

Environment Current Affairs by Pmfias.com – November & December 2020

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This file is filled with a lot of very important stuff for the exam

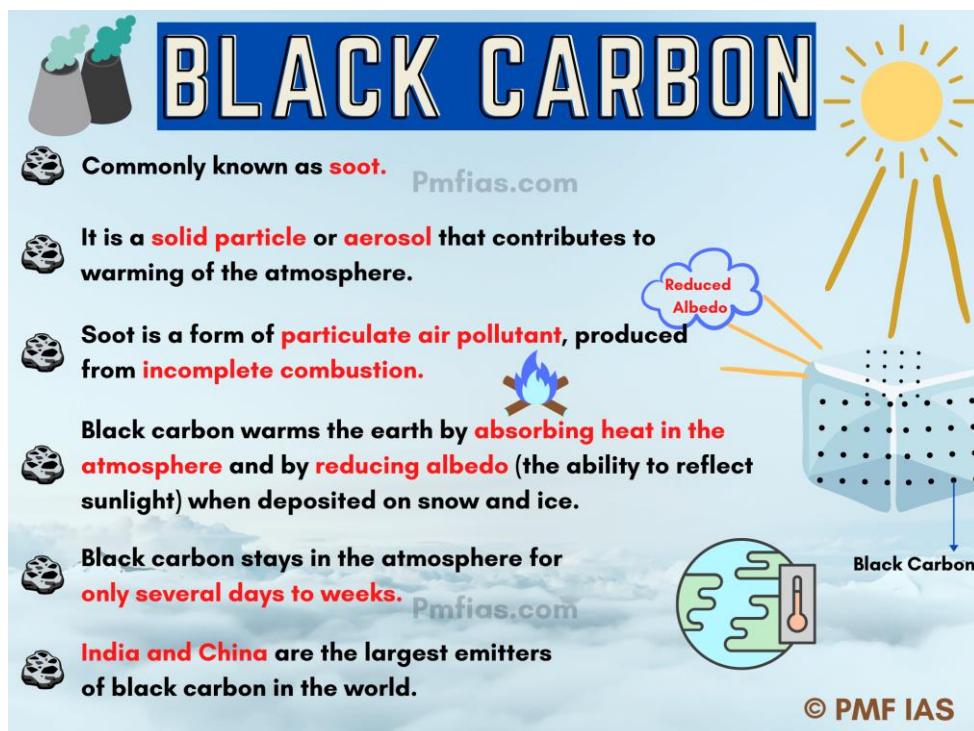
{Envi – CC – 2020/12} Black carbon and Himalayan Glaciers

[DTE](#) | Prelims + Mains | GS1 > Climate Change

- **Context:** Black carbon is contributing to the melting of Himalayan Glaciers.

Black Carbon or Soot

- Black carbon is a solid particle or **aerosol** (though not a gas) that contributes to warming of the atmosphere.
- Black carbon, **commonly known as soot**.
- Soot is a form of **particulate air pollutant**, produced from **incomplete combustion**.
- Black carbon warms the earth by absorbing heat in the atmosphere and by **reducing albedo** (the ability to reflect sunlight) when deposited on snow and ice.
- BC is the **strongest absorber of sunlight and heats the air directly**.
- It **emits infra-red radiation that increases the temperature**.
- In addition, it darkens snowpack and glaciers through deposition and leads to melting of ice and snow.
- Regionally, **BC disrupts cloudiness and monsoon rainfall**.
- Black carbon stays in the atmosphere for **only several days to weeks**.
- Thus, the effects of BC on the atmospheric warming and glacier retreat disappear within months of reducing emissions.
- **India and China are the largest emitters of black carbon** in the world.
- The Indo-Gangetic plains will become the largest contributor of black carbon, with about 20 per cent from biofuels, 40 per cent from fossil fuels and about 40 per cent from bio-mass burning.



- CCPI is Published by **Germanwatch**, the **New Climate Institute** & the **Climate Action Network** annually since 2005.
- The CCPI looks at **four categories**, with 14 indicators:
 - ✓ **Greenhouse Gas Emissions** (40% of the overall score),
 - ✓ **Renewable Energy** (20%),
 - ✓ **Energy Use** (20%), &
 - ✓ **Climate Policy** (20%).
- Globally, **no country had met the criteria** to get placed high enough on the index.
- Top three ranks were empty.
- Only two G20 nations, the **UK & India** are among the **high rankers in CCPI 2021**, which covers 2020.
- **India ranked 10th**.
- India received high ratings in all CCPI indicators **except renewable energy**.
- China, the biggest emitter of greenhouse gases, is ranked at the 33rd position on the CCPI 2021 report.

{Envi – CC – 2020/12} Emissions Gap Report 2020

- **Context:** UNEP released Emission gap report 2020.
- The [United Nations Environment Programme \(UNEP\)](#), releases **Emissions Gap Report annually**.
- It measures the **gap between what we need to do & what we are actually doing** to tackle climate change to keep earth's temperature according to **Paris agreement**.

Findings from the Emission Gap Report 2020 on key aspects

- The world is heading for a temperature rise in excess of 3°C this century.
- Global GHG emissions **continued to grow** for the third consecutive year in 2019.
- Fossil **carbon dioxide (CO₂)** emissions dominated total GHG emissions.
- Over the last decade, the **top four emitters (China, the United States of America, EU27+UK & India)** have contributed to 55 per cent of the total GHG emissions without LUC (land-use change).
- Rich countries have higher **consumption-based emissions** than territorial-based emissions.
- **Consumption-based emissions:** Emissions allocated to the country where goods are purchased & consumed, rather than where they are produced.
- The year 2020 is on course to be one of the warmest on record.

- The wildfires, storms & droughts continue to cause havoc.
- Since 2010, global GHG emissions have grown 1.4% per year on average, with a **more rapid increase of 2.6% in 2019** due to a large **increase in vegetation forest fires**.
- CO₂ emissions **could decrease** by about 7% in 2020 compared with 2019 emission levels due to COVID-19.

Solutions

- Green pandemic recovery by **increasing net zero emission** can cut the emissions.
- Combining a green pandemic recovery with NDCs under the **Paris Agreement**.
- Measures to prioritize in **green fiscal recovery** include:
 - ✓ Direct support for zero-emissions technologies & infrastructure,
 - ✓ Reducing fossil fuel subsidies,
 - ✓ No new coal plants, &
 - ✓ Promoting nature-based solutions – including large-scale landscape restoration & reforestation.
- **Decarbonisation of energy sector** based on renewable energy & phasing out coal fired power plants.

About UNEP

- The UNEP is the leading **global environmental authority**.
- It **sets the global environmental agenda**, promotes the coherent implementation of the environmental dimension of sustainable development **within the United Nations system**.
- **HQ:** Nairobi, Kenya.
- **Established:** 5th June 1972.

Important Reports

1. **Emission Gap Report**,
2. **Global Environment Outlook**,
3. **Frontiers**,
4. **Invest into Healthy Planet**.

Major Programmes of the UNEP

1. **Clean up the World**
2. **Billion Tree Campaign**
3. **World Environment Day (June 5th)**

Q. Consider the following statements regarding 'Earth Hour' (UPSC Prelims 2014).

- It is an initiative of UNEP & UNESCO.
- It is a movement in which the participants switch off the lights for one hour on a certain day every year.
- It is a movement to raise the awareness about the climate change & the need to save the planet.

Which of the statements given above is / are correct?

- a) 1 & 3 only
- b) 2 only
- c) 2 & 3 only.
- d) 1, 2 & 3

Earth Hour

- Earth Hour is an initiative organized worldwide by the **World-Wide Fund for Nature (WWF)**.
- The event is held annually encouraging individuals, communities, & businesses to **turn off their non-essential lights for one hour**, from 8:30 to 9:30 p.m. towards the end of March, as a symbol for their commitment to the planet.

Answer: two & three only

Q. The increasing amount of carbon dioxide in the air is slowly raising the temperature of the atmosphere, because it absorbs (UPSC)

- a) The water vapour of the air & retains its heat.
- b) The ultraviolet part of the solar radiation.
- c) All the solar radiations.
- d) The infrared part of the solar radiation

Explanation

- Among GHGs, only water vapor has the ability to absorb both incoming (UV) & outgoing (infrared) radiation.

Answer: The infrared part of the solar radiation (outgoing radiation).

Summary

- The [United Nations Environment Programme \(UNEP\)](#), releases **Emissions Gap Report annually**.
- It measures the **gap between what we need to do & what we are actually doing** to tackle climate change.
- Global GHG emissions **continued to grow** for the third consecutive year in 2019.
- Over the last decade, the **top four emitters** are **China, the United States of America, EU27+UK & India**.
- Rich countries have higher **consumption-based emissions** than territorial-based emissions.
- **Consumption-based emissions:** Emissions allocated to the country where goods are consumed.
- Since 2010, global GHG emissions have grown **1.4% per year** on average.

{Envi – CC – 2020/12} Report on the State of the Global Climate 2020: WMO

[IE](#) | Prelims + Mains | GS1 > Important Geophysical phenomena | GS3 > Environmental Pollution & Degradation

- **Context:** The year 2020 is set to be one of the warmest years in history, according to WMO report.

Basics: [El Nino](#), [La Niña](#), [El Nino Modoki](#), [ENSO](#) etc.

Key Points from the WMO Report

- Average global temperature in 2020 is likely to be around **1.2°C above the pre-industrial** (1850-1900) level.
- There is at least a one in five chance of it temporarily exceeding 1.5 °C by 2024.
- **2011-2020 will be the warmest decade on record**, with the warmest six years being since 2015.
- **The year 2016 has been the warmest year on record** and is being followed closely by 2020 temperatures.
- **Record warm years have usually coincided with a strong El Niño event.**
- We are now (2020) experiencing a **La Niña**, which **has a cooling effect on global temperatures**, but has not been sufficient to put a brake on this year's heat.
- 2020 has been an extraordinary year for climate.
 - ✓ Earth saw new extreme temperatures on land, sea and especially in the Arctic.
 - ✓ Wildfires consumed vast areas in Australia, Siberia, the US West Coast and South America.
 - ✓ It also saw a record number of hurricanes in the Atlantic, including back-to-back category 4 hurricanes.
 - ✓ Flooding in parts of Africa and South East Asia led to massive population displacement.
- The most notable warmth was observed across northern Asia, particularly the Siberian Arctic, where temperatures were more than 5 °C above average.
- **Ocean heat content for 2019 was highest on record** in the datasets going back to 1960.
- 80% of ocean areas have experienced at least one [Marine heat wave \(MHW\)](#) so far in 2020.

Model Question: "Climate Change is Affecting global atmospheric phenomena with more intensity than ever before." Justify.

Suggested Reading: Marine Heat Waves (Hot Topic for UPSC Mains)

{Envi – Conservation – 2020/11} Water Conservation

[DTE](#) | GS3 > Environmental Pollution and Degradation | GS3 > Conservation

- **Context:** WWF identifies 100 cities, including 30 in India, facing '**severe water risk**' by 2050.
- A hundred cities worldwide, including 30 in India, face the risk of '**severe water scarcity**' by 2050, according to a recent report by **World Wide Fund for Nature (WWF)**.
- The cities would face a '**grave water risk**' by 2050 due to a dramatic increase in their population percentage to 51 per cent by 2050, from 17 per cent in 2020.
- The cities include global hubs such as **Beijing, Jakarta, Johannesburg, Istanbul, Hong Kong, Mecca and Rio de Janeiro**.
- Thirty Indian cities are also included in the list.
- **Jaipur topped the list of Indian cities, followed by Indore and Thane.**
- Mumbai, Kolkata, and Delhi also featured on the list.
- **More than half of the identified cities are from China and India.**

Difference between Water Scarcity, Water stress and Water risk

Water Scarcity	Water Stress	Water Risk
<ul style="list-style-type: none">• "Water scarcity" refers to the volumetric abundance, or lack thereof, of water supply.• Water scarcity is a physical, objective reality that can be measured consistently across regions and over time.	<ul style="list-style-type: none">• "Water stress" refers to the ability, or lack thereof, to meet human and ecological demand for water.• Compared to scarcity, "water stress" is a more inclusive and broader concept.• It considers several physical aspects related to water resources, including water scarcity, but also water quality.	<ul style="list-style-type: none">• "Water risk" refers to the probability of an entity experiencing a deleterious water-related event.• Water risk is felt differently by every sector of society and the organizations within them and thus is defined and interpreted differently (even when they experience the same degree of water scarcity or water stress).

	environmental flows , and the accessibility of water .	
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- “**Water scarcity**” is one aspect of many that contributes to and informs “**water stress**.”
- **An area could be highly water stressed, but not water scarce**, if, for example, it had **water pollution**, but plentiful supplies of contaminated water.

Previous Mains Question: What is water stress? How and why does it differ regionally in India?

Mains Practise: What is the difference between water scarcity and water stress? Describe the spatial pattern of water stress in India.

- **Water scarcity:** there is a lack of adequate availability or supply of water.
- **Water scarce regions:** Rajasthan, Gujarat, rain-shadow region of Western Ghats (Hyderabad-Karnataka, Vidarbha), and other drought prone regions.
- **Water stress:** it is caused either due to water scarcity or due to the unusable nature of the available water.
- **Water stress regions (spatial pattern of water stress):** All the water scarce regions plus the regions affected by
 - ✓ Urban and industrial pollution (Ganga-Yamuna industrial region, mining hotbeds like Odisha, Jharkhand and metropolitan cities like Mumbai, Bengaluru),
 - ✓ alkalinity and salinity (overexploited regions like Punjab-Haryana),
 - ✓ marine saline ingress (coastal regions affected by cyclones and storm surge)
 - ✓ marine saline ingress due to sea level rise (due to climate change)

Water Requirement

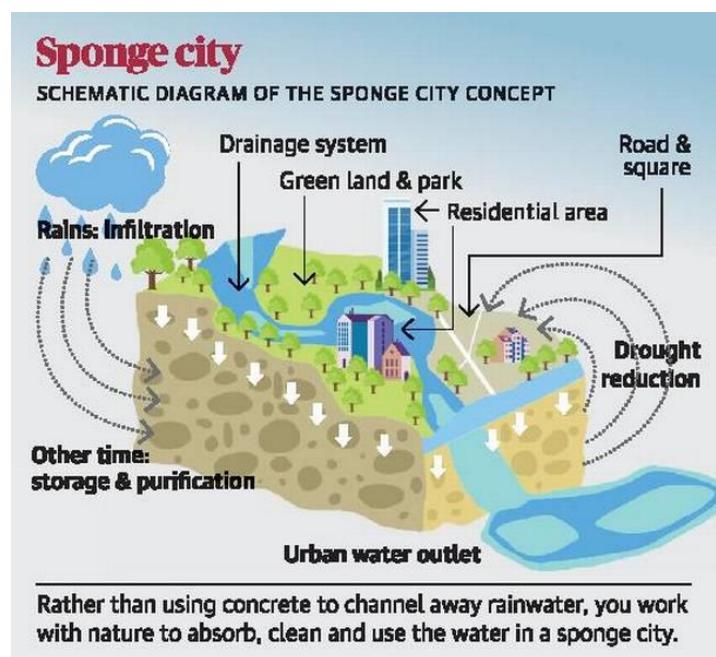
- The absolute minimum water requirement for domestic usage is **50 litres per person per day**.
- Ideal requirement = 100-200 litres/person/day.
- 1700 cubic meters/person/year – 1000 cubic meters/person/year = Water Stressed Condition.
- Less than 1000 cubic meters/person/year = Water Scarcity Condition.
- 1000 cubic meters/person/year – 500 cubic meters/person/year = Chronic Water Scarcity.
- **Less than 500 cubic meters/person/year = Absolute Scarcity**

Steps to be taken

- For cities to break away from the current vicious loop of flooding and water scarcity, **nature-based solutions like restoration of urban watersheds and wetlands could offer solutions.**
- The **Smart Cities Initiative** in India could offer an integrated urban water management framework combining **urban planning, ecosystem restoration** for building future-ready, water smart cities.
- Urban planning and wetland conservation needed to be integrated to ensure zero loss of freshwater systems in the urban areas.

Sponge City Concept

- The Sponge City indicates a particular type of city **that does not act like an impermeable system** not allowing any water to filter through the ground.
- It acts like a sponge and absorbs the rainwater.
- It is then naturally filtered by the soil and allowed to reach into the urban aquifers.
- This allows for the extraction of water from the ground through urban or peri-urban wells.
- This water can be easily treated and used for the city water supply.
- System in which water is **Conserved+ Stored+ Recharged+ Sustainable** use is practiced.



[Source and Credits](#)

What does a Sponge City need in practise?

- A sponge city **needs to be abundant with spaces that allow water to seep through them.**
- Instead of only impermeable concrete and asphalt, the city needs more:
 - ✓ Contiguous open green spaces, interconnected waterways, channels and ponds across neighbourhoods.

- ✓ **Green roofs** that can retain rainwater and naturally filters it before it is recycled or released into the ground.

What are the benefits of a Sponge City?

- Replenished groundwater and thus greater accessibility to water resources for cities.
- Cleaner groundwater due to the increase volume of naturally filtered storm water.
- **Reduction in flood risk** as the city offers more permeable spaces for the natural percolation of water.
- Lower burdens on drainage systems, water treatment plant, artificial channels and natural streams.
- Greener, healthier, more enjoyable urban spaces.
- Enriched biodiversity around green open spaces, wetlands, urban gardens and green rooftops.

{Envi – Conservation – 2020/12} Eco-Bridges or Eco-Ducts for Sustainable Development

IE | Prelims + Mains | GS3 > Conservation

Eco-Bridges or Eco-Ducts



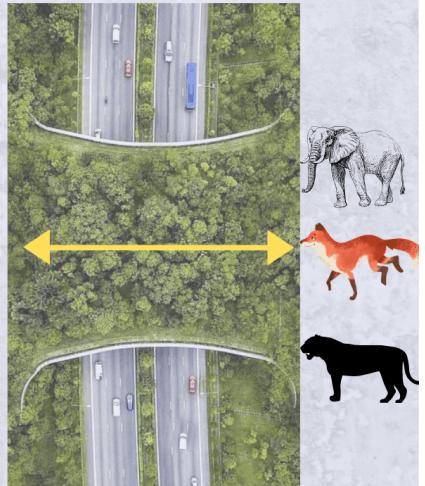
Why need such bridges?

- Many Roadkills (especially of reptiles such as the monitor lizard.)
- Awareness-Building Mechanism
- Way to see how we can preserve the Ecosystem.

Ecobridges Includes:

- Canopy Bridges (usually for monkeys, squirrels and other arboreal species)
- Concrete Underpasses or Overpass Tunnels or Viaducts (usually for larger animals)
- Amphibian Tunnels or Culverts.

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Examples of Eco-Bridges

One of the largest underpasses - 1.4km - for animal conservation in India is being built along the Madhya Pradesh-Maharashtra border (Through Pench Tiger Reserve)



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- **Context:** Ramnagar Forest Division, Uttarakhand, built its first **eco-bridge** for reptiles & smaller mammals.

What are Eco-bridges or Eco-ducts?

- Eco-bridges **aim to enhance wildlife connectivity**, that can be disrupted because of highways or logging.
- Eco-bridges include
 1. **canopy bridges** (usually for monkeys, squirrels & other arboreal species);
 2. **concrete underpasses or overpass tunnels** or **viaducts** (usually for larger animals); &
 3. **amphibian tunnels or culverts**.
- Usually, these bridges are overlaid with planting to give it a contiguous look with the landscape.

Environment vs. Development

- In most of the cases, it is not possible to complete development projects without harming the environment.
- The scenario is grave in India as it does not have enough resources to balance environment & development.
- Projects must be completed either with high environmental costs or high financial costs.
- With a complex web of legal processes (SC, NGT) & regulatory regimes (NTCA, National Board for Wildlife, etc), the development projects are stalled midway & the project costs skyrocket over the years.

Case 1

- In June 2019, SC ordered to halt the construction of a road that passes through the “critical” corridor between the **Rajaji & Corbett Tiger Reserves** as it violates numerous provisions of the **Forest Conservation Act**.
- The road is being built **without the statutory approval** of the **National Board for Wildlife**.
- The advice of the **National Tiger Conservation Authority (NTCA)** has also not been taken.

Case 2

- NHAI's project to widen **NH 44 through Pench Tiger Reserve** is mired in legal hurdles.
- The NH 44 stretch passes through the eco-sensitive zone of Pench Tiger Reserve (PTR) on both Maharashtra & Madhya Pradesh sides.
- In 2008, **Wildlife Trust of India (NGO)** had moved SC seeking a ban on NHAI's project.
- NHAI's project would involve felling more than 22,000 trees in the critical corridor.
- According to NTCA & Wildlife Institute of India (WII), the forest connecting **Kanha & Pench TRs** is **one of the four most viable tiger habitats** (the other three being the **Western Ghats, Corbett & Kaziranga**).
- NHAI made several changes in the plan to address the concerns raised by wildlife experts.
- GOI is now spending a whooping ₹1300 crore to build 9 km of highway with 13 underpasses in **Pench TR**.

- Demands have been raised to build such underpasses on the NH between Mysuru & Wayanad to protect tigers in the **Bandipur wildlife sanctuary**.

The Effect on tiger population

- Central India's tigers have the highest genetic variation among Indian tigers.
- This has been made possible by the large habitats available here in the past.
- When populations are isolated by linear projects, there's the risk of inbreeding of disease & local extinction.

Eco-bridges for Sustainable development (balancing development and environment)

- Nine 'animal underpasses (**viaducts**)' were built in 2018 beneath a stretch of **NH 44 (Srinagar to Kanyakumari — India's longest highway)** between **Kanha & Pench tiger reserves**.
- GOI will construct a 36 km-long flyover above NH 37, which passes through the **Kaziranga National Park**.
- These viaducts prevent roadkill & reduce the '**barrier effect**' that roads have on the movement of animals.
- These underpasses are examples of '**wildlife mitigation measures**' or attempts to remedy the impact of infrastructure on wild animals (attempting for sustainable development).
- According to an estimate, around 55,000 km of roads pass through India's forests & protected areas.
- NH 44 cuts through corridors connecting **Kanha, Satpura, Pench, Bandhavgarh, Panna tiger reserves**.
- NH 6 — India's second longest highway that runs from Surat to Kolkata — passes through corridors around **Melghat, Bor, Nagzira, Simlipal tiger reserves**.

Tiger Reserves Map: https://drive.google.com/file/d/1kA-Rn32zbn8XvhGo9rA7u3JGMA_buYp/view

Prelims practise: Consider the following statements

1. NH 44 passes through Pench Tiger Reserve.
2. Kashmir-Kanyakumari highway passes through Pench Tiger Reserve.
3. Pench Tiger reserve is spread across the borders of Maharashtra & Madhya Pradesh.

Which of the above statement(s) are false?

- a) 2 only
- b) 2 & 3 only
- c) 3 only
- d) None

Explanation

- All the statements are true.
- NH 44 (3700+ km) also known as Kashmir-Kanyakumari highway, is the longest highway in India.

Answer: None

Prelims Practise: Consider the following

- 1) [Wildlife Institute of India](#)
- 2) [National Tiger Conservation Authority](#)
- 3) [National Board for Wildlife](#)
- 4) [Wildlife Crime Control Bureau](#)
- 5) [Central Zoo Authority](#)

Which of the above are statutory bodies?

- a) All
- b) 1, 2, 3 & 4 only
- c) 2, 3 & 4 only
- d) 2, 3, 4 & 5 only

Explanation

- A statutory body is a non-constitutional body established by the legislature (established by a law).
- [Wildlife Institute of India \(WII\)](#) is an autonomous institute under MoEF.

Answer: 2, 3, 4 & 5 only (d)

Prelims practise: Consider the following

- 1) [Wildlife Trust of India](#)
- 2) [Wildlife Institute of India \(WII\)](#)
- 3) [The Energy & Resources Institute \(TERI\)](#)

Which of the above are NGOs?

- a) 1 and 2 only
- b) 2 and 3 only
- c) 1 and 3 only

d) 3 only

Explanation

- [Wildlife Institute of India \(WII\)](#) is an autonomous institute under MoEF. The rest two are NGOs

Answer: one and three only (c)

Summary

- Eco-bridges **aim to enhance wildlife connectivity**, that can be disrupted because of highways or logging.
- They include **canopy bridges, underpasses or overpasses or viaducts & amphibian tunnels or culverts**.
- In 2008, [Wildlife Trust of India \(NGO\)](#) had moved SC seeking a ban on widening of NH44.
- The NH 44 stretch [passes through the eco-sensitive zone of Pench Tiger Reserve](#).
- NH 44 cuts through corridors connecting **Kanha, Satpura, Pench, Bandhavgarh, Panna tiger reserves**.
- The forest connecting **Kanha & Pench TRs** is **one of the four most viable tiger habitats** (the other three being the **Western Ghats, Corbett & Kaziranga**).
- GOI is now spending a whooping ₹1300 crore to build 9 km of highway with 13 **viaducts in Pench TR**.
- These viaducts prevent roadkill & reduce the '**barrier effect**' that roads have on the movement of animals.
- These underpasses are examples of **wildlife mitigation measures**.

{Envi – Conservation – 2020/12} Ex-Situ conservation

[DTE](#) | **Prelims** | GS3 > Conservation

- **Context:** Reliance Industries Ltd to build the world's largest zoo on 280 acres of land near Jamnagar.
- Over the decades, zoos got transformed into centres for wildlife conservation & environmental education.

Ex Situ Conservation

- In this approach, threatened animals & plants are taken out from their natural habitat & placed in special setting where they can be protected & given special care.
- **Zoological parks, botanical gardens, wildlife safari parks & seed banks** serve this purpose.
- There are many animals that have become extinct in the wild but continue to be maintained in zoos.
- In recent years ex-situ conservation has advanced beyond keeping threatened species.

BIODIVERSITY CONSERVATION

In-Situ Conservation

It is **on-site conservation** of genetic resources in natural populations of plant or animal species.

Eg: Biosphere reserves, national parks, sanctuaries, reserved forests, protected forests and nature reserves.



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Reserved & Protected Forests

- Reserved forests:** Rights to all activities like hunting, grazing, etc. are banned unless specific orders are issued otherwise.
- Protected Areas:** In protected areas, rights to activities like hunting and grazing are sometimes given to communities living on the fringes of the forest

Wildlife Sanctuaries

- Grazing, firewood collection by tribals is allowed.
- Settlements not allowed.**
- A Sanctuary can be promoted to a National Park.

National Park

- No rights are allowed.
- No grazing of any livestock shall also be permitted.

Eco-Sensitive Zones

- Land falling within 10 km of the boundaries of national parks and wildlife sanctuaries.
- Declared under the Environmental (Protection) Act, 1986.
- The protected areas are based on the core and buffer model of management.
- Note:** The core area has the legal status of being a national park.
- The buffer area does not have the legal status of being a national park and could be a reserved forest, wildlife sanctuary or tiger reserve.

Biosphere Reserve

Conservation of wildlife, plant and animal resources and traditional life of the tribals living in the area.

Used for scientific research, monitoring, training and education.



Ecologically sustainable human settlements and economic activities (tourism) are permitted.



Human activity is not allowed.

Buffer

Transition

Tiger Reserve

- Same as sanctuaries.
- They are monitored by NTCA under Project Tiger.
- Created based on 'core-buffer' strategy.
- Core Areas are freed of all human activities.
- Core Area has the legal status of a national park or wildlife sanctuary.

Conservation Reserves

- Declared by the State Governments in any area owned by the Government.
- The rights of people living inside a Conservation Reserve are not affected.

Community Reserves

- Declared by the State Government in any private or community land, not comprised within a National Park, Sanctuary or a Conservation Reserve.
- The rights of people living inside a Community Reserve are not affected.



Ex-Situ Conservation

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Threatened animals and plants are taken out from their natural habitat and placed in special setting where they can be protected and given special care.

National Bureau of Plant Genetic Resources (NBPGR), Delhi is primarily responsible for conservation of unique accessions on long-term basis

Eg: Zoological parks, botanical gardens, wildlife safari parks and seed banks serve this purpose.

Zoo

- Where captive animals are kept for exhibition to the public and includes a circus and rescue centres but does not include an establishment of a licensed dealer in captive animals.
- Zoos have a role to play in species conservation too (through captive breeding).

Botanical Garden

- Refers to the scientifically planned collection of living trees, shrubs, herbs, climbers and other plants from various parts of the globe.

Suggested Reading: [Biodiversity Conservation: In Situ & Ex Situ Conservation](#)

{Envi – Conservation – 2020/12} Green Ammonia

[Livemint](#) | Prelims + Mains | GS3 > Environmental Pollution & Degradation | GS3 > Conservation

- **Context:** GOI is planning to invite bids for setting up green ammonia projects to reduce import dependence.
- Ammonia is a **pungent gas** that is widely used to make **agricultural fertilisers**.
- Green ammonia production is where the **process of making ammonia is 100% renewable & carbon-free**.

- The production of green ammonia could help in the transition to **net-zero carbon dioxide emissions**.
- These include:
 1. **Ease of Energy Storage:**
 - a) Ammonia is **easily stored in bulk as a liquid** at modest pressures. This makes it an ideal chemical store for renewable energy.
 - b) There is an existing distribution network, in which ammonia is stored in large, refrigerated tanks & transported around the world by pipes, road tankers & ships.
 2. **Zero-Carbon Fuel:**
 - a) Ammonia can be burnt in an engine or used in a fuel cell to produce electricity.
 - b) When used, ammonia's only **by-products are water & nitrogen**.
 3. **Hydrogen Carrier:**
 - a) **Hydrogen (used in PEM fuel cells) is difficult & expensive to store in bulk** (needing cryogenic tanks or high-pressure cylinders).
 - b) Ammonia is easier & cheaper to store, & transport & it can be **readily “cracked” & purified to give hydrogen gas when required**.

{Envi – Conservation – 2020/12} GRIHA

[PIB](#) | Prelims + Mains | GS3 > Conservation

- **Context:** Recently, 12th Green Rating for Integrated Habitat Assessment (GRIHA) summit was inaugurated.
- GRIHA is a **national rating tool** that assesses the performance of buildings against certain benchmarks.
- It **evaluates the environmental performance of a building** holistically, thereby providing a definitive standard for what constitutes a '**green building**'.
- It is developed by **The Energy & Resources Institute (TERI)** with support from **Ministry of New & Renewable Energy (MNRE)**.

Some of the benefits of a green building are

- Reduced energy consumption without sacrificing the comfort levels
- Reduced destruction of natural areas, habitats, & biodiversity, & reduced soil loss from erosion etc.
- Reduced air & water pollution (with direct health benefits)
- Reduced water consumption
- Limited waste generation due to recycling & reuse

The Energy & Resources Institute (TERI)

- Established in **1974** as **Tata Energy & Resource Institute**.
- TERI is an **independent research institute**, headquartered in Delhi.
- It conducts research work in the fields of **energy, environment, & sustainable development**.

{Envi – Conservation – 2020/12} National Mission for Sustaining Himalayan Eco-system (NMSHE)

[Livemint](#) | Prelims + Mains | GS3 > Conservation

- **Context:** Recently 3 centres of excellence were inaugurated under NMSHE.
- They are at Kashmir, Sikkim & Tezpur.
- The primary objective of the Mission is to:
 1. Develop a sustainable model to continuously assess the health status of the Himalayan Ecosystem, and
 2. Enable policy bodies in their policy-formulation to **assist States in the Indian Himalayan Region** with implementation of actions selected for sustainable development.

The NMSHE will attempt to address a variety of important issues:

- Himalayan glaciers & associated hydrological consequences.
- Prediction & management of natural hazards.
- Biodiversity conservation & protection.
- Wildlife conservation & protection.
- Traditional knowledge societies & their livelihood.

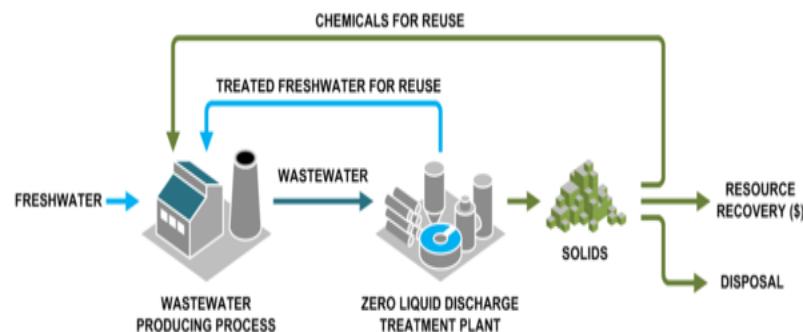
The effect of Climate Change on Himalayan glaciers & associated hydrological consequences:

- Increased drought like situations due to overall decrease in the number of rainy days.
- Increased flood events due to overall increase in the rainy-day intensity.
- Effect on groundwater quality in alluvial aquifers due to increased flood & drought events.
- Influence on groundwater recharge due to changes in precipitation & evaporation.
- Increased saline intrusion of coastal & island aquifers due to rising sea levels.

{Envi – Conservation – 2020/12} Zero Liquid Discharge (ZLD) policy

[TH](#) | Prelims + Mains | GS3 > Conservation

- **Context:** The Centre is examining various options of moving forward on the country's ZLD policy to ensure that investment is not hampered while environment continues to be protected.
- ZLD is a **water treatment process** to recirculate all the water back to the process with zero liquid waste.
- **It has near zero impact on environment.**
- The focus of ZLD is to reduce wastewater economically & produce clean water that is suitable for reuse (e.g., irrigation), thereby saving money & being beneficial to the environment.
- ZLD systems employ advanced wastewater/desalination treatment technologies to purify & recycle virtually all of the wastewater produced.
- Also, ZLD technologies help plants meet discharge & water reuse requirements, enabling businesses to:
 1. Meet stringent government discharge regulations
 2. Reach higher water recovery (%)
 3. Treat & recover valuable materials from the wastewater streams, such as **potassium sulfate, caustic soda, sodium sulfate, lithium & gypsum**



{Envi – In News – 2020/11} Roridomyces Phyllostachydis

[IE](#) | GS3 > Conservation | GS3 > Biodiversity

- **Context:** 'Roridomyces phyllostachydis' — a new mushrooms species discovered in the forests of Meghalaya.

Key Points

- It is a **bioluminescent mushroom** (light emitting variety of mushroom).
- The Roridomyces phyllostachydis was first sighted near a stream in Meghalaya.
- It is now one among the **97 known species of bioluminescent fungi in the world**.

Bioluminescence

- Bioluminescence is the property of a living organism to produce and emit light.
- Animals, plants, fungi and bacteria show bioluminescence.
- Bioluminescent organisms are usually found in the ocean environments, but they are also found on terrestrial environments.
- The colour of the light emitted by the organism depends on their chemical properties.
- In the **case of fungi, the luminescence comes from the enzyme, luciferase**.
- The [green] light emits when luciferans is catalysed by the enzyme luciferase, in the presence of oxygen.



[Source and Credits](#)

{Envi – Invasive Species – 2020/12} Pink Phenomenon

[DTE](#) | **Prelims** | GS3 > Environmental Pollution and Degradation

- **Context:** In a village in Kerala the widespread growth of an aquatic plant has painted the water bodies pink.
- The plant behind the 'pink phenomenon' is **forked fanwort**, which comes from the family of Red Cabomba.
- Cabomba is a **submerged perennial aquatic plant** that grows in **stagnant to slow-flowing freshwater**.
- It is an **invasive species** that **belongs to Central and South America**.
- It **requires a huge amount of oxygen** to grow and that could badly affect freshwater biodiversity.



Invasive Species

- Any biological species that are **introduced outside their natural range** and negatively **impact the native biodiversity**, ecosystem function, health and human welfare are called invasive alien species.
- They are the **second-biggest cause for biodiversity loss, next to habitat destruction**.
- Invasive alien species could reproduce rapidly and out-compete the native species for food, water, and space.

{Envi – IUCN – 2020/12} Gir Lions

[IE](#) | Prelims | GS3 > Conservation

- **Context:** Recently, the lions have been spotted in Gujarat's Jasdan area.

Asiatic Lion

- **Scientific Name:** Panthera Leo Leo.
- **IUCN Status:** [Endangered](#).
- Population of **Asiatic Lions are surviving today only in India**.
- Since the turn of the 20th century, its range is restricted to **Gir National Park** and the surrounding areas.
- **Threats:** Habitat destruction, Diseases spreading from domestic animals.
- The **Asiatic Lion Reintroduction Project** to find an alternative habitat for reintroducing Asiatic lions was pursued in the early 1990s.

Gir National Park and Wildlife Sanctuary

- Today, it is the only area in Asia where **Asiatic lions** occur.
- In 2015, the population of Asiatic lions was 523 (27% up compared to previous census in 2010).

- The lion population is highest in **Junagadh District** (268 individuals), Amreli, Gir Somnath and Bhavangar Districts have a sizeable Asiatic lion population.
- **Kamleshwar Dam situated in the park is 'the lifeline of Gir'.**
- Vegetation: dry deciduous scrub forest. Teak and acacia are found.
- Major Fauna: **Asiatic lion (EN)**, **Mugger crocodile (VU)**, Indian leopard, striped hyena, Golden jackal, chital, nilgai, sambar, four-horned antelope, chinkara, wild boar, blackbuck, etc.

{Envi – IUCN – 2020/12} Great Indian Bustard (GIB)

[DTE](#) | Prelims | GS3 > Conservation

- It is one of the **heaviest flying birds in the world**.
- It is the **State bird of Rajasthan**.
- **Habitat:** large expanses of **dry grassland & scrub**.
- Its largest populations are found in the Indian state of **Rajasthan (Jaisalmer)**.
- **IUCN Red List Status:** [Critically Endangered](#)
- **Appendix I of CITES**
- **Schedule I of the Indian Wildlife (Protection) Act, 1972**.
- **Threats:** Habitat loss, hunting, mortality due to collision with power lines (they have a poor frontal vision).



{Envi – IUCN – 2020/12} Himalayan Griffon Vulture

[TOI](#) | Prelims | GS3 > Conservation

- **Context:** Himalayan griffon vulture has been sighted for the first time at the **Point Calimere WLS (TN)**.
- Himalayan griffon vulture is found along the Himalayas and the adjoining Tibetan Plateau.
- **IUCN status:** [Near threatened](#)
- **Appendix II** of the CITES.
- **Threat:** Himalayan vultures are also susceptible to toxicity induced by [Diclofenac](#).



Read More: [Indian Vulture Crisis Due to Diclofenac, Vulture Safety Zones](#)

{Envi – IUCN – 2020/12} Himalayan Serow

[IE](#) | Prelims | GS3 > Conservation

- **Context:** A Himalayan serow has been sighted for the first time in the Himalayan cold desert region.
- Habitat: Himalayan region — typically found at altitudes between 2,000 m & 4,000 m.
- **IUCN:** [Vulnerable](#)
- **Wildlife Protection Act, 1972: Schedule I**

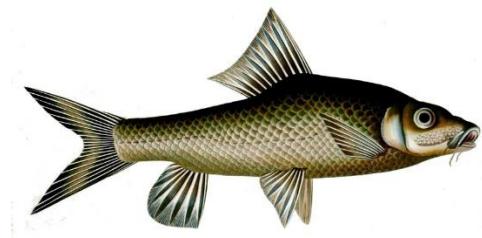


[Source & Credits](#)

{Envi – IUCN – 2020/12} Hump Backed Mahseer

[IE](#) | Prelims | GS3 > Conservation

- The humpbacked mahseer is a large **freshwater fish**.
- It is found **only** in the **Cauvery river basin**.
- It is also known as the **Tiger of the Water**.



- **IUCN Red List Status:** [Critically Endangered](#).

- **Threats:** dams, destructive fishing methods, reduced water flow rates, water & pollution, etc.

{Envi – IUCN – 2020/12} IUCN updated its Red List

Prelims | GS3 > Conservation

- **Context:** IUCN updated its Red list of threatened species recently.
- IUCN is an **NGO** working in the field of **nature conservation & sustainable use of natural resources**.
- It is involved in data gathering and analysis, research, field projects, advocacy, lobbying and education.
- The organization is best known for compiling and publishing the **IUCN Red List**.
- Its headquarters are in **Gland, Switzerland**.

Must Read: [IUCN Red List India | Red Data List | Red Book Part-1](#)

{Envi – IUCN – 2020/12} Increase in Population of Leopard

[HT](#) | Prelims | GS3 > Conservation

- **Context:** The population of leopard in India has **increased by 60 per cent**, according to GOI report.

About Leopard

- Leopards are known to exist **awfully close to human habitations**.
- Indian subspecies is found in **all forested habitats** in the country.
- It is **absent only in arid deserts & above timber line in Himalayas**.
- In Himalayas we have **snow leopard**.
- **IUCN:** [Vulnerable](#)
- **CITES:** Appendix I
- **Wildlife Protection Act, 1972:** Schedule 1.
- **Threat:** hunting, poaching, habitat loss, depletion of natural prey, human conflict.

Status of Leopard in India

- India now has 12,852 leopards.
- More than 60 per cent increase over the previous estimate which was conducted in 2014
- State wise Leopard population:
 - ✓ **MP: 3421 MP is (Highest in both Tiger & Leopard).**
 - ✓ **Karnataka: 1783**

- ✓ **MH: 1690**
- ✓ **Central India has highest number of leopards followed by eastern ghats.**
- Rajasthan is the 1st state to launch project leopard.
- **Note:** Other big cats IUCN status:
 1. **Lion:** [Endangered](#)
 2. **Tiger:** [Endangered](#)

{Envi – IUCN – 2020/12} Kolar Leaf-Nosed Bat

[IE](#) | Prelims | GS3 > Conservation

- It is **endemic to India**.
- It is **found in only two caves in the village of Hanumanahalli in Kolar district of Karnataka**.
- **IUCN:** [Critically Endangered](#)
- **Wildlife Protection Act 1972:** Not been accorded with the legal protection.
- Bats are vital for the ecology as they are **pollinators**, their main diet being nectar.
- The plants that bloom at night are entirely dependent on bats & moths for pollination.
- Bats also help in insect control & therefore, help in the protection of crops.



{Envi – IUCN – 2020/12} Malayan Giant Squirrel

[IE](#) | Prelims | GS3 > Conservation

- **Context: Zoological Survey of India (ZSI)** has projected that numbers of the **Malayan Giant Squirrel** could decline by 90 per cent in India by 2050.

About Malayan Giant Squirrel

- The Malayan Giant Squirrel is **one of the world's largest squirrel species.**
- It is currently found in parts of **North-Eastern States** and **South-East Asia**.
- It is found in evergreen and semi-evergreen forests, from plains to hills at elevations of 50 m to 1,500 m.
- IUCN Red List: [Near Threatened](#)
- CITES: Appendix II
- Wildlife Protection Act, 1972: Schedule I
- **Threats:** Deforestation, Fragmentation of forests, Crop cultivation and Over-harvesting of food.



[Source and Credits](#)

Zoological Survey of India (ZSI)

- The Zoological Survey of India (ZSI) was launched in 1916.
- ZSI promote survey, exploration, and research to enhance the knowledge regarding the flora and fauna.
- It is India's **apex organization on animal taxonomy.**
- HQ: Kolkata.
- It has been declared as a designated repository for the National Zoological Collection.

Primary Objectives

- Exploration, Survey, Inventorying and Monitoring of faunal diversity in various States.
- Periodic review of the Status of Threatened and Endemic species.
- **Preparation of Red Data Book, Fauna of India, and Fauna of States.**
- Preparation of databases for the recorded species of the country.
- Maintenance & Development of National Zoological Collections.

{Envi – IUCN – 2020/12} Peacock Soft- Shelled Turtle

[IE](#) | Prelims | GS3 > Conservation

- **Context:** Peacock soft-shelled turtle has been rescued from a fish market in Assam's Silchar.
- This species is **confined to India, Bangladesh, and Pakistan.**
- These are found in rivers, streams, lakes and ponds with mud or sand bottoms.
- **Wildlife Protection Act, 1972: Schedule I**
- **IUCN Red List: Vulnerable**
- **CITES: Appendix I**

Threats

- The species is heavily exploited for its meat and calipee (outer cartilaginous rim of the shell).
- Overfishing, pollution, increase in river traffic, and sandmining, among others.



[Source and Credits](#)

{Envi – Laws – 2020/11} Coastal Regulation Zone (CRZ) Rules

[TH](#) | GS3 > Conservation

- **Context:** Recently, Supreme Court gives ultimatum to the builders in the Maradu flat demolition case to either propose a fresh plan to pay dues or face sale of all attached properties.

The Story so Far

- In 2007, the Maradu panchayat (now a municipality) issued a show-cause notice to builders that constructed high rise structures on the banks of **Vembanad Lake**, citing violations of CRZ norms.
- The Local Self Government directed the local body (Maradu panchayat) to revoke the permits.
- However, the **panchayat only issued a show-cause notice** to the builders for violating CRZ rules.

- The builders got a stay order from the **Kerala HC in 2007 which allowed them to continue construction.**
- Kerala HC ruled that the **builders could not be taken to task for not referring the applications to Kerala Coastal Zone Management Authority (KCZMA)** for a 'No-Objection Certificate' — a mandatory clearance.
- KCZMA filed a petition in the SC against the Kerala HC's order.
- **SC ordered the demolition of the apartments** by September 20 as the buildings fell within **CRZ-III**.
- Finally, the buildings were razed in January by the Kerala government.
- The case raises multiple concerns regarding environmental governance and adjudication.

Implications

Ecological Implications

- Contamination of the lake due to the debris.
- Air pollution caused by the demolition posed severe health hazards to those residing nearby.

Economic Implications: Builders, Buyers and the state, all lost money

- Explosion of illegal structures could cause collateral damage to the neighbouring structures.
- The economical vulnerable poor and the middle class are usually the primary victims of such demolitions.

Moral implications: Who is at fault? Who paid the price?

Municipal Authorities

- When there is weak enforcement of laws, corruption, and undue influences, violations become common.
- The civic authorities of Maradu turned a blind eye to the reminders from the KCZMA.
- It was the responsibility of the municipality and not the project proponents to send the files for clearance.

Builders

- The builders had constructed the apartments after conspiring with panchayat officials in 2006.
- In the Maradu case, the builders had never applied for a CRZ clearance.

Buyers

- Purchased the flats knowing similar constructions were challenged in courts elsewhere.
- In a populous burgeoning country like India, people are eternally land-hungry, and owning a house is an ultimate dream for many. To realise their dream, people ignorantly violate laws.

Judiciary

- Kerala HC held that permit holders should not be made liable and allowed the construction.

- SC relied on bureaucratic categorisation and ignored that the construction was based on permission granted by the local government and ordered the demolition of the structures.
- While State authorities and courts were complicit in allowing the buildings to be constructed in the first place, liability was ultimately placed squarely on the apartment owners.

Legal: Ambiguity surrounding the CRZ rules

- As per the CRZ notification of 1991 the area in question came under CRZ-III.
- Maradu became a municipality in 2010 and consequently, the 2011 CRZ notification categorised it under CRZ-II, though the MoEFCC approved this only in February 2019.
- SC held that the area fell within CRZ-III at the time of construction and ordered the demolition.

Coastal Regulation Zone (CRZ) Rules

- After the passing of the **Environment Protection Act in 1986, CRZ Rules were first framed in 1991.**
- The CRZ Rules **govern human and industrial activity close to the coastline.**
- After the 1991 rules were found to be restrictive, the Centre notified new Rules in 2011.
- In 2018, fresh Rules were issued, which aimed to remove certain restrictions on building, streamlined the clearance process, and aimed to **encourage tourism in coastal areas.**
- In all Rules, the regulation zone has been defined as the area up to **500 m from the high-tide line (HTL).**
- **CRZ Rules are made by the Union Environment Ministry.**
- **Implementation is to be done by state governments** through their Coastal Zone Management Authorities.
- The states need to frame their **own coastal zone management plans** in accordance with the central Rules.

Evolution of the rules

- Despite several amendments, states found the 1991 Rules to be extremely restrictive.
- The 1991 Rules also created hurdles for industrial and infrastructure projects such Navi Mumbai.

CRZ Rules in 2011

- An exemption was made for the construction of the Navi Mumbai airport.
- Projects of the Department of Atomic Energy (nuclear power plants near the coast) were exempted.

Coastal Regulation Zone Notification, 2011

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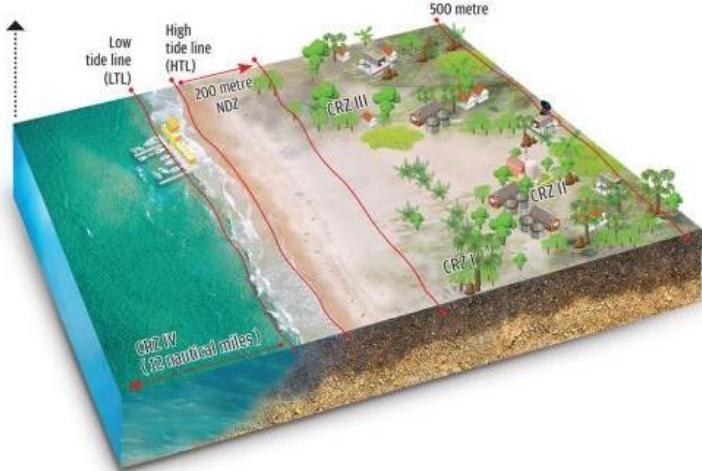
CRZ I: Eco-sensitive and intertidal areas

CRZ II: Areas which have been developed up to or close to the shore

CRZ III: Areas that are relatively undisturbed and do not fall under CRZ-I or CRZ-II

CRZ IV: Area between Low Tide Line and 12 nautical miles into the sea/ tidal influenced waterbodies

NDZ: No development zone that extends up to 200 m from High Tide Line towards land in CRZ-III area



Coastal Regulation Zone Notification, 2018



GRAPHICS: RAJ KUMAR SINGH / CSE

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CRZ I A: Eco-sensitive areas

CRZ I B: Inter-tidal areas

CRZ II: Areas which have been developed up to or close to the shore

CRZ III A: CRZ-III areas, where the population density is more than 2,161 sq km as per 2011 Census

CRZ III B: Areas with population density of less than 2,161 per sq km, as per 2011 Census

CRZ IV A: 12 nautical miles from the Low Tide Line towards the sea

CRZ IV B: Tidal influenced waterbodies

NDZ: 50 metres from High Tide Line in CRZ III A areas, 200 m from HTL in CRZ-III B areas

Source and Credits: [D2E](#)

CRZ Rules 2019

- In January 2019, the government notified new CRZ Rules with the stated objectives of promoting sustainable development and conserving coastal environments.
- For the so-called CRZ-III (Rural) areas, two separate categories have been stipulated.
 - In the densely populated rural areas (**CRZ-III A**) with a population density of 2,161 per sq km as per the 2011 Census, the **no-development zone is now 50 m from the high-tide level, as against the 200 m stipulated earlier.**
 - In the **CRZ-III B** category (rural areas with population density below 2,161 per sq km) continue to have a no-development zone extending up to 200 m from the high-tide line.
- The new Rules have a **no-development zone of 20 m for all islands close to the mainland coast**, and for all backwater islands in the mainland.
- Floor Space Index Norms eased:** In the CRZ 2019 Notification, the government decided to de-freeze the Floor Space Index and permit FSI for construction projects.
- Tourism infrastructure permitted in coastal areas:** The new norms permit temporary tourism facilities such as shacks, toilet blocks, change rooms, drinking water facilities, etc. in Beaches.
- Streamlining of CRZ Clearances:** Projects which are located in the **CRZ-I (Ecologically Sensitive Areas)** and **CRZ IV (area covered between Low Tide Line and 12 Nautical Miles seaward)** will be dealt with for CRZ clearance by the **Central Ministry**.

- The powers for clearances with respect to CRZ-II and III have been delegated at the State level.

COAST CUTTER

CLASSIFICATION

CRZ I | Ecologically sensitive areas like sanctuaries, reserve forests, mangroves, coral reefs, turtle-nesting grounds, which could be inundated due to rise in sea level

CRZ II | Areas which have already been developed up to the shoreline within municipal or corpn limits

CRZ III A | CRZ III areas with a population of more than 2,161 per sqkm. Here, 50m from high tide will be no-development zone (NDZ)

CRZ III B | Other CRZ III areas with less population. Here area up to 200m from the HTL on the landward side will be earmarked as NDZ

BOOST FOR TOURISM

► With the freeze on constructions along the coastal zone more or less lifted, the tourism sector will be the biggest beneficiary



► Toilets, changing rooms, drinking water facility and temporary shacks can be constructed even on beaches

► Existing residential buildings can be converted into homestays without increasing the plinth area

► CRZ will not be a bar for public utilities like roads even if it passes through mangrove forests

► Introduction of CRZ-III into A and B clauses will address state's main concern of issuing permission to dwelling units as well

BACKGROUND

► Under Environment Protection Act, 1986 a notification was issued in February 1991 for regulation of activities in coastal area by the ministry of environment and forests

► Coastal land up to 500m from the high tide line (HTL) and area of 100m along banks of estuaries, backwater, creeks and rivers which are subject to tidal fluctuations are called coastal regulation zone (CRZ)

Sea change

Coastal zone rules, 2011

- No development in CRZ-1, the most ecologically sensitive zone, except for defence, strategic purposes

- The 500-metre CRZ is apportioned into 4 subdivisions

- Coastal Regulation Zone shall apply to the land between high tide line to 100 metres on landward side of creeks, estuaries, rivers

- States have no discretion

Coastal zone rules, 2018

- Eco-tourism activities such as mangrove walks, tree huts and nature trails, among others, in identified stretches, subject to permissions

- There are now further subdivisions within these 4 regions. For instance, the CRZ-1 is split into CRZ-1a and CRZ-1b and CRZ-3 has 3a and 3b

- CRZ shall apply to the land area between high tide line to 50 mts on the landward side of creeks, estuaries, backwaters and rivers

- 50 metre-limit after approval of State

Mains Practise:

- Q.** "Demolishing illegal structures comes with a baggage of moral, constitutional (legal), ecological and humanitarian implications." Examine this statement with relevant examples.
- Q.** "Environmental governance is a victim of pathologies of the executive and the judicial decision-making on environment and urban development in India." Examine.
- Q.** "For **environmental justice**, India needs a strong **environmental governance** system that enables all stakeholders to prevent violations instead of the court becoming India's new demolition man." Elaborate this statement citing recent examples.

{Envi – Solid Waste – 2020/12} Waste to Energy Plant

[TH](#) | Prelims + **Mains** | GS3 > Conservation

- **Context:** Foundation stone laid for a 11.5 MW waste-to-energy (WTE) plant near Bidadi, Karnataka.
- Waste-to-Energy is the process of generating energy in the form of electricity and/or heat from the waste.
- Step1: segregation of biodegradable or wet waste from dry waste at source.
- Step 2: municipal governments can use wet waste to produce compost and biogas in bio methanation plants.
- Step 3: the dry waste, after removing recyclable elements, goes to waste-to-energy plants.
- The inorganic material (dry waste) is processed as **Refuse Derived Fuel (RDF: calorific value: 2,500 kJ/kg)**.
- This waste (RDF), usually taken from industrial or commercial sites, is burned to produce electricity.
- **Refuse Derived Fuel is a renewable energy source** that ensures waste simply is not thrown into a landfill.

Advantages of WTE plants

- Dependence on **Fossil fuels & Foreign countries** will be reduced.
- **Dual purpose will be served** i.e. -waste to energy & reduction in the volume of waste for disposal.
- Area required for waste disposal will be minimised.
- Energy obtained is clean & renewable.

Challenges associated with Waste-to-Energy plants in India

1. Cost of Operation is high because India is heavily dependent on foreign countries for technology.
2. **Nature of Waste:** WTE plants require fine inorganic material with less than 5% moisture & less than 5% soil contents, whereas the moisture and inert content in Indian Municipal Solid Waste is more than 15%-20%.
3. **Segregation at Source:** Since segregation at source doesn't happen in the city, the collected waste material needs to be sieved which adds up to the additional costs.

4. **Low Calorific value of electricity generation:** Sticky silt and soil particles can also reduce the calorific value.
5. **Power tariff:** the tariff at which the power is purchased by WTE plants is around ₹7-8 KwH which is higher than the ₹3-4 per KwH generated through coal and other means.

{Envi – Tiger – 2020/11} Tiger Conservation Award 2020

[TH](#) | GS3 > Conservation

Basics: [Tiger Census Report 2018](#)

Tiger Reserves Map: https://drive.google.com/file/d/1kA-Rn32zbn8XvhGo9rA7u3JGMA_buYp/view

Maps by Pmfias.com: <https://drive.google.com/drive/folders/1hWbzmAwjX37nUsepsr8ucigbJPbeiW8S>

Context

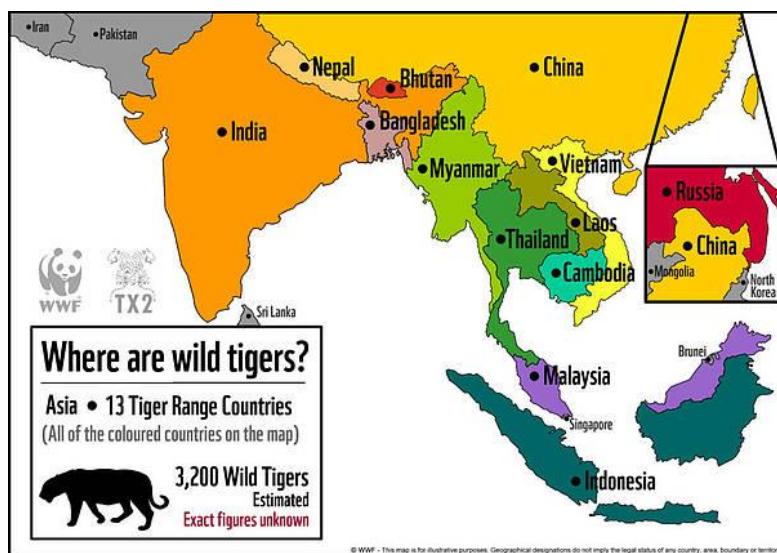
- **Manas conservation area** has received the **TX2 Conservation Excellence Award for 2020**.
- The number of the striped cat in the **Indian Manas** increased from nine in 2010 to 25 in 2018 while that in the **Bhutan Manas** more than doubled from 12 in 2008 to 26 in 2018.
- With 65 individuals recorded in 2018, the **Pilibhit Tiger Reserve** in Uttar Pradesh has won the **TX2 award** for doubling its population of wild tigers since 2010.
- TX2 stands for “**Tigers times two**”, signalling the **goal to double the population of wild tigers by 2022**.
- India and Bhutan are among 13 countries working towards TX2, a goal that the **World Wildlife Fund (WWF)** had set through the **Global Tiger Initiative, Global Tiger Forum** and other critical platforms.

World Wide Fund for Nature (World Wildlife Fund or WWF)

- It is an international NGO founded in 1961.
- It is headquartered at Gland, Switzerland.
- It was formerly named the **World Wildlife Fund**.
- It works towards **wilderness preservation**, & the **reduction of human impact on the environment**.
- WWF aims to “**stop the degradation of the planet’s natural environment** and to build a future in which **humans live in harmony with nature**.”
- The **Living Planet Report** is published **every two years** by **WWF** since 1998.
- WWF has launched several notable worldwide campaigns including **Earth Hour** and **Debt-for-Nature Swap**.
- **The Wildlife Trade Monitoring Network (TRAFFIC, an NGO)** is a joint programme of **WWF** and **IUCN**.

The Global Tiger Initiative (GTI)

- The Global Tiger Initiative (GTI) was launched in 2008 as a global alliance of governments, NGOs, and the private sector, with the **aim of working together to save wild tigers from extinction**.
- In 2013, the scope was broadened to include **Snow Leopards**.
- The GTI's founding partners included the **World Bank**, the **Global Environment Facility (GEF)**, the Smithsonian Institution (a group of museums), International Tiger Coalition (40+ NGOs), etc.
- The initiative is led by the **13 tiger range countries** (TRCs – India, Bangladesh, Bhutan, Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, Russia, Thailand and Vietnam).



[Source and Credits](#)

Global Tiger Forum

- Established in 1994, the Global Tiger Forum (GTF) has its headquarters in **New Delhi**.
- The General Assembly of GTF meets after **every three years**.
- It was set up to promote a worldwide campaign to save the tiger, its prey and its habitat.

St. Petersburg Declaration on Tiger Conservation

- In 2010, the 13 **TRCs** adopted the St. Petersburg Declaration on Tiger Conservation and endorsed its implementation mechanism, called the **Global Tiger Recovery Program**.
- The **global TX2 goal** was to **double the number of world's wild tigers** from ~3,200 to 7,000+ by **2022**.

TX2 Award and Tiger Conservation Excellence Award

- **TX2 Award** and **Tiger Conservation Excellence Award** are awarded to sites that are contributing towards achieving the TX2 goal.
- The **TX2 Award** will go to one site that has achieved remarkable increase in its tiger population since 2010.
- **Pilibhit Tiger Reserve** has **won the inaugural TX2 Award in 2020**.
- **Conservation Excellence Award** recognises one site that has achieved excellence in at least 2/5 themes:
 1. Tiger and prey population monitoring and research (tiger translocation / prey augmentation)
 2. Effective site management (CA|TS and METT assessments)
 3. Enhanced Law Enforcement & protection & Ranger Welfare improvement
 4. Community based conservation, benefits and Human-Wildlife conflict mitigation
 5. Habitat and prey management
- The **Transboundary Manas Conservation Area** or TraMCA (India-Bhutan border) has **received the Conservation Excellence Award for 2020**.
- TraMCA comprises of
 1. The 500 sq. km. - **Manas National Park in Assam** and
 2. The 1,057-sq. km.- **Royal Manas National Park in Bhutan**.

Manas Tiger Reserve, National Park

- It is a UNESCO Natural World Heritage site, an **elephant reserve** and a **biosphere reserve (Map)**.
- It is contiguous with the Royal Manas National Park in Bhutan.
- Right branch of the Manas river passes through the heart of the national park.



Major Fauna

- The combination of **bhabar-terai** formation makes it one of the richest areas of biodiversity.
- Rare and Endangered endemic wildlife: **Assam roofed turtle (EN)**, **hispid hare (EN)**, **golden langur (EN)** & **pygmy hog (EN)**.
- Manas is famous for its population of the **wild water buffalo (EN)**.
- The grassland biomes: **pygmy hog**, **rhinoceros (re-introduced in 2007)**, elephants, **Bengal florican (CR)**, **Schedule I of WPA 1972, Appendix I of CITES, Appendix I of CMS**, etc.

Pilibhit Tiger Reserve

- It lies along the **India-Nepal border** in the foothills of the Himalayas and the plains of the 'terai'.
- The **Sharda Sagar Dam** is on eastern boundary of the reserve.
- **River Sharda** (tributary of **River Ghaghara**) forms the north-eastern boundary of the reserve.
- Vegetation: sal forests, tall grasslands and swamps characterised by periodic flooding.
- Major Fauna: Bengal tiger, leopard, swamp deer, spotted deer, **gharial**, etc.

{Envi – UNFCCC – 2020/12} India & INDC

[TH](#) | Prelims + Mains | GS3 > Conservation | GS3 > Climate Change

- **Context:** India is on track to meet its **INDC commitment by the target year of 2030**.
- India had achieved **21% of its emissions intensity reduction target as a proportion of its GDP in line with its pledge to a 33-35% reduction by 2030**.
- The share of renewables in our energy mix is **37.9%**.
- **Tree cover** of India has **increased** by 15,000 sq.km. in six years.
- **Solar capacity** has grown to **36 gigawatts in 2020** from 2.63 gigawatt in 2014.
- India is the only major G20 country compatible with a less than 2°C world.

About Intended Nationally Determined Contributions (INDCs)

- INDCs are **voluntary pledges** that countries took to cut carbon emissions ahead of [2015 Paris summit](#).

INDC & INDIA

- In 2015, India announced three voluntary commitments called the **Nationally Determined Contributions**:
 1. **Improving the emissions intensity of its GDP by 33–35% by 2030 over 2005 levels.**
 2. **Increasing the share of non-fossil fuels-based electricity to 40% by 2030.**

3. Enhancing its forest cover, thereby absorbing 2.5 to 3 billion tonnes of carbon dioxide.

- Recently, government has constituted an Apex committee for implementation of Paris Agreement.
- Recent **Emission gap report (by UNEP)** highlighted that **India's per capita emission is 60% lower than global average.**

About Paris Climate Deal

- The Paris Agreement was adopted at COP 21 in Paris in 2015.
- It is **legally binding** international treaty on climate change.
- It **seeks to limit global average temperature rise to well below 2°C above pre-industrial levels & endeavour to limit the increase to 1.5°C.**

Must Read: [**Paris Agreement, Intended Nationally Determined Contributions \(INDC\)**](#)

{Envi – Water Pollution – 2020/11} Ammonia Pollution

[IE](#) | GS3 > Environmental Pollution and Degradation

- **Context:** Ammonia levels in the Yamuna River near Delhi had reached nearly 3 parts per million (ppm), almost six times above the **acceptable limit of 0.5ppm.**
- Ammonia is produced for commercial fertilizers and other industrial applications.

Ammonia

- Ammonia, a **colorless gas** with a distinct odour.
- It **occurs naturally** throughout air, soil and water and in plants and animals, including humans.
- The human body makes ammonia when the **body breaks down foods containing protein into amino acids** and ammonia, **then converting the ammonia into urea.**
- **Ammonium hydroxide** commonly known as household ammonia is an ingredient in many everyday household cleaning products.
- Ammonia has been **used in municipal treatment systems** for more than 70 years to prolong the effectiveness of disinfection chlorine added to drinking water.
- The addition of ammonia **enhances the formation of chloramines** (which may create objectionable tastes).
- It reduces the formation of chlorination by-products which may be carcinogenic.
- Ammonia is a basic building block for **ammonium nitrate fertilizer**, which releases **nitrogen**, an essential nutrient for growing plants, including farm crops and lawns.
- If the concentration of ammonia in water is **above 1 ppm it is toxic to fishes.**

- In humans, ingestion of water having ammonia levels of 1 ppm may cause damage to internal organs.

{Envi – Water Pollution – 2020/11} Blue Tide

[IE](#) | GS1 > Oceanography

- **Context: Bioluminescence or light-emitting tide** made an appearance along the coastline of Mumbai.

Key Points

- The **blue tide** phenomenon appears when **luminescent marine life makes the sea appear deep blue**.
- The spectacle occurs when **phytoplankton (microscopic marine plants), commonly known as dinoflagellates, produce light through chemical reactions in proteins**.
- Waves disturb these unicellular microorganisms and make them release blue light.
- Factors such as the **wind pattern and the temperature of the ocean** also determine their occurrence.

What is Bioluminescence?

- Bioluminescence is the property of a living organism to produce and emit light.
- **Animals, plants, fungi, and bacteria show bioluminescence.**
- It is found in many marine organisms such as bacteria, algae, jellyfish, crustaceans, sea stars, fish, sharks, etc.
- Luminescence is **generally higher in deep-living and planktonic organisms** than in shallow species.

Why do they glow?

- It is an **antipredatory response**.
- Bioluminescence is assumed to startle predators, causing them to hesitate, in a form of predator intimidation.
- Bioluminescence helps these organisms gather and make colonies.

Is the Blue Tide harmful?

- While smaller blooms may be harmless, **slow-moving larger blooms impact deep-sea fishing**.
- According to experts, the **phenomenon is an indicator of climate change**.
- It is an **ecological indicator of degraded water quality**.
- The phytoplankton shows up where seawater has **low dissolved oxygen and a high presence of Nitrogen**.
- Bioluminescence could have been caused by **heavy rain, fertilizers run off, discharge of sewage**, etc.

{Envi – Water Pollution – 2020/12} Organochlorine

- **Context:** Mysterious disease in Andhra Pradesh found to be linked with **Organochlorine**.
- Organochlorines (OC) are a group of **chlorinated compounds** that belong to the class of **persistent organic pollutants (POPs)** with high persistence in the environment.
- **Organochlorine pesticides are used in agriculture & mosquito control.**
- The compounds include **Dichlorodiphenyltrichloroethane (DDT)**, which is widely used in **anti-mosquito fogging**.

About Persistent Organic Pollutants (POPs)

- POPs are defined as “**chemical substances** that persist in the environment, **bioaccumulate** through the [food web](#), & pose a risk of causing adverse effects to human health & the environment”.
- Persistent organic pollutants (POPs) are chemicals of global concern due to their potential for:
 - ✓ long-range transport,
 - ✓ persistence in the environment,
 - ✓ ability to **bio-magnify & bio-accumulate** in ecosystems,
 - ✓ Have significant negative effects on human health & the environment.
- The most commonly encountered POPs are organochlorine pesticides, such as **DDT**, industrial chemicals, **polychlorinated biphenyls (PCB)** as well as unintentional by-products of many industrial processes.

Stockholm Convention on Persistent Organic Pollutants

- **Stockholm Convention on Persistent Organic Pollutants** is an international environmental treaty.
- It aims to **eliminate or restrict the production & use of persistent organic pollutants (POPs)**.

{Envi LBT – NP – 2020/11} Kaziranga NP

- **Context:** Kaziranga National Park resumes elephant safaris after the Covid shutdown.

About Kaziranga National Park

- It is a National park in the **Golaghat, Karbi Anglong, and Nagaon districts** of the state of **Assam**, India.
- It is a **UNESCO World Heritage Site**.
- Kaziranga is recognized as an **Important Bird Area** by **BirdLife International**.
- Vegetation: **terai** marsh with a vast expanse of **elephant grass** and dense tropical moist broadleaf forests.

- **Threats:** Floods and encroachment by people along the periphery.

Major Fauna

- The park hosts two-thirds (2,413) of the world's Great **One-horned Rhinoceroses (VU)**.
- The **One-Horned rhinoceros, Royal Bengal Tiger, Asian Elephant, Wild Water Buffalo, and Swamp Deer** are collectively known as the '**Big Five' of Kaziranga**.
- **Kaziranga** has the largest population of the **Wild Water Buffalo (EN)** anywhere.

{Envi LBT – NP – 2020/12} Kaziranga NP

In News | Prelims

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- The **One-Horned rhinoceros, Royal Bengal Tiger, Asian elephant, wild water buffalo & swamp deer** are collectively known as 'Big Five' of Kaziranga.
- **Kaziranga** has the largest population of the **wild water buffalo (EN)** anywhere.
- Small herbivores include the Indian muntjac, wild boar, & hog deer.

{Envi LBT – RS – 2020/11/16} Lonar Lake & Keetham lake declared Ramsar Site

IE | GS3 > Conservation

- **Context:** The meteor lake at **Lonar & Keetham lake** has been declared a Ramsar site.

List of Ramsar Sites in India: <https://www.pmfias.com/ramsar-sites-india-ramsar-convention-wetlands/>

Key Points

- **India now has 41 wetlands** of international importance under the treaty of **Ramsar Convention**.
- The **Lonar lake in Maharashtra** and **Sur Sarovar (Keetham lake) in Agra** are the recent entrants to the list of recognised **Ramsar sites**.

- The **Asan Conservation Reserve in Dehradun**, the **first wetland from Uttarakhand** to be recognised by Ramsar convention, was added to the list earlier this year.

Lonar Lake

- The **Lonar meteor lake** is in **the Deccan Plateau's volcanic basalt rock** of Buldhana district, **Maharashtra**.
- It was **created by the impact of a meteor 35,000 to 50,000 years ago**.
- The lake is part of Lonar Wildlife Sanctuary.
- It is a **saline and alkaline lake**, containing microbes like anaerobes, Cyanobacteria and phytoplankton.
- It is the second Ramsar site in the state after **Nandur Madhmeshwar Bird Sanctuary** in Nashik district.
- Lonar crater, is a notified **National Geo-heritage Monument**.
- It is one of the four known, **hyper-velocity, impact craters in basaltic rock anywhere on Earth**.
- The **oval shape** lake has a circumference of about 8 km (five miles) at top.

Keetham lake

- Keetham lake (**Sur Sarovar**) is a scenic lake just outside Agra on the Agra – Delhi highway (NH 2).
- Alongside the Keetham Lake is the Agra Bear Rescue Facility, which is a Sloth bear rescue facility dedicated to rehabilitating previously enslaved 'dancing bears'.
- The lake has been designated as a protected Ramsar site.
- The riverine belt of River **Yamuna surrounds the area of Sur-Sarovar**.
- Keetham Lake is pentagonal in shape.
- There are artificially created islands for shelter and breeding grounds to the migratory birds.

Basics: [Ramsar Convention on Wetlands](#)

{Envi LBT – RS – 2020/11} Mansar Lake Project

[Financial Express](#) | GS3 > Conservation

- **Context:** Union Minister of State for Development of North Eastern Region, inaugurated the **Mansar Lake Development plan in Jammu** through virtual mode.
- Situated 62 km from Jammu, the lake has religious significance apart from its serene beauty.
- Fishing is a major activity in the **natural freshwater lake**.
- **Surinsar-Mansar Lakes** are designated as [Ramsar Sites](#) in November 2005.

Suggested Reading: [Ramsar Sites in India](#)

{Envi LBT – RS – 2020/12} Ramsar List expanded to 42

[TOI](#) | **Prelims** | Environment Location Based Topics > Ramsar Sites

- **Context:** India has added one more wetland, **Tso Kar Wetland Complex** in Ladakh, in its list of Ramsar sites.
- Tso Kar wetland is **India's 42nd Ramsar site** & the **second in the UT of Ladakh**.
- The Tso Kar Basin is a high-altitude wetland complex, consisting of two principal waterbodies,
 1. Startsapuk Tso, a freshwater lake to the south, &
 2. **Tso Kar** itself, a **hypersaline lake** to the north, situated in the Changthang region of Ladakh.
- It is called Tso Kar, meaning white lake, because of the white salt efflorescence found on the margins due to the evaporation of highly saline water.
- Tso Kar Basin is an **Important Bird Area** according to the Bird Life International.
- It is a key staging site in the Central Asian Flyway.
- Also, the site is the most important breeding areas of the **Black necked Cranes** in India.
- Recently, two wetlands — the **Lonar lake in Maharashtra & Sur Sarovar (Keetham lake) in Agra** — were **added to the list of Ramsar sites**.

Suggested Reading: [Wetland Ecosystem, Measures to Protect Wetlands, NWCP](#) | [Ramsar Site](#)

{Envi LBT – TR – 2020/11} Pakke Tiger Reserve (PTR)

[TH](#) | GS3 > Conservation

- **Context:** Pakke Tiger Reserve (PTR) in Arunachal Pradesh has become the first in the eight-State northeast to provide insurance cover against COVID-19 for "green soldiers".

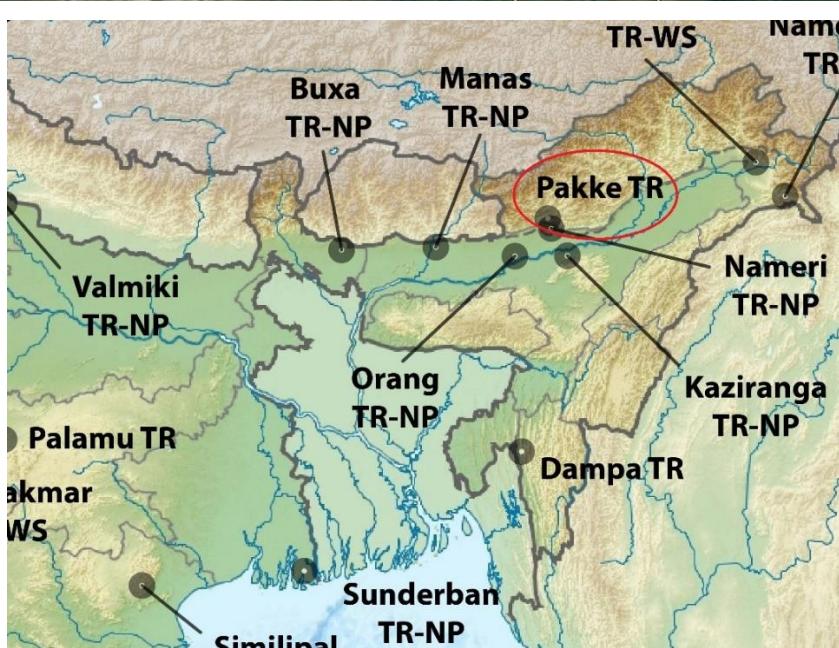
Pakke (Pakhui) Tiger Reserve

- It falls within the **Eastern Himalaya Biodiversity Hotspot**.
- It lies in the **foothills of the Himalayas** in Pakke Kessang District at altitude ranging from 150 to 2,000 m.
- The reserve is known for its **Hornbill Nest Adoption Programme**.



Great Indian Hornbill (NT)

- It is bounded by **Kameng River** in the west and north, and **by Pakke River in the east**.
- Towards the south and south-east, the sanctuary adjoins Assam's **Nameri National Park**.
- To the west, it is bounded by and **Eaglenest Wildlife Sanctuary** and **Sessa Orchid Sanctuary**.
- **Vegetation:** lowland semi-evergreen, evergreen forest and Himalayan broadleaf forests.
- **Major Fauna:** Bengal tiger, Indian leopard, clouded leopard, elephant, barking deer, gaur, sambar, rhesus macaque, Assamese macaque, etc.



{Envi LBT – TR – 2020/11} Panna Tiger Reserve

[Outlook India](#) | GS3 > Conservation | **Basics: Project Tiger**

- **Context:** Madhya Pradesh's **Panna National Park** has been declared a **UNESCO Biosphere Reserve**.

Key Points

- Every year UNESCO appoints new biosphere reserves and removes others to
 - ✓ Promote the conservation of biodiversity,
 - ✓ Resolve the man-animal conflict at that site, and
 - ✓ Allow sustainable use of natural resources.
- The Panna Tiger Reserve witnessed a remarkable growth in tiger population last year.
- The number of tigers increased to 50, from zero which was just a decade ago.
- The Tiger Reintroduction Project started in 2009 with tigers from Bandhavgarh and Kanha national parks.
- The All-India Tiger Estimation reported that **Madhya Pradesh has the highest number of tigers**.
- **The state has a total of 526 tigers according to the 2018 census.**

Panna Tiger Reserve, National Park

- **Panna National Park** along with **Ken Gharial Wildlife Sanctuary** form a significant part of the catchment area of the **Ken River** (a tributary of **Yamuna**) which runs northeast through the park.
- In the **Ken Gharial Sanctuary** **gharial**s (**CR fish-eating freshwater crocodiles**) are bred in captivity and then released.



- **Vegetation: fragmented deciduous forests.**
- **Major Fauna:** Tiger, leopard, chital, chinkara, nilgai, sambhar and sloth bear.
- **In 2012, there were no tigers left in the reserve.**
- A tiger each from **Bandhavgarh NP** and **Kanha NP** were translocated to Panna Tiger Reserve.

Man and Biosphere Programme (MAB Programme)

- It was first started by **UNESCO in 1971**.

- Later introduced in India in 1986.
- Aim: Studying the effects of human interference on the biotic and abiotic components of ecosystems.

The main objects of MAB programme are to

1. Conserve representative samples of ecosystem.
2. Provide long term in situ conservation of genetic diversity.
3. Provide opportunities for education and training.
4. Provide appropriate sustainable managements of the living resources.
5. Promote international co-operation.

{Envi LBT – TR – 2020/12} Satkosia Tiger Reserve

[HT](#) | Prelims | GS3 > Conservation | [**National Tiger Conservation Authority \(NTCA\)**](#)

- **Context:** The NTCA has asked Odisha chief wildlife warden to submit a status report on the adverse impact of tourism on Satkosia Tiger Reserve.
- Satkosia Tiger Reserve = **Satkosia Gorge Wildlife Sanctuary + Baisipalli Wildlife Sanctuary**.
- It is located where the **Mahanadi River** passes through a 22 km long gorge in the Eastern Ghats mountains.
- The area is also a part of the **Mahanadi elephant reserve**.
- Vegetation: moist deciduous forests including sal & riverine forest.
- Major Fauna: tiger, elephant, etc.

{Envi LBT – WLS – 2020/12} Pobitora Wildlife Sanctuary

[Xinhua](#) | Prelims | GS3 > Conservation

- **Context:** Migratory birds are widely seen at wetland of Pobitora wildlife sanctuary.

About Pobitora Wildlife Sanctuary

- Pobitora Wildlife Sanctuary is about 30 km to the **east of Guwahati**.
- The sanctuary is often called '**Mini Kaziranga**' because of a sizeable population of the **one-horned rhino**.
- Pobitora has exceeded its rhino-bearing capacity & is overpopulated.
- Under the Indian **Rhino Vision 2020 (IRV 2020)** several rhinos were translocated from Pobitora & re-introduced into the **Manas National Park**.

Pobitora Wildlife Sanctuary



Envi Locations Map: <https://drive.google.com/file/d/1BWTArHc93pb6ne8NqzpRMssWkS0sBc/view>