

Environment FOR You 2021



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

November -2021

1. National Interlinking of Rivers Authority

- The Centre Government is contemplating creation of the National Interlinking of Rivers Authority (NIRA).
- NIRA is supposed to be an independent autonomous body for planning, investigation, financing and the implementation of the river interlinking projects in the country.
- NIRA will function as an umbrella body for all river linking projects and to be headed by a Government of India Secretary-rank officer.
- It will replace the existing National Water Development Agency (NWDA)
- It will coordinate with neighbouring countries and concerned states and departments and will also have powers on issues related to environment, wildlife and forest clearances under river linking projects and their legal aspects
- NIRA will have the power to raise funds and act as a repository of borrowed funds or money received on deposit or loan given on interest.
- It will also have the power to set up a Special Purpose Vehicle (SPV) for individual link projects

Inter-Linking of Rivers Programme

The idea was first mooted during the British Raj when Sir Arthur Cotton, a British general and irrigation engineer suggested linking the Ganga and the Cauvery for navigational purposes.

The InterLinking of Rivers programme (ILR) programme is aimed at linking different surplus rivers of the country with deficient rivers so that the excess water from surplus regions could be diverted to deficient regions.

Need for Such Projects:

- Reducing Regional Imbalance
- Reducing Water Distress

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- Other Benefits: Hydropower generation, Round the year navigation, Employment generation, Ecological benefits as dried up forests and lands will be replenished.

Ganges River Dolphin

- Ministry of Jal Shakti released a guide for the safe rescue and release of stranded Ganges River Dolphins.
- The document has been prepared by the Turtle Survival Alliance and the Environment, Forest and Climate Change Department (EFCCD) of the Uttar Pradesh Government.
- It was recognised as the National Aquatic Animal in 2009, by the Government of India.
- Habitat: They live in the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river systems of Nepal, India, and Bangladesh.
- The Ganges river dolphin can only live in freshwater and is essentially blind. They hunt by emitting ultrasonic sounds, which bounces off of fish and other prey, enabling them to “see” an image in their mind. They are also called ‘susu’
- The global population of the species is estimated at 4,000, and nearly 80% found in the Indian subcontinent.
- It is a reliable indicator of the health of the entire river ecosystem.

Conservation Status:

- Indian Wildlife (Protection), Act 1972: Schedule I.
- International Union for the Conservation of Nature (IUCN): Endangered.
- Convention on International Trade in Endangered Species (CITES): Appendix I (most endangered).

Steps Taken:

- Project Dolphin: The Prime Minister announced the government’s plan to launch a Project Dolphin in his Independence Day Speech 2020.
- It is on the lines of Project Tiger, which has helped increase the tiger population.
- Dolphin Sanctuary: Vikramshila Ganges Dolphin Sanctuary has been established in Bihar.
- National Ganga River Dolphin Day: The National Mission for Clean Ganga celebrates 5th October as National Ganga River Dolphin Day.

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- Conservation Plan: The Conservation Action Plan for the Ganges River Dolphin 2010-2020, which “identified threats to Gangetic Dolphins and impact of river traffic, irrigation canals and depletion of prey-base on Dolphins populations”

India to Reach Carbon Neutrality by 2070

- India announced that it will reach carbon neutrality by 2070 as part of a five-point action plan that included reducing emissions to 50% by 2030
- India made this pledge at the Conference of the Parties (COP) 26 climate summit in Glasgow, where it also urged developed countries to deliver on their promise of climate financing

Net Zero is a state in which a country’s total emissions are offset by absorptions of carbon dioxide from the atmosphere, like that done by trees and forests, and physical removal of carbon dioxide through futuristic technologies.

- India has the lowest per capita emissions of the world’s major economies – emitting 5% of the total, despite accounting for 17% of the world’s population.
- In 2019 India announced that it would take up its installed capacity of renewable energy to 450 GW by 2030.
- Most of the new capacity additions in the energy sector are being done in the renewable and nonfossil fuel space.
- In fact, India has already said it does not plan to start any new coal power plants after 2022.
- India demands USD 1 trillion of climate finance as soon as possible and will monitor not just climate action, but deliver climate finance.

PM MAKES FIVE PLEDGES

- 1 India will increase its non-fossil energy capacity to 500GW by 2030
- 2 India will meet 50% of its energy requirements from renewable energy by 2030
- 3 India will reduce the total projected carbon emissions by one billion tonnes from now to 2030
- 4 By 2030, India will reduce the carbon intensity of its economy by 45% (from a previous target of 35%)
- 5 By 2070, India will achieve the target of net zero

WHAT IS NET ZERO?

Net zero refers to a balance where emissions of greenhouse gases are offset by the absorption of an equivalent amount from the atmosphere. Experts see net zero targets as a critical measure to successfully tackle climate change and its devastating consequences

PLEDGES BY TOP THREE EMITTERS

- CHINA: Beijing announced no new pledges on Monday. It previously pledged net zero by 2060.
- UNITED STATES: The US touted domestic legislation to spend \$555bn to boost renewable power and electric vehicles. It has pledged net zero by 2050.
- INDIA: The country’s economy will become carbon neutral by the year 2070

Glasgow Glacier: Antarctica

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- The 100-km long body of ice in Antarctica, which has been experiencing rapid melting, was formally named Glasgow after the Glasgow climate summit.
- 14 glaciers in the Getz Basin of West Antarctica are thinning by an average of 25% between 1994 and 2018 due to climate change contributing to rising global sea levels.
- The Getz basin is part of Antarctica's largest ice shelf. The shelf is subject to more changeable oceanic forcing - a process where relatively warm deep ocean water melts the glaciers from below - than other Antarctic shelves.

Other Glaciers Named: The eight newly named glaciers are based on:

- Stockholm Conference (1972): One of the major results of the Stockholm conference was the creation of the United Nations Environment Programme (UNEP).
- World Climate Conference, Geneva (1979): The World Climate Conference, now usually referred to as the First World Climate Conference was held in Geneva.
- Rio Summit (1992): It recommended a list of development practices called Agenda 21. It gave the concept of sustainable development to be combined economic growth with ecological responsibility.
- COP1 (Berlin, Germany, 1995): The first Conference of the Parties to the UN Framework Convention on Climate Change (COP-1) met in Berlin in 1995.
- Kyoto Protocol (1997): In Kyoto, developed countries agreed to a collective target of a 5.2% reduction in greenhouse gas emissions below 1990 levels by between 2008 and 2012.
- COP13 (Bali, Indonesia, 2007): Parties agreed on the Bali Road Map and Bali action plan, which charted the way towards a post-2012 outcome.
- COP21 (Paris, 2015): To keep global temperature well below 2.0C above pre-industrial times and endeavor to limit them even more to 1.5C. It requires rich nations to maintain USD 100bn a year funding pledge beyond the year 2020.
- Incheon: The Green Climate Fund (GCF) is based in Incheon, South Korea

World Heritage Sites & Climate Change

- The first ever scientific assessment of the amounts of greenhouse gases emitted from and absorbed by forests (2001-2020) in UNESCO World

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Heritage sites has found that forests in World Heritage sites play a vital role in mitigating climate change

- Carbon sequestration by world heritage forests over long periods has led to total carbon storage of approximately 13 billion tons of carbon.
- UNESCO under its World Heritage Marine Programme lists 50 sites across the globe for their unique marine values. These represent just one per cent of the global ocean area. But they comprise at least 15% of global blue carbon assets.

Blue Carbon is organic carbon that is mainly obtained from decaying plant leaves, wood, roots and animals. It is captured and stored by coastal and marine ecosystems

- India's Sundarbans National Park (60 million tonnes of carbon) is among five sites that have the highest blue carbon stocks globally.
- The increasing scale and severity of wildfires, often linked to severe periods of drought and hurricanes are also a predominant factor for high emissions

Sundarban National Park

The Sundarbans are mangrove forest, on the delta of the Ganges, Brahmaputra and Meghna rivers on the Bay of Bengal

home to many rare and globally threatened wildlife species such as the estuarine crocodile, Royal Bengal Tiger, Water monitor lizard, Gangetic dolphin, and olive ridley turtles

World Heritage Marine Programme

It is a global collection of unique ocean places stretching from the tropics to the poles.

Today, the List includes 50 unique ocean places across 37 countries – recognized for their unique marine biodiversity, singular ecosystem, unique geological processes or incomparable beauty.

India's Sundarban National Park is the only listed site under this programme.

India has 40 world heritage sites as declared by UNESCO, including 32 cultural properties, 7 natural properties and 1 mixed site. The latest one included is Dholavira in Gujarat.

Global Resilience Index Initiative

- A global coalition of ten organisations launched the Global Resilience Index Initiative (GRII).

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- It was launched during the Conference of Parties (CoP) 26 adaptation day (8th November 2021), it will be the world's first curated, open-source reference index.
- It has been launched to build a universal model for assessing resilience to climate risks.
- It will provide reference data on climate and natural hazard risks to inform and protect populations and economies, particularly in emerging and developing countries, form a basis for mobilising the trillions of investment needed to meet the Paris goals on climate-resilient development.
- It can be used in aggregated risk management across sectors and geographies
- GRII has been initiated with partial funding and in-kind contributions from the insurance sector and partner institutions such as: Coalition for Disaster Resilient Infrastructure (CDRI) & Coalition for Climate Resilient Investment (CCRI)
- The outcomes of this risk analysis will help close the insurance protection gap and direct investment and aid to where they are needed the most. □
- It will help global economic sectors understand, in concrete terms, the value of building climate resilience and the costs of doing nothing, this will address the data emergency that is contributing to the climate crisis

Mass Fish Death in Kameng River

- Recently, the landslides caused by an earthquake of 3.4 magnitude close to the border with China has led to mass fish death in the Kameng river in Arunachal Pradesh.
- The region has been placed into Seismic Zone V, thus most vulnerable to earthquakes. The earthquake triggered the landslides which caused turbidity in the river and reducing the Biological Oxygen Demand.

Kameng River originates in Tawang district from the glacial lake below snow-capped Gori Chen mountain on the India-Tibet border.

It forms the boundary between East Kameng District and West Kameng Districts.

It also forms the boundary between the Sessa and Eaglenest sanctuaries to its west (Arunachal Pradesh) and the Pakke tiger reserve to the east.

It becomes a braided river in its lower reaches and is one of the major tributaries of the Brahmaputra River

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Increased Risk of Leopard Extinction

- According to a study published in the journal *Global Ecology and Biogeography* leopard population of North India is at highest risk due to Roadkill.
- Other populations found highly vulnerable include the lion-tailed macaque (*Macaca silenus*) and sloth bear (*Melursus ursinus*) in South India.

The leopard is the smallest of the Big Cats- A nocturnal animal, the leopard hunts by night.

Melanism is a common occurrence in leopards, wherein the entire skin of the animal is black in colour, including its spots.

It occurs in a wide range in sub-Saharan Africa, in small parts of Western and Central Asia, on the Indian subcontinent to Southeast and East Asia

The Indian leopard is widely distributed on the Indian subcontinent

- As per a recent report 'Status of leopards in India, 2018' released by the Ministry of Environment, Forest and Climate Change, there has been a "60% increase in the population count of leopards in India from 2014 estimates".
- The largest number of leopards have been estimated in Madhya Pradesh (3,421) followed by Karnataka (1,783) and Maharashtra (1,690)

Conservation Status:

- IUCN Red List: Vulnerable
- CITES: Appendix-I
- Indian Wildlife (Protection) Act, 1972: Schedule-I

New Pledges at CoP26 Summit

- The European Union (EU) and the US have launched a landmark pledge to slash emissions of the powerful greenhouse gas methane, a commitment that could prevent 0.2 degrees Celsius of global warming.
- The alliance's members will seek to lower global emissions of methane - the second-largest contributor to climate change after carbon dioxide - by 30% below 2020 levels by 2030.
- More than 103 countries have signed up so far, including major methane emitters like Nigeria and Pakistan
- China, Russia and India - have not signed up, while Australia has said it will not back the pledge.

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Methane is more short-lived in the atmosphere than carbon dioxide but 80 times more potent in warming the earth.

Human sources of methane include landfills, oil and natural gas systems, agricultural activities, coal mining, wastewater treatment, and certain industrial processes

- More than 100 leaders pledged to halt and reverse deforestation and land degradation by the end of the decade, underpinned by USD 19 billion in public and private funds to invest in protecting and restoring forests.
- The agreement vastly expands a commitment made by 40 countries as part of the 2014 New York Declaration of Forests, and promises more resources

Infrastructure for Resilient Island States: India launched this initiative as a part of the CDRI that would focus on building capacity as they face the biggest threat from Climate Change

ISRO will build a special data window for them to provide them timely information about cyclones, coral-reef monitoring, coast-line monitoring etc. through satellite.

One Sun One World One Grid Group (OSOWOG):

- It is an initiative by India and the United Kingdom to tap solar energy and have it travel seamlessly across borders. □
- It includes a group of governments called the Green Grids Initiative (GGI) - One Sun One World One Grid group.
- The aim of GGI is to help achieve the pace and scale of reforms to infrastructure and market structures needed to underpin the global energy transition. □
- It has the potential to be a modern engineering marvel, and a catalyst for greatly expanding renewable electricity generation, and effectively mitigating climate change in the next decade. □

According to the ISA's concept note on OSOWOG, the global solar grid will be implemented in three phases.

- In the first phase, the 'Indian Grid' will interconnect with the Middle East, South Asia and Southeast Asia grids to share solar and other renewable energy resources for meeting electricity needs, including during peak demand.
- It will then be interconnected with the African power pools in the second phase.
- The third phase would cover global interconnection of the power transmission grid to achieve the OSOWOG's vision.

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Name	Details	Is India a signatory?
Breakthrough Agenda	It commits countries to work together to make clean technologies and sustainable solutions the most affordable, accessible and attractive option in each emitting sector (power, road transport, steel, agriculture etc.) globally before 2030.	✓
Global Methane Pledge	A voluntary non-binding agreement under which signatory countries have promised to cut their methane emissions by at least 30 per cent by 2030.	✗
Glasgow Leaders' Declaration on Forests and Land Use	The declaration commits the countries to halt and reverse deforestation and land degradation by 2030.	✗
Forest, agriculture and commodity trade (FACT) statement	It was jointly led by the UK and Indonesia and aims to support sustainable trade between commodity-producing and -consuming countries.	✗
Sustainable Agriculture Policy Action Agenda	Signatories have agreed to urgent action and investment to protect nature and shift to more sustainable ways of farming.	✗
Declaration on "accelerating the transition to 100% zero-emission cars and vans"	It aims to work towards all sales of new cars and vans being zero emission globally by 2040, and by no later than 2035 in leading markets.	✓
Beyond Oil and Gas Alliance (BOGA)	It is an international coalition of governments and stakeholders working together to facilitate the managed phase-out of oil and gas production.	✗

Glasgow Leaders' Declaration on Forests and Land Use

- Initiated by the United Kingdom to "halt deforestation" and land degradation by 2030
- India did not sign this, as it objected to "trade" being interlinked to climate change and forest issues in the agreement

The declaration recognise that to meet our land use, climate, biodiversity and sustainable development goals, both globally and nationally will require transformative further action in sustainable production and consumption & Infrastructure development; trade; finance and investment.

- The declaration has over 105 signatories including the UK, US, Russia and China
- These countries represent 75% of global trade and 85% of global forests in key commodities that can threaten forests – such as palm oil, cocoa and soya.
- They have also committed USD 12 billion in public funds from 2021-25.
- India, Argentina, Mexico, Saudi Arabia and South Africa are the only G20 countries that did not sign the declaration. □

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- The declaration interlinks trade to climate change and forest issues. Trade falls under the World Trade Organization and should not be brought under climate change declarations. □
- India and others had asked the word “trade” to be removed, but the demand was not accepted. Therefore they didn’t sign the declaration

G20 Summit & Climate Change

- In the recently concluded G20 summit, the leaders made a commitment to reach carbon neutrality by or around mid-century.
- They have adopted the Rome Declaration (the current presidency of G20 countries is being held by Italy).
- Earlier, the G20 Climate Risk Atlas was released which provides climate scenarios, information, data and future changes in climate across the G20 countries

Highlights of the Declaration:

- Roadmap for COP 26: It urged leaders of the world’s biggest economies to put their action plans to tackle the global climate change crisis
- Restricting Aid to Coal Based Plants: It included a pledge to halt financing of overseas coal-fired power generation by the end of this year (2021).
- PPP Model of Finance Mobilisation: Public-Private Partnerships (PPP) are the only way to achieve the trillions of dollars in annual investment needed to transition to clean, sustainable energy sources that will mitigate the warming of global temperatures.

Declarations by India:

- PPP Model of Finance Mobilisation: Public-Private Partnerships (PPP) are the only way to achieve the trillions of dollars in annual investment needed to transition to clean, sustainable energy sources that will mitigate the warming of global temperatures.
- One Earth One Health: The vision of “One Earth One Health”, or the need for a collaborative approach in the international domain in the fight against the pandemic. □
- Resilient Global Supply Chains: India highlighted the need for resilient global supply chains and invited G-20 countries to make India their partner in economic recovery and supply chain diversification. □

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- Support for Global Minimum Tax: India also lauded the G-20's decision to come up with a 15% Minimum Corporate Tax to make global financial architecture fairer.
- Welcoming Indo-Pacific Strategy: India welcomed the European Union's Indo-Pacific strategy and French leadership in it.

About G20-

It is an informal group of 19 countries and the European Union (EU), with representatives of the International Monetary Fund and the World Bank.

It does not have a permanent secretariat or Headquarters

Members: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, the United Kingdom, the United States and the EU.

The membership comprises a mix of the world's largest advanced and emerging economies, representing about two-thirds of the world's population, 85% of global gross domestic product, 80% of global investment and over 75% of global trade.

Indian Flapshell Turtles

- The Indian flapshell turtle is a freshwater species of turtle and is found in many states
- It is a relatively small soft-shell turtle with a carapace length of up to 350 millimetres
- They are found in Pakistan, India, Sri Lanka, Nepal, Bangladesh (Indus and Ganges drainages), and Myanmar (Irrawaddy and Salween Rivers).
- They live in the shallow, quiet, often stagnant waters of rivers, streams, marshes, ponds, lakes and irrigation canals, and tanks.

Turtles are smuggled and killed for their supposed aphrodisiac properties, livestock feed, to make leather from their skins, to make potions from their blood and to use as fishing bait.

Conservation Status:

- IUCN Red List: Vulnerable
- CITES: Appendix II
- Wildlife (Protection) Act, 1972: Schedule I

Steps Taken for Conservation:

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- KURMA App: It has a built-in digital field guide covering 29 species of freshwater turtles and tortoises of India
- It was developed by the Indian Turtle Conservation Action Network (ITCAN) in collaboration with the Turtle Survival Alliance-India and Wildlife Conservation Society-India
- World Turtle Day is observed every year on 23rd May.

Climate Change & Locust Infestations

- Infestation of desert locusts has been closely linked to climate change.
- Recently, the Global Landscapes Forum Climate Hybrid Conference has proposed that plans to mitigate climate change must include action against pests and diseases.

Global Landscapes Forum

The Global Landscapes Forum (GLF) is the world's largest knowledge-led platform on integrated land use, dedicated to achieving the Sustainable Development Goals and Paris Climate Agreement.

It is led by the Center for International Forestry Research (CIFOR), in collaboration with its co-founders UNEP and the World Bank and Charter Members.

- The conference was recently held alongside the 26th Conference of Parties (CoP26) to the United Nations Framework Convention on Climate Change.

The desert locust is a short-horned grasshopper.

Harmless when solitary, locusts undergo a behavioural change when their population builds up rapidly. In East Africa and Yemen alone, damages and losses in 2020 due to locusts could amount to as much as \$8.5 billion

- Change in cyclonic patterns over the Arabian Sea is behind the locust invasions in east Africa, west and south Asia, in 2020.
- Unusual rainfall in Iran helped in their breeding.
- Locusts are known to be passive flyers and generally follow the wind.
- Their movement has been aided by westerly winds, which were further strengthened by the low-pressure area created by Cyclone Amphan (2019) in the Bay of Bengal

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- It said that heavy use of a broad-spectrum pesticide may slow down the desert locust invasion but they also exert significant external costs on the environment and human health.
- Organophosphate pesticides such as Malathion and Chlorpyrifos, for instance, are highly toxic to humans and animals

Mass Extinction

- A new research has come up that has propounded Late Ordovician mass Extinction.
- Published in the international journal Nature Geoscience, It notes that the cooling climate likely changed the ocean circulation pattern. This caused a disruption in the flow of oxygen-rich water from the shallow seas to deeper oceans, leading to a mass extinction of marine creatures.

A mass extinction event is when species vanish much faster than they are replaced.

Mass Extinctions So Far:

- First Mass Extinction: The Ordovician mass extinction that occurred about 445 million years ago killed about 85% of all species.
- Second Mass Extinction: The Devonian mass extinction (about 375 million years ago) wiped out about 75% of the world's species. □
- Third Mass Extinction: The Permian mass extinction (about 250 million years ago) also known as the Great Dying caused the extinction of over 95% of all species. □
- Fourth Mass Extinction: The Triassic mass extinction (about 200 million years ago) eliminated about 80% of Earth's species, including some dinosaurs. □
- Fifth Mass Extinction: This Cretaceous mass extinction (about 65 million years ago) is known for wiping out non-avian dinosaurs

Some researchers have pointed out that we are currently experiencing a sixth mass extinction as the result of human-induced climate change (referred to as the Anthropocene extinction). □

Currently, only an estimated 2% of all of the species that ever lived are alive but the absolute number of species is greater than ever before.

Possible Impact:

- The extinction of the species causes tangible impact such as in the form of a loss in crop pollination and water purification.

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- Further, if a species has a specific function in an ecosystem, the loss can lead to consequences for other species by impacting the food chain.
- The effects of extinction are expected to worsen the genetic and cultural variability which would change entire ecosystems. □
- When genetic variability and resilience is reduced, its contribution to human welfare may be lost.

Depletion of Groundwater

- An analysis of water level data done by the Central Ground Water Board (CGWB) indicates that about 33% of the wells monitored have registered decline in ground water levels in the range of 0 – 2 metres
- The UNESCO World Water Development Report, 2018 states that India is the largest extractor of groundwater in the world
- According to the CGWB, with 230 billion metre cube of groundwater drawn out each year for irrigating agriculture lands in India, many parts of the country are experiencing rapid depletion of groundwater.
 - In India, construction of irrigation wells does not require any clearance and no records are maintained of abandoned wells

Reasons for Depletion:

- Green Revolution enabled water intensive crops to be grown in drought prone/ water deficit regions, leading to over extraction of groundwater.
- Subsidies on electricity and high MSP (Minimum Support Price) for water intensive crops.
- Water contamination as in the case of pollution by landfills, septic tanks, leaky underground gas tanks, and from overuse of fertilizers and pesticides leading to damage and depletion of groundwater resources.
- Inadequate regulation of groundwater encourages the exhaustion of groundwater resources without any penalty.
- Water being a State subject, initiatives on water management including water conservation and water harvesting and making available adequate drinkable water to citizens in the Country is primarily States' responsibility.

Steps taken by the Central Government:

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- Government of India launched Jal Shakti Abhiyan (JSA) in 2019, intended to improve water availability including groundwater conditions in the water stressed blocks of 256 districts in India
- Master Plan for Artificial Recharge to Groundwater - 2020: CGWB in consultation with the state governments has prepared The Master Plan - 2020. □ It envisages construction of about 1.42 crore Rain water harvesting and artificial recharge structures in the Country to harness 185 Billion Cubic Metre (BCM). □ In addition, the government has also launched the 'Catch the Rain' campaign to promote rainwater harvesting
- National Water Policy (2012): The policy advocates rainwater harvesting and conservation of water and highlights the need for augmenting the availability of water through direct use of rainfall.
- Atal Bhujal Yojana (ABHY) scheme (co-funded by World Bank funding, for sustainable management of ground water with community participation is being taken up in the identified overexploited and water stressed areas
- Aquifer Mapping and Management Programme: The CGWB has taken up Aquifer Mapping and Management Programme. The program is aimed to delineate aquifer disposition and their characterization for preparation of aquifer/ area specific groundwater management plans with community participation

Amazon Deforestation

- Recently, it was found that the area deforested in Brazil's Amazon reached 15-year high after a 22% jump from the prior year (2020)
- Earlier, a study showed that Amazon Forests have started emitting Carbon dioxide (CO₂) instead of absorbing it.

Drivers of Deforestation in the Amazon:

- One of the leading causes of deforestation in the Amazon Rainforest is linked to beef consumption.
- Vast areas of forest are cleared by cutting down trees and burning the forest down in order to create pasture land for grazing cattle.

Brazil is a major supplier of beef to countries like the United States and China, exporting 1.82 million tons in 2019 alone.

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- **Small-Scale Agriculture:** small-scale agriculture requires the forest to be “slashed and burned” to clear the ground for crops and grazing of various types. □
- **Fires:** Unlike other types of forests, the Amazon did not evolve to burn. And in the Amazon basin, fires can actually be spurred by deforestation.

Amazon Rainforests: □

These are the world’s largest tropical rainforest occupying the drainage basin of the Amazon River and its tributaries in northern South America.

Tropical forests are closed-canopy forests growing within 28 degrees north or south of the equator.

They are very wet places, receiving more than 200 cm rainfall per year, either seasonally or throughout the year.

Temperatures are uniformly high - between 20°C and 35°C.

Such forests are found in Asia, Australia, Africa, South America, Central America, Mexico and on many of the Pacific Islands.

The Amazon is a vast biome that spans eight rapidly developing countries—Brazil, Bolivia, Peru, Ecuador, Colombia, Venezuela, Guyana, and Suriname—and French Guiana, an overseas territory of France. □

The Amazon rainforests cover about 80% of the Amazon basin and they are home to nearly a fifth of the world’s land species and is also home to about 30 million people including hundreds of indigenous groups and several isolated tribes.

The Amazon basin is huge with an area covering over 6 million square kilometres, it is nearly twice the size of India.

The basin produces about 20% of the world’s flow of freshwater into the oceans. □

Comprising about 40% of Brazil’s total area, it is bounded by the Guiana Highlands to the north, the Andes Mountains to the west, the Brazilian central plateau to the south, and the Atlantic Ocean to the east.

SAFAR

- SAFAR (System of Air Quality and Weather Forecast and Research) has studied post Diwali Air Pollution in the four Indian Cities
- Air pollution during the Diwali period in 2021 was higher compared to 2020 in the three metropolitan cities of Delhi, Ahmedabad and Mumbai.

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SAFAR is a national initiative introduced by the Ministry of Earth Sciences (MoES) to measure the air quality of a metropolitan city, by measuring the overall pollution level and the location-specific air quality of the city.

It is an integral part of India's first Air Quality Early Warning System operational in Delhi.

It monitors all weather parameters like temperature, rainfall, humidity, wind speed, and wind direction, UV radiation, and solar radiation.

The World Meteorological Organization has recognized SAFAR as a prototype activity on the basis of the high-quality control and standards maintained in its implementation

Pollutants Monitored: PM2.5, PM10, Ozone, Carbon Monoxide (CO), Nitrogen Oxides (NOx), Sulfur Dioxide (SO2), Benzene, Toluene, Xylene, and Mercury.

Air Quality Index (AQI)

It is an index for reporting daily air quality. It displays the changes in air pollution in the atmosphere.

AQI keeps a tab on 8 major air pollutants in the atmosphere namely, □ Ground-level ozone, □ PM10, □ PM2.5, □ Carbon monoxide, □ Sulfur dioxide, □ Nitrogen dioxide, □ Ammonia, □ Lead,

Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in India

CLYDEBANK DECLARATION FOR GREEN SHIPPING CORRIDORS

- A coalition of 22 countries have agreed to create zero emissions shipping trade routes between ports to speed up the decarbonisation of the global maritime industry.
- The signatory countries signed the 'Clydebank Declaration for Green Shipping Corridors' (launched at the COP26 climate summit in Glasgow) and agreed to support the establishment of at least 6 green corridors by 2025.
India has not signed the declaration yet.
- The strategy for going carbon neutral will include using ships that run on zero-carbon fuels and updating port infrastructure.

Indian Scenario in shipping:

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- India is a member of International Maritime Organisation (IMO) and signatory to International Convention on Prevention of Marine Pollution (MARPOL).
- Recently, India signed an agreement under IMO to cut the shipping industry's greenhouse gas emissions by 50% by 2050. With a coastline of about 7500 km and 13 major and 200 minor ports, India is the 16th largest maritime country in the world.
- Approximately, 95% of the country's trade by volume (70% in terms of value) is moved by sea. India is located strategically on the international trade route and offers ship repair and maintenance services to ships plying from west to east.

National Coal Gasification Mission

- A blueprint for the 'National Coal Gasification Mission' prepared by the Union Coal Ministry.
 - The government aims to achieve gasification of 100 Million Tonnes (MT) of coal by 2030 and this is the first time that a mission document has been released.
- Coal gasification is the process of converting coal into synthesis gas (also called syngas), which is a mixture of hydrogen (H₂), carbon monoxide (CO) and carbon dioxide (CO₂).

The syngas technology allows conversion of non-mineable coal/lignite into combustible gases through in situ gasification of the material

Need for coal gasification

- Coal gasification is considered as cleaner option compared to burning of coal.
- Syn-Gas produced from Coal gasification can be used in producing Synthetic Natural Gas (SNG), energy fuel (methanol & ethanol), ammonia for fertilizers and petro-chemicals.
- The gasification technology will

Coal Gasification Products			
Source	Compounds		Products
	Precursor	Derivatives	
Bituminous coals (High grade)	Hydrogen		Refinery processes; Ammonia; Ammonium nitrate
	Carbon monoxide		Acetic acid; Chemical feedstock
		Acetic acid	Household cleaners; Waterproof sealants
	Methanol		Dyes, Formaldehyde; Fuels; plasticizers; Source for methyl acetate
		Formaldehyde	Caulks; Cements and glues; Construction adhesives; Detergents; Fingernail polish; Liquid soaps and shampoos
		Olefins:	Ethylene glycol; Polyester fibers; Engine coolant; Source for ethylene and propylene
		Ethylene	Styrene to make synthetic rubber
		Propylene	Fuel (similar to propane); Refrigerants
		Methyl acetate	Solvent for paints and glues; Source for acetic anhydride
		Acetic anhydride	Cellulosic plastics; Filter products; Photographic film

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also help India overcome the shortage of oil, gas, methanol, ammonia, urea and other products, making the country Aatmanirbhar

Bharat Heavy Electricals Limited (BHEL) has developed the fluidized bed gasification technology suitable for high ash Indian coals to produce syngas and then convert syngas to methanol with 99% purity.

Jindal Steel & Power Limited has installed world's first DRI plant based on Coal gasification technology by using domestic coal which is already operating in Angul District of Orissa for steel making.

Pakke Tiger Reserve 2047 Declaration

- Arunachal Pradesh Cabinet adopted the declaration on climate change-resilient and responsive Arunachal Pradesh envisages a low emission and climate-resilient development through five broad themes:
 - Environment, forest and climate change; health and well-being of all; sustainable and adaptive living; livelihoods and opportunities and evidence generation and collaborative action.
- Cabinet also approved Kaiser-i-Hind as the State butterfly with a view to boosting butterfly tourism and saving the species from extinction in the State

River Cities Alliance (RCA)

- RCA is a dedicated platform for river cities to ideate, discuss and exchange information for sustainable management of urban rivers.
- It will focus on three broad themes- Networking, Capacity Building and Technical Support.
- RCA includes cities from both Ganga basin and non Ganga basin states.
- RCA gives opportunities to these cities to strengthen governance aspects for river cities and improves their liveability to attract external economic investments

Continent Formation

- Based on the age of rocks from continental fragments (called cratons), researchers have found that Earth's first continents emerged from the ocean 700 million years earlier than thought

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- Study also pointed that earliest continental land to have risen may have been Jharkhand's Singhbhum region.
- Research tends to break another notion that continents rose due to plate tectonics.
- Continents probably rose as they were inflated by progressive injection of magma derived from deep in the Earth.

Down to Earth Special

PT Points:

- Scientists in Uganda have found evidence of a drug-resistant form of malaria, which could potentially render the top treatment available for the disease in the country ineffective.
- China on October 25 held its first Planetary Defense Conference to discuss strategies to improve the country's early warning systems, small-body exploration and space-based monitoring mechanisms.
- US space agency nasa on November 4 announced the first ever inter-planetary defense mission, "Double Asteroid Redirection Test (dart)" to be launched on November 23, to deliberately collide with a small asteroid and test the results.
- Cumbre Vieja is a volcano in the island of La Palma, Canary Islands, Spain. It erupted on September 19 this year.
- Population of North Atlantic right whales described as the world's most endangered large whale species, further decreased by 8 per cent in 2020. Only 366 whales exist currently. The decline of the species is largely due to an increase in fishing activities.
- Current rate of global greenhouse gas emissions could affect crops as early as 2030, as per NASA study. While higher temperatures will lead to favorable conditions to increase wheat yields by 5-10% by 2050 and 17% by 2070, they will also lower maize production by 5-15% and 24%, respectively.
- The Sundarbans National Park in West Bengal is one of five World Heritage sites that have the highest blue carbon stocks, according to a new assessment by the UN Educational, Scientific and Cultural Organization (UNESCO) on October 28. Blue carbon is stored by ocean and coastal ecosystems. UNESCO's assessment says that all World Heritage forests, including Sundarbans, now sequester more carbon than they store.

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The United Nation's Production Gap Report 2021

- Report states that by 2040, countries' plans and projections show 190 per cent more fossil fuels than would be consistent with the median 1.5°C pathway, and 89 per cent more than the median 2°C pathway.
- The gap will grow post-2030 because of the renewed investments in fossil fuels made by several countries after the pandemic.
- As part of their covid-19 responses, governments have provided support to the production of fossil fuels through new tax incentives, guarantees, regulatory changes, and other financial support, largely without accompanying social, economic, or environmental requirements, says the report.

The united Nation's Emissions Gap Report 2021:

- The report shows that the new nationally determined contributions (NDCs), combined with other mitigation pledges, put the world on track for a global temperature rise of 2.7°C by the end of the century, even if all new unconditional commitments are met.
- To quantify the production gap, the UN report looks individually at three fossil fuel components: coal, oil and gas. It says that global coal, oil and gas production should annually decrease by 11 per cent, 4 percent, and 3 per cent respectively between 2020 and 2030 to limit warming to 1.5°C.
- The reality is much worse. By 2030, the world, at the current pace, would produce 240 per cent more coal, 57 per cent more oil, and 71 per cent more gas than consistent with the median 1.5°C-warming pathway; and 120 per cent more coal, 14 per cent more oil and 15 per cent more gas than consistent with the median 2°C-warming pathway.

AGENDA FOR COP26

Agenda 1 - Carbon Net Zero:

- Net zero is not part of the Paris Agreement, an international treaty on climate change, adopted in 2015.
- It emerged as a concept in IPCC's 2018 special report "Global Warming of 1.5°C", which said global emissions need to be 45 per cent lower than the 2010 levels in 2030 to keep the temperature rise to 1.5°C above the pre-industrial

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level. The world must also become a net zero carbon emitter by 2050, the report said. To stay under 2°C, it has to be net zero between 2070 and 2085.

Suggestions for Net - Zero:

- Carbon dioxide (CO₂) emissions must be negated by an equivalent amount of CO₂ absorbed or removed by various means.
- To keep emissions “net-net”, countries can either plant trees and restore ecosystems in their territories for sequestering CO₂ or increase the carbon offset programme of the world so that trees planted in the homes and habitats of poor countries are accounted for in the carbon balance sheet of the rich paying countries.
- The other option is to artificially sequester CO₂ from the atmosphere and bury it permanently in the ground using carbon removal technologies.

National Net Zero Targets:

- Of the 192 countries who have signed the UN Framework Convention on Climate Change, 65 have announced national net-zero targets.
- By 2021, Bhutan and Suriname are the only two countries that have achieved net zero—meaning, they sequester more carbon in their forests than they emit.
- Uruguay has set an ambitious net-zero target for 2030, and the rest of the countries have said that they will get there by 2050. China has set a target of 2060.

How to get Net Zero:

- IPCC estimates that through afforestation and reduced deforestation, forests can sequester between 0.4 and 5.8 gigatonnes (Gt) of CO₂ a year; and through sustainable land management policies, soil can sequester between 0.4 and 8.6 GtCO₂ a year.
- The best-known carbon removal technologies are: Carbon Capture and Storage (CCS), Direct Air Capture and Storage (DACs) and Bioenergy with Carbon Capture and Storage (BECCS).
- Direct Air Capture and Storage (DACs) technology, as the name suggests, sucks CO₂ directly from the air. Among the various carbon removal technologies, DACs is the only one that can remove carbon at climate-significant scales. However, it consumes large amounts of electricity, making the technology expensive—US \$94-232 per tonne of CO₂.

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- Bio-Energy Carbon Capture and Storage (BECCS), which captures CO₂ from biomass-based power plants, has been granted a bigger role in IPCC's report. It says BECCS needs to sequester up to 8 GtCO₂e each year by 2050, but currently all active BECCS projects sequester a total of 0.0015 GtCO₂e per year. Economic viability of the technology is also highly uncertain—the cost is estimated at \$15-400 per tonne CO₂.

Agenda 2 - Coal:

- Among fossil fuels, coal has the highest contribution to carbon dioxide (CO₂) emissions. Of the 36.44 gigatonnes (Gt) of CO₂ emitted from the burning of fossil fuels in 2019, almost 40 per cent came from coal-fired power plants and industry. The fuel accounts for 34% of the world's electricity production in 2020.
- Coal production also releases methane (CH₄), a more potent greenhouse gas than CO₂; it accounts for 35 per cent of CH₄ emitted by all fossil fuel-related sources, says IPCC's Sixth Assessment Report (AR6).
- According to the AR6 report, fossil CO₂ emissions have slowed down in the past decade. CO₂ emissions from coal use grew at 4.8 per cent per year in the 2000s but slowed to 0.4 per cent per year in the 2010s.
- IPCC's 2018 special report "Global Warming of 1.5°C" states that to limit temperature rise to below the threshold level, coal use for power generation needs to peak by 2020. Its use should then reduce steeply in all 1.5°C-consistent pathways and its share in the electricity mix should reduce to close to 0 per cent by 2050 (with 66 per cent reduction by 2030).
- The countries occupying the majority of the world's remaining coal pipeline are China, India, Vietnam, Indonesia, Turkey and Bangladesh—predominantly Asian countries.
- Major consumers of coal are Japan, South Africa, Russia and South Korea. None of them have a target date to phase out coal.

Agenda 3 - China:

- China's rapid growth is visible in terms of the fact that it has exceeded emissions of the other developed countries in a matter of two decades or so.
- By 2005, China's CO₂ emissions surpassed the US' and the country is currently the world's largest emitter.

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- China says it will not build coal-fired power projects abroad but is silent about such plants at home. Despite its renewable energy plans, China will not be carbon neutral unless it curbs its coal power production.
- China dominates every step of the global solar supply chain. For solar photovoltaic cells, Chinese companies have the lion's share of global manufacturing—it ranks first in the production of wafers, cells and modules globally.
- In the lithium-ion battery supply chain, China controls 80 per cent of the world's raw material refining, 77 percent of the world's cell capacity and 60 per cent of the world's component manufacturing.
- As the new global superpower and polluter, China's emissions will have a significant impact on the world's ability to achieve its climate goals.

Agenda 4 - Market Mechanism:

- As the Kyoto Protocol, the first accord under the UN Framework Convention on Climate Change that came into force in 2005, had established a Clean Development Mechanism (CDM) for this carbon purchase. The Paris Agreement includes provision for two types of market instruments—Internationally Transferred Mitigation Outcomes (ITMO) and Sustainable Development Mechanism (SDM).
- Under ITMO, the aim is to establish bilateral or mini-multilateral markets—similar to the EU Emissions Trading System. It is also about securing overall mitigation in global emissions.
- Under SDM, the aim was to create a new international carbon market for the trade of emissions cuts, created by the public or private sector anywhere in the world, shaped by the previous CDM.

Agenda 5 - Climate Finance:

- The UN Framework Convention on Climate Change (UNFCCC) when established in 1992 had recognised finance and technology transfer as two critical pillars for transformation—the idea is if funds are provided, developing and emerging economies whose emission footprint is still small can grow, but differently.
- In 1994, Washington-based Global Environment Facility (GEF) was given the charge to manage financial transfers under UNFCCC.

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- In 2001, the Adaptation Fund was set up under the Kyoto Protocol to finance concrete adaptation projects and programmes in developing countries.
- At the 2010 UN climate change conference (COP16), the Green Climate Fund (GCF) was established. It was made a designated entity of the financial mechanism in 2011 with the setting up of two funds under it: Special Climate Change Fund (SCCF) and the Least Developed Countries Fund (IDCF).
- At COP16, parties to the convention decided to set up the Standing Committee on Finance (SCF) to help them make informed decisions on funding. So, there is no dearth of mechanisms to fund adaptation projects. Rather, availability of funds is the problem.
- At COP15 in Copenhagen in 2009, developed countries committed to a goal of jointly mobilising US \$100 billion per year by 2020 to address the needs of developing countries.
- A bulk of climate finance flows to mitigation, Oxfam found. Only a quarter of funding was spent in helping countries adapt to the impacts of climate crises, while about 66 percent of it was spent helping countries cut emissions or climate mitigation.
- UK-based think tank Overseas Development Institute (ODI) has found that of the developed nations, only Germany, Norway and Sweden are paying their fair share of the \$100 billion a year using public climate finance.
- The biggest shortfall comes from the US, which has provided less funding than France, Germany, Japan or the UK, even though its economy is larger than all of them combined, says ODI. The US transferred \$1 billion during Barack Obama's second stint as president, but no funds were contributed during Donald Trump's presidency.

Agenda 6 - Adaption Goal:

- Article 7 of the Paris Agreement establishes a Global Goal on Adaptation of “enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change”. The core components of the goal are interconnected and overlapping. Their progress will be assessed every five years under the Paris Agreement's Article 14, Global Stocktake.
- The Adaptation Gap Report 2020, released by the United Nations Environment Programme (UNEP) earlier this year, states that the adaptation finance gap is not closing—not by a long shot. The annual adaptation costs in

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developing countries alone are currently estimated to be in the range of US \$70 billion and will reach \$280-500 billion by 2030.

- The issue of adaptation—the goal to make the world less vulnerable and more resilient—needs urgency and finance. This is the real agenda for the 2021 UN climate change conference (COP26).

Agenda 7 - Loss and Damage:

- Article 8 of the Paris Agreement “recognises the importance of averting, minimising and addressing loss and damage associated with adverse effects of climate change, including extreme weather events and slow onset events”. It also says that countries should “enhance understanding, action and support to address loss and damage”.
- The discussions go back to 2010, when during COP16, a “loss and damage work programme” was started. This led to the creation of the Warsaw International Mechanism on Loss and Damage (WIM) in 2013 during COP19.
- In 2015, under the Paris Agreement, WIM was tasked with specific roles under Article 8. The key roles of WIM include enhancing action and support through finance for loss and damage, building the right technology regime to gauge climate change’s impacts and also capacity-building of members.
- It’s time the agenda of loss and damage was prioritised. Countries and communities need more than networks, information and knowledge. They need resources—human and financial— to cope with extreme weather events.

Agenda 8 - Nature-Based Solution:

- In climate change negotiations, Reducing Emissions from Deforestation and Forest Degradation (REDD) and its addition on conservation of forest stocks (REDD+) was originally the framework to implement nature-based solutions. At the 2013 UN climate change conference (COP19), the Warsaw Framework for REDD+ was adopted.
- In 2015, the Paris Agreement recognised this and included it in Article 5; parties reiterated their commitment to implement REDD+.
- The UN Environment Programme (UNEP) estimates that if the world is to meet its climate change goals, it needs to close a US \$4.1 trillion financing gap in nature by 2050.
- In May 2021, the World Economic Forum published in collaboration with McKinsey and Company a report, “Nature and Net Zero”.

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- According to this, nature-based solutions provide a “potential of [removing] close to 7 GtCO₂ per year, sufficient to deliver around one-third of the 2050 target [to cut emissions by 50 per cent over 2010 levels]” and this cost is lower than technological solutions.
- The problem is not the idea of using forests as carbon sinks but the fact that what is being seen as a low-cost solution is in the lands of the poor and in forests of the developing world. They are the habitats of poor communities. So the choice of trees and their management has to be driven from the objective of securing livelihoods and not primarily for fixing emissions.
- It is now estimated that Amazon rainforests are emitting more carbon than they are absorbing— the key cause is large-scale deforestation to clear land for the production of beef and other commodities. It is estimated that one-third of the world’s tropical deforestation is driven by international trade in food commodities.
- All this again points to the problem of lack of measurement, accounting tools and, most importantly, the question of the ownership of lands in which forests are being grown and carbon credits are being generated. So, even as nature-based solutions are critical for climate change mitigation, the world has not ensured that this win-win solution really works for people and forests. This should be the agenda for COP26, which at present seems to be missing the wood for the trees.

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