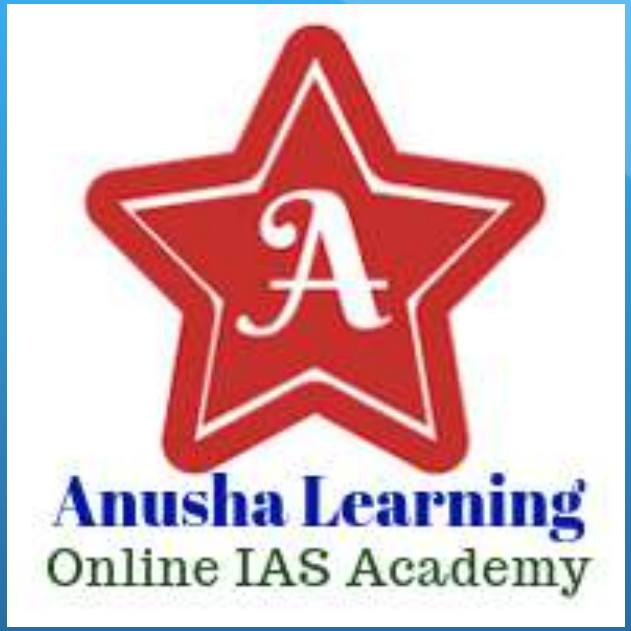


COMPLETE ENVIRONMENT QUESTION & ANSWER SET

What are GM Crops?

- Genetically modified crops (GM Crops) are plants used in agriculture, the DNA of which has been modified using genetic engineering methods

What is the advantage of GM Crops?

- In most cases, the aim is to introduce a new trait to the plant which does not occur naturally in the species.

Give examples of GM Crops in India.

- GM Soybean GM Maize GM Cotton

What is Biotechnology?

- Biotechnology deals with techniques of using live organisms or enzymes from organisms to produce products and processes useful to human.

Give some examples of Biotechnology.

- In vitro fertilization leading to a 'test-tube' baby, synthesizing a gene and using it, developing a DNA vaccine or correcting a defective gene are all part of biotechnology

What is Genetic Engineering?

- Genetic engineering are techniques to alter the chemistry of genetic material (DNA RNA) to introduce these in to host organisms and thus change the phenotype of the host organism.

What is Phenotype?

- Phenotype is all the observable characteristics of an organism that result from the interaction of its genotype (total genetic inheritance) with the environment. Examples of observable characteristics include behaviour, biochemical properties, colour, shape, and size.

What are Phenotype of a person?

- A **phenotype** is an individual's observable traits, such as **height**, eye color, and blood type.

What is Genotype? How it is different from Phenotype?

- A **genotype** refers to the genetic characteristics of an organism. An organism's **genotype** is the set of genes that it carries.
- A **phenotype** refers to the physical characteristics. For example, having blue eyes (an autosomal recessive trait) is a **phenotype**; lacking the gene for brown eyes is a **genotype**.

Do Green Plants make their own food?

- Green plants make their own food.
- Green plants have chlorophyll in the leaves where they make their own food in the presence of sunlight.
- Animals (including humans) cannot synthesize food and they feed on either plants or other animals. In all cases the food for animals comes directly or indirectly from plants.

What is manure?

- Manures are organic substance obtained from dead plants and animal wastes.

What is the usage of Potassium bromate and Potassium iodate?

- Potassium Bromate and Potassium Iodate are carcinogenic chemicals.
- They are used in bread making.
- Recently the All India Bread Manufacturers Association decided to stop the use of these chemicals immediately.

What is carbon neutral status?

- **Carbon neutrality**, or having a net zero **carbon** footprint, refers to achieving net zero **carbon** dioxide emissions by balancing **carbon** emissions with **carbon** removal.
- It can be through off setting (balanced out by funding an equivalent amount of **carbon** savings elsewhere in the world.)

  OR

  eliminating **carbon** emissions altogether.

What are carbon sink?

- A **carbon sink** is any reservoir, natural or otherwise, that absorbs more **carbon** than it releases, and thereby lowers the concentration of Carbon dioxide from the atmosphere. Globally, the two most important **carbon sinks** are vegetation(Forests) and the ocean.

What is Carbon Cycle?

- The carbon cycle is the biogeochemical cycle by which carbon is exchanged among five spheres of the Earth, carbon (C) sinks: the biosphere, pedosphere, lithosphere, hydrosphere, and atmosphere

What is Paris Agreement Ratification?

- The Paris Agreement was adopted by 185 nations in December 2015.
- The Paris treaty on Climate Change will come into force when 55 countries contributing to 55 percent of total global emission ratify the agreement.
- India became 62nd country to ratify the agreement These 62 countries including India are responsible for almost 52 percent of Green House Gases (GHG) emission

What is IUCN ? When was it founded? Where is its HQ?

- The International Union for Conservation of Nature is an international Organization working in the field of nature conservation and sustainable use of natural resources.
- Founded: 5 October, 1948
- HQ: Switzerland

What is Hazardous waste?

- **Hazardous waste** is **waste** that has substantial or potential threats to public health or the environment. Characteristic **hazardous wastes** are materials that are known or tested to exhibit one or more of the following **hazardous** traits: Ignitability. Reactivity. Corrosivity.

What are different types of Hazardous waste?

- Types of hazardous waste depending on the specific characteristic:
  - **ignitability**, or something flammable.
  - **corrosivity**, or something that can rust or decompose
  - **reactivity**, or something explosive.
  - toxicity, or something poisonous.

Give common examples of Hazardous material?

- AMERICIUM: The radioactive source in smoke alarms. It is known as carcinogenic.
- LEAD: used in batteries, CRT monitor glass, one 15 inch CRT tube contains 1.5 pounds of lead. Lead exposure impaired cognitive functions; behavioral disturbances; attention deficits; children are more prone

Give common examples of Hazardous material?

- MERCURY: in fluorescent tubes, thermostats, flat screen monitors: sensory impairment, memory loss, muscle weakness
- CADMIUM: Used in nickel-cadmium batteries now banned: sever damage to the lungs and kidney; deficit in cognition and behavior

What are 5R's of waste Management?

- As citizens of a society we have a responsibility to **manage** our **waste** sustainably.
- We should follow the **five R's of waste management**: reduce, reuse, recycle, recover and residual **management**.

Comment on Pygmy Hog ? Is it endangered species?

- The pygmy hog is a critically endangered wild pig.
- It was previously spread across Bangladesh, Bhutan, India and Nepal. But now only found in India.
- The current population is about 150 only
- They are found in Assam, Manas National Park.
- Scientific name Porcula savania
- Pygmy hog is diurnal animal (active during day)
- It is omnivore.

Pygmy hog is consider indicator species, why?

- Pygmy hog is an indicator species. Its presence reflects the health of its primary habitat, the tall, wet grasslands of the region.

What is E-waste?

- Electronic waste is a term for electronic products that have become unwanted, non- working or obsolete, and have essentially reached the end of their useful life.
- Most electronics that are improperly thrown away contain some form of harmful materials such as BERYLLIUM, CADMIUM, MERCURY, LEAD
- CRTs are relatively high concentration of lead and phosphors.

Is sea cow mammal?

- Sea cow is plant eating water mammals living in rivers and bays along the tropical Atlantic Ocean

Is sea horse a mammal?

- No it is NOT
- Sea horse is the name given to small marine fishes in the genus Hippocampus

Do people keep Star Tortoise as pet? Is it legal to keep it as pet?

- The Indian star tortoise is a species of tortoise found in dry areas and scrub forest in India and Sri Lanka. It is quite popular in exotic pet trade. Star tortoise is found in illegal trade.
- It is endangered species.
- The **star tortoise** is Schedule IV species under the Wildlife (Protection) Act, 1972 – that means it's **illegal** to keep them as pets or trade them commercially.

Is sea loin a mammal?

- Yes, Sea lions are sea mammals characterized by external ear flaps, long fore flippers, the ability to walk on all fours, short, thick hair, and a big chest and belly. They eat herring salmon and sardines

What is bagasse?

- Bagasse is the by-product of sugar cane processing. It is the fibrous matter

  Bagasse is used as a biofuel and in the manufacture of pulp and building materials.

  For each 10 tonnes of sugarcane crushed, a sugar factory produces nearly 3 tonnes of wet bagasse

What is a Food Chain?

- A food chain shows how the organisms are related with each other by the food they eat. Each level of a food chain represents a different trophic level.
  A food web is the natural interconnection of food chains.
  Food chain starts from producer organisms such as grass or trees and ending at apex predator or decomposers such as bacteria or fungi.

Which state has the largest forest area?

- Madhya Pradesh has the largest forest cover of 77,522 square kilometer in terms of area in the country followed by Arunachal Pradesh with forest cover of 67,321 square kilometer.

What is shifting cultivation?

- A form of agriculture, in which an area of ground is cleared of vegetation and cultivated for a few years and then abandoned for a new area until its fertility has been naturally restored.

What is Green Urea?

- Green Urea fertilizer contains a new formulation of urease inhibitor.

  This delays the conversion of urea to ammonium by suppressing urease activity.

What is nitrification?

- When Urea is applied to soil it is broken down into Ammonia and Nitrate in the presence of water. This process is called nitrification. This process make nitrogen available to plants.

What is the problem if the Nitrification happens too fast?

- If the process of nitrification is too rapid nitrogen will escape to atmosphere. And there is a concentration of nitrates in the soil. Excess nitrates reaches underground water. Excess nitrate in groundwater when used causes diseases such as blue baby syndrome.

How can we control or reduce the speed of Nitrification?

- Coating urea with Neem inhibits the fast nitrification.
- It is mandatory to produce at least 75% of domestic urea as Neem coated urea only.

What are Biodiversity Hot Spots?

- A biodiversity hotspot is a biogeographic region with significant levels of biodiversity that is threatened with destruction.

What is the criteria to declare a Biodiversity Hot Spot?

- It must contain at least 0.5% or 1500 species of vascular plants as endemics, and it has to have lost at least 70% of its primary vegetation.

Give examples of Biodiversity Hot Spot in India.

- Western Ghats, The Himalayas, Sunderban

What is Bioasphalt? What is the importance of Bioasphalt?

- Bioasphalt is an asphalt alternative made from non-petroleum based renewal resources
- These sources include sugar, molasses and rice, corn and potato starches, natural tree and gum resins, natural latex rubber and vegetable oils, lignin, cellulose, palm oil waste, coconut waste, peanut oil waste, canola oil waste, dried sewerage effluent and so on.
- **Bioasphalt** is a renewable construction material that is manufactured without the **use** of petroleum

How the use of Bioasphalt in laying road surface is better?

- Bioasphalt can be coloured, which can reduce the temperatures of road surfaces and reduce the Urban heat islands.

What are the Urban heat islands?

- An **urban heat island** (UHI) is an **urban** area or metropolitan area that is significantly warmer than its surrounding rural areas due to human activities.
- The temperature difference is usually larger at night than during the day, and is most apparent when winds are weak.

Why there is formation of urban heat island?

- Asphalt and concrete of roads, buildings and other structures absorbs the Sun's heat causing surface temperatures and overall ambient temperature to rise.
- Thus city experiences higher temperature as compared to nearby rural areas.

What are the emissions from coal combustion at thermal power houses?

- Coal thermal power plants are one of the primary sources of air emissions

  Sulphur Dioxide
  Oxides of Nitrogen
  Particulate matter
  Mercury emissions
  Fly ash

How the knowledge of DNA sequencing help us?

- It is possible to know the pedigree of livestock
- Gene sequencing helps to understand how the protein functions in a system
- DNA sequencing is used for gene selection in crops and cloning
- It is possible to develop disease-resistant animal breeds.

What is microbial fuel cell (MFC)?

- A **microbial fuel cell** (**MFC**), is a bio-electrochemical system that drives an electric current by using bacteria.
- **Microbes** at the anode oxidize the organic **fuel** generating protons which pass through the membrane to the cathode, and electrons which pass through the anode to an external circuit to generate a current.
- Bacteria can extract electrons from their food sources such as organic materials and feed them into an electrical circuit to **generate power**.

Does human body produces electricity ?

- Our cells are specialized to conduct electric current.
- The elements **in our bodies**, like sodium, potassium, calcium, and magnesium, have a specific **electrical** charge. Almost all of our cells **can** use these charged elements, called ions, to **generate electricity**.
- The average **human**, at rest, produces around 100 **watts** of power. This equates to around 2000 kcal of food energy, which is why your recommended daily intake of calories is around 2000 kcal.

Why there is formation of ozone hole in the Antarctic region?

- The severe depletion of the Antarctic ozone layer known as the "ozone hole" occurs because of the special atmospheric and chemical conditions that exist there and nowhere else on the globe.
- The very low winter temperatures in the Antarctic stratosphere cause polar stratospheric clouds (PSCs) to form.
- Presence of prominent polar front and stratospheric clouds and inflow of chlorofluorocarbons has caused this hole

Where the Bhitarkanika National Park located?

- It is located in the Kendrapara District of the State of Odisha.
- It was declared as a National Park because of its ecological, faunal, floral, geomorphological and zoological association and importance and for the purpose of protection in 1998.

For what Bhitarkanika Wildlife Sanctuary is famous?

- The Bhitarkanika Wildlife Sanctuary is one of India's biggest estuarine crocodile habitats and a major coastal eco-system.

Where is Gahirmatha Coast? Why it is famous?

- Gahirmatha Coast is in Bhitarkanika.
- Gahirmatha Coast finds a prominent place in the turtle map of the world because of the distinction of having one of world's largest nesting and breeding congregation of Olive Ridley Sea turtles.

What are carbon credits?

- The ultimate goal of **carbon credits** is to reduce the emission of greenhouse gases into the atmosphere.
- A **carbon credit** is a permit or certificate allowing the holder, such as a company, to emit **carbon** dioxide or other greenhouse gases. The **credit** limits the emission to a mass equal to one ton of **carbon** dioxide

How carbo credits are used?

- Carbon credits are a highly regulated medium of exchange used to 'offset', or neutralize, carbon dioxide emissions. A single carbon credit generally represents the right to emit one metric ton of carbon dioxide or the equivalent mass of another greenhouse gas.
- Each offset is equal to one metric ton of carbon dioxide and sells for approximately $11 to $14 per credit, depending on market rates

What are the criteria for recognition of an area as hotspots of biodiversity?

- Species richness
- Endemism
- Threat perception

What is the extent of Western Ghats ?

- The Western Ghat range **starts** near the Songadh town of Gujarat, and runs approximately 1,600 km through the states of Maharashtra, Goa, Karnataka, Kerala and Tamil Nadu ending at Marunthuvazh Malai, at Swamithope, near the southern tip of India.
- It spread across six **states** of the **Western Ghats** region namely, Gujarat, Maharashtra, Goa, Karnataka, Kerala

What is the importance of Western Ghats?

- The Western Ghats perform important hydrological and watershed functions. Approximately 245 million people live in the peninsular Indian states that receive most of their water supply from rivers originating in the Western Ghats. Thus, the soil and water of this region sustain the livelihoods of millions of people.

Which is the highest peak of Western Ghats?

- Anamudi 2,695 metres in Kerala is the highest peak in Western Ghats.

Which tiger reserve is located in Western Ghats?

- Periyar Tiger Reserve.

What are Hotspots of Biodiversity?

- Biodiversity hotspots are defined as regions "where exceptional concentrations of endemic species are undergoing an exceptional loss of habitat"
- The term biodiversity hotspot specifically refers to 25 biologically rich areas around the world that have lost at least 70 percent of their original habitat.

Who developed the concept of Hotspots of Biodiversity?

- The concept of **biodiversity hotspots** was developed by the Norman Myers in 1988 when he identified that the tropical forest losing its plants species as well as habitat.

How many Hotspots are identified in India?

- **India** has four biodiversity **hotspots**, i.e., Eastern Himalayas, Western Himalayas, Western Ghats and Andaman and Nicobar Islands.

Why Hotspots are so important?

- Currently, 35 **biodiversity hotspots** have been identified, most of which occur in tropical forests. They represent just 2.3% of Earth's land surface, but between them they contain around 50% of the world's endemic plant species and 42% of all terrestrial vertebrates.

What is the importance of The Cape Floristic Region?

- The Cape Floristic Region (CFR) has been called the world's '**hottest hot-spot**' for plant diversity and endemism. ... The CFR is the most remarkable of the world's five Mediterranean climate regions; regions that cover only 2% of the earth's land area, but harbour 16% of the world's plant species.

Which was the first sanctuary or National Park in India?

- The **first sanctuary** or national park established in **India** is Manas National Park or Manas Wildlife **Sanctuary** which is many in one -a national park, UNESCO Natural World Heritage site, a Project Tiger reserve, an elephant reserve and a biosphere reserve in Assam, **India**.

Which was the first Bird sanctuary in India?

- Keoladeo Ghana Bird Sanctuary (Formerly Bharatpur Bird Sanctuary) located in Rajasthan is the first bird sanctuary in India. Keoladeo Ghana Bird Sanctuary (or Bharatpur National Park) was created around 250 years ago and was named after a Shiva (Keoladeo) temple located within the forest by the Rajput King Maharaja Suraj Mal.

Which is the oldest water bird sanctuary in India?

- The oldest water bird sanctuary in India is the Vedanthangal Bird Sanctuary located in Tamil Nadu. It was established in 1936. The protected area is the home of above 1000 species of birds .

How carbon Dioxide affects us?

- **Carbon dioxide** emissions impact human health by displacing oxygen in the atmosphere. Breathing becomes more difficult as **carbon dioxide** levels rise. In closed areas, high levels of **carbon dioxide** can lead to health complaints such as headaches.
- Higher concentrations of Carbon Dioxide can affect respiratory function and cause excitation followed by depression of the central nervous system. A high concentration can displace oxygen in the air.

How carbon dioxide affects as a greenhouse gas?

- Carbon dioxide is a naturally occurring greenhouse gas.
- An increase in the amount of carbon dioxide creates an overabundance of greenhouse gases that trap additional heat.
- This trapped heat leads to melting ice caps and rising ocean levels, which cause flooding.

What are Marine Upwelling Zones?

- Upwelling is a process in which deep, cold water rises toward the surface. Upwelling occurs in the open ocean and along coastlines
- The deeper water that rises to the surface during upwelling is rich in nutrients. These nutrients “fertilize” surface waters, encouraging the growth of plant life, including phytoplankton.
- Upwelling can also play an important role in the movement of marine animals.

What are downwelling?

- The reverse process, called “downwelling” also occurs when wind causes surface water to build up along a coastline and the surface water eventually sinks toward the bottom.

If a tropical rain forest is removed, it does not regenerate quickly as compared to a tropical deciduous forest.

- The soil of rain forest is deficient in nutrients.
- The undergrowth in rainforest may be restricted by poor penetration of sunlight to the ground level.

Why the Himalayan range is very rich in species diversity?

- it is confluence of different bio-geographical zones
- The amount of yearly rainfall increases from west to east along the southern front of the **range**. This **diversity** of altitude, rainfall and soil conditions combined with the very high snow line supports a variety of distinct plant and animal communities.
- The flora and fauna of the Himalayas vary with climate, rainfall, altitude, and soils. The climate ranges from tropical at the base of the mountains to permanent ice and snow at the highest elevations

What is Ionosphere layer of earth's atmosphere?

- The **ionosphere** is defined as the layer of the Earth's atmosphere that is ionized by solar and cosmic radiation. It lies 75-1000 km above the Earth
- The **ionosphere** is the part of the atmosphere that is ionized by solar radiation. It plays an important part in atmospheric electricity and forms the inner edge of the magnetosphere.

Why ionosphere layer is called as ionosphere?

- Ionosphere has "free electrons" and they are negatively charged. The molecules that lose the electrons become positively charged. The name for charged molecules or atoms is "ions" and these positive ions are what the ionosphere is named after.

Why a genetically engineered form of brinjal, known as the Bt-brinjal, has been developed?

- The Bt brinjal has been developed to give resistance against lepidopteron insects, in particular the Brinjal Fruit and Shoot Borer

How Bt-brinjal is created?

- The genetically modified **brinjal** is created by inserting a crystal protein gene (Cry1Ac) from the soil bacterium Bacillus thuringiensis into the genome of brinjal.
- With Bt brinjal 42% reduction in use of pesticide and a doubling of the yield is possible.

What are algal bloom?

- An algal bloom or algae bloom is a rapid increase or accumulation in the population of algae in freshwater or marine water systems, and is often recognized by the discoloration in the water from their pigments

Why algal bloom happens?

- **Algal blooms** are the result of an excess of nutrients (particularly phosphorus and nitrogen) into waters and higher concentrations of these nutrients in water **cause** increased growth of **algae** and green plants.

What is the harmful effect of algal bloom?

- The **harmful** effects from such **blooms** is due to the toxins they produce or from using up oxygen in the water which can lead to fish die-offs.

What are the activities add carbon to the carbon cycle on earth?

- Respiration
- Decay of Organic matter
- Volcanic action

What are the steps of Carbon Cycle?

- The **carbon cycle** is the process in which **carbon** travels from the atmosphere into organisms and the Earth and then back into the atmosphere. Plants take **carbon**-dioxide from the air and use it to make food. Animals then eat the food and **carbon** is stored in their bodies or released as CO2 through respiration.

The surface of a lake is frozen in severe winter, but the water at its bottom is still liquid. What is the reason?

- The surface **water** keeps on cooling till it gets converted to **ice** continuing to float on the Surface of **Water** keeping the inside of **water at** a **Temperature** of 4 degree Celsius. This Anomaly allows the Aquatic Organism to survive in **freezing** cold, as the **temperature below** is warmer than above

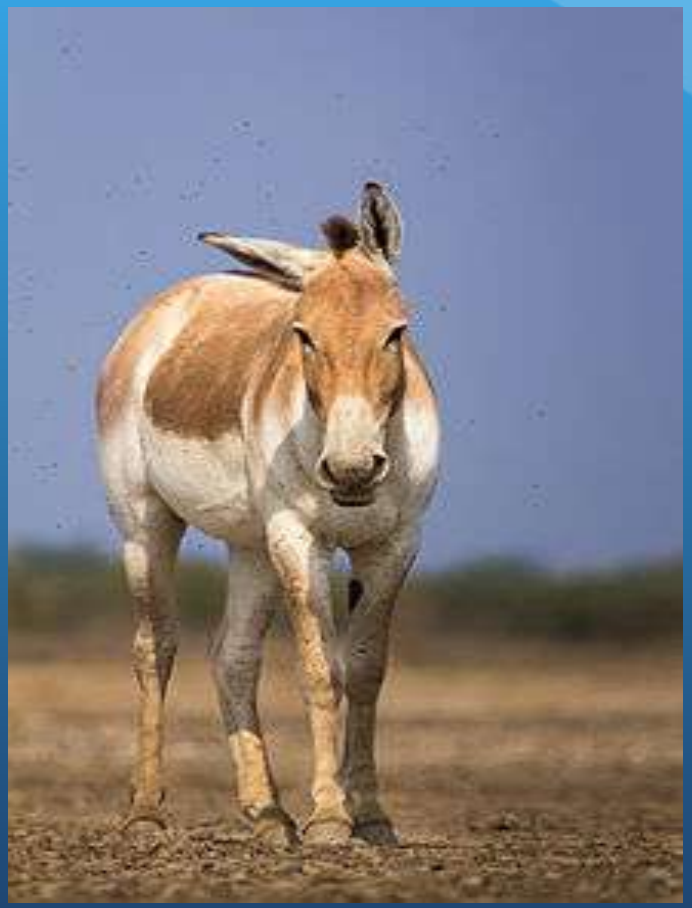
When water is cooled it contracts or expand?

- When **water** is cooled, it contracts like until a temperature of approximately **4°** Celsius is reached. After that, it expands slightly until it reaches the **freezing** point, and then when it **freezes** it expands by approximately 9%.

Is existence of Indian Wild Ass threatened?

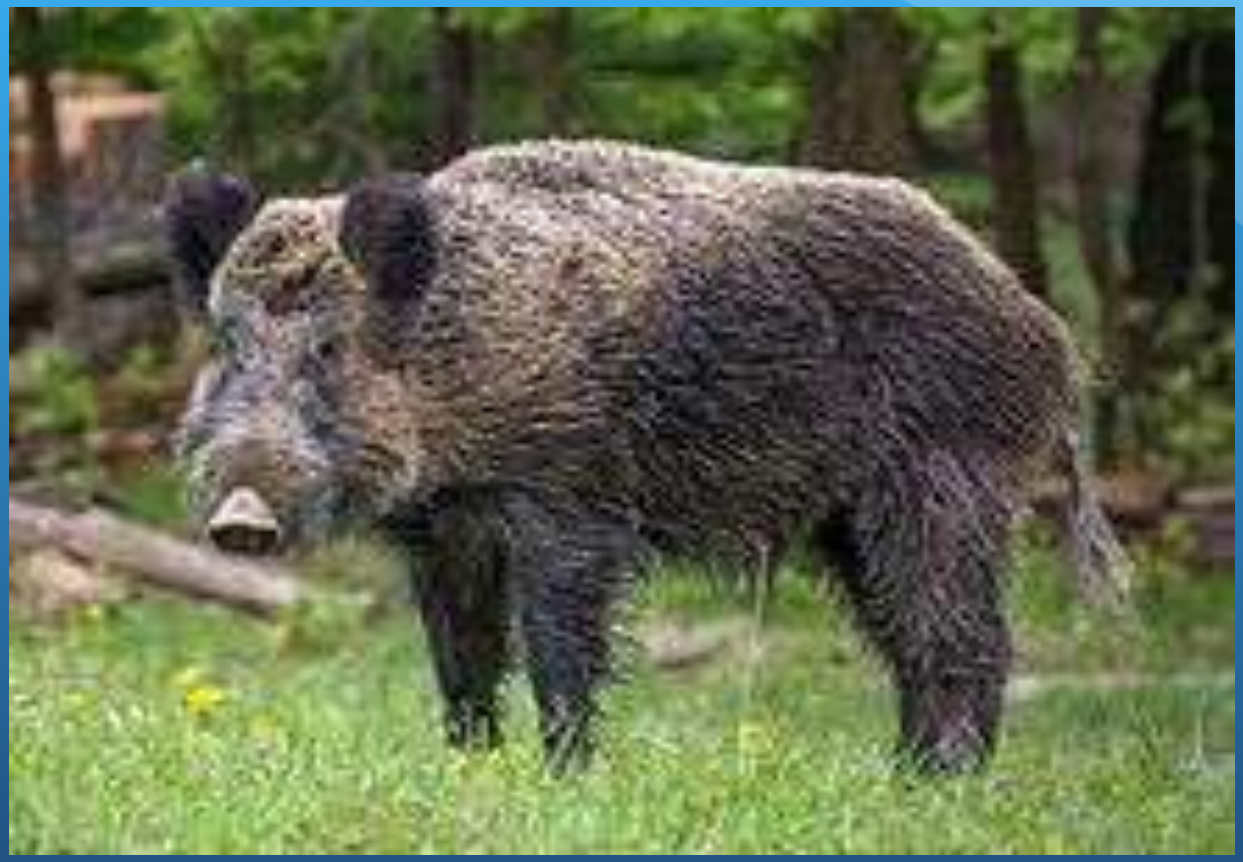
- It is currently listed as Near Threatened by IUCN.
- In India it is found in Little Raan of Kutch
- Indian wild asses graze between dawn and dusk. The animal feeds on grass, leaves and fruits of plant, crop, Prosopis pods, and saline vegetation.
- It is one of the fastest of Indian animals, with speeds clocked at about 70 – 80 km. per hour
- Indian Wild Ass Sanctuary is located in the Little Raan of Kutch

Indian Wild Ass



Is Indian wild boar a mammal?

- The Wild Boar or wild pig . The species is one of the widest-ranging mammals in the world.



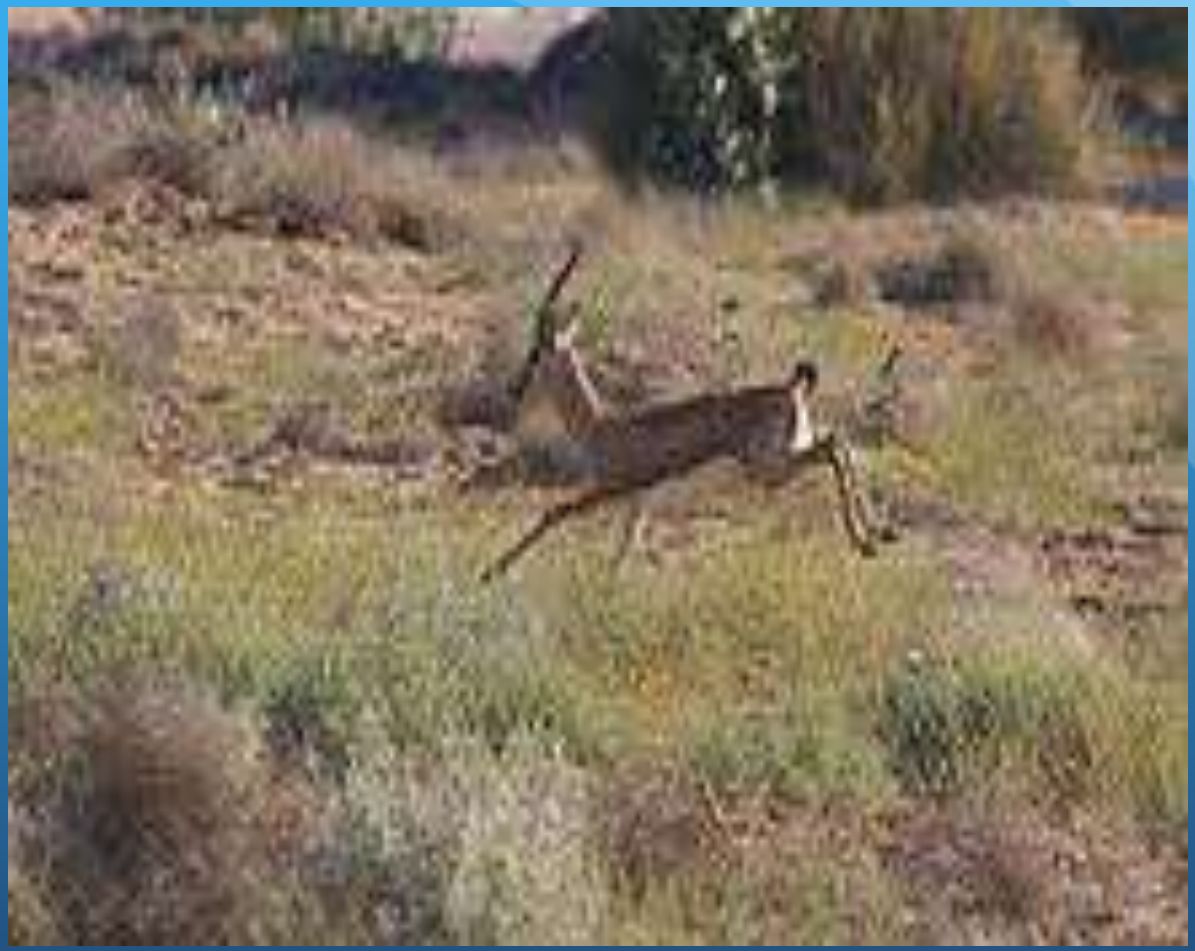
Indian Wild Boar

Where do you find Indian gazelle? What are the main characteristics of Indian gazelle?

- The chinkara also known as Indian gazelle.It stands at 65 cm (26 in) tall and weighs about 23 kg (51 lb). It has a reddish-buff summer coat with smooth, glossy fur. In winter, the white belly and throat fur is in greater contrast.
- Chinkara live in arid plains and hills, deserts, dry scrub and light forests. In India is found in the Thar Desert.
- Chinkaras are shy and avoid human habitation. They can go without water for long periods and can get sufficient fluids from plants and dew.
- It has been listed as Vulnerable on the IUCN Red List

Are Chinkara in endangered list of IUCN?

- It has been listed as Vulnerable on the IUCN Red List
- The chinkara is threatened by extensive hunting for meat and trophies in Afghanistan, Iran and Pakistan. Other threats include habitat loss due to agricultural and industrial expansion.
- Trophy hunting is the animal or part of the animal kept and usually displayed as success in hunting.



Chinkara

Which is the state animal of Chhattisgarh?

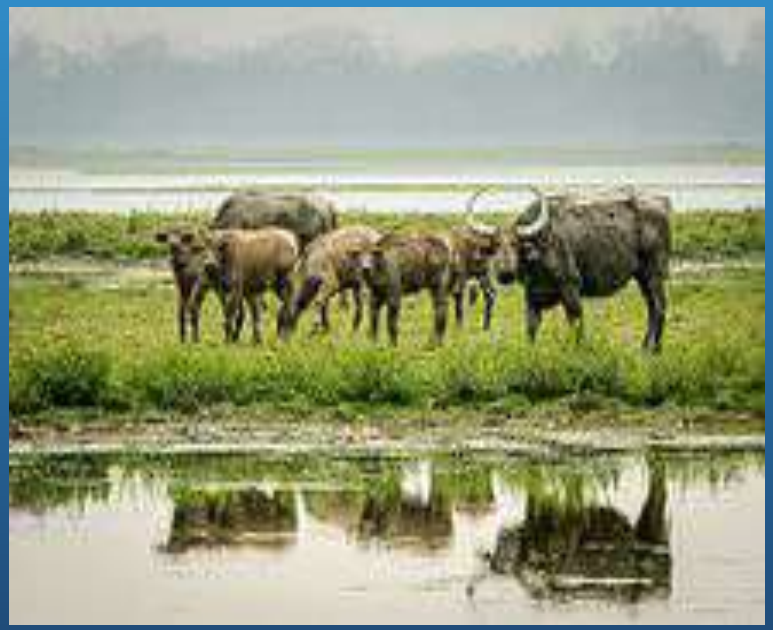
- Indian wild buffalo
- This magnificent animal is an ancestor of domestic Buffalo and is genetically invaluable

Is Wild Asian Buffalo endangered?

- Yes. It has been listed as endangered in the IUCN Red List.
- The remaining population is estimated to be 4000. Out of which more than 3000 are in India.
- In India it is largely restricted to around Kaziranga, Manas and Assam, Arunachal Pradesh.
- It is associated with wet grasslands, swamps and densely vegetated river valleys.

How wild buffalo is important in ecosystem?

- The wild buffalo is important to the ecosystem because it helps in the rejuvenation of grasslands.



What is Biodiversity and why it is important ?

- Biodiversity is the variety and variability of life on Earth. Biodiversity means types of living forms in existence
- Biodiversity forms the basis for human existence: It helps in soil formation, recycling of waste and pollination of crops etc

Where on earth we find the diversity more?

- Biodiversity is greater near the equator because of warm climate and high primary productivity
- Tropical forests cover less than 10% of earth's surface and contain 90% of world's species
- Marine biodiversity is usually highest along coasts in the western Pacific where sea surface temperature is highest.

What is Oil zapper?

- Oil-Zapper refers mixture of five microbial strains – are capable of eating up oil, they take in the pollutants and give out carbon dioxide without producing any harmful residues
- **Oil zapper** feeds on hydrocarbon compounds present in crude oil and the hazardous hydrocarbon waste generated by oil refineries, known as Oil Sludge and converts them into harmless CO2 and water.

What are Orchids?

- Orchids are flowering plants of family Orchidaceae.
- Orchidaceae have about 28,000 species or different types. Orchids are perennial herbs
- Some orchids have single flowers, but most have a group of flowers called as inflorescence
- Generally they are bilaterally symmetrical
- The world's richest diversity of orchid genera and species is found in the tropics, but they are also found above the Arctic Circle.

What is In-Situ Conservation?

- In-Situ means in the original position. When we are doing conservation of plants and animal in their habitat it is called In-Situ conservation.
- Biosphere reserve; National Park; Wildlife sanctuary are examples of In-Situ Conservation
- Botanical Garden is not in-situ habitat of plants and animals. They are there because of human interaction

What are the Mangrove forest? How are they adapted to thrive in salt and low oxygen conditions?

- **Mangroves** are a group of trees and shrubs that live in the coastal intertidal zone
- Mangroves are salt-tolerant trees, also called halophytes, and are adapted to life in harsh coastal conditions.
- They contain a complex salt filtration system and complex root system to cope with salt water immersion and wave action.
- They are adapted to the low oxygen conditions of waterlogged mud.

Where all we find mangroves?

- Mangroves occur worldwide in the tropics and sub tropics mainly between latitudes 25^0 N and 25^0 S
- It is found in 118 countries and estimated total mangrove forest is 1.38 lakh square km.

How mangroves can serve as a reliable safety hedge against coastal calamities?

- The mangrove trees do not get uprooted by storms and tides because of their extensive roots

What is salinization of soil?

- **Salinization** refers to a build up of salts in soil, eventually to toxic levels for plants. (3,000 - 6,000 ppm salt results in trouble for most cultivated plants.)

What is the effect of salinization of soil?

- Salt in soils decreases the osmotic potential of the soil so that plants can't take up water from it.
- Salinization makes some soils impermeable
- If the level of salts in the soil water is too high, water may flow from the plant roots back into the soil. This results in dehydration of the plant, causing yield decline or even death of the plant.

Who issues the 'Red Data Books' ?

- The 'Red Data Books' published by the International Union for Conversion of Nature and Natural Resources (IUCN)

What data information is contained in Red Data Book?

- The Red Data Book is a public document which is created for recording endangered and rare species of plants, animals, fungi as well as some local subspecies which are present in a particular region.
- The Red Data Book helps us in providing complete information for research, studies and also for monitoring the programs on rare and endangered species and their habits.
- This book is mainly created to identify and protect those species which are on the verge of extinction.

What could be the main reason/reasons for the formation of African and Eurasian desert belt?

- The main reasons for the formation of African and Eurasian desert belt is because it is located in the sub-tropical high pressure cells. It is under the influence of warm ocean currents.

What is Latitudinal Diversity gradient?

- The decrease in diversity when moving from **lower latitudes** towards higher **latitudes** is referred to as Latitudinal Diversity Gradient.
- Generally it is observed that the diversity richness is more in the areas near the equator than at the poles.

Why high altitudes are less diverse than lower altitudes? What is Elevational diversity gradient?

- Elevational diversity gradient (EDG) is an ecological pattern where biodiversity changes with elevation. The EDG states that species richness tends to increase as elevation increases, up to a certain point, creating a "diversity bulge" at middle elevations. There have been multiple hypotheses proposed for explaining the EDG, none of which accurately describe the phenomenon in full.

Why Spider Monkey is called spider monkey? Where are they found?

- They are found in tropical forests of Central and South America, from southern Mexico to Brazil.
- They have long, lanky arms and prehensile (gripping) tails that enable them to move gracefully from branch to branch and tree to tree. These nimble **monkeys** spend most of their time aloft, and maintain a powerful grip on branches even though they have no thumbs.
- They were named **spider monkeys** because they look like spiders as they hang upside down from their tails with their arms and legs dangling.

Is Star tortoise is threatened?

- The Indian star tortoise (Geochelone elegans) is a threatened species of tortoise found in dry areas and scrub forest in India, Pakistan and Sri Lanka. This species is quite popular in the exotic pet trade, which is the main reason it is endangered.
- The star tortoise is Schedule IV species under the Wildlife (Protection) Act, 1972 — that means it's illegal to keep them as pets or trade them commercially.

Is star tortoise a pet?

- The Indian **star tortoise** is popular as a pet and a spiritual symbol, largely because of its striking shell that has a **star**-like radiating pattern of yellow and black.
- **Star tortoises** survive in an extremely harsh environment. They inhabit the hot dry scrubland areas of central and southern India

Are Monitor Lizard found in India?

- **Monitor lizards** are large **lizards** in the genus Varanus
- They are native to Africa, Asia, and Oceania
- **Monitor lizards** have long necks, powerful tails and claws, and well-developed limbs.
- Common Indian monitor is found widely distributed over the Indian Subcontinent

Why population of Lizard decreasing?

- The Bengal monitor is listed as Appendix I of CITES and Schedule I of the 1972 Wildlife Protection Act. The wild population is decreasing as it is hunted for both consumption and medicinal purposes
- It is mainly terrestrial . Length 60-175 cm
- Preying mainly on arthropods, birds, eggs and fish They have keen eyesight and can detect human movement nearly 250 m away.

What are the major Water Pollutants?

- There are **four** main categories of **water pollution**: pathogens, inorganic compounds, organic material and macroscopic **pollutants**.

• Aluminium.	Ammonia.	Arsenic.	Barium.
• Cadmium.	Chloramine.	Chromium.	Copper.
• Uranium	Lead.	Mercury	Perchlorate

Sea cow

- Sea cow is extinct mammal about 250 years ago
- The manatee was a large marine mammal with an egg-shaped head, flippers and a flat tail.
- Manatees are also **known as sea cows**. This name is apt, due to their large stature; slow, lolling nature; and propensity to be eaten by other animals.

Sea Horse

- Seahorses are **fish**.
- They live in water, breath through gills and have a swim bladder.
- They do not have caudal fins and have a long snake-like tail.
- They also have a neck and a snout that points down.
- **Seahorses** swim vertically, lack pelvic fins, have bony plates over their bodies, and move their eyeballs independently.
- The males carry babies and give birth to them instead of females.

Sea Lion

- **Sea lions** are marine **mammals.**
- **Mammals** are warm-blooded vertebrates that have body hair or fur and give birth to live young.
- **Sea lions** get their name from the mane of coarse long hair around the face.
- These **sea lions** are able to rotate their hind flippers forward, which allow them to support their entire weight when walking on all flippers.
- The **sea lions**' coat colour changes as **they** grow.
- sea lions live in the Northern Pacific between Asia and North America and off the coasts of **South America**, Antarctica, southwestern Africa and **southern Australia**

What are the by products of sugar Industry?

- The four main by products of the sugarcane industry are cane tops, bagasse, filter muds and molasses

What is Bagasse? What are its uses?

- **Bagasse** is the dry pulpy fibrous residue that remains after sugarcane or sorghum stalks are crushed to extract their juice.
- It is used as a biofuel for the production of heat, energy, and electricity, and in the manufacture of pulp and building **materials**

What is press mud? What are its uses?

- Sugarcane **press mud** is the residue of the filtration of sugarcane juice.

What is molasses? What is its use?

- The extracted juice is processed further with chemicals and crystallized. The by product left after the crystals are separated is a called **molasses**.
- This **molasses** will be fermented and distilled to produce alcohol.

Fresh water is becoming scarce. How fresh water is existed/distributed on earth?

- Only 2.5% water on earth is fresh water
- **Fresh water** includes **water** in ice sheets, ice caps, glaciers, icebergs, bogs, ponds, lakes, rivers, streams, and even underground **water** called groundwater.
- **Fresh water** is not the same as potable **water** (or drinking **water**).
- Glaciers and ice caps: 68.7%
  Ground Water: 30.1%
  Surface Water: 1.2% (69% in ice and permafrost, 20.9% in lakes, Rivers 0.49% Swamps marshes 2.6%)
  Atmosphere 3%

Nokerk Bio-Reserve

- Nokrek National Park, the core area of Nokrek Biosphere Reserve is a national park located in West Garo Hills in Meghalaya.
- UNESCO added this National Park to its list of Biosphere Reserves in 2009
- Nokrek is a hotspot of biodiversity in Meghalaya
- Nokrek has a remnant population of the red panda
- Nokrek is also an important habitat of the Asian Elephant.
- Nokrek has 8 species of cat- tiger, marbled cat ; 7 species of Primates: stump-tailed macaque, Hoolocks
- Nokrek also has National citrus Gene Sanctuary-cum-Biosphere

Logtak Lake

- **Loktak Lake** is the largest freshwater lake in Northeast India and is famous for the phumdis floating over it. The lake is located at Moirang in Manipur state, India.
- the largest freshwater (sweet) **lake** in North -East India, also **called** the only **Floating lake** in the world due to the **floating** phumdis (heterogeneous mass of vegetation, soil, and organic matters at various stages of decomposition) on it.
- This ancient **lake** plays an important role in the economy of Manipur.
- **Wular Lake**, located in the state of Jammu and Kashmir, is often referred to as the largest freshwater lake in India. **Wular** is a natural lake that is a major part of the Jhelum River basin.

Namdapha National Park

- **Namdapha National Park** is a 1,985 km^2 in Arunachal Pradesh.
- With more than 1,000 floral and about 1,400 faunal species it is a biodiversity hotspot
- It is the fourth largest national Park in India.
- Namdapha was originally declared a Wildlife Sanctuary in 1972, then a National Park in 1983 and became a Tiger Reserve under the Project Tiger scheme in the same year.
- The land cover changes with increasing elevation from Tropical evergreen forest to temperate broadleaf and mixed forests. It also have extensive bamboo forests.

Namdhapa National Park

- The Namdhapa flying squirrel is endemic to the park and critically endangered.
- The park has about 425 species of birds

Grassland Biome

- **Grassland biomes** consist of large open areas of grass. Trees if present but are very infrequent
- In **grassland** regions, the climate is ideal for the growth of grasses only.
- Low rainfall, wildland fires, and grazing by animals are three factors that maintain **grasslands**.
- The **grassland seems like** an endless ocean of grass.
- **Grassland** soil tends to be deep and fertile. The roots of perennial grasses usually penetrate far into the soil.
- While **temperatures** are often extreme in some **grasslands**, the average **temperatures** are about -20° C to 30° C. Tropical **grasslands** have dry and wet seasons that remain warm all the time. Temperate **grasslands** have cold winters and warm summers with some rain.

What is bagasse? How it is used?

- **Bagasse is** the dry pulpy fibrous residue that remains after sugarcane stalks are crushed to extract their juice.
- It **is** used as a biofuel for the production of heat, energy, and electricity, and in the manufacture of pulp and building materials.

What is National Biodiversity Authority?

- The **National Biodiversity Authority** (NBA) is a statutory autonomous body under the Ministry of Environment, Forests and climate change,
- Established in 2003 to implement the provisions under the Biological Diversity Act, 2002, after India signed Convention on Biological Diversity (CBD) in 1992.

Do National Biodiversity Authority issues IPR?

- NBA don't issue IPR but its approval is required if anybody seeking IPR for anything based on biological material and associated knowledge obtained from India.

The National Green Tribunal Act, 2010 was enacted in consonance with which of the following provisions of the Constitution of India?

- Right to healthy environment construed as a part of Right to Life under Article 21

What is the objective of National Water Mission?

- The objective of National Water Mission is "conservation of water, minimizing wastage and ensuring its equitable distribution both across and within States through integrated water resources development and management".
- Recycling of water, low temperature desalination of ocean water are priority areas of work under National Water Mission

What are biopesticides?

- **Biopesticides** are certain types of pesticides derived from such natural materials as animals, plants, bacteria, and certain minerals. For example, canola oil and baking soda have pesticidal applications and are considered **biopesticides**.

Give some examples of living organisms used as biopesticides?

- **The** most commonly used **biopesticides** are living organisms, which are pathogenic for **the** pest of interest. These include biofungicides (Trichoderma), bioherbicides (Phytopthora) and bioinsecticides (Bacillus thuringiensis).

What is biomass? Give some examples.

- **Biomass** is organic material made from plants and animals.
- **Biomass** is a renewable energy source because we can always grow more trees and crops, and waste will always exist.
- **Some examples** of **biomass** fuels are wood, crops, manure, and **some** garbage. When burned, the chemical energy in **biomass** is released as heat.

What is Biomass gasification?

- Biomass gasification is the process of converting organic material into gases namely methane, carbon monoxide, hydrogen , carbon dioxide.
- It is obtained by reacting the material at high temperature (>7000C) without combustion with a controlled amount of oxygen / steam and the resulting gas mixture is called Syngas or Producer Gas which itself is a fuel.

What organic material can be used for Biomass gasification?

- Coconut shells, groundnut shells and rice husk can be used in biomass gasification
- Process can convert any carbonaceous (carbon-based) raw material such as coal into fuel gas, also known as synthesis gas (syngas for short).

How methane gas can be used?

- **Methane** gas can be used to create electricity
- **Methane** can be used to burn as **fuel** and create heat
- **Methane** can be found in compressed natural gas and then used as **fuels** for vehicles.

Is sugarcane a good source of biomass energy?

- **Sugarcane is** one of the most promising agricultural sources of **biomass** energy in the world.
- Roughly, 1 ton of **Sugarcane biomass**-based on Bagasse, foliage and ethanol output – has an energy content equivalent to one barrel of crude oil.
- One Barrel = 42 US gallons
  one US gallon = 3.78 Litre

Is biomass a good source of energy?

- The benefit of **biomass energy** is that **biomass** is renewable **source** of **energy** and it cannot be depleted.
- **Biomass** helps reduce the amount of GHG that give more impact to global warming and climate change

What is the role of Ultraviolet (UV) radiation in the water purification system?

- It inactivates/kills the harmful microorganisms in water

What are the uses of Ultraviolet Rays ?

- **Ultraviolet rays** can be **used** to kill microbes. Hospitals **use UV** lamps to sterilise surgical equipment and the air in operating theatres.
- Suitable doses of **Ultraviolet rays** cause the body to produce vitamin D
- UV lamps can be used to inspect various materials and surfaces
- The UV beams emit a black light. This black light is useful in many ways. It can be used to inspect splits, breaks, and various defects, inspection of documents, forged bank notes, etc.

What are the sources of lead poisoning?

- Smelting Units
- Paints
- Addition of lead to petrol has been banned. It was used to help reduce engine knocking, boost octane ratings, and help with wear and tear on valve seats within the motor. Besides causing poisoning lead also affect smog-reducing catalytic converters used in new vehicles

Why the use of Chlorofluorocarbons are banned?

- It is known to cause depleting Ozone Layer in the atmosphere.

What are the uses of Chlorofluorocarbons?

- 1. in the production of plastic foams and packaging material
  2. in cleaning certain electronic components
  3. as pressurizing agents in aerosol cans
  4. as refrigerants: refrigerant **CFC** is dichlorodifluoromethane, CF_2Cl_2 (also known as **CFC**-12), which boils at -30° C.

How chlorofluorocarbons affect ozone layer?

- When ultraviolet light waves (UV) strike **CFC*** ($CFCl_3$) molecules in the upper atmosphere, a carbon-chlorine bond breaks, producing a chlorine (Cl) atom. The chlorine atom then reacts with an **ozone** (O_3) molecule breaking it apart and so destroying the **ozone**.

What is 'sea buckhorn' and why it is important?

- **Sea buckthorn** is a plant. It is a soil stabilizer, wildlife food and cover, repairs desert areas and is a source of commercial products.
- A tea containing **sea buckthorn** leaves is used as a source of vitamins, antioxidants, protein building blocks (amino acids), fatty acids and minerals; for improving blood pressure and lowering cholesterol; preventing and controlling blood vessel diseases; and boosting immunity
- **Sea buckthorn oil** helps prevent the development of **wrinkles** as well as shields the skin's surface from the sun's UV rays.

Where does sea buckthorn grow in India?

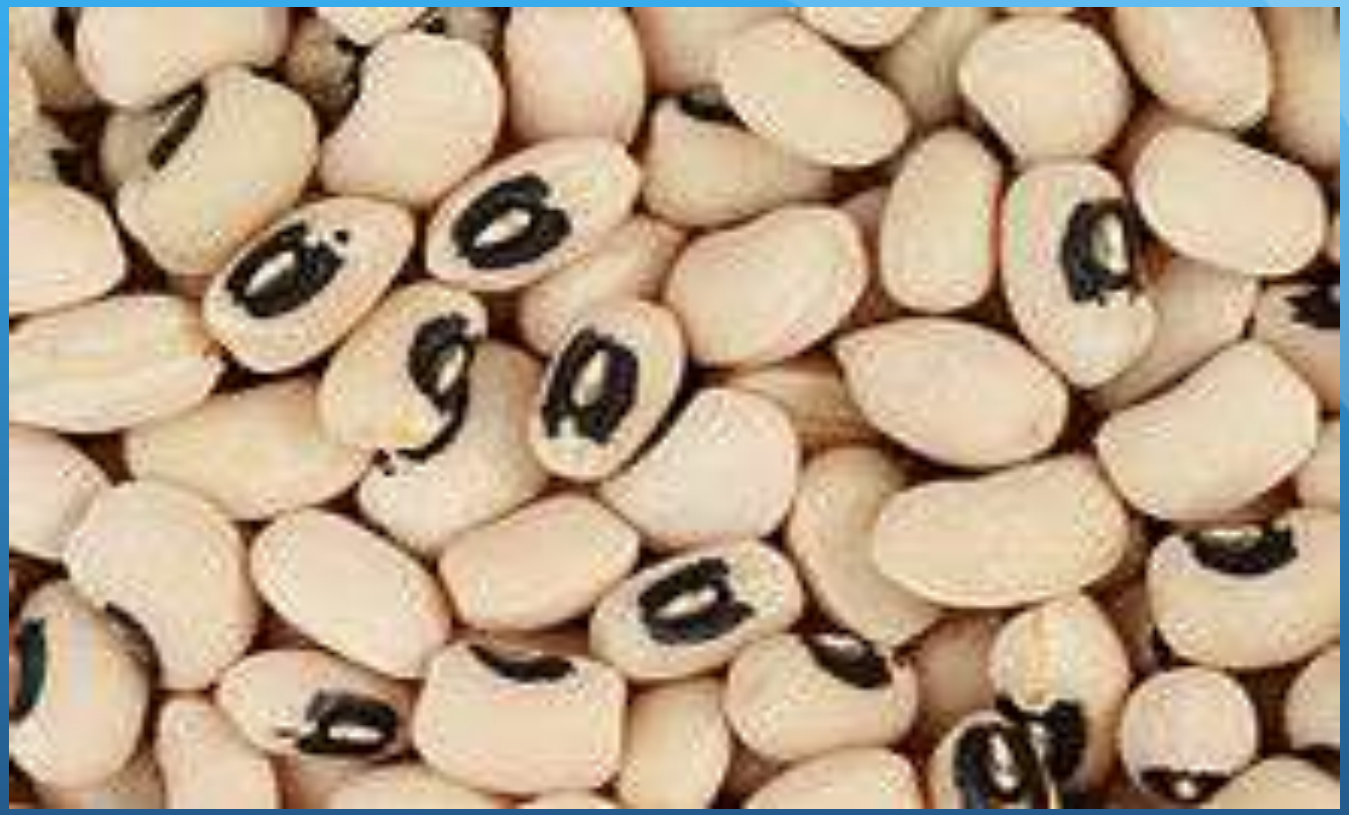
- **Seabuckthorn**, is a thorny, deciduous, temperate bush **plant** native to European and Asian countries. In **India**, it is widely distributed at high altitude, cold arid condition of Ladakh (Leh and Kargil), Himachal Pradesh, Sikkim and Arunachal Pradesh.

What is mixed farming?

- In this method of cultivation, crops are grown and animals are reared on the same farm land.
- A variety of crops such as cereals and vegetables are grown and alongside, the farmers keep dairy animals to get milk.

What is Cowpea?

- The **cowpea** (Vigna unguiculata) is an annual herbaceous legume.
- Due to its tolerance for sandy soil and low rainfall, it is an important crop in the semiarid regions across Africa and Asia.



Cow Pea

What is the use of cowpea?

- Cowpea may be used green or as dry **fodder**. It also is used as a green manure crop, a nitrogen fixing crop, or for erosion control. Similar to other grain legumes, cowpea contains trypsin inhibitors which limit **protein** utilization.

What is pigeon pea?

- **Pigeon pea** is commonly known as arhar dal or split toor (tuvar) dal. A yellow coloured lentil.
- It has its origins in the Eastern part of peninsular India.
- In Barbados, it was used to feed **pigeons**.

What is the nutritional value of pigeon pea?

- **Pigeon pea** is a good source of protein, dietary fiber, and various vitamins: thiamin, magnesium, phosphorus, potassium, copper, and manganese. 100g of mature raw **pigeon peas** also provide 114% (76% for pregnant women) of the daily requirement of folate.

What is green gram?

- Split **moong** beans or **green moong dal is green gram** that has been split but not skinned.
- Since the husk is not removed completely, the **green** colour is retained. The splitting is done in a mill.
- **Green moong dal** a traditional ingredient in Indian cooking, often used in curries.

How many wetlands India has?

- **India** has totally 27, 403 **wetlands**, of which 23,444 are inland **wetlands** and 3,959 are coastal **wetlands**.

How much area is covered under wetlands in India?

- **Wetlands** occupy 18.4% of the country's area (excluding rivers), of which 70 % are under paddy cultivation.

Which is the largest and smallest wetland in India?

- Vembanad **Lake** (in Kerala)also known as Vembanad Kayal or **Vembanad Kol wetland** is the largest wetland in India.
- Renuka Wetland is smallest wetland of India

What are Ramsar sites?

- Ramsar sites are wetlands sites of international importance for the conservation of global biological diversity

How many Ramsar wetland sites are there in India?

- As of February 2020 there are 37 recognized Ramsar sites in India.
- The Ramsar convention entered into force in India on **1 February 1982**.
- The 10 new Ramsar sites of India announced by the Ministry of Environment, Forest and Climate Change (MoEFCC) includes: Nawabganj, Parvati Agra, Saman, Samaspur, Sandi and Sarsai Nawar (Uttar Pradesh)

Which state in India has the maximum number of wetlands?

- The highest number of such identified wetlands are in **Uttar Pradesh** (16) followed by Madhya Pradesh (13), Jammu & Kashmir (12), **Gujarat** (8), Karnataka (7) and **West Bengal**(6).

Which state in India has the largest area under wetland?

- **Gujarat** comes out on top with the largest amount of its landmass identified as wetlands of different kinds. **Gujarat** is followed by **Andhra Pradesh**, **Uttar Pradesh**, **West Bengal** and Maharashtra in that order.

What is 'Critical Wildlife Habitat'?

- Critical wildlife habitats (CWH) are defined under the Forest Rights Act, 2006, as the "areas of national parks and sanctuaries where it has been specifically and clearly established, case by case, on the basis of scientific and objective criteria, that such areas are required to be kept as inviolate for the purposes of wildlife conservation"

What are the new guidelines for Critical Wildlife Habitat?

- In its preamble to the guidelines, the Ministry emphasised that it "is in no way intended to cause or force resettlement or relocation of Scheduled Tribes and Other Forest Dwellers from National Parks and Wildlife Sanctuaries", in a bid to ease the concerns of activists.
- The new guidelines envisage a bigger role for the gram sabha, whose free informed consent must be given before any relocation is carried out. It also seems to ensure that forest rights are settled under the FRA before a CWH can be declared in an area.

What is acidification of oceans and why it is happening?

- **Ocean acidification** is mainly **caused** by carbon dioxide gas in the atmosphere dissolving into the **ocean**.
- Carbon dioxide gas in atmosphere is increasing because of global warming.

What will be adverse affect of acidification of Oceans?

- **Ocean acidification** reduces the amount of carbonate, a key building block in seawater.
- Many marine organisms--such as **coral**, clams, mussels, sea urchins, barnacles, and certain microscopic plankton--rely on equilibrated chemical conditions and pH levels in the ocean to build their calcium-based shells and other structures.
- The existing shells may begin to dissolve

Why with the increase of Carbon dioxide levels in the air causing rise in temperature of the atmosphere?

- (**CO2**) is an important greenhouse gas
- It strongly **absorbs energy** with a wavelength of 15 μm (micro-meters).
- This makes **carbon dioxide** a good absorber of wavelengths falling in the infrared **radiation** region of the spectrum.
- Molecules of **carbon dioxide** (CO_2) can **absorb** energy from **infrared** (IR),(heat) **radiation**.

Which elements were primary responsible for origin of life on the Earth?

- Carbon, Hydrogen and Nitrogen

All organisms are built from which six elements responsible for life?

- All organisms are built from the same six essential elemental ingredients: **carbon**, **hydrogen**, **nitrogen**, **oxygen**, **phosphorus** and **sulphur** (CH NOPS).
- These form the nucleic acids, proteins, carbohydrates, and lipids that are the fundamental components of living matter.

What are the reasons for the people's resistance to the introduction of Bt brinjal in India?

- There is an apprehension that the consumption of Bt brinjal may have adverse impact on health
- There is some concern that the introduction of Bt brinjal may have adverse effect on the biodiversity

How Bt Brinjal is created?

- The genetically modified **brinjal is** created by inserting a crystal protein gene (Cry1Ac) from the soil bacterium Bacillus thuringiensis into the genome of **brinjal.**

What are the main reasons for creating genetically engineered plants?

- Resistance to pests
- To enable them to withstand drought
- To increase the nutritive value of the produce
- To increase their shelf life

Why Bhitarkanika protected area is famous and unique?

- **Bhitarkanika** is **famous** for its wide and dense mangrove forest and crocodile reserve.

Which is the largest tiger reserve in India?

- **Nagarjunsagar-Srisailam Tiger Reserve** is the largest tiger reserve in India .
- The reserve spreads over five districts, Kurnool , Prakasam, Guntur, Nalgonda and Mahbubnagar.
- The total area of the tiger reserve is 3,728 km^2

How many tiger reserves are there in India?

- There are 50 tiger reserves are there in India.

Who controls Project Tiger? What it is? When was it started?

- National Tiger Conservation Authority. (NTCA)
- **Project Tiger** is a Centrally Sponsored Scheme of Government of India which was **launched** on the 1 st of April, 1973 for in-situ conservation of wild **tigers** in designated **tiger** reserves.

Why Project Tiger started?

- As per estimates, the number of tigers was about 40,000 at the beginning of the 20th century.
- The number came down to estimated about 1200 only in 1970.
- So, India was facing huge challenge in conservation of tiger.
- The **Project Tiger** aimed at protection of **tigers** especially of Royal Bengal **tigers** and reduce the factors that result in the decrease of the population of **tigers**.

How many tigers are there in India?

- India is now home to nearly **3,000 tigers**
- The tiger population had risen from **2,226** in 2014 to **2,967** in 2018.

Which day is The International Tiger Day?

- The **International Tiger Day** (also known as **Global Tiger Day**) is celebrated every year on 29 July to raise awareness for **tiger** conservation.
- The goal of observance of the **day** is to promote the protection and expansion of the wild **tigers** habitats and to gain support through awareness for **tiger** conservation.

Who is the Chairman of The National Tiger Conservation Authority?

- The Minister for Environment and Forests

When was Project Elephant launched?

- **Project Elephant** was **launched** in 1992 by the Government of India Ministry of Environment and Forests

What is the aim of Project Elephant?

- The project aims to ensure the long-term survival to the populations of elephants in their natural habitats by protecting the elephants, their habitats and migration corridors.

What are wildlife corridors?

- A wildlife corridor, habitat corridor or green corridor is an area of habitat connecting wildlife populations separated by human activities or structures such as roads, development etc.

Why wildlife corridors are important?

- The corridors allow an exchange of individuals between populations, which may help prevent the negative effects of inbreeding and reduced genetic diversity (that often occur within isolated populations. Corridors help in increase biodiversity.
- Corridors may also help facilitate the re-establishment of populations that have been reduced or eliminated due to events like fires or disease.

Which is the 50th Tiger Reserve of India?

- **Kamlang** Tiger Reserve, Arunachal Pradesh is India's 50th Tiger Reserve.

How many National Parks are there in India?

- There are 104 existing **national parks** in **India** covering an area of 40501.13 km^2, which is 1.23% of the geographical area of the country

Which is the largest National Park in India?

- The biggest national park in India is the **Hemis National Park**, located in Jammu and Kashmir states. It stretches over nearly 1,700 square miles north of the Himalayas and is covered in dense pine forests, alpine shrubs, and meadow lands.

What activities are not allowed in National Parks?

- local people NOT allowed to collect and use the biomass, means removal of forest produce and livestock grazing are strictly prohibited.
- There are no human **activities allowed** though tourism in certain areas inside the **park** is **allowed**

Under what authority National Parks and Sanctuaries are declared?

- Wildlife Protection Act, 1972

Which authority declares Biosphere reserves ?

- Biosphere reserves are declared under UNESCO Man and Biosphere Reserve Programme, 1971

What is pollination?

- **Pollination** is the act of transferring pollen grains from the male anther of a flower to the female stigma.
- The goal of every living organism, including plants, is to create offspring for the next generation.
- One of the ways that plants can produce offspring is by making seeds.

What and who are the pollinating agents?

- **Pollination** may be biotic or abiotic.
- Biotic **pollination** relies on living **pollinators** to move the pollen from one flower to another.
- Abiotic **pollination** relies on wind, water or even rain.

What are the types of pollination?

- **Pollination** takes place in two ways : self-**pollination** and cross-**pollination.**
- Self-**pollination** occurs when the pollen from the anther is deposited on the stigma of the same flower, or another flower on the same plant
- Cross-pollination when two plants are involved in the process of pollination

Which is better self or cross pollination?

- **Cross pollination is** advantageous because it allows for diversity in the species, as the genetic information of different **plants are** combined.
- Self **pollination** leads to more uniform progeny, meaning that the species **is**, for example, less resistant as a whole to disease.

What is the Millennium Ecosystem Assessment?

- The Millennium Ecosystem Assessment (MA) was called for by the United Nations Secretary-General Kofi Annan in 2000.

What is the objective of Millennium Ecosystem Assessment?

- The objective of the MA was to assess the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems and their contribution to human well-being.

What was the conclusion of Millennium Ecosystem Assessment?

- The overall **Millennium Ecosystem Assessment** has concluded that two thirds of the world's **ecosystems** ranging from wetlands and coastal areas to forests and soils are either degraded or being managed unsustainably. The new spin-off report argues that this has important ramifications for business and industry

Antelopes Oryx

- **Oryx** is a genus consisting of four large antelope species called oryxes. Three of them are native to arid parts of Africa, and the fourth to the Arabian Peninsula. Their fur is pale with contrasting dark markings in the face and on the legs, and their long horns are almost straight.
- Oryx is the national animal of Qatar
- The Arabian **Oryx**, thrives in the harsh desert environment, where temperatures can reach up to 50ºC in the summers.

Chiru

- The Tibetan antelope (Pantholops hodgsonii), locally called **chiru**, is mainly confined to the Tibetan plateau in China. A small population migrates into Chang Thang in eastern Ladakh in the state of Jammu and Kashmir in **India**.
- Males carry thin, long horns that curve slightly forward; females are hornless.

Black-necked crane

- The Black-necked crane is a medium sized crane in Asia that breeds on the Tibetan Plateau and remote parts of India and Bhutan.
- It is whitish-gray with black head, red crown patch, black upper neck and legs and white patch to the rear of the eye.
- It is revered in Buddhist traditions.
- It is a State bird for J&K

Cheetah

- The **cheetah** (Acinonyx jubatus) is a large cat native to Africa and central Iran. It is the fastest land animal, capable of running at 80 to 128 km/h (50 to 80 mph), and as such has several adaptations for speed, including a light build, long thin legs and a long tail.

Flying squirrel

- Flying squirrel are able to glide from one tree to another with the aid of a patagium, a furry, parachute like membrane that stretches from wrist to ankle. Their long tail provides stability in flight. Most are nocturnal and omnivorous eating fruits flowers insects, spiders fungi tree sap and birds eggs.

Where the flying squirrel found in India?

- **flying squirrels** are **found in India** and mainly concentrated in the Himalayan and Northeast regions
- Western Ghats have also but few varities

Indian giant flying squirrel

- The **Indian giant flying squirrel**(*Petaurista philippensis*), also called the **large brown flying squirrel** or the **common giant flying squirrel**, is a species of rodent.
- It is capable of gliding flight using a skin membrane stretched between front and hind legs.
- It is found in mainland Southeast and South Asia, and southern and central China.

Where do we find Indian giant flying squirrel?

- The species is native to China, India, Laos, Myanmar, Sri Lanka, Thailand, and Vietnam.
- It inhabits dry deciduous and evergreen forest, usually at higher elevations from 500–2,000 m (1,600–6,600 ft) and has been recorded on plantations.

Snow leopard

- The **snow leopard** (Panthera uncia), also known as the ounce, is a large cat native to the mountain ranges of Central and South Asia. It is listed as Vulnerable on the IUCN Red List because the global population is estimated to number less than 10,000 mature individuals and is expected to decline about 10% by 2040.

Why snow leopards are killed by locals?

- Snow leopards are often killed by local farmers because they prey on **livestock** such as sheep, goats, horses, and yak calves. The animals which snow leopards would typically hunt—such as the Argali sheep—are also hunted by local communities.

Who all are enemies of snow leopard?

- The **snow leopard** needs trees to get away from it's enemies such as the wolf, the tiger, and the cheetah.
- The **snow leopard** gets away from the cheetah by camouflage and by leaping big leaps because the **snow leopard** is super athletic.

What is Carbon Sequestration?

- **Carbon sequestration** is the **process** of capturing and storing atmospheric **carbon** dioxide. It is one method of reducing the amount of **carbon** dioxide in the atmosphere with the goal of reducing global climate change.
- **Carbon sequestration** describes long-term storage of **carbon** dioxide or other forms of **carbon** to either mitigate or defer global warming and avoid dangerous climate change.

What would happen if phytoplankton of an ocean is completely destroyed for some reason?

- 1. The ocean as a carbon sink would be adversely affected
  2. The food chains in the ocean would be adversely affected
  3. The density of ocean water would drastically decrease.

Why Phytoplankton are important?

- **Phytoplankton** are some of Earth's most critical organisms
- They generate about half the atmosphere's oxygen, as much per year as all land plants.
- **Phytoplankton** is the base of several aquatic food webs. In a balanced ecosystem, they provide food for a wide range of sea creatures including whales, shrimp, snails, and jellyfish.
- No **plankton**=no fish= no food for millions of people. **Without** ocean life millions (if not billions) of people will start to starve

Why Vultures are on the verge of extinction?

- **Vultures** are on the verge of extinction in **India** because a banned drug is being used illegally to treat suffering cattle.
- The endangered birds eat the remains of the drugged animals and suffer kidney failure and visceral gout, which is usually fatal.
- Diclofenac drug . It was banned in 2006. Diclofenac is a nonsteroidal anti-inflammatory drug (NSAID)
- India's three vulture species saw an unprecedented decline of 97 to 99.9 percent between 1992 and 2007 owing to ingesting diclofenac through cattle carcasses.
- The near extinction of this efficient scavenger is linked to spread of zoonotic diseases and increased incidence of rabies.

What are zoonotic diseases?

- **zoonotic disease** is an infectious **disease** caused by a pathogen (an infectious agent, such as a bacterium, virus, parasite or prion) that has jumped from a non-human animal (usually a vertebrate) to a human.
- Ex. Zoonotic influenza; Salmonellosis; Plague; Rabies; Lyme disease; Ebola;

What are the different types of productivity in an ecosystem?

- **Productivity** in **ecosystems** is of two **kinds**,
  -primary and
  -secondary.

  Green plants fix solar energy and accumulate it in organic **forms** as chemical energy. As this is the first and basic form of energy storage, the rate at which the energy accumulates in the green plants or producers is known as primary **productivity**.

What is primary productivity?

- The amount of biomass or organic matter produced per unit area over a time period by plants during photosynthesis is called **primary productivity**.

Which ecosystem has the highest productivity?

- The most productive systems are estuaries, swamps and marshes, tropical **rain forests**, and temperate **rain forests**

What is net primary productivity?

- Net Primary Productivity is the measure of how much carbon dioxide vegetation takes in during photosynthesis minus how much carbon dioxide the plants release during respiration

What is secondary productivity?

- The **productivity** of heterotrophs, such as animals, is called **secondary productivity**. ...

What are the factors affecting primary productivity?

- Net primary productivity varies among ecosystems and depends on many factors. These include solar **energy** input, temperature and moisture levels, **carbon dioxide** levels, nutrient availability, and community interactions.

What are the components of ecosystem?

- An ecosystem can be categorized into its abiotic constituents, including **minerals**, climate, soil, **water**, sunlight, and all other nonliving elements, and its biotic constituents, consisting of all its living members.

What is a food chain?

- A food chain is a chain in an ecosystem where there is transfer of food and energy from one organism to another in a sequence.

What is the importance of ecosystem?

- It provides habitat to wild plants and animals. It promotes various food chains and food webs. It controls essential ecological processes and promotes lives. Involved in the recycling of **nutrients** between biotic and abiotic components.

Which is the largest ecosystem on Earth?

- The World **Ocean** is the largest existing ecosystem on our planet. Covering over 71% of the Earth's surface, it's a source of livelihood for over 3 billion people.

What is Ecological Balance?

- Ecological **balance is** a term used to describe the equilibrium between living organisms such as human being, plants, and animals as well as their environment
- This **balance is** very important because it ensures survival, existence and stability of the environment.

What is ecosystem loss?

- Biodiversity **loss** is the extinction of species (plant or animal) worldwide, and also the local reduction or **loss** of species in a certain habitat.
- Reduced biodiversity in particular leads to reduced **ecosystem** services and eventually poses an immediate danger for food security, also for humankind.

What is the effect of Biodiversity Loss?

- **Biodiversity loss** disrupts the functioning of ecosystems, making them more vulnerable to perturbations and less able to supply humans with needed services.
- The **loss** of **biodiversity** has two significant impacts on human health and the spread of disease.
- First, it increases the number of disease carrying animals in local populations.
- At the same time, habitat fragmentation brings humans in closer and more frequent contact with these disease carrying species.

What is Contour Bunding?

- **Contour bunding** , involves the placement of lines of stones along the natural rises of a landscape, and **contour** farming.
- These techniques help to capture and hold rainfall before it can become runoff.
- They also inhibit wind erosion by keeping the soil.
- **Contour ploughing** is the farming practice of ploughing and or planting across a slope following its elevation **contour** lines.
- In **contour plowing**, the ruts **made** by the plow run perpendicular rather than parallel to the slopes.
- **Contour ploughing** mitigates the impacts of floods, storms and landslides on the crops

What are Aflatoxins?

- Improper handling and storage of cereal grains and oilseeds result in the production of toxins known as aflatoxins
- **Aflatoxins** are a family of toxins produced by certain fungi that are found on agricultural crops such as maize (corn), peanuts, cottonseed, and tree nuts.
- The main fungi that produce **aflatoxins** are Aspergillus flavus and Aspergillus parasiticus .
- **Aflatoxin**: A toxin produced by mold that **can** damage the liver and may **lead to** liver cancer. **Aflatoxins cause** cancer in some animals.
- Children are particularly affected by aflatoxin exposure, which is associated with stunted growth, delayed development, liver damage, and liver cancer

What pollutants are added to environment as (e-waste) when we dispose of old and used computer?

- 1. Beryllium
  2. Cadmium
  3. Chromium
  4. Mercury
  5. Lead

E Waste

- **Electronic waste** or **e-waste** describes discarded electrical or electronic devices.
- Used electronics which are destined for refurbishment, reuse, resale, salvage recycling through material recovery, or disposal are also considered e-waste
- CPUs contain potentially harmful materials such as lead, cadmium, beryllium.
- CRTs have a relatively high concentration of lead and phosphors
- In 2018 e-waste was estimated to be 50 million tonnes in the world.

What is Acid Rain?

- **Acid rain**, or **acid deposition**, is a broad term that includes any form of **precipitation with acidic** components, such as sulfuric or nitric **acid** that fall to the ground from the atmosphere in wet or dry forms.
- This can include **rain**, snow, fog, hail or even dust that is **acidic**

What is the ecological effects of acid rain?

- The ecological **effects of acid rain** are most clearly seen in aquatic environments, such as streams, lakes, and marshes where it can be harmful to fish and other wildlife. As it flows through the soil, **acidic rain** water can leach aluminium from soil clay particles and then flow into streams and lakes.

Where does acid rain occur?

- While **acid rain** is most prevalent where emissions of sulphur dioxide and nitrogen oxide are high, especially in industrial areas/countries, it can **occur** anywhere on Earth as winds blow emissions many miles from their sources.

What a food chain in an ecosystem illustrate?

- A food chain illustrates the order in which a chain of organisms feed upon each other
- **Food chain**, in ecology, the sequence of transfers of matter and energy in the form of **food** from organism to organism.
- **Food chains** intertwine locally into a **food** web because most organisms consume more than one type of animal or plant.

Why the understanding of food chain important?

- It is **important** for us to understand how the **food chain** works so that we know what are the **important** living organisms that make up the **food chain** and how the ecology is balanced.

Corbett National Park

- Jim **Corbett National Park** 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.
- Corbett National Park comprises 520.8 km^2 area of hills, riverine belts, marshy depressions, grasslands and a large lake. The elevation ranges from 1,300 to 4,000 ft
- Forest type: Moist deciduous – Sal, haldu, peepal rohini and mango trees; 10% of the area consists of grasslands. It houses around 110 tree species, 50 species of mammals, 580 bird species and 25 reptile species

Kaziranga National Park

- **Kaziranga National Park** is a national park in the Golaghat, Karbi Anglong and Nagaon districts of Assam.
- **Kaziranga National Park** in Assam is the world's largest habitat for the great one-horned rhinos. It is a UNESCO's world heritage site.
- The **One-Horned rhinoceros**, Royal Bengal Tiger, Asian **elephant**, **wild water buffalo** and swamp deer are collectively known as 'Big Five' of Kaziranga.
- Kaziranga is one of the few wild breeding areas outside Africa for multiple species of large cats, such as Bengal tigers and leopards.

Silent Valley National Park

- **Silent Valley National Park** is a national park in Kerala. It is located in the Nilgiri hills, has a core area of 89.52 km^2.
- **Silent Valley** National Park is situated in the core of the Nilgiri Biosphere Reserve.
- The British **named** the area **Silent Valley** because of a perceived absence of noisy cicadas.
- There are at least 34 species of mammals including the threatened **lion-tailed macaque**, Nilgiri langur, Malabar giant squirrel, Nilgiri tahr, Peshwa's bat (Myotis peshwa) and hairy-winged bat. There are nine species of bats, rats and mice.
- It is home to the largest population of lion-tailed **macaques**, an endangered species of primate.

What are Biofertilizers?

- **Biofertilizers** are the substance that contains microbes, which helps in promoting the growth of plants, trees by increasing the supply of essential nutrients to the plants. It comprises living organisms which include mycorrhizal fungi, blue-green algae, and bacteria.
- Rhizobium, Azotobacter, Azospirillum and blue green algae(BGA) have been traditionally used as **Biofertilizers**
- Rhizobiuminoculant is used for leguminous crops such as pulses.
- Azotobacter can be used with crops like wheat, maize, mustard, cotton, potato and other vegetable crops.

What is Nitrogen Cycle?

- Nitrogen cycle is a continuous series of natural processes by which **nitrogen** passes successively from air to soil to organisms and back to air or soil involving principally **nitrogen fixation**, nitrification, decay, and denitrification.
- Fixation is the first step in the process of making nitrogen usable by plants. Here bacteria change nitrogen into ammonium. **Nitrification** - This is the process by which ammonium gets changed into nitrates by bacteria. Nitrates are what the plants can then absorb.
- An example of free-living bacteria is Azotobacter. Symbiotic nitrogen-fixing bacteria such as Rhizomium usually live in the root nodules of Legumes (such as peas, alfalfa, and locust trees).

What are the stages of Nitrogen Cycle?

- There are 5 stages of Nitrogen cycle

- **Nitrogen fixation** (N2 to NH3/ NH4+ or NO3-)
- Nitrification (NH3 to NO3-)
- Assimilation (Incorporation of NH3 and NO3- into biological tissues)
- Ammonification (organic **nitrogen** compounds to NH3)
- Denitrification(NO3- to N2)

Lion-tailed macaque

- The **lion-tailed macaque** (Macaca silenus), or the wanderoo, is an Old World monkey
- A species that's endemic to western ghats of **India**, spread across tamilnadu, kerala and karnataka. Total population in the wild is estimated around 3000+
- The **hair** of the lion-tailed macaque is black. Its outstanding characteristic is the silver-white mane which surrounds the head from the cheeks down to its chin, which gives this monkey its German name Bartaffe - "beard ape". The hairless face is black in colour.
- The **lion-tailed macaque** or the bearded ape feed on fruits, seeds, young leaves, stems, flowers and buds.

What is Chikungunya? How does it spread?

- **Chikungunya** virus is spread to people by the bite of an infected mosquito. The most common symptoms of infection are fever, joint pain, muscle pain, headache, nausea, fatigue and rash and **low** blood (**platelets**) **count**.
- Most people **recover** fully, with symptoms resolving in three to 10 days. For some people, joint pain may continue for months, or even years.
- Common laboratory tests for **chikungunya** include for instance RT-PCR and serological tests.

What is Hepatitis B infection?

- **Hepatitis B** is an infection of liver.
- It can cause scarring of the organ, liver failure, and cancer.
- It can be fatal if it isn't treated.
- It's spread when people come in contact with the blood, open sores, or body fluids of someone who has the **hepatitis B** virus.

What is HIV-AIDS infection?

- Acquired immunodeficiency syndrome (**AIDS**) is a chronic, potentially life-threatening condition caused by the human immunodeficiency virus (**HIV**). By damaging your immune system, **HIV** interferes with your body's ability to fight infection and disease.
- The fever, **usually** one of the **first symptoms of HIV**, is **often** accompanied by other mild **symptoms**, such as fatigue, swollen lymph glands, and a sore throat. At this point the virus is moving into the blood stream and starting to replicate in large numbers.
- Stages of Infection: Infection, Asymptomatic, Symptomatic, AIDS

What is a niche of an organism?

- The **niche of an organism** is the functional role that it plays within an ecosystem.
- The 'ecological **niche**' is determined by the biotic factors, which comprise of living features such as animals, plants and fungi, and abiotic factors.
- Abiotic factors are non-living environmental features such as sunlight and water availability, and weather and also availability of food and other nutrients.
- The niche of an organism within an ecosystem depends on how the organism responds and reacts to the distribution and abundance of these factors, and in turn how it alters the factors.

What is photochemical smog?

- **Smog** is a type of intense air pollution.
- **Photochemical smog**, often referred to as "summer **smog**", is the chemical reaction of sunlight, nitrogen oxides and volatile organic compounds in the atmosphere, which leaves airborne particles and ground-level ozone.
- **Photochemical smog** depends on primary pollutants as well as the formation of secondary pollutants.
- Photochemical smog is due to vehicular emission from internal combustion engines and industrial fumes.
- Pollution level goes up in cities like Delhi due to the process of inversion that traps pollution close to the ground

What is the role of Trace elements in our nutrition?

- **Trace** elements **function** primarily as catalysts in enzyme systems; some metallic ions, such as iron and copper, participate in oxidation-reduction reactions in energy metabolism.
- Iron, as a constituent of haemoglobin and myoglobin, also plays a vital **role** in the transport of oxygen.
- **Essential trace elements**: boron, cobalt, copper, iodine, iron, manganese, molybdenum, and zinc.
- **Zinc** is found in cells throughout the **body**. It is needed for the **body's** defensive (immune) system to properly work. It plays a **role** in cell division, cell growth, wound healing, and the breakdown of carbohydrates. **Zinc** is also needed for the senses of smell and taste.

How muscle contraction takes place?

- **Contraction occurs** when nerve impulses are transmitted across neuromuscular junctions to the membrane covering each **muscle** fibre
- The **muscle contraction** cycle is **triggered by** calcium ions binding to the protein complex troponin, exposing the active-binding sites on the actin.
- Iron and sodium also essential for contraction of muscles.

What are decomposers?

- An organism who decomposes organic material especially a soil bacterium, fungus are called decomposers.
- Some insects and snails are also decomposers
- **Fungi**, such as the Winter **Fungus**, eat dead tree trunks. Decomposers can break down dead things.
- Most **decomposers** are microscopic **organisms**, including protozoa and bacteria.
- Decomposers include fungi along with invertebrate **organisms** sometimes called detritivores, which include earthworms, termites, and millipedes.
- Virus is not a decomposer

What are fishing grounds?

- **Fishing ground is** an area in a body of water where fishes congregate and **fishing** is usually good.
- More than 70 per cent of the world's fish catch comes from the **Pacific Ocean**.
- Marine life is found to be best developed in oceans with a temperature lower than 20° C. Both the Atlantic and Pacific coastlines of the middle and high latitudes in" the northern hemisphere are very much indented and are backed by strong relief.
- More than half of the annual fish catch comes from the cold and temperate waters of the northern hemisphere.
- The Atlantic and the Pacific Oceans each account for about 40 per cent of the total, the Indian Ocean 4 per cent, while freshwater fishing amounts to about 15 per cent of the total.

What are the unique characteristics of equatorial forests?

- 1. Presence of tall, closely set trees with crowns forming a continuous canopy
  2. Coexistence of a large number of species
  3. Presence of numerous varieties of epiphytes

Equatorial / Rain Forests

- The **forest** in the **equatorial** region is **known** as tropical rain **forest** . It is **also known** as tropical evergreen **forests**. They are confined to tropical regions where heavy rainfall occurs throughout the year. All the trees of these **forests** don't shed their leaves at the same time.

- Characters:
  -High animal and vegetable biodiversity
  - Evergreen trees
  -Dark and sparse undergrowth
  - Scanty Litter
  - Presence of ‘strangler’ creepers ex. Ficus
  - Presence of buttresses: large winged ribs at the base of trunks

The annual range of temperature in the interior of the continents is high as compared to coastal areas. What is/are the reason/reasons?

- Thermal difference between land and water

What are Steppe?

- Steppe. Climate is too dry to support forest but not dry enough to be a desert
- Steppe are grasslands without trees
- Ex. The prairie of North America
- Steppe can be classified by climate:
  1. Temperate steppe
  2. Subtropical steppe- Has a short wet period
- The world's largest steppe region, often referred to as "the Great Steppe" is found in Eastern Europe and Central Asia

How cold storage function?

- **Cold storage** is a means of keeping things at the right temperature. As suggested by its name, **cold storage** keeps perishable items at a low temperature. This way, the chances of the product getting spoilt is reduced drastically.
- Temperature of 4 degree or below is maintained
- **Cold storage** slows down the ripening process and **fruits** and vegetables **stay** fresh for **longer**.
- **Fruits** stored in a **cold** chamber exhibit **longer storage** life because their rate of respiration is decreased.

Gharial

- The **gharial** (Gavialis gangeticus), is the fish-eating crocodile
- It is among the longest of all living crocodiles
- Mature females are 8 ft 6 in–14 ft 9 in long, and males 9 ft 10 in–19 ft 8 in.
- **Gharials** are very shy and will typically hide from humans.
- India's special crocodilian **Gharial** population is the biggest concern for the wildlife lovers, Due to the river pollution, loss of riverine habitat and fishing gill nets, the **Gharial** came to the brink of extinction and fall in the critically **endangered** category.

Leatherback Turtle

- The **leatherback** sea **turtle** (Dermochelys coriacea), sometimes called the lute **turtle** or leathery **turtle** or simply the luth, is the largest of all living **turtles**
- **It lacks bony shell. Carapace (dorsal side) is covered by skin and oily flesh**
- Leatherback turtles have hydrodynamic body design
- A large pair of front flippers powers the turtles through the water.
- In **India**, **leatherback turtles** nest mainly in the Andaman and Nicobar islands. But where they go from there is not known. **Leatherback turtles** are the largest of living **sea turtles**, growing up to two metres and weighing as much as 900 kg.

Swamp Dear

- The barasingha (Rucervus duvaucelii), also called **swamp deer**, is a **deer** species distributed in the Indian subcontinent.
- Populations in northern and central India are fragmented, and two isolated populations occur in southwestern Nepal.
- It is extinct in Pakistan and Bangladesh.
- The **Barasingha** is a vulnerable species. The destruction of their habitat due to deforestation, the draining of swamps and marshes for farming, poaching for its horns and diseases transmitted by domestic cattle, have all led to the decline of the **Barasingha** in India.

Virus

- A **virus** is a sub-microscopic infectious agent that replicates only inside the living cells of an organism.
- **Viruses** can infect all types of life forms, from animals and plants to microorganisms, including bacteria.
- There are millions of types of viruses in the environment
- Viruses are found in almost every ecosystem on Earth and are the most numerous type of biological entity.
- HIV is one of several viruses transmitted through sexual contact and by exposure to infected blood.
- Viral infections in animals provoke an immune response that usually eliminates the infecting virus. Immune responses can also be produced by vaccines

Leaf modifications in desert area plants?

- 1. Hard and waxy leaves
  2. Tiny leaves or no leaves
  3. Thorns instead of leaves

Desert Adaptations

- Nocturnal desert **animals** keep cool by being active at night, whereas some other desert **animals** get away from the sun's heat by digging underground burrows. Other common adaptations seen in desert **animals** include big **ears**, light-coloured coats, humps to store fat, and adaptations that help conserve water.
- **Desert plants** have developed three main adaptive strategies: succulence, drought tolerance and drought avoidance
- The two main adaptations that **desert animals** must make are how to deal with lack of water and how to deal with extremes in temperature.

Desert Adaptations

- Cactus have thick, waxy skin to reduce loss of water and to reflect heat. They have large, fleshy stems to store water. Leaves are modified into thorns to reduce water loss.
- Some plants have glossy leaves to reduce water loss.
- Plants have deep roots to tap ground water
- **Animals survive** in **deserts** by living underground or resting in burrows during the heat of the day. Some creatures get the moisture they need from their food, so they don't need to drink much water
- camels and rattle snakes, Foxes, spiders, antelopes, **elephants and lions** are common desert species.
- the Addax antelope found in the Sahara Desert is one of the most beautiful antelopes in the world.

Why Mycorrhizal biotechnology has been used in rehabilitating degraded sites?

- because mycorrhiza enables the plants to
  1. resist drought and increase absorptive area
  2. tolerate extremes of pH
  3. resist disease infestation

Mycorrhizal biotechnology

- **Mycorrhiza** are symbiotic associations between plant roots and certain soil fungi which play a key role in nutrient cycling in the ecosystem and also protect plants against environmental and cultural stress.
- The fungi colonize the root system of a host plant, providing increased water and nutrient absorption capabilities while the plant provides the fungus with carbohydrates formed from photosynthesis.
- **Mycorrhizal** fungi play a crucial role in plant nutrient uptake, water relations, ecosystem establishment, plant diversity, and productivity of plants.

What is Montreux Record?

- The **Montreux Record** is a register of wetland sites on the List of Ramsar wetlands of international importance

How many sites India have in Montreux Record?

- India has 48 sites in Montreux Record (Keoladeo National Park-Rajasthan, Loktak Lake – Manipur)

What is Ramsar Treaty?

- Ramsar Treaty : It is named after the city of **Ramsar** in Iran, where the Convention was signed in 1971.
- India signed the treaty in 1982

What were the objectives of Ramsar Convention?

- **Ramsar Convention** has two fold objectives viz. Conservation and sustainable utilization of wetlands; and stop the encroachment and loss of wetlands.
- This treaty is not a **legal binding** treaty and is not a part of UN & UNESCO **conventions**.

What are the New Ramsar sites in India identified and included in the list ?

- **The 10 new Ramsar sites of India announced by the Ministry of Environment, Forest and Climate Change (MoEFCC) includes:**
- Nawabganj, Parvati Agra, Saman, Samaspur, Sandi and Sarsai Nawar (Uttar Pradesh)
- Nandur Madhameshwar (Maharashtra)
- Keshopur-Miani, Beas Conservation Reserve and Nangal (Punjab)
- India has 37 Ramsar sites with a surface area of more than 10 lakh hectares

What is Draught Prone Area Programme?

- **Drought** Prone **Areas Programme** (DPAP) is the "earliest **area development programme**" launched by the Central Government in 1973-74 to tackle the special problems faced by those fragile **areas** which are constantly affected by severe **drought** conditions.

What are the objectives of Drought Prone Area Programme?

- The basic objective of the programme is to minimise the adverse effects of drought on production of crops and livestock and productivity of land, water and human resources ultimately leading to drought proofing of the affected areas.
- The programme also aims to promote overall economic development and improving the socio-economic conditions of the resource poor and disadvantaged sections inhabiting the programme areas.

Is Bombay Natural History society is GOI initiative?

- BNHS was founded in 1883 as NGO.

What Bombay Natural History Society does?

- Engaged in conservation and biodiversity research
- Publishes the Journal of the Bombay Natural History Society and quarterly magazine, Hornbill.
- It organizes and conducts nature trails and camps for the general public

What is 'Global Environment Facility' ?

- The Global Environment Facility (GEF) was established on the eve of the 1992 Rio Earth Summit to help tackle our planet's most pressing environmental problems
- Main aim is safeguard the Global Environment

What Global Environment Facility does?

- GEF provides grants mobilize funds for various projects in different countries.
- GEF even supports small civil societies and community initiatives
- Their focus is cities, energy and food and even gender equality

What is Solar Photovoltaic technology?

- **Solar Photovoltaic** (**PV**) is a **technology** that converts sunlight (**solar** radiation) into direct current electricity by using semiconductors.
- When the sun hits the semiconductor within the **PV** cell, electrons are freed and form an **electric** current.
- **Solar PV technology** is generally employed on solar panels.

What power we get from Solar Photovoltaic?

- PV panels provide green energy.
- Sun in an hour radiates energy enough to cover for human consumption for a year.
- Problem of intermittency as sun shine is differ during day
- Solar energy is DC needs to be converted into AC before use.

Dampa Tiger Reserve

- **Dampa Tiger Reserve** or Dampha Tiger Reserve is a tiger reserve of western Mizoram, India. It covers an area of about 500 km^2 (190 sq mi) in the Lushai Hills.
- It was established in 1994 and has an area of 50 square km at an altitude range 2630-3600ft.
- It is the part of Project Tiger. It has tropical forests
- one has to walk through the forest if one wishes to sight animals In the tiger census of 2018, no tiger was found in this reserve

Gumti Wildlife Sanctuary

- Gumti Wildlife Sanctuary is a Wildlife Sanctuary in South Tripura.
- It covers an area of 390 Square Metres
- It provides habitat for Asian elephant, sambar, water buffalo, deer, Phayre's leaf monkey, serow, wild goat and few migratory birds.

Saramati Peak

- **Saramati** is a **peak** rising above the surrounding **peaks** at the mountainous border of Nagaland state, India and the Sagaing Region, Burma.
- **Saramati Peak**. Standing at an altitude of 3841 m, **Saramati** is the highest peak in the state of Nagaland
- Other mountain of Nagaland are, Japfu Peak, Mount Pauna and Pfutsero

What is 'Wetlands International'?

- **Wetlands International** is a **global** organisation that works to sustain and restore **wetlands** and their resources for people and biodiversity
- It is an NGO HQ: Netherlands
- Wetlands International's work ranges from research and community-based field projects to advocacy and engagement with governments, corporate and international policy fora and conventions.

Diphtheria

- **Diphtheria** is a serious bacterial infection that affects the mucous membranes of the throat and nose. Although it spreads easily from one person to another, **diphtheria** can be prevented through the use of vaccines.
- Diphtheria is a serious **infection** caused by strains of bacteria called Corynebacterium **diphtheriae** that make toxin (poison).
- It can lead to difficulty breathing, heart failure, paralysis, and even death.
- The **diphtheria** vaccine is usually combined with vaccines for tetanus and whooping cough (pertussis).

Chickenpox

- **Chickenpox** is caused by the contagious varicella virus and mainly affects children.
- The disease results in a characteristic skin rash that forms small, itchy blisters, which eventually scab over.
- It usually starts on the chest, back, and face. It then spreads to the rest of the body.[
- Chickenpox is an airborne disease which spreads easily from one person to the next through the coughs and sneezes of an infected person.

Smallpox

- **Smallpox** was an infectious disease caused by one of two virus variants, Variola major and Variola minor.
- The last naturally occurring case was diagnosed in October 1977, and the World Health Organization (WHO) certified the global eradication of the disease in 1980.
- Smallpox is estimated to have killed up to 300 million people in the 20th century

What is the theory of Continental Drift?

- **Continental drift** is the theory that the Earth's **continents** have moved over geologic time relative to each other, thus appearing to have "drifted" across the ocean bed.

Who had put up the Continental Drift theory?

- The speculation that **continents** might have 'drifted' was first put forward by Abraham Ortelius in 1596.

What is the evidence for Continental Drift theory?

- look-alike animal and plant fossils, and similar rock formations, are found on different **continents**.

How Continental Drift triggered evolution of new species?

- As **continents** broke apart from Pangaea, species got separated by seas and oceans and speciation occurred.
- This drove **evolution** by creating new species. Also, as the **continents drift**, they move into new climates.

What is a Glacial Cycle?

- A **glacial** period (alternatively **glacial** or **glaciation**) is an interval of time (thousands of years) within an ice age that is marked by colder temperatures and **glacier** advances.
- Inter glacial, on the other hand, are **periods** of warmer climate between **glacial periods**.
- The Last **Glacial** Period ended about 15,000 years ago.

What is the trigger for Ice Age?

- An **ice age** is **triggered** when summer temperatures in the northern hemisphere fail to rise above freezing for years.

Was there any significant outcome of the recent ice age?

- One significant outcome of the recent **ice age** was the development of Homo sapiens. **Humans** adapted to the harsh climate by developing such tools as the bone needle to sew warm clothing, and used the land bridges to spread to new regions.

How Organisms evolved?

- **Evolution** is the change in the characteristics of a species over several generations and relies on the process of natural selection.
- **Evolution** relies on there being genetic variation in a population which affects the physical characteristics (phenotype) of an **organism**.

What are reasons for declining population of Dolphins of River Ganges?

- Once present in tens of thousands of numbers, the **Ganges river dolphin** has dwindled abysmally to less than 2000 during the last century owing to direct killing, habitat fragmentation by dams and barrages and indiscriminate fishing.
- Use of synthetic fertilizers and other agricultural chemicals in crop-fields in the vicinity of rivers
- The **Ganges river dolphin** can only live in freshwater that too when there is no pollution.

Why there is some concern in use of Brominated Flame Retarders?

- **Brominated flame retardants** (BFRs) are mixtures of man-made chemicals that are added to a wide variety of products, including for industrial use, to make them less flammable.
- They are used commonly in plastics, textiles and electrical/electronic equipment
- It was found that they are able to accumulate in humans and animals
- The critical effects are on neuro behavioural and kidney and liver are also affected. It has carcinogenic effects too.
- **Brominated flame retardant** chemicals, **banned** in the U.S. since 2004.

What is Hibernation?

- **Hibernation** is a deep sleep that helps them to save energy and survive the winter without eating much. During **hibernation** the animal's body temperature drops, and its heartbeat and its breathing slow down so that it does not use much energy.
- Ex. Bats, Rodents, Bear, Snakes, ground hogs, Bees

Is hibernation is an adaptation?

- Yes. It is way to tide over unsuitable climate.

How long the hibernation last?

- **Hibernation** may last days, weeks, or months - depending on the species, ambient temperature, time of year, and the individual's body-condition. Before entering **hibernation**, **animals** need to store enough energy to last through the duration of their dormant period, possibly with margins of safety.

What are the methods of adding of Carbon Dioxide to the carbon cycle on Earth?

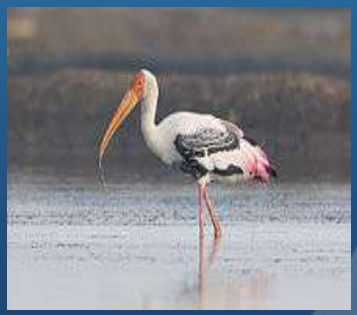
- 1. Volcanic action
  2. Respiration
  3. Decay of organic matter

Carbon Cycle

- The **carbon cycle** is nature's way of reusing **carbon** atoms, which travel from the atmosphere into organisms in the Earth and then back into the atmosphere over and over again.
- Most **carbon** is stored in rocks and sediments, while the rest is stored in the ocean, atmosphere, and living organisms.
- Carbon Cycle consist 4 steps: Photosynthesis, Decomposition, Respiration and Combustion.
- In the natural **carbon cycle**, there are two main processes which occur: photosynthesis and metabolism. During photosynthesis, plants use **carbon** dioxide and produce oxygen. During metabolism oxygen is used and **carbon** dioxide is a product.

Painted Stork

- The **painted stork** (Mycteria leucocephala) is a large wader in the **stork** family.
- It is found in the wetlands of the plains of tropical Asia south of the Himalayas in the Indian Subcontinent and extending into Southeast Asia.
- Their distinctive pink tertial feathers of the adults give them their name.
- As they wade along they also stir the water with their feet to flush hiding fish. They nest colonially in trees, often along with other water birds.
- They are not migratory.

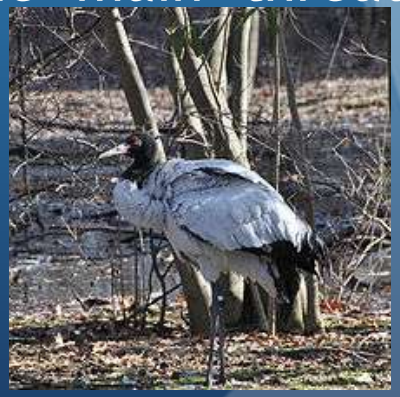


Common Myna

- The common Mayan is native of Asia.
- An omnivorous open woodland bird with a strong territorial instinct, the common myna has adapted extremely well to urban environments.
- IUCN declared it one of the world's most invasive species
- It poses a threat to biodiversity, agriculture and human interests.

Black-necked Crane

- The **black-necked crane** (Grus nigricollis) is a medium-sized **crane** in Asia that breeds on the Tibetan Plateau and remote parts of India and Bhutan.
- It is 55 in long with a 7.8 ft wingspan, and it weighs 5.5 kg.
- These birds are legally **protected** in China, India and Bhutan
- Loss and degradation of habitat are the main threats facing the **black-necked cranes.**



What are Lichens?

- A Lichen is a composite organism
- It is a symbiotic relationship of algae and a fungi
- **Lichens**come in many colors, sizes, and forms and are sometimes **plant**-like, but **lichens** are not **plants**.
- **Lichens** do not have roots that absorb water and nutrients as **plants** do,
- But they produce their own nutrition by photosynthesis.
- Common names of Lichens reindeer moss, Iceland moss BUT LICHENS ARE NOT MOSSES
- Lichens occur from sea level to alpine elevation and can grow on almost any surface.

What is common flora of Himalayas?

- In the lower forested zone, birch, juniper, blue pines, firs, bamboo and rhododendron grow. Above this zone all **vegetation** are found to be dwarf or shrubs. As the altitude increases, **plant** life is restricted to lichens and mosses.

What pollutants released by Steel Industry?

- Producing **steel** requires the use of large quantities of energy and minerals, as well as vast mining and waste disposal areas. As a result, **steel** production generates significant amount of air **pollutants**, solid by-products and residues, as well as waste water sludge
- Steel production has a number of impacts on the environment, including air emissions (CO, SOx, NOx, PM2), **wastewater** contaminants, hazardous wastes, and solid wastes. The major environmental impacts from integrated steel mills are from coking and iron-making.
- Steel industry is highly raw material intensive industry for making 1 ton of steel it requires 3.5 to 5 tons of raw material.

What festival is Hari Jiroti celebrated by tribals?

- Every monsoon, the Gond and Korku **tribes** of Madhya Pradesh's Betul and Harda districts celebrate Hari Jiroti.
- It is a month-long **festival** of greenery, during which the **tribals plant saplings** of fruit-bearing trees
- hari jiroti — the Gond and Korku festival celebrating the beginning of the rains and the new sowing season.
- To combat the twin problems of malnutrition and environmental degradation, adivasis of Harda and Betul districts of Madhya Pradesh have decided to launch 'Operation Guerrilla Green' — a movement to plant large numbers of fruit bearing trees on vacant land, wherever it is available.

What is coal bed Methane?

- **Coal bed methane** (**CBM**) is a form of natural gas which can be recovered from **coal** deposits or **coal seams** (a **coal** deposit is a geographical location containing mineable accumulations of **coal** while a **coal seam** is entrapment of **coal** in underlying rock).
- **CBM is formed** during the process of coalification by transformation of plant material into **coal**. It is generated by either a microbiological or thermal process as a result of increasing heat at greater depth during **coal** formation.
- The **coal seams** are often saturated with groundwater at high pressure.
- **Where is coalbed methane found**? **Coalbed methane** is associated with **coal** deposits, and is **found** in **coal seams**. In the past, the gas was the cause of numerous explosions in underground mines.

What is Shale Gas?

- Shale gas is occurring within shale.
- **Shale gas** is natural **gas** trapped within tiny pore spaces in **shale** formations. It is a hydrocarbon **gas** mixture. It consists mainly of methane. Other hydrocarbons are natural **gas** liquids like ethane, propane, and butane, and it also contains carbon dioxide, nitrogen, and hydrogen sulphide.
- **Shale gas**, also known as parent rock **gas** or schist **gas**, it is trapped in rocks and schist. The different methods have to be **used** to extract it. The most well-known of these methods is hydraulic fracturing.
- Shale gas is trapped in rock and is much harder to access.

In India where have we explored for shale gas?

- **India** has identified six basins as areas for **shale gas** exploration: Cambay (Gujarat), Assam-Arakan (North East), Gondwana (Central **India**), Krishna Godavari onshore (East Coast), Cauvery onshore, and Indo-Gangetic basins.
- **India has** got technically recoverable **shale gas** of 96 trillion cubic feet. The recoverable reserves are identified in Cambay, Krishna – Godavari, Cauvery, Damodar Valley, Upper Assam, Pranahita – Godavari, Rajasthan and Vindhya Basins.

Is shale gas is fossil fuel?

- Yes it is fossil fuel.

Where do we find corals in India?

- The major reef formations in India are restricted to the **Gulf of Mannar**, Palk bay, **Gulf of Kutch**, **Andaman and Nicobar Islands** and the **Lakshadweep islands.**
- While the Lakshadweep reefs are atolls, the others are all **fringing reefs.**

Which is the largest coral reef in India?

- They are a part of the Mannar **Barrier reef** which is about 140 km long and 25 km wide between Pamban and Tuticorin

Can coral be collected?

- **Corals** are schedule 1 species under the Wildlife Protection Act, 1972, meaning **corals** have the same protection as that of a tiger or a leopard.
- "The collection of these species, dead or alive, is completely banned under Indian laws. They can neither be exported nor imported.

How many coral islands are there in India?

- The Lakshadweep **Islands** union territory of **India** is a group of 39 **coral Islands**, and some minor islets and banks.
- Also, some of the **islands** belonging to Kiribati are considered **coral islands**.

Which is India's first national marine park?

- Marine National Park in the **Gulf of Kutch** is situated on the southern shore of the **Gulf of Kutch** in the Devbhumi Dwarka district of **Gujarat** state, India.
- In 1980, an area of 270 km^2 from Okha to Jodiya was declared Marine Sanctuary.

Are coral animal?

- Yes corals are animals.
- The branch or mound that we often call “a **coral**” is actually made up of thousands of tiny **animals** called polyps.
- A **coral** polyp is an invertebrate that can be no bigger than a pinhead to up to a foot in diameter.

What are the types of coral reefs?

- The three main types of coral reefs are fringing, barrier, and atoll.
- The most common type of reef is the fringing reef. This type of reef grows seaward directly from the shore

Do corals have symbiotic relationship with algae?

- Most **corals**, like other cnidarians, contain a symbiotic algae called zooxanthellae, within their gastro-dermal cells.
- The **coral** provides the algae with a protected environment and the compounds necessary for photosynthesis.
- In return, the algae **produce oxygen** and help the **coral** to remove wastes.

Why coral reefs are important?

- **Coral** reefs are **important.**
- They: protect coastlines from the damaging effects of wave action and tropical storms. provide habitats and shelter for many marine organisms.

Do coral fight?

- **Corals** are superb fighters. They fend off encroaching **corals** by stinging them with their tentacles and by ejecting their stomachs to digest them.
- These **coral-coral battle** zones are easy to spot; when two different **corals** meet, there's often a cleared band between the two where they've killed each other off.

What are going to be Global Warming Effects?

- Ongoing **effects** include rising sea levels due to thermal expansion and melting of glaciers and ice sheets, and **warming** of the ocean surface, leading to increased temperature stratification. Other possible **effects** include large-scale changes in ocean circulation.
- Changes in food webs
- With increase in temperature will led to the emergence of large-scale environmental hazards to human health, such as extreme weather, ozone depletion, increased danger of wildland fires, loss of biodiversity, stresses to food-producing systems and the **global** spread of infectious diseases.

What is Watershed area?

- **Watershed** is the area that drains into a single river is the **watershed** for that river.
- A **watershed** is an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel.

What are the functions of watershed?

- Watersheds fulfill three primary functions: to capture **water**, to filter and store **water** in the soil and to release **water** into a waterbody. Within the complex living system of a watershed, everything is connected.

What is Integrated Watershed Development Programme?

- **Integrated Watershed Management Programme** (IWMP) is implemented by Department of Land Resources of Ministry of Rural **Development**.
- The main objective of IWMP is to restore ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover and water.

What is Watershed Management?

- **Watershed management** serves to integrate planning for land and **water**; it takes into account both ground and surface **water** flow, recognizing and planning for the interaction of **water**, plants, animals and human land use found within the physical boundaries of a **watershed**.
- Core **principles of Watershed** management is continuous and needs a multi disciplinary approach.

What are Transgenic crops?

- A **transgenic crop** is a **genetically modified** organism (**GMO**).
- **Transgenic** indicates that a transfer of genes has occurred using recombinant DNA technology.
- Generally a **transgenic crop** contains one or more genes that have been inserted artificially either from an unrelated plant or from different species altogether.
- **Transgenic plants** are developed that are resistant to a specific pest.
- **Transgenic** organisms are all **GMOs** because they have been **modified** at the genomic level by using DNA from a **different** organism (like the GloFish), but not all **GMOs** are **transgenic**

What are GMO Crop?

- The **first genetically modified crop**, an antibiotic-resistant tobacco **plant**, was produced in 1982. China was the **first** country to commercialize **transgenic** plants, introducing a virus-resistant tobacco in 1992.
- In GMO the manipulation of genes are done but new genes from other organism are not added. The genes of the original organism is modified as for example some genes can be turned off from depicting some characters which are undesirable
- Example When we cut apple browning happens due to release of Polyphenol oxidase. The gene is responsible for release of this chemical. This particular gene is suppressed. Now apple when cut doesn't turn brown

What is Golden Rice?

- Golden Rice is the most well known GM crop that is aimed at increasing nutrient value. It has been engineered with three genes that biosynthesise beta- carotene, a precursor of Vitamin A in the edible parts of rice.
- It is intended to produce a fortified food to be grown and consumed in areas with a shortage of dietary Vitamin A, a deficiency which each year is estimated to kill 670,000 children under the age of 5 and cause an additional 500,000 cases of irreversible childhood blindness.
- The original golden rice produced 1.6µg/g of the carotenoids with further development increasing this 23 times. In 2018 it gained its first approvals for use as food.

What are the uses of Maize?

- 1.Maize can be used for the production of starch
  2. Oil extracted from maize can be a feedstock for biodiesel
  3. Alcoholic beverages can be produced by using maize

What is Maize? Is it better than wheat?

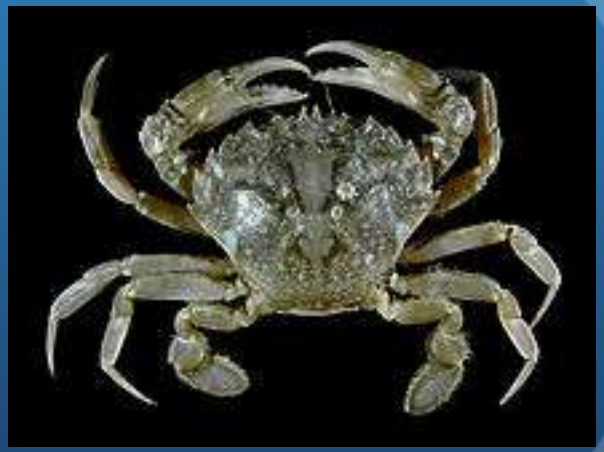
- **Maize**, a member of the grass family Poaceae.
- It is a cereal grain which was first grown by people in ancient Central America. It is now the third most important cereal crop in the world.
- **Maize** grows quickly and produces almost double the yield of wheat.
- In India, **maize** is the third most important food crops after rice and wheat.
- **Corn** can be used for food as **corn** flour. It can be used as animal feed. And it can be turned into ethanol, high-fructose **corn** syrup or even bio-based plastics.

How animals are classified?

- Animals are classified as Invertebrates and Vertebrates.
- Vertebrates are further classified as
  - Fishes
  - Amphibians
  - Reptiles
  - Birds
  - Mammals
- Invertebrates are further classified as
  - Sponges
  - Coelenterates
  - Worms
  - Arthropods
  - Mollusks
  - Echinoderms

What are crab?

- Crabs are decapod crustaceans, Arthropoda.
- They live in all the world's oceans, in fresh water, and on land, are generally covered with a thick exoskeleton, and have a single pair of pincers.
- Hermit crab, king crab, porcelain crabs, horseshoe crabs , crab lice are not true crabs.



Spider, Scorpion and Mite belong to which group of animals?

- Scorpion; spider; mite; are arachnids phylum: Arthropoda
- They have eight legs and are easily recognized by the pair of grasping pedipalps and the narrow, segmented tail.
- **Scorpions** can be observed in many types of habitats. However, most **scorpions** prefer deserts and semi-arid regions. Most **scorpions** hide under logs, rocks, boards and clutter. Some, such as the bark **scorpion**, rest on vertical surfaces like trees, bushes and walls.

Which is the most lethal scorpion?

- The **Indian Red Scorpion** is considered the most lethal of all scorpions. But despite its reputation, it only stings as a last resort.

Are scorpion good for nature?

- In nature, **scorpions** are **beneficial**. **Scorpions** are predators, and so they feed on a variety of potential pest organisms.
- Some **scorpions** also feed on other **scorpions**, so they do have an important role in the environment potentially controlling pest populations

What are spiders?

- **Spiders** are arachnids, a class of arthropods that also includes scorpions, mites, and ticks.
- **Spiders** (order Araneae) are air-breathing arthropods that have eight legs, chelicerae with fangs generally able to inject venom, and spinnerets that extrude silk
- They are the largest order of arachnids and rank seventh in total species diversity among all orders of organisms.

What is the most deadly spider?

- **Phoneutria** are poisonous to humans, and they are considered to be the deadliest of all the world's spiders.

Where do spiders live?

- **Spiders live in** both temperate and tropical climates and can be found in a variety of wetlands, including bogs, swamps and marshes. They make their homes in a variety of biomes, including tundra, desert, chaparral, rainforests, mountains and forests.

What are Mites?

- **Mites** are small arthropods belonging to the class Arachnida
- Dust **mites** are almost always found inside homes
- Folliculorum **mites live** in or around **hair** follicles, feeding **on the** dead skin cells, oils, and hormones that build up there. These **mites** usually **live on the** face, including **the** eyelids and eyelashes.
- **Bed** is probably where **we find** the highest concentration of **mites**. Like the common **bed** bug, **mites** love to **make** their homes in mattress pads and pillows.

What is the International Treaty on Plant Genetic Resources for Food and Agriculture

- The objectives of the International Treaty on Plant Genetic Resources for Food and Agriculture are

  -the conservation and sustainable use of all plant genetic resources for food and agriculture and

  -the fair and equitable sharing of the benefits arising out of their use,

  -in harmony with the Convention on Biological Diversity,

  for sustainable agriculture and food security.

What is the United Nations Convention to Combat Desertification

- **UNCCD** is the sole legally binding international agreement linking environment and development to sustainable land management. It was established in 1994

What are the objectives of UNCCD?

- The objectives of the UNCCD seeks to improve land productivity, to restore (or preserve) land, to establish more efficient water usage and to introduce **sustainable** development in the affected areas and more generally, improve the living conditions of those populations affected by drought and desertification.

What preventive actions are taken for combating Desertification?

- Preventive actions include: Integrating land and water management to protect soils from erosion, salinization, and other forms of degradation. Protecting the vegetative cover, which can be a major instrument for soil conservation against wind and water erosion.

What is 'Earth Hour'?

- Earth Hour is a worldwide movement organized by the World Wide Fund for Nature (WWF)
- The event is held annually encouraging individuals, communities, and businesses to turn off non-essential electric lights, for one hour, from 8:30 to 9:30 p.m. on a specific day towards the end of March, as a symbol of commitment to the planet.
- It was started as a lights-off event in Sydney, Australia, in 2007. Since then, it has grown to engage more than 7,000 cities and towns across 187 countries and territories to raise awareness for energy consumption and effects on the environment

Food chain among Diatoms, Crustaceous and herrings?

- Diatoms- **Diatoms** are algae that live in houses made of glass. They are the only organism on the planet with cell walls composed of transparent, opaline silica. They are found very widely almost anywhere moist.
  Diatoms are classified as eukaryotes, organisms with a membrane-bound **cell** nucleus
  They play a key role in the global carbon cycle.
- Crustaceous- The **Crustacea** are a subphylum of arthropods **Crustaceans** include crabs, lobsters, crayfish, shrimp, krill and barnacles
- Herrings- **Herring** are forage fish, It is good to eat herring as it is most nutritional benefits, has Omega 3 and antioxidants.
- Food chain: Diatoms-> Crustaceous-> Herrings

What are 'Eco-Sensitive Zones'?

- **Eco-Sensitive Zone. Eco-Sensitive Zones** (ESZs) or Ecologically Fragile **Areas**(EFAs) are **areas** in India notified by the Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India around Protected **Areas** , National Parks and Wildlife Sanctuaries.
- **Eco-Sensitive Zones** or Ecologically Fragile Areas are areas within 10 km around Protected Areas, National Parks and Wildlife Sanctuaries.
- **Permitted** activities in the Eco Sensitive Zones: Ongoing **agricultural** or horticultural practices, rainwater harvesting, organic **farming**, use of renewable energy sources, adoption of green technology for all activities.

What is Animal Welfare Board?

- The **Animal Welfare Board** of India (AWBI), headquartered at Ballabhgarh in Haryana state, is a statutory advisory body advising the Government of India's Ministry of Fisheries, **Animal** Husbandry and Dairying (**Department** of **Animal** Husbandry and Dairying). It was previously based at Chennai.
- The Animal Welfare Board (**AWBI**) was established in 1962 under Section 4 of the Prevention of Cruelty to Animals Act, 1960.

What is the mandate of Animal Welfare Board of India?

- Mandate of Animal Welfare Board is to prevent cruelty, suffering and pain to all creatures.
- Welfare need identified are Health, Proper behaviour, & Companionship

In the South Atlantic and South-Eastern Pacific regions in tropical latitudes, cyclone does not originate. What is the reason?

- Inter-Tropical Convergence Zone seldom occurs
- Winds flow outward above the storm allowing the air below to rise. **Hurricanes** typically form between 5 to 15 degrees latitude north and **south** of the equator. The Coriolis Force is needed to create the spin in the hurricane and it becomes too weak near the equator, so **hurricanes** can never form there.
- The **south eastern Pacific** Ocean is normally **not** conducive to tropical **cyclone** development. Sea surface temperatures off the west coast of South America are normally far too cold and the region is located in a semi-permanent high pressure zone, characterized by dry, sinking air.

Keibul Lamjao National Park

- The Keibul Lamjao National Park is in Bishnupur district of the state of Manipur.
- It is 40 square km in area
- It is the only floating park in the world
- It is an integral part of Loktak Lake
- The national park is characterized by many floating decomposed plant materials locally called phumdis
- Sangai also called the dancing deer listed as an endangered species by IUCN

How harmful is the excessive use of nitrogenous fertilizers?

- Excessive use of N (urea) encourages climate change (when lost through denitrification) and groundwater pollution (when lost through leaching).
- Increase in nitrate content of groundwater in some intensively-cropped areas has been reported, which is obviously due to leaching of nitrates beyond crop root zone.
- Increase in nitrate content of groundwater is potentially harmful, as it is used for drinking purposes in most of the rural areas.

How can we achieve balanced use of Nitrogen Fertilizer?

- Unbalanced use of urea decreases N use efficiency, thus leads to increase in cost of production and lowering of net profits.
- Inclusion of legumes may curtail fertilizer N (urea) requirement by 25-50%. Depending on cropping system and availability of irrigation, legumes could be introduced as catch crop, green manures, forage crop, break crop or as short duration grain crop.

What is IUCN?

- **IUCN means International Union for Conservation of Nature and Natural Resources**
- IUCN has a membership of over 1400 governmental and non-governmental organizations. Its HQ is in Switzerland. It is not the part of UNO.
- It is an International Organization working in the field of nature conservation and sustainable use of natural resources.
- It is involved in data gathering and analysis, research, field projects, advocacy, and education.

What is the mission of IUCN? What they publish?

- IUCN's mission is to "influence, encourage and assist societies throughout the world to conserve nature and to ensure that any use of natural resources is equitable and ecologically sustainable".
- Now IUCN have widened the scope as now they look into the sustainable development
- They publish the IUCN Red List of Threatened Species.

What is Fly Ash?

- **Fly ash is produced** by **coal**-fired electric and steam generating plants. Typically, **coal** is pulverized and blown with air into the boiler's combustion chamber where it immediately ignites, generating heat and **producing** a molten mineral residue.
- **Fly ash** is a by product from burning pulverized **coal** in electric power generating plants. As the fused material rises, it cools and solidifies into spherical glassy particles **called fly ash. Fly ash** is collected from the exhaust gases by electrostatic precipitators or bag filters.

Why fly ash is considered harmful to human beings?

- **Fly ash** particles (a major component of coal **ash**) can become lodged in the deepest part of our lungs, where they trigger asthma, inflammation and immunological reactions.

How fly ash can be used?

- **Fly ash** can be used as prime material in many cement-based products, such as poured concrete, concrete block, and brick. One of the most common **uses** of **fly ash** is in Portland cement concrete pavement or PCC pavement.

Is fly ash green material?

- **Fly ash** comes from one of the biggest sources of air pollution and carbon dioxide emissions on **Earth**, and yet it's considered to be a **green** material.
- The main reason that **fly ash** is considered to be **eco-friendly** when used in construction is because it's a recycled material.

Dugong

- The **dugong** is a medium-sized marine mammal. Herbivorous.
- In **India**, **dugongs** are found in the Gulf of Mannar, Palk Bay, Gulf of Kutch and Andaman and Nicobar Islands. Once found in abundance in **Indian** waters, the **dugong** population has reduced to about 200 individuals
- **Dugongs** have a fluked tail, meaning it is made up of two separate lobes joined together **in the** middle. The snout of a **dugong** is broad, short, and trunk-like. **Dugongs** use their flippers like hands,
- Adult dugongs do not have any natural predators, but juveniles may be eaten by **saltwater crocodiles**, **killer whales**, and large, coastal **sharks**.

Which is National Aquatic Animal?

- The Ministry of Environment and Forest declared the **Gangetic dolphin** the national aquatic animal of India.
- **Ganges river** dolphins prefer deep waters, in and around the confluence of rivers. The distribution range of the **Ganges river** dolphins in India covers seven states namely, Assam, Uttar Pradesh, Madhya Pradesh, Rajasthan, Bihar, Jharkhand and West Bengal.
- The International Union for Conservation of Nature (IUCN) revised the threatened status of the **Ganges river dolphin** from vulnerable to endangered as per IUCN Global Red List guidelines . At present, it is thought that there are about 3500 individuals of this species throughout its distribution range .

Where is Gangetic Dolphin Sanctuary?

- **Vikramshila Gangetic Dolphin Sanctuary** (VGDS) in Bihar's **Bhagalpur district**, is the only sanctuary for Gangetic Dolphin
- Dolphis are blind
- Water pollution, poaching, and fishing in the **river** have also been a part of the reason for the population decline.
- The Indus river dolphin eats **crustaceans** such as prawns, as well as fish including gobies, catfish and carp.

What are Sanitary and Phytosanitary Measures?

- The **Agreement** on **the Application of Sanitary and Phytosanitary Measures** sets out the basic rules for food safety and animal and plant health **standards**.
- It allows countries to set their own **standards**.
- They should be applied only to the extent necessary to protect human, animal or plant life or health.

Which is the region in India having a combination of mangrove forest, evergreen forest and deciduous forests?

- Andaman and Nicobar Islands

What are the different types of forests in Andaman and Nicobar Islands?

- The Andaman and Nicobar Islands comprises of 572 islands of which 37 are inhabited.
- Andaman Islands and Nicobar Islands separated by the 150 km wide Ten Degree Channel on the 10 Degree North Parallel
- The Andaman and Nicobar Islands have a tropical rainforest canopy,
- The South Andaman forests have a profuse growth of epiphytic vegetation mostly ferns and orchids.
- The Middle Andamans harbours mostly moist deciduous forests.
- North Andaman have wet evergreen forests North Nicobar are completely devoid of evergreen forests
- Grasslands occur only in the Nicobar.

What was Montreal Protocol?

- The **Montreal Protocol** is an international treaty designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. It was agreed on 16th September 1987, and entered into force on 1st January 1989.

What was Nagoya Protocol?

- The **Nagoya** Protocol addresses traditional knowledge associated with genetic resources with provisions on access, benefit-sharing and compliance. It also addresses genetic resources where indigenous and local communities have the established right to grant access to them.
- **India**, along with 10 other countries, has signed the **Nagoya Protocol** on Genetic Resources, with an aim to promote sustainable use of biological diversity.
- **Nagoya** is the fourth largest city in Japan and sits in the charming Aichi region of the country. It is best **known** perhaps for being the centre of the automotive industry in Japan

What is Kyoto Protocol?

- Targets for the first commitment period The targets for the first commitment period of the **Kyoto Protocol** cover emissions of the six main greenhouse gases.
- Kyoto Protocol failed. Many argue that **Kyoto's failure** is due to deficiencies in the structure of the agreement, such as the exemption of developing countries from reductions requirements, or the lack of an effective emissions trading scheme.

What was Rio+20 Conference?

- Rio + 20 Conference was United Nations Conference on Sustainable Development.
- **Rio+20 - took place** in **Rio** de Janeiro, Brazil on **20**-22 June 2012.
- It resulted in a focused political outcome document which contains clear and practical measures for implementing sustainable development.
- The Rio Summit produced conventions dealing with climate change, biodiversity, forestry and recommended a list of development practices called '**Agenda 21**'. Compromise and accommodation are the two essential policies required by states to save planet Earth.

What for the term 'Goldilocks Zone' refers to?

- The **Goldilocks Zone** refers to the **habitable zone** around a star where the temperature **is** just right - not too hot and not too cold - for liquid water to exist on an **planet**. ... Looking for planets in the **Goldilocks Zone is** a way that allows scientists to hone in their search for Earth-like planets that **could** contain life

- The **moon** is within the **Goldilocks Zone**.

- The **Goldilocks principle** is **named** by analogy to the children's story "The Three Bears", in which a little girl **named Goldilocks** tastes three different bowls of porridge and finds that she prefers porridge that is neither too hot nor too cold, but has just the right temperature.

What is 'Green Climate Fund'?

- It was set up by the United Nations Framework Convention on **Climate** Change (UNFCCC) in 2010.
- The **Green Climate Fund** (GCF) is the world's largest dedicated **fund** helping developing countries reduce their greenhouse gas emissions and enhance their ability to respond to **climate** change.
- Fund: $10.3 billion
- The Paris Agreement's long-term temperature goal is to keep the increase in global average temperature to well below 2 ° C above pre-industrial levels; and to pursue efforts to limit the increase to 1.5 ° C, recognizing that this would substantially reduce the risks and impacts of climate change.

What type of Forests Namdapha National Park has?

- Namdapha National Park is about 2000 square km. in Arunachal Pradesh.
- There are more than 1000 floral and about 1400 faunal species. It is a biodiversity hotspot.
- Park has Evergreen rainforests also temperate broad leaf and mixed forest. Park ha s extensive bamboo forests.
- It also has dipterocarp forests. Trees having two winged fruits . Found in Evergreen forests
- It has a climate that varies from tropical to subtropical, temperate and arctic?

What is 'Bio Carbon Fund Initiative for Sustainable Forest Landscapes'?

- The Bio Carbon Fund Initiative for Sustainable Forest Landscapes (ISFL)
- It was launched at the UNFCCC COP19 in Warsaw, Poland.
- It is a multilateral **fund**, supported by donor governments and **managed** by the World Bank.
- The Bio Carbon Fund Initiative for Sustainable Forest Landscapes (ISFL) collaborates with countries around the world to reduce emissions from the land sector through smarter land-use planning, policies, and practices.
- Including efforts to reduce deforestation and forest degradation in developing countries (REDD+), sustainable agriculture

What is the Genetic Engineering Appraisal Committee?

- The **Genetic Engineering Appraisal Committee** (GEAC) is a statutory body constituted under the 'Rules for the Manufacture, Use /Import /Export and Storage of Hazardous Microorganisms/**Genetically Engineering** Organisms or Cells, 1989' notified under the Environment (Protection) Act, 1986.

What are the functions of the Genetic Engineering Appraisal Committee?

- The functions of GEAC as prescribed in the Rules 1989 are as follows:
- To appraise activities involving large scale use of hazardous microorganisms and recombinants in **research** and industrial production from the environmental angle

What are Living Root Bridges?

- A living root bridge is a type of simple suspension bridge formed of living plant roots by tree shaping.
- They are common in the southern part of Meghalaya.
- The bridges have existed in Meghalaya since 1844.There are 11 living root bridges in Meghalaya.
- They are handmade from the aerial roots of rubber fig trees (Ficus elastica) by the Khasi and Jaintia peoples of the mountainous terrain along the southern part of the Shillong Plateau.
- Mature bridges stretch 15 to 250 feet over deep rivers and gorges, and can bear impressive loads—upwards of 35 people at a time. A double-decker root bridge in Cheerapunji is one of the main attractions in Meghalaya

In India, where we find 'Tropical Wet Evergreen Forests'?

- Arunachal Pradesh
- Mizoram

Tropical Wet Evergreen Forests

- **Moist tropical evergreen forests are found** in The Shillong plateau
- **Tropical evergreen forests** in our country are found mainly in the **rainy** tracts of the Sahyadris and the hill regions of the Shillong plateau.
- **Tropical evergreen forests are usually found in areas receiving more than 200 cm of rainfall and having a temperature of 15 ° C to 30 ° C. They occupy about seven per cent of the Earth's land surface and harbour more than half of the planet's terrestrial plants and animals.**

What is IndARC?

- **IndARC** is India's first underwater moored observatory in the Arctic region.

When and where IndARC deployed?

- **IndARC** is India's first underwater moored observatory in the Arctic region

What is the goal of IndARC project?

- Its research goal is to study the Arctic climate and its influence on the monsoon.

Who developed IndARC observatory?

- This moored observatory is designed and developed by Earth System Science Organisation (ESSO)- and others.

What is Forest Carbon Partnership Facility?

- **The Forest Carbon Partnership Facility (FCPF)** is a global partnership of governments, businesses, civil society, and Indigenous Peoples focused on reducing emissions from deforestation and forest degradation, forest carbon stock conservation, the sustainable management of forests, and the enhancement of forest carbon stocks in developing countries, activities commonly referred to as REDD+.
- The FCPF works with 47 developing countries across Africa, Asia, and Latin America and the Caribbean, along with 17 donors that have made contributions and commitments totalling $1.3 billion. The FCPF supports REDD+ efforts through its Readiness and Carbon Funds.

What is REED?

- **REDD** refers to reducing emissions from deforestation and forest degradation;

What is REED+?

- **REDD+** refers to conservation of forest carbon stocks, sustainable management of forests, and enhancement of forest carbon stocks

How REED+ was created?

- **REDD+** was **created** through international negotiations under the United Nations Framework Convention on Climate Change (UNFCCC).

What is Forest Carbon Stock?

- Forest **carbon stock** is the amount of **carbon** that has been sequestered from the atmosphere and is now stored within the forest ecosystem, mainly within living biomass and soil, and to a lesser extent also in dead wood and litter.

Why Forest Carbon Stock is important?

- Forest **carbon stock** prevents **carbon** emission into the atmosphere

What is 'Bird Life International' ?

- **BirdL ife International** is a **global** partnership of conservation organisations (NGOs) that strives to conserve **birds**, their habitats and **global** biodiversity, working with people towards sustainability in the use of natural resources.
- It was formed in 1922. HQ: UK
- Its motto is 'Partnership for Nature and People'

Teak is dominant species (tree) of which forest?

- Teak is not an evergreen tree. It is found in Tropical moist deciduous forests
- It is a large, deciduous tree that occurs in mixed hardwood forests. Teak (**Tectona grandis**) has small, fragrant white flowers arranged in dense clusters (panicles) at the end of the branches.
- The large, papery leaves of **teak trees** are often hairy on the lower surface
- Teak is native to South and southeast Asia mainly Bangladesh, India, Indonesia, Malaysia, Myanmar, Thailand, and Sri Lanka.

What are the characteristics of Equatorial Climate?

Characteristics of equatorial climate.

- High mean annual temperature of about 27 degree C.
- Uniformly high temperatures of about 30 degreeCwith only a small annual range.
- High relative humidity of about 80%.
- Abundant rainfall of 2000mm on average.
- Double maxima rainfall around April and October each year.
- Rainfall are accompanied by thunder and lightning.
- Absence of distinct dry season.

What is an Ecosystem?

- An **ecosystem** is that it is a community or group of living organisms that live in and interact with each other in a specific environment. Environment includes both biotic and abiotic surroundings.
- Biotic components include plants, animals, decomposers. Non living components include air, **water**, land.

What an ecosystem does?

- Ecosystem as a system regulates the essential ecological processes, supports life systems and renders stability. It is also responsible for the cycling of **nutrients** between biotic and abiotic components. It maintains a balance among the various trophic levels in the ecosystem.

Human being are part of which Ecosystem?

- **Terrestrial ecosystem.**

How can we say an Ecosystem is a dynamic?

- **Ecosystem** is a part of natural environment consisting of a community of living beings and the physical environment both constantly interchanging materials and energy between them.

What is H1N1 Virus?

- H1N1 virus causes Swine Flu.
- It's **called swine flu** because in the past, the people who caught it had direct contact with pigs.
- This new **H1N1 virus** contained a unique combination of influenza genes not previously identified in animals or people.
- The designation "**H1N1**" indicates unique traits, which exhibit characteristics that identify the virus to the immune system and allows for attachment and replication of the virus. The "H" (hemagglutinin) and the "N" (neuraminidases) are both proteins that are found on the outer shell or envelope of the virus.

What are Bio Toilets?

- **Bio**-digester technology treats human waste at the source.
- A collection of anaerobic bacteria that has been adapted to work at temperatures as low as -5° C and as high as 50° C.
- Inocula (seed material) to the **bio**-digesters and convert the organic human waste into water, methane, and carbon-dioxide.

What are 'Intended Nationally Determined Contributions'?

- **Intended Nationally Determined Contributions** (INDC) are (**intended**) reductions in greenhouse gas emissions under the United Nations Framework Convention on Climate Change (UNFCCC).
- The intended contributions were determined without prejudice to the legal nature of the contributions

Which are the top countries in global emission?

- China and US together contribute 38% of total global emission.
- India 4.1% of global emission

What details INDC contain?

- The INDCs contain steps taken towards emissions reductions and also aim to address steps taken to adapt to climate change impacts, and what support the country needs, or will provide, to address climate change.

What is United Nations Convention to Combat Desertification?

- It was established in 1994 **UNCCD** is the sole legally binding international agreement linking environment and development to sustainable land management.

What are the objectives of UNCCD?

- The objectives of the UNCCD seeks to improve land productivity, to restore (or preserve) land, to establish more efficient water usage and to introduce **sustainable** development in the affected areas and more generally, improve the living conditions of those populations affected by drought and desertification

What are the preventive measures to check on Desertification?

- Integrating land and water management to protect soils from erosion, salinization, and other forms of degradation.
- Protecting the vegetative cover, which can be a major instrument for soil conservation against wind and water erosion.

Great Indian Hornbill

- (Buceros bicornis) also known as the concave-casqued **hornbi**The **great hornbillll**, **great Indian hornbill** or **great** pied **hornbill**, is one of the larger members of the **hornbill** family. It is found in the **Indian** subcontinent and Southeast Asia.
- They are found in a few forest areas in the **Western Ghats** and in the forests along the Himalayas.
- **India** has nine **hornbill** species, of which four are found in the Western Ghats: **Indian** Grey **Hornbill** (endemic to **India**), the Malabar Grey **Hornbill** (endemic to the Western Ghats), Malabar Pied **Hornbill** (endemic to **India** and Sri Lanka) and the widely distributed but endangered Great **Hornbill**.
- Due to ongoing habitat lost and hunting in some areas, the **Great Hornbill** is evaluated as Near Threatened on the IUCN Red List of Threatened Species.

Why Hornbills are hunted for?

- A scheduled species under the 1972 Wildlife Protection Act, **hornbills** are **hunted** for their beaks, which are used to make the traditional headgear of the Nyishi tribe men. **Hornbills** are also **hunted** for their oil—believed to relieve pain and for their meat.

What is 'National Ganga River Basin Authority (NGRBA)'?

- **National Ganga River Basin Authority** (**NGRBA**) is a financing, planning, implementing, monitoring and coordinating **authority** for the **Ganges River**, functioning under the water resource ministry of India.
- Now National Ganga Council is formed. It is chaired by PM
- The National Ganga Council is formed under the **Environment (Protection) Act (EPA),1986.**

What are the responsibilities of 'National Ganga River Basin Authority (NGRBA)'?

- It has been given overall responsibility for the superintendence of pollution prevention and rejuvenation of River Ganga Basin, including Ganga and its tributaries.
- National Mission for Clean Ganga(NMCG) acts as an implementation arm of the National Ganga Council.

What is National Mission for Clean Ganga?

- NMCG was established in the year 2011 as a registered society.
- It has a two-tier management structure and comprises of Governing Council and Executive Committee.

What are the aims and objectives of NMCG?

- The aims and objectives of NMCG are:
  - To ensure effective control of pollution and rejuvenation of the river Ganga by adopting a river basin approach to promote inter-sectoral coordination for comprehensive planning and management.
  - To maintain minimum ecological flows in the river Ganga with the aim of ensuring water quality and environmentally sustainable development.

Why does the Government of India promote the use of 'Neem-coated Urea' in agriculture?

- Neem coating slows down the rate of dissolution of urea in the soil

What are the advantages of Neem Coated Urea?

- **Neem coating** leads to more gradual release of **urea**, helping plants gain more nutrient and resulting in higher yields. Lower underground water contamination due to leaching of **urea**

Why the FAO accords the status of 'Globally Important Agricultural Heritage System (GIAHS) to traditional agricultural systems.

- To identify and safeguard eco-friendly traditional farm practices and their associated landscapes, agricultural biodiversity and knowledge systems of the local communities

What is 'Green India Mission' ?

- GIM was launched in February 2014, is aimed at protecting, restoring and enhancing **India's** diminishing forest cover and responding to climate change by a combination of adaptation and Mitigation Measures.
- The scheme is monitored by **Ministry of Environment and Forests** (MoEF).

What is National Action Plan on Climate Change (NAPCC)?

- National Action Plan on Climate Change (NAPCC) aims at creating awareness among the representatives of the public, different agencies of the government, scientists, industry and the community as a whole, on the threat posed by climate change and the steps proposed at the level of India to counter these changes.

What are the Eight Missions under NAPCC?

- National Solar Mission
- National Mission for enhanced Energy Efficiency
- National Mission on Sustainable Habitat
- National Water Mission
- National mission for Sustaining the Himalayan Ecosystem
- National Mission for a Green India
- National Mission for Sustainable Agriculture
- National Mission on Strategic Knowledge for Climate Change

National Solar Mission

- The **National Solar Mission** is an initiative of the Government of India and State Governments to promote **solar** power.
- Target of 20 GW by 2022.
- **Karnataka** tops the list of states with the highest installed solar power generation capacity in the country. The state's total solar capacity at the end of 2018 stood at 5,328 megawatt (MW).

Where is Bhadla Solar Park?

- With attractive solar insolation, the state tops the list of solar park installations in the country. **Bhadla Solar Park**, with a capacity of 2,245 MW, is the world's largest solar park. Spread across more than 14,000 acres, the park is located at **Bhadla** village in the **Jodhpur district** in **Rajasthan**.

National Mission for enhanced Energy Efficiency

- The **National Mission for Enhanced Energy Efficiency** (NMEEE) is aimed to promote the market for **energy efficiency** by fostering innovative policies and effective market instruments.
- The Ministry of Power, Government of India, through Bureau of **Energy Efficiency** (BEE), looks over the progress of the NMEEE **mission**.

National Mission on Sustainable Habitat

- The **National Mission on Sustainable Habitat** is one of the eight climate **mission** of the Government of India under the NAPCC mitigation strategy.
- It was formulated to make the cities **sustainable** through improvements in energy efficiency in building, management of solid waste and to shift to public transport.

National Water Mission

- The **National Mission on Sustainable Habitat** is one of the eight climate **mission** of the Government of India under the NAPCC mitigation strategy.
- It was formulated to make the cities **sustainable** through improvements in energy efficiency in building, management of solid waste and to shift to public transport.

National Mission for Sustaining the Himalayan Ecosystem

- **National Mission for Sustaining the Himalayan Ecosystem**. The **National Mission for Sustaining the Himalayan Ecosystem** (NMSHE) is one of the eight **missions** under the **National** Action Plan on Climate Change (NAPCC).
- NMSHE is a multi-pronged, cross-cutting **mission** across various sectors.

National Mission for a Green India

- 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 .

National Mission for Sustainable Agriculture

- The **National Mission for Sustainable Agriculture** (NMSA), which is one of the eight **Missions** under the **National** Action Plan on Climate Change (NAPCC) seeks to address issues regarding '**Sustainable Agriculture**' in the context of risks associated with climate change by devising appropriate adaptation and mitigation

National Mission on Strategic Knowledge for Climate Change

- The mission seeks to build a dynamic and vibrant knowledge system that informs and supports national policy and action for responding effectively to climate change challenges, while not compromising on the nation's growth goals.
- Department of Science and Technology drives the mission, and a recent development under the mission was the govt's approval for establishing Karnataka's first climate change lab.

Kharai Camel

- **Kharai camels** have a special ability to swim in seawater and feed on saline plants and mangroves, which is how they get their name, **Kharai** ('salty' in Gujarati). They are also known as dariyataru (meaning sea-swimmer). Due to their unique diet, these **camels** swim to islands near the shore in search of food.
- **Camels** are **smarter than horses**
- **Camels** are slightly slower **than horses** because they can only reach speeds of around 20 to 25 miles per hour while **horses** have an average gallop speed around 25 to 30 miles per hour.
- The camel is not the rude, vulgar and unruly creature of myth, but a stately, noble and amiable servant

Red Sanders

- The wood is famous for its medicinal properties and commercial uses. The **Red Sander** Wood at the centre of the trunk (heartwood) is mainly **used** for medical purposes. **Red sander** Wood has various medical uses such as fluid retention, treating digestive tract problems, purification of blood and treatment of coughs.
- Red sanders is a species of Pterocarpus endemic to the southern Eastern Ghats mountain range of South India.
- Pterocarpus santalinus L.f. (Red Sanders) is an endemic and endangered **tree** species in the southern Eastern Ghats. Red Sanders bearing forest is a one of the climax forest type in tropical dry deciduous forests in India. The natural habitat of Red Sanders is a hilly region with hot dry climate.

What advantages can be there if UN-REDD+ programme is implemented properly.

- 1. Protection of diversity
  2. Resilience of forest ecosystem
  3. Poverty reduction

What is 'Green House Gas Protocol?

- The Greenhouse Gas Protocol (GHGP) provides accounting and reporting standards, sector guidance, calculation tools, and trainings for business and government.
- The GHG Protocol also provides webinar, e-learning and in-person training and capacity-building support on its standards and tools.
- Water vapor is the most potent of the greenhouse gases in Earth's atmosphere, and it's sort of a unique player among the greenhouse gases. The amount of water vapor in the atmosphere cannot, in general, be directly modified by human behaviour—it's set by air temperatures.
- Atmospheric levels of carbon dioxide—the most dangerous and prevalent greenhouse gas.

What is Agenda 21?

- **Agenda 21** is a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations System, Governments, and Major Groups in every area in which human impacts on the environment.
- Its aim is to achieve global sustainable development. One major **objective** of the Agenda 21 initiative is that every local government should draw its own local Agenda 21. Since 2015, Sustainable Development Goals are included in the newer Agenda 2030.
- **Agenda 21** is a declaration accepted by the heads of the states in the Earth summit held at Rio De janeiro (1992) ,Brazil. The **two principles** of **agenda 21** are : 1. To combat environmental damage, poverty disease through global cooperation an common interests mutual needs and shared responsibilities.

Virus

- A **virus** is a sub microscopic infectious agent that replicates only inside the living cells of an organism. **Viruses** infect all types of life forms, from animals and plants and even microorganisms including Bacteria
- There are millions of types of viruses in the environment.
- Viruses are found in all ecosystems
- When infected, a host cell is forced to rapidly produce thousands of identical copies of the original virus.
- Out side the cell they are independent can be powdered also. Virus contain genetic material DNA or RNA.

What are 'Gadgil and 'Kasturirangan Committee Reports?

- The Gadgil panel submitted its 552-page report to the Ministry of Environment and Forests in 2011 and since then no government cared to implement its recommendations.
- The major recommendations of the Gadgil panel include a ban on growing of single commercial crops like tea, coffee, cardamom, rubber, banana, pineapple that are causing widespread soil erosion.
- The panel in its report suggested promoting ecologically suitable farming methods. The report said, "A policy shift is urgently warranted curtailing the environmentally disastrous practices and switching over to a more sustainable farming approach in the Western Ghats."

What is Shale Gas?

- **Shale gas** is a fossil fuel.
- Shale gas is **natural gas** produced from shale formations that typically function as both the reservoir and the source rocks for the **natural gas**. In terms of chemical makeup, shale gas is typically a dry gas composed primarily of methane (60–95% v/v), but some formations do produce wet gas.

Where shale gas was found in India?

- India has identified six basins as areas for shale gas exploration: Cambay (Gujarat), Assam-Arakan (North East), Gondwana (Central India), Krishna **Godavari** onshore (East Coast), Cauvery onshore, and Indo-Gangetic basins.
- Shale, any of a group of fine-grained, laminated **sedimentary rocks** consisting of silt- and **clay**-sized particles. Shale is the most abundant of the **sedimentary rocks**

What is 'International Thermonuclear Experimental Reactor'

- ITER is an international nuclear fusion research and engineering megaproject, which will be the world's largest magnetic confinement plasma physics experiment.

What are the goals of ITER?

- One of the primary **goals of ITER** operation is to demonstrate the control of the plasma and the fusion reactions with negligible consequences to the environment

What are the main features of ITER?

- Without the electrons, atoms have a positive charge and repel. This means that you have to have super high atomic energies to get these things to have nuclear **fusion**.
- The main feature of the 180-hectare ITER site in **Saint Paul-lez-Durance**, southern France, is a man-made level platform that was completed in 2009. This 42-hectare platform measures 1 kilometre long by 400 metres wide, and compares in size to 60 soccer fields.

How the project ITER is financed?

- In all, 35 countries are sharing the cost of the **ITER** Project.

What is the International Solar Alliance?

- The **International Solar Alliance** (ISA) is an **alliance** of 121 countries initiated by India, most of them being sunshine countries, which lie either completely or partly between the Tropic of Cancer and the Tropic of Capricorn.

When was ISA launched?

- The International Solar Alliance (ISA) initiative was launched at the UN Climate Change Conference in Paris on **30 November 2015** by Hon'ble Prime Minister Narendra Modi and French President Francois Hollande.
- HQ: Gurugram

What is drip irrigation?

- Drip irrigation is the most efficient water and nutrient delivery system for growing crops. It delivers water and nutrients directly to the plant's roots zone, in the right amounts, at the right time, so each plant gets exactly what it needs, when it needs it, to grow optimally.

What are the advantages of Drip Irrigation?

- Drip Irrigation is enabling higher yields to be produced from any land, while saving water, fertilizer and energy. Water application **efficiency** is high if managed correctly. Field levelling is not necessary.
- Fertilizer and **nutrient** loss is minimized due to a localized application and reduced leaching.

What are differences in Sprinkler irrigation system and drip irrigation system?

- **Sprinkler irrigation** systems are best suited for large, flat areas that need a substantial volume of water. **Drip irrigation** systems are most effective for precisely **watering** small areas or plants that require a specific **watering** schedule.

What is the Linking of Rivers Project?

- **River Linking** is a project of **linking** two or more **rivers** by creating a network of manually created reservoirs and canals, and providing land areas that otherwise does not have **river** water access and reducing the flow of water to sea using this means.
- The **National River Linking Project** (NRLP) formally known as the **National** Perspective Plan, envisages the transfer of water from water 'surplus' basins where there is flooding to water 'deficit' basins where there is drought/scarcity, through inter-basin water transfer **projects**.

Which rivers are planned to be linked now?

- First, the Mahanadi, **Godavari**. **Krishna** and Kaveri **rivers** would all be inter-linked by canals. Reservoirs and dams would be built along the course of these **rivers**. These would be used to transfer surplus water from the Mahanadi and **Godavari rivers** to the south of India.

What is the project of linking of Godavari and Krishna rivers?

- Vykuntapuram barrage would be constructed on Krishna river located near 16° 34′41″N 80° 24′43″E in the upstream of Prakasam barrage with FRL at 25m MSL to receive Godavari water diverted from Polavaram dam.
- As the water availability in the Krishna river was becoming inadequate to meet the water demand, Godavari River is linked to the Krishna river by commissioning the Polavaram right bank canal with the help of Pattiseema lift scheme in the year 2015 to augment water availability to the Prakasam Barrage in Andhra Pradesh.

What is Air Quality Index?

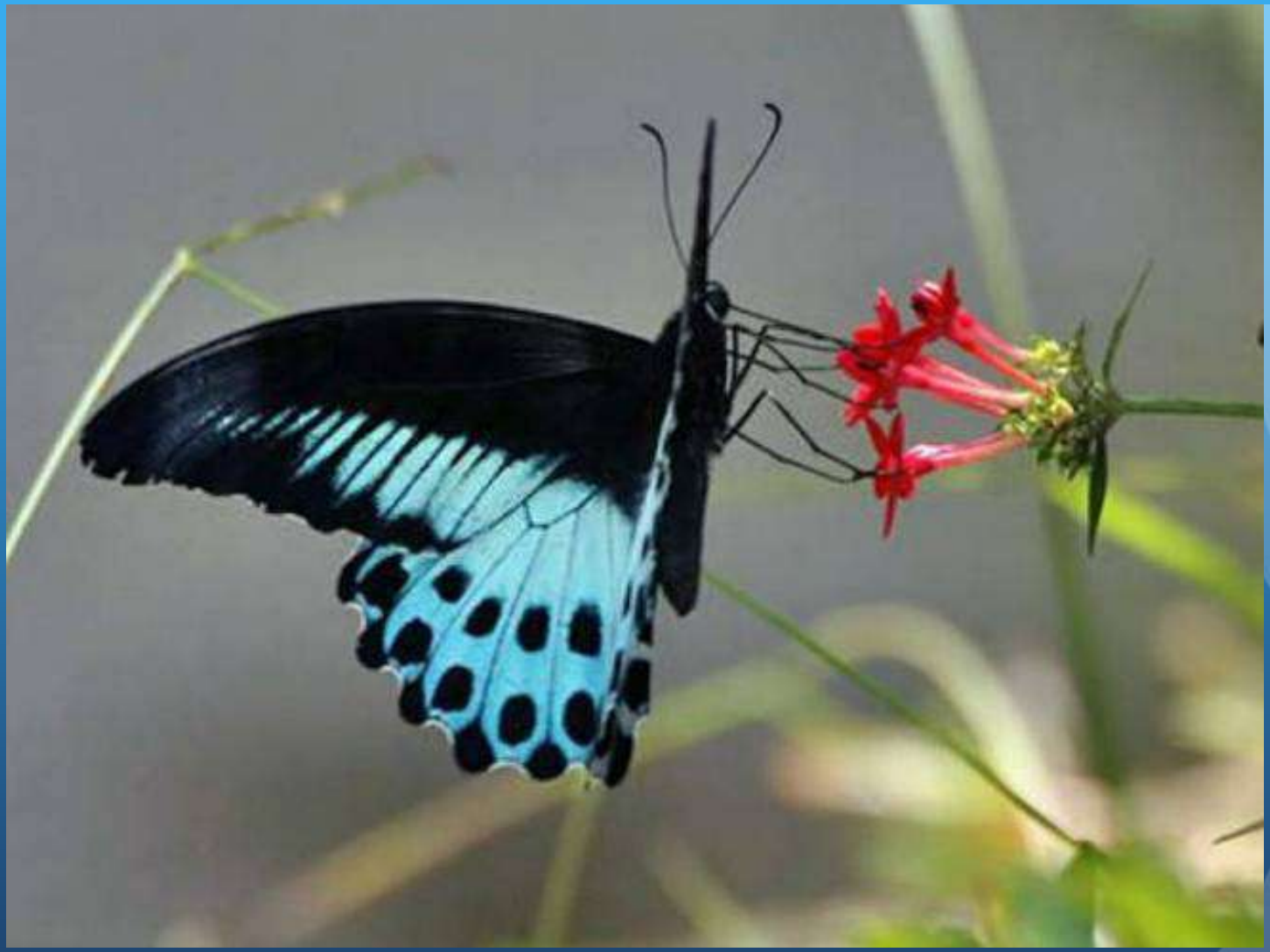
- The **Air Quality Index** is based on measurement of particulate matter ($PM_{2.5}$ and PM_{10}), Ozone (O_3), Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2) and Carbon Monoxide (CO) emissions.
- "Good" AQI is 0 to 50. **Air quality** is considered satisfactory, and **air pollution** poses little or no risk. "Moderate" AQI is 51 to 100. **Air quality** is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people.

Which State declared a butterfly as State Butterfly?

- Maharashtra has become the first State in the country to have a ‘State butterfly.’

Which Butterfly has been named as State Butterfly?

- Papilio polymnestor, the blue Mormon, is a large swallowtail butterfly found in south India and Sri Lanka
- The Blue Mormon is a large, swallowtail butterfly found primarily in Sri Lanka and India, mainly restricted to the Western Ghats of Maharashtra, South India and coastal belts. It may occasionally be spotted in the Maharashtrian mainland between Vidarbha and Western Maharashtra.



What is the agreement at the UNFCC Meeting in Paris in 2015?

- The Agreement aims to limit the greenhouse gas emissions so that the rise in average global temperature by the end of this century does not exceed 2 degree or even 1.5 degree above pre-industrial levels

What was achieved in UNFCC Meeting in Paris in 2015

- At COP 21 in **Paris**, on 12 December **2015**, Parties to the **UNFCCC** reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future.
- The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius

What are the Sustainable Development Goals?

- The SDGs were adopted by **the United Nations General Assembly** in September 2015 and look to 2030. They are far broader in scope than the Millennium Development Goals (MDGs) which focused on a narrow set of disease-specific health targets for 2015.

How the idea of SDG developed?

- In September 2011, this idea was picked up by the **United Nations** Department of Public Information 64th NGO Conference in Bonn, Germany. The outcome document proposed 17 sustainable development goals and associated targets. In the run-up to Rio+20 there was much discussion about the idea of the SDGs.

What is the importance of SDGs?

- The **17 Sustainable Development Goals** (SDGs), with their 169 targets, form the core of the 2030 Agenda. They balance the economic, social and ecological dimensions of **sustainable development**, and place the fight against poverty and **sustainable development** on the same agenda for the first time.

What are the plant adaptations in a desert plant?

- The **leaves** and stems of many **desert plants** have a thick, waxy covering. This waxy substance does not cover the stomata, but it covers most of the **leaves**, keeping the **plants** cooler and reducing evaporative loss.
- Small **leaves** on **desert plants** also help reduce moisture loss during transpiration.
- Thorns instead of **leaves**.

What is National Green Tribunal?

- The **National Green Tribunal was set up** under the **National Green Tribunal** Act, 2010 (**NGT** Act). It is a specialised judicial body equipped with expertise solely for the purpose of adjudicating environmental cases in the country.

What is the objective of NGT Act?

- The objective of the **NGT** Act is to provide effective and expeditious disposal of cases relating to the protection of the environment.

Is NGT is a statutory body?

- The **NGT** is a '**quasi-judicial body**' and has limited power.

What is Central Pollution Control Board ?

- The Central Pollution Control Board (**CPCB**) of India is a statutory organisation under the Ministry of Environment, Forest and Climate Change (MoEFC).

When CPCB was established?

- It was established in 1974 under the Water (Prevention and Control of pollution) Act, 1974.

What CPCB do?

- It Co-ordinates the activities of the State Pollution Control Boards by providing technical assistance and guidance and also resolves disputes among them. It is the apex organisation in country in the field of pollution control, as a technical wing of MoEFC.
- The board conducts environmental assessments and research. It is responsible for maintaining national standards under a variety of environmental laws

In India whose responsibility is to monitor water and air quality?

- CPCB has responsibilities to conduct monitoring of water and air quality
- It advises the central government to prevent and control water and air pollution.

What CPCB do in regard to water and air pollution control?

- CPCB, under the Water (Prevention and Control of Pollution) Act, 1974, and the Air (Prevention and Control of Pollution) Act, 1981, aims to promote cleanliness of streams and wells in different areas of the States by prevention, control and abatement of water pollution, and to improve the quality of air and to prevent, control or abate air pollution in the country.

What is NAMP?

- CPCB runs nationwide programs of ambient air quality monitoring known as NAMP.
- The network consists of 621 operating stations covering 262 cities/towns in 29 states and 5 Union Territories of the country.

What all is monitored under NAMP?

- Under NAMP, four air pollutants viz., (SO2), NO2, Suspended Particulate Matter (SPM) and Respirable Suspended Particulate Matter (RSPM/ PM10) have been identified for regular monitoring at all the locations.

How CPCB is monitoring water Quality/ pollution?

- CPCB has 1019 stations/ checkpoints covering entire India
- The monitoring process is done on quarterly basis in surface waters and on half yearly basis in case of ground water.
- It covers 200 Rivers, 60 Lakes, 5 Tanks, 3 Ponds, 3 Creeks, 13 Canals, 17 Drains and 321 Wells.

What is EcoCity Programme?

- It is a CPCB programme.
- *EcoCity Programmme is* to improve environment through implementation of identified environmental improvement projects in the selected towns and cities.
- Pilot studies conducted for urban areas by the Centre for Spatial Environmental Planning created at the CPCB under the World Bank funded *Environmental Management Capacity Building Project* and supported by the *GTZ-CPCB Project* under the *Indo-German Bilateral Program*.

Why Aral Sea has shrunk?

- Aral Sea has shrunk because of human activities.
- Aral Sea was there between Kazakhstan and Uzbekistan
- The Aral Sea has been shrinking since the 1960s after the rivers that fed it were diverted by Soviet irrigation projects
- By 1997, it had declined to 10% of its original size,
- The shrinking of the Aral Sea has been called "one of the planet's worst environmental disasters".
- The region's once-prosperous fishing industry has been devastated, bringing unemployment and economic hardship.

What is 'Additional Protocol' with the 'International Atomic Agency' ?

- The civilian nuclear reactors come under IAEA safeguards
- The **Additional Protocol** is not a stand-alone agreement, but rather a **protocol** to a safeguards agreement that provides **additional** tools for verification. In particular, it significantly increases the **IAEA's** ability to verify the peaceful use of all nuclear material in States with comprehensive safeguards agreements.

What is 'Global Alliance for Climate-Smart Agriculture (GACSA)?

- **GACSA** is an inclusive, voluntary and action-oriented multi-stakeholder platform on Climate-Smart Agriculture (CSA) Objectives. GACSAs vision is to improve food security, nutrition and resilience in the face of climate change

What is 'Conservation Agriculture'?

- **Conservation Agriculture** (CA) is a farming system that can prevent losses of arable land while regenerating degraded lands. It promotes maintenance of a permanent soil cover, minimum soil disturbance, and diversification of plant species.

What are the three principles of 'Conservation Agriculture'?

- **The 3 principles**
  -minimum tillage and soil disturbance.
  -permanent soil cover with crop residues and live mulches.
  -crop rotation and intercropping

What is the methodology of 'Conservation Agriculture'?

- To conserve agriculture: Avoid mechanical soil disturbance to the extent possible. Avoid soil compaction beyond the elasticity of the soil. Maintain or improve soil organic matter during rotations until reaching an equilibrium level. Maintain organic cover through crop residues and cover crops to minimize erosion loss by wind and/or water.

What is 'Sixth mass extinction'?

- There has been five mass extinction in the last 500 million years, 75 to more than 90 percent of all species on Earth have disappeared in a geological blink of an eye in catastrophes.
- The **sixth mass extinction** -- the one happening now -- is different: Scientists say it's **caused** by humans. "It is entirely our fault," Ceballos González said.

Have these mass extinction helped in evolution on earth?

- Though mass extinctions are deadly events, they open up the planet for new forms of life to emerge. The most studied mass extinction, which marked the boundary between the Cretaceous and Paleogene periods about 66 million years ago, killed off the non avian dinosaurs and made room for mammals and birds to rapidly diversify and evolve.

What Genetically Modified mustard developed in India?

- GM mustard developed in India has the genes that allow the plant cross-pollination and hybridization

Who developed GM Mustard?

- It was developed by Professor Deepak Pental from the University of Delhi, with the aim of reducing India's demand for edible oil imports.
- Dhara **Mustard** Hybrid-11, otherwise known as DMH - 11, is a **genetically modified** hybrid
- DHM -11 was created through transgenic technology, primarily involving the Bar, Barnase and Barstar gene system

Why GM Mustard is important to India?

- **Mustard** is among the three highest produced oil seed crops in **India**
- India is importing edible oil in large quantity.
- GM Mustard has demonstrated increased yields over existing mustard varieties

How GM Mustard was developed?

- The transgenic mustard DMH - 11 was developed in 2002 using genetic material isolated from non-pathogenic soil bacteria, and techniques in transgenic systems for pollination control, which primarily involved the Barnase-Barstar system. Three genes, Bar, Barnase and Barstar, were extracted from Bacillus amyloquefaciens to produce the hybrid seed.

How GM Mustard is better?

- The insertion of the Barnase gene induces genetic male sterility by preventing the production of the male gametophyte (pollen grains) in the mustard plant. Meanwhile, the Barstar gene acts to restore the ability of the plant to produce fertile hybrid seeds. Mustard is a self-pollinating plant, thus, making it difficult to perform cross-pollination with another desired male parental line, without the occurrence of self pollination.

What is Carbon Fertilization?

- Carbon fertilization is also known as Carbon Dioxide Fertilisation. It is the phenomena that the increase of carbon dioxide in the atmosphere increases the rate of photosynthesis in plants.

What are the consequences of heavy sand mining in riverbeds?

- **Riverbed mining** causes erosion and often leaves the river-plains much more vulnerable to flooding because it allows loose landmass to be washed downstream, especially during monsoons.
- Unsustainable sand mining from riverbeds can have huge social, environmental, geomorphic and disastrous impacts for rivers
- It will lead to erosion of coasts due to long shore currents because there is **not** enough sediment available.

Why and Sulphur is important?

- **Sulphur** is **important** for the functioning of proteins and enzymes in plants, and in animals that depend upon plants for **sulphur**. Plants absorb **sulphur** when it is dissolved in water. Animals consume these plants, so that they take up enough **sulphur** to maintain their health.

What is Sulphur Cycle?

- The **sulphur cycle** contains both atmospheric and terrestrial processes. Within the terrestrial portion, the **cycle** begins with the weathering of rocks, releasing the stored **sulphur**. The **sulphur** then comes into contact with air where it is converted into sulphate (SO4).
- The **sulphur cycle** is the collection of processes by which **sulphur** moves between rocks, waterways and living systems. Such biogeochemical **cycles** are important in geology because they affect many minerals.

What is salinization of agricultural land?

- **Salinization** is the increase of salt concentration in soil and is, in most cases, caused by dissolved salts in the water supply. This supply of water can be caused by flooding of the land by seawater, seepage of seawater or brackish groundwater through the soil from below.

Why salinization is a problem?

- **Salinization** is a major **problem** associated with irrigation, because deposits of salts build up in the soil and can reach levels that are harmful to crops. In addition, the salts can make ground water, which may be in use for drinking, saltier and unsuitable for drinking.

How salinity affects production in crops?

- **Salinity affects** production in crops, pastures and trees by interfering with nitrogen uptake, reducing growth and stopping plant reproduction. Some ions (particularly chloride) are toxic to plants and as the concentration of these ions increases, the plant is poisoned and dies.

What is Partnership for Action on Green Economy?

- A UN mechanism to assist countries transition towards greener and more inclusive economies, emerged at the United Nations Conference on Sustainable Development 2012, Rio de Janerio

How 'PAGE' helps?

- **The Partnership** supports nations and regions in reframing **economic** policies and practices around sustainability to foster **economic growth**, create income and jobs, reduce poverty and inequality, and strengthen the ecological foundations of their **economies**.
- PAGE provides services that enable countries to transition towards green economies.

Why the growth of plant Prosopis juliflora is considered bad?

- It tends to reduce the biodiversity in the area in which it grows

Why Prosopis juliflora introduced in India?

- **Prosopis juliflora** (Sw,) DC. (Seemai karuvelam) was introduced in Tamil Nadu, to overcome the shortage of fire wood at Ramanathapuram district (South **India**) during 1877. It was also introduced in arid and semi-arid regions of Tamil Nadu.

How Prosopis juliflora affects the land?

- **Prosopis Juliflora** causes land erosion due to the loss of the grasslands that are habitats for native **plants** and animals. Although it is a small tree, almost like a shrub, but it causes havoc to the people as well as affects the fertility of the soil of land.

Is it true that Coral reefs host far more number of animal phyla than those hosted by tropical rainforests?

- Yes.
- **Coral reefs** teem with diverse life. Thousands of species can be found living on one **reef**.

Why coral reefs are important to us?

- **Coral reefs** provide an **important** ecosystem for life underwater, protect coastal areas by reducing the power of waves hitting the coast, and provide a crucial source of income for millions of people.

Where we find coral reefs?

- **Coral reefs** are **found** in more than 100 countries around the world. Most **reefs** are **located** between the Tropics of Cancer and Capricorn, in the Pacific Ocean, the Indian Ocean, the Caribbean Sea, the Red Sea, and the Persian Gulf.

What is "Momentum for Change: Climate Neutral Now" initiative?

- **Climate Neutral Now** is an initiative launched by UN **Climate** Change in 2015, aiming at encouraging all stakeholders in society to take **climate** action to achieve a **climate neutral** world by mid-century, as enshrined in the Paris Agreement adopted the same year.

What is climate neutrality?

- **Climate neutrality** is having no net carbon (greenhouse gas) emissions. This is to be achieved by "minimizing carbon emissions as much as possible, and using carbon offsets or other measures to mitigate the remaining emissions."

What is climate compensation?

- **Climate compensation** means financing a measure outside one's own operations. This measure will lead to a reduction in emissions that is equal to the emissions for which you **compensate**.

Where is Pakhui Wildlife Sanctuary?

- Arunachal Pradesh

Where is Pakhui Tiger Reserve?

- Pakke Tiger Reserve, also known as Pakhui Tiger Reserve, is a Project Tiger reserve in the in 2001, it was renamed **Pakhui Wildlife Sanctuary** and became Pakhui Tiger Reserve on 23 April 2002 as the 26th Tiger Reserve under Project Tiger reserve.
- It is in Arunachal Pradesh. It has area of 862 Skm.
- It is bounded by Bhareli or Kameng River in the west and north and by Pakke River in the east.

What award was won by 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.

How the plant diseases spread?

- Infectious plant diseases are caused by living (biotic) agents, or pathogens. These pathogens can be spread from an infected plant or plant debris to a healthy plant. Microorganisms that cause plant diseases include nematodes, **fungi**, bacteria, and **mycoplasmas**.
- **Diseases** that attack the leaves of a **plant** are primarily **spread** by wind, but they can also move to nearby **plants** by taking a ride on splashing water droplets from **rain** or irrigation

What is the National Programme for Organic Production" (NPOP)?

- **The National Programme for Organic Production** (NPOP) provides Standards for organic production, systems, criteria and procedure for accreditation of Certification Bodies, the National (India Organic) Logo and the regulations governing its use.
- **Organic** food is produced without using most conventional pesticides; fertilizers **made** with synthetic ingredients or sewage sludge; bioengineering; or ionizing radiation.

- Thank You