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Contents

1. ECOLOGY & BIODIVERSITY 01-25

- Black Softshell Turtle 1
- Golden Jackal's increase in Haryana's Asola Bhatti Wildlife Sanctuary 1
- New snake species discovered in Arunachal Pradesh 2
- New frog species discovered in Kerala 2
- Wild Buffalo population increases in Gadchiroli 3
- Honey as Pollution Detector 3
- East Asian Birds make Andaman stopover 3
- Two Great Indian Bustards Satellite-Tagged in Rajasthan 4
- Why the Hangul's future still hangs in the balance? 5
- Kaziranga National Park 5
- Orchids of India: A Pictorial Guide 6
- Tigers under High Stress 7
- Tiger Census 7
- World Elephant Day: India's jumbos stare at a worrying future 8
- Proposal to change IUCN Status of some species 9
- New Frog species confirmed 9
- New Monkey Species Discovered 10
- 18 Endangered Sharks and Rays Afforded Protection 10
- Gharial Conservation in India 11
- What is Cryodrakon Boreas? 11
- 2 New Ginger Species 12
- Nilgiri Tahr's Population up 27% in three years in TN 12
- Vulture Conservation: How the bird was saved from extinction? 13
- Anthrax Scare in reserve after the death of Buffaloes 14
- Madhya Pradesh set to get its 7th Tiger Reserve - Ratapani Tiger Reserve 14
- Top five largest Ramsar sites in India 15

- Dudhwa National Park 15
- Why India needs Project Dolphin? 16
- Avian Botulism in Sambhar Lake 16
- Rhinos to be re-introduced in Uttarakhand 17
- The Asiatic Lion Census is scheduled to take place 18
- Bhitarkanika census finds an increase of 15 saltwater crocodiles from last year 18
- A Giant fish is declared extinct 19
- Diego- the giant tortoise 19
- Highest number of wetland species in Kaziranga 20
- Addition of 3 Endangered Indian species to the Global Conservation List 20
- Madhya Pradesh Radio-Tags first-ever Indian Pangolin 21
- Arrangements for the Protection of Wild Life 22
- Cheetah Reintroduction Project 22
- Houbara Bustard 23
- Assam Roofed Turtle 23
- Pakke Tiger Reserve 23
- Senna Spectabilis 24
- Steppe Eagle has been sighted recently near Vijayawada 24
- Malabar Tree Toad 25

2. POLLUTION 26-34

- Menace of Stubble Burning 26
- Air pollution is the third-highest cause of death among all health risks in India 26
- Sewage Treatment Plants can turn E Coli into Superbug 27
- Ganga has a higher proportion of anti-bacterial agents 28
- Plastic Pollution 28
- Pet Bottles 29
- Chilika Lake 30
- Deforestation in the Amazon rainforest 30

- SO₂ Emissions.....31
- Lead Batteries.....31
- Nitrate Pollution.....32
- Solid fuels and household air pollution.....32
- Particulate Matter Emissions Trading33
- Heavy Metals Contaminating India's Rivers...33
- Hydrochlorofluorocarbon (HCFC)-141 b.....33

3. CLIMATE CHANGE 35-41

- Ground Frost reported from many35
states of South India
- Polar Vortex.....35
- Algae Thrive under Greenland Sea Ice.....36
- Coral Bleaching36
- Sea Level Increase37
- The Amazon Fire.....37
- Great Barrier Reef.....38
- Geo-engineering.....38
- New IPCC report warns of a dire threat39
to ocean
- Climate change is already damaging39
the health of children, says Lancet report
- Deforestation and Agriculture triggered40
soil erosion 4,000 years ago
- Emperor Penguins would be extinct if41
climate goals are not met
- Northern European Enclosure Dam (NEED)...41

4. CONFERENCES & REPORTS 42-66

- Sixth National Report (NR6) on42
Biological Diversity
- Climate Change Performance Index 201943
- India's proposal to remove rosewood44
from Appendix II of CITES
- Waterbird Survey.....45
- Alliance to End Plastic Waste45
- Smart Food Executive Council.....45
- South Asian Nitrogen Hub.....46
- Global Tiger Recovery Program47
- 13th COP of Bonn Convention.....47
- Hindu Kush Himalayan Assessment Report...48
- India-Norway Marine Pollution Initiative.....49
- UN Environment Assembly.....50
- Global Environment Outlook50
- Global Energy and CO₂ Status Report51

- Global Cool Coalition.....52
- International Solar Alliance (ISA).....53
- Global Carbon Project Report54
- CITES CoP 201954
- Global Coalition of the Willing55
on Pollinators
- 14th Conference of Parties (COP14) to55
the UN Convention to Combat Desertification
(UNCCD) and report on Soil Organic
Carbon (SOC)
- Climate and Clean Air Coalition.....56
- Basel Ban Amendment.....57
- Bonn Challenge.....58
- Emissions Gap Report 2019.....59
- Climate Emergency CoP 25: Climatic59
tipping point is closer than we think
- Ocean Deoxygenation60
- MECOS 3: Global Marine Ecosystem Meet....61
- India Climate Report 201961
- State of India's Birds Report 202062
- The Future of Earth, 2020.....63
- India 5th Most Polluted Country63
in the World
- State Energy Efficiency Index 201964
- Global Climate Risk Index, 202065
- Brown to Green Report, 201965
- Zero Carbon Law.....66

5. POLICIES, SCHEMES 67-89 & INITIATIVES

- Goa State Biodiversity Board's Tag.....67
- India and Nepal to sign the67
transboundary agreement for
conserving tigers, rhinos and elephants
- India - Spearheading Climate Solutions.....68
- Super-Efficient Air Conditioning69
Programme
- Green India Mission (GIM)70
- Grid Connected Rooftop Solar Programme...70
- India Cooling Action Programme71
- Star Labelling Programmes.....71
- Certification Standard for Sustainable72
Forest Management (SFM)
- Indian Forest Act, 1927.....73
- BS-IV and BS-VI Norms.....74
- Adidas set to tap the Indian firm's PET75
project to cut Virgin Plastic use

- Blue Flag Challenge75
- SATAT initiative76
- Blue Economy77
- Soil Health Card78
- Government releases Rs 47,436 crore79
fund for afforestation
- Coastal Regulation Zone79
- Jal Jeevan Mission80
- Air Quality Index and Safar81
- National Clean Air Programme82
- National Green Corps 'Eco Club'83
Programme
- Delhi gets its first smog tower: What is83
it and how does it work?
- Green Credit Scheme84
- Cauvery Delta and Protected Special85
Agriculture Zone
- National Mission of Clean Ganga (NMCG)85
- Sustainable Development Cell for86
Environmental Mitigation Measures
- National Water Policy (NWP)86
- Forest-PLUS 2.087
- Reducing Emissions from Deforestation87
and Forest Degradation (REDD+)
Himalayan programme
- Eleven States seek 'Green Bonus'88
- Recycling of Ships Bill, 201988
- Swachh-Nirmal Tat Abhiyaan89

**6. RESOURCE CONSERVATION 90-99
& MANAGEMENT**

- Environment ministry stops clearance90
to mining of beach sand minerals90
- Waste-to-Energy90
- Uranium in Aravallis91
- Waterbodies Conservation92
- Bio fuel93
- Conservation of Lakes94
- India's Renewable Energy Capacity94
- Tesla-style giga factories95
- Zero Budget Natural Farming (ZBNF)95

- Ethanol blending96
- Wastelands Atlas - 201997
- Biorock or mineral accretion Technology97
- Kerala bans CFL and Filament Bulbs98
- Miyawaki Method of Afforestation98

7. DISASTER MANAGEMENT 100-105

- International Dam Safety Conference 100
- Flood Management and Border Areas 101
Programme (FMBAP)
- International Workshop on Disaster 101
Resilient Infrastructure
- Disaster resilience in risk-prone Asia 102
needs realistic policy and
financial planning
- National Disaster Response Force 103
- Cyclone Bulbul 103
- 1st International Conference on 104
"Landslides Risk Reduction
and Resilience-2019"
- Proposal to amend the Disaster 104
Management Act of 2005

8. MISCELLANEOUS 106-112

- Wetland Day 106
- Anthropocene recognised as an epoch 106
- World Environment Day 107
- World Biofuel Day 107
- State Butterfly 108
- World Ozone Day 108
- The Silver Ants- World's Fastest Ants 109
- The World Soil Day (WSD) 109
- World's oldest rhino' dies in Tanzania 109
- Asia Pacific Drosophila Research 110
Conference
- Locust Attacks 110
- Demand For Declaring Eastern Ghats 111
As UNESCO Cultural Heritage Site
- 'Green wall' of India 112
- World's largest cave fish discovered 112
in Meghalaya



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ECOLOGY & BIODIVERSITY

1 Black Softshell Turtle

Context:

- Recently, black softshells hatchlings were released into the Haduk Beel (wetland) of Pobitora Wildlife Sanctuary, Assam.
- The rare turtle species are being bred in the ponds of various temples and shrines of the State.

Black Softshell Turtle

- It is a freshwater turtle that is found in India and Bangladesh.
- Of the 29 species of freshwater turtles identified in India, 20 are found in Assam, and temple ponds are known to house a dozen species.
- It is omnivorous, with a diet ranging from aquatic plants to aquatic insects and carrion. Indian black turtles may sometimes be seen to aggregate alongside the carcass of a large dead animal.
- The black softshell turtle (*Nilssonina nigricans*) figures in the International Union for Conservation of Nature's (IUCN) Red List as "extinct in the wild" since 2002.
- Consumption of turtle meat and eggs, silt mining, the encroachment of wetlands and change in flooding patterns have had a disastrous impact on the State's turtle population.

Pobitora Wildlife Sanctuary

- The sanctuary is situated in the flood plains of river Brahmaputra in the district of Morigaon.
- It is often called 'Mini Kaziranga' due to similar landscape and vegetation.
- The wildlife sanctuary is home to endangered one-horned rhinoceros and the other mammals such as Leopard, Leopard cat, Fishing cat, Jungle cat, Feral Buffalo, Wild pigs, Chinese pangolins, etc.
- About 72% of Pobitora Sanctuary consists of wet savannah of *Arundo donax* and *Saccharum*. The remaining area is covered by water bodies.

2 Golden Jackal's increase in Haryana's Asola Bhatti Wildlife Sanctuary

Context: A survey that has been going on in the Asola Bhatti Sanctuary near Faridabad in southern Haryana since 2014, has revealed that the population of golden jackals (*Canis aureus*) has nearly doubled.

More on news:

The census was started by the Bombay Natural History Society as well as the authorities to see which parts of the sanctuary could be improved. In the nearly five years since then, the population of golden jackals has increased from 8 to 19. Species like the Striped Hyena and the Common Leopard have also been sighted. The surveyors say the rise in jackal numbers could mean an improvement in habitat in the sanctuary.

Asola-Bhatti Wildlife Sanctuary

- It is located on the **Southern Delhi Ridge of Aravalli hill range on Delhi-Haryana border**. It spreads over Southern Delhi as well as northern parts of Faridabad and Gurugram districts of Haryana state. The name of the sanctuary is derived from the contiguous Asola village in Delhi.

Golden Jackal

- IUCN Status: **'Least Concern'**
- The species is included in **CITES Appendix III (in India)**.
- Jackals feature on **Schedule III of the Wildlife Protection Act (1972) of India**
- The Golden Jackal is widespread in North and north-east Africa, Arabian Peninsula, Eastern Europe and the entire Indian Subcontinent.
- In India, jackal populations achieve high densities in pastoral areas such as Kutch, Maharashtra, Rajasthan, and Haryana. It is present in all protected areas of India **except for those in the high elevation regions of the Himalayas**.

3 New snake species discovered in Arunachal Pradesh

- A new species of snake has been discovered in Arunachal Pradesh. **The Crying Keelback (*Hebiuslacrima*) was found in Arunachal Pradesh's Lepa-Rada district** by Guwahati-based reptile expert Jayaditya Purkayastha and Patrick David of the Paris-based National Museum of Natural History.
- The Crying Keelback is named for the mark below its eyes that gives the illusion that it is crying. It can be differentiated from all other species of the genus *Hebius* by the combination of a distinctive broad, white, interrupted stripe along its body; three rows of irregular dark blotches (not vertically aligned) on each side; six cream, elongated spots on its anterior part and a smooth dorsal scale row.
- The genus *Hebius* is represented by 44 species worldwide out of which six species are from Northeast India.

4 New frog species discovered in Kerala

Researchers from the University of Delhi have discovered a new frog species in a roadside puddle in Kerala. The research has been published in the journal **Scientific Reports**. The new species belongs to the **family of narrow-mouthed frogs (*Microhylidae*)** and was found to be under an entirely new genus, called *Mysticellus*. The genus was named after the Latin word *mysticus* meaning 'mysterious', owing to their secretive lifestyle, and *ellus* meaning 'tiny' referring to the small size of these frogs, which are only 2.3-2.9 cm long. The researchers named the **frog *Mysticellusfranki*** after

evolutionary biologist Prof Franky Bossuyt from Vrije Universiteit Brussel, for his contributions to the study of Indian amphibians. **The new frog is currently known from a single locality in the Wayanad district in Kerala.**

5 Wild Buffalo population increases in Gadchiroli

- The number of wild Asiatic Water Buffaloes (*Bubalus arnee*) has increased in the district of Gadchiroli in eastern Maharashtra, which borders Chhattisgarh. The animals are found in the **Kolamarka Conservation Reserve located in Gadchiroli's Aheritaluka, Maharashtra.**
- The global population of wild buffaloes is estimated to be 3,800 of which 3,500 are in India. These animals are accorded the highest level of protection under the **Wildlife (Protection) Act, 1972, by inclusion in Schedule I.** It is classified as **endangered in the IUCN Red List** of Threatened Species.
- The reserve, with an area of 180.72 sq km, was declared a Protected Area in 2013. Apart from wild buffaloes, bears, nilgai, bison, sambar, chital, wild boar, and foxes are also found at Kolamarka. **It has two perennial water sources at Jitam and Penkasa.**

6 Honey as Pollution Detector

Context

- Recently, scientists in Canada have reported that honey can be a sensitive indicator of air quality.
- Organic things carry coded messages about their home environments, tree rings can tell scientists what the atmosphere was like when the tree was young. Similarly, lichens (unions of algae and fungi) can reveal local air pollution levels.

More on news:

- A survey of urban beehives around Vancouver showed that the hives' honey contained minute levels of lead.
- And with urban hives growing in number, tracking their pollutant levels may offer an inexpensive way to monitor what's in the air all over the world.

How does honey serve as a sensitive pollution detector?

- The chemistry of different samples can reveal where the honey came from.
- Volcanoes, river rocks, coal and other natural sources of lead have their distinctive signatures, based on the ratio of different isotopes of the heavy metal in them.

7 East Asian Birds make Andaman stopover

Context:

- For the 1st time, three new migratory birds (Horsfield's Bronze-Cuckoo, Zappey's Flycatcher and Javan Pond Heron) from East Asia have been spotted in Andaman and Nicobar Islands.
- The Andaman and Nicobar island area is an essential stopover for migratory birds following the **East Asian-Australasian Flyway.**

More on News:

- The **East Asian-Australasian Flyway (EAAF)** extends from Arctic Russia and North America to the south Australian boundaries and includes most of the East Asian regions including Andaman and Nicobar Islands.
- Andaman and Nicobar Islands, with just about 0.25 % the country’s landmass, is home to about 350 species of exotic birds, according to an official estimate.
- **Birdlife International has designated migratory routes as 8 flyways in the world.** The 8 major migratory bird flyways: Pacific Americas; Central Americas; Atlantic Americas; East Atlantic; Black Sea- Mediterranean; East Asia-East Africa; Central Asia; East Asia-Australasia

What is a flyway?

- A flyway is a flight path used in bird migration. Flyways generally span over continents and often oceans. The migration routes often follow a north-south axis covering more than 30 countries.
- **India is an integral part of 3 flyways.**

Central Asian Flyway

- It covers a large continental area of Eurasia between the Arctic and Indian Oceans and the associated island chains.
- The Flyway comprises several important migration routes of waterbirds, most of which extend from the northern most breeding grounds in the Russian Federation (Siberia) to the southernmost non-breeding (wintering) grounds in West and South Asia, the Maldives and the British Indian Ocean Territory.

East Asian-Australasian Flyway

- Encompasses 22 countries extending from Arctic Circle, through East and South-east Asia including eastern India and Andaman and Nicobar Islands to Australia and New Zealand.
- **Asian East African Flyway**
- It is a group of well-established routes by which many species of birds migrate annually between mid-Palaearctic breeding grounds in Asia and non-breeding sites in eastern and southern Africa.

8

Two Great Indian Bustards Satellite-Tagged in Rajasthan

Context: Two female Great Indian Bustards (GIBs) have been satellite-tagged in the Desert National Park (DNP) in Rajasthan’s Jaisalmer district.

Great Indian Bustard

- The GIB is one of the heaviest flying birds endemic to the Indian subcontinent.
- Historically, the great Indian bustard was distributed throughout Western India, spanning 11 states, as well as parts of Pakistan. Its stronghold was once the Thar desert in the north-west and the Deccan plateau of the peninsula. Today, its population is confined mostly to Rajasthan and Gujarat. A small population occurs in Maharashtra, Karnataka and Andhra Pradesh.
- **Scientific Name:** Ardeotis nigriceps
- **Habitat:** Dry grasslands and scrublands on the Indian subcontinent

- **Protection Status:**
 - **Critically endangered** on the IUCN Red list
 - **In Appendix I of CITES**
 - **Schedule I Wildlife Protection Act 1972 of India.**

9 Why the Hangul's future still hangs in the balance?

Context: A massive decline in the population of Kashmir's iconic wildlife species, the Hangul (*Cervushangluhanglu*), also known as the Kashmir stag, continues to be a big concern as conservation efforts for it, going on for years, have not yielded any significant results so far.

Why is the Hangul population declining?

- The biggest challenges in the way of conservation and population growth of Hangul are habitat fragmentation, predation, and very low fawn-female ratio.
- Another challenge is the male-female and fawn-adult disparity in the Hangul population.

Conservation efforts:

- An important part of the conservation project for Hangul is to study the food habits, breeding patterns and movements of the species in and out of its habitat and tagging the animals with satellite collars.
- Another conservation measure taken by the wildlife department in recent years is a project for improving the population of the Hangul through ex-situ breeding.

Hangul in India:

- **Protection Status:**
 - **The IUCN's Red List has classified it as Critically Endangered**
 - **Schedule I of the Indian Wildlife (Protection) Act, 1972 and the J&K Wildlife Protection Act, 1978.**
- **Hangul is the official animal of UT of J&K. (Ladakh: Domestic Yak)**
- It is restricted to the Dachigam National Park (which include Shikargah-Tral and the Overa-Aru Wildlife Sanctuary in south Kashmir).
- It was once widely distributed in the mountains of Kashmir and parts of Chamba district in neighboring Himachal Pradesh.

Dachigam National Park

- It was established in 1981
- It is located in the high altitude temperate zone in Jammu & Kashmir
- Main trees found in the park are; Himalayan moist temperate evergreen, moist deciduous and shrubs, deodar, pine and oak.

10 Kaziranga National Park

Context: Four people lost their lives and two one-horned rhinos drowned in Kaziranga National Park (KNP) as Assam continued to reel under floods and rain-induced landslides.

Kaziranga National Park

- Formed in 1908 on the recommendation of Mary Curzon, the park is located in the edge of the Eastern Himalayan biodiversity hotspots – Golaghat and Nagaon district in Assam

- In 1985, declared as a World Heritage Site by UNESCO.
- Along with the iconic Greater one-horned rhinoceros, the park is the breeding ground of elephants, wild water buffalo, and swamp deer.
- Over time, the tiger population has also increased in Kaziranga, and that's the reason why Kaziranga was declared as Tiger Reserve in 2006.
- Also, the park is recognized as an Important Bird Area by BirdLife International for the conservation of avifaunal species.
- Due to the difference in altitude between the eastern and western areas of the park, here one can see mainly four types of vegetation' alluvial inundated grasslands, alluvial savanna woodlands, tropical moist mixed deciduous forests, and tropical semi-evergreen forests.

Asian One-horned Rhinoceros

- **The greater one-horned rhinoceros is the largest of the three Asian rhinos and, together with African white rhinos, is the largest of all rhino species. It is listed as Vulnerable on the IUCN Red List. With at least half of the total population, India's Kaziranga National Park remains the key reserve for this species.**
- **Two species of rhino in Asia—Javan and Sumatran—are critically endangered.**

11 Orchids of India: A Pictorial Guide

Context: The Botanical Survey of India has published Orchids of India: A Pictorial Guide- the first comprehensive census of orchids of India.

Highlights of the survey

- It gives all details of all the orchids species of India, which was unveiled by the **Ministry of Environment, Forest and Climate Change**.
- According to the publication, the total number of orchid species endemic to India is 388.
- **The Himalayas, North-East parts of India and the Western Ghats are the hot-spots of orchids.**
- The highest number of orchid species is recorded from **Arunachal Pradesh** followed by **Sikkim** and **West Bengal**. The Western Ghats have high endemism of orchids.
- Among the biogeographic zones of India, the Himalayan zone is the richest in terms of orchid species followed by Northeast, Western Ghats, Deccan plateau and Andaman & Nicobar Islands.
- The publication points out that Kerala has 111 of these endemic species while Tamil Nadu has 92 of them.

Orchids

- They are broadly categorised into three life forms:
 - ▶ **Epiphytic** (plants growing on another plants including those growing on rock boulders and often termed lithophyte),
 - ▶ **Terrestrial** (plants growing on land and climbers) and
 - ▶ **Mycoheterotrophic** (plants which derive nutrients from mycorrhizal fungi that are attached to the roots of a vascular plant).
- ▶ The entire orchid family is listed under **Appendix II of CITES**.

Botanical Survey of India (BSI)

- It is the apex research organization under **Ministry of Environment, Forest and Climate Change** established in 1890 for carrying out taxonomic and floristic studies on wild plant resources of the country.
- It develops National database of Indian plants, including herbarium and live specimens, botanical paintings and illustrations, etc.

12 Tigers under High Stress

Context: A study conducted by the Hyderabad-based Centre for Cellular and Molecular Biology (CCMB) has found that the Tigers in Bandhavgarh, Kanha, and Sariska are under tremendous stress induced by tourism and this is probably affecting their reproduction.

Highlights of the study

- Results of the study were published in CCMB's Laboratory for Conservation of Endangered Species.
- This study is based on the comparison between the samples of fecal Gluco Corticoid metabolite (fGCM) of the same tigers from the same location during tourist and off-peak seasons, which is regarded as a marker of stress.
- The stress levels of tigers during the 8-9 month tourism period were very high. Although females are known to undergo more stress, the study shows that males were also under tremendous stress.
- Study could also be distinctly correlated with the stress levels depending on the number of vehicles entering the tiger reserves.
- The report suggests that unsustainable wildlife tourism causes distinct physiological stress in tigers in protected areas. Recently introduced tigers in Sariska Tiger Reserve, Rajasthan, failed to reproduce effectively presumably due to high levels of stress caused by high anthropogenic disturbance.
- It recommends strict regulation of vehicular traffic, and reducing other anthropogenic disturbances.

What the study focussed on?

- The study examines the relationship between anthropogenic disturbances and physiological stress levels in tiger populations in protected areas.
- The research team collected a total of 341 fGCM, a stress marker among tigers, samples from **Bandhavgarh** and **Kanha** reserves during tourist and off-peak seasons, besides data on various anthropogenic disturbances, including tourism activities.

13 Tiger Census

Context: Prime Minister released the All India Tiger Estimation Report 2018.

More on News:

- India has 2,967 tigers, a third more than in 2014, according to the results of a tiger census.
- Madhya Pradesh saw the highest number at 526**, followed by Karnataka (524), Uttarakhand (442), Maharashtra (312) and Tamil Nadu (264).
- Chhattisgarh and Mizoram saw a decline in the tiger population** and all other States saw a "positive" increase.
- Pench Tiger Reserve in Madhya Pradesh** recorded the highest number of tigers;

National Tiger Conservation Authority

It is a statutory body under the Ministry of Environment, Forests and Climate Change constituted under enabling provisions of the Wildlife (Protection) Act, 1972, as amended in 2006, for strengthening tiger conservation, as per powers and functions assigned to it under the said Act.

Sathyamangalam Tiger Reserve in Tamil Nadu registered the “maximum improvement”.

- **4th cycle of the Management Effectiveness Evaluation of Tiger Reserves (MEETR)**, which evaluates India’s 50 tiger sanctuaries were also released along with 4th National Tiger Estimation (Tiger census). According to its **Pench sanctuary (MP) and Periyar sanctuary of Kerala emerged as best managed tiger reserves in the country**. Top performers scored 93.75%. Dampa Reserve (Mizoram) and Rajaji reserve (Uttarakhand) with a score of 42.97% and 44.53% respectively were left at the bottom of the ladder. Chhattisgarh was the least performing State in reserve management.

International or Global Tiger day

- It is observed on 29 July every year, which is dedicated to the worldwide awareness and support for tiger conservation.
- It was created when 13 countries came together in 2009 and pledged to double the world’s Tiger population by 2022 -- the next “Year of the Tiger” on the Asian lunar calendar.

14 World Elephant Day: India’s jumbos stare at a worrying future

Context: Today only about 27,000 wild elephants remain in India, as opposed to a million a decade ago. There has been a 98 percent nose-dive in their population, according to research.

More on News:

- The World Elephant Day is observed every year on **August 12**, to create awareness of the urgent plight of African and Asian elephants. In India, cultural event **Gaj Mahotsav was organised by Wildlife Trust of India (WTI) and Ministry of Environment, Forests and Climate Change (MoEFCC)** on this occasion of this day. It was aimed to sensitise people the urgent plight of elephants through different art forms including an exhibition of elephant themed paintings and installations.
- India is home to over 50 percent population of Asian elephants in the world, making it the last stronghold of the species.
- Wildlife SOS, established in 1995, started working with elephants in 2010 to save the species in India. The initial efforts of the project were focused on rescuing captive elephants across India that were facing severe abuse and cruelty by their captors.

Some Facts

- There are **three subspecies** of Asian elephant – the Indian, Sumatran and Sri Lankan.
- The Indian has the widest range and accounts for the majority of the remaining elephants on the continent.
- African elephants are listed as “**vulnerable**” and Asian elephants as “**endangered**” in IUCN Red List of threatened species.
- The elephant has been accorded the highest possible protection under the Indian wildlife law through its listing under **Schedule I** of the **Wildlife (Protection) Act, 1972**.
- Some of the major threats faced by both African and Asian elephants are escalation of habitat loss, poaching, human-elephant conflict and mistreatment.

15 Proposal to change IUCN Status of some species

Context: India has submitted proposals regarding changes to the listing of various wildlife species in the CITES secretariat meeting in Geneva, Switzerland.

More on News:

- India has also proposed for the **removal of Indian rosewood from CITES Appendix II.**
- The species are facing two threats: **loss of habitat to agriculture and illegal harvesting for the pet trade.** Hence, India seeks to boost the protection of all the 5 wildlife species as they are facing a high risk of international trade.
- India is among the parties proposing the re-listing of the species from CITES Appendix II to Appendix I.

Animal Listed by India	Species	Current Status	IUCN
◦ SmoothCoated Otter		Vulnerable	
◦ SmallClawed Otter		Vulnerable	
◦ Indian Star Tortoise		Vulnerable	
◦ Tokay Gecko		Least Concern	
◦ Wedgefish		Vulnerable	

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

- It is also known as the Washington Convention entered into force in 1975.
- The species covered by CITES are listed in three appendices on the degree of protection they require.
 - ▶ **Appendix I** lists species that are the most endangered among CITES-listed animals and plants.
 - ▶ **Appendix II** lists species that are not necessarily now threatened with extinction but that may become so unless trade is closely controlled.
 - ▶ **Appendix III** is a list of species included at the request of a Party that already regulates trade in the species and that needs the cooperation of other countries to prevent unsustainable or illegal exploitation.
- It is legally binding on the Parties but it does not take the place of national laws.
- It provides a framework which each party should adopt in its own domestic legislation to ensure that CITES is implemented at the national level.

16 New Frog species confirmed

Context: A new species of burrowing frog has been confirmed in Jharkhand’s Chhota Nagpur Plateau.

More on News:

- The frog was first discovered in 2015.
- Its existence was verified and confirmed recently and published in the journal Records of the **Zoological Survey of India.**
- The frog is **endemic** to agricultural areas in **Nawadih and Jounji village of Jharkhand’s Koderma district.**
- It has been named as **Spahaerotherca Magadha** and will be known by the common name of **‘Magadha Burrowing Frog’.**

Zoological Survey of India (ZSI)

- It was established on 1 July 1916 to promote surveys, exploration and research leading to advancement of our knowledge of various aspects of the exceptionally rich animal life of India.
- It had its genesis as the Zoological Section of the **Indian Museum at Calcutta in 1875.**

- The discovery points to the fact that new species of frogs can still be found even in the ‘Central Indian Landscape’ other than the Western Ghats and the Northeast, where most discoveries are currently taking place.

17 New Monkey Species Discovered

Context: New monkey species discovered in the rapidly-deforested area of Amazon.

More on News:

- A new species of marmoset has been discovered in the **south-west of Pará State in Brazil** in an area of the Amazon that has suffered extensive illegal logging and agricultural incursion. It was found at the **Tapajós River**.
- The region where the marmoset was discovered is one of the main fronts of forest destruction within the **‘arc of deforestation’**, a region infamously characterised by the fast, intense and disordered conversion of forests to pastoral and agricultural land and human settlements.
- The new species has been named **Micomunduruku after the Munduruku Amerindians** who live in the area where the monkey was discovered.

Amazon’s ‘arc of deforestation’

- Deforestation in the Amazon has accelerated markedly in recent months.
- 88% forest was been cleared within a time span of one year.
- In addition to logging and agricultural expansion, four hydroelectric power plants have been approved for construction that will directly threaten the habitat.
- The region is also a hotspot for gold miners, so there is dredging and digging of the river bed and its tributaries.

18 Endangered Sharks and Rays Afforded Protection

Context: Eighteen species of sharks and rays, threatened by the scale of international trade in their fins and meat, were included in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

More on News:

- The decision to include the species in Appendix II was taken at the ongoing 18th Conference of the Parties (CoP18) of CITES in Geneva.
- **An Appendix II listing is an important step, limiting trade to sustainable levels.**
- The species included in the list are endangered shortfin and longfin mako shark, six species of giant guitarfish and 10 species of wedge fish.
- Of the giant guitarfish and wedge fish species on the listing, **all except one of the wedge fish species are critically endangered.**

International Fund for Animal Welfare (IFAW)

- It is one of the largest animal welfare and conservation charities in the world.
- The group’s declared mission is to “rescue and protect animals around the world.
- It was founded by a small group of people in 1969, to stop the commercial hunt for seal pups in Canada.

- Warm-blooded makos are the fastest sharks in the sea and travel at speeds which most speedboats cannot compete with.
- Giant guitarfishes (named for their guitar-like shape), and wedge fishes are flat-bodied shark-like rays, adapted for living close to the seabed.

- With projects in more than 40 countries, IFAW provides hands-on assistance to wildlife and livestock, in the wake of disasters.

More than half of sharks and their relatives are recognized as being threatened or near-threatened with extinction and at least 100 million sharks are killed annually in commercial fisheries.

19 Gharial Conservation in India

Context: The National Green Tribunal has directed the Madhya Pradesh government to submit within three weeks separate progress reports of the departments concerned on the steps taken according to an action plan to conserve gharial habitat along the Son River.

More on News:

- The NGT had constituted a committee to prepare an action plan to check illegal mining, conserve gharials and turtles, and maintain a minimum ecological flow downstream of the Ban Sagar Dam.
- According to the IUCN, their population has declined by 96-98% since 1946, despite the Centre declaring it a **protected species under the Wildlife Protection Act, 1972**.
- The increasing intensity of fishing using gill nets and large-scale illegal and impermissible mining activity in the protected area of the Son Gharial Sanctuary along the Son river is rapidly killing many of the scarce adults and many sub-adults

Some Facts on Gharials

- The gharial (*Gavialis gangeticus*), also known as the gavial, and fish-eating crocodile is a crocodylian in the family Gavialidae, native to sandy freshwater river banks in the plains of the northern part of the Indian subcontinent.
- It is protected under **Schedule I of Wildlife Protection Act, 1972**.
- It is a **critically endangered crocodylian existing only in India, Nepal and Bangladesh**.
- India's **Katerniaghat Wildlife Sanctuary** contains a breeding population vital to the survival of the species.
- **Chambal River in National Chambal Sanctuary is the natural habitat of gharial.**

20 What is Cryodrakon Boreas?

Context: Cryodrakonboreas, the largest flying animal was a plane-sized reptile.

More on News:

- **New species of pterosaur**, the plane-sized **reptiles** that lorded over primeval skies above T-rex, Triceratops and other dinosaurs of the Late Cretaceous.
- With a wingspan of 10 m and weighing 250 kg, Cryodrakonboreas rivals another pterosaur as the largest flying animal of all time

- Its remains were first **discovered more than 30 years ago in Alberta, Canada**, yet elicited scant excitement because of the misclassification.
- Like other winged reptiles living at the same time, about 77 million years ago, **C. boreas was carnivorous** and probably fed on lizards, small mammals, and even baby dinosaurs.
- Despite their large size and wide distribution across North and South America, Asia, Africa, and Europe only fragmentary remains have been unearthed, making the new find especially important.

21 2 New Ginger Species

Context: Scientists from the Botanical Survey of India (BSI) have discovered two new species of Zingiber, commonly referred to as ginger, from Nagaland.

More on News:

- **Zingiber Perenense** -The lip of the flower (modified corolla) is white in colour, with dense dark- purplish-red blotches. Its pollen is a creamy-white and ovato-ellipsoidal, whereas the fruit is an oblong 4.5 cm-5.5 cm long capsule. It has been discovered from the **Peren** district of **Nagaland**.
- **Zingiber Dimapurense** - The lip of the flower is white with purplish-red streaks throughout, and the pollen is ellipsoidal. It was found in the **Dimapur** district of the **Nagaland**.

22 Nilgiri Tahr’s Population up 27% in three years in TN

Context: The population of Nilgiri Tahr in the Mukurthi National Park has risen from 568 in 2018 to 612 this year.

More on News:

- This is the second consecutive year that an increase in the population of the animal had been recorded in the park.
- The almost 8% increase in the population of the iconic animal in 2019 follows a similarly significant increase in its population in 2018.
- Factors responsible for maintaining an increase in the population of Nilgiri Tahr are:
 - ▶ Keeping the national park closed to tourists and free from poaching
 - ▶ Fighting the spread of invasive flora.

Nilgiri Tahr

- Nilgiritahrs are stocky goats with short, coarse fur and a bristly mane.
- Males are larger than females and have a darker colour when mature. Both sexes have curved horns, which are larger in the males, reaching up to 40 cm for males and 30 cm for females.

Mukurthi National Park

- It is a protected area located in the northwest corner of Tamil Nadu in the Western Ghats.
- The park was created to protect its keystone species, the Nilgiri Tahr.
- The park is characterised by montane grasslands and shrublands interspersed with sholas in a high altitude area of high rainfall, near-freezing temperatures and high winds.
- The park was previously known as Nilgiri Tahr National Park.
- It is part of Nilgiri Biosphere Reserve along with Mudumalai Wildlife Sanctuary, Bandipur National Park, Nagarhole National Park, Wayanad Wildlife Sanctuary and Silent Valley.

- Adult males develop a light grey area or “saddle” on their backs and are hence called “saddlebacks”
- **IUCN status – Endangered**
- It has been listed under **Schedule 1 of the Wildlife (Protection) Act, 1972.**
- It is the state animal of **Tamil Nadu.**
- **It is found in open montane grassland habitat of rain forests ecoregion.**
- **It is endemic to the Nilgiri Hills and the southern portion of the Western Ghats In Tamil Nadu & Kerala.**

23 Vulture Conservation: How the bird was saved from extinction?

Context: The commendable role played by the Vulture Care Centres (VCC) in saving the endangered vulture species has brought the VCC in limelight.

Indian Vultures Crisis

- Nine species of vulture can be found living in India, but most are now in danger of extinction.
- India’s conservation efforts are focussed on the three species of vultures which are **Critically Endangered** according to the International Union for Conservation of Nature (IUCN) namely,
 - ▶ **White-backed Vulture,**
 - ▶ **Slender-billed Vulture, and**
 - ▶ **Long-billed Vulture.**
- The number declined from 40 million in the 80s to a few thousand by 2009.
- The major reason behind the vulture population getting nearly wiped out was the drug Diclofenac, found in the carcass of cattle the vultures fed on. The drug, whose veterinary use was banned in 2008, was commonly administered to cattle to treat inflammation.
- The dramatic vulture decline observed across India presents a range of ecological threats, by influencing the numbers and distribution of other scavenging species. Increased feral dog populations have been reported all over in India, posing many associated disease risks such as rabies to humans and wildlife.

Vulture Care Centre (VCC)

- To study the cause of deaths of vultures, a Vulture Care Centre (VCC) was set up at Pinjore, Haryana. Starting with just a few vultures, the VCC, until then the sole facility for the conservation of vultures in the country, has come a long way in the past two decades.
- At present, there are nine Vulture Conservation and Breeding Centres (VCBC) in India, of which three are directly administered by the Bombay Natural History Society (BNHS).
- The objective of the VCBCs was not only to look after the vultures and breed them in captivity but also to release them into the wild.

Bombay Natural History Society,

- It was founded in 1883, is one of the largest non-governmental organisations in India engaged in conservation and biodiversity research.
- It supports many research efforts through grants and publishes the Journal of the Bombay Natural History Society.
- It is the partner of Bird Life International in India. It has been designated as a ‘Scientific and Industrial Research Organisation’ by the Department of Science and Technology.

24 Anthrax Scare in reserve after the death of Buffaloes

Context: Veterinarians have confirmed anthrax as the cause of death of two Asiatic water buffaloes in central Assam's Pobitora Wildlife Sanctuary, which has the highest concentration of one-horned rhinos in the world and is often called 'Mini Kaziranga' due to similar landscape and vegetation.

Asiatic Water Buffalo

- It is scientifically known as **Bubalus Arnee**.
- It is known to be found **in the Central Indian Forests** and is mostly restricted to the states of Assam, Arunachal Pradesh, and Madhya Pradesh.
- Recently, it was found in the forests of Maharashtra after which the Maharashtra Government declared the **Kolamarka forest area** as a conservation reserve for the Asiatic Wild Buffalo.
- Asiatic buffalo has the **widest horn span** among all bovids found globally.
- The wild buffalo is mainly found in the alluvial grasslands, marshes, swamps and river valleys. They are generally found in areas that have plenty of water holes and resources.

Anthrax

- It is caused by the bacterium **Bacillus anthracis**, and can be fatal for humans who come in contact with infected animals.
- It is characterised by blisters around swellings on the skin, chest pain, vomiting, diarrhoea and fever.

Protection Status:

- It has been listed as an endangered species by the **International Union for Conservation of Nature (IUCN)**.
- It is listed **under Schedule-1 of the Wild Life (Protection) Act, 1972**.
- It is included in **CITES Appendix-III** and is legally protected in Bhutan, India, Nepal, and Thailand.
- Wild Water Buffalo is believed to be **extinct** in Bangladesh, Peninsular Malaysia, and on the islands of Sumatra, Java, and Borneo.

25 Madhya Pradesh set to get its 7th Tiger Reserve - Ratapani Tiger Reserve

Context: A committee set up by the state government to finalise contours of the core and buffer areas of the proposed reserve, to be carved out of the Ratapani wildlife sanctuary, has submitted its report.

More on News:

- Recently declared the Tiger State of India, Madhya Pradesh is inching closer to getting its seventh tiger reserve — the Ratapani Tiger Reserve.

Ratapani Tiger Reserve

- Established in the year 1976. **It mainly comprises a beautiful teak forest.**
- It is located in the **Raisen district of Madhya Pradesh, in Vindhya Range.**
- Although the tiger holds the position of top predator in the park, leopards, striped hyenas, jackals, Indian foxes and wild dogs also inhabit its forested tracts.
- Members of the deer family such as chausingha, chinkara, and barasingha are spotted often, and herds of nilgai, the largest Indian antelope.

- Of the 823.065 sq km area of the existing sanctuary, 763.812 sq km has been redrawn as the core and the remaining 59.253 sq km will be the buffer area of the proposed reserve.
- While residents of Dantkhov village have been relocated, the process to relocate residents of three other villages is on.

- Dahod Dam, Ratapani Dam and Barna Dam are large water bodies inside the park and home to aquatic avifauna such as ducks, geese, cranes, storks and snipes. Among reptiles, pythons and crocodiles are also seen here.

26 Top five largest Ramsar sites in India

About:

Following are the top five largest Ramsar sites in India:

Sr No.	Ramsar Site	State	Designation year	Area (in sq. km.)
1.	Sunderbans Wetland	West Bengal	2019	4230
2.	VembanadKol Wetland	Kerala	2002	1512.5
3.	Chilka Lake	Odisha	1981	1165
4.	Kolleru Lake	Andhra Pradesh	2002	901
5.	Bhitarkanika Mangroves	Odisha	2002	650

Ramsar Convention on Wetlands:

- The Convention on Wetlands, called the Ramsar Convention, is the intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources.
- It is the only global treaty that focuses specifically on wetlands.
- The Convention was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975.
- At present, there are 27 Ramsar Wetlands Sites in India

27 Dudhwa National Park

Context: Tourists visiting the Dudhwa National Park will not be able to enjoy elephant safari this season as most trained jumbos have been deployed in patrolling duties, the park administration.

Dudhwa National Park

- It is a national park in the **Terai belt of marshy grasslands of northern Uttar Pradesh**.
- It is part of the Dudhwa Tiger Reserve covering the **areas of Kheri and Lakhimpur districts**.
- The area was established in **1958 as a wildlife sanctuary for swamp deer**.
- In 1987, the park was declared a tiger reserve and brought under the purview of the **'Project Tiger'**.

- Together with the **Kishanpur Wildlife Sanctuary** and the **Katarniaghat Wildlife Sanctuary**, it forms the **Dudhwa Tiger Reserve**.

28 Why India needs Project Dolphin?

Context: The government is planning to launch a programme called “Project Dolphin”, along the lines of “Project Tiger” to enhance the population of these dolphins.

Gangetic River Dolphin

- It can **only live in freshwater**, are blind and uniquely catch their prey, using ultrasonic sound waves.
- They were officially discovered in 1801 and are one of the oldest creatures in the world along with some species of turtles, crocodiles, and sharks, according to the World Wildlife Fund (WWF).
- They once lived in the Ganges-Brahmaputra-Meghna and Karnaphuli-Sangu river systems of Nepal, India, and Bangladesh, but are now mostly extinct from many of its early distribution ranges, as per WWF.
- In 2009, the Gangetic dolphin was declared **India’s National Aquatic animal**. Gangetic dolphin has been notified by the **Assam as the state aquatic animal too**.
- It is placed under the **“endangered” category by the International Union for Conservation of Nature (IUCN)**.
- They are distributed across seven states in India: Assam, Uttar Pradesh, Madhya Pradesh, Rajasthan, Bihar, Jharkhand, and West Bengal.
- It has been included in **Schedule -I of the Wildlife Protection Act, 1972**.
- They are also one among the 21 species identified under the centrally sponsored scheme, **“Development of Wildlife Habitat”**.

Project Tiger

- It is a Centrally Sponsored Scheme of the Ministry of Environment, Forests and Climate Change.
- The project was launched in Jim Corbett National Park of Uttarakhand in 1973.
- It is administered by the National Tiger Conservation Authority.
- Its aim is to protect tigers from extinction by ensuring a viable population in their natural habitats.
- The **monitoring system M-STRIPES** was developed to assist patrol and protection of tiger habitats.
- The government has set up a **Tiger Protection Force** to combat poachers and funded relocation of villagers to minimize human-tiger conflicts.

29 Avian Botulism in Sambhar Lake

Context: Recently, the Indian Veterinary Research Institute (IVRI) has attributed the deaths of migratory birds to avian botulism at Sambhar Lake in Rajasthan.

More on News:

- The avian botulism is a **neuro-muscular illness** caused by Botulinum (natural toxin) that is produced by a bacteria — Clostridium botulinum.
- The bacteria are commonly found in the soil, rivers, and seawater. It affects both humans and animals.

- The bacteria also need anaerobic (absence of oxygen) conditions and do not grow in acidic conditions.
- It affects the nervous system of birds, leading to paralysis in their legs and wings.
- The outbreaks of avian botulism tend to occur when average temperatures are above 21 degrees celsius, and during droughts.

Causes of Mass Mortality at Sambhar Lake

- **Reduced water levels:** This might have increased salinity levels leading to the death of living organisms.
- The decaying plant or animal materials are capable of hosting the bacteria for a longer period.
- **A bird-to-bird cycle:** Since only insectivorous and omnivorous birds were affected and not herbivores, the birds feeding on dead birds could have been a possible cause of such mortality.

Sambhar Lake

- It is India's largest inland saltwater body located near Jaipur in Rajasthan.
- The lake is surrounded on all sides by the Aravali hills.
- It is the source of most of Rajasthan's salt production.
- It has been designated as a **Ramsarsite** because the wetland is a key wintering area for tens of thousands of flamingos and other birds that migrate from northern Asia.

30 Rhinos to be re-introduced in Uttarakhand

Context: The Uttarakhand State Wildlife Board has cleared a proposal by the Wildlife Institute of India (WII) to introduce rhinoceroses in the Corbett Tiger Reserve (CTR) to boost tourism and revive the habits of species that survive on low-height grass.

More on News:

- According to officials, around 10 rhinos will be brought in CTR in the first phase and subsequently, 10 more would be added.
- Experts claim that protecting these rhinos from poaching will be the only challenge for the state's forest department staff after the move.
- The geographical terrain and environmental conditions in CTR are suitable for rhinos.
- The ideal sites chosen in Corbett are valley habitats bounded on either side by the lower Himalayas (north), Shivalik Hills (south) and the Ramganga Reservoir (east), which would also act as natural barriers to rhino movement outside these areas, thereby minimising conflict with people.

Indian Rhino Vision 2020

- **It is an ambitious effort to attain a wild population of at least 3,000 greater one-horned rhinos spread over seven protected areas in the Indian state of Assam by the year 2020.**
- IRF has partnered with the Assam Forest Department, the Bodoland Territorial Council, the World Wide Fund for Nature (WWF), and the US Fish & Wildlife Service to address the threats facing Indian rhinos.

Jim Corbett National Park

- It is the oldest national park in India and was established in 1936 as Hailey National Park to protect the endangered Bengal tiger.
- It is located in Nainital district and Pauri Garhwal district of Uttarakhand and was named after Jim Corbett, a well known hunter and naturalist.
- The park was the first to come under the Project Tiger initiative in 1973.

31 The Asiatic Lion Census is scheduled to take place

Context: It is scheduled to take place in May 2020. Around 8,000-10,000 cameras will be used to carry out the 2020 lion census in Gujarat, the last abode of the Asiatic lion.

More on News:

- For the first time, the expertise of the Wildlife Institute of India (WWI) will be perused in the Census.
- The WWI had sent a proposal to the Gujarat government for finalizing the modalities of the Census.
- In the 2015 Lion Census, it had counted 523 lions in the state. The number has expected to rise with internal assessments of the forest department which indicates that the population may have crossed the 1000 mark.

Asiatic lions

- They belong to the category of **Pantherine cats**.
- The Asiatic Lions in Gujarat is restricted to Gir National Park in the state.
- It is listed as '**Endangered**' under the **IUCN Red List**.
- It is listed in **Schedule-I of the Wildlife (Protection) Act, 1972**.
- The lion is one of five pantherine cats inhabiting India, along with the Bengal tiger (*P. Tigris Tigris*), Indian leopard (*P. pardusfusca*), snow leopard (*P. uncia*) and clouded leopard (*Neofelisnebulosa*).
- It was also known as the "Indian lion" and the "Persian lion".

Gir National Park and Wildlife Sanctuary

- It is also known as Sasan Gir, a forest and wildlife sanctuary near Talala Gir in Gujarat, India.
- It is part of the Kathiawar-Gir dry deciduous forests ecoregion.
- The seven major perennial rivers of the Gir region are Hiran, Shetrunji, Datardi, Shingoda, Machhundri, Godavari and Raval.
- The four reservoirs of the area are at four dams, one each on Hiran, Machhundri, Raval and Shingoda rivers, including the biggest reservoir in the area, the Kamleshwar Dam, dubbed 'the lifeline of Gir'.

Asiatic Lion Conservation Project

- It has been launched by the Ministry of Environment, Forest and Climate Change with an aim to protect and conserve the world's last ranging free population of Asiatic Lion and its associated ecosystem.
- It is a 3 year-long conservation project launched in 2018

32 Bhitarkanika census finds an increase of 15 saltwater crocodiles from last year

Context: The population of the saltwater or estuarine crocodile (*Crocodylus porosus*) has increased in the water bodies of Odisha's Bhitarkanika National Park and its nearby areas in Kendrapara district, with forest officials counting 1,757 individuals in this year's annual reptile census on January 3, 2020.

More on News:

- The enumerators also sighted around 12 albino crocodiles and four giant crocodiles more than 20 feet long in the water bodies of Bhitarkanika during the census.

- In the Bhitarkanika area, 1,580 and outside it 91 crocodiles were identified. In the Kanika 1,284, Rajnagar 296, Mahakalapada 69, Gahirmatha 22 were spotted.
- The peak winter is the ideal time to carry out the census as it exposes more than 50% of mud banks.

Bhitarkanika National Park

- It is located in the **northeast Kendrapara district in Odisha**.
- It obtained the status of a **Ramsar site in 2002**.
- It is surrounded by Bhitarkanika Wildlife Sanctuary. Gahirmatha Beach and Marine Sanctuary are to the east, separating swamp region and mangroves from the Bay of Bengal.
- The national park and wildlife sanctuary is inundated by the **rivers Brahmani, Baitarani, Dhamra, Pathsala**.
- It hosts many mangrove species and is the **second-largest mangrove ecosystem in India**.

Saltwater Crocodile

- It is a crocodilian native to saltwater habitats and brackish wetlands from India's east coast across Southeast Asia and the Sundaic region to northern Australia and Micronesia.
- It has been listed as **Least Concern on the IUCN Red List since 1996**.

33 A Giant fish is declared extinct

Context: One of the largest freshwater fish has been declared extinct in a study published in the journal Science of the Total Environment.

More on News:

- The Chinese paddlefish (*Psephurus gladius*) was an iconic species, dating back from 200 million years ago.
- The fish was a very large freshwater fish—they were on average 10 feet in length, but some were as large as twice that length—they got their name from their large, protruding snout.
- Its ancestral home was the Yangtze River.
- Chinese researchers made this conclusion based on the Red List criteria of the International Union for Conservation of Nature (IUCN). They suggest that the extinction was due to overfishing and loss of habitat.

34 Diego- the giant tortoise

Context: Recently, Diego (*Chelonoidis hoodensis*, or the giant tortoise species) has retired from the captive breeding programme in the Galapagos National Park, Ecuador. It will be returned to Española Island, from where it was taken around 80 years ago.

More on News:

- Diego is 100 years old and joined the breeding programme in 1976.
- The tortoise population has since gone up from 15 to 2,000.
- It is responsible for about 40% of the offspring produced.
- Another male tortoise 'E5' has generated about 60% of offspring.

- Diego has a long leathery neck, dull-yellow face, and beady eyes. Fully stretched out, he extends to about five feet and weighs about 176 pounds.
- The long neck is critical for his species' survival, helping the tortoises crane their necks to feed on cacti.
- **IUCN Red List Status: Critically Endangered**

Galápagos National Park

- It was created in 1959 and it was the first national park of Ecuador.
- The Galápagos Islands were designated as a UNESCO World Heritage Site in 1978.

35 Highest number of wetland species in Kaziranga

Context: Kaziranga recorded 96 species of wetland birds — one of the highest for wildlife reserves in India, according to the second wetland bird count conducted recently.

Key-highlights of the Survey:

- **The survey registered a total of 19,225 birds belonging to 96 species under 80 families. It covered four ranges of the park:**
 - ▶ Agoratoli
 - ▶ Bagori
 - ▶ Kohora
 - ▶ Burapahar
- More than half the birds (9,924) and 85 of the 96 species were recorded in **Agoratoli Range**. This was because **Sohola**, the largest of Kaziranga's 92 perennial wetlands, is in this range.
- With 6,181 individuals, the **bar-headed goose** led the species count, followed by the common **teal** at 1,557 and **northern pintail** at 1,359. All three belong to the family **Anatidae**.
- The other species with sizeable numbers include **gadwall, common coot, lesser whistling duck, Indian spot-billed duck, little cormorant, ferruginous duck, tufted duck, Eurasian wigeon, Asian openbill, northern lapwing, ruddy shelduck, and spot-billed pelican**.

Facts:

- The **first wetland bird survey in Kaziranga**, a UNESCO World Heritage Site since 1985, was **conducted in 2018**.
- The first waterfowl census in 2018 had yielded 10,412 birds covering 80 species, belonging to 21 families.

36 Addition of 3 Endangered Indian species to the Global Conservation List

Context: India has proposed to include three species- the Indian elephant, the Great Indian Bustard, and the Bengal Florican in the 'Appendix I' of the CMS Convention for 'migratory species threatened with extinction'.

Key-highlights:

- India hosted the Thirteenth Meeting of the **Conference of Parties (COP13)** to the **Convention on the Conservation of Migratory Species of Wild Animals (CMS)** in Gandhinagar.
- The theme of the conference is, **"migratory species connect the planet and together we welcome them home"**.
- The session witnessed the inclusion of ten new species for protection under the CMS.

The Indian Elephant (*Elephas maximus indicus*)

- There are about 47 lakh elephants in the wild in the 13 range countries, with 60% of them in India.
- IUCN Status: Endangered**
- Habitat:** Subtropical broadleaf forest, tropical broadleaf moist forest, dry forest, grassland

The Great Indian Bustard (*Ardeotisnigriceps*)

- It is a large bird of the bustard family (Otididae), one of the heaviest flying birds in the world.
- The species is listed in:
 - Schedule I of the Indian Wildlife (Protection) Act, 1972,
 - CMS Convention
 - Appendix I of CITES
 - Critically Endangered on the IUCN Red List

Bengal Florican (*Houbaropsis bengalensis*)

- It is a large grassland bird that is **Critically Endangered with extinction**, due to rapid habitat loss and hunting.
- Also known as **Bengal bustard**, it is a bustard species native to the Indian subcontinent, Cambodia, and Vietnam.

The Convention on the Conservation of Migratory Species (CMS) of Wild Animals (Bonn Convention)

- It is an international treaty, concluded under the aegis of the **United Nations Environment Programme**, concerned with the conservation of wildlife and habitat on a global scale.
- India became its member in the year 1983.
- India has also signed non-legally binding MOU with CMS on the conservation and management of **Siberian Cranes (1998), Marine Turtles (2007), Dugongs (2008) and Raptors (2016)**.

37 Madhya Pradesh Radio-Tags first-ever Indian Pangolin

Context: In order to know the species' ecology and develop an effective conservation plan, the Madhya Pradesh forest department has radio-tagged an Indian Pangolin (*Manis crassicaudata*) for the first time.

More on News:

- The radio-tagging is part of a joint project by the department and non-profit, the **Wildlife Conservation Trust (WCT)** that also involves the species' monitoring apart from other activities.
- The measure comes as the world gets ready to observe the ninth **'World Pangolin Day'** on February 15, 2020. **World Pangolin Day** is celebrated on the third Saturday in February, and this year, the special day falls on February 15, 2020.

Pangolin Habitat Map in India:

- India is home to two species of pangolin. While the Chinese Pangolin (*Manis pentadactyla*) is found in northeastern India, the Indian Pangolin is distributed in other parts of the

Pangolins:

- They are uniquely covered in tough, overlapping scales. Commonly known as 'scaly anteaters', the toothless animals are unique.
- Species:** There are eight species of pangolins:
- Asia:** Four of them are found in Asia. They have been listed by the IUCN as **critically endangered**. They are:
 - Chinese
 - Sunda
 - Indian
 - Philippine

countries as well as Sri Lanka, Bangladesh, and Pakistan.

- Both these species are protected and are listed under the **Schedule I Part I of the Wild Life (Protection) Act, 1972** and under **Appendix I of the Convention on International Trade in Endangered Species (CITES)**.

◦ **Africa:** The following four African species have been listed as **vulnerable**:

- ▶ Ground pangolin
- ▶ Giant pangolin
- ▶ White-bellied
- ▶ Black-bellied

38 Arrangements for the Protection of Wild Life

Context:

- A barely one-month-old female leopard cub was seized from a passenger who arrived at Chennai's Anna International Airport on a flight from Thailand, carrying the cub in a stroller bag.
- The leopard cub was seized under the Customs, Wildlife Protection Act, 1972 and as per the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

• Protection Status of Leopard:

- It is listed in **Schedule I** of the Wildlife Protection Act.
- It is the species **threatened with extinction** and hence included in **Appendix I of CITES**.
- It is categorised as **Vulnerable in the IUCN Red List of Threatened Species**.

Wildlife Protection Act, 1972:

- It is an Act of the Parliament of India enacted for protection of plants and animal species.
- It has six schedules which give varying degrees of protection:
 - ▶ **Schedule I and Part II of Schedule II:** They provide absolute protection i.e. offences under these are prescribed the highest penalties.
 - ▶ **Schedule III and Schedule IV:** Species listed in them are also protected, but the penalties are much lower.
 - ▶ **Schedule V:** It includes the animals which may be hunted.
 - ▶ **Schedule VI:** The specified endemic plants in this schedule are prohibited from cultivation and planting.

39 Cheetah Reintroduction Project

Context: The Supreme Court recently allowed the Centre to introduce the African cheetah to a suitable habitat in India.

More on News:

- With India's own cheetahs vanishing, a plea for this had been filed by the National Tiger Conservation Authority (NTCA), seeking permission to introduce the African cheetah from Namibia.
- The matter came up before the Supreme Court during a hearing on shifting a few lions from Gujarat to Kuno-Palpur wildlife sanctuary, Madhya Pradesh, which was also one of the sites identified for releasing cheetahs.

Facts:

- The **cheetah, *Acinonyx jubatus***, is one of the oldest of the big cat species, with ancestors that can be traced back more than five million years to the Miocene era.
- The cheetah is also the **world's fastest land mammal**.
- It is listed as **vulnerable in IUCN red listed species**.
- The country's last spotted feline died in Chhattisgarh in 1947. Later, the **cheetah — was declared extinct in India in 1952**.
- The **Asiatic cheetah is classified as a "critically endangered"** species by the IUCN Red List, and is believed to survive only in Iran.

40 Houbara Bustard

Context: Pakistan had issued special permits to the Emir of Qatar and nine other members of the royal family to hunt the houbara bustard, an internationally protected bird species.

Key Facts:

- The houbara bustard, which lives in arid climates, comes in two distinct species as recognised by the IUCN, one residing in North Africa (*Chlamydotis undulata*) and the other in Asia (*Chlamydotis macqueenii*).
- The population of the Asian houbara bustards extends from northeast Asia, across central Asia, the Middle East, and the Arabian Peninsula to reach the Sinai desert.
- After breeding in the spring, the Asian bustards migrate south to spend the winter in Pakistan, the Arabian Peninsula and nearby Southwest Asia.
- **IUCN Conservation status: Vulnerable.**

41 Assam Roofed Turtle

Context: The multipurpose Assamese gamosa, a ubiquitous, white cotton towel, has been assigned a new function — conservation of rare freshwater turtles- Assam roofed turtle.

More on News:

- It is an endangered small freshwater species.
- Protected under **Schedule I of the Wildlife Protection Act**.

42 Pakke Tiger Reserve**Context:**

- Arunachal Pradesh State government is planning to build a 692.7 km highway through the Pakke Tiger Reserve (PTR) in East Kameng district.
- Named the East-West Industrial Corridor, the highway aims to connect Bhairab Kunda in West Kameng district and Manmao in Changlang district along Arunachal Pradesh's border with Assam.

Pakke Tiger Reserve also known as Pakhui Tiger Reserve

- This Tiger Reserve has won India Biodiversity Award 2016 in the category of ‘**Conservation of threatened species**’ for its **Hornbill Nest Adoption Programme**.
- It is bounded by **Bhareli or Kameng River** in the west and north, and by **Pakke River in the east**.
- Neighbours: Papum Reserve Forest in Arunachal Pradesh, Assam’s Nameri National Park, Doimara Reserve Forest and Eaglenest Wildlife Sanctuary.
- The main perennial streams in the area are the Nameri, Khari and Upper Dikorai. West of Kameng River is Sessa Orchid Sanctuary.

43 Senna Spectabilis

Context: The Kerala Government is planning to arrest the rampant growth of Senna spectabilis, in the forest areas of the Nilgiri Biosphere Reserve (NBR), including the Wayanad Wildlife Sanctuary.

More on News:

- It is a deciduous tree native to tropical areas of America.
- It grows up to 15 to 20 metres in a short period of time and distributes thousands of seeds after flowering.
- It is an invasive species.
- Concerns: The thick foliage of the tree arrests the growth of other indigenous tree and grass species. Thus, it causes food shortage for the wildlife population, especially herbivores. It also adversely affect the germination and growth of the native species.
- **It is categorised as ‘Least Concern’ under IUCN Red List.**

Wayanad Wildlife Sanctuary (WWS):

- It is located in Wayanad, Kerala.
- This **biodiversity hotspot is an integral part of the Nilgiri Biosphere Reserve**. It is bounded by protected area network of Nagarhole and Bandipur of Karnataka in the northeast, and on the southeast by Mudumalai of Tamil Nadu.
- The wildlife sanctuary comes under Protect Elephant.

44 Steppe Eagle has been sighted recently near Vijayawada

- **IUCN status:** Endangered.
- **Scientific name:** Aquila nipalensis. Like all eagles, it belongs to the family Accipitridae.
- **Habitat:** It breeds from Romania east through the south Russian and Central Asian steppes to Mongolia. The European and Central Asian birds winter in Africa, and the eastern birds in India.
- Throughout its range it favours **open dry habitats, such as desert, semi-desert, steppes, or savannah**.
- The Steppe Eagle appears on the **flag of Kazakhstan**. **It is also the National bird (animal) of Egypt** and appears on its flag.

45 Malabar Tree Toad

Context: A Bangalore based non-profit is working to train and equip residents of villages in the Western Ghats for mapping the range of an extremely rare species of toad i.e. Malabar Tree toad (MTT).

Key Facts:

- It is a very rare species of amphibian that is **endemic to the Western Ghats**. At the same time, it is an **endangered species** that spends most of its life on trees and comes to the ground only during the first monsoon showers to mate.
- The Western Ghats is a biodiversity hotspot and is home to 179 recorded amphibian species and 80% of them are endemic to it.

Pollution

1 Menace of Stubble Burning

Context: Paddy fields in Kuttanad, the rice bowl of Kerala, look black these days with some of them emitting plumes of smoke. Relatively a new phenomenon in this part of the region, setting paddy fields on fire after harvest by 'padashekharasamitis' and farmers is emerging as a major cause for concern.

More on News:

- In Punjab or Haryana, residue burning is rampant after harvest, resulting in heavy smog choking the region every year.
- In Kerala, the rampant burning of fields started only a few years ago. The smoke from stubble contains carbon monoxide and other toxic chemicals, which adversely affect human health and the environment. However, the farmers are yet to be aware of the dangers.
- In Kuttanad, the farmers are burning fields to destroy stubble, to check the germination of weedy rice and prevent diseases, as part of preparing their fields for the next crop season. They believe setting the fields on fire will improve soil fertility.
- The burning impacts the quality of soil as it robs the soil of vital nutrients.

How it is beneficial to farmers?

- This method is **quick** one for clearing the fields.
- It is a **cheap** method.
- It kills weeds, including those resistant to herbicide and also killsslugs and other pests.
- It can reduce nitrogen tie-up.

What are the harmful effects of stubble burning?

- It causes loss of nutrients.
- It contributes to pollution from smoke.
- It has risk of out of controlspreading of fire.
- It damages electrical and electronic equipment from floating threads of conducting waste.

2 Air pollution is the third-highest cause of death among all health risks in India

Context: State of Global Air 2019, published by Health Effects Institute (HEI), said exposure to outdoor and indoor air pollution contributed to over 1.2 million deaths in India in 2017.

Key points from the report:

- **For the first time**, this year's report and website include worldwide estimates of the effect of air pollution on life expectancy.
- **In India**, air pollution is the **third-highest cause of death** among all health risks, ranking just above smoking.
- The study found that **China and India together were responsible for over half of the total global attributable deaths**, with each country witnessing over 1.2 million deaths from all **air pollution in 2017**.
- Overall, long-term exposure to outdoor and indoor air pollution contributed to nearly 5 million deaths from stroke, diabetes, heart attack, lung cancer, and chronic lung disease in 2017.
- Out of these, 3 million deaths are directly attributed to PM2.5, half of which are from India and China together.
- The South Asian region — Bangladesh, India, Nepal, and Pakistan — led the world as the most polluted, with over 1.5 million air-pollution related deaths according to the report.
- In 2017, exposure to **PM 2.5 pollution** was found to be the **third leading risk factor globally for Type 2 diabetes**-related deaths and disability after high blood sugar and excess body weight.
 - ▶ Globally, such exposure contributed to about 2.76 lakh deaths and 15.2 million life-years lost to disability in 2017.
 - ▶ **This burden was highest in India** followed by China, Indonesia, Mexico, and Brazil.
- Worldwide, air pollution reduced life expectancy by an average of 20 months in 2017.
- It also highlighted that nearly half of the world's population — a total of 3.6 billion people — were exposed to household air pollution in 2017.
- Globally, there has been progress in the proportion of people cooking with solid fuels has declined as economies develop. But in India, 60% of the population still uses solid fuels; in Bangladesh, that number rises to 79%.

State of Global Air Report

- It brings into one place the latest information on air quality and health for countries around the globe.
- It is produced annually by the **Health Effects Institute and the Institute for Health Metrics and Evaluation's Global Burden of Disease project** as a source of objective, peer-reviewed air quality data and analysis.

Health Effects Institute (HEI)

- It is a **non-profit corporation chartered in 1980** as an independent research organization to provide high-quality, impartial, and relevant science on the health effects of air pollution.
- It is **headquartered in Boston, Massachusetts**, United States.

3 Sewage Treatment Plants can turn E Coli into Superbug

Context: In samples collected from Sabarmati River, two lakes and three effluent treatment plants, researchers find microorganisms to be drug-resistant.

More on News:

- It is found that pollution, whether in a lake or at a point of sewage discharge into a river, induced multi-drug anti-microbial resistance in collected samples of E. Coli bacteria possibly transforming it into what is known as a superbug.
- **The Asia Pacific Network for Global Change Research** is funding the project, **in collaboration with the University of Kanazawa and the University of Tokyo from Japan, the University of Ruhuna from Sri Lanka and IIT-Gandhinagar from India.**

Findings:

- In Sabarmati, they collected samples from three different locations — Nehru Bridge (upstream), Sardar Bridge (middle) and Fatehwadi (downstream).
- While the sample from Nehru Bridge showed the E Coli was not resistant to any antibiotics.
- But in the Sardar Bridge sample, 60 percent of the E Coli was resistant to kanamycin and 40 percent of the bacteria were resistant to the other five drugs.
- But the resistance again decreased to zero further downstream in Fatehwadi showing that the river had a natural way of dealing with the phenomenon if not polluted again.
- Similarly, in the samples collected from Chandola Lake, 80 percent of the bacteria were multi-drug resistant.

What caused the resistance to go up at Sadar Bridge?

Sabarmati does not have a high natural flow during summers but the riverfront needs water at all times. So, the water is stored at Sardar Bridge and remains stagnant. This stagnant water probably makes the E Coli antibiotic resistant.

4 Ganga has a higher proportion of anti-bacterial agents

Context: Recently, a study commissioned by the Union Water Resources Ministry has confirmed a significantly higher proportion of organisms with antibacterial properties in River Ganga.

Key observations of the study:

- The study was conducted by the **Nagpur-based National Environmental Engineering and Research Institute (NEERI), a CSIR lab.**
- It was titled **“Assessment of Water Quality and Sediment To Understand Special Properties of River Ganga”**
- The study was to probe the “unique properties” of the river Ganga.
- The antibacterial properties varied widely along the length of the river, with it being high especially in upper stretches of the river.
- Though the presence of bacteriophage species may not be unique to the Ganga, the study suggests there are many more of them in the Ganga than in other rivers.
- In the river Ganga, the bacteriophages were detected to be approximately 3 times more in proportion than bacterial isolates. As part of the assessment, five pathogenic species of bacteria (Escherichia, Enterobacter, Salmonella, Shigella, and Vibrio) were selected and isolated from the Ganga, Yamuna and the Narmada and their numbers compared with the bacteriophages present in the river water.

Anti-bacterial properties of Ganga:

- **River Ganga is known for its self-purifying and anti-bacterial properties.**
- A British scientist in 1896 confirmed that ‘Vibrio cholera’, the pathogen that causes cholera, could not survive in Ganga water for even few hours.
- The main reason for anti-bacterial property of river Ganga is the presence of **bacteriophages** (They are prokaryotic viruses that kill bacteria, they are frequently found in proximity to each other).

5 Plastic Pollution

Context: More than 300 women will join a round-the-world voyage known as Expedition, launching in October to highlight the devastating impact of

plastic pollution in the oceans and conduct scientific research into the escalating crisis.

More on News:

- Millions of tonnes of plastic, from food packaging to fishing gear enter the sea each year, leading some marine experts to warn that there could be more plastic than fish in our oceans by 2050.
- The two-year all-female voyage comprises scientists, teachers, filmmakers, product designers, photographers, and athletes who will collect samples from some of the planet's most important and diverse marine environments to build a picture of the state of the seas.
- The 38,000 nautical mile trip will cover the Arctic, the Galapagos Islands, the South Pacific islands and central ocean areas where plastic accumulates because of circulating currents.

WWF (World Wide Fund) Report 2019 on plastic waste pollution

The Report describes a rather alarming scenario:

- 75% of the plastic ever produced in the world is already waste and almost half of the plastic that exists today was produced after the year 2000,
- In 2016, the production reached 396 million tons (53 kg/person), resulting in the emission of 2 billion tons of CO₂ into the atmosphere, and it is expected that by 2030 plastic production could increase by a further 40%,
- Given that only 20% of plastic waste is recycled, Carbon dioxide emissions from burning – one of the most popular methods of disposal for end-of-life plastic, could triple.

Key facts related to Ocean Pollution

- Since the 1950s, humans have generated about 8.3 billion metric tons of plastic.
- About half of the plastic produced was made in the past 13 years. By 2050, around 12 billion metric tons of plastic could wind up in landfills or the natural world.
- The **United Nations Environment Programme** estimates that every square mile of ocean contains roughly 46,000 pieces of floating plastic.
- The world's largest collection of floating trash is the **Great Pacific Garbage Patch**, a collection of debris that lies between California and Hawaii.
- Up to 85 % of plastic pollution found on shorelines is **microplastics**.
- According to UNESCO, **plastic waste accounts for the deaths of more than a million seabirds every year**, along with over 100,000 marine mammals.

6 Pet Bottles

Context: Central Food Technological Research Institute(CFTRI) study reveals that Polyethylene Terephthalate (PET) bottles are safe.

Findings:

- Bisphenol-A (BPA), a compound used in polycarbonate, was below its detection limit of 0.02 mg/kg.
- All the metals used in the manufacturing of PET were below their detection limits (BDL) of 0.001 mg/kg.
- They were also below the EU regulation norms of the "specific migration limit".

Polyethylene Terephthalate(PET)

- It is a highly valued packaging material because it is strong yet lightweight, non-reactive, economical, and shatterproof.
- It is a polymer of **ethylene glycol and terephthalic acid**.

- The **specific migration limit (SML)** is the **maximum** permitted quantity of a specific substance that can migrate from a food packaging material or food container into food.

7 Chilika Lake

Context: Chilika faces oil spillage threat from the stuck ship.

More on News:

- The Indian Coast Guard has issued a warning about possible oil spillage into the ecologically sensitive Chilika lake from a Malaysian cargo vessel which is stuck in the Bay of Bengal near the lake.
- The barge contains 30,000 litres of diesel, 1,000 litre of lube oil and 200 litres of hydraulic oil.
- Under Section 356 of Indian Merchant Shipping Act, 1958, all necessary measures should be undertaken to prevent any leakage of oil from the vessel causing pollution to the area
- The Coast Guard also advised undertaking action on a priority basis either through a local agent or any professional salvor.
- The vessel — Jin Hwa 32 — with a deadweight tonnage of 7,500 **had sailed from Mongla Port was heading towards Visakhapatnam Port.** It was caught in stormy waters and drifted towards Odisha.

Chilika Lake

- It is a **brackish water lagoon**, spread over the Puri, Khurda and Ganjam districts of Odisha state on the east coast of India, at the mouth of the Daya River, flowing into the Bay of Bengal.
- It is the **largest coastal lagoon in India and the second largest coastal lagoon in the world.**
- The Nalaban Island within the lagoon is classified as a Bird Sanctuary under the wildlife protection act.
- In 1981, Chilika Lake was designated the first Indian wetland of international importance under the Ramsar Convention.
- The Irrawaddy dolphin has been found in Chilika Lake. It is a euryhaline species of oceanic dolphin found in discontinuous subpopulations near sea coasts and in estuaries and rivers in parts of the Bay of Bengal and Southeast Asia.
- **Irrawaddy dolphins are classified as 'Vulnerable' in the IUCN Red List of Threatened Species**

8 Deforestation in the Amazon rainforest

Context: There has been a rapid increase in deforestation in the Amazon forests of Brazil.

More on News:

- Deforestation in the Amazon rainforest is increasing **rapidly.**
- Satellite images show that **about 4,200 sq km of forests have been destroyed** up to now under the **new government.**
- New government is in favour of **"reasonable" exploitation** of these forests which have **emboldened illegal expansion** into the forest.
- **Armed gold-hunting gangs** have reached **tribal areas.**

Amazon rainforests

- It is the **world's biggest rainforest**, larger than the next two largest rainforests — in the Congo Basin and Indonesia — combined.

- The Amazon River is by far **the world's largest river by volume**.
- The Amazon River once had flown **west-ward instead of east-ward** as it does today. The rise of the Andes caused it to flow into the Atlantic Ocean.
- 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**.

9 SO₂ Emissions

Context: India is the largest emitter of sulphur dioxide (SO₂) in the world, contributing more than 15 percent of global anthropogenic emissions, according to a new report released by Greenpeace.

More on News:

- The primary reason for India's high emission output is the expansion of coal-based electricity generation over the past decade, the report added.
- Five of the top 10 SO₂ emission hotspots from the coal/power generation industry across the world are in India.
- The analysis is based on hotspots detected by NASA Ozone Monitoring Instrument (OMI) satellite data that captured more than 500 major source points of SO₂ emissions across the globe including natural sources such as volcanoes.
- The analysis excluded all-natural sources and only anthropogenic sources of SO₂ were investigated.
- Thermal power plants or clusters at Singrauli, Neyveli, Talcher, Jharsuguda, Korba, Kutch, Chennai, Ramagundam, Chandrapur, and Koradi to be the major emission hotspots in the country.
- The vast majority of plants in **India lack flue-gas desulfurisation (FGD)** technology to reduce air pollution, according to the report. The flue gas desulfurization (FGD) plant removes sulphur dioxides (SO₂) from flue gas produced by boilers, furnaces, and other sources

10 Lead Batteries

Context: A study by environmental think tank Toxic Links has found that 90 percent of lead-acid batteries (LABs) reach the informal recycling sector.

More on News:

- The study — **"Loaded Batteries: Mapping the toxic waste trail"** — released was conducted across Rajasthan, Delhi, Jharkhand, and Andhra Pradesh.
- The findings show that the transportation of LABs to the informal recycling sector is in direct contravention of the **Batteries Management and Handling Rules (2001)**.

Batteries Management and Handling Rules (2001)

- According to the rules either battery manufacturing companies should take the LABs for recycling, or they should be recycled by registered recycling units.
- According to the Battery Rules which were set up in 2001, the target was that by 2003, 90 per cent of LABs were to be sent back to the manufacturer for recycling. But even after 18 years this has not been achieved which shows a failure of the regulatory authorities.

- The study points out two broad problems in the disposal of the LABs
 - ▶ The first is the lack of regulation by authorities such as the CPCB and the SPCBs.
 - ▶ The second is the nature of recycling in the informal sector, in which lead is melted on furnaces and the acid in the batteries is often dumped in nearby drains or fields — polluting water as well as soil.

11 Nitrate Pollution

Context:

- A World Bank report looks at the long-term impact of **nitrate exposure experienced during infancy**.
- The data set used was taken from over 1,330 monitoring stations from 1963-2017. The birth years of the sample range were from 1966-1999, “a period when the effect of the Green Revolution was already in force yet nitrogen fertilisers were increasing in use.”

Report findings

- An infant girl who has been exposed to nitrate levels above the safety threshold in the first three years experiences a 1-2 cm decrease in her adult height.
- Given that female adult height in India has increased by approximately 4 cm over the last century, a 1-2 cm loss means that nitrate exposure in infancy can wipe out almost half of this gain in height.
- The report also found (using data from the Central Groundwater Board of India) that nitrate levels in groundwater aquifers exceeded permissible levels in more than 50 percent of the districts across 19 states.
- The report broadly covers two types of pollutants — the well-known ones such as faecal contaminants and the new pollutants that include plastic, nutrients, and pharmaceuticals.

12 Solid fuels and household air pollution

Context: A study published states that the single greatest contributor to air pollution in India is the burning of solid fuels in households.

More on News:

- The burning of solid fuels like firewood impacts the health of household members and accounts for somewhere between 22% to 52% of all ambient air pollution in India.
- The study to cleaner fuels such as LPG for household use will have a dramatic impact on pollution levels and health problems due to pollution.
- The study asserts that immediate action is required to rectify the harm caused by HAP.
- It points to initiatives undertaken by the government of India to promote LPG for use in households as opposed to the traditionally used solid fuels, such as **the Pradhan Mantri Ujjwala Yojana**.
- More effort is required, in particular, increasing the **use of electricity** as a substitute in these scenarios, and ensuring that the use of LPG is sustained.

13 Particulate Matter Emissions Trading

Context:

- Gujarat became the **world's first market for particulate matter emissions** in the world after 155 industrial units of Surat came together for "live trading" under the Emissions Trading Scheme (ETS) on World Environment Day 2019.
- The ETS was designed with the help of a team of researchers from the Energy Policy Institute at the University of Chicago (EPIC), the Economic Growth Center at Yale University and others from The Abdul Latif Jameel Poverty Action Lab (J-PAL).

Emissions Trading Scheme (ETS)

- The programme is a **market-based system** where the government sets a cap on emissions and allows industries to buy and sell permits to stay below the cap.
- Under the cap and trade system, **the regulator first defines the total mass of pollution** that can be put into the air over a defined period by all factories put together.
- Then, **a set of permits is created, each of which allows a certain** amount of pollution, and the total is equal to the cap.
- These permits are the quantity that is bought and sold. Each factory is allocated a share of these permits (this could be equal or based on size or some other rule).
- After this, plants can trade permits with each other, just like any other commodity on the National Commodity and Derivatives Exchange Limited (NCDEX).

14 Heavy Metals Contaminating India's Rivers

Context:

- The Central Water Commission (CWC) has reported that the samples from two-thirds of the water quality stations spanning India's major rivers have a heavy metal contamination problem.
- According to the Report, samples taken from two-thirds of water quality stations on major rivers revealed the presence of heavy metal (or in some cases more than one) beyond limits specified by the Bureau of Indian Standards.

More on News:

- The exercise was limited to surface water and did not cover groundwater contamination.
- The most common heavy metal found was iron, and above safe limits in 156 samples.
- Lead, nickel, chromium, cadmium, and copper were the other metals.
- According to the report, **Arsenic and zinc are the two toxic metals whose concentration was always obtained within the limits throughout the study period.**
- For other metals, contamination levels change with the season. For instance, iron contamination was persistent through most of the Ganga during monsoon but dipped significantly during the non-monsoon periods.

15 Hydrochlorofluorocarbon (HCFC)-141 b

- India has successfully achieved the complete phase-out of hydrochlorofluorocarbon (HCFC)-141 b, according to the Ministry of Environment, Forest and Climate Change.

- HCFC- 141 bis a chemical used by foam manufacturers as a blowing agent in the production of rigid polyurethane (PU) foams.
- It is one of the most potent ozone-depleting chemicals after Chlorofluorocarbons (CFCs).
- The complete phase-out of HCFC 141 b from the country in the foam sector is among the first at this scale in **Article 5 parties** (developing countries) under the **Montreal Protocol**.

Montreal Protocol

- It **seeks to cut the production and consumption of ozone depleting substances (ODS)** in order to protect the earth's fragile ozone layer. It also aims at phase out HCFCs by 2030.
- It came into force in **1989** and has been ratified by 197 parties making it universally ratified protocol in UN history.

CLIMATE CHANGE

1 Ground Frost reported from many states of South India

Context: As several states across the country reel under cold wave conditions, the ground frosting has been reported in Jharkhand, Odisha, Uttar Pradesh, Punjab, Kerala, and Tamil Nadu.

What is unusual this time?

- In India frost is most prevalent during **December and January** when minimum temperatures across the Indo-Gangetic Plains as well as parts of Rajasthan and Madhya Pradesh drop to 4°C or less
- Frost has caught attention due to the increase in density of ground frosting in southern Indian states.
- Recent reports highlighted a blanket of ground frost covering the hills of Kerala's Munnar, Kanimalla, Chenduvvara, Chittuvvara, Sevenvalley and Nallathanni over the weekend, with temperatures falling as low as -3 degrees Celsius. The report also flagged the losses caused to tea plantation owners as tea leaves wilt away due to heavy frosting.

2 Polar Vortex

Context: Weather experts an extremely cold January and February for the Northeastern United States due to low polar vortex. Extreme cold has become the cause of concern as low polar vortex has been alleged earlier for the drop in temperatures along the mid-latitudes, in the United States and Europe.

Is global warming responsible for the weakening of polar vortex?

- It is being hypothesised that the weakening of polar vortex is a result of global warming. Warming leads to the melting of polar ice

What is Polar Vortex?

- The stratospheric polar vortex is a large-scale region of air that is contained by a strong west-to-east jet stream that circles the polar region. This jet stream is usually referred to as the polar night jet.
- The polar vortex extends from the tropopause through the stratosphere and into the mesosphere. Low values of ozone and cold temperatures are associated with the air inside the vortex.

during the summer months. The melting ice warms the Arctic Ocean and the heat is radiated back to the atmosphere.

- In the absence of global warming, there used to be a substantial difference between the temperatures at the poles and in the mid-latitudes.
- As more and more ice melts in the coming years, more such events can be expected. But very little research on this is available as ice melting is a recent phenomenon.
- IPCC report says that the polar vortex is expected to become smaller in the coming years.

- It is described as a whirling cone of low pressure over the poles that is strongest in the winter months due to the increased temperature contrast between the Polar Regions and the mid-latitudes, such as the US.
- Often when the **polar vortex is strong, temperatures** are mild in the mid-latitudes across the Eastern US and Northern Eurasia; **and when the vortex is weak, temperatures** tend to be cold across the Eastern US and northern Europe and Asia.

3 Algae Thrive under Greenland Sea Ice

- Microscopic marine plants flourish beneath the ice that covers the Greenland Sea, according to a new study published in the **Journal of Geophysical Research**. This phytoplankton creates the energy that fuels ocean ecosystems, and the study found that half of this energy is produced under the sea ice in late winter and early spring, and the other half at the edge of the ice in spring.
- The Greenland Sea is an important **transition zone between the North Atlantic and Arctic oceans**, both of which are being profoundly impacted by global climate change.

4 Coral Bleaching

Context: The world’s southernmost coral reef - Lord Howe Island – approx. 600 kilometres offshore from Sydney - has been hit by bleaching due to an increase in temperature but escape severe bleaching that damaged the Great Barrier Reef in 2016 and 2017.

More on News:

- Rising sea temperature from climate change is affecting even the most isolated ecosystems and also has been held responsible for the recent adverse phenomenon (affected reef is 600 kilometres from the mainland).
- Deeper-water corals in the marine park, contains species not found anywhere else and like the Barrier Reef is a World Heritage site, were still “looking quite healthy” having mostly escaped the bleaching.
- Increasing baseline temperatures caused by climate change, and local factors such as elevated temperatures in the area have been held responsible for the bleaching.

Coral Bleaching

- It occurs when abnormal environmental conditions, such as warmer sea temperatures, cause coral polyps to expel algae (zooxanthellae) living in their tissues, causing the coral to turn completely white.

Great Barrier Reef

- It is **off the coast of Queensland in northeastern Australia**, is the largest living thing on Earth, and even visible from outer space.

5 Sea Level Increase

Context: According to the Ministry of Earth Sciences, Diamond Harbour, which is one of the major ports in West Bengal located at the mouth of river Hooghly, has recorded the maximum sea-level increase.

More on News:

- While recent studies reveal that sea-level rise in the country has been estimated to be **1.3 mm/year along India's coasts during the last 40-50 years.**
- At Diamond Harbour, the rise was almost five times higher at 5.16 mm per year. The mean sea-level rise for this port was based on recordings over the period from 1948 to 2005.
- Studies over the Indian region have shown a warming trend of 0.6°C on all India average basis, mainly contributed by maximum temperatures.
- If global warming exceeds 2°C by 2100, about 80 % of global coastline could see a 6-ft rise in sea levels.

Sinking Chain of Atolls of India

- Parali I Island of Lakshadweep** has already sunk and **Parali II has sunk** almost 80% of its total area. Thinkara(14.38%) and **Parali III** (11.42%) are eroding at fast pace.
- UNIPCC in its fifth report has stated that sea level in Lakshadweep has risen up to 0.6 m in last 20 years. This will not only cause loss in livelihood to the native people but also loss of biodiversity as large number of flora and fauna inhabit these Islands along with Particularly Vulnerable Tribal groups (PVTGs).
- El-Nino event has also weakened coral colonies to a larger extent.

Sea Level Rise

- It is said to be linked with global warming and as per the fifth assessment report of the **United Nations International Panel on Climate Change (UNIPCC)**, the global sea level was rising at an average rate of **1.8 mm per year** over the last century.
- According to the data from the **Ministry of Earth Sciences**, four ports namely **Diamond Harbour, Kandla, Haldia, and Port Blair** recorded a higher sea-level rise than the global average.
- Chennai and Mumbai recorded a sea-level rise far below the global and the national averages at 0.33 mm per year (1916-2005) and 0.74 mm (1878-2005) respectively.
- The sea-level rise is higher in West Bengal, particularly in the Sunderbans delta is because of the deltaic sediment deposition as a result of the mixing of freshwater and saline water, according to experts.

6 The Amazon Fire

Context:

- Satellite images showed fires in the Brazilian states of Amazonas, Rondonia, Para and Mato Grosso. The state of Amazonas is most affected.
- The number of fires in Brazil this year is the highest on record since 2013 and is up by 85% from last year alone.

What's the connection to climate change?

- Forest fires and climate change operate in a vicious circle. As the number of fires increase, greenhouse gas emissions do too. This makes the planet's overall temperature rise, the organization said. As the temperature increases, extreme weather events like major droughts happen more often.

- In addition to increasing emissions, deforestation contributes directly to a change in rainfall patterns in the affected region, extending the length of the dry season, further affecting forests, biodiversity, agriculture, and human health.
- NASA released an AIRS Map showing the carbon monoxide associated with the fires in Brazil. The map shows a carbon monoxide plume bloom in the northwest Amazon region, move south and east, and then toward San Paolo.

7 Great Barrier Reef

Context: The long-term outlook for Australia’s Great Barrier Reef was downgraded to “very poor” for the first time by the official agency charged with managing the world heritage site.

More on News:

- The Great Barrier Reef Marine Park Authority singled out rising sea temperatures due to climate change as the biggest threat to the giant organism.
- However, the threats to the 2,300-kilometre (1,400-mile) reef were “multiple, cumulative and increasing” and, in addition to warming seas; agricultural run-off and coral-eating crown of thorns starfish are the rising threats.
- If the condition of the Great Barrier Reef continues declining, it may lose its world heritage status.

Coral reefs

- They are large underwater structures composed of the skeletons of colonial marine invertebrates called coral.
- The coral species that build reefs are known as hermatypic, or “hard,” corals.
- Hard corals rely on symbiotic algae (zooxanthellae) living within their tissues for nutrition and energy to build their skeleton.

8 Geo-engineering

Context:

- With the intensified debate on climate change, alternate methods like geoengineering can be considered.
- Also known as “climate engineering”, geo-engineering is the intentional large-scale intervention in the Earth’s climate system to counter climate change.

Types of Geoengineering Proposals

- Carbon dioxide removal techniques (CDR): Techniques to remove carbon dioxide from the atmosphere. Example:
 - ▶ Ocean fertilisation using phytoplankton and iron
 - ▶ Biochar production
 - ▶ Artificial trees
 - ▶ Carbon filtering
- Solar geoengineering, or “solar radiation management” (SRM); technologies to rapidly cool the Earth by reflecting solar energy to space.Example:
 - ▶ Stratospheric aerosol injection
 - ▶ Marine cloud brightening

- ▶ Cirrus cloud thinning (CCT)
- ▶ Space reflectors

9 New IPCC report warns of a dire threat to ocean

Context: The Intergovernmental Panel on Climate Change (IPCC) in its special report underlined the dire changes taking place in oceans, glaciers, and ice-deposits on land and sea.

More on News:

- **IPCC in its 'Special Report on the Ocean and Cryosphere in a Changing Climate'** found that over the 21st century, the ocean is projected to transition to unprecedented conditions with increased temperatures, further ocean acidification, marine heatwaves and more frequent extreme El Niño and La Niña events.
- The report was prepared following an IPCC Panel decision in 2016 to determine the impact on the world's oceans and ice-covered regions.
- Rising seas are already threatening low-lying coastal areas that today are home to 680 million people, about 10 percent of the world's population.
- The Southern Ocean accounted for 35%–43% of the total heat gain in the upper 2,000 m global ocean between 1970 and 2017, and its share increased to 45%–62% between 2005 and 2017.

IPCC

- **Created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP)**
- **Headquarter: Geneva**
- **Objective: To provide governments at all levels with scientific information that they can use to develop climate policies. IPCC reports are also a key input into international climate change negotiations.**
- **Composition: The IPCC is an organization of governments that are members of the United Nations or WMO. The IPCC currently has 195 members.**

10 Climate change is already damaging the health of children, says Lancet report

Context: Climate change poses an unprecedented health risk to children and is already having “persistent and pervasive” effects that will last throughout their lives, a major new study has warned.

Outcomes of the report

- The Lancet Countdown on Health and Climate Change' is a comprehensive yearly analysis tracking progress across 41 key indicators.
- Without drastic reductions in emissions, escalating temperature increases will burden the next generation with high levels of malnutrition, weaker immune systems and a higher risk of premature death.

The Lancet

- It is a weekly peer-reviewed general **medical journal**.
- It is among the world's oldest, most prestigious, and best known general medical journals.

- As temperatures rise, the study predicts a reduction in yields of staple crops such as maize, rice, and soybean, which will cause prices to rise and leave infants vulnerable to malnutrition, resulting in stunted growth and long-term developmental problems.
- Small children are particularly vulnerable to rises in infectious diseases caused by increasing temperatures and changing rainfall patterns.
- Warmer temperatures caused an increase in the spread of bacteria that causes diarrhoeal diseases and wound infections.
- Over the past 30 years, the number of climatically suitable days for Vibrio bacteria (which causes diarrhoea) to thrive has doubled. Dengue is also on the spread.
- The damage done in early childhood is persistent and pervasive, with health consequences lasting for a lifetime.

- The journal was founded in 1823 by Thomas Wakley, an English surgeon who named it after the surgical instrument called a lancet.
- The journal publishes original research articles, review articles, editorials, book reviews, correspondence, as well as news features and case reports.

11 Deforestation and Agriculture triggered soil erosion 4,000 years ago

Context: Increased sediment deposits and changes in land use showed the degradation of soil during the last four millennia. Human activities such as agriculture and deforestation intensified global soil erosion 4,000 years ago, according to a study.

More on News:

- While weathering of soil and erosion has known to be controlled by changing climatic patterns and tectonic impacts of the planet, the new study suggests a role of human practices and land-use change.
- Soil erosion has direct impacts on climate and society, as it decreases the productivity of ecosystems and changes nutrient cycles.
- **Max Planck Institute, a Germany-based non-profit**, used radiocarbon dating techniques recorded temporal changes of soil erosion by analysing sediment deposits in more than 600 lakes worldwide. To understand the cause they analysed pollen fossil records and observed a decline in the tree cover.
- Changes in land cover were identified as the main driver of soil erosion in 70 percent of all studied watersheds. This suggests that human practices intensified soil erosion much before the advent of industrialisation.
- Socio-economic developments during human settlements also correlated with sediment accumulation in lakes, a proxy for soil erosion.

Wetlands in Kashmir shrinking due to urbanisation

- An analysis of land cover data shows that the catchment of **Narkara wetland** in **near Srinagar** is now predominantly an urban setting.
- This reduction is attributed to barren lands and agriculture being taken over by built-up area.
- The reckless urbanisation both within Narkara and its catchment not only affects the hydrology and ecology of this important semi-urban wetland but also increases vulnerability of people to flooding in this part of Himalaya because wetlands act as natural sponges and flood protection system.
- The catchment of Narkara is predominantly a semi-urban setting with settlements, agricultural fields and table lands locally called karewas, which are barren denuded landscapes.

12 Emperor Penguins would be extinct if climate goals are not met

Context: Warming climate may render Emperor Penguins, one of the most striking and charismatic animals on Earth, extinct by the end of the century, according to a new study by the Woods Hole Oceanographic Institution (WHOI).

More on News:

- The study was a part of an international collaboration between scientists.
- Disappearing sea ice impacts Emperor Penguins directly, as the animals use it as a home base for their nine-month breeding season and feeding and moulting.
- As the climate warms, however, that sea ice will gradually disappear, robbing the birds of their habitat, food sources and ability to raise their chicks.

Emperor Penguins

- **IUCN Status:** Near Threatened.
- **The emperor penguin is the tallest and heaviest of all living penguin species and is endemic to Antarctica.**
- Feathers of the head and back are black and sharply delineated from the white belly, pale-yellow breast and bright-yellow ear patches.
- This is the only penguin species that breeds during the Antarctic winter.

13 Northern European Enclosure Dam (NEED)

Context: Scientists have proposed to protect 25 million people and important economic regions of 15 Northern European countries from rising seas. It is called Northern European Enclosure Dam (NEED) enclosing all of the North Sea.

More on News:

- The scientists have proposed the construction of two dams of a combined length of 637 km.
- The first between northern Scotland and western Norway. It would be 476 km and with an average depth of 121 m and a maximum depth of 321 m.
- The second between France and southwestern England, of length 161 km, and an average depth of 85 m and a maximum depth of 102 m.
- According to scientists, separating the North and Baltic Seas from the Atlantic Ocean is considered to be the "most viable option" to protect Northern Europe against unstoppable sea-level rise (SLR).
- They have also identified other regions in the world where such mega-enclosures could potentially be considered, including the Persian Gulf, the Mediterranean Sea, the Baltic Sea, the Irish Sea, and the Red Sea.



CONFERENCES & REPORTS

1 Sixth National Report (NR6) on Biological Diversity

Context: India submitted its Sixth National Report (NR6) to the Convention on Biological Diversity (CBD) and became one of the first five countries in the world and the first in Asia to do so.

India's sixth report an appraisal of efforts and initiatives

- The Ministry of Environment, Forest and Climate Change (MoEFCC), also released the document '**Progress on India's National Biodiversity Targets: A Preview**' on the occasion.
- The NR6 provides an update of progress in the achievement of **12 National Biodiversity Targets (NBT)** developed under the Convention process **in line with the 20 global Aichi biodiversity targets**.
- The Report highlights that while India has exceeded/overachieved two NBTs, it is on track to achieve eight NBTs and in respect of the remaining two NBTs also, India is striving to meet the targets by the stipulated time of 2020.
- With well over **20 percent of its total geographical area under biodiversity conservation**, India has exceeded the terrestrial component of 17 percent of Aichi target 11, and 20 percent of corresponding NBT relating to areas under biodiversity management.
- As a mega-diverse country harbouring **nearly 7-8% of globally recorded species while supporting 18% of the global human population on a mere 2.4% of the world's**

Convention on Biological Diversity:

- It is one of the important conventions that resulted in the Earth Summit of 1992.
- It was inspired by the world community's growing commitment to sustainable development.
- It represents a dramatic step forward in the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources.

Cartagena Protocol on Biosafety to the Convention on Biological Diversity:

- It is an international treaty governing the movements of living modified organisms (LMOs) resulting from modern biotechnology from one country to another.

Nagoya Protocol:

- It aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way.

Aichi Biodiversity Targets:

- Adopted at COP10, and advocates realization of a society in harmony with nature as a shared vision until 2050.

land area, India's quest for inclusive economic development while maintaining the integrity of its natural capital is being pursued through various programmes and strategies.

- This includes national focal points for the **Cartagena Protocol on Biosafety and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization** as well as the national focal points for the biodiversity-related Conventions, **the Rio Conventions** and other relevant international and regional conventions.

2 Climate Change Performance Index 2019

Context:

- The 2019 edition of the *Climate Change Performance Index (CCPI)* has been released which illustrates regional differences in climate protection and performance within the 56 evaluated countries and the EU.
- No country performed well enough to reach the ranking 'very good' in this year's index.

More on News:

- The ranking results are defined by a country's aggregated performance on 14 indicators within the four categories "**GHG Emissions**", "**Renewable Energy**" and "**Energy Use**", as well as on "**Climate Policy**."
- **Sweden leads the ranking, followed by Morocco and Lithuania.** The bottoms five are **Saudi Arabia, the United States, Islamic Republic of Iran, Republic of Korea and Chinese Taipei.**
- **India ranks 11th in this year's CCPI**, improving its standing by three places compared to the previous edition. Most notably India improved its performance in the Renewable Energy category, joining the group of medium performers.

Category wise performance of countries

- **GHG Emissions**
 - **Sweden is the best-performing country regarding GHG emissions.** The Islamic Republic of Iran, the Republic of Korea and Saudi Arabia are the bottom three countries.
- **Renewable Energy**
 - **Latvia** leads the ranking in this category. Iran, Saudi Arabia, and Russia are the bottom three.

Climate Change Performance Index (CCPI)

- It is an instrument designed to enhance transparency in international climate politics.
- The index is published by Germanwatch, the New Climate Institute and the Climate Action Network.
- On the basis of standardised criteria, the index evaluates and compares the climate protection performance of 56 countries and the European Union (EU), which are together responsible for more than 90% of global greenhouse gas (GHG) emissions.
- In 2017 the methodology of the CCPI was revised, to fully incorporate the Paris Agreement, which marked a milestone in the international climate negotiations.
- The CCPI captures NDCs and other promises and evaluates the countries' 2030 targets within the important categories - "GHG Emissions", "Renewable Energy" and "Energy Use" - to determine if they are on track to a well-below-2°C pathway.
- The CCPI also reflects countries' current performances towards this pathway in absolute terms, in addition to the relative indicators measuring the current level and past trends in all three categories.
- 40% of the evaluation is based on indicators of Emissions, 20% on Renewable Energies and 20% on Energy Use. The remaining 20% of the CCPI evaluation is based on national and international climate policy assessments by experts from the respective countries.

- **Energy Use**

- ▶ Ukraine, Malta, and Morocco, as well as Romania, remain the frontrunners in this category, mostly due to low current levels of energy use and relatively good ratings regarding a 2°C-compatible pathway in this category.
- ▶ While emerging economies tend to perform well in this category, Thailand, Turkey, Algeria, India, and Indonesia have been rapidly increasing their energy use in the past few years.

- **Policy Category**

- ▶ Portugal, France, the Netherlands, Sweden, and Morocco all scored high regarding national and international climate policy.
- ▶ Australia, Turkey, and the United States form the group of the worst-performing countries.
- ▶ It is noteworthy that many countries, including Germany, Canada and the United Kingdom, for example, are performing relatively well on the international stage, yet seem to be failing to implement policy measures sufficiently at the national level.

3 India's proposal to remove rosewood from Appendix II of CITES

Context: India has proposed to remove rosewood (*Dalbergiasissoo*) from Appendix II of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), a multilateral treaty to protect endangered plants and animals.

More on News:

- **Appendix II of CITES** lists species that are not threatened with extinction, but in which trade must be controlled to avoid utilisation incompatible with their survival.

What lies at the heart of India's concern?

- During 17th COP (2016), several African and Latin American countries had raised concerns over a "considerable rise in interest in the wood of *Dalbergia* in international markets, primarily in China". According to them, this was fuelling an illegal trade, which was decimating *Dalbergia* populations.
- Although CITES focuses on the protection of individual species, **COP 17 puts the entire genus under Appendix II, which regulates trade in species.**
- Though most of the 182 member countries agreed to the proposal, India, for the first time, entered a reservation concerning **the inclusion of all rosewood in Appendix II.**
- Since all species of *Dalbergia* are not threatened, India has suggested **that CITES should regulate the trade of individual species based on their conservation status.**
- The International Union for Conservation of Nature (IUCN) classifies ***D latifolia* (Indian rosewood), native to southeast India, as "vulnerable", while considers *D sissoo*, also called sheesham or North Indian rosewood, a species of least concern.**
- According to the proposal sent by India, the species grows at a very fast rate and can become naturalised outside its native range, it is even invasive in some parts of the world.
- Listing of *Dalbergia* genus may create unnecessary complications in the trade of common species like *D sissoo*, which are being managed and monitored through the management plans of forest areas and are protected under the forest laws of India.

4 Waterbird Survey

Context:

- A waterbird survey conducted in the Upper Kuttanad region of Kerala has recorded 16,767 birds of 47 continental and local species.
- The survey, conducted as part of the **annual Asian Waterbird Census**, has spotted three new species — **Greater flamingo, Grey-headed lapwing, and Blue-cheeked bee-eater**.

Asian Waterbird Census

- It is a part of the global waterbird monitoring programme of **the International Waterbird Census (IWC)** carried out each January as a voluntary activity and coordinated by Wetlands International. It runs in parallel with other regional programmes of the International Waterbird Census in Africa, Europe, West Asia, the Neotropics, and the Caribbean.
- It was initiated in 1987 in the Indian subcontinent and since has grown rapidly to cover the major region of Asia, from Afghanistan eastwards to Japan, Southeast Asia, and Australasia.
- Presently, the census covers the entire East Asian - Australasian Flyway and a large part of the Central Asian Flyway.

5 Alliance to End Plastic Waste

Context: An alliance of global companies from the plastics and consumer goods value chain has launched a new organisation- Alliance to End Plastic Waste (AEPW) - to advance solutions to eliminate plastic waste, especially in the ocean.

Alliance to End Plastic Waste

- **It is a not-for-profit organization that includes companies that make, use, sell, process, collect, and recycle plastics.** This includes chemical and plastic manufacturers, consumer goods companies, retailers, converters, and waste management companies, also known as the plastics value chain.
- The cross value chain AEPW, currently made up of nearly thirty member companies, has committed over \$1.0 billion intending to invest \$1.5 billion over the next five years to help end plastic waste in the environment.
- It will develop and bring to scale solutions that will minimize and manage plastic waste and promote solutions for used plastics by helping to enable a circular economy.
- The membership of alliance represents global companies and located throughout North and South America, Europe, Asia, Southeast Asia, Africa, and the Middle East.
- The Alliance has been working with the **World Business Council for Sustainable Development** as a founding strategic partner.

6 Smart Food Executive Council

Context: The largest agriculture associations in Africa and Asia met recently in Hyderabad to sign an agreement for diversifying major food staples and creating a new industry, with the intent of bringing some 'Smart Food' back on the plate as major staples.

More on News:

- The Smart Food Executive Council has been formed under the aegis of the “Smart Food Initiative” that was launched in 2013 and stemmed from the strategic thinking around the need for food that fulfills the criteria of being good for the consumer, good for the planet and good for the farmer.
- The major objective under the initiative is to diversify staples which can have the strongest impact on nutrition, the environment, and farmer welfare. This would contribute to the Sustainable Development Goals (SDGs) for overcoming poverty and hunger (SDG 1 and 2), responsible consumption and production (SDG 12), along with adaptation to climate change (Goal 13). The approach taken will include gender equality (SDG 5) and action through partnerships (SDG 17).
- Following associations got together to form the Smart Food Executive Council:
 - ▶ The Asia-Pacific Association of Agricultural Research Institutions (APAARI)
 - ▶ Forum for Agricultural Research in Africa (FARA)
 - ▶ West and Central African Council for Agricultural Research and Development (CORAF)
 - ▶ Food Agriculture and Natural Resources Policy Analysis Network (FANRPAN)
 - ▶ The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)

7 South Asian Nitrogen Hub**Context:**

- **South Asian Nitrogen Hub**, a partnership led by the UK’s Centre for Ecology & Hydrology and comprising around 50 organisations from across the UK and South Asia, will be established with funding from UK Research and Innovation (UKRI) under its Global Challenges Research Fund (GCRF).
- With this UK announced its commitment to fund a major international research programme to tackle the challenge that **nitrogen pollution** poses for the environment, food security, human health, and the economy in South Asia.

More on News:

- The Hub is one of 12 GCRF hubs being announced today by UKRI to address intractable challenges in sustainable development.
- The interdisciplinary hubs will work across 85 countries with governments, international agencies, partners and NGOs on the ground in developing countries and around the globe, to develop creative and sustainable solutions that help make the world safer, healthier and more prosperous.
- The Hub will be awarded £19.6 million over the next five years, comprising £17.1 million from UKRI and £2.5m from the UK and international partners, including the South Asia Cooperative Environment Programme (SACEP).

Facts about Nitrogen in South Asia

- South Asia, home to a quarter of the world’s population, is critical to the global nitrogen cycle. By 2050, its population of 1.8 billion is expected to rise by 20 per cent, while its use of fertilizers could double.
- Around 12 million tonnes of nitrogen are used in fertilizers across South Asia to support food production, but the efficiency is low, with around 80% wasted which contributes to multiple forms of nitrogen pollution.
- About 10 billion USD worth of nitrogen is lost as pollution in South Asia. In India alone, the total societal cost of nitrogen pollution on human health, ecosystems and climate is estimated at about 75 billion USD annually.
- Government subsidies of the fertilizer industry in South Asia are around 10 billion US dollars a year (including 7 billion USD in India).
- Indian Prime Minister Narendra Modi asked the country’s farmers to cut urea fertilizer consumption by half by 2022.

- The UKRI GCRF South Asian Nitrogen Hub will study the impacts of the different forms of pollution to form a coherent picture of the nitrogen cycle.
- In particular, it will look at nitrogen in agriculture in eight countries - **India, Pakistan, Bangladesh, Nepal, Afghanistan, Sri Lanka, Bhutan, and the Maldives.**
- The Hub's recommendations will support cleaner and more profitable farming, as well as industrial recycling of nitrogen, fostering the development of a cleaner circular economy for nitrogen.

8 Global Tiger Recovery Program

Context: 3rd Stocktaking Conference on the Global Tiger Recovery Program highlights the world to fall short of its targets of doubling the tiger population.

More on News:

- **St. Petersburg Declaration on doubling the tiger population was signed in 2010** under which all 13 tiger range countries in Asia and partner organizations of the Global Tiger Initiative agreed to a **Global Tiger Recovery Program**, the first-ever coordinated, range-wide and international effort to save the world tigers.
- The tiger range countries that are part of the Global Tiger Recovery Program are Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Nepal, Russia, Thailand, and Vietnam. However, China and Indonesia were not present at the conference.
- The Declaration, in turn, established **29 July as International Tiger Day** (also known as Global Tiger Day) to be observed annually to raise awareness for tiger conservation.

9 13th COP of Bonn Convention

Context:

- India hosted 13th Conference of Parties (COP) of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), in Gandhinagar, Gujarat.
- Representatives from 129 Parties and eminent conservationists and international NGOs working in the field of wildlife conservation are expected to attend the COP.

CMS and its role

- The Convention was signed in 1979 in Bonn (hence the name) and entered into force in 1983.
- It is an environmental treaty exclusively for migratory species **under the aegis of the United Nations Environment Programme.**
- It provides a global platform for the conservation and sustainable use of migratory animals and their habitats.

Appendixes

- Migratory species threatened with extinction are listed on **Appendix I of the Convention.**
- Besides establishing obligations for each State joining the Convention, CMS promotes concerted action among the Range States (through which respective species migrate) of many of these species.
- Migratory species that need or would significantly benefit from international co-operation are listed in **Appendix II of the Convention.** For this reason, the Convention encourages the Range States to conclude global or regional agreements.

Is the convention legally binding?

- CMS acts as a framework Convention. The agreements may range from legally binding treaties (called Agreements) to less formal instruments, such as Memoranda of Understanding, and can be adapted to the requirements of particular regions.

India and CMS

- India is a signatory to the convention since 1983.
- During COP 10, the Ministry of Environment, Forests, and Climate Change, WWF-India, Wetlands International and BNHS (Bombay Natural History Society) jointly organized a side event on Black-necked Crane urging the Range States for regional cooperation for the conservation of this unique species found in the Himalayan high altitude wetlands.

10 Hindu Kush Himalayan Assessment Report

Context:

- **International Centre for Integrated Mountain Development (ICIMOD)**, a regional intergovernmental body has released the first-ever **assessment of climate change impacts on the Hindu Kush Himalayan (HKH) region**.
- The ICIMOD is pursuing 8 countries, including India, to set up an inter-governmental body to protect the Hindu Kush Himalayan region, known as the water tower of Asia.

Main findings of the report:

- HKH region is warming faster than the global average. It would continue to warm through this century even if the world can limit global warming at the agreed 1.5 degrees Celsius.
- The **per capita fossil fuel carbon dioxide emission** from the HKH countries is **one-sixth of the global average** though it is disproportionately impacted.
- In the last 60 years, extreme cold events have become lesser while extreme warm weather events have become more pronounced. Both minimum and maximum temperatures are also changing: they are moving north, indicating overall warming.
- Every decade HKH loses one cold night and half a cold day. While warm nights have increased by 1.7 per decade, the region gets 1.2 warm days every decade.
- Alarmingly, **changes in surface temperature** (relative to 1976-2005) **in this Himalayan region are higher than the global average, and even the South Asian region**.
- The projected changes in the surface mean temperature over the HKH region is larger compared to the global mean change by the end of the 21st century.
- Although the climate of the region has changed significantly in the past, it is projected to change more dramatically shortly.
- The number of glaciers in the **Himalayan area has increased in the last five decades** and this is an indicator of how severe glacier melting has been due to global warming.

International Centre for Integrated Mountain Development (ICIMOD)

- It is a regional intergovernmental learning and knowledge sharing centre serving the eight regional member countries of the Hindu Kush Himalaya – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – and based in Kathmandu, Nepal.
- It aims to assist mountain people to understand these changes, adapt to them, and make the most of new opportunities, while addressing upstream-downstream issues.

- The increase in the number of glaciers is **primarily due to glacier fragmentation** — that big ones are splitting into smaller ones. And this is happening due to consistent loss in areas the glaciers occupy.
- Smaller glaciers are shrinking faster than larger ones, although the smaller glaciers of Ladakh show a lower rate of a retreat than other Himalayan glaciers. However, the assessment makes clear that despite the surety of glaciers in the Hindu Kush Mountains losing length since 1973, no studies have been done to examine area change in this region.
- In 1998-2014, when global warming slowed down, this region continued to warm.
- In the 20th century, the HKH region oscillated between warming and cooling phases. In the first 40 years, it reported warming to be followed by a cooling phase in 1940-1970.
- However, since 1970 it has been warming, and as assessed, it would continue to be through the current century.
- Warming may be good news for agriculture as the length of the growing season has increased by 4.25 days per decade — a positive change for agriculture.

11 India-Norway Marine Pollution Initiative

Context: The Ministry of Environment, Forests and Climate Change signed a letter of Intent establishing the India-Norway Marine Pollution Initiative together with the Norwegian Ministry of Foreign Affairs.

More on News:

- A joint Task Force on Blue Economy with government officials, researchers, and experts, as well as the private sector, were established to develop sustainable solutions within strategic areas of the blue economy, such as maritime and marine sector in addition to the energy sector.

Highlights of the Initiative

- In partnership, Norway and India will share experiences and competence, and collaborate on efforts to develop clean and healthy oceans, sustainable use of ocean resources and growth in the blue economy.
- The India-Norway Marine Pollution Initiative will combat marine pollution, which is one of the fastest-growing environmental concerns.
- Through a range of implementing partners, this initiative will seek to support local governments in implementing sustainable waste management practices
- It will help in developing systems for collecting

Clean Seas Campaign

- UN Environment launched Clean Seas (#CleanSeas on social media) in February 2017, with the aim of engaging governments, the general public and the private sector in the fight against marine plastic pollution.
- **India joined 'Clean Seas Campaign' on World Environment Day 2018.**

Beat Plastic Pollution

- "Beat Plastic Pollution", the theme for World Environment Day 2018, is a call to action for all of us to come together to combat one of the great environmental challenges of our time.
- India aims at banning single use plastics by 2022.

National Centre for Sustainable Coastal Management (NCSCM)

- It has a vision and mission to aid in the better protection, conservation, rehabilitation, management and policy design of the coast.
- Recently, India emerged as a world leader with beach clean-up projects across the country.

and analyzing information about sources and scope of marine pollution and improve private sector investment.

- Support will also be directed towards beach clean-up efforts, awareness-raising campaigns and pilot projects using plastic waste as fuel substitution for coal in cement production and developing frameworks for deposit schemes.

Consortium for the Conservation of Coastal and Marine Ecosystems

It comprises a group of international and regional NGOs in partnership with intergovernmental organizations that have presence and are active in regional marine and coastal ecosystem management in the Western Indian Ocean.

12 UN Environment Assembly

Context:

- Fourth UN Environment Assembly was held in Nairobi, represented by thousands of delegates, business leaders and campaigners.
- Assembly will provide the framework for shifting our global economic systems towards more sustainable trajectories that tackle our environmental challenges and bring us closer to the 'future we want'.

More on News:

- The theme of the fourth Assembly was **'Innovative Solutions to Environmental Challenges and Sustainable Consumption and Production'**.
- A major focus was to curb plastic waste, a source of long-term pollution and worsening contamination of the ocean's food chain.
- The 2019 Assembly will aim to build the policies, partnerships and a culture of innovation that will support the solutions and systemic change needed for sustainability to thrive.
- Areas of focus:
 - Tackling the environmental challenges related to poverty and natural resources management, including sustainable food systems, food security, and halting biodiversity loss;
 - Introducing life-cycle approaches to resource efficiency, energy, chemicals, and waste management;
 - Ensuring sustainable business development at a time of rapid technological change.

UN Environment Assembly

- It was created in June 2012, when world leaders called for UN Environment to be strengthened and upgraded during the United Nations Conference on Sustainable Development, also referred to as RIO+20.
- The establishment of the Assembly was the culmination of decades of international efforts, initiated at the UN Conference on the Human Environment in Stockholm in 1972 and aimed at creating a coherent system of international environmental governance.
- It meets **biennially** to set priorities for global environmental policies and develop international environmental law.

13 Global Environment Outlook

Context : The sixth Global Environment Outlook, recently released by the United Nations Environment Programme

More on News:

- The report is another stark warning that the world is unsustainably extracting resources and producing unmanageable quantities of waste.
- The theme of the report is **“Healthy Planet, Healthy People,”** with a focus on highlighting the damages that have been done and will likely impact the human civilization on planet earth.
- The GEO draws on hundreds of data sources to calculate the environmental impact on over 100 diseases.

Highlights of the report

- GEO-6 estimates that the top 10% of populations globally, in terms of wealth, are responsible for 45% of GHG emissions, and the bottom 50% for only 13%.
- A quarter of all premature deaths and diseases worldwide are due to manmade pollution and environmental damage. Poor environmental conditions “cause approximately 25 percent of global disease and mortality” - around 9 million deaths in 2015 alone
- Lacking access to clean drinking supplies, 1.4 million people die each year from preventable diseases such as diarrhoea and parasites linked to pathogen-riddled water and poor sanitation.
- Chemicals pumped into the seas cause “potentially multi-generational” adverse health effects, and land degradation through mega-farming and deforestation occurs in areas of Earth home to 3.2 billion people.
- The report says air pollution causes 6-7 million early deaths annually.
- Unchecked use of antibiotics in food production will see drug-resistant superbugs become one of the largest causes of premature death by mid-century.
- Food waste accounts for 9 percent of global greenhouse gas emissions.
- The “grow now, clean up later approach” in most parts of the world “has not factored in climate change, pollution or degradation of natural systems. This approach has also contributed to increasing inequality within and between countries.

Global Environment Outlook

- It is a flagship report because it fulfils the core functions of the organization, which date back to the **UN Environment Programme in 1972.**
- It is a consultative and participatory process to prepare an independent assessment of the state of the environment.
- It provides a platform to analyse the effectiveness of the policy response to address these environmental challenges and the possible pathways to be achieved to various internationally agreed environmental goals.

14 Global Energy and CO₂ Status Report

Context: The IEA’s second Global Energy and CO₂ Status Report released in March 2019 provided a snapshot of recent global trends and developments across fuels, renewable sources, and energy efficiency and carbon emissions, in 2018.

Global Trends:

- Energy consumption worldwide grew by 2.3% in 2018, nearly twice the average rate of growth since 2010, driven by a robust global economy as well as higher heating and cooling needs in some parts of the world.
- As a result of higher energy consumption, CO₂ emissions rose 1.7% in 2018 and hit a new record.

- The biggest gains came from natural gas, which emerged as the fuel of choice last year, accounting for nearly 45% of the increase in total energy demand.
- Demand for all fuels rose, with fossil fuels meeting nearly 70% of the growth for the second year running.
- Renewables (gas, solar and wind) grew at a double-digit pace, but still not fast enough to meet the increase in demand for electricity around the world.
- As a result of higher energy consumption, global energy-related CO₂ emissions increased to 33.1 Gt CO₂, up.
- Coal-fired power generation continues to be the single largest emitter, accounting for 30% of all energy-related carbon dioxide emissions.
- Higher energy demand was propelled by a global economy that expanded by 3.7% in 2018, a higher pace than the average annual growth of 3.5% seen since 2010.
- China, the United States, and India together accounted for nearly 70% of the rise in energy demand.
- The United States had the largest increase in oil and gas demand worldwide. Gas consumption jumped 10% from the previous year, the fastest increase since the beginning of IEA records in 1971.

International Energy Agency

- Founded in 1974, the IEA was initially designed to help countries co-ordinate a collective response to major disruptions in the supply of oil, such as the crisis of 1973.
- It is at the heart of global dialogue on energy, providing authoritative analysis through a wide range of publications, including the flagship **World Energy Outlook and the IEA Market Reports**; data and statistics.
- The four main areas of IEA focus are: Energy Security, Economic Development Environmental Awareness: and Engagement Worldwide.
- **India is not a member of IEA.**

Trends by technology

- Global gas demand expanded at its fastest rate since 2010, with year-on-year growth of 4.6%. Oil demand grew 1.3% and coal consumption rose 0.7%. Oil and coal together accounted for a quarter of global demand growth.
- Renewables, which grew by over 4%, met around one-quarter of the growth in total primary energy demand.
- This was largely due to expansion in electricity generation, where renewables accounted for 45% of the growth in 2018.
- India emitted 2,299 million tonnes of carbon dioxide in 2018, a 4.8% rise from last year.
- India's per capita emissions were about 40% of the global average and contributed 7% to the global carbon dioxide burden.
- India saw primary energy demand increase 4% or over 35 Mtoe (million tonnes of oil equivalent), accounting for 11% of global growth, the third-largest share.
- Growth in India was led by coal (for power generation) and oil (for transport), the first and second biggest contributors to energy demand growth, respectively.
- India's energy intensity improvement declined 3% from last year even as its renewable energy installations increased by 10.6% from last year.

15 Global Cool Coalition

Context: The first-ever global coalition on clean and efficient cooling was launched at the First Global Conference on Synergies between the 2030 Agenda and Paris Agreement.

Global Cool Coalition

- It is a unified front that links action across the Kigali Amendment, Paris Agreement and Sustainable Development Goals.
- It will complement and build upon ongoing successful programmes to advance clean and efficient cooling, including, the Cooling for All Secretariat, the Climate and Clean Air Coalition, the Kigali Cooling Efficiency Programme, private sector action like the Global Cooling Prize, and other initiatives.

What is the current scenario?

- Throughout the world, 2018 was the fourth hottest year, preceded by 2017, 2015 and 2016.
- The India Meteorological Department (IMD), too, warned that the season average maximum temperatures from April to June are likely to be warmer than normal by 0.5 degrees Celsius.
- As the world gets warmer, the demand for air conditioners is projected to grow and the greenhouse gas it emits will endanger the planet.
- With increasing incomes and urbanisation, the number of air conditioning units across the globe is set to increase from 1.2 billion to 4.5 billion by 2050, and India alone may account for one billion units.
- In the next 20 years, India's cooling requirement will increase by eight times, with air conditioners alone consuming more than half of the total energy required for cooling in the country by 2037-38.

16 International Solar Alliance (ISA)

Context: According to the year-end review of the government's policies, the establishment of the International Solar Alliance by India ranked amongst its biggest successes as it is the first multilateral organisation with as many as 71 member countries already signed on that is headquartered in India.

What is the International Solar Alliance?

- Launched in 2015, ISA is a coalition of solar resource-rich countries lying fully or partially between the Tropic of Cancer and the Tropic of Capricorn to specifically address energy needs by harnessing solar energy.
- It is a treaty-based intergovernmental organization.
- The ISA Framework Agreement has a total of 14 articles. **There are no targets or legal obligations imposed on member-countries.**
- UN member countries that are located beyond the Tropics can join the ISA as "Partner Countries." United Nations including its organs can join the ISA as "Strategic Partners".
- Organizations that have the potential to help the ISA achieve its objectives including regional intergovernmental economic integration organizations constituted by sovereign states at least one of which is a member of the ISA can join the ISA as a "Partner Organization".
- India and France jointly laid the foundation stone of ISA Headquarters and inaugurated the interim Secretariat of the ISA at the National Institute of Solar Energy campus, Gurugram, Haryana.

What are the initiatives ISA has undertaken so far?

- As an action-oriented organization three programmes of ISA namely "Scaling up solar applications for agricultural use", "Affordable finance at scale" and "Scaling up Solar Minigrids" have been launched. Drafts of the fourth and the fifth programmes are proposed to be launched shortly.

- The ISA signed and issued Joint Declarations with World Bank, United Nations Development Programme (UNDP), and Climate Parliament, European Bank for Reconstruction and Development (EBRD) for the promotion and cooperation of solar energy.

17 Global Carbon Project Report

Context: According to the Global Carbon Project report, global carbon emissions are an all-time high of 37.1 billion tonnes of CO₂ in 2018. India, the third-highest contributor, saw emissions rise by about 6.3% from 2017 in 2018.

Global Carbon Project Report Highlights

- Global carbon dioxide emissions rose 1.6% in 2017, and new data indicates emissions could have risen more than 2% in 2018 on the back of sustained increases in coal, oil, and gas use.
- CO₂ emissions have now risen for a second year, after three years of little to no growth from 2014 to 2016. The rise in 2017 was 1.6%.
- The 10 biggest emitters in 2018 are China, the U.S., India, Russia, Japan, Germany, Iran, Saudi Arabia, South Korea, and Canada. The EU as a region of countries ranks third.
- China's emissions accounted for 27% of the global total, having grown an estimated 4.7% in 2018 and reaching a new all-time high.
- Emissions in the U.S., which has withdrawn from its commitment to the Paris Agreement, account for 15% of the global total and look set to have grown about 2.5% in 2018 after several years of decline.
- Despite the rapid deployment in low carbon technologies in India, emissions are expected to grow a solid 6.3% in 2018, pushed by the strong economic growth of around 8% per year. Coal is still the mainstay of the Indian economy, and it will be a challenge for solar and wind to displace coal given the strong growth in energy use.
- Limiting global warming to the 2015 Paris Agreement goal of keeping the global temperature increase this century to well below 2°C would need carbon dioxide emissions to decline by 50% by 2030 and reach net zero by about 2050.
- Also, the IPCC Special Report reveals that at the current rate of emissions, the world is set to breach the global warming limit of 1.5 degrees Celsius goal set in the Paris Agreement between 2030 and 2052. At present, the world is 1.2°C warmer compared to pre-industrial levels.

18 CITES CoP 2019

Context: CITES CoP 2019: Giraffes accorded protection from trade for the first time.

More on News:

- The Conference of Parties (CoP) to the Convention on International Trade in Endangered Species or CITES in Geneva passed a resolution to place the **giraffe in Appendix II of CITES**.
- Giraffes, those tall, stately and graceful animals of Africa's savannahs, have been accorded protection from unregulated trade as the world finally woke up to their 'silent extinction'.
- The Appendix II listing was proposed by the Central African Republic, Chad, Kenya, Mali, Niger, and Senegal.
- "Appendix II includes species not necessarily threatened with extinction, but in which trade must be controlled to avoid utilization incompatible with their survival,"

- Giraffes once ranged over much of the semi-arid savannah and savannah woodlands of Africa. But their numbers have plummeted dramatically — by up to 40 percent over the last 30 years — due to threats including international trade in their parts, as well as habitat loss, civil unrest and illegal hunting.
- There is currently only one recognized species of giraffe, with nine subspecies. They have been listed as **'vulnerable'** on the International Union for Conservation of Species Red List since 2016, with **some sub-species classified as 'endangered' or 'critically endangered'**.

19 Global Coalition of the Willing on Pollinators

Context: Nigeria becomes the fourth African nation to join a global coalition to protect pollinators.

More on News:

- Nigeria became the fourth African country to join the Global Coalition of the Willing on Pollinators
- While Morocco became a member of this group in May this year, **Ethiopia was the first African nation to be part of this global coalition in 2017**. Burundi was the second African country to join this global group.
- Other non-African nations such as Bosnia and Herzegovina, the Dominican Republic, Ireland, and Mexico had joined the global group last year
- The coalition now has 28 signatories including 17 European countries, five from Latin America and the Caribbean and four from Africa.
- The organisation was formed three years ago, to follow up on the findings of IPBES Assessment on Pollinators, Pollination and Food Production, which found that many of the world's pollinator species are on the decline.
- Protecting pollinators will be important for addressing the Sustainable Development Goals (SDGs) too. The goals relevant to pollinators are SDG 2 (zero hunger), SDG 15 (life on land), and SDG 3 (good health and well-being) through access to sufficient nutritious food (highly dependent on pollinators) and SDG 8 (decent work and economic growth) too as 1.4 billion people work in agriculture.

20 14th Conference of Parties (COP14) to the UN Convention to Combat Desertification (UNCCD) and report on Soil Organic Carbon (SOC)

Context: The United Nations Convention to Combat Desertification (UNCCD)'s Committee on Science and Technology (CST) released its report on Soil Organic Carbon (SOC).

More on News:

- The report titled as "Realising the Carbon Benefits of Sustainable Land Management Practices: Guidelines for Estimation of Soil Organic Carbon in the Context of Land Degradation Neutrality Planning and Monitoring", emphasises the importance of SOC in preventing land degradation and desertification.
- Soil organic carbon (SOC) comes from plants, animals, microbes, leaves, and wood. It is mostly found in the first-metre layer of the soil.

- There are many conditions like temperature, rainfall, vegetation, soil management and land-use change and processes that determine the changes in SOC content.

United Nations Convention to Combat Desertification (UNCCD)

- Established in 1994, it is the sole legally binding international agreement linking environment and development to sustainable land management.
- The Convention addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found.
- The UNCCD is particularly committed to a bottom-up approach, encouraging the participation of local people in combating desertification and land degradation.
- The new **UNCCD 2018-2030 Strategic Framework** is the most comprehensive global commitment to achieve **Land Degradation Neutrality (LDN)** to restore the productivity of vast expanses of degraded land, improve the livelihoods of more than 1.3 billion people, and reduce the impacts of drought on vulnerable populations to build.
- The **UNCCD collaborates closely with the other two Rio Conventions; the Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC)** with an integrated approach and the best possible use of natural resources.

Land Degradation Neutrality (LDN)

- It is defined as a state where the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security, remains stable or increases within specified temporal and spatial scales and ecosystems
- **India's target for LDN is 30 million hectares by 2030.**

21

Climate and Clean Air Coalition

Context: Climate and Clean Air Coalition leaders agreed to reduce short-lived climate pollutants by 2030.

Climate and Clean Air Coalition (CCAC)

- It is a voluntary partnership of governments, intergovernmental organizations, businesses, scientific institutions and civil society organizations committed to improving air quality and protecting the climate through actions **to reduce short-lived climate pollutants.**
- Its global network currently includes over 120 state and non-state partners and hundreds of local actors carrying out activities across economic sectors.
- The Coalition's activities are financed through a multi-donor **The Climate and Clean Air Trust Fund**, established in 2012, which is administered through UN Environment. While governments are the core of the Coalition's funding, contributions from the private sector and global community are encouraged.
- The Coalition's goal is to reduce short-lived climate pollutants beyond the recommendations made by the

India and CCAC:

- **India formally joined the Climate & Clean Air Coalition (CCAC)**, becoming the 65th country to join the partnership.
- India plans to work with Climate Clean and Coalition countries on best practices and experiences for the effective implementation of India's National Clean Air Programme (NCAP).

Short-lived climate pollutants

- Are those pollutants **which are short lived in atmosphere.**
- They are also known as **Super Pollutants.**

Intergovernmental Panel on Climate Change (IPCC) in its special report Global Warming of 1.5°C.

Recommendations made by the Intergovernmental Panel on Climate Change (IPCC)

- According to the report, there need to be considerable cuts in emissions of black carbon (35 percent by 2030), methane (37 percent by 2030) and HFCs (70 percent to 80 percent by 2050) if the world is to keep the global warming below 1.5°C.

- Methane, black carbon and hydrofluorocarbons (HFCs)** are some examples of short lived pollutants.

- Because they are short-lived in the atmosphere, preventing emissions can rapidly reduce the rate of warming.

22 Basel Ban Amendment

Context: Croatia became the 97th country to ratify the ban, which was adopted by the parties to the Basel Convention in 1995, to protect human health and the environment against the adverse effects of hazardous wastes. With Croatia's ratification, a necessary $\frac{3}{4}$ th of the parties to the Basel Convention have ratified the agreement and has become international law.

Basel Convention:

- The Basel Convention on the **Control of Transboundary Movements of Hazardous Wastes and their Disposal** was adopted on 22 March 1989 by the **Conference of Plenipotentiaries in Basel, Switzerland**.
- It does not address the movement of radioactive waste.**
- To implement and restrict the trade of hazardous waste between more developed countries and less developed countries an organization is formed which is known as **Basel Action Network (BAN)**.
- The provisions of the Convention center around the following principal aims:
 - The reduction of hazardous waste generation** and the promotion of environmentally sound management of hazardous wastes, wherever the place of disposal.
 - The restriction of transboundary movements of hazardous wastes** except where it is perceived to be in accordance with the principles of environmentally sound management.
 - A regulatory system applying to cases where transboundary movements are permissible.

Basel Action Network (BAN):

- Founded in 1997, the Basel Action Network is a **charitable organization of the United States, based in Seattle**.
- BAN is the world's only organization focused on confronting the global environmental justice and economic inefficiency of toxic trade and its devastating impacts.

Ratification status of other major countries:

- According to BAN the United States, the world's most wasteful country per-capita, has not ratified the Basel Convention, nor the Ban Amendment
- Other developed countries like Canada, Japan, Australia, and New Zealand, likewise, have e-waste export problems and they too have so far refused to ratify the Ban Amendment.
- South Korea, Russia, India, Brazil, and Mexico are yet to ratify the ban.

Some definitions:

- **Hazardous waste:**

- ▶ A waste falls under the scope of the Convention if it is within the category of wastes listed in Annex I of the Convention and it exhibits one of the hazardous characteristics contained in Annex III.
- ▶ It must both be listed and possess a characteristic such as being explosive, flammable, toxic, or corrosive.
- ▶ 14th Conference of the Parties (COP14) of the Basel Convention adopted a resolution which is **legally binding** which restricted plastic scrap exports by requiring countries to obtain prior informed consent before exporting contaminated or mixed plastic scrap
- ▶ The other way that waste may fall under the scope of the Convention is if it is defined as or considered to be a hazardous waste under the laws of either the exporting country, the importing country or any of the countries of transit

- **Transboundary movement:**

- ▶ It means any movement of hazardous wastes or other wastes from an area under the national jurisdiction of one State to or through an area under the national jurisdiction of another State or to or through an area not under the national jurisdiction of any State, provided at least two States are involved in the movement.

The Basel Convention BAN Amendment:

- ▶ The Ban Amendment was originally adopted as a decision of the second meeting of the Conference of the Parties in March 1994.
- ▶ The “Ban Amendment” provides for the prohibition by Parties listed in Annex VII (members of OECD, EU, Liechtenstein) of all transboundary movements of hazardous wastes including electronic wastes and obsolete ships which are destined for final disposal operations from OECD to non-OECD States.
- ▶ According to the amendment, it was agreed that such “Annex VII Parties” prohibit and phase out all transboundary movements of hazardous wastes destined for recovery or recycling operations from OECD to non-OECD States by 31 December 1997.
- ▶ At COP-3 in 1995, Parties adopted the same as a further amendment to the Convention known as the “Ban Amendment”.

23 Bonn Challenge

Context: India to rejuvenate 50,000 hectares of degraded land.

More on News:

- The Bonn Challenge is a global effort to bring 150 million hectares of the **world’s deforested and degraded land** into restoration by 2020, and 350 million hectares by 2030.
- It was **launched in 2011 by the Government of Germany and IUCN**, and later endorsed and extended by the **New York Declaration** on Forests at the 2014 UN Climate Summit.
- Bonn Challenge is the forest landscape restoration (FLR) approach, which **aims to restore ecological integrity** at the same time as improving human well-being through multifunctional landscapes.
- The Bonn Challenge is not a new global commitment but rather a practical means of realizing many existing international commitments, including the **CBD Aichi Target 15, the UNFCCC REDD+ goal, and the Rio+20 land degradation neutrality goal**.

24 Emissions Gap Report 2019

Context: The 2019 UN Environment Programme (UNEP) Emissions Gap Report paints a “bleak” picture of accelerated global greenhouse gas (GHG) emissions and a growing gap between “what we need to do and what we are doing to tackle climate change.”

More on News:

- This is the tenth edition of the **United Nations Environment Programme (UNEP) Emissions Gap Report**.
- As per the report, GHG emissions continue to rise, despite scientific warnings and political commitments;
- To close the emissions gap by 2030, annual emissions need to be 15 GtCO₂e lower than current unconditional NDCs imply for the 2°C goal, and 32 GtCO₂e lower for the 1.5°C goal;
- Enhanced action by G20 members will be essential for the global mitigation effort. Collectively, G20 members – who account for 78% of global GHG emissions – are on track to meet their limited 2020 Cancun Pledges, but seven countries are currently not on track to meet their 2030 NDC commitments.
- “Dramatic strengthening” of the NDCs is needed in 2020. Countries must increase their NDC ambitions threefold to achieve the “well below 2°C” goal and more than fivefold to achieve the 1.5°C goal.
- Although the number of countries announcing net-zero GHG emission targets for 2050 is increasing, only a few countries have so far formally submitted long-term low-emission development strategies to the UNFCCC.
- Decarbonising the global economy will require fundamental structural changes, which should be designed to bring multiple co-benefits for humanity and planetary support systems.
- Renewable and energy efficiency, in combination with the electrification of end uses, are key to a successful energy transition and to driving down energy-related CO₂ emissions.
- Demand-side material efficiency offers substantial GHG mitigation opportunities that are complementary to those obtained through an energy system transformation.

“Emissions Gap” (also called the “Commitment Gap”)

- It measures the gap between what we need to do and what we are actually doing to tackle climate change.
- The gap is the difference between the low levels of emissions that the world needs to drop to, compared with the projected level of emissions based on countries’ current commitments to decarbonisation.
- The Emissions Gap Report measures and projects three key trend lines:
 - ▶ The amount of greenhouse gas emissions every year up to 2030
 - ▶ The commitments countries are making to reduce their emissions and the impact these commitments are likely to have on overall emission reduction
 - ▶ The pace at which emissions must be reduced to reach an emission low that would limit temperature increase to 1.5°C, affordably.

25 Climate Emergency CoP 25: Climatic tipping point is closer than we think

Context: COP 25, in Madrid, Spain.

More on News:

- The 2019 United Nations Climate Change Conference, also known as COP25, is the 25th United Nations Climate Change Conference.

- It was held in Madrid, Spain, under the presidency of the Chilean government.
- The conference incorporates the 25th Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC), the 15th meeting of the parties for the Kyoto Protocol (CMP15), and the second meeting of the parties for the Paris Agreement.

Several issues have been discussed in the meeting

- The Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (WIM);
- International climate finance;
- Capacity building;
- Matters relating to least developed countries (LDCs);
- The forum on the impact of the implementation of response measures;
- Gender and climate change;
- Common time frames for Nationally Determined Contributions (NDCs) to the Paris Agreement
- The Koronivia joint work on agriculture;
- National adaptation plans (NAPs)
- The Local Communities and Indigenous Peoples Platform (LCIPP)

26 Ocean Deoxygenation

Context: Marine life, fisheries increasingly threatened as the ocean loses oxygen – IUCN report

More on News:

- **International Union for Conservation of Nature (IUCN)** has released a report titled **“Ocean deoxygenation: Everyone’s problem”**.
- The report is the largest peer-reviewed study so far into the **causes, impacts and possible solutions** to ocean deoxygenation; and was released **by IUCN at COP25 to the UNFCCC**.
- With this report, the **scale of damage climate change is wreaking upon the ocean** has come into stark focus. As the warming ocean loses oxygen, the delicate balance of marine life is thrown into disarray.
- Large areas of the open ocean are increasingly threatened with low levels of dissolved oxygen. It is **harming marine ecosystems which were already under stress** from ocean warming and acidification.
- The potentially **dire effects on fisheries and vulnerable coastal communities** make the decisions taken at the UN Climate Change Conference (CoP25) even more crucial.
- **“To drive action towards restoring ocean health”** is one of the key themes **of the IUCN World Conservation Congress** in Marseille in 2010.

What is the problem?

- Ocean deoxygenation is one of the most pernicious, yet under-reported side-effects of human-induced climate change.
- Oxygen loss from the warming of oceans has alarming consequences for global oceanic oxygen reserves, which have already reduced by 2% over a period of just 50-years (from 1960 to 2010).

- Ocean regions with low oxygen concentrations are expanding, with around 700 sites worldwide now affected by low oxygen conditions – up from only 45 in the 1960s.
 - ▶ In the same period, the volume of **anoxic waters – areas completely depleted of oxygen** – in the global ocean has **grown four times**.
- If the situation continues as is, the ocean is **expected to lose 3-4% of its oxygen** inventory globally **by the year 2100**.
 - ▶ But impact witnessed at the **local level will be far more severe** compared to that seen on average at the global level.
 - ▶ For example, the impact will be more severe in **mid to high latitudes**.
 - ▶ Most of the losses are predicted to be concentrated in the **upper 1000m of the water column**, which is the richest in marine biodiversity.

27 MECOS 3: Global Marine Ecosystem Meet

Context: Recently, the third international conference on Marine Ecosystems-Challenges and Opportunities (MECOS) was held in Kochi in January 2019.

More on News:

- ▶ The conference is aimed at reviewing the concerns involved in the marine ecosystem and formulating strategies for the better and sustainable utilisation of marine wealth by enhancing livelihood options.
- ▶ The symposium is organized by the **Marine Biological Association of India**.
- ▶ It will also serve as a platform for discussions on a range of topics, including the impact of the climate crisis on marine ecosystems and unusual warming of the Arabian Sea.
- ▶ The conference would focus on the **Sustainable Development Goal of the United Nations, SDG-14** which says '**conserve and sustainably use the oceans and its resources for sustainable development**'.

Marine Biological Association of India

- The Marine Biological Association of India was established in the year **1958**.
- It serves the cause of promotion of research on marine sciences in the Asia-Pacific region.
- It also aims to create an active interest among its members in the field of marine biology and allied marine sciences.

28 India Climate Report 2019

Context: India Meteorological Department (IMD) has released the India Climate Report 2019.

More on News:

- The India climate report 2019 confirms that **extreme weather events have become par for the course in the country**.
- It notes **that excessive heat, cold and rainfall killed 1,562 people in 2019**.
- **In 2019, the mean temperature was 0.36 above normal** while the country also recorded excess rainfall during both the southwest and northeast monsoons.
- Intense dry spells were interspersed with floods in several parts of the country.

- The World Meteorological Organisation, reckons that the decade starting **2011 remains on track to be the warmest on record.**
- At the same time, data from the European Centre for Medium-Range Forecast shows that the relative humidity in the mid-troposphere in the Subcontinent has increased by about 2% in the past four decades.
- Such warming has increased the capacity of oceans to form intense cyclonic disturbances.

Facts

- **India ranks 5th in Global Climate Risk Index** released by Environment think tank, **Germanwatch.**
- India has also recorded the highest number of fatalities due to climate change and the second highest monetary losses from its impact in 2018.
- India’s high rank is due to severe rainfalls, followed by heavy flooding and landslide that killed over 1000 people.

29 State of India’s Birds Report 2020

Context: Recently, a new scientific report, ‘State of India’s Birds 2020 was jointly released by 10 organisations.

Key findings:

- The State of India’s Birds 2020 (SoIB) assessment raises the alarm that several spectacular birds, many of them endemic to the sub-continent, face a growing threat from loss of habitat due to:
 - ▶ Human activity.
 - ▶ The widespread presence of toxins, including pesticides.
 - ▶ Hunting and trapping for the pet trade.
 - ▶ It is highlighted that, for every bird species that were found to be increasing in numbers over the long term, 11 have suffered losses, some catastrophically.
 - ▶ 101 species have been categorised as being of High Conservation Concern.
 - ▶ 59 are based on range and abundance.
 - ▶ Rests are included from high-risk birds on the IUCN Red List.
- Endemics such as the **Rufous-fronted Prinia, Nilgiri Thrush, Nilgiri Pipit** and **Indian vulture** have been confirmed as suffering a current decline.
- All except 13 had a restricted or highly restricted range, indicating greater vulnerability to man-made threats.
- Among widely known species, the common sparrow, long seen as declining in urban spaces, has a stable population overall.
- The analysis concludes that raptors overall are in decline, with ‘open country’ species such as the Pallid and Montagu Harriers, White-bellied Sea Eagle and Red-necked Falcon suffering the most.
- The severe long-term decline of vultures is underscored by the report.
- Migratory shorebirds, along with gulls and terns, seem to have declined the most among waterbirds.

State of India’s Birds 2020 (SoIB)

- It was produced using a base of 867 species.
- It is analysed with the help of data uploaded by birdwatchers to the online platform, eBird.
- Adequate data on how birds fared over a period of over 25 years (long-term trend) are available only for 261 species.
- Current annual trends are calculated over a five-year period.
- The assessment says that
 - ▶ Over a fifth of India’s bird diversity has suffered strong long-term declines over a 25-year period.
 - ▶ More recent annual trends point to a drastic 80% loss among several common birds.

30 The Future of Earth, 2020

Context: Five global risks that have the potential to impact and amplify one another in ways that may cascade to create a global systemic crisis, have been listed by “The Future of Earth, 2020”.

More on News:

- “The Future of Earth, 2020” has been released by the **South Asia Future Earth Regional Office**, Divecha Centre for Climate Change, Indian Institute of Science.
- As many as 222 leading scientists from 52 countries surveyed by **Future Earth**, an international sustainability research network.
- The report was prepared with the aim of reducing carbon footprint and halting global warming below 2 degrees Celsius by 2050.

What are the Five Global Risks?

- The report lists the following as the five global risks:
 - ▶ failure of climate change mitigation and adaptation
 - ▶ extreme weather events
 - ▶ major biodiversity loss and ecosystem collapse
 - food crises
 - water crises

Facts:

- **South Asia Future Earth Regional Office** is hosted by the **Divecha Centre for Climate Change**, Bengaluru, India.
- **The Divecha Centre for Climate Change** was established at Indian Institute of Science in 2009 to understand climate variability and climate change and its impact on the environment.
- **Future Earth**, established in 2015, is an international sustainability research network.

31 India 5th Most Polluted Country in the World

Context: According to the World Air Quality Report, 2019 compiled by IQAir Air Visual, India was the 5th most polluted country in 2019, with Ghaziabad in the National Capital Region ranked as the most polluted city in the world.

More on News:

- On the whole, air pollution in India decreased in 2019 from 2018, though about half of the 50 most polluted cities were in India, the report notes.
- India launched a National Clean Air Programme (‘NCAP’) in 2019 that commits to reducing air pollution in 102 most polluted cities by a maximum of 30% by 2024.
- The report however notes that the reduction in pollution in 2019 couldn’t be attributed to the NCAP but rather was due to a slowing economic growth. =
- Whilst cities in India, on average, exceed the World Health Organisation (‘WHO’) target for annual PM2.5 exposure by 500%, national air pollution decreased by 20% from 2018 to 2019, with 98% of cities experiencing improvements.
- Moreover, as per the report, **Bangladesh was marked the most polluted country in 2019** with an average PM 2.5 concentration of 83 µg/m³. Pakistan came next with 65 µg/m³ and India recorded an average of 58.1 µg/m³.

- In the 2018 version of the IQAir report, the top two countries were the same and India was the third most polluted in the world with an average of 72 µg/m³.
- In the 90 country/region-ranking, the **Bahamas ranked the cleanest** with an average of 3 µg/m³.
- The new dataset highlights elevated air pollution levels as a result of climate change events, such as sandstorms and wildfires and pollution gains from the rapid urbanization of cities, in regions such as Southeast Asia.
- Lastly, as per the report, while some achievements have been made in air quality monitoring infrastructure globally, there are still huge gaps in access to data around the world.

32 State Energy Efficiency Index 2019

Context: The ‘State Energy Efficiency Index 2019’, which tracks the progress of Energy Efficiency (EE) initiatives based on 97 significant indicators was recently released.

More on News:

- The Index was developed by AEEE (Alliance for an Energy Efficient Economy) under the guidance and leadership of BEE (Bureau of Energy Efficiency), with technical counsel from ACEEE (American Council for an Energy Efficient Economy).
- The first such Index, was launched in August, 2018. Taking it forward, the 2019 index incorporates qualitative, quantitative and outcome-based indicators to assess energy efficiency initiatives, programs and outcomes in five distinct sectors – buildings, industry, municipalities, transport, agriculture, and DISCOMs.
- This year, a total of 36 States and Union Territories have been assessed based on their efforts and achievements in policy and regulation, financing mechanisms, institutional capacity, adoption of energy efficiency measures and energy savings achieved.

Alliance for an Energy Efficient Economy

- It is a policy advocacy and energy efficiency market enabler with a not-for-profit motive.
- **It advocates for data driven and evidence-based energy efficiency policies** to unleash innovation and entrepreneurship within the country to create an energy-efficient economy.

Bureau of Energy Efficiency

- It was set up by the Union government in 2002 **under the provisions of the Energy Conservation Act, 2001.**
- Its mission is to assist in developing policies and strategies with a thrust on self-regulation and market principles, with the primary objective of reducing energy intensity of the Indian economy

The Key Findings

- The **State Energy Efficiency Index categorises states as ‘Front Runner’, ‘Achiever’, ‘Contender’ and ‘Aspirant’** based on their efforts and achievements towards energy efficiency implementation.
- Haryana, Karnataka and Kerala have topped the State Energy Efficiency Index 2019 and are in the achiever’s category.
- Since there isn’t any ‘front runner’ state, it can be inferred that a lot more can be done at the state level to realise energy savings from energy efficiency,
- For a rational comparison, the States or Union Territories are grouped into four groups based on the aggregated Total Primary Energy Supply (TPES) required to meet the state’s actual energy demand (electricity, coal, oil, gas, among others) across sectors.
- Karnataka, Haryana, Himachal Pradesh and Puducherry led their groups, while, Manipur, Jammu & Kashmir, Jharkhand and Rajasthan performed the worst in each of their groups.

33 Global Climate Risk Index, 2020

Context: India is the fifth most vulnerable country globally to climate change, according to Global Climate Risk Index, 2020. Moreover, as per the Index, India has also recorded the highest number of fatalities due to climate change and the second highest monetary losses from its impact in 2018.

More on News:

- The **Global Climate Risk Index 2020 is published by environmental think tank Germanwatch** which assessed 181 countries and quantified impacts of climate change through economic losses, losses to GDP and fatalities to arrive at a ranking.
- The Index is based on data from the Munich Re NatCatSERVICE, one of the largest databases on natural catastrophes.
- **Index has found Japan to be the most vulnerable followed by Philippines, Germany, Madagascar and India.**
- The southwest monsoon in 2018 severely affected India, Kerala was especially impacted where 324 people died because of drowning or being buried in the landslides set off by the flooding.
- Further, as per the Index, over 2,20,000 people had to leave their homes, 20,000 houses and 80 dams were destroyed due to climate change.
- The Index has another set of ranking for the period 1999 - 2018, which is based on average values over a twenty-year period. In the 1999 to 2018 period Puerto Rico is the most vulnerable followed by Myanmar, Haiti, Philippines and Pakistan. **India is ranked 17th under long term vulnerability.**

34 Brown to Green Report, 2019

Context: The Brown to Green Report (2019) has been published by the Climate Transparency partnership.

More on News:

- **The report is the most comprehensive review of G-20 countries climate performance.** It also aims at mapping achievements and drawbacks of individual countries to reduce emissions and adapt to climate impact.
- It points out that the carbon emissions from all 20 countries including India is rising.
- The report also notes that none of the G-20 countries have a plan that will help them achieve the target under Paris agreement.
- Further, the report suggests that renewable energy despite accounting for 25.5% of power generation is not sufficient to outweigh the growth of emissions from fossil fuel sources.
- It also suggests that low-carbon fuels need to increase roughly 10 times by 2050 to keep global warming below 1.5 degrees Celsius.
- Among the G-20 countries, India has the most ambitious nationally determined contribution (NDC). However, it still needs real action now to prepare the different sectors for stringent emission reductions. India and China are the only two G-20 countries that have most progressive energy efficiency policies.

35 Zero Carbon Law

Context: Recently, New Zealand's Parliament has passed the Zero Carbon Act that will commit New Zealand to be zero carbon emissions by 2050 or earlier .

More on News:

- The step has been taken as part of the country's attempts to meet its Paris climate accord commitments.
- **Specific Provisions of the Act :**
 - ▶ To reduce all greenhouse gases (**except methane**) to net zero by 2050.
 - ▶ It also aims to reduce emissions of **biogenic methane** (produced from biological sources) up to **24-47 % below 2017 levels by 2050 and to 10 % below 2017 levels by 2030.**
 - ▶ The legislation also aims to establish an independent **Climate Change Commission.**
 - ▶ The statute also proposes to establish a system of emissions budget.

Biogenic Methane

- It is emitted by livestock, waste treatment and wetlands.
- Biogenic methane is a short-lived gas and degrades into the atmosphere over the decades.
- It is a **more potent greenhouse gas than carbon dioxide.**

POLICIES, SCHEMES & INITIATIVES

1 Goa State Biodiversity Board's Tag

Context: Goa State Biodiversity Board (GSBB) issued a tagging system to ensure communities residing within the biodiversity zone get Access Benefit Share (ABS) from their profits.

More on News:

- This product tagging is a new system however, **paying ABS has already been a part of the Biodiversity Act 2002.**
- The tag indicates that the **ingredients used** therein are sourced from nature.
- The sellers are supposed to **pay 0.01% of their annual profit** to the GSBB and the board will then use this amount to protect the habitat from where the ingredients are.
- The amount sourced from the biodiversity zones by the organization will be submitted annually along with payments. The industries will pay profits obtained from only those products which have been sourced from that zone.
- More than 300 industries were approached to join the scheme, but currently, only three organizations **Tanshikar Spice Farm, Krishna Plantation, and Raika Honey** have agreed for the same.

2 India and Nepal to sign the transboundary agreement for conserving tigers, rhinos and elephants

- Both countries are expected to sign a Memorandum of Understanding (MoU) for **cooperation on conserving species like tigers, rhinos and elephants.**
- The **Indo-Nepalese border stretches over 1,850 kilometres and touches the states of Sikkim, West Bengal, Bihar, Uttar Pradesh, and Uttarakhand.**
- People and animals move freely across the border. For instance, the **Valmiki Tiger Reserve** in Bihar lies adjacent to the Chitwan National Park in Nepal while the **Dudhwa Tiger Reserve** in Uttar Pradesh shares space with the Shukla Phanta National Park in Nepal.

3 India - Spearheading Climate Solutions

Context:

- Ministry of Environment, Forest and Climate Change released a publication titled '**India - Spearheading Climate Solutions**' highlighting actions taken by the country to combat climate change.
- According to the **Coffee Table Book** released, India has accomplished its ambitious targets to combat climate change.

What are the main initiatives taken by the government as per the publication?

- **International Solar Alliance (ISA)**
 - ▶ ISA was jointly launched by Prime Minister Narendra Modi, and the then President of France, Francois Hollande in Paris on the side-lines of CoP 21 in 2015.
 - ▶ The vision and mission of the alliance are to provide a dedicated platform for cooperation among solar resource-rich countries that lie completely or parts between the Tropics of Capricorn & Cancer.
- **National Action Plan on Climate Change (NAPCC)**
 - ▶ NAPCC comprises, inter alia, of eight National Missions in specific areas of **Solar Energy, Enhanced Energy Efficiency, Sustainable Habitat, Water, Sustaining the Himalayan Eco-system, Green India, Sustainable Agriculture and Strategic Knowledge for Climate Change** with the approved funding under sectoral outlays.
 - ▶ **State Action Plan on Climate Change (SAPCC):** State governments have drafted climate strategies aligned with the eight National Missions under the NAPCC. The strategies focus on issues ranging from climate mitigation, energy efficiency, and resource conservation to climate adaptation.
- **FAME Scheme for E-mobility**
 - ▶ Union Government in April 2015 launched Faster Adoption and Manufacturing of Hybrid and Electric vehicles (FAME) – India Scheme with an aim to boost sales of eco-friendly vehicles in the country. It is a part of the National Mission for Electric Mobility.
- **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)**
 - ▶ All the following outcomes are valued by citizens, particularly women, and indicators and standards have been prescribed by the **Ministry of Urban Development** in the form of Service Level Benchmarks.
 - Ensure that every household has access to a tap with assured supply of water and a sewerage connection;
 - Increase the amenity value of cities by developing greenery and well maintained open spaces (e.g. parks); and
 - Reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g. walking and cycling).
- **Pradhan Mantri Ujjwala Yojana**
 - ▶ Under the scheme, the government aims to provide LPG connections to BPL households in the country.
 - ▶ The scheme is aimed at replacing the unclean cooking fuels mostly used in rural India with the clean and more efficient LPG (Liquefied Petroleum Gas).

- UJALA scheme
 - ▶ State-run Energy Efficiency Services Ltd (EESL) today said it has distributed over 30 crores light-emitting diode (LED) bulbs across the country under the scheme.
- **Swachh Bharat Mission**
 - ▶ The campaign seeks to clean the streets, roads, and infrastructure of the country's 4041 statutory cities and towns.
- **National Clean Air Program (NCAP)**
 - ▶ The tentative national level target of 20%–30% reduction of PM2.5 and PM10 concentration by 2024 is proposed under the NCAP taking 2017 as the base year for the comparison of concentration.
 - ▶ The overall objective of the NCAP is comprehensive mitigation actions for prevention, control and abatement of air pollution besides augmenting the air quality monitoring network across the country and strengthening the awareness and capacity building activities.

4 Super-Efficient Air Conditioning Programme

Context:

- Energy Efficiency Services Limited (EESL), a joint venture of four National Public Sector Enterprises under the Ministry of Power, Government of India launched its **Super-Efficient Air Conditioning Programme** for **residential** and **institutional consumers** in the BSES area.
- These Super-Efficient Air Conditioners are 40 percent more efficient than but priced comparably with, the 3-star ACs currently available in the market.

Programme:

- EESL and BSES have joined hands to implement a 12-month pilot of the programme by exchanging an agreement.
- BSES Rajdhani Power Limited would assist in aggregating demand and providing local marketing and outreach support to promote energy-efficient technologies in the areas it currently services, thereby covering over 25 lakh residential and institutional consumers in South and West Delhi.
- EESL will conduct all activities related to the source, supply, complaint management and redressal, and fulfillment of warranty obligations for the products.

Benefits of the programme:

- Besides promoting energy efficiency, the Super-Efficient AC programme will also help to reduce the peak power demand in South and West Delhi by 22MW, enabling the two organisations to harness synergies to promote energy security and sustainability.
- The programme directly addresses the prospect of the nearly four-fold increase in energy consumption from buildings and cooling appliances in India by 2032.
- It will also address the goals of India's Cooling Action Plan and Hydrochlorofluoro- carbons **Phase Out Management Plan**, enabling achievement of India's targets under the Kigali and Paris Agreements.

Global Environment Facility (GEF)

- It is an independent financing mechanism that was established on the eve of the 1992 Rio Earth Summit to address global environmental issues.

- Applying its proven business model of demand aggregation, EESL will mobilize the capital of INR 150 crores for the programme while redeeming its investment through upfront payments for the super-efficient ACs from customers.
- EESL's investment in the programme is partially supported by a grant from the Global Environment Facility.
- Further, the Asian Development Bank (ADB) is providing necessary grant support and loan while United Nations Environment (UNEP) is providing technical assistance support to the Super-Efficient AC programme.

5 Green India Mission (GIM)

Context: According to a Parliamentary committee report 'Performance of the National Action Plan on Climate Change', **Green India Mission** is grossly underfunded.

Highlights of the Report:

- During 2017-18, Rs 47.8 crore has been allocated for the scheme which is grossly insufficient as the committed liability for 2015-16 and 2016-17 is Rs 89.53 crore which is much more than the budget allocated. However, the scheme is proposed for 10 years with an outlay of Rs 60,000 crore.
- The panel raises concerns about the targets set by GIM on India's Intended Nationally Determined Contribution (NDC) submitted to the United Nations Framework Convention on Climate Change.
- The committee pointed out that the afforestation done under the mission was only aimed at increasing tree count without considering the soil and weather conditions.
- Though plantation activity is aimed at increasing green cover, they cannot replace actual forest cover. Forest has plants and trees of numerous varieties and sizes and shapes. Forests grow naturally and according to climate conditions existing in the area.

Green India Mission

- The National Mission for Green India (GIM) is one of the eight Missions outlined under the National Action Plan on Climate Change (NAPCC).
- It aims at protecting; restoring and enhancing India's diminishing forest cover and responding to climate change by a combination of adaptation and mitigation measures.

Objectives:

- **To increase forest/tree cover to the extent of 5 million hectares (mha) and improve quality of forest/tree cover on another 5 mha of forest/non-forest lands;**
- To improve/enhance eco-system services like carbon sequestration and storage (in forests and other ecosystems), hydrological services and biodiversity; along with provisioning services like fuel, fodder, and timber and non-timber forest produces (NTFPs); and
- To increase forest-based livelihood income of about 3 million households.

6 Grid Connected Rooftop Solar Programme

Context: The Cabinet Committee on Economic Affairs has given its approval for the Phase-II of Grid Connected Rooftop Solar Programme for achieving a

cumulative capacity of 40,000 MW from Rooftop Solar (RTS) Projects by the year 2022.

More on News:

- The Phase-II Programme **Central Financial Assistance (CFA)** for the residential sector has been restructured with the availability of **40% CFA** for RTS systems up to 3 kW capacity and 20% for RTS system capacity beyond 3 kW and up to 10 kW.
- Central financial support will not be available for another category i.e., institutional, educational, social, government, commercial, industrial, etc.
- Under Phase-II Programme, the focus will be on increased involvement of DISCOMs. Performance-based incentives will be provided to DISCOMs based on RTS capacity achieved in a financial year.

Grid Connected Rooftop Solar Programme

- It is one of a series of World Bank's engagements in India's solar sector and is an important means for Ministry of New and Renewable Energy to implement its scheme to install 10GW of grid connected rooftop solar power on an accelerated basis. The program has two components:
 - ▶ Commercial Lending for GRPV
 - ▶ Institutional support and Technical Assistance

7 India Cooling Action Programme

Context: Ministry of Environment, Forest and Climate Change launched the India Cooling Action Plan (ICAP) in New Delhi.

More on News:

- ICAP provides an integrated vision towards cooling across sectors encompassing inter alia reduction of cooling demand, refrigerant transition, enhancing energy efficiency and better technology options with a 20-year time horizon.
- The India Cooling Action seeks to:
 - ▶ Reduce cooling demand across sectors by 20% to 25% by 2037-38.
 - ▶ Reduce refrigerant demand by 25% to 30% by 2037-38.
 - ▶ Reduce cooling energy requirements by 25% to 40% by 2037-38.
 - ▶ Recognize "cooling and related areas" as a thrust area of research under the national S&T Programme.
 - ▶ Training and certification of 100,000 servicing sector technicians by 2022-23, synergizing with Skill India Mission.

8 Star Labelling Programmes

Context: Star Labelling Programmes, formulated by the Bureau of Energy Efficiency (BEE), has been expanded to air-conditioners and washing machines. Initially, it will be implemented on a voluntary basis and will be valid up to December 31, 2020.

More on News:

- This initiative will promote the advancement of technology and energy efficiency in microwave ovens which is becoming a popular household gadget.

- For washing machines, BEE has also expanded the criteria for inclusion of water efficiency, in addition to energy performance for the grant of Star Rating.

What is BEE Star Rating?

- Energy ‘labeling’ is one of the most cost-effective policy tools for improving energy efficiency and lowering the energy cost of appliances/equipment for consumers.
- Star ratings are provided to all the major kinds of appliances in the form of labels.
- These star ratings are given between 1- 5 and they provide a basic sense of how energy efficient each product is, just in a single glance.
- The manufacturers are officially required to put these labels as per the **Standards and Labelling Program introduced in 2006**.

What are the two variants of the labeling?

- **Big energy rating label**
 - ▶ It is aimed at appliances which have a constant usage and consume more electricity.
 - ▶ These labels show additional information such as the yearly energy consumption of the product, brand name, product category and much more.
 - ▶ Products with a big label: Refrigerators, air-conditioners, geysers and washing machines.
- **Small energy rating label**
 - ▶ It can be found in appliances that usually don’t consume more energy. These labels just give you a visual representation of the energy consumption levels by showing star ratings.
 - ▶ Products with a small label: Ceiling fans, tube lights, computers/laptops, and televisions.

9 Certification Standard for Sustainable Forest Management (SFM)

Context: India’s first forest-certification scheme gets global recognition as Geneva-based non-profit recently decided to endorse the Certification Standard for Sustainable Forest Management designed for Indian forests.

More on News:

The council of **Programme for Endorsement of Forest Certification (PEFC)**, a Geneva-based non-profit, has decided to endorse the **Certification Standard for Sustainable Forest Management (SFM) developed by Network for Certification and Conservation of Forests (NCCF)**, an Indian non-profit organisation.

Programme for Endorsement of Forest Certification (PEFC)

- It is an international non-profit, non-governmental organization dedicated to promoting Sustainable Forest Management (SFM) through independent third-party certification.
- As an umbrella organization, it works by **endorsing national forest certification systems** developed through multi-stakeholder processes and tailored to local priorities and conditions.

Forest Management Certification:

- Forest certification is a global movement initiated in 1990s after Rio Earth Summit.
- It is a **market-based non-regulatory conservation** tool designed to promote sustainable management of forests and trees outside forests by an independent third party.

- It is the world's largest forest certification system.
- India is the National Governing Body Member of PEFC.

Network for Certification and Conservation of Forests (NCCF)

- It is a non-profit organisation, registered as a Society, to have a globally aligned certification program developed within India. It came into existence in January 2015.
- NCCF is working towards developing national sustainability certification standards in diverse areas of natural resource management, majorly forestry, trees outside forests, protected areas, and wetlands.
- It also includes non-wood forest products, quality planting material, ecotourism, biofuels, sustainable mining and water quality, etc.
- Policy advocacy and diverse conservation activities are other areas of focus.
- It has got support from the key forest-based stakeholders such as the Ministry of Environment, Forest and Climate Change.

- As several developed countries have put trade restrictions on import of non-certified timber, non-timber forest products and wood-based goods into their countries, getting sustainable forest management certificates has become mandatory for exports.
- There are currently two mainstream operational Forest Management Certification schemes available on a global level; **FSC (Forest Stewardship Council) launched in 1993, PEFC (Programme for Endorsement of Forest Certification) founded in 1999.**

10 Indian Forest Act, 1927

Context: The Ministry of Environment, Forest and Climate Change (MoEF&CC) has finalised the first draft of the comprehensive amendments to the Indian Forest Act, 1927 (IFA).

Major highlights of the Draft:

- The idea behind this legislation is **to facilitate the increase of forest cover from about 24% now to 33%.**
- Forest is defined to include "any government or private or institutional land recorded or notified as forest/forest land in any government record and the lands managed by government/community as forest and mangroves, and also any land which the central or state government may by notification declare to be forest for this Act".
- The amendment defines community as "a group of persons specified based on government records living in a specific locality and joint possession and enjoyment of common property resources, without regard to race, religion, caste, language, and culture
- **"Village forests", according to the proposed Act, may be forestland or wasteland.**
- It will be the property of the government and would be **jointly managed by the community through the Joint Forest Management Committee or Gram Sabha.**

Indian Forest Act, 1927

- The act sought to consolidate and reserve the areas having forest cover, or significant wildlife.
- It also aimed to regulate movement and transit of forest produce, and duty leviable on timber and other forest produce.
- It also defined the procedure to be followed for declaring an area as Reserved Forest, Protected Forest or a Village Forest.
- The act has detailed definition of what a forest offence is, what are the acts prohibited inside a Reserved Forest, and penalties leviable on violation of the provisions of the Act.

- The legislation has proposed a **forest development cess of up to 10%** of the assessed value of mining products removed from forests and water used for irrigation or in industries.
- This amount would be deposited in a special fund and used “exclusively for reforestation; forest protection and other ancillary purposes connected with tree planting, forest development, and conservation.
- The amendment also introduces a new category of forests — the **production forest**. These will be forests with specific objectives for the production of timber, pulp, pulpwood, firewood, non-timber forest produce, medicinal plants or any forest species to increase production in the country for a specified period.
- **The amendments specifically deal with the Forest Rights Act, 2006 (FRA).**
- If the state government, after consultation with the central government, feels that the rights under FRA will hamper conservation efforts, then the state “may commute such rights by paying such persons a sum of money in lieu thereof, or grant of land to maintain the social organisation of the forest-dwelling communities or set out some other forest tract of sufficient extent, and in a locality reasonably convenient, for such forest dwellers.

11 BS-IV and BS-VI Norms

Context:

- Bringing an end to a segment that accounts for almost a quarter of its total sales, Maruti Suzuki announced that it will stop selling diesel cars next year.
- Industry experts and company sources said that the company’s decision to stop sales of diesel cars is in line with the mandatory upgrade for automakers from BS-IV to BS-VI beginning April 1, 2020.
- In the wake of rising pollution levels, the Supreme Court had said that March 31, 2020, would be the last date for the registration of BS-IV compliant vehicles.

BS-IV norms:

- The BS-IV norms were introduced in 13 cities apart from the National Capital Region from April 2010 onwards. According to the roadmap, the entire nation was covered under BS-IV by April 1, 2017.
- **BS-IV norms stipulate only 50 parts per million sulphur compared with up to 350 parts per million under BS III.** Also, hydrocarbon, carbon monoxide, nitrogen oxide, and particulate matter emissions are lower under BS-IV.

Bharat Stage Norms:

- These are **emission control standards introduced** by the government in 2000 to check air pollution. **These are based on the European regulations (Euro norms).**
- They set limits for release of air pollutants from equipment using internal combustion engines, including vehicles. Typically, the **higher the stage, the more stringent the norms.**

BS-VI norms:

- India is lagging even after the implementation of BS-IV norms. To compensate for this, BS V standards will be skipped and BS-VI norms are proposed to come in by April 2020.
- Vehicles must be fitted with **DPF (diesel particulate filter) for Particulate Matter (PM) reduction.** It is a cylindrical object mounted vertically inside the engine compartment.
- Vehicles also have to be equipped with an **SCR (selective catalytic reduction) module to reduce oxides of nitrogen.**

- Manufacturers will also need to make petrol engines more fuel-efficient as CO emission levels will also need to be controlled. This may lead to a shift towards gasoline direct injection engines.

12

Adidas set to tap the Indian firm's PET project to cut Virgin Plastic use

Context:

- Global sportswear giant Adidas aims at eliminating the use of virgin plastics in its products by 2024 — with a little help from a Maharashtra-based firm — the only one of its kind in the country to produce yarn out of discarded PET bottles.
- Discarded bottles are upcycled to make high-quality polyester filament yarn for Adidas products.

More on News:

- At its first factory set up in Nashik five years ago, Polygenta Technology Limited deploys a unique technology to break down used **PET (Polyethylene Terephthalate)** bottles and convert them into polyester filament yarn.
- The firm, with a capacity to convert 30 tonnes of PET bottles into yarn a day, plans to scale up capacity to around 100 tonnes a day in the next two years to meet demand from the likes of Adidas — one of its first clients.
- Polygenta would be converting around 8 to 10 million bottles a day in a couple of years from now. At present, the company recycles roughly two million bottles a day.
- The yarn produced by Polygenta, currently sent to Adidas' manufacturing centres to be converted into sportswear, and may also be tapped to potentially upcycle clothes made from polyester yarn.
- **PET material collection rate in India is nearly 80%** — among the best in the world — but a good portion of these bottles are downcycled, eliminating the possibility of further recycling. **Downcycling is the reuse of waste in a manner that the recycled product is of lower value than the original material.**
- **The upcycling process consumes 86% less water and 75% less energy than conventional manufacturing but costs approximately 10% more.**
- A key area where costs can be reduced is curbing the level of contamination in PET bottles.

13

Blue Flag Challenge

Context: Twelve Indian beaches are in the race for the 'Blue Flag' challenge, which started in France in 1985.

Blue Flag Challenge

- It is international recognition conferred on beaches and marinas that meet certain criteria of cleanliness and environmental propriety and equipped with amenities of international standards for tourists.
- **It was first started in France in 1985 and has been implemented in Europe since 1987.**
- It is run by international, non-governmental, non-profit organization **Foundation for Environmental Education (FEE)**.
- Since 2001 it has been implemented in areas outside Europe when South Africa joined.

- **Criteria:** There are almost 33 criteria that must be met by beaches and marinas to qualify for Blue Flag certification. It includes:
 - ▶ Information about the Blue Flag Programme and other FEE eco-label must be displayed.
 - ▶ Environmental education activities must be offered and promoted to beach users.
 - ▶ Information about bathing water quality must be displayed.
 - ▶ Information relating to local eco-systems, environmental elements, and cultural sites must be displayed.
 - ▶ A map of the beach indicating different facilities must be displayed.
 - ▶ The beach must fully comply with water quality sampling and frequency requirements.
 - ▶ The beach must fully comply with the standards and requirements for water quality analysis.
 - ▶ Industrial, waste-water or sewage-related discharges must not affect the Beach Area
 - ▶ The beach must comply with the Blue Flag requirements for physical parameters.
 - ▶ At least one Blue Flag beach in each municipality must have access and facilities provided for the physically disabled
- **Validation:** If approved, beaches are given blue flag tag for a year and they must apply annually to continue meriting right to fly this flag at their locations.
- **Top countries:** Spain (total blue flags: 684), France (492) and Turkey (458). Japan and South Korea are only countries from South/southeastern Asia to have Blue Flag beaches.
- **Chandrabhaga beach on the Konark coast in Odisha was first in Asia to get Blue Flag certification (awarded in June 2019).**

Foundation for Environmental Education (FEE)

- It is a non-profit non-governmental organisation with member organisations in 48 countries as of June 2007.
- FEE aims to promote sustainable development through environmental education.
- **It is based in Copenhagen, Denmark.**

Initiatives by Government for Beach Conservation

- The Ministry of Environment, Forests and Climate Change signed a letter of Intent establishing the **India-Norway Marine Pollution Initiative** together with the Norwegian ministry of Foreign Affairs.
- The government is in the process of framing a **National Marine Litter Policy** with the objective to clean up the oceans, which is in line with **UN Environment's global 'Clean Seas Campaign' that India joined on World Environment Day 2018.**
- The government is installing debris booms and fin deflectors upstream as measures to reduce the quantity of floating solid waste entering coastal waters.

14 SATAT initiative

Context:

- The government is expanding its search for alternative sources of energy, including biomass, wind, solar and hydel power, to safeguard India's energy sources.
- In this direction, oil PSUs had launched '**Sustainable Alternative Towards Affordable Transportation**' (SATAT) initiative.

SATAT initiative

- **Launched by the petroleum ministry**, it is aimed at providing a **developmental effort** that would benefit both vehicle-users as well as farmers and entrepreneurs.

- It aims to tap the potential of **Compressed Bio-Gas (CBG) production plants** as it has the potential to replace CNG in automotive, industrial and commercial uses in the coming years.

Production Process

Biogas is produced naturally through a process of anaerobic decomposition from waste/ bio-mass sources like agriculture residue, cattle dung, sugarcane press mud, municipal solid waste, sewage treatment plant waste, etc. After purification, it is compressed and called CBG.

Properties

- Compressed Bio-Gas is exactly similar to the commercially available natural gas in its composition and energy potential.
- **It has a pure methane content of over 95%.**
- With calorific value (~52,000 KJ/kg) and other properties similar to CNG, Compressed Bio-Gas can be used as an alternative, renewable automotive fuel.

India's Potential

The potential for Compressed Bio-Gas production from various bio-mass/waste sources, including agricultural residue, municipal solid waste, sugarcane press mud, distillery spent wash, cattle dung and sewage treatment plant waste in India is **estimated at 62 million tonnes per annum.**

Other related Initiatives

- The National Policy on Biofuels 2018 emphasises active promotion of advanced bio-fuels, including CBG.
- GOBAR-DHAN (Galvanising Organic Bio-Agro Resources) scheme was launched to convert cattle dung and solid waste in farms to CBG and compost. The programme will be funded under Solid and Liquid Waste Management (SLWM) component of Swachh Bharat Mission-Gramin (SBM-G) to benefit households in identified villages through Gram Panchayats.
- The Ministry of New and Renewable Energy has notified Central Financial Assistance (CFA) of Rs. 4 crore per 4,800 kg of CBG per day generated from 12,000 cubic metres of biogas per day, with a maximum of Rs.10 crore per project.
- Other waste streams, i.e, rotten potatoes from cold storages, rotten vegetables, dairy plants, chicken/poultry litter, food waste, horticulture waste, forestry residues and treated organic waste from industrial effluent treatment plants (ETPs) can be used to generate biogas.

15 Blue Economy

Context: Commitment to the development of the Blue Economy has been expressed by a mention in the budget speech. This has laid the foundation and will provide the initial traction to create the space for implementation of the strategy.

Blue Economy

- It is the integration of ocean economy development with values of social inclusion and environmental sustainability, along with dynamic and innovative business models.
- United Nation's Sustainable Development Goal 14 that states "Conserve and sustainably use the oceans, seas and marine resources for sustainable development".
- The Ocean-based Blue Economy is the next sunrise issue for development - **"The Blue Economy: 10 years, 100 innovations, 100 million jobs"**.

India's Sagarmala initiative for port led development

- The government has planned six megaports under the project, namely the Vizhinjam International Seaport (Kerala state), Colachel Seaport (Tamil Nadu), Vadhavan Port (Maharashtra), Tadadi Port (Karnataka), Machilipatnam Port (Andhra Pradesh), and Sagar Island Port (West Bengal).

Scopes of growth and development

- The sub-sectors include blue trade in both goods and services, including the development of marine services (such as port services, ship repair, maritime finance and insurance, marine ICT and digitisation)
 - Blue investment (port and transloading in mid-seas, coastal-to-hinterland connectivity)
 - Blue SMEs — a sub-category of the SMEs as defined by the Ministry of Small and Medium Enterprises (MSME)
 - Blue manufacturing (development of dedicated industrial parks, as is being envisaged under the Sagarmala, protection risks of coastal natural calamities, etc.)
 - Some time-tested paradigms of PPPs (Public-Private Partnerships) will be ideal for the growth and development of the sector.
 - A mechanism to coordinate the efforts of the coastal districts/municipalities/panchayats, coastal state governments, and the Union government will need to be established.
- India currently permits 100 percent FDI for the construction and maintenance of ports.
 - **Key initiatives under Sagarmala are:**
 - ▶ Port modernization and new port development
 - ▶ Port connectivity enhancement
 - ▶ Port-led industrialization; and
 - ▶ Coastal community development.

16 Soil Health Card

Context: Evaluation of Soil Health Card Scheme has revealed a significant reduction in usage of an area in Kolhapur district of Maharashtra.

Soil Health Card Scheme

- **It was** launched in **2015** to issue '**Soil card**' to farmers which will **carry crop-wise recommendations of nutrients and fertilizers** required for the individual farms.
- This is aimed to help farmers to **improve productivity through the judicious use of inputs.**
- It is promoted by the **Department of Agriculture & Co-operation under the Ministry of Agriculture and Farmers' Welfare.**
- It is being implemented through the **Department of Agriculture of all the State and Union Territory Governments**
- It is made available **once in a cycle of 3 years**, which indicates the status of soil health of a farmer's holding for that particular period.
- **The unique features of the SHC scheme are:-**
 - ▶ **Collecting soil samples** at a grid of 2.5 ha in irrigated area and 10 ha in un-irrigated areas.
 - ▶ **GPS enabled soil sampling** to create a systematic database and allow monitoring of changes in the soil health over the years.
 - ▶ **Uniform approach in soil testing** adopted for 12 parameters viz. **primary nutrients (NPK); secondary nutrient (S); micronutrients (B, Zn, Mn, Fe & Cu); and other (pH, EC & OC)** for comprehensiveness.
 - ▶ It also provides **crop-wise fertiliser recommendations.**
 - ▶ It would also lead to **crop diversification** in the country.

17 Government releases Rs 47,436 crore fund for afforestation

Context:

- To promote forestry activities and boost afforestation across the nation, the central government released a fund of Rs 47,436 crore.
- These funds are meant to be used by states to implement agroforestry in non-forest land to compensate for the felled forest.

More on the topic:

- State Governments will utilize this fund for the enhancement of forestry activities to achieve the objectives of the **Nationally-Determined Contributions (NDCs)**. The objective of the NDCs is to increase its forest and tree cover. This will help in an additional carbon sink equivalent to 2.5 to 3 billion tonnes of carbon dioxide by the year 2030.
- **The top four states** that received the highest CAMPA fund are Odisha, Chhattisgarh, Madhya Pradesh, and Jharkhand.
- **The fund will be utilised in important activities which will include** the Compensatory Afforestation, Catchment Area Treatment, Assisted Natural Regeneration, Forest Fire Prevention, Wildlife Management, and Control Operations, Soil and Moisture Conservation Works in the forest, Improvement of Wildlife Habitat, Management of Biological Diversity and Biological Resources, Research in Forestry and Monitoring of CAMPA works, etc.

CAMPA:

- The apex court of India ordered for establishment of **Compensatory Afforestation Fund and Compensatory Afforestation Fund Management and Planning Authority (CAMPA) in 2001**.
- To compensate the loss of forest area and to maintain the sustainability, the Government of India came up with a well-defined Act, known as **CAMPA (Compensatory Afforestation Fund Management and Planning Authority)**.
- The law establishes the **National Compensatory Afforestation Fund under the Public Account of India**, and a **State Compensatory Afforestation Fund under the Public Account of each state**.
- **These Funds will receive payments for:** (i) compensatory afforestation, (ii) net present value of forest (NPV), and (iii) other project specific payments.
- The **National Fund will receive 10% of these funds, and the State Funds will receive the remaining 90%**.
- According to the Act's provision, **a company diverting forest land must provide alternative land to take up compensatory afforestation**.
- For afforestation, **the company should pay to plant new trees in the alternative land provided to the state**.

18 Coastal Regulation Zone

Context: Supreme Court has ordered the demolition of Maradu Apartments in Kerala for violation of Coastal Regulation Zone (CRZ) norms.

More on News:

- Under the Environment Protection Act, 1986 Ministry of Environment, Forests and Climate Change issued notification in 1991, for regulation of activities in the coastal area.
- **Coastal Regulation Zone (CRZ) is the area up to 500m from the high-tide line and a stage of 100m along banks of creeks, estuaries, backwater and rivers subject to tidal fluctuations.**

- CRZ Rules **govern human and industrial activity close to the coastline, in order to protect the fragile ecosystems near the sea.**
- The Union Ministry of Environment, Forest and Climate Change has notified the 2019 Coastal Regulation Zone (CRZ) norms, replacing the existing CRZ norms of 2011.
- The new CRZ norms **aim to promote sustainable development based on scientific principles.**

Changes Brought about by CRZ Regulations 2019

- Two separate categories for CRZ-III (Rural) areas:
 - ▶ **CRZ-III A:** The A category of CRZ-III areas are densely populated rural areas with a population density of 2161 per square kilometre as per 2011 Census. Such areas have a No Development Zone (NDZ) of 50 meters from the High Tide Line (HTL) as against 200 meters from the High Tide Line stipulated in the CRZ Notification, 2011.
 - ▶ **CRZ-III B** – The B category of CRZ-III rural areas have population density of below 2161 per square kilometre as per 2011 Census. Such areas have a No Development Zone of 200 meters from the HTL.
- No-development zone of 20 m for all islands close to the mainland coast, and for all backwater islands in the mainland.
- The government has decided to de-freeze the Floor Space Index and permit FSI for construction projects to do away with CRZ 2011 notification
- Tourism infrastructure like shacks, toilet blocks, change rooms, drinking water facilities, etc. permitted in coastal areas: The new norms permit temporary tourism facilities such in Beaches.
- To address pollution in Coastal areas, the treatment facilities have been made permissible in CRZ-I B area subject to necessary safeguards.

Coastal Regulation Zones(CRZ) 1991 notification gave four fold classifications of coastal areas:

- **CRZ-1:** These are ecologically sensitive areas as they help in maintaining the ecosystem of the coast. They lie between low and high tide line. Exploration of natural gas and extraction of salt are permitted
- **CRZ-2:** These areas are urban areas located in the coastal areas. Now under new coastal zone regulations 2018, the floor space index norms have been de-frozen.
- **CRZ-3:** Rural and urban localities which fall outside the 1 and 2. Only certain activities related to agriculture even some public facilities are allowed in this zone.
- **CRZ-4:** This lies in the aquatic area up to territorial limits. Fishing and allied activities are permitted in this zone. Solid waste should be let off in this zone. This zone has been changed from 1991 notification, which covered coastal stretches in islands of Andaman & Nicobar and Lakshadweep.

19 Jal Jeevan Mission

Context: Government launched Jal Jeevan Mission to deal with water conservation in an integrated manner.

More on News:

- India has 180 million rural households. About 33 million have access to piped water; a little over 145 million don't.
- The **Jal Jeevan Mission (JJM) aims to provide tap water to all of these households by 2024.**
- It attempts an **integrated approach** to water-related issues. Following ministries were merged to create **Ministry of Jal Shakti:**

- ▶ Ministry of water resources, river development and Ganga rejuvenation
- ▶ Ministry of drinking water and sanitation
- There is an attempt to inculcate a responsible and responsive relationship with water as gauged by phases like **'value of water'**, and **'water footprint'** of human and economic activity.
- **Jal Shakti Abhiyan (JSA)** is an intensive **water conservation campaign** to empower local communities, in cooperation with state and GoI agencies.
- The campaign focuses on **integrated demand and supply-side management** of water at the local level in the 256 water-stressed districts in India.
- Government's rural e-governance initiative — **Common Service Centres (CSCs)** — are nodal centers to provide clean and safe drinking water in villages.
- It will rope in **village-level entrepreneurs (VLEs)** to set up **water filtration plants** in 1 lakh villages in the country.
- Through their rural entrepreneurs, CSC will set up these plants in villages depending upon the **mineral contamination profile**.
- CSC entered into a **MoU with the Bhabha Atomic Research Centre (BARC)** for installing water filtration plants in villages.
- Consultation process to make mandatory **compliance of the BIS quality standard for tap water**.
- **Satellite backed sensors** monitor ground water level on real time basis.
- **Gram panchayats and local bodies** will decide **water usage charges** for supply of potable piped water under the JJM.
- JSA requires **every city to rejuvenate at least 1 water body**.

Common Service Centres (CSCs)

- **CSCs** were formed as part of the government's **National e-Governance Plan (NeGP)**.
- They are **ICT-enabled front-end service delivery points** for villages providing the government, financial, social and private sector services in agriculture, health, education, entertainment, FMCG products, banking, insurance, pension, utility payments, etc.

20 Air Quality Index and Safar

Context: Delhi air quality deteriorated to severe category, pollution talks in Lok Sabha

Air Quality Index

- **AQI is calculated for eight major air pollutants:** Ground-level ozone, PM10, PM2.5, Carbon monoxide, Sulphur dioxide, Nitrogen dioxide, Ammonia, Lead.
- **There are six AQI categories:** Good, Satisfactory, Moderately polluted, Poor, Very Poor, and Severe.

India Meteorological Department (IMD)

- It is an agency of the Ministry of Earth Sciences of the Government of India.
- IMD is headquartered in Delhi. Regional offices are at Mumbai, Kolkata, Nagpur and Pune.
- It has the responsibility for forecasting, naming and distribution of warnings for tropical cyclones in the Northern Indian Ocean region, including the Malacca Straits, the Bay of Bengal, the Arabian Sea and the Persian Gulf.

System of Air Quality and Weather Forecasting And Research (SAFAR)

- It is an initiative introduced by the **Ministry of Earth Sciences (MoES)**
- The system is indigenously developed by the Indian Institute of Tropical Meteorology (IITM), Pune and is operationalized by the India Meteorological Department (IMD).
- The system will be an integral part of India's first Air Quality Early Warning System operational in Delhi.
- SAFAR will accelerate public awareness and preparedness of air pollution and weather extremes.
- It will also lead to better understanding of linkages among emissions, weather, pollution and climate. It will monitor all weather parameters like temperature, rainfall, humidity, and wind speed and wind direction.
- **In addition to regular air quality parameters like PM2.5, PM10, Sulphur Dioxide, Ozone, Nitrogen Oxides, Carbon Monoxide, the system will also monitor the existence of Benzene, Toluene and Xylene.**

21 National Clean Air Programme

Context: Minister of Environment, Forest and Climate Change has launched National Clean Air Programme (NCAP) as a long-term, time-bound, national-level strategy to tackle the air pollution problem across the country in a comprehensive manner.

Key features of the National Clean Air Programme (NCAP):

- **Achieve a national-level target** of 20-30% reduction of PM2.5 and PM10 concentration by between 2017 and 2024.
- **Central Pollution Control Board (CPCB) will execute this nation-wide programme** in consonance with the section 162 (b) of the Air (Prevention and Control of Pollution) Act, 1986.
- **The programme has been launched with an initial budget of ₹300 crore** for the first two years.
- **The plan includes 102 non-attainment cities**, across 23 states and Union territories, which were identified by Central Pollution Control Board (CPCB) on the basis of their ambient air quality data between 2011 and 2015.
- **Non-attainment cities are those** which have been consistently showing poorer air quality than the National Ambient Air Quality Standards. These include Delhi, Varanasi, Bhopal, Kolkata, Noida, Muzaffarpur, and Mumbai.
- As part of the programme, **the Centre also plans to scale up the air quality monitoring network across India**. At least 4,000 monitors are needed across the country, instead of the existing 101 real-time air quality (AQ) monitors, according to an analysis.
- **The plan proposes a three-tier system**, including real-time physical data collection, data archiving, and an action trigger system in all 102 cities, besides extensive plantation plans, research on clean-technologies, landscaping of major arterial roads, and stringent industrial standards.
- **It also proposes state-level plans** of e-mobility in the two-wheeler sector, rapid augmentation of charging infrastructure, stringent implementation of BS-VI norms, boosting public transportation system, and adoption of third-party audits for polluting industries.

22 National Green Corps 'Eco Club' Programme

Context: Recently, the Ministry of Environment, Forest and Climate Change (MoEFCC) organized an annual meeting of state nodal agencies implementing the 'Ecoclub' programme for the first time.

More on News:

- **National Green Corps** is a programme started in 2001-02 by the Ministry of Environment Forests and Climate Change.
- **Aim:** To provide opportunities for children to understand the environment and environmental problems through school eco-clubs.
- The programme is a sub part of **Environment Education Awareness and Training (EEAT)**.

Implementation:

- The scheme is being operated through Eco-clubs of 50-60 students having an interest in environment related issues, formed in member schools.
- **Eco clubs are supervised by a Teacher In-charge** who is selected from among the teachers of the member schools on the basis of his/her interest in environment related issues.
- There is **District Implementation and Monitoring Committee** to supervise, organise training for In-charge teachers and monitor periodically the implementation of scheme at the District level.
- There is a **State Steering Committee** for guidance, direction and to oversee the implementation of the scheme.
- The **State Nodal Agency** coordinates the implementation of the scheme in the State and organize related activities like training to Master Trainers.
- The **National Steering Committee** will give overall direction to the programme and ensure linkages at all levels.

Environment Education Awareness and Training (EEAT)

- It is a central sector scheme of the Ministry of Environment Forests and Climate Change continuing since 1983-84.
- The basic objective to promote environmental awareness among all sections of the society and to mobilize people's participation for conservation of environment.
- The objectives of the scheme are achieved through the implementation of four programmes namely National Green Corps, National Environment Awareness Campaign, Seminars/Workshops and National Nature Camping Programme.

23 Delhi gets its first smog tower: What is it and how does it work?

Context: The Supreme Court had directed the Centre and the Delhi government to prepare a plan to install 'smog towers' across the capital to deal with air pollution.

More on News:

- **Smog towers are structures designed to work as large-scale air purifiers.**
- They are usually fitted with multiple layers of air filters, which clean the air of pollutants as it passes through them.

- The 20-metre (65 feet) high tower will trap particulate matter of all sizes suspended in the air.
- Large-scale air filters shall draw in the air through fans installed at the top before passing it through the filters and releasing it near the ground.
- The filters installed in the tower will use carbon Nano fibres as a major component and will be fitted along its peripheries.
- The smog tower is expected to purify around 2,50,000 to 6,00,000 cubic meter air per day and release fresh air in return.
- The project is collaboration between the Indian Institute of Technology (IIT) Bombay, IIT-Delhi and the University of Minnesota.
- The Central Pollution Control Board (CPCB) will also be involved with the project.

Facts:

- China has two smog towers — in its capital Beijing and in the northern city of Xi'an.
- The Xi'an tower is dubbed the world's largest, and has reportedly brought down PM 2.5 by 19% in an area of around 6 sq km in its vicinity.
- The tower in Beijing, built by Dutch artist Daan Roosegaarde, has been able to compress the carbon waste generated during purification to produce gemstones.

24 Green Credit Scheme

Context: The Forest Advisory Committee has approved the 'Green Credit Scheme' that could allow "forests" to be traded as a commodity. If implemented, it allows the Forest Department to outsource one of its responsibilities of reforestation to non-government agencies.

More on News:

- The proposed 'Green Credit Scheme', allows agencies, they could be private companies, village forest communities, to identify land and begin growing plantations.
- After three years, they would be eligible to be considered as compensatory forest land if they had met the Forest Department's criteria.
- An industry needing forest land could then approach the agency and pay it for parcels of such forested land, and this would then be transferred to the Forest Department and be recorded as forest land.
- The participating agency will be free to trade its asset, that is a plantation, in parcels, with project proponents who need forest land.
- Once finalised, the scheme will overhaul the compensatory afforestation process by accrediting private or public-private partnership companies to raise plantations near reserved forests which can be bought in lieu of projects involving forest diversion.
- If the company raising the plantation doesn't wish to trade it, it can retain it and harvest the timber once ready.

Understanding the current system:

- Under the Forest Conservation Act 1980, each time forest land is diverted for non-forest purposes, the project developer is supposed to identify land and pay for planting forests over an equal area of non-forest land, or when that is not available, twice the area of degraded forest land.
- It also must pay the State Forest Department the current economic equivalent, called Net Present Value, of the forest land.
- This money currently gets collected under the Compensatory Afforestation Fund.

- It's then the Forest Department's responsibility to grow appropriate vegetation that, over time, would grow into forests.
- Industries have often complained that they find it hard to acquire appropriate non-forest land, which has to be contiguous to an existing forest.

25 Cauvery Delta and Protected Special Agriculture Zone

Context: In a significant decision, the Tamil Nadu government has announced Cauvery delta region as Protected Special Agriculture Zone to prevent implementation of oil exploration projects in the state's rice bowl.

A brief about Cauvery Delta

- **The river Cauvery is the fourth largest river of the southern region and flows from North West to the Southeast.**
- Cauvery Delta zone consists of four districts of Nagapattinam, Thanjavur and Thirivarur and parts of the district Trichy, Cuddalore and Puddubottai in Tamil Nadu.
- Cauvery Delta zone has a total geographical land area of 1.45 million Ha which is equivalent 11% of the area of Tamil Nadu state.
- In the **Cauvery Delta rice is the principal crop; it is either single or double-cropped.** A third crop rise is also grown during summer in some parts.
- The landholdings in the delta are quite small with more than 75% are one ha or less.

Protected Special Agriculture Zone (PSAZ)

- A Special Agricultural Zone is one where agricultural land is preserved for posterity because of its importance to increasing agriculture production and promoting livelihood security for a large number of farm families.
- The idea is very similar to the theme of the Special Economic Zone. The difference is that there is no statutory backing as yet to the concept of Protected Special Agriculture Zone (PSAZ)

26 National Mission of Clean Ganga (NMCG)

Context: The National Mission for Clean Ganga (NMCG) under its 'Namami Gange' program has taken up an initiative to conserve the wetlands in Ganga River Basin.

More on News:

- The difference in the Namami Gange Project is primarily to rejuvenate the river through increasing the base flow and aquifers recharge and conservation of wetlands because that forms the part of one of our 'Aviral Dhara' which is to maintain the environmental flow in the river.
- So, in a first step the programme is aimed at conserving wetlands in Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal.
- The NMCG in collaboration with the State Wetland Authorities will help in identifying and preparing Integrated Management Plans for management and conservation in the Ganga basin.

- The program is also aimed at involving the community in the wetland conservation process through the Wildlife Institute of India. Apart from the government's efforts, NMCG has also appointed a team to educate the people in contributing to the rejuvenation of these water bodies.
- Ecosystem-based and community-led models of rejuvenation of wetlands for enhancing 'Aviralta' and 'Nirmalta' of the river and water conservation in the Ganga basin are being integrated into the NamamiGange Programme.

27

Sustainable Development Cell for Environmental Mitigation Measures

Context: The Ministry of Coal has decided to establish a 'Sustainable Development Cell'.

Objectives:

To promote environmentally sustainable coal mining in the country and address environmental concerns during the decommissioning or closure of mines.

Roles and functions:

- Advise, mentor, plan and monitor the mitigation measures taken by the coal companies for maximising the utilisation of available resources in a sustainable way.
- Act as nodal point at Ministry of Coal level in this matter.
- Formulate the future policy framework for the environmental mitigation measures including the Mine closure Fund.

28

National Water Policy (NWP)

Context: The government has finalised a committee to draft a new National Water Policy (NWP).

National Water Policy 2012:

- The NWP currently in force was drafted in 2012 and is the third such policy since 1987.
- Among the major policy innovations in the 2012 policy was the concept of an **Integrated Water Resources Management approach** that took the "river basin/ subbasin" as a unit for **planning**, development and management of water resources.
- **Minimum levels:** It also proposed that a portion of river flows ought to be kept aside to meet ecological needs. Such an approach led to the government, in 2018, requiring minimum water levels to be maintained in the Ganga all through the year and hydropower projects, therefore, to refrain from hoarding water beyond a point.
- The policy also stressed for a minimum quantity of potable water for essential health and hygiene to all its citizens to be made available within easy reach of households.
- The policy also noted that inter-basin transfers of water should be considered on the basis of merits of each case after evaluating the environmental, economic and social impacts of such transfers.

29 Forest-PLUS 2.0

Context: US Agency for International Development (USAID) and India's Ministry of Environment, Forest and Climate Change (MoEF&CC) have launched Forest-PLUS 2.0.

More on News:

- It is a five-year programme initiated in December 2018 that focuses on developing tools and techniques to bolster ecosystem management and harnessing ecosystem services in forest landscape management.
- It comprises pilot project in three landscapes — Gaya in Bihar, Thiruvananthapuram in Kerala and Medak in Telangana. The choice of these sites was driven by the contrast in their landscapes – Bihar is a forest deficit area, Telangana is a relatively drier area where there is ample scope for community livelihood enhancement and Kerala is rich in biodiversity.
- The targets of this set are:
 - ▶ 1,20,000 hectares of land under improved management.
 - ▶ New, inclusive economic activity worth \$12 million.
 - ▶ Measurable benefits accrued to 800,000 households.
 - ▶ Three incentive mechanisms demonstrated in managing landscapes for ecosystem services.

30 Reducing Emissions from Deforestation and Forest Degradation (REDD+) Himalayan programme

Context: The Reducing Emissions from Deforestation and Forest Degradation (REDD+) programme being carried out in the Himalayan states jointly by Indian Council of Forestry Research and Education (ICFRE) and International Centre for Integrated Mountain Development (ICIMOD) has been extended till July 2020.

More on News:

- ICFRE-ICIMOD's REDD+ programme was launched in January 2016 to address the drivers of deforestation and forest degradation in India's Himalayan states.
- The REDD+ programme was initiated by the United Nations in 2005 to mitigate climate change through enhanced forest management in developing countries. It aimed to create incentives for communities so that they stop forest degrading practices.
- The mechanism has been enshrined in the Paris Agreement of 2015, and its implementation is transitioning from smaller, isolated projects to larger, jurisdictional programmes with support from bilateral and multilateral agencies.

REDD+:

- It is a mechanism developed by Parties to the United Nations Framework Convention on Climate Change (UNFCCC).
- It creates a financial value for the carbon stored in forests by offering incentives for developing countries to reduce emissions from forested lands and invest in low carbon paths to sustainable development.
- Developing countries would receive results-based payments for results-based actions.

- REDD+ goes beyond simply deforestation and forest degradation and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

31 Eleven States seek 'Green Bonus'

Context:

- Eleven States belonging to Indian Himalayan Region (IHR) sought '**Green Bonus**' from the Centre considering their contribution in environmental conservation.
- They also want the Centre to set up a dedicated Ministry for this region.
- These States assembled for the first time on a platform titled, '**Conclave of the Himalayan States**' and held their meeting in this location situated over 6000 feet above the sea level.

Indian Himalayan Region (IHR)

- It is the section of **Himalayas within India, spanning 11 Indian states (Arunachal Pradesh, Assam Himachal Pradesh, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand) & 2 districts of Bengal** and that runs along 2500 km of Himalayan ranges between Indus river basin in North-West and Brahmaputra in the East.
- Approximately 9,000 glaciers of IHR store about 12,000 km³ of freshwater. This region is endowed with rich vegetation & is home to almost 36% of India's total biodiversity.
- More than 41.5% area of IHR states is under forests, representing 1/3rd of total forest cover of India & nearly half (47%) of the "very good" forest cover of the country.
- The total geographical area of IHR states is approximately 591,000 sq. km (18% of India) and it is inhabited by about 3.8% of the country's population.
- The strategic importance of the IHR is evident from the fact that **IHR states share borders with 6 neighbouring countries.**

32 Recycling of Ships Bill, 2019

Context: The Union Cabinet has approved the proposal for enactment of Recycling of Ships Bill, 2019 and accession to the Hong Kong International Convention for Safe and Environmentally Sound Recycling of Ships, 2009.

Hong Kong Convention

- The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (the Hong Kong Convention), was adopted at a diplomatic conference held in Hong Kong, China in 2009. **It was adopted by the International Maritime Organization (IMO) in 2009.**
- The Convention is aimed at ensuring that ships, when being recycled after reaching the end of their operational lives, do not pose any unnecessary risks to human health, safety and to the environment.
- The Convention is yet to come into force because it has not been ratified by 15 nations, representing 40 per cent of the world merchant shipping by gross tonnage (capacity) and a maximum annual ship recycling volume of not less than 3 per cent of the combined tonnage of the countries.

33 Swachh-Nirmal Tat Abhiyaan

Context: The Environment Ministry is undertaking a mass cleanliness-cum-awareness drive in 50 identified beaches under Swachh-Nirmal Tat Abhiyaan

More on News:

- It has been launched by Ministry of Environment, Forest and Climate Change (MoEF&CC).
- The programme aims at making beaches clean and also aims to create awareness amongst citizens about the importance of coastal ecosystems (in Beaches across 10 states / UTs).
- Environment Education Division and Society of Integrated Coastal Management (SICOM) under the Environment Ministry will be responsible for its implementation.
- Finally, the best three beaches will be awarded along with a certificate of appreciation.

RESOURCE CONSERVATION & MANAGEMENT

1

Environment ministry stops clearance to mining of beach sand minerals

Context: The Union Ministry of Environment, Forest and Climate Change (MoEF&CC) agreed to a request by the Ministry of Mines (MoM), seeking that clearances to private companies for mining beach sand minerals be stopped.

More on News:

- One of the important constituent of beach sand mineral is Monazite which is the primary ore for thorium, a nuclear fuel. Its presence brings beach sand mining under the **Atomic Minerals Concession Rules**.
- As monazite is found in various concentrations in all the beaches, this amendment essentially meant a ban on mining by private companies. The MoM's notification followed an August 2018 ban on export of sand minerals.
- A state government can permit private companies to mine only if atomic mineral in an ore is below a certain threshold, according to **Atomic Minerals Concession Rules, 2016**.
- The MoM, through a notification, prohibited private companies from mining beach sand minerals by changing the threshold limit for monazite from 0.75 per cent to zero.
- At 13 per cent of the world reserves, India has the third-largest stash of beach sand minerals and meets 6-7 per cent of global demand.
- According to the Working Group of Planning Commission for the 12th Plan, mining of beach sand minerals in India was expected to reach about 0.18 million tonnes per year by 2017, accounting for a tenth of global production.

What are Rare Earth Minerals?

- Rare earths are a series of **chemical elements found in the Earth's** crust that are vital to many modern technologies, including consumer electronics, computers and networks, communications, clean energy, advanced transportation, health care, environmental mitigation, national defense, and many others.
- Because of their **unique magnetic, luminescent, and electrochemical properties**, these elements help make many technologies perform with reduced weight, reduced emissions, and energy consumption; or give them greater efficiency, performance, miniaturization, speed, durability, and thermal stability.

2

Waste-to-Energy

Context: DMRC becomes India's 1st project to receive Power from Waste-to-Energy.

More on News:

- Delhi Metro has started receiving 2 MW power from a 12 MW capacity waste-to-energy plant set up in Ghazipur and the plant will mitigate over 8 million tons of Greenhouse Gases (GHG) over the life of the project.
- DMRC will take approximately 17.5 million units per annum from this plant, however, the energy off-take will depend upon the actual generation of the plant.
- The waste-to-energy plant set up by East Delhi Waste Processing Company Limited (EDWPCL) is based on a **Public Private Partnership (PPP)** involving the Delhi government and East Delhi Municipal Corporation (EDMC), besides the EDWPCL.
- The plant is **India's first Euro norms compliant waste-to-energy facility** and the state of the art facility is set up to process above 1,500 tonnes per day (TPD) of waste and generate 12 MW of green power.
- The DMRC has also commissioned a facility at Rohini (Delhi) on PPP model with IL&FS Environmental Infrastructure & Services Ltd (IEISL) for recycling of Construction and Demolition (C&D) waste with a capacity of 150 tons per day.

Waste-to-Energy

- Waste-to-Energy (WtE) or Energy-from-Waste (EfW) is a form of energy recovery and the process of generating energy in the form of electricity and/or heat from the primary treatment of waste, or the processing of waste into a fuel source.
- Incineration, the combustion of organic material such as waste with energy recovery, is the most common WtE implementation method.

Other WtE methods which convert the energy into liquid or gaseous fuels

Thermal technologies:

- ▶ **Gasification:** Produces combustible gas, hydrogen, synthetic fuels
- ▶ **Thermal depolymerization:** Produces synthetic crude oil, which can be further refined
- ▶ **Pyrolysis:** produces combustible tar/biooil and chars
- ▶ **Plasma arc gasification or plasma gasification process (PGP):** Produces rich syngas including hydrogen and carbon monoxide usable for fuel cells or generating electricity to drive the plasma arch, usable vitrified silicate and metal ingots, salt and sulphur.
- ▶ **Landfill Gas Collection**
- Non-thermal technologies:
 - ▶ **Anaerobic digestion:** Biogas rich in methane
 - ▶ **Fermentation production:** Examples are ethanol, lactic acid, hydrogen
 - ▶ **Mechanical biological treatment (MBT)**
 - MBT + Anaerobic digestion
 - MBT to Refuse derived fuel

3 Uranium in Aravallis**Context:**

- To be self-sufficient in uranium production, Atomic Minerals Directorate for Exploration and Research (AMD) is conducting a second round of survey in parts of Rajasthan along the Aravallis ranges. If successful, the government will begin mining in the state to get enough of the nuclear fuel.

- The Aravallis have been considered as one of the most uranium rich areas in the country.

Atomic Minerals Directorate (AMD) for Exploration and Research

- It is the oldest unit of the Department of Atomic Energy (DAE). Under the Atomic Energy Act passed by the Govt. of India in 1948 and followed by the creation of the Atomic Energy Commission (AEC) in 1948, AMD was created in 1949 as 'Rare Minerals Survey Unit'.
- It is headquartered in Hyderabad.

Mandate:

- The prime mandate is to identify and evaluate uranium resources required for the successful implementation of Atomic Energy program of the country.
- It has also the mandate to identify, evaluate and augment mineral resources of thorium, niobium, tantalum, beryllium, lithium, zirconium, titanium, rare earths (containing uranium and thorium) besides beach sand minerals like garnet and sillimanite.
- At present, uranium deposits established by AMD are mined by Uranium Corporation of India Limited (UCIL), a PSU of DAE.
- In respect of beach sand minerals, the mining operations are being carried out by both PSUs and private entrepreneurs.

Uranium Corporation of India Limited (UCIL)

- It is a Public Sector Undertaking under the Department of Atomic Energy, engaged in mining and processing of uranium ore in the country. The company is operating seven uranium mines in the State of Jharkhand and one uranium mine in the State of Andhra Pradesh.

Uranium rich states:

- Andhra Pradesh, Telangana, Jharkhand, Meghalaya, Rajasthan, Karnataka, Chhattisgarh, Uttar Pradesh, Uttarakhand, Himachal Pradesh and Maharashtra.

4 Waterbodies Conservation

Context:

- **United Nations and NitiAyog reports** has said that the demand for **water will reach twice the available supply, and 40 per cent of India's population will not have** access to clean drinking water by 2030.
- Currently, a major water crisis is being faced by India, where 100 million people are on the frontlines of a nationwide water crisis and many major cities facing an acute water shortage.

More on News:

- One of the reasons is **increasing negligence and lack of conservation of waterbodies**.
- **Rapid urbanisation and unplanned growth** have put **waterbodies under continuous and unrelenting stress**.
- Waterbodies are being polluted by **untreated effluents and sewage** that are continuously being dumped into them
- Lack of data and action plans, encroachments, interrupted water flow from the catchment, siltation, and violations of laws, solid waste deposit and polluted water and involvement of too many agencies.

Actions Taken

- **Water Conservation Act 1974** have been enacted for protection and restoration of waterbodies
- The Centre had launched the **Repair, Renovation and Restoration of Water Bodies' scheme in 2005** with the objectives of comprehensive improvement and restoration of traditional waterbodies.

Impacts

- **Encroachment of waterbodies** has been identified as a **major cause of flash floods** in Mumbai (2005), Uttarakhand (2013), Jammu and Kashmir (2014) and Chennai (2015).
- Across the country, **86 waterbodies are critically polluted**, having a chemical oxygen demand or **COD concentration of more than 250 mg/l**.
- In urban India, the **number of waterbodies is declining rapidly**.
- India is **facing its 'worst' water crisis** in history and **that demand for potable water will outstrip supply by 2030** if steps are not taken.
- Nearly **600 million Indians faced high to extreme water stress** and about **2,00,000 people die every year** due to inadequate access to safe water.
- There will be a 6% loss in the country's Gross Domestic Product (GDP) if this water crisis continues.
- **Critical groundwater resources**, which **accounted for 40% of India's water supply**, are being depleted at **"unsustainable"** rates and up to **70% of India's water supply is "contaminated"**.

- Ministry of Environment, Forests and Climate Change **notified the Wetlands (Conservation and Management) Rules, 2010** to ensure better conservation and management and to prevent degradation of **existing wetlands in India**.
- **Jal Shakti Abhiyan**, a **time-bound, mission-mode water conservation campaign** initiated by the **new Jal Shakti ministry** focusses on rainwater harvesting, rejuvenation of waterbodies, reuse of treated wastewater, and intensive afforestation.

5 Bio fuel

Context: A Nano carbon catalyst developed by IIT-Hyderabad can be used to convert corn cob waste into valuable fuels.

More on News:

- By using sugar, sulphuric acid and salt, the researchers of IIT Hyderabad have developed a cheap and efficient nano-carbon catalyst to help in the production of biofuel precursors.
- The catalyst showed better efficiency and selectivity than the commercially available variants to produce the desired C15 oxygenated hydrocarbon — a precursor to diesel and jet fuel. This development is important as States like Uttar Pradesh and Andhra Pradesh / Telangana produce a large amount of corn cob waste in the country.
- This can be converted into valuable fuel instead of being burnt. The nano-carbon catalyst developed by the institute can enable conversion into biofuel (fuel from biological sources rather than fossil fuels) and provide an additional earning opportunity for the corn farmer, besides being a sustainable energy source.

Bio Fuels

- Any fuel that is derived from biomass— that is, plant or algae material or animal waste.

Categories of Bio Fuels

- **First generation bio fuels**—These are made from sugar, starch, vegetable oil, or animal fats using conventional technology. These include Bio alcohols, Biodiesel, Vegetable oil, Bio ethers, Biogas.
- **Second generation bio fuels** - These are produced from non-food crops, such as cellulosic bio fuels and waste biomass. Examples include advanced bio fuels like bio hydrogen, bio methanol.
- **Third generation bio fuels** - These are produced from micro-organisms like algae.
- **Fourth Generation Bio fuels** - These are aimed at not only producing sustainable energy but also a way of capturing and storing CO₂.

6 Conservation of Lakes

Context: Odisha to conserve two of its largest lakes.

More on News:

- The Odisha Wetland Authority has approved implementation of an integrated management plan for **Chilika, country's largest brackish water lagoon, and Ansupa, State's largest freshwater lake.**
- The five-year management of lakes is intended at strengthening livelihood of thousands of fishermen relying on the two water-bodies. Besides, tourism promotion and conservation of ecology will be taken up.

Ansupa Lake

- It is one of the largest fresh water lake of Odisha situated in Banki, Cuttack.
- It was created by Mahanadi and got a shape like the hoof of a horse.
- It spreads over a vast area of 141 hectare, and surrounded by Saranda Hills in its length.
- The lake is surrounded with high hills. One can have a view of high hills around the lake.

7 India's Renewable Energy Capacity

Context: India is running at a slower pace in achieving its Nationally Determined Contribution as per Paris Accord on Climate Change.

Reason behind Slow Progress of India in achieving the required Target

- Between 2014-17, China's addition to its renewable energy was six times more than what India did. This is because India has not been able to utilize the advantage of decreasing cost of electricity production due to technological advancement in this field.
- The main reasons behind this non-utilization of this advantage of decreasing cost are:
 - ▶ Recent imposition of safeguard duty on imported Solar Photovoltaic cells.
 - ▶ Depreciation of Indian rupee increases the import bill of India
 - ▶ Lack of investment in research and development in India has not led to any significant domestic production
 - ▶ Coal still features among the top 5 imports of India. Moreover, top ten lenders to coal power plants are public sector banks. This leads to the crowding out of the Renewable Energy Industry.

India's Nationally Determine Contributions for Climate Change

- To reduce the emissions intensity of its GDP by **33 to 35 per cent by 2030 from 2005 level.**
- To achieve about **40 per cent** cumulative electric power installed capacity from **non-fossil fuel based energy resources by 2030**, with the help of transfer of technology and low cost international finance, including from Green Climate Fund.
- To create an additional carbon sink of **2.5 to 3 billion tonnes** of CO₂ equivalent through additional **forest and tree cover by 2030.**
- As a result, a target of installing **175 GW** of renewable energy capacity by the year **2022** has been set by the government. It includes **100 GW from solar, 60 GW from wind, 10 GW from bio-power and 5 GW from small hydro-power.**

8 Tesla-style giga factories

Context: India is planning to build at least four Tesla-style giga factories to manufacture batteries with an investment of around \$4 billion to switch to electric vehicles to curb pollution and reduce the dependence on foreign oil.

More on News:

- According to **NITI Aayog**, India will need 6 such gigawatt-scale facilities (of 10 GWh each) by 2025 and 12 by 2030 but it does not include the export market potential. Hence, the base scenario envisions 11 factories by 2025 and 24 by 2030.
- On the demand creation side, the plan involves providing tax credits at the retail level and state-level grants to promote usage of electric vehicles.
- Union budget of 2019-20 also announced tax breaks for setting up mega-manufacturing plants for solar photovoltaic cells, lithium storage batteries and solar electric charging infrastructure.

India's Renewable Energy

- It is the world's third-largest oil consumer. Hence, its imports are more than 80% of its oil requirements and around 18% of its natural gas.
- Currently, there are no indigenous battery manufacturers in India. Almost all of the electric lithium-ion batteries are imported from China.
- The upcoming four Tesla-inspired Gigafactories in India seek to address that problem.

9 Zero Budget Natural Farming (ZBNF)

Context: In the recent Union Budget of 2019, ZBNF model has been emphasised, which can help in doubling farmers' income. Andhra Pradesh and Himachal Pradesh have been shifted towards this model.

What is ZBNF?

- It is a method of **chemical-free agriculture** drawing from traditional Indian practices.
- Using cowdung, urine based formulations and botanical extracts would help farmers in reducing the input cost.
- Intercropping with leguminous crops** is one of the components of ZBNF and it improves the crop productivity and soil fertility by way of fixing the atmospheric nitrogen.
- It promotes soil aeration, minimal watering, intercropping, bunds and topsoil mulching and discourages intensive irrigation and deep ploughing.

Role of Indian States

- ZBNF was adopted by Karnataka as a movement by **Karnataka RajyaRaithaSangha**.
- Andhra Pradesh became India's first State to practise 100% natural farming by 2024.

Budget Allocation

- Norms to promote organic farming and soil health:** Government has revised the norms for the **Rashtriya Krishi Vikas Yojana** and the **Paramparagat Krishi Vikas Yojana**, which has an allocation of ₹3,745 crore and ₹325 crore respectively this year.
- Role of state:** Centre allow States to use their funds to promote the ZBNF, vedic farming, natural farming, cow farming and a host of other traditional methods.

- It was developed by **Subhash Palekar** from Maharashtra in the mid-1990s as an alternative to the Green Revolution's methods, which led to indebtedness and suicide among farmers due to rising cost on external inputs in agriculture.

Components of ZBNF

- **Jeevamrutha**: It is a fermented **microbial culture** that uses urine and dung from an indigenous cow breed and paste of green gram to rejuvenate the soil to **provide micro-nutrients to crops**.
- **Bijamrita**: It is a treatment used for seeds, seedlings or any planting material.
- **Acchadana**: It promotes mulching and soil aeration for favourable soil conditions.
- **Whapasa**: It provides moisture to the soil.

10 Ethanol blending

Context: Government has hiked ethanol procurement price for blending with petrol, allowed conversion of old sugar into ethanol.

More on News:

- The government has approved an **increase in the price of ethanol to be procured by public sector oil marketing companies (OMCs) from sugar mills** for blending with petrol for the 2019-20 supply year from December 1.
- Cabinet Committee on Economic Affairs (CCEA) has also allowed conversion of old sugar into ethanol, which again is expected to help mills deal with the current overproduction in the sweetener and make timely payments to farmers for the cane delivered by them.
- It has thus allowed mills to produce ethanol **from heavy molasses and directly from sugarcane juice**.
- The CCEA approved even use of sugar and sugar syrup for production of ethanol; mills can simply add these to the molasses mother liquor for further fermentation.

Ethanol Blended with Petrol (EBP) programme:

- It was launched by the government in 2003 to promote the use of alternative and environmental friendly fuels.
- This intervention also aimed to reduce import dependency for energy requirements, and give boost to the agriculture sector (supply of straw, additional income to farmers).
- Oil marketing companies (OMCs) were mandated to sell ethanol blended petrol with percentage of ethanol up to 10 per cent. The government allowed procurement of ethanol produced from non-food feed stocks, like cellulosic and ligno-cellulosic materials, including petrochemical route.

National Policy on Biofuels 2018:

- The Policy categorizes biofuels as "Basic Biofuels" viz. First Generation (1G) bioethanol & biodiesel and "Advanced Biofuels" - Second Generation (2G) ethanol, Municipal Solid Waste (MSW) to drop-in fuels, Third Generation (3G) biofuels, bio-CNG etc. to enable extension of appropriate financial and fiscal incentives under each category.
- The Policy expands the scope of raw material for ethanol production by allowing use of Sugarcane Juice, Sugar containing materials like Sugar Beet, Sweet Sorghum, Starch containing materials like Corn, Cassava, Damaged food grains like wheat, broken rice, Rotten Potatoes, unfit for human consumption for ethanol production.
- The Policy allows use of surplus food grains for production of ethanol for blending with petrol with the approval of National Biofuel Coordination Committee.

- With a thrust on Advanced Biofuels, the Policy indicates a viability gap funding scheme for 2G ethanol Bio refineries of Rs.5000 crore in 6 years in addition to additional tax incentives, higher purchase price as compared to 1G biofuels.
- The Policy encourages setting up of supply chain mechanisms for biodiesel production from non-edible oilseeds, Used Cooking Oil, short gestation crops.

11 Wastelands Atlas - 2019

Context: The Union Minister for Rural Development, Agriculture and Farmers Welfare & Panchayati Raj has recently released the Wastelands Atlas – 2019.

Findings of Wastelands Atlas - 2019:

- The changes in wastelands between 2008-09 and 2015-16 have been presented in this Atlas. The effort has resulted in estimating the spatial extent of wastelands for entire country to the tune of 55.76 Mha (16.96 % of geographical area of the Country) for the year 2015-16 as compared to 56.60 Mha (17.21%) in the year 2008-09.
- During this period 1.45 Mha of wastelands are converted into non wastelands categories. There is a net conversion of 0.84 Mha (0.26%) of different wasteland categories in the country during 2008-09 to 2015-16.
- **A reduction in wasteland area was observed in the categories of land with dense scrub, waterlogged and marshy land, sandy areas, degraded pastures (grazing land) and gullied and ravinous land.**
- It provides district and state wise distribution of different categories of wastelands area including mapping of about 12.08 Mha hitherto unmapped area of Jammu & Kashmir.
- The wastelands have undergone positive change in the states of Rajasthan (0.48 Mha), Bihar (0.11 Mha), Uttar Pradesh (0.10 Mha), Andhra Pradesh (0.08 Mha), Mizoram (0.057 Mha), Madhya Pradesh (0.039 Mha), Jammu & Kashmir (0.038 Mha) and West Bengal (0.032 Mha).
- Majority of wastelands have been changed into categories of 'croplands' (0.64 Mha), 'forest-dense / open' (0.28 Mha), 'forest plantation' (0.029 Mha), 'plantation' (0.057 Mha) and 'industrial area' (0.035 Mha).

Wasteland Atlas:

- The wasteland mapping exercise is carried out by **National Remote Sensing Centre (NRSC), Department of Space using the Indian Remote Sensing Satellite (IRSS) data.**
- The atlas is then jointly published by The Department of Land Resources (Ministry of Rural Development) and National Remote Sensing Centre.
- The Wastelands Atlas – 2019 is the fifth edition of all atlases. The previous editions released were in 2000, 2005, 2010 and 2011.

12 Biorock or mineral accretion Technology

Context: The Zoological Survey of India (ZSI), with help from Gujarat's forest department, is attempting for the first time a process to restore coral reefs using biorock or mineral accretion technology.

Mineral Accretion Technology

- It is a coral reef restoration technology that utilizes low voltage electricity to improve the health and growth rates of corals and other marine organisms.

Locating the Biorock:

- Biorock is the name given to the substance formed by electro accumulation of minerals dissolved in seawater on steel structures that are lowered onto the sea bed and are connected to a power source, in this case solar panels that float on the surface.
- A biorock structure has been installed one nautical mile off the Mithapur coast in the Gulf of Kachchh.
- The location for installing the biorock had been chosen keeping in mind the high tidal amplitude in the Gulf of Kachchh.
- The low tide depth where the biorock has been installed is four metres, and at high tide it is about eight metres.

- The technology works by passing a small amount of electrical current through electrodes in the water.
- When a positively charged anode and negatively charged cathode are placed on the sea floor, with an electric current flowing between them, calcium ions combine with carbonate ions and adhere to the structure (cathode). This results in calcium carbonate formation. Coral larvae adhere to the CaCO₃ and grow quickly.
- Fragments of broken corals are tied to the biorock structure, where they are able to grow at least four to six times faster than their actual growth as they need not spend their energy in building their own calcium carbonate skeletons.

13 Kerala bans CFL and Filament Bulbs

Context: Kerala will impose a ban on the sale of compact fluorescent lamps (CFL) and incandescent (filament) bulbs starting November this year as part of sustainable energy policy.

Filament-Free Project:

- The announcement is in line with the government project of 'Filament-free Kerala' envisaged in 2018 as part of the state's Urja Kerala mission.
- Filament Free Kerala project is for replacing the entire Incandescent Lamps & CFLs of domestic consumers in the state by energy-efficient LED bulbs.
- The project is implemented by the Kerala State Electricity Board Ltd. and Energy Management Centre, Kerala.
- In 2018, Kerala has launched '**Urja Kerala Mission**', an aggressive Energy generation and Conservation program - aimed at the integrated development of the electricity sector in the state. It aims at implementing FIVE important projects-Soura, Filament free Kerala, Dyuthi 2021, Transgrid 2.0 and e-safe.

14 Miyawaki Method of Afforestation

Context: The Miyawaki method of afforestation is to come up on the government office premises, residential complexes, school premises, and puramboke land in Kerala.

More on News:

- The Miyawaki method, developed by a Japanese botanist after whom it is named, involves planting saplings in small areas, causing them to "fight" for resources and grow nearly 10 times quicker.

- It originated in Japan, and is now increasingly adopted in other parts of the world, including our Chennai.
- **It has revolutionised the concept of urban afforestation by turning backyards into mini-forests.**

DISASTER MANAGEMENT

1 International Dam Safety Conference

Context: Central Water Commission in collaboration with Odisha Water Resources Department and World Bank has organized the International Dam Safety Conference in Bhubaneswar, Odisha.

More on News:

- International Commission on Large Dams (ICOLD) and National Committees on Large Dams were among the organizing partners for this conference.
- Dam Safety Conferences are being organized as an annual event in different Dam Rehabilitation and Improvement Programme (DRIP) States in collaboration with the Implementing Agencies and leading academic institutes to provide a common platform for all stakeholders including non-DRIP States.
- Conference aims on deliberate all aspects related to dam safety and the solutions that worked best in addressing dam safety concerns.

Dam Rehabilitation and Improvement Programme (DRIP)

- In 2012, Ministry of Water Resources, River Development & Ganga Rejuvenation embarked upon the six year DRIP with World Bank assistance.
- The project originally envisaged the rehabilitation and improvement of 223 dam projects in four states namely, **Kerala, Madhya Pradesh, Odisha, and Tamil Nadu.**
- Later Karnataka, Uttarakhand (UJVNL) and Damodar Valley Corporation (DVC) joined the DRIP and presently 198 dam projects are being rehabilitated.
- In addition to rehabilitation of dams, other important activities include activities such as development of Dam Health And Rehabilitation Monitoring Application (DHARMA) etc.
- It also developed Seismic Hazard Mapping along with development of Seismic Hazard Assessment Information System (SHAISYS).
- Under DRIP, capacity building in dam safety area of eleven academic institutions is being done.
- Also, capacity building of two Central Agencies i.e. **Central Soil and Material Research Station (CSMRS) as well as Central Water and Power Research Station (CWPRS)**, is also one of the activities.

2 Flood Management and Border Areas Programme (FMBAP)

Context: Cabinet approves “FMBAP” for Flood Management Works in entire country and River Management Activities and works related to Border Areas during 2017-18 to 2019-20.

More on News:

- The Scheme “FMBAP” has been framed by merging the components of two continuing XII Plan schemes titled “Flood Management Programme (FMP)” and “River Management Activities and Works related to Border Areas (RMBA)”.
- The aim of the Scheme is to assist the State Governments to provide reasonable degree of protection against floods in critical areas by adopting optimum combination of structural and non-structural measures and enhancing capabilities of State/Central Government officials in related fields.
- The works under the scheme will protect valuable land from erosion and flooding and help in maintaining peace along the border.
- The Scheme aims at completion of the on-going projects already approved under FMP. Further, the scheme also caters to Hydro-meteorological observations and Flood Forecasting on common rivers with the neighbouring countries.
- The Scheme also includes survey and investigations, preparation of DPR etc. of water resources projects on the common rivers with neighbouring countries like Pancheshwar Multipurpose Project, Saptakosi-Sun Kosi Projects in Nepal which would benefit both countries.
- The funding pattern for FM Component for works in general category States will continue to be 50% (Centre) : 50% (State) and for projects of North Eastern States, Sikkim, J&K, Himachal Pradesh and Uttarakhand, the funding pattern will continue to be 70% (Centre) : 30% (State).

3 International Workshop on Disaster Resilient Infrastructure

Context: International Workshop on Disaster Resilient Infrastructure is being organised by the National Disaster Management Authority (NDMA) in collaboration with United Nations Office for Disaster Risk Reduction (UNISDR), and in partnership with the Global Commission on Adaptation, United Nations Development Programme and the World Bank.

More on News:

- The workshop will bring together countries from different parts of the world, multilateral development banks, UN agencies, academia and research institutions, the private sector, academics and policy think tanks to discuss and collaborate on promoting policies and practices towards achieving disaster resilience of large infrastructure systems (transport, telecom, energy, water). This will also be a great opportunity to learn from the unique experiences of different countries.
- Various international agreements have also reiterated the importance and long-term benefits of investing in resilient infrastructure.
- The first International Workshop on Disaster Resilient Infrastructure (IWDR I 2018) was held in January 2018.

Disaster resilience in risk-prone Asia needs realistic policy and financial planning

Context: As per new Asian Development Bank (ADB) report four in five people affected by natural disasters are in Asia, putting the region's prosperity at risk.

More on News:

- The report is published under ADB's flagship **Asian Development Outlook (ADO) 2019**. It released ahead of the biennial global platform for Disaster Risk Reduction (DRR).
- Over the past three decades, natural disasters have affected over 10 million people throughout the Central Asian region and caused economic losses of almost \$2.5 billion. In this backdrop, experts from the Central Asian countries also agreed on increasing financial protection against natural disasters at a regional forum on Disaster Risk Financing held at Almaty in February 2019.

Key Findings:

- With nearly 38,000 disaster fatalities per year between 2000 and 2018, the region accounted for 55 per cent of the 60,000 disaster fatalities across the world.
- The region also accounted for 26 per cent of the \$128 billion in economic damage due to natural disasters.
- In Asia, 82 per cent of the disasters ensued from extreme weather events such as floods, storms and droughts.
- **It has been recognised that the poor suffer the maximum brunt of natural catastrophes.**
- A survey conducted across five Asian countries found that, among the rural households surveyed, 90 per cent suffered either loss of life or significant damage to assets from floods in the past decade, and their financial recovery took more than three times longer compared to urban households.
- The ADB report highlights case studies from Indian cities like Mumbai, Chennai and Puri, which show that in the absence of social protection; disaster-hit families deplete their savings or borrow at high interest rates from informal sources, pushing them into indebtedness and poverty traps.
- Asia is projected to need \$26 trillion in infrastructure investment between 2016 and 2030, or \$1.7 trillion per year. The report calls upon the international agencies for more financial support.
- At present, international agencies provide seven times more assistance to the developing countries to respond to disasters after they occur, than fund preparation programmes beforehand.
- Even though many countries in the region are adapting the **Sendai Framework for Disaster Risk Reduction 2015-2030**, the increasingly high losses from such disasters need effective actions too.
- It also urges governments in the region to work on realistic policy and budget planning.
- It suggests that Asian nations integrate disaster risk reduction into national development and investment plans, and spend more on prevention.

The Sendai Framework for Disaster Risk Reduction (SFDRR), 2015-2030

- It is the first major agreement of the post-2015 development agenda, identifies investing in Disaster Risk Reduction (DRR) for resilience and to build back better in reconstruction as priorities for action towards reducing disaster risk.
- It was endorsed by the UN General Assembly following the 2015 third UN World Conference on Disaster Risk Reduction (WCDRR).
- It is a 15-year, voluntary, non-binding agreement.
- **Goal 9 of the Sustainable Development Goals (SDGs)** recognizes disaster resilient infrastructure as a crucial driver of economic growth and development.

- According to the report, although climate change is spurring more natural hazards and rapid urbanisation is increasing exposure to such hazards, only around 8 per cent of Asia's catastrophe losses since 1980 have been covered by insurance.

5 National Disaster Response Force

Context:

- Arunachal Pradesh got its first permanent battalion of National Disaster Response Force as headquarters of its 12th battalion has been inaugurated at Hollongi.
- The battalion will serve the needs of both Arunachal Pradesh and state of Assam in times of natural calamity and human made disasters.

What is National Disaster Response Force?

- It is a force of 12 battalions with 1149 persons each dedicated for rescuing and protecting human lives and property during the natural as well as human made disasters.
- Out of 12 battalions, three each from the BSF and CRPF and two each from CISF, ITBP and SSB. Each battalion have 18 self-contained specialist search and rescue teams of 45 personnel each including engineers, technicians, electricians, dog squads and medical/ paramedics.
- All battalions have been equipped and trained to respond natural and man-made disasters including chemical, biological, radiological and nuclear (CBRN) emergencies.
- It works under the Ministry of Home Affairs.**

Yokohama Strategy and Plan of Action for a Safer World

- Guidelines for natural disaster prevention, preparedness and mitigation. This document is the output of the World Conference on Natural Disaster Reduction, held in Yokohama, Japan in May 1994.

Hyogo Framework for Action (2005-2015)

- It was a 10-year plan to make the world safer from natural hazards.

Sendai Framework (2015-30)

- It is the successor instrument to the Hyogo Framework.

How has NDRF come into being?

- The Disaster Management Act, 2005 has statutory provisions for constitution of National Disaster Response Force (NDRF) for the purpose of specialized response to natural and man-made disasters.
- Accordingly, in 2006 NDRF was constituted with 8 Battalions. In the beginning, the personnel of NDRF were deployed for routine law and order duties also.
- In 2007, the need of NDRF being made a dedicated force was highlighted and accepted.
- This led to the notification of NDRF Rules on February 14th, 2008, making NDRF a dedicated force for disaster response related duties, under the unified command of DG NDRF.

6 Cyclone Bulbul

Context: Bulbul damages crops, houses, electricity and water connections in Odisha and West Bengal.

More on News:

- Very Severe Cyclonic Storm Bulbul is an active tropical cyclone which struck the Indian state of West Bengal.
- At Category 2 hurricane-equivalent intensity and is currently a flood and storm surge threat to Bangladesh.
- Originating from the remnants of Severe Tropical Storm Matmo over the southern Bay of Bengal.
- It is only the fourth tropical cyclone ever recorded to regenerate over the Andaman Sea, having crossed Southeast Asia overland.
- The cyclone has been named by Pakistan.

The conditions for the formation of Tropical cyclones

- The temperature of the surface layer of ocean water must be 26.5 °C or warmer, and this warm layer must be at least 50 metres deep.
- A pre-existing atmospheric circulation must be located near the surface warm layer.
- The atmosphere must cool quickly enough with height to support the formation of deep convective clouds.
- The middle atmosphere must be relatively humid at a height of about 5,000 metres above the surface.
- The developing system must be at least 500 km away from the Equator.

7**1st International Conference on “Landslides Risk Reduction and Resilience-2019”**

Context: The Union Minister of State for Home Affairs inaugurated the 1st International Conference on “Landslides Risk Reduction and Resilience” in Delhi. The conference has been organised by the National Institute of Disaster Management.

More on News:

- The conference has been organised by the **National Institute of Disaster Management**.
- Aim of the Conference is to explore and debate the most recent advances in landslide risk reduction and resilience.
- Continent-wise, **Asia suffers the maximum damages / losses due to landslides** and among the Asian countries, South Asian nations are the worst sufferers and even among South Asian countries India is one of the worse affected by landslides.
- As landslides are frequent and widespread, the annual cumulative losses worldwide amount to tens of billions of USD in terms of lost property, environmental damage, repair works, and the maintenance of defence measures.
- As per Geological Survey of India, the window of economic loss due to landslides may reach between 1-2% of the gross national product in many developing countries.
- **Special Focus is given to:**
 - ▶ Governance and administrative issues and support for LRR&R
 - ▶ Tools, techniques and technologies for LRR&R
 - ▶ Impact of climatic change, development, urbanization, and population growth for LRR&R

8**Proposal to amend the Disaster Management Act of 2005**

Context: The Union Cabinet is taking up the proposal to amend the Disaster Management Act of 2005.

A brief about Disaster Management Act, 2005

- It was enacted to effectively prevent, mitigate (reducing the severity) and prepare for disasters.
- It came into being on the heels of three major disasters.
 - ▶ 1999 - Super cyclone in Odisha
 - ▶ 2001 - Bhuj earthquake
 - ▶ 2004 - Indian Ocean tsunami.
- The Act mandated the creation of the National Disaster Management Authority, State Disaster Management Authorities and District Disaster Management Authorities.
- It laid down the framework, roles and responsibilities of these bodies to formulate and implement disaster management plans at their levels.
- **The present Act largely focuses on:**
 - Improving preparedness
 - Providing immediate relief
 - ▶ Protecting infrastructure

The main drawback of the present policy is it neglects long-term recovery.

MISCELLANEOUS

1 Wetland Day

Context: The World Wetlands Day was celebrated on February 2, in Alappuzha, home to the country's largest wetland system, the Vembanad Lake.

Theme:

- **For 2018:** Wetlands for Sustainable Urban Future.
- **For 2019:** Wetlands and Climate Change

Why celebrated on 2nd February?

- **The day marks the date of the adoption of the Convention on Wetlands in, 1971, in the Iranian city of Ramsar.**
- It commemorates the need to maintain wetlands and to plan for their sustainable use. It has been chosen to initiate action against the drainage of wetlands.

Some Facts

- **State with largest Ramsar sites** --- Jammu and Kashmir (4 in number)
- **States having three Ramsar Sites** ---- Himachal, Punjab and Kerala
- **States with at least two Ramsar sites** ---- West Bengal, Rajasthan, Odisha

2 Anthropocene recognised as an epoch

Context: The pervasive and persistent signatures of modern human activity on the earth have been so striking that officially, it is being recognised and named as a new geologic epoch (Anthropocene).

More on News:

Recently, the Anthropocene Working Group (AWG) overwhelmingly voted to recognise Anthropocene as an epoch. The vote gives form to the efforts of scientists, notably the **Nobel Laureate Paul Crutzen and Eugene F. Stoermer, who coined the term in 2000** to highlight how human activity had changed many facets of the earth.

Marker for this new epoch:

- Anthropocene Working group voted to look for unique signatures around the 1950s to define the start of the Anthropocene.

Geological epoch:

- In geochronology, an epoch is a subdivision of the geologic timescale that is longer than an age but shorter than a period. The current epoch is the Holocene Epoch of the Quaternary Period.

- To be chosen as a **geologic marker**, the golden spike must be present globally across most environments and must be a part of deposits for a geologically significant length of time.
- A decrease in deuterium excess, a proxy for climate change, owing to the reorganisation of North Atlantic Ocean-atmosphere circulation was a definitive geologic marker (or golden spike) to signify the base of Holocene.
- Now, radionuclides from atomic bomb tests from the early 1950s are emerging as a favourite golden spike candidate to define the base of the Anthropocene.

Cenozoic (current era)

- **Quaternary (current period)**
 - ▶ Holocene
 - ▶ Pleistocene
- **Neogene**
 - ▶ Pliocene
 - ▶ Miocene
- **Paleogene**
 - ▶ Oligocene
 - ▶ Eocene
 - ▶ Paleocene

3 World Environment Day

Context:

- World Environment Day was celebrated on 5th June and a new song **Hawa Aane De** was released by the Ministry of Environment, Forest and Climate Change for this day.
- Since it began in 1974, it has grown to become a global platform for public outreach that is widely celebrated in more than 100 countries.

World Environment Day, 2019

- The theme for this year, set by the **United Nations Environment Programme**, is **Air Pollution, a much-needed theme for awareness and action in India.**

About the Song:

- The song is a call to action for all to come together to combat the environmental challenges of our time, urging each one of us to explore green technologies and measures to improve the quality of air and make the country and our cities less polluted.
- The **Bhamla Foundation**, an NGO working across many themes including health, child rehabilitation, woman empowerment & environment awareness, has collaborated with the Ministry on the song.
- The theme song is written by Shri SwanandKirkire and sung by Shri Shantanu Mukherjee, Kapil Sharma, Sunidhi Chauhan and Shankar Mahadevan.

4 World Biofuel Day

Context: In a bid to encourage the biofuel sector, Petroleum and Natural Gas Minister announced that the state-run oil marketing companies would procure the entire supply of biodiesel produced from used cooking oil for a three-year period.

More on News:

- Recently, Food Safety and Standards Authority of India (FSSAI) directed that Food Business Operators (FBOs), whose consumption of edible oils for frying is **more than 50 litres per day** shall stop reusing the oil **more than three times.**

- Rather this used cooking oil should be used by the Oil Manufacturing Companies (OMCs) to produce Biodiesel.
- As per the order, the staterun oil marketing companies would **procure the entire supply of biodiesel** produced from used cooking oil for a threeyear period.
- The scheme is applicable in 100 cities across the country.

World Biofuel Day

- It is observed every year on **10th August** to create awareness about the importance of non-fossil fuels as an alternative to conventional fossil fuels and highlight the various efforts made by Government in the biofuel sector.
- This year the theme of the World Biofuel Day is **“Production of Biodiesel from Used Cooking Oil (UCO)”**.
- The **National Policy on Biofuels - 2018** envisages a target of **5% blending of Biodiesel** in High Speed Diesel(HSD) by **2030**.

Repurpose Used Cooking Oil (RUCO)

- During frying, several properties of oil are altered, **Total Polar Compounds(TPC)** are formed on repeated frying. The toxicity of these compounds is associated with several diseases such as hypertension, atherosclerosis, Alzheimer’s disease, liver diseases.
- In order to safeguard consumer health, FSSAI has fixed a limit for **Total Polar Compounds at 25 percent** beyond which the vegetable oil shall not be used.
- Repurpose Used Cooking Oil (RUCO) is an ecosystem that will enable the collection and conversion of UCO to biodiesel.

5 State Butterfly

Context: Tamil Nadu becomes fifth Indian state to declare a State Butterfly.

More in News:

- Tamil Nadu has recently declared **Tamil Yeoman (Cirrochroathais)** as its state butterfly.
- Locally known as Tamil Maravan meaning ‘Tamilian Warrior’, the canopy butterfly, belongs to the family of brush-footed butterflies or the Nymphalid.
- This is the latest addition to Tamil Nadu’s existing symbols from the natural world – palmyra as the state tree, gloriosa lily as the state flower, emerald dove as the state bird, and jackfruit as the state fruit and Nilgiritahr as the state animal.

This butterfly species is endemic to Western Ghats.

- Tamil Nadu has become the fifth India state after Maharashtra (Blue Mormon), Uttarakhand (Common peacock), Karnataka (Southern birdwings) and Kerala (Malabar banded peacock) to bestow a state emblem status to one of its colorful insects.

6 World Ozone Day

More in News:

- The theme for the **World Ozone Day 2019: 32 Years and Healing**
- The theme for this year celebrates over three decades of remarkable international cooperation to protect the ozone layer and the climate under the Montreal Protocol.

- The Montreal Protocol has led to the phase-out of 99 per cent of ozone-depleting chemicals in refrigerators, air-conditioners and many other products.
- The latest Scientific Assessment of Ozone Depletion shows that, parts of the ozone layer have recovered at a rate of 1-3% per decade since 2000.
- At projected rates, Northern Hemisphere and mid-latitude ozone will heal completely by the 2030s.

7 The Silver Ants- World's Fastest Ants

- Saharan silver ant has joined the list of world record-breaking animals, as researchers from the University of Ulm in Germany have found it is able to run at speeds of 855mm/s, 108 times its own body length per second.
- The high speed help the Saharan antsto survive across the hot desert.

8 The World Soil Day (WSD)

Context: The World Soil Day (WSD) was observed across the world on December 5, 2019.

More in News:

The day is observed annually to highlight the importance of healthy soil and advocate for the sustainable management of soil resources. The theme for WSD 2019 was '**Stop Soil Erosion, Save Our Future**'.

Highlights about the World Soil Day:

- World Soil Day award is distributed to honour the contributions made by people. That is, **FAO gives two awards in line with this day-**
 - ▶ **The King Bhumibol World Soil Day Award-** an annual award that honours individuals, communities, organizations and countries that organized remarkable and engaging World Soil Day activities or campaigns in the previous year.
 - ▶ **The Glinka World Soil Prize-** An annual award for dynamic change-makers dedicated to solving one of our world's most pressing environmental issue: soil degradation.

9 World's oldest rhino' dies in Tanzania

- A rhino believed to the world's oldest has died at the age of 57 in a Tanzanian conservation area.
- Fausta, a female black rhino, died of natural causes in captivity in the Ngorongoro Crater.
- Records show that Fausta lived [longer] than any rhino in the world and survived in the Ngorongoro, free-ranging, for more than 54 years before it was kept in a sanctuary for the last three years of its life in 2016.
- Fausta was first located in 1965 when she was between three and four years old. Her health deteriorated after hyenas attacked her in 2016. She was subsequently taken into refuge.

10 Asia Pacific Drosophila Research Conference

Context: Pune is set to host the fifth edition of the Asia Pacific Drosophila Research Conference (APDRC5), which is being organised in the country for the first time by the Indian Institute of Science Education and Research (IISER).

Asia Pacific Drosophila Research Conferences

- They are biennial events that aim to promote the interaction of Drosophila Researchers in the Asia-Pacific region with their peers in the rest of the world.
- The conference includes sessions, like Gametogenesis & Stem Cells, Pattern Formation, Morphogenesis & Mechanobiology, Hormones & Physiology, Cellular Neurobiology, Behavioural Neurobiology, Infection & Immunity, and Ecology & Evolution.
- The last four editions of this conference took place in **Taipei, Seoul, Beijing** and **Osaka**.

What is Drosophila?

- The fruit fly (*Drosophila melanogaster*) is the most extensively used and one of the most well understood of all the model organisms.
- A model organism is a species that has been widely studied, usually because it is easy to maintain and breed in a laboratory setting and has particular experimental advantages.
- Drosophila is ideal for the study of genetics and development.
- Its genome is entirely sequenced and there is enormous information available about its biochemistry, physiology and behaviour.
- The complete genome sequence of the Drosophila was published in 2000.

The Indian Institute of Science Education and Research, Pune:

- It is a premier institute dedicated to research and teaching in the basic sciences.
- It was established in 2006 by the Ministry of Human Resource Development. In 2012, it was declared as an Institute of National Importance by an Act of Parliament.
- It was ranked 601-800 in 2019 Times Higher Education (THE) World University Rankings
- It was ranked 109 in the 2019 THE Emerging Economies University Rankings
- It was ranked 401-500 in the Physical Sciences subject category in 2019 THE World University Rankings

It was ranked 101-150 in the 2019 THE Young University Rankings

11 Locust Attacks

Context: Recently, locust attacks emanating from the desert area in Pakistan have struck parts of Rajasthan and Gujarat, causing heavy damage to standing crop.

More on News:

- **Crop damage:** Estimates say crops were affected in more than 3.5 lakh hectares in districts of Rajasthan and Gujarat.

Locust Facts

- **From grasshopper family:** Locusts are a group of **short-horned grasshoppers**. The word "locust" is derived from the Vulgar Latin *locusta*, meaning grasshopper.

- ▶ Crops of **mustard, cumin and wheat** have been most damaged.
 - ▶ Farmers whose crop was damaged would be **entitled to compensation**.
 - India has a locust control and research scheme that is being implemented through the **Locust Warning Organisation (LWO)**, established in 1939 and amalgamated in 1946 with the Directorate of Plant Protection Quarantine and Storage (PPQS) of the Ministry of Agriculture.
 - ▶ LWO's responsibility is monitoring and control of the locust situation in Scheduled Desert Areas, mainly in Rajasthan and Gujarat, and partly in Punjab and Haryana.
 - **Food and Agriculture Organisation (FAO)** monitors and manages locust invasions.
 - ▶ All locust-affected countries transmit data about attacks to the FAO.
 - ▶ FAO also provides forecasts for locust attacks up to six weeks in advance and issues warnings for each country.
- **High breeding:** Under suitable conditions of drought followed by rapid vegetation growth, serotonin in their brains triggers a dramatic set of changes and they start to breed abundantly.
 - **Origin:** The swarms usually originate in the **Arabian Peninsula and the Horn of Africa**.
 - **Indian locusts:** Only four species of locusts are found in India.
 - ▶ Desert locust (*Schistocerca gregaria*)
 - ▶ Migratory locust (*Locusta migratoria*)
 - ▶ Bombay Locust (*Nomadacris succincta*)
 - ▶ Tree locust (*Anacridium* sp.).
 - **Risk:** India is most at risk of a swarm invasion just before the **onset of the monsoon**.
 - **Locust control:** To control locust swarms, a chemical called **organophosphate** is sprayed in small, concentrated doses.

Demand For Declaring Eastern Ghats As UNESCO Cultural Heritage Site

The Greens' Alliance for Conservation of Eastern Ghats (GRACE) and the Council for Green Revolution (CGR) have demanded that all the historically and culturally significant mountains of the Eastern Ghats should be declared UNESCO cultural heritage sites.

- These groups in their report titled '**Eastern Ghats - Environment Outlook**' have also declared that five States encompassing Eastern Ghats viz. Tamil Nadu, Andhra Pradesh, Telangana, Karnataka and Odisha should prepare an action plan to protect and conserve their ecology and natural resources.
- The report said the degradation of the Eastern Ghats, had accelerated since the 1970s and the ecosystem of the hills had lost their natural species composition, forest structure, size, scale and character.
- According to the report, the situation was grave due to the threats and challenges to floral and faunal elements and the bio-geographic significance of the Eastern Ghats was declining fast.
- They have also demanded that the Central government form a **Regional Coordination Committee of States on Eastern Ghats** with a mandate for linking and coordinating activities relating to the Ghats, and have sought the appointment of a Nature Ombudsman for the Eastern Ghats and the publication of an Environmental Atlas of the Eastern Ghats, incorporating various ecological, social, cultural and heritage information, among others.
- Land of Eastern Ghats have become sites for clandestine dumping of toxic waste, illegal mining, poaching and hunting, including human trafficking.

13 'Green wall' of India

Context: The Centre is mulling an ambitious plan to create a Green Wall on NorthWestern part of India.

More on News:

- It will be a 1,400km long and 5km wide **green belt from Gujarat to the Delhi Haryana border**, on the lines of the "**Great Green Wall**" running through the width of Africa, from Dakar (Senegal) to Djibouti, to combat climate change and desertification.
- If approved, this may turn out to be a legacy programme in India's efforts to deal with land degradation and the eastward march of the Thar desert.
- India seeks replicate the idea as a national priority under its goal to restore 26 million hectares of degraded land by 2030.
- The green belt may not be contiguous, but would roughly cover the entire degraded Aravali range through a massive afforestation exercise.

14 World's largest cave fish discovered in Meghalaya

- World's largest species of cave fish has been discovered in Meghalaya's **Jaintia Hills**.
- The **cave fish is around one and a half feet in length and has no eyes and is white due to a lack of melanin pigmentation**.
