Environment FOR You 2021

ASPIRE IAS
The Name Associated with Excellence

GOOD MORNING TIMES

Environment

(APRIL -2021)

Environment FOR You 2021

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

April -2020

1) SUSTAINABLE FOOD SYSTEMS

Why in news?

India held the first National Dialogue on agri-food systems (at Delhi) for exploring national pathways towards creating sustainable and equitable food systems.

• The dialogue was conducted as consultative processes precursor to first ever UN Food Systems Summit to be held in September 2021 to strategize the actions for change in global Agri-food systems.

• The Summit will focus on pathways to shape food systems nationally and globally to accelerate progress in the Sustainable Development Goals 2030.

• The Summit is planned to be participatory and consultative for 5 Action Tracks:
o Action Track 1: Ensure safe and nutritious food for all
o Action Track 2: Shift to sustainable consumption patterns
o Action Track 3: Boost nature-positive production
o Action Track 4: Advance Equitable Livelihoods
o Action Track 5: Build resilience to vulnerabilities to shock and stress

• India has volunteered to the Action Track 4: Advance Equitable Livelihoods for the Summit.

About Sustainable Food Systems

• Food systems encompass the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution,

consumption and disposal of food products that originate from agriculture, forestry or fisheries.

o It also involves economic, societal and natural environments in which they are embedded.

• Food system is composed of sub-systems (e.g., farming system, waste management system, input supply system, etc.) and interacts with other key systems (e.g., energy system, trade system, health system, etc.)

International efforts on Sustainable Food Systems

• FAO-UNEP Sustainable Food Systems Programme (SFSP) o It was started in 2011 with support from Government of Switzerland.

o Its objective is to :

- ✓ Spearhead efforts to improve resource use efficiency.
- ✓ Reduce the pollution intensity of food systems from production to consumption.
- ✓ Address issues of food and nutrition security.

• Food and Land Use Coalition (FOLU)

o It is a self-governing coalition composed of over 30 organizations established to transform the global food and land use systems.

o It was established in 2017 at United Nations General Assembly

• A structural change in the food system can originate from a change in another system; for example, a policy promoting more biofuels will have a significant impact on the food system.

• A sustainable food system (SFS) is a food system that delivers food security and nutrition for all in such a way that: o It is profitable throughout (economic sustainability)

o It has broad-based benefits for society (social sustainability)

o It has a positive or neutral impact on the environment (environmental sustainability)

o Need of future generations are not compromised.

Challenges for Sustainable Food Systems in India

• Scarcity of Land: Scarcity of land combined with poverty and inability to take risks, lack of access to credit and inputs and poor market access, severely limit the sustainability of food and agriculture systems.

• Low productivity of agriculture: Capital formation in the agriculture sector is low (15-19% of GDP) in comparison with other sectors (approx. 40% of GDP).

• Green House Gas Emissions from agriculture: Majority of agricultural GHG emissions occur at the primary production stage and are generated through the production and use of agricultural inputs - water, fertilisers, and pesticides.

• Stubble Burning: Burning of crop residue causes damage to micro-organisms present in the upper layer of the soil as well as its organic quality. It also contributes to environmental pollution.

• Low water use efficiency: The overall irrigation project efficiency in developed countries is 50 – 60% as compared to only 38% in India.

• Outdated legacy incentives and policy support o Subsidies on irrigation water and power have led to overexploitation of groundwater. o Fertiliser subsidies, particularly urea, have led to imbalanced application of nutrients in the crop cycle, besides degrading the soil.

o Policy biased in favour of rice and wheat, at the opportunity cost of many nutritious and climateresilient crops.

India's initiatives in the direction of Sustainable Food Systems

• National Mission for Sustainable Agriculture (NMSA) aims at making agriculture more productive, sustainable, remunerative and climate resilient by:

o It was included as one of the 8 missions under National Action Plan on Climate Change in 2008 and operationalized from 2014-15.

• Pradhan Mantri Krishi Sinchayi Yojana (PMKSY) aims to Introduce sustainable water conservation practices, among others.

• Paramparagat Krishi Vikas Yojana which

aims promotion of commercial organic production through certified organic farming.

Way forward

- Sustainable farming practices: A crop management system that promotes the use of organic manures, bio-fertilizers and bio-pesticides and judicious use of agrochemicals.
- Effective implementation of land use policy measures: Revisiting the legislation on the ceiling on land holdings, tenancy etc. from the perspective of livelihood and sustainable food and nutrition security is necessary.
- Adoption of modern irrigation methods: Promotion of water efficient technologiessuch as sprinkler and drip irrigation can increase the efficiency of surface water use in agriculture.
- Crop diversification: To tackle the twin challenges of climate change and malnutrition, diversifying existing cropping systems to more nutritious and environment-friendly crops is need of the hour.
- Adoption of technology: E.g., Turbo Happy Seeder (THS) machine can uproot the stubble and also sow seeds in the area cleared. The stubble can then be used as mulch for the field.
- Research and Innovation: It will play a key role in achieving the goal of sustainable and nutritious food systems by development of suitable crop varieties with desired traits like yield, climate-resilience and nutritional qualities.
- Consumer Behaviour: For crop diversification to succeed, healthy and diversified diets need to be incorporated and promoted in the menu of Indian consumer. Post-COVID-19, this positive trend for healthier foods is expected to further rise.

2) SECOND WORLD OCEAN ASSESSMENT

Environment FOR You 2021

United Nation released the Second World Ocean Assessment.

About the World Ocean Assessment

• Concerned by the declining state of the ocean the United Nations General Assembly, established the regular process for global rporting and assessment of the state of the marine environment.

• The first World Ocean Assessment was completed in 2015.

o It concluded that many parts of the ocean had been seriously degraded which may produce a destructive cycle of degradation.

• The second World Ocean Assessment provides an update to the first Assessment.

Key Findings

• Key Drivers: Drivers that have the greatest influence on the marine environment and its sustainability are:

o Population growth and demographic changes: The extent to which an increasing global population places pressure on the marine environment varies, depending on a range of factors, including where and how people live, their consumption patterns and technologies used to produce energy, food and materials, provide transport and manage waste.

o Economic activity: As the global population has grown, demand for goods and services has increased, with associated increases in energy consumption and resource use.

o Technological advances: Innovations have enabled outcomes for the marine environment that are both positive (such as increasing efficiencies in energy generation) and negative (such as overcapacity in fisheries).

o Changing governance structures and geopolitical instability: Improved methods of cooperation and implementation of effective policies across some regions have contributed to reducing some pressures on the ocean.

o Climate change: Anthropogenic greenhouse gas emissions have continued to rise, causing further longterm climate changes, with widespread effects throughout the ocean that will persist for centuries and affect the ocean.

• **Trends in the physical and chemical state of the ocean**: The assessment discusses key trends in marine environment such as:

o Decrease in dissolved oxygen concentrations for most ocean regions mostly due to temperature-driven solubility decrease.

o Expansion of oxygen-depleted zones.

o Total sea ice extent has been declining rapidly in the Arctic, but trends are insignificant in the Antarctic.

o Global warming is affecting many circulation systems: The impacts of ocean circulation changes include a regional rise in sea levels, changes in the nutrient distribution and carbon uptake of the ocean and feedbacks with the atmosphere, such as altering the distribution of precipitation.

o Marked pattern of salinity changes: with surface and subsurface patterns providing clear evidence of a water cycle amplification over the ocean.

o Rise in sea levels: Thermal expansion from a warming ocean and land ice melt are the main causes of the accelerating global rise in the mean sea level.

o Ocean acidification: An increase in atmospheric CO2 levels, and a subsequent increase in carbon in the oceans, has changed the chemistry of the oceans to include changes to pH (acidification) and aragonite saturation.

- ✓ Aragonite is a form of calcium carbonate that many marine animals use to build their skeletons and shells.

o Increases in ocean heat content are observed practically throughout the global ocean.

• **Suggestions for sustainable use of ocean**:

o Holistic management of ocean resources: through eased capacity in trans boundary cooperation, the strengthening of science-policy capacity, greater coordination between social and natural sciences and between science and civil society, including industry, and the recognition of traditional knowledge, culture and social history.

o Integration of multidisciplinary observation systems: for improved monitoring of significant changes in physical and biogeochemical environments and their impacts

on ecosystems and society and to gain a much better understanding of the effects of pollutants, including anthropogenic noise, on the marine environment.

o Efficient management and governance of marine areas: Several key capacity-building and technology transfer requirements in this field include

- ✓ Training and expertise in marine management and governance linked to the relevant science.
- ✓ Learning within and between nations and regions (i.e., knowledge and technology transfer).

o Reduce the input of pollutants into the ocean: in particular through the introduction of cleaner production, quieter technologies and cheaper and readily deployable wastewater-processing technologies.

Regional and international cooperation and improved implementation of international law: as reflected in the United Nations Convention on the Law of the Sea to safeguard ocean benefits.

o Adoptiong ecosystem appoach: The implementation of the 2030 Agenda for Sustainable Development requires management grounded in the ecosystem approach in order to achieve the integrated set of global priorities and objectives set out in the Sustainable Development Goals.

- ✓ The ecosystem approach is one of the most significant approaches to ocean management, consisting of the environmental, social and economic management of human interactions with oceans and coasts at multiple levels (transboundary, regional, national and local).

Blue Nature Alliance

• It is a global partnership founded and led by five core partners: Conservation International, The Pew Charitable Trusts, The Global Environment Facility, Minderoo Foundation, and the Rob & Melani Walton Foundation.

• Their aim is to advance Ocean Conservation Areas, inclusive of Marine Protected Areas, Other Effective Area-based Conservation Measures, Indigenous Protected Areas, and other innovative place-based interventions designed to achieve biodiversity conservation outcomes.

• The alliance is working on large-scale efforts in Fiji's Lau Seascape, Antarctica's Southern Ocean and the Tristan da Cunha island group to collectively secure protections over 4.8 million square kilometers of the ocean.

3) MARINE LITTER

Countries from across the oceans decided to tackle marine plastic litter under the ambitious global project called 'GloLitter Partnerships Project'.

About Marine Litter

• Marine litter is any persistent, manufactured or processed solid material discarded into the sea or rivers or on beaches or brought indirectly to the sea with rivers, sewage, storm water or winds. It is a form of marine pollution.

• At least 8 million tons of plastic end up in our oceans every year, and make up 80% of all marine debris from surface waters to deep-sea sediments.

o A plastic bottle can last up to 450 years in the marine environment.

• Recent research has suggested that the amount of discarded plastics will outweigh the amount of fish in our oceans by 2050.

Causes of Marine Litter

• Land-based pollutants: 80% of marine pollution originates on land. Main sources of marine plastic are urban and storm runoff, sewer overflows, tourism and recreational use of the coasts, industrial activities etc.

• Consumerism and urbanisation: Rapid urbanisation along the world's coastlines has seen the growth of coastal 'megacities' (cities with a population of 10 million or more).

o According to IUCN, over 300 million tons of plastic are produced every year, half of which is used to design single-use items such as shopping bags, cups etc

• Microplastics: Under the influence of solar UV radiation, wind, currents and other natural factors, plastic fragments into small particles, termed microplastics (particles smaller than 5 mm) or nanoplastics (particles smaller than 100 nm).

• Other factors include:

o Sea based sources like abandoned, lost or discarded fishing gear, shipping activities and ocean mining.

o Shortage of financial resources and poor practices in managing solid wastes,

o Insufficient understanding among the public of the potential consequences of its actions,

o Inadequate legal and enforcement systems.

GloLitter Partnerships Project

• The Project is implemented by the International Maritime Organization (IMO) and the Food and Agriculture Organization of the United Nations (FAO), with initial funding from the Government of Norway via the Norwegian Agency for Development Cooperation (Norad).

• The project aims to help the maritime transport and fishing sectors move towards a low-plastics future.

• To achieve this goal, this initiative will assist developing countries to apply best practices for prevention, reduction and control of marine plastic litter from those sectors.

• Food and Agricultural Organization is a specialized agency of United Nations that leads international efforts to defeat hunger. Headquartered in Rome, Italy.

• International Maritime Organization is United Nations

specialized agency with responsibility for the safety and security of shipping and the prevention of marine and atmospheric pollution by ships.

Other forms of Marine Pollution

• Chemical pollution: Chemical pollution is the introduction of harmful contaminants. Common man-made pollutants that reach the ocean include pesticides, herbicides, fertilizers, detergents, oil, industrial chemicals, and sewage. Crude oil lasts for years in the ocean and is difficult to clean up

• Light pollution: Light pollution penetrates under the water, creating a vastly different world for species near urban environments. Light disrupts the normal cues associated with circadian rhythms.

• Noise pollution: The increased presence of loud or persistent sounds from ships, sonar devices, and oil rigs disrupts natural noises in the marine environment. Unnatural noises interrupt communication (whales use echolocation), disrupting migration, hunting, and reproduction patterns for many marine animals.

Effects of Marine Litter

On marine environment	On food and health	Economic loss
• Death of marine	• Fish and other	• Coastal communities

species due to ingestion, suffocation and entanglement of marine species. o An estimated one million sea birds die each year due to plastic debris clogging their digestive tracts • Floating plastics contribute to the spread of invasive marine organisms and bacteria, causing loss of biodiversity. • Excessive nutrients (from Agri runoff) trigger massive blooms of algae that rob the water of oxygen, creating dead zones. o Dead zones are the areas which can no longer sustain life because they have low or zero oxygen. There are now around 500 of these dead zones around the world. • Plastic litter can become concentrated in certain areas called gyres as a result of oceanic currents. E.g., North Pacific Gyre,	marine life ingest microplastics which in turn can find their way into the human food chain through biomagnification and bioaccumulation. o Bioaccumulation is the accumulation over time of a substance and especially a contaminant in a living organism. o Biomagnification the process by which a compound (such as a pollutant) increases its concentration in the tissues of organisms as it travels up the food chain.	are facing increased expenditure on beach cleaning, public health and waste disposal. • Plastic strewn beaches, garbage filled waters and sea devoid of marine life adversely affects tourism industry. • The shipping industry is impacted by higher costs associated with fouled propellers, removing litter and managing waste in harbours. • The fishing industry faces reduced and lost catch, damaged nets and other fishing gear, which also affects coastal aquaculture

known as the Great Pacific Garbage Patch.		

Global initiatives to reduce marine litter

• **London Convention/Protocol (1972 Convention on the Prevention of Marine Pollution by Dumping Wastes and Other Matter)** is one of the first global conventions to protect the marine environment from human activities.

o London protocol to the convention entered into force in 2006.

o It regulates the dumping of wastes from ships, permitting only certain types of non-harmful waste to be dumped.

• **MARPOL: IMO's International Convention for the Prevention of Pollution from Ships (MARPOL)** has regulations on prevention of pollution by garbage, which prohibits the discharge of plastics (including fishing gear) into the sea from ships.

• **The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA):** It is a unique intergovernmental mechanism to counter the issue of land-based pollution.

• **GPML (The Global Partnership on Marine Litter):** GPML was launched at the United Nations Conference on Sustainable Development (Rio+20) in June 2012. It seeks to address the global problem of marine litter by:

o Providing a mechanism for cooperation and coordination;

o Harnessing the expertise, resources and enthusiasm of all stakeholders.

o Making a significant contribution to the achievement of the 2030 Agenda, in particular **SDG 14.1** (By 2025, prevent and significantly reduce marine pollution of all kinds, particularly from land-based activities, including marine debris and nutrient pollution).

4) NAGOYA PROTOCOL ON ACCESS AND BENEFIT-SHARING (ABS)

Recently, Brazil became the 130th country to ratify the Nagoya Protocol.

Nagoya Protocol on ABS

• It was adopted on 29 October 2010 in Nagoya, Japan as a supplementary agreement to the Convention on Biological Diversity.

• It entered into force on 12 October 2014, 90 days after the deposit of the fiftieth instrument of ratification.
• Objective: Fair and equitable sharing of benefits arising from the utilization of genetic resources, thereby contributing to the conservation and sustainable use of biodiversity.
o Utilization includes research and development on the genetic or biochemical composition of genetic resources, as well as subsequent applications and commercialization.
• The Nagoya Protocol applies to genetic resources as well as traditional knowledge (TK) associated with genetic resources that are covered by the CBD and the benefits arising from its utilization.
• 3 Core obligations for its contracting Parties: Access obligations, Benefitsharing obligations, Compliance obligations
• Tools and mechanisms to assist implementation o Establishing national focal points (NFPs) and competent national authorities (CNAs) to serve as contact points for information, grant access or cooperate on issues of compliance
o Access and Benefit-sharing Clearing-House: It is a web based platform to share information to support the implementation of the Nagoya Protocol.
o Capacity-building to support key aspects of implementation. Based on a country's selfo Targeted financial support for capacity-building and development initiatives through the Nagoya rotocol's financial mechanism, the Global Environment Facility [EF).
o Awareness-raising, Technology Transfer

About the UN Convention on Biological Diversity (CBD)

• The CBD provides a global legal framework for action on biodiversity. The CBD entered into force on 29 December 1993.
• It's a near universal convention with a participation of 196 member countries.
• Conference of the Parties (COP) is the governing body of the CBD. It meets every two years, or as needed, to review progress in the implementation of the Convention, to adopt programmes of work, to achieve its objectives, and provide policy guidance.
• Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA) assists the COP. It is made up of government representatives with expertise in

relevant fields, as well as observers from non-Party governments, the scientific community, and other relevant organizations.

• The Secretariat of the CBD (SCBD) is based in Montreal, Canada. Its main function is to assist governments in the implementation of the CBD and its programmes of work, to organize meetings, draft documents, and coordinate with other international organizations and collect and spread information.

• Global Biodiversity Outlook (GBO) is the flagship publication of the CBD.

• India and CBD o India being a signatory to CBD, enacted the Biodiversity Act in 2002. It has same objectives as that of CBD

o The Act has a 3 tier institutional Structure (refer to the infographics) for facilitating its implementation.

5) NATIONAL CLIMATE VULNERABILITY ASSESSMENT REPORT

Recently, Department of Science and Technology (DST) has released the report titled 'Climate Vulnerability Assessment for Adaptation Planning in India Using a Common Framework'.

About the report

• The report aims to carry out a current-climate state-level and district-level vulnerability assessment for India and also building the capacity of states to carry out vulnerability assessments using a common methodological framework.

Based on an all-India assessment, this report identifies the most vulnerable states and districts in India with respect to current climate risk and the main drivers of vulnerability using a Vulnerability Index (VI).

- ✓ The assessment is based on a set of common indicators and common methodology. States also carried out district-level vulnerability assessments individually.

• It is essential for prioritising investment in climate adaptation.

• It involves active participation of States and Union Territory governments based on capacity building exercises which will help policymakers in initiating appropriate climate actions.

• It is part of two national missions of the National Action Plan on Climate Change (NAPCC).

o National Mission for Sustaining the Himalayan Ecosystem (NMSHE)- It aims to prevent melting of the Himalayan glaciers and to protect biodiversity in the Himalayan region.

o National Mission on Strategic Knowledge for Climate Change (NMSKCC)- It builds a dynamic and vibrant knowledge system that informs and supports national policy and action for responding effectively to climate change challenges, while not compromising on the nation's growth goals.

• The risk assessment framework is based on the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, i.e., IPCC-AR5 (IPCC, 2014) which defines the risk of climate change at the intersection of 'Hazard', 'Exposure' and 'Vulnerability'.

Global Climate risk Index

• It is released by Germany-based think tank Germanwatch.

• It indicates a level of exposure and vulnerability to extreme events, which countries should understand as warnings in order to be prepared for more frequent and/or more severe events in the future. In the CRI 2021, data from 180 countries were analysed.

• India has improved its ranking from 5th in CRI 2020 to 7th in CRI 2021.

NAPCC

• In 2008, India announced NAPCC that includes eight ambitious goals set for the country to tackle climate change.

IPCC

• It is created by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) in 1988.

• It has currently 195 members.

• It provides regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.

Key indicators of the assessment (14)

Socio-economic and	Agricultural	Biophysical	Institution and Infrastructure	Health

livelihood				
1. Percentage Below Poverty Line Population 2. Share of income from natural resources. 3. Women participation in the workforce.	4. Share of horticulture in agriculture. 5. Share of marginal and small landholdings. 6. Yield variability of food grain. 7. Area under crop insurance. 8. Area under rainfed agriculture.	9. Lack of forest area per 1,000 rural population.	10. Implementation of MGNREGA. 11. Road and rail connectivity.	12. Density of health care workers 13. Vector borne diseases 14. Water borne diseases

Key findings of the report:

• State-level vulnerability indices: These indices vary over a small range of 0.42- 0.67 which means all states must deal with concerns related to vulnerability.

• District-level vulnerability indices: These indices also vary within a small range of 0.34 - 0.75. o Assam, Bihar, and Jharkhand have over 60% districts in the category of highly vulnerable districts.

• Vulnerability indices (VI): These indices are relative measures which mean that all districts or states are vulnerable, but some are relatively more vulnerable than others, requiring prioritised adaptation interventions.

Application of the vulnerability assessment:

• Ranking and identification: It can assist in ranking and identification of the most vulnerable districts and states and help states prioritise adaptation planning and investments.
• Funding mechanism: It is critical for developing adaptation projects for the Green Climate Fund, Adaptation Fund, and funds from multilateral and bilateral agencies.
• Catalyst for INDC target: It will facilitate India's Nationally Determined Contributions (INDC) under Paris Agreement, which aims to adapt better to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, health sector and regions such as Himalayan region, coastal regions, etc. o It may also aid to plan disaster management.
o It contributes in the assessment of climate change impacts and vulnerability, the formulation, monitoring and evaluation of a National Adaptation Plan, and the development and implementation of resilience of socio-economic and ecological systems.
• Evidence based policy making: The vulnerability assessments carried out by the states can supplement revised State Action Plan on Climate Change, as per the outline provided by the Ministry of Environment, Forest and Climate Change (MoEFCC).

6) STATE OF THE GLOBAL CLIMATE 2020

Recently, World Meteorological Organization (WMO) released its annual report 'State of the Global Climate, 2020'.

About the report

• The WMO issued the first state of the climate report in 1993. The report was initiated due to the concerns raised at that time about projected climate change.
• In the recent report all key climate indicators and impact information provided show relentless, continuing climate change, an increasing occurrence and intensification of high-impact events and severe losses and damages affecting people, societies and economies.

• **Key findings**

o The past six years, including 2020, have been the six warmest years on record. Temperatures reached 38.0 °C at Verkhoyansk, Russia, the highest recorded temperature anywhere north of the Arctic Circle.

o The report provides five key indicators of irreversible changes in the global climate-

Indicators	**Findings**
Greenhouse Gases	Notwithstanding the economic slowdown due to the COVID-19 pandemic, emission of major greenhouse gases increased in 2019 and 2020. More to it, the level of greenhouse gas emission will be higher in 2021.
Oceans	In 2020 the oceans had the highest heat content on record. Over 80% of the ocean area experienced at least one marine heat wave in 2020.
Sea-level rise	Since 1993 sea-level has been rising. However, there was a blip in summer of 2020 that recorded a drop in sea level. It is due to the La Niña induced cooling. "Sea level has recently been rising at a higher rate partly due to the increased melting of the ice sheets in Greenland and Antarctica."
The Arctic	In 2020, the Arctic sea-ice extent came down to second lowest on record.
The Antarctica	The Antarctic ice sheet has

	exhibited a strong mass loss trend since the late 1990s. This trend accelerated around 2005. Currently, Antarctica loses approximately 175 to 225 Gt per year, due to the increasing flow rates of major glaciers in West Antarctica and the Antarctic Peninsula.

About World Meteorological Organization (WMO)

• Established in 1950, the WMO became a specialized agency of the United Nations in 1951. • It is headquartered at Geneva, Switzerland.

• Its mandate is in the areas of meteorology (weather and climate), operational hydrology and related geophysical sciences.

• WMO has 187 Member States (including India) and 6 Member Territories.

• It has 6 regional associations are responsible for the coordination of meteorological, hydrological and related activities within their respective Regions: o Africa, o Asia o South America o North America, Central America and the Caribbean o South-West Pacific o Europe

7. NEW EMISSION NORMS FOR COAL-FIRED POWER PLANTS

The Ministry of Environment, Forests, and Climate Change (MoEFCC) had pushed the deadline for thermal power plant (TPP) by upto three years for complying emission norms in the country.

Background

• In 2015, MoEFCC notified environmental norms for particulate matter, sulphur oxides, nitrogen oxides and mercury and water use for coal based TPPs.

• Initially, India had set a 2017 deadline for thermal power plants to install flue gas desulphurisation units that cut emissions of sulphur dioxides. But this was postponed to varying deadlines for different regions, ending in 2022.

• The deadline was pushed to December 2022 for all power stations in the country in view of implementation issues and challenges.

Need of new guidelines

• Coal- based power is a resource-intensive and polluting industry and contributes to air pollution.

o Major pollutants from coal-fired power plants are oxides of nitrogen (NOx), sulphur dioxide (SO2) and particulate matter (PM).

• According to Centre for Science and Environment (CSE), TPPs account for more than 60 percent of total industrial emissions of particulate matter, 45 percent of SO2, 30 percent of NOx, and more than 80 percent of mercury in the country.

o These are also responsible for 70 percent of the total freshwater withdrawal by all industries.

• The emission from TPPs causes lung diseases, acid rain and smog.

• Till 2015, power plants in India were required to meet only the PM emission norms which was less stringent than similar norms in China, the US and Europe. There were no national regulationsfor SO2, NOx and mercury emissions from power plants.

Flue Gas Desulphurisation (FGD)

• It is a set of technology used to remove sulfur dioxide (SO2) from exhaust flue gases generated in furnaces, boilers, and other processes due to thermal processing, treatment, and combustion.

• It involves wet scrubbing or dry scrubbing. Wet scrubbing is most common.

• It is highly reliable, and energy and utility savings.

Central Pollution Control Board (CPCB)

• It is a statutory organisation which was constituted in 1974 under the Water (Prevention and Control of Pollution) Act, 1974.

• It was entrusted with the powers and functions under the Air (Prevention and Control of Pollution) Act, 1981.

• It serves as a field formation and also provides technical services to the Ministry of Environment and Forests of the provisions of the

Environment (Protection) Act, 1986.

Key Highlights of new guidelines

• Creation of task force: A task force will be constituted by the Central Pollution Control Board (CPCB) to categorise thermal power plants (TPPs) in three categories on the basis of their location to comply with the emission norms within the different time limit.
o Category A: TPP within 10 kilometres of the National Capital Region (NCR) and in cities with more than 10 lakh population to comply with new emission norms by the end of 2022.
o Category B: In non-attainment cities (those cities which are not meeting National Ambient Air Quality Standards) and those within 10 kilometres of critically polluted areas have to meet the norms by December 31, 2023.
o Category C: Coal-fired power plants in the rest of the areas have to comply with the new standards by December 31, 2024.
• Exemption on ground of retirement: TPPs declared to retire before December 31, 2025 are not required to meet the specified norms in case such plants submit an undertaking to the CPCB and the CEA (Central Electricity Authority) for exemption on ground of retirement.
• Penalty provisions: In case of non-compliance, a penalty of up to 0.20 rupees per unit will be levied for electricity generated for continuing the operations beyond the deadlines. Issues in implementation of guidelines
• Weak penalty regime: Since the penalty is generation-based, the fine for a smaller capacity non-complying plant operating at a lesser load (generally old plants) also reduces considerably.
• Compensation designed to favour polluters: Instead of investing in costlier technologies such as flue-gas desulfurization, which comes at a cost of 45 lakh / MW, it would then be much easier for plants, especially in Category C, to pay a penalty as low as Rs 5 lakh / MW, thereby favouring polluters.
• Exemption to old plants: A new category for retiring plants has been created in the current amendment without specifying which these plants are. It highly favours old, inefficient polluting plants that are scheduled to retire by 2025.

• Delay in implementation: The new extension means about 72 percent of the coal-based capacity will now continue to pollute for another two-three years given the extension.

7) GLOBAL ENERGY REVIEW 2021

Recently, International Energy Agency (IEA) released the annual Global Energy Review which assesses the direction of energy demand and carbon dioxide emissions that are taking in 2021.

About IEA

• The IEA is an autonomous intergovernmental organisation within the OECD framework, headed by its Executive Director.

• The Governing Board is the main decision-making body of the IEA. It is composed of energy ministers or their senior representatives from each Member country.

• It was created in 1974 to help co-ordinate a collective response to major disruptions in the supply of oil.

• It mainly focuses on its energy policies which include economic development, energy security and environmental protection. These policies are also known as the 3 E'S of IEA.

• It advocates policies that will enhance the reliability, affordability and sustainability of energy.

• A candidate country to the IEA must be a member country of the OECD. In addition, it must demonstrate several requirements.

These are: o Crude oil and/or product reserves equivalent to 90 days of the previous year's net imports

o A demand restraint programme to reduce national oil consumption by up to 10%;

o Legislation and organisation to operate the Co-ordinated Emergency Response Measures (CERM) on a national basis;

o Legislation and measures to ensure that all oil companies under its jurisdiction report information upon request;

o Measures in place to ensure the capability of contributing its share of an IEA collective action.

• India became an associate member of IEA in 2017.

Key Findings:

Economic impacts of Covid-19	The Covid-19 pandemic continues to impact global energy demand. Global economic output is expected to rebound by 6% in 2021, pushing the global GDP more than 2% higher than 2019 levels. • Global energy demand is set to increase by 4.6% in 2021, surpassing pre-Covid-19 levels. o Global oil demand was more than 20% below pre-crisis levels. Overall, oil demand was down by almost 9%. o Coal demand dropped by 4%. The largest declines in coal use for electricity generation were in advanced economies is down by 15% which accounts for more than half of coal's global decline. o Renewables usage grew by 3% in 2020, largely due to an increase in electricity generation from solar PV and wind energy.
Oil	• Sluggish demand for transport oil is mitigating the rebound in emissions. Despite an expected annual increase of 6.2% in 2021, global oil demand is set to remain around 3% below 2019 levels as the aviation sector remains under pressure. o A full return to pre-crisis oil

	demand levels would have pushed up CO2 emissions a further 1.5%.
Coal	Global coal demand in 2021 is set to exceed 2019 levels and approach its 2014 peak. Coal demand is on course to rise 4.5% in 2021, with more than 80% of the growth concentrated in Asia, led by China. o China alone is projected to account for over 50% of global growth. o The power sector accounted for only 50% of the drop in coal-related emissions in 2020. But the rapid increase in coalfired generation in Asia means the power sector is expected to account for 80% of the rebound in 2021.
Natural Gas	• Among fossil fuels, natural gas is on course for the biggest rise relative to 2019 levels. • Natural gas demand is set to grow by 3.2% in 2021, propelled by increasing demand in Asia, the Middle East and Russia. This is expected to put 50 IAS global demand more than 1% above 2019 levels. o Nearly three-quarters of the global demand growth in 2021 is from the industry and buildings sectors, while electricity generation from natural gas remains below 2019 levels.
Renewables	• Renewables remain the success story of the Covid-19 era. Demand

	for renewables grew by 3% in 2020 and is set to increase across all key sectors like power, heating, industry and transport in 2021. • Renewable electricity generation in 2021 is set to expand by more than 8%, to reach 8300 TWh (terawatt hour), the largest year-on-year growth on record in absolute terms. • Renewables are set to provide 30% of electricity generation worldwide in 2021, their biggest share of the power mix since the beginning of the Industrial Revolution and up from less than 27% in 2019. • Renewables provide more than half of the increase in global electricity supply in 2021, with Solar PV and wind expected to contribute two-thirds of renewables' growth. o China is likely to account for almost half the global increase in renewable electricity generation, followed by US, EU and India.
Electricity	• Electricity demand is heading for its fastest growth in more than 10 years. • Electricity demand is due to increase by 4.5% in 2021. This is almost five times greater than the decline in 2020, cementing electricity's share in final energy demand above 20%. o Almost 80% of the projected

	increase in demand in 2021 is in emerging market and developing economies with China alone accounting for half of global growth. o Demand in advanced economies remains below 2019 levels.
Nuclear	• Nuclear power rebounds and increases 2% in 2021, reversing only half of the decline in output that took place in 2020. • Nuclear remains the largest single source of low-carbon generation in advanced economies. o Electricity generation from nuclear reactors decreased by around 4% – the largest decline since the aftermath of the Fukushima accident in 2011. Major reductions took place in the EU (-11%), Japan (-33%) and the US (-2%).

8) INDIAN RHINO VISION 2020

The Indian Rhino Vision 2020 (IRV 2020) has officially come to a close with the translocation of two rhinos to Manas National Park from Pobitora Wildlife Sanctuary in Assam, India.

Indian Rhino Vision 2020 (IRV 2020)

• It was eighth round of rhino translocation under IRV 2020.
• It was designed by Rhino Task Force 2005 with a target to achieve rhino population to 3,000 by 2020 in seven protected areas in Assam.

o These areas include Kaziranga national park, Pobitora national park, Orang national park, Manas national park, Laokhowa wildlife sanctuary, Burachapori wildlife sanctuary and Dibru Saikhowa wildlife sanctuary.

• It also aims to reduce the risk to the rhino population, mainly from poachers by spreading the population in multiple parks with enough habitats to encourage population growth.

• It was a joint programme of the Assam Forest Department, Worldwide Fund for Nature India (WWF-India), Bodoland Territorial Council, International Rhino Foundation (IRF) and US Fish & Wildlife Service. The program was implemented with the help of the forest department, College of Veterinary Sciences, WWF India, IRF, WTI, Aaranyak (wildlife NGO in Guwahati) and others.

• The translocated rhinos helped Manas National Park get back its World Heritage Site status in 2011. Success of IRV 2020

• Indian rhino numbers have increased from about 2,575 to more than 3,550 - a 38% increase in 9 years. o According to WWF- India data in 2012, more than 91 percent of Assam's rhinos and about 80 percent of India's rhinos count are concentrated within Kaziranga national park, with a few in Pobitora wildlife sanctuary.

• IRV 2020 is helping to re-populate those areas where the habitat is still suitable by translocating animals from other rhino protected areas, such as Pobitora and Kaziranga National Parks.

o Manas, which did not have even a single rhino 10 years ago, has now become home to 20 rhinos.

• It helped to reduce the death of the rhinos from poaching and sickness.

• It helped to move the IUCN status of Indian rhino from endangered (since 1986) to vulnerable in 2008.

Other Conservation efforts for Rhinos

• National Rhino Conservation Strategy: It is launched by the Ministry for Environment, Forest and Climate Change (MoEFCC) in 2019 on the occasion of World Rhino Day to conserve the greater one-horned rhinoceros.

o It aims to work for the conservation of the species under five objectives which includes strengthening protection, expanding the distribution range, research and monitoring, and adequate and sustained funding.

o The conservation initiative for rhino has also enriched the grassland management which helps in reducing the negative impacts of climate change through carbon sequestration.
o It calls for active engagement between India and Nepal to protect the species.
o As per the strategy, the single population of rhinos in Sukla-Phanta (Nepal), Valmiki Tiger Reserve (India) and Chitwan National Park (Nepal) and Dudhwa (India) is separated by the political boundary between the two countries.

• New Delhi Declaration on Asian Rhinos 2019: India collaborates with Bhutan, Nepal, Indonesia and Malaysia to increase the population of three species of Asian rhinos, including the Greater one-horned rhinoceros found in the Indian sub-continent.
o It includes studies on health issues of the rhinos, their potential diseases and taking necessary steps.
o It also aims at collaborating and strengthening wildlife forensics for the purpose of investigation and strengthening of trans-boundary collaboration among India, Nepal and Bhutan for the conservation and protection of the Greater one-horned rhino.

9) EARTHQUAKE MANAGEMENT

A massive earthquake of 6.4 magnitude on the Richter scale hit Assam recently.

About Earthquake

• An earthquake is a series of vibrations on the earth's surface caused by the generation of elastic (seismic) waves due to sudden rupture within the earth crust during release of accumulated strain energy.
• India has seen some very damaging earthquakes like Koyna (1967), Assam (1988) Latur (1993) and Bhuj (2001) earthquakes.
• As per Earthquake Disaster Risk index (EDRI) report (2019), in the last 25 years, India has witnessed several moderate earthquakes that caused around 40,000 deaths, largely due to collapse of buildings.
• The occurrence of several devastating earthquakes in areas hitherto considered safe from earthquakes indicated that the built environment in the country is

extremely fragile and our ability to effectively respond to earthquakes is inadequate.
Earthquake Management in India

• Seismic code: The first seismic code was developed and implemented after the 1935 Quetta earthquake for reconstruction in Baluchistan (now in Pakistan).

o First national seismic code was developed in 1962. However, effective implementation of the building codes remains a major challenge.

• Earthquake Engineering: The institutionalization of earthquake engineering in the country started in the late 1950s.

o National Information Centre of Earthquake Engineering (NICEE) undertakes various capacity-building activities by publishing and disseminating information, and by increasing awareness among students and professionals through conferences and workshops.

o During 2003–2007, a comprehensive National Programme on Earthquake Engineering Education (NPEEE) was implemented.

• NDMA Guidelines (2007): National Disaster Management Authority (NDMA) guidelines suggest following six Pillars for Earthquake Management in India.

International Collaboration:

o To fulfil the Sustainable Development Goal-9 that focuses on building resilient infrastructure, India announced the launch of Coalition for Disaster Resilient Infrastructure (CDRI) at the Climate Action Summit in 2019.

- ✓ CDRI is a multi-country, multi-stakeholder Coalition aims to promote knowledge exchange and provide technical support to countries on implementing disaster resilient infrastructure.

o India also works closely with the United Nations International Strategy for Disaster Reduction (ISDR).

- ✓ ISDR is a global framework for the promotion of action to reduce social vulnerability and risks of natural hazards and related technological and environmental disasters.

Earthquake Measurements: Magnitude vs Intensity

• Magnitude measures the energy released at the source of the earthquake. It is measured using Richter scale.

Classification of earthquakes

Category	Magnitude on Richter Scale
Slight	Upto 4.9
Moderate	5.0 to 6.9
Great	7.0 to 7.9
Very Great	8.0 and more

Intensity measures the strength of shaking produced by the earthquake at a certain location.

o It is measured using Mercalli Scale which is composed of increasing levels of intensity that range from observable quake impacts from light shaking to catastrophic destruction.

o Intensity is reported by Roman numerals from I to X with a progressive increase in shaking and damage, highest being at X.

Critical areas of concern for the management of Earthquake in India

• Lack of awareness among various stakeholders about the seismic risk;

• Inadequate attention to structural mitigation measures in the engineering education syllabus;

• Inadequate monitoring and enforcement of earthquake-resistant building codes and town planning bye-laws;

• Absence of systems of licensing of engineers and masons.

• Absence of earthquake-resistant features in non-engineered construction.

• Lack of formal training among professionals in earthquake-resistant construction practices;

• Lack of adequate preparedness and response capacity among various

stakeholder groups.

NDMA

• Disaster Management Act, 2005 envisaged the creation of National Disaster Management Authority (NDMA), headed by the Prime Minister as the apex body for Disaster Management in India.

• It is mandated to lay down the policies, plans and guidelines for Disaster Management to ensure timely and effective response to disasters.

10) Cloudbursts

Recently 'cloudbursts' were observed in Uttarakhand's Chamoli, Tehri and Rudraprayag districts.

What is Cloudburst?

• Cloudbursts are sudden and extreme rainfall events over a limited area in a short span of time.

• The India Meteorological Department (IMD) defines a cloudburst as any event where 100 millimetres of rainfall have fallen in a span of an hour over a region that is 20-30 square kilometres in area.

• It is very difficult to predict the cloud bursts due to its very small scale in space and time.

• It is generally more common in India during the south west monsoon season that begins in June.

• National Disaster Management Authority (NDMA) is the nodal agency responsible for monitoring the relief operation.

How does it happen?

• A cloudburst occurs when moisturecarrying air moves up a hilly terrain, forming a vertical column of clouds known as 'cumulonimbus' clouds. Such clouds usually cause rain, thunder and lightning. This upward motion of the clouds is known as an 'orographic lift'.

• Cloudbursts do happen in plains as well, but there is a greater probability of them occurring in mountainous zones.

• Raindrops, instead of dropping down, are carried upwards by the air current. New drops are formed and existing raindrops gain in size.

o After a point, the raindrops become too heavy for the cloud to hold on to, and they drop down together in a quick flash.

o Hilly terrains aid in heated air currents rising vertically upwards, thereby, increasing the probability of a cloudburst situation.

• The energy necessary for the cloudburst comes from the upward motion of air. Cloudbursts mostly occur at elevations between 1,000-2,500 metres above sea level.

• The moisture is usually provided by a low pressure system (usually associated with cyclonic storms in the ocean) over the Gangetic plains associated with low level winds flowing in from the east.

• Sometimes winds flowing in from the north-west also aid the occurrence of cloudbursts. The many factors that have to come together to make a cloudburst event happen make them highly unlikely.

Impact of Cloudburst

• Flash flood: It usually happens downstream from the storm as heavy rains produce more water than the area can handle.

• Landslides: Mountainous terrain adds momentum to large amounts of water gushing down, leading to landslides, mudslides and flooding.

o Sheet erosion and landslides contribute substantially to soil loss resulting in the decline of productivity of agricultural land.

• Loss of life and property: It is the consequences of heavy rain in the hilly terrain that causes loss of human lives and destruction of infrastructure.

Way Forward

• Radar Network: To monitor the cloud burst, there is need to have dense radar network over the cloud burst prone areas or one need to have a very high resolution weather forecasting models to resolve the scale of cloud burst.

• Best practice: A useful model in cloudburst mitigation is Copenhagen climate adaptation plan which has organized a cloudburst master plan coupled with concretization plans and creation of canals. The plan is envisioned with a view to cope with the effects of climate change.

• Avoiding constructing settlements in fragile shops and along the streams.

• Imparting training to the rural people for minimizing damage.

11) World Energy Transitions Outlook: 1.5°C Pathway

Environment FOR You 2021

News-

• The International Renewable Energy Agency (IRENA) released the World Energy Transitions Outlook report.

Key highlights of the report:

• The report proposes energy transition solutions for the narrow pathway available to contain the rise of temperature to 1.5 degree Celsius.
• It estimated that by 2050, 90% of total electricity needs would be supplied by renewables, followed by 6% from natural gas and the remaining from nuclear.
• The agency has identified 30 innovations for the integration of wind and solar PV in power systems.

The International Renewable Energy Agency **(IRENA)**
• It is an intergovernmental Organisation.
• Mandate: To facilitate cooperation and promote the adoption and sustainable use of renewable energy.
• Founded in: 2009
• Its statute entered into force in 2010.
• Headquarter: Masdar City, Abu Dhabi.
• IRENA is an official United Nations observer.

12) As a tri-polar nation, India has a critical role in the Arctic

India's Arctic attention has a brief-but-significant timeline-

• 2007: Started with expeditions to the Arctic Ocean
• 2008: Opening of a research station, Himadri, at the international research base at Ny-Alesund in Svalbard, the northernmost island in the world belonging to Norway;
• 2013: India was granted Observer Status to the Arctic Council in 2013 along with other Asian countries such as China, Japan, Singapore and South Korea.

Significance of Three Poles

• The Hindu-Kush Himalaya mountains, referred to as the Third Pole, with maximum snow and ice accumulation outside the two polar regions, is a critical water store for socio-economic development in India and its neighbourhood.
• The physical changes in the Arctic are highly likely to impact the Indian monsoon or "teleconnection" as it is described.
• Likewise, the emissions from the Gangetic plains partly explain the black carbon events witnessed recently in the Arctic. Rising importance of Arctic region
• Unlike the Antarctic, where the legacy of peace and science prevails, the Arctic has politico strategic challenges and competitive economic and commercial interests.
• Rich Resource: Arctic region contains 13% of the world's undiscovered oil resources and 30% of undiscovered natural gas resources. Vast deposits of strategic metals have also been discovered.
• Potential to alter global trade routes: As the ice extent declines due to global warming, navigation in the Arctic Ocean will become significantly wider with the potential to become the world's largest logistics intersections.

Way Ahead for India

• Integrate Science & Diplomacy: India would do well to leverage the tri-polar geographical expression and its scientific engagement (with the Antarctic Treaty System and the Arctic Council) into its diplomacy. This is necessary given India's own climate vulnerability and its efforts to foster climate-resilient economic development.
• Careful engagement w.r.t resource rush in Arctic: The opening up of the Arctic in terms of economic opportunity is in India's interest, but has to be carefully weighed. Rather than engaging in a resource rush, it would be better to draw home new investments in clean energy from the Arctic states.
• Prioritise Science over Resource: The Arctic emphasis, thus, should continue to be one of scientific enterprise with efforts to build India's knowledge profile. Expanding its scientific footprint will require a state-of-the-art polar research vessel and Indian government should work in this direction.
• Bilateral Polar Science Cooperation: Joint projects on polar research should become part of the bilateral arrangement with the Arctic states such as Russia and

Canada. There is already abiding polar science cooperation with the Norwegian Polar Institute.

Conclusion-

For India, the Arctic has a deep civilisational connect. It enshrines a consciousness of human social evolution as a response to the physical environment as Bal Gangadhar Tilak expressed in his work, The Arctic Home in the Vedas (1903).

13) India-Germany Agreement on 'Cities Combating Plastic Entering the Marine Environment-

In news

• The Ministry of Housing and Urban Affairs (MoHUA), Government of India and German Federal Ministry of Environment signed an agreement on Technical Cooperation titled 'Cities Combating Plastic Entering the Marine Environment'.

Key takeaways

• The project's outcomes are in line with the objectives of Swachh Bharat Mission-Urban focusing on sustainable solid waste management and India's vision to phase out single use plastic by 2022.

• This project is envisaged on the outlines of the Joint Declaration of Intent regarding cooperation in the field of 'Prevention of Marine Litter' signed between India and Germany in 2019.

• Aim: Enhancing practices to prevent plastic entering the marine environment.

• It will be undertaken at the national level, selected states (Uttar Pradesh, Kerala and Andaman & Nicobar Islands) and in the cities of Kanpur, Kochi and Port Blair for a period of 3.5 years.

14) Foundation stone of the Integrated Solar Dryer and Pyrolysis pilot laid down

In news

• The foundation stone of the Integrated Solar Dryer and Pyrolysis pilot was laid by the Director, CSIR- Central Leather Research Institute (CLRI), Chennai. Key takeaways

• The pilot is part of the Indo-German project 'Pyrasol' launched to transform urban organic waste into biochar and energy in smart cities.
• It was awarded to CSIR-CLRI by the Indo-German Science & Technology Centre.
• It will ultimately lead to technology development for the joint processing of Fibrous Organic Waste (FOW) and Sewage Sludge (SS) of Indian smart cities into hygienic and highly valuable biochar associated with energy recovery, carbon sequestration and environmental improvement.

Do you know?

• Indo-German Science & Technology Centre (IGSTC) was established by India and Germany to facilitate Indo-German R&D networking with emphasis on industry participation, applied research and technology development.
• IGSTC through its flagship program '2+2 Projects', catalyses innovation centric R&D projects by synergising the strength of research and academic institutions and public/private industries from India and Germany.

15) Population of dolphins in Chilika lake doubled this year

In news

• The population of dolphins in Chilika, India's largest brackish water lake, and along the Odisha coast has doubled this year compared with last year.

Key takeaways

• The State Environment Department released the final data on the dolphin census conducted in January and February 2021, indicating a spectacular growth in numbers.
• The endangered Irrawaddy dolphins are mostly found in Chilika lake.
• The highest growth has been noticed in the case of humpback dolphins with a population of 281.
• These humpback dolphins were not part of any riverine systems, so they cannot be identified as residential mammals. They were spotted travelling along the Odisha coast and the number is likely to fluctuate in the next census.

16) Meghalay yields India's first bamboo-dwelling bat

In news

• Meghalaya has yielded India's first bamboo-dwelling bat with sticky discs.
• The count of the bats in India has reached now to 130.

Key takeaways

• The disc-footed bat (Eudiscopus denticulus) was recorded near the Nongkhyllem Wildlife Sanctuary.

• The extent of adaptation for bamboo habitat in this species is not seen in the others.

• Scientists analysed the very high frequency echolocation calls of the disc-footed bat, which was suitable for orientation in a cluttered environment such as inside bamboo groves.

• It has raised Meghalaya's bat count to 66, the most for any State in India.

• It has also helped add a genus and species to the bat fauna of India.

17) Species in news: Rewaconodon Indicus

In news

- The Tiki Formation in Madhya Pradesh, a treasure trove of vertebrate fossils, has now yielded a new species and two genera of cynodonts, small rat-like animals that lived about 220 million years ago.
- Researchers from the IIT Kharagpur, used scanning electron microscopy to study about 10 teeth samples collected from Shahdol District, Madhya Pradesh.
- The results showed that they had found a new species, and they named it Rewaconodon indicus, indicating India, the country it was discovered from.
- The team also identified two new genera from the area.
- The first was named Inditherium floris, after India and the Latin word therium meaning beast.
- As the teeth had a flower-shaped crown, it earned the species name floris.
- The second was named Tikiodon cromptoni, after Tiki Formation and Greek word odon meaning tooth.
- The species name is after paleontologist A.W. Crompton.

Do you know?

• The Tiki Formation is a Late Triassic (Carnian to Norian) geologic formation in Madhya Pradesh.

.

. .

Environment FOR You 2021