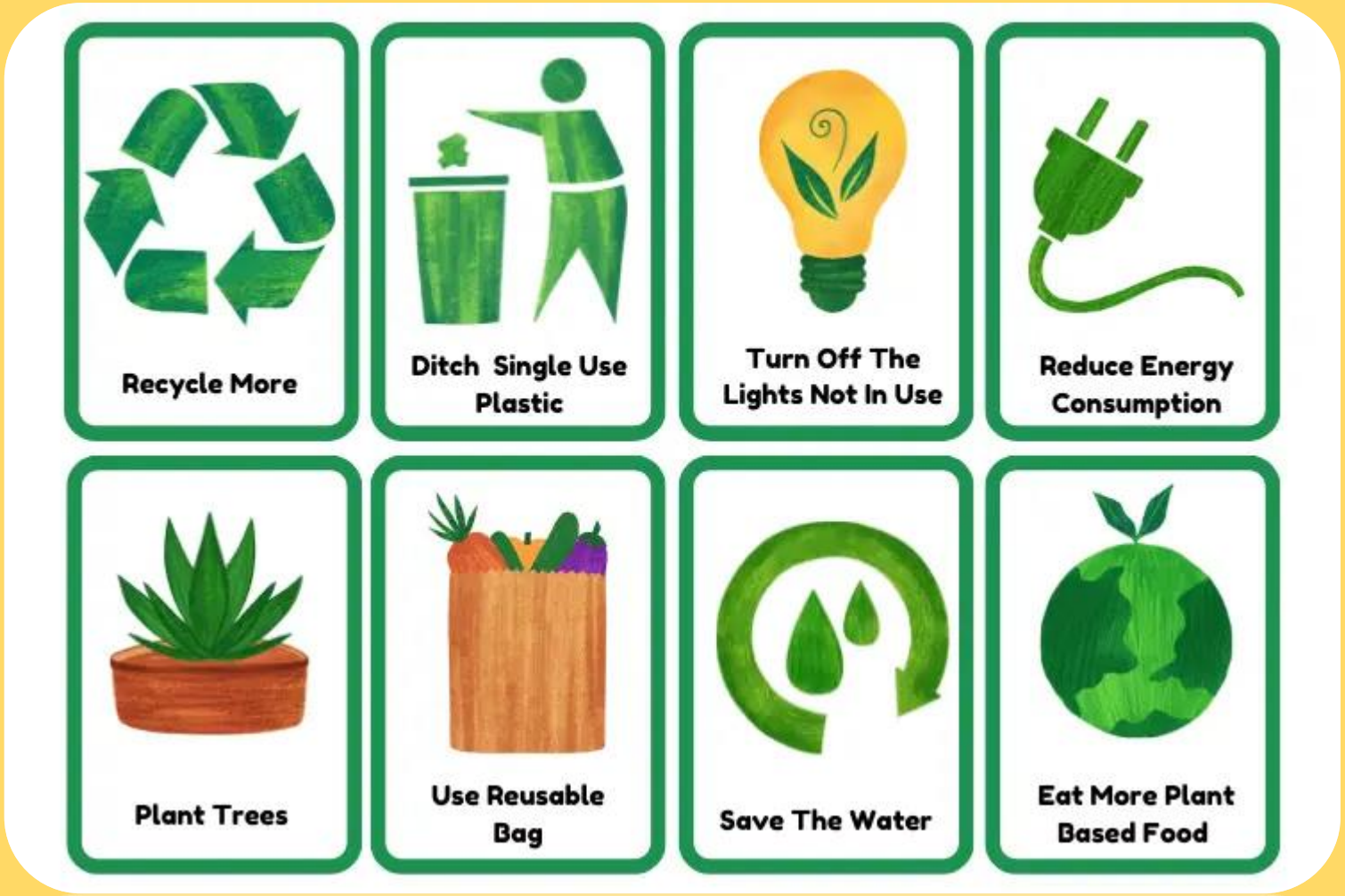


Unit-IX: People, Development and Environment

1. Development and environment: Millennium development and Sustainable development goals.
2. Human and environment interaction: Anthropogenic activities and their impacts on environment.
3. Environmental issues: Local, Regional and Global; Air pollution, Water pollution, Soil pollution, Noise pollution, Waste (solid, liquid, biomedical, hazardous, electronic), Climate change and its Socio-Economic and Political dimensions.
4. Impacts of pollutants on human health.
5. Natural and energy resources: Solar, Wind, Soil, Hydro, Geothermal, Biomass, Nuclear and Forests.
6. Natural hazards and disasters: Mitigation strategies.
7. Environmental Protection Act (1986), National Action Plan on Climate Change, International agreements/efforts -Montreal Protocol, Rio Summit, Convention on Biodiversity, Kyoto Protocol, Paris Agreement, International Solar Alliance.

❑ *Population*

Population is a near permanent group of interbreeding individuals of a species found in a space or geographical area at a particular point. It is called local population or deme. Metapopulation is a complex of local populations connected by dispersing individuals.
The main factors affecting population are as follows.

1. Natality (birth rate)
2. Mortality (death rate)
3. Population dispersal (emigration, immigration and migration)
4. Age distribution (pre-reproductive, reproductive and post-reproductive)
5. Population growth rate
6. Carrying resources mainly food, water, space and there are limited resources to support all life forms.

Population density is the number of individuals divided by space (such as per square km).

❑ *Environment*

The term environment is derived from the French word “environner”. It means ‘to surround’. According to the Environment (Protection) Act, 1986, environment includes all the physical and biological surroundings of an organism and their interactions. Environment is defined as the sum of water, air and land, and the interrelationships that exist among them and with the human beings, other living organisms and materials. The flora, fauna, microorganisms and the manmade structures in our surroundings have a bidirectional interaction with us, either directly or indirectly. The totality of all these components and their interactions constitute the environment. Air, water and land constitute our environment and influence us directly. We too exert an influence on our environment due to overuse or over exploitation of resources or due to discharge of pollutants in air, water and land. In context of relation between people and environment, the following concepts developed:

1. ***Environmental determinism:*** It developed in 19th century Europe, a belief that environment determines how a culture develops. For example, white European nations believed that people from warmer climates were lazier because they did not have to work as hard to survive.
2. ***Environmental possibilism:*** It developed in the first half of the 20th century. It is the belief that the environment puts limits on people, but it does not determine how they will behave.

❑ ***Ecology***

The term ecology was coined by Ernst Haeckel in 1869. Ecology deals with the study of organisms in their natural home. Ecology is the scientific study of the relations that living organisms have with respect to each other, their natural environments and ecosystems. It is present at three levels, which are as follows:

1. The individual organism (how individuals are affected by the environment and how they, in turn, affect the environment)
2. The population
3. The community

Ecology is defined as the study of ecosystems.

❑ ***Ecological Footprint:***

The ecological footprint measures human consumption of natural resources in comparison to Earth's ecological capacity to regenerate them. Calculation of the footprint takes into account our consumption habits both at (i) micro (individual) level and (ii) macro (area or nation) level. The objective of its calculation is also to educate people about the need to change our consumption behaviour to make it more sustainable. Ecological footprint is measured in global hectares (gha).

❑ ***Species, Population And Community***

The organisms in this world can be divided into different species, just as human beings are a species, so are the roses and neem trees. A species is a set of organisms that resemble each other in certain features. The members of a species living together and interacting with each other are called a population. The members of a population live within a given area.

❑ ***Species Diversity***

• It is an important attribute of biotic community, which is determined by the total number of species and their relative abundance.
• Greater species diversity indicates higher number of niches and greater stability of the community.

❑ ***Keystone Species***

• It is a species that has a significant and disproportionately large influence on the community structure and characteristics.
• It has often considerably low abundance and biomass as compared to dominant species.

❑ ***Critical Link Species***

- These are the species that play an important role in supporting network species as pollinators, dispersal agents, absorption or circulation of nutrients, etc. Mycorrhizal fungi help the vascular plants in obtaining inorganic nutrients from soil and organic residues.

❑ ***Community***

- A community is an assemblage of all the interacting populations of different species in a geographical area. It is a complex interacting network of plants, animals, and microorganisms. Each population has a defined role in the community.

❑ ***Ecosystem***

The term ecosystem was defined by Arthur Tansley in 1935. Ecosystem is a self-regulating community of living organisms (populations of species), interacting with each other and their non-living, physical environment, for example, forest ecosystem and ocean ecosystem. Even a clump of bushes can be an ecosystem. All ecosystems on the planet are interconnected and interdependent, and together, they make up the biosphere. There is also exchange of matter and energy with physical environment. In an open ecosystem, there is free exchange of energy and matter with the outside world. In a closed ecosystem, there is no or very limited exchange. An ecotone is the transitional area of vegetation between two different plant communities, such as forest and grassland. The influence of the two bordering communities on each other is known as the edge effect.

❑ ***Ecotone***

Ecosystems show large variations in their size, structure, composition and so on. However, all the ecosystems are characterized by certain basic structural and functional features which are common. There can be different types of ecosystems, such as forest ecosystem, marine ecosystem and desert ecosystem. The composition and organization of communities and physical components decide the structure of an ecosystem. Thus, ecosystems have basically two types of components, namely biotic and abiotic.

❑ ***Biotic Components (Living Components)***

Living components in an ecosystem are either producers or consumers and they are also called biotic components. Producers produce organic components, for example, plants produce starch, carbohydrates and cellulose by a process called photosynthesis. Different living organisms constitute the biotic component of an ecosystem and it belongs to the following categories.

1. ***Producers (or Autotrophs):*** These components produce their own food. Green plants produce food through photosynthesis by combining carbon dioxide and water with the help of energy in the form of sunlight.

2. ***Consumers:*** Consumers depend upon producers for their food, for example, human beings and other animals. These organisms get their food by feeding on other organisms and they are of the following types.

(a) ***Herbivores*** feed on plants, for example, rabbit and insects.
(b) ***Carnivores*** are those animals that eat other animals and they are of two types.
(i) ***Secondary carnivores*** feed on herbivores, for example, a frog and a small fish.
(ii) ***Tertiary carnivores*** feed on other carnivores, for example, a snake and a big fish.

(c) ***Omnivores*** feed both on plants and animals, for example, humans, rats and many species of birds. (d) Detritivores feed on dead organisms, for example, earthworms, crabs and ants. The living beings that feed on dead or decayed organic matter are also called saprophytes. They are fungi and bacteria, which does not contain any chlorophyll and they are dependent on dead organisms for their food.
The parasites depend on living organisms for food. They can be (i) endoparasites, which live inside the body, such as liver flukes and tapeworms and (ii) ectoparasites, which live on the exterior, such as fleas and lice.

3. ***Decomposers:*** These are microorganisms that break down organic matter into inorganic compounds and in this process, derive their nutrition. They play a very important role in converting the essential nutrients from unavailable organic form to free inorganic form which is available for use by plants, for example, bacteria, fungi and so on.

❑ ***Abiotic components***

In ecology, abiotic components are non-living chemical and physical factors in the environment that affect the ecosystems. Some of the real time examples are water, light, wind, soil, humidity, minerals and gases. They affect the ability of organisms to survive and reproduce. They also help determine the types and number of organisms able to exist in an environment.

❑ ***Functions of Ecosystem***

- Every ecosystem performs the following important functions.
- It has different food chains and food webs. Food chain is the sequence of eating and being eaten. Food chains are generally found to be interlinked and interwoven as a network and hence, known as a food web. There are several options of eating and being eaten in a food web. Hence, these are more stable.
- There is unidirectional flow of energy. It flows from sun and then after capture by primary producers (green plants), it flows through the food chain or the food web.
- Materials (nutrients) in an ecosystem move in a cyclic manner. The cycling of nutrients takes place between biotic and abiotic components.
- Every ecosystem functions to produce and sustain some primary production (plant biomass) and secondary production (animal biomass).
- Every ecosystem regulates and maintains itself. This self-regulation or control system is known as cybernetic system.

❑ ***Trophic Levels And Ecological Pyramids***

The trophic levels form a pyramid with producers at the bottom, then primary consumers (herbivores), secondary consumers (carnivores) and tertiary carnivores.

❑ ***Ecological Pyramids - Trophic Levels***

The concept of ecological pyramid was developed by Charles Elton. All ecological pyramids begin with producers like plants at the bottom and proceed through

Sl. no.	Terminology	Proponent	Year
1.	Ecosystem	A.G. Tansley	1935
2.	Ecology	E. Haeckle	1869
3.	Symbiosis	Odum	1971
4.	Bological diversity	Raymond F. Dasmann	1968
5.	Biodiversity	W.G.Rosen	1985
6.	Biodiversity hotspot	Norman Myers	1998
7.	Niche/Ecological niche	Grinnel	1971
8.	Pyramid of numbers	Charles Elton	1927
9.	Biomass pyramid	Bodenheimer	1938
10.	Energy pyramid	G. Evelyn Hutchinson and Raymond Lindeman	1942
11.	Ecocline	Julian Huxley	1938
12.	Ecotone	Alfred Russel Wallace (first observed)	1859
13.	Edge effect	Aldo Leopold	1930
14.	Deep ecology	Aldo Leopold	1949
15.	Natural selection	Charles Darwin	1859
16.	Synecology	Schrocter and Kirchner	1896

❑ What are the Anthropogenic Activities?

- Any human practices which have the capability to effect the surroundings regionally in addition to globally are taken into consideration as Anthropogenic Activities. The gift generation in the world is called the Anthropocene Age due to the fact now people are directing the environmental adjustments on Earth.
- Fossil Fuels, Mineral, Timber, Agriculture, Recreational, etc. are the herbal assets utilized by society, and the portions of those herbal assets transformed into carbon dioxide with inside the surroundings which creates the pollutants which is known as Anthropogenic activities.

❑ Impact of Anthropogenic Activities on Environment

- The flexible association of human civilization with nature, whose homes will in a alternate in space (topographically) and in time (evolutionally), opens guy to fluctuated ecological impacts. According to Fox News, Volcano emissions launched for the duration of historic mass extinction provide us a warning, scientists said,- “Our estimates advocate that the quantity of CO2 that every CAMP magmatic pulse injected into the end-Triassic surroundings is corresponding to the wide variety of anthropogenic emissions projected for the twenty first century.”

1) Human Force on Ecosystem Process

The sports of people with inside the surroundings make adjustments in some of the herbal techniques in a damaging fusion. A component of those herbal methods and brief portrayal of human effect on those methods seem with inside the desk beneath.

Ecosystem Process	Human Impact
Soil Generation	Agricultural practices have presented soil to the climate, bringing about the incredible loss of topsoil.
Control on the Water Cycle	Because of the forest cutting and other human actions, it creates an uncontrolled overflow prompting increased erosion disintegration and flooding.
Removal of Wastes	Untreated sewage squanders and overflow from homesteads and feedlots have prompted expanded water contamination.
Flow of Energy	It is the Greenhouse Effect to a few industries and atomic plants that have added thermal power to the environment. The release of some gases from the burning of fossil fuels gradually increases the temperature of the Earth.
Nutrient Recycling	The utilization of packing material which doesn’t separate, burning of refuse, and the putting of materials in landfills forestalls the return of some valuable materials to the earth.

2) Deleterious Human Activities on Environment

Humans are a part of Earth's Ecosystem; human sports can both voluntarily or unwittingly regulate the stability of an ecosystem. The balance of the planet will imbalance due to those addiction of destruction with inside the human, whether or not by accident or intentionally. If those human affects aren't addressed, the stability of severa organic structures is probably irreversibly influenced.

Some of the methods that people pollute and devastate ecosystems are indicated with inside the factors noted below-

- ***Population Growth-*** The growing quantity of the populace is the usage of immoderate of the constrained assets at the Earth.
- ***Over Consumption-*** As evaluate to the rising international locations, the Industrialized international locations are the usage of extra assets consistent with man or woman from our planet.
- ***Advance Technologies-*** We regularly introduce generation outwardly, understanding how it'll have an effect on the environment.
- ***Pollution-*** Land, Air, Water, and Nuclear Pollution has had severa opposed influences on organic structures.
- ***Changes withinside the Atmosphere-*** These contain the growth of Greenhouse gases for the maximum component due to the intake of non-renewable electricity reassets and the depletion of our stratospheric ozone layer. Other pollution additionally have unfavorable influences on residing things.

3) Environmental Changes

- As the uncontrollable usage of herbal assets is affecting the non-stop air and water pollution. The environmental adjustments carry humanity in a few regions to attain or close to fatigue of herbal assets important for rendering and hence threatening all lifestyles at the globe, such as humans itself.
- It extensively expresses that it's miles a Worldwide Disaster extra difficult than some other social or political problem. It invitations for severity measures to abridge a request, withinside the particular via contraception, and mild technological advancement, simply as to installation global oversight of the usage of ordinary assets.
- There is a protracted records of the international Environmental Movement with none sharp beginning. It is the inheritor to the amazing tours of invention and adventure that made human beings informed of the machine and the multifariousness of land and waters, rocks, trees, flora, fauna, and societies

❑ *Impact of Environment in Progress of Civilization*

New facts illuminates the diploma of prehistoric guy`s dependency on nature also, at the sort of modifications in guy's situation at the start of human advancement. But, the Archaeological hollows throughout the previous numerous a long time have devised a mess of recent innovations that have, to a exceptional quantity, enlarged clinical theories of the ancient backdrop of a crude society.

- During the uppermost Paleolithic primitive guy may want to make the hearthplace outwardly any hassle and use it for cooking and heating with inside the bloodless days.
- The want for the hearth place became traditional to such an quantity that even in a while while the precept wellspring of hearthplace disappeared in locations dwelled via way of means of primitive men, they could make use of Hines of great warm-blooded animals as fuel.
- The elements of nature permitting a primitive society, a primitive tribe to domesticate crops, and to reproduce cattle, a aggregate of crop farming with animal husbandry, proved greater effective.

❑ *Anthropogenic Impact in the Sea and Marine Pollution*

The nature of excessive range and the mosaic of the Anthropogenic creates an effect at the Hydrosphere. It consists of multifactorial phenomena likely-

- Adjustments in temperature control and radioactive environment
- Releases of dangerous effluents and influx of dietary supplements
- Irreparable water usage and waste of water lifestyles paperwork throughout seismic research
- Arriving of commercial enterprise species and their improvement
- The annihilation of the coastline and production of drilling apparatuses

The effects of the impact of factors can surpass the unimportant mixture of the affects introduced approximately through every issue independently. However, the effect of some objects can motive synergetic consequences. Such situations are very conceivable, for instance, while radioactive, compound and heat effects are consolidated.

- The effect of Anthropogenic at the water surroundings need to be interpreted as a cumulative demonstration of a extensive variety of human movement which causes-obvious or probably shrouded aggravations withinside the ordinary shape and factors of water biotic interfaces
- Dwindling their piscaries and leisure value
- Different poor affects of biological, industrial, or socioeconomic conduct
- The above time period is primarily based totally at the concept of a multifactorial surroundings of the anthropogenic impact at the Hydrosphere, which leads to anatomical and sensible acknowledgments of the water ecosystems and biota.

AIR POLLUTION

- Air Pollution is change in the characteristics of air due to introduction of harmful and excessive quantities of substances.
- Four main reason for increase in air pollution are: increasing traffic, growing cities, rapid economic development, and industrialization.
- It is injurious to human health or welfare, animal or plant life.
- It can cause health problems, damage the environment, property and climate change.

❑ ***Major air pollutants***

- Carbon monoxide (CO)
- Carbon dioxide (CO2)
- Chlorofluorocarbons (CFC)
- Lead
- Ozone
- Suspended particulate matter (SPM)
- Sulphur dioxide (SO2)
- Smog

❑ ***Air pollutants are of two types:***

- suspended particulate matter, and
- gaseous pollutants like carbon dioxide (CO2), NOx etc.

(a). ***Particulate pollutants***

- Particulate matter suspended in air is dust and soot released from the industrial chimneys. Their size ranges from 0.001 to 500 µm in diameter. Particles less than 10µm float and move freely with the air current. Particles which are more than 10µm in diameter settle down. Particles less than 0.02 µm form persistent aerosols. A major source of SPM (suspended particulate matter) are vehicles, power plants, construction activities, oil refinery, railway yard, marketplace, industries, etc.

(b). ***Fly ash***

- Fly ash is ejected mostly by thermal power plants as by-products of coal-burning operations. Fly ash pollutes air and water and may cause heavy metal pollution in water bodies. Fly ash affects vegetation as a result of its direct deposition on leaf surfaces or indirectly through its deposition on the soil. Fly ash is now being used for making bricks and as landfill material.

(c). ***Lead and other metals particles***

- Tetraethyl lead (TEL) is used as an anti-knock agent in petrol for the smooth and easy running of vehicles. The lead particles coming out from the exhaust pipes of vehicles is mixed with air.
- Lead mixed with water and food can create cumulative poisoning. It has long-term effects on children as it lowers intelligence.
- Oxides of iron, aluminium, manganese, magnesium, zinc, and other metals have an adverse effect due to the deposition of dust on plants during mining operations and metallurgical processes.

(d). ***Gaseous pollutants***

- Power plants, industries, different types of vehicles – both private and commercial use petrol, diesel as a fuel and release gaseous pollutants such as carbon dioxide, oxides of nitrogen and sulphur dioxide along with particulate matter in the form of smoke. All of these have harmful effects on plants and humans.

Pollutant	Source	Harmful effect
Carbon compound (CO and CO_2)	Automobile exhaust burning of wood and coal	• Respiratory problems • Green house effect
Sulphur compounds (SO_2 and H_2S)	Power plants and refineries volcanic eruptions	• Respiratory problems in humans • Loss of chlorophyll in plants (chlorosis) • Acid rain
Nitrogen Compound (NO and N_2O)	Motor vehicle exhaust atmospheric reaction	• Irritation in eyes and lungs • Low productivity in plants • Acid rain damages material (metals and stone)
Hydrocarbons (benzene, ethylene)	Automobiles and petroleum industries	• Respiratory problem • Cancer causing properties
SPM (Suspended Particulate Matter) (Any soild and liquid) particles suspended in the air, (flush, dust, lead)	Thermal power plants, Construction activities, metalurgical processes and automobiles	• Poor visibility, breathing problems • Lead interfers with the development of red blood diseases and cancer. • Smoge (skoke & fog) formation leads to poor visibility and aggravates asthma in patients
Fibres (Cotton, wool)	Textiles and carpet weaving industries	• Lung disorders

❑ Reports

1. ***Greenpeace*** has found that India is the largest emitter of sulphur dioxide in the world, contributing more than 15% of global anthropogenic emissions.

2. ***World Air Quality Report 2019***

- Released by the pollution tracker IQAir and Greenpeace.
- The ranking is based on a comparison of PM 2.5 levels.
- Bangladesh emerged as the most polluted country for PM 2.5.
- India is at 5th place.
- Among the top 30 cities, 21 cities are in India.
- Among top 10 cities 6 cities are in India.
- Ghaziabad, Uttar Pradesh, is ranked as the world's most polluted city, with an average PM 2.5 concentration measurement of 110.2 in 2019.
- Government Initiatives

1. ***National Air Quality Monitoring Programme***

- Executed by Central Pollution Control Board (CPCB)
- It is a Nationwide programme of ambient air quality monitoring.
- It is undertaken in India for the following purposes:
- To determine status and trends of ambient air quality
- To ascertain the compliance of NAAQS.
- To identify non-attainment cities.
- To understand the natural process of cleaning in the atmosphere
- To undertake preventive and corrective measures.

2. ***National Ambient Air Quality Standards (NAAQS)***

- It was notified in the year 1982 than revised in 1994 based on health criteria and land uses. It has been revised again in November 2009. In 2009, 12 pollutants were included
- Sulphur dioxide (SO2),
- Nitrogen dioxide (NO2),
- PM10
- PM2.5
- Ozone
- Lead
- Carbon monoxide (CO)
- Arsenic
- Nickel
- Benzene
- Ammonia
- Benzopyrene.

3. ***National Air Quality Index***

- It was launched in **April, 2015** with the theme **'One Number -One Colour -One Description'** for the people to identify the air quality within their area.
- Developed by Central pollution Control Board **(CPCB) with IIT-Kanpur** and an expert group comprising medical and air-quality professionals.
- At present it is in 10 cities- Delhi, Agra, Kanpur, Lucknow, Varanasi, Faridabad, Ahmedabad, Chennai, Bangalore and Hyderabad.
- It measures the air quality in real time basis.
- It has six categories of air quality associated with health impact.
- Good, Satisfactory, Moderately Polluted, Poor, Very Poor and Severe with distinct colour scheme.

It considers eight pollutants

- PM10
- PM 2.5
- NO2
- SO2
- CO
- Ozone
- NH3
- Pb

4. ***SAFAR***

- The System of Air Quality and Weather Forecasting And Research (SAFAR)
- Introduced by Ministry of Earth Sciences (MoES)
- Its aim is to measure the air quality of a metropolitan city, by measuring the overall pollution level and the location-specific air quality of the city.
- It is indigenously developed by the Indian Institute of Tropical Meteorology (IITM), Pune and is operationalized by the Indian Meteroilogical Department (IMD).
- It shared on real time, air quality index on a 24x7 basis with colour-coding.
- It also gives advance forecast for 72 hours.
- Objective of this project is to create awareness among the people regarding the air quality in their city so that appropriate mitigation measures and systematic action can be taken up.
- It monitors all weather parameters like temperature, rainfall, humidity, wind speed, and wind direction, UV radiation, and solar radiation.
- Pollutants monitored: PM2.5, PM10, Ozone, Carbon Monoxide (CO), Nitrogen Oxides (NOx), Sulfur Dioxide (SO2), Benzene, Toluene, Xylene, and Mercury.

5. ***Action Plan for Cleaner Industry***

- Launched in 2016 by NITI Aayog along with Confederation of Indian Industry (CII).
- Its objective is to address the issue of air pollution in Delhi National Capital Region (NCR).

6. ***National Clean Air Programme (NCAP)***

- Launched by Central Government.
- It is Central Sector "Control of Pollution" Scheme.
- It aims to tackle the air pollution problem across the country in a comprehensive manner.
- It targets to achieve 20 % to 30 % reduction in PM10 and PM2.5 concentrations by 2024 keeping 2017 as the base year.
- The programme has identified 102 non-attainment cities (for city specific action plans) mostly in Indo-Gangetic Plains.

7. ***Graded Response Action Plan (GRAP)***

- It was notified in January 2017
- It is aimed at prevention, control and abatement of air pollution in Delhi and NCR.
- Environmental Pollution (Prevention and Control) Authority (EPCA) is the implementing agency.
- Four AQI categories, namely, Moderate to Poor, Very Poor, Severe and Severe+ or Emergency.

8. ***WAYU (Wind Augmentation Purifying Unit)***

- It is an air pollution control device which can purify air in an area of 500m.
- It was developed by Council of Scientific and Industrial Research – National Environmental Engineering Research Institute (CSIR-NEERI) as a part of Technology Development Project being funded by Department of Science and Technology.

9. *SAMEER app*

- It provides hourly updates on the National Air Quality Index.
- Developed By Central pollution control board **(CPCB)**.
- It provides information for more than **100 cities**.
- The app can be used to file complained related to pollution issues.

10. ***Green Crackers***

- Its aim is to resolve the crisis of air pollution.
- Council of Scientific and Industrial Research (CSIR) led by Nagpur-based National Environmental Engineering Research Institute (NEERI) developed green firecrackers.
- Names of Green crackers developed are - Safe Water Releaser (SWAS), Safe Thermite Cracker (STAR) and Safe Minimal Aluminum (SAFAL).

Other measures to curb pollution

- Delhi became first city running on BS VI fuels.
- Delhi is scheduled to run Hydrogen-CNG (H-CNG) fueled buses to curb emission. It reduces carbon monoxide emission by upto 70%.
- Anti-smog guns: Anti-smog gun is a device that sprays nebulized water droplets into the air through high pressure propellers which help particles to settle down.
- Smog towers Smog towers are basically structures designed as large-scale air purifiers to reduce pollution particles from the atmosphere.

Noise Pollution

- It is a loud and unpleasant sound created by people or machines that can cause discomfort.
- Noise is loud, annoying, distracting, intrusive, and physically painful.
- The noise sources could be road traffic, jet planes, garbage trucks, construction equipment, manufacturing processes, leaf blowers, and boom boxes.
- The intensity of sound is measured in decibels (dB).
- If the sound intensity is increased by about 10 dB, it will double the increase in loudness.
- According to WHO (World Health Organization), a person's hearing can be damaged if exposed to noise levels over 75 dB over a prolonged period.
- WHO recommended that the sound level indoors should be less than 30 dB.

Properties of sound

1. Loudness

- It is the intensity and strength of sound perceived by human ears.
- It is measured in decibels.
- The intensity of the audible sound is 10 decibels.

2. Frequency

- It is measured in Hertz.
- It is defined as the number of vibrations per second.
- The range of human hearing is 20-20,000Hz.
- Above 20,000 Hz is called ultrasound, and below 20Hz is called infra-sound.

Source	Intensity	Source	Intensity
Quiet Conversation	20-30dB	Radio Music	50-60 dB
Loud Conversation	60 dB	Traffic Noise	60-90 dB
Lawn Mower	60-80 dB	Heavy Truck	90-100 dB
Aircraft Noise	90-120 dB	Space Vehicle	140-179 dB
Beat Music	120 dB	Launch	
Motor Cycle	105 dB	Jet Engine	140 dB

Effects of Noise Pollution

- ***Hypertension:*** Exposure to loud and unpleasant noise elevates blood levels which can cause hypertension in humans.
- ***Annoyance:*** Irregular and loud sounds cause displeasure to hear and annoy.
- ***Physiological effects:*** The physiological features like breathing amplitude, blood pressure, heart-beat rate, pulse rate, and blood cholesterol are affected.
- ***Hearing disability:*** Constant exposure to loud sound cause damage to eardrums leading to loss of hearing.
- ***Sleeping disorder:*** Excessive and loud noise affect the sleep cycle, leading to low-energy level and fatigue.
- ***Human performance:*** The working performance of workers/humans will be affected as it distracts the concentration.
- ***Nervous system:*** It causes pain, ringing in the ears, and feeling of tiredness, thereby affecting the functioning of the human system.
- ***Damage to the material:*** The buildings and materials may get damaged by exposure to infrasonic/ultrasonic waves and even collapse.

Control

- Noise level reduction from domestic sectors.
- Regular maintenance of automobiles leads to the lowering of sound.
- Loud Speakers should be prohibited.
- Heavy machinery used in Industries should be regularly maintained.
- The building should be designed in such a way that it absorbs sound.
- The planting of trees leads to a reduction in Noise Pollution.
- Highways traffic should be diverted from cities and towns to bypasses and over-bridges.
- Workers working in Heavy industries should be provided with protective devices like cotton plugs.

Government Measures

- Ambient noise level for various areas has been defined by Noise Pollution (Control and Regulation) Rules, 2000.
- Monitoring noise Pollution in seven metropolitan cities- Mumbai, Delhi, Kolkata, Chennai, Bangalore, Lucknow, and Hyderabad through a network of 70 noise-monitoring stations.
- Excessive noise is a crime under section 268 of IPC.
- Environment Protection Act, 1986 has recognized noise as a pollutant.
- 'Silence Zone'- 100-meter radius around schools, colleges, hospitals, and courts.
- Section 133 of IPC uses loudspeakers in public as a punishable offense.
- Central Motor vehicle Rule, 1989 banned pressure horns (sirens and multi-tone horns) except for police vans, fire brigade, and ambulances.

Category of Area/Zone	Limits in dB	
	Day Time	Night Time
	6 a.m. To 10 p.m	10 p.m. To 6 a.m
A. Industrial Area	75	70
B. Commercial Area	65	55
C. Residential Area	55	45
D. Silence Zone	**50**	40

WATER POLLUTION

- Water pollution is the contamination of water bodies when toxic substances are added to the water.
- Containment could be organic, inorganic, biological, radiological, heat, etc.
- This leads to the degradation of water quality; it becomes unfit for use.
- Both groundwater and surface water gets polluted.
- Water pollution now has reached to sea and ocean also.

Sources of water pollution

- Discharge from houses, commercial and industrial establishments.
- Untreated sewage system. The sewage system includes human and animal excrete, food residues, cleaning agents, detergents, and other wastes.
- Excesses fertilizers used in agriculture contain major plant nutrients such as nitrogen, phosphorus, and potassium. It leaches and contaminates groundwater or may be mixed with surface water of rivers, lakes, and ponds by runoff and drainage.
- Agricultural pesticides are non-degradable, and their residues have a long life and further contaminate water bodies.
- The animal excreta such as dung, wastes from poultry farms, piggeries and slaughterhouses, etc., reach the water through runoff and surface leaching during the rainy season.
- Power plants that provide electricity to us use water as coolant and release hot water to the source. A sudden increase in temperature leads to the killing fishes and other aquatic animals.
- Underground water pollution because of excessive extraction of water.
- Oceans are becoming polluted because rivers discharge their pollutants into the sea, and sewerage and garbage from coastal cities are also dumped into the sea. Other sources of oceanic pollution include oil spills from ships, disposal of radioactive wastes, offshore oil mining, etc.

Effects of Water Pollution

- Dissolved Oxygen which is important for the survival of organisms living in water bodies, gets reduced.
- The outbreak of water-borne diseases like jaundice, cholera, typhoid, amoebiasis, etc., is due to viruses, bacteria, parasitic protozoa, and worms.
- Mercury compound is converted into toxic methyl mercury due to bacterial action in water bodies. It causes deafness, blurring vision, and mental derangement. It also causes Minamata disease, which was detected in Japan in 1952.
- Cadmium in water bodies causes Itai Itai, also called an ouch-ouch disease.
- Lead in water bodies causes anemia, loss of muscle power, and a bluish line around the gum.
- Excessive nitrates in drinking water cause blue baby syndrome after its reaction with hemoglobin.
- Excessive fluoride in drinking water leads to neuro-muscular disorders, gastrointestinal problems, teeth deformities, hardening of bones, and stiff and painful joints.
- Over-exploitation of groundwater leads to contamination through arsenic. Arsenic causes black foot disease.

Government measures to control Water pollution

Jal Shakti Abhiyan

- It's a campaign for water conservation and water security.
- The campaign focuses on water-stressed districts and blocks.
- It has two phases:
- Phase I: 1st July to 15th September 2019 (all States)
- Phase II: 1st October to 30th November 2019 (States with retreating monsoon - Andhra Pradesh, Karnataka, Puducherry, and Tamil Nadu).
- It is a collaborative effort of various Ministries of the Government of India and State Governments, coordinated by the Department of Drinking Water and Sanitation (Ministry of Jal Shakti).

Jal Jeevan Mission

- This mission aims to provide functional household Tap Connection to every rural household (Har Ghar Nal Se Jal) by 2024.
- Every household in the village will get a tap water connection.
- Further, developing reliable drinking water sources and augmenting existing sources.
- Treatment of water through technological intervention.
- Community-driven approach with a pivotal role to Gram Panchayats and the local community.
- Fund sharing pattern: 90:10 for Himalayan and North-Eastern States; 50:50 for other States, and 100% for us.

Composite Water Management Index (CWMI)

- Released by NITI Aayog.
- It aims to assess and improve the performance in the efficient management of water resources.
- Launched by NITI Aayog in 2018 as a tool to instill a sense of cooperative and competitive federalism among the states.
- The CWMI 2019 measures the performance of States abfrom017-18 as well as from previous years.
- States and Union Territories (UTs) have been divided into Non-Himalayan states, North-Eastern and Himalayan states, and Union Territories (UTs).
- Gujarat is ranked 1 among non-Himalayan States, followed by Andhra Pradesh, Madhya Pradesh, Goa, Karnataka, and Tamil Nadu.
- Himachal Pradesh is ranked 1 among North Eastern and the Himalayan States, followed by Uttarakhand, Tripura, and Assam.
- Puducherry is ranked 1 among the Union Territories.

Atal Bhujal Yojana (Atal Jal)

- It is a Central Sector Scheme
- It aims to improve groundwater management in identified priority areas through community participation.
- It covers seven States- Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh.
- It is to be implemented over 5 years (2020-21 to 2024-25).
- World Bank sponsors it with 50% of the total outlay.

National Water Mission Awards

- Initiated by the National Water Mission and Department of Water Resources, River Development & Ganga Rejuvenation under the Ministry of Jal Shakti.
- It recognizes excellence in water conservation, efficient water use, and sustainable water management practices.
- The awards are given in ten categories defined under the five goals of the National Water Mission.

Namami Ganga Programme

- Launched in June 2014 with a budget outlay of Rs.20,000 Crore.
- Objective- effectively reducing pollution and conserving and rejuvenating National River Ganga.
- Its Vision- Ganga Rejuvenation constitutes restoring the wholesomeness of the river defined in terms of ensuring "Aviral Dhara" (Continuous Flow"), "Nirmal Dhara" ("Unpolluted Flow"), and Geologic and ecological integrity.
- The main pillars of the Namami Gange Programme are Sewerage Industrial Effluent Development; BioDiversity; Afforestation; Public Awareness; Ganga Gram. Treatment Infrastructure; Monitoring; River-Front River-Surface Cleaning.
- NMCG is registered as a society under the Societies Registration Act 1860.
- It acts as the implementation arm of the National Council for Rejuvenation, Protection, and Management of River Ganga (referred to as the National Ganga Council).
- Under the Environment (Protection) Act, 1986, a five-tier structure has been envisaged at the national, state, and district levels to take measures for prevention, control, and reduction of environmental pollution in Ganga.
- Five-tier structure is:
- National Ganga Council under the chairmanship of the Prime Minister (replaced National Ganga River Basin Authority).
- Empowered Task Force (ETF) on river Ganga under the chairmanship of Union Minister of Jal Shakti.
- National Mission for Clean Ganga (NMCG).
- State Ganga Committees.
- District Ganga Committees in every specified district abutting river Ganga and its tributaries in the states.

1. ***What is Global Warming?***

- Global warming is the gradual increase in the average temperature of the earth's atmosphere. It is because of increased sun rays striking the earth's surface, which get trapped and do not radiate out into space.
- These rays are trapped by certain gases called 'Greenhouse gases.' These include - Carbon dioxide, Water Vapour, Methane, Ozone, Nitrous Oxide, etc.

2. ***How are these gases produced?***

Greenhouse gases are produced by artificial activities which are listed below:

- Burning coal and petroleum, known as 'fossil fuels.
- Cutting down rainforests.
- Production of Animal Waste

3. ***Are Green House Gases Harmful?***

- Without greenhouse gases, the earth would be very cold and would be unsurvivable, and it was the most important thing which life thrived on this planet. But Nowadays, these gases trap too much sunlight in our atmosphere.

4. ***Effects of Global Warming:***

- With so much heat being trapped in the greenhouse gases, the average temperature of the earth's surface is increasing at an enormous rate compared with earlier decades.
- This increase in temperature is leading to changes in climatic change.
- As we know, nearly 75% of the earth is covered with Water. The Water gets heated up, which after evaporation forms clouds. This Water then comes down and sometimes leads to flooding of rivers.
- A warmer atmosphere makes glaciers and mountain snow packs, the Polar ice cap, and the great ice shield jutting off Antarctica melt, raising sea levels.
- Temperature changes change the patterns of wind greatly, bringing the monsoon in Asia and rain and snow around the World, leading to unpredictable weather being more common.
- This is why scientists have stopped focusing just on global warming and now focus on the larger topic of climate change.

The World takes initiatives:

The World has taken many initiatives to reduce the pace of Global Warming by bringing down the Global temperature level.

- ***United Nations Framework Convention on Climate Change:***

- The UNFCCC is an international agreement on the environment which was adopted on 9 May 1992 and opened for signature at the Rio de Janeiro Earth Summit from 3 to 14 June 1992.

- ***Paris Agreement:***

- The Paris Agreement is a United Nations Framework Convention on Climate Change (UNFCCC) agreement on mitigating, adapting, and financing greenhouse gas emissions, signed in 2016.
- In 2015 the Paris Agreement was adopted, governing emission reductions from 2020 on through commitments of countries in Nationally Determined Contributions, lowering the target to 1.5 °C. The agreement entered into force on 4 November 2016.

India takes initiatives:

India is a developing country; to increase its GDP, it depends on conventional fuels to meet its energy demands. India is well aware of all the issues that the World is facing due to global warming, so it has taken various steps:

a. ***Energy Sector Interventions***

- The energy sector interventions aim to reduce GHG emissions (Greenhouse Gas) by improving energy efficiency and adopting cleaner energy sources.

(i) ***International Solar Alliance:***

- The International Solar Alliance (ISA) is an alliance of more than 122 countries initiated by India, most of which are sunshine countries, between the Tropic of Cancer and the Tropic of Capricorn, either entirely or partly. It has now been extended to all UN members. The alliance's primary goal is to work towards the efficient use of solar energy to reduce dependence on fossil fuels.

(ii) ***Pradhan Mantri Ujjwala Yojana (PMUY) :***

- Out of 24 Cr households, 10 Cr households still use cooking biomass such as firewood and cow dung, which causes hazardous pollution to people's and the environment's health.
- By Ujjawala Yojana, the government has provided free LPG connections and reduced people's dependence on fuels like firewood and cow dung.

(iii) ***Green Rating for Integrated Habitat Assessment (GRIHA) :***

- GRIHA, developed by the Institute of Energy and Resources (TERI), was adopted as the government's national green building rating system.
- It assesses a building's environmental performance holistically throughout its life cycle, thus establishing a definitive standard for what constitutes a green building

b. ***Renewable Energy Development***

India has set an ambitious target of adding 175 Gigawatt (GW) renewable energy capacity by 2022, over and above the installed 30 Gigawatt (GW).

(i) ***Solar cities:***

- Reducing a minimum of 10% of the anticipated energy demand of the cities through renewable energy installations using wind and solar energy. Recycling municipal waste and implementing energy efficiency measures to meet the objective.

(ii) ***Ultra mega solar parks:***

- A series of planned solar power projects, each of which has a more than 500 MW capacity. Government plans to establish 25 of these plants, adding 20GW of solar power capacity.

(iii) ***National Biofuel Policy:***

- This policy aims to attain 20% of the ethanol blending in a conventional fuel. Currently, only 5% of the ethanol blending is taking place.

(iv) ***National Offshore Wind Energy Policy 2015:***

- By installing a 23 GW power supply, India has successfully developed the onshore wind power program. This new policy seeks to develop wind farming deeper into the sea to reduce the dependence only on land for wind energy.

(v) ***Nuclear Power Program:***

- India currently sources about 2% of its energy needs from nuclear energy. When complete, stage 3 of the nuclear power program will ensure India becomes a self-sufficient country in nuclear fuel as it holds 25% of the World's Thorium reserves.
- The government recently cleared about 10 nuclear power reactors with a net capacity of 7000 MW.

c. ***Industrial Sector Schemes Objective***
Reducing emissions from the automobiles

(i) ***National Electric Mobility Mission Plan (NEMMP):***

- Achievement of national fuel security by promoting hybrid and electric vehicles in the country and parallelly reducing harmful emissions from the vehicles running on hydrocarbons. It aims at achieving annual sales of 6-7 million hybrid and electric vehicles from 2020 onwards.

(ii) ***Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME):***

- It aims to support market development and eco-system for producing hybrid / electric vehicles.
- The scheme has four focus areas, viz. Technological development, Demand Creation, Pilot Projects, and Charging Infrastructure.

d. ***Increasing the green cover:***

(i) ***River inter-linking program***

- Help address the issues arising from disasters such as drought and floods and increase the area under the irrigation channel.

(ii) ***National Green Highway Mission:***

- Planting trees along the national highway would also act as a green muffler for noise pollution, store CO2, and provide a livelihood to the communities near the highways.

Climate Change: Introduction, Causes, Effects & Efforts

❑ *Introduction*

- As per United Nations Framework Convention on Climate Change(UNFCCC), climate change means a change in the earth's climate that is attributed directly or indirectly to human activity, which alters the composition of our atmosphere.
- The variation and periodical shifts in weather conditions over space and time resulting in climate change may also be defined as Climate Change. Ex – Change of climate from warm and moist to warm and dry.
- It is a change in the local, regional or global environment caused due to rise in the global temperature and human activities.
- The rate of climate change relies on the pace of the causal factor.
- Climate may change gradually or rapidly, partly or drastically, short term or long term, over a Local, regional, or global scale, depending on the pace of causal factors.
- The disastrous effect of climate change may be understood by the fact that during the Jurassic Period, climate change led to the mass extinction of Dinosaurs due to the rapid onset of the Cold Climate.

❑ *Areas of concern*

- According to a research study by the Intergovernmental Panel on Climate Change (IPCC), human activities have increased global temperature by about 1 ° C (0.8 ° C to 1.2 ° C) above pre-industrial levels.
- The global temperature may rise by 1.5 ° C between 2030 and 2052 if it continues to rise at the present rate.
- The atmospheric concentrations of the primary greenhouse gas (CO2) have increased to 410 parts per million (ppm) from about 280 ppm in pre-industrial times.
- As per an estimate by WHO, climate change may be the prime reason for the deaths of around 250,000 people yearly due to increasing pollution-related problems.
- The poorest people will be the most affected section by climate change.

❑ *Evidence of Climate Change*

Following is the evidence that proves that climate change is a reality and needs to be taken into account for future policies and action:-

- A rise in the Global Temperature
- A decrease in the snow cover on Glaciers
- A reduction in Arctic Sea Ice Cover
- Warming of Ocean Waters
- The rising sea level of the Ocean
- Increase in the event of forest fires around the world
- Ocean acidification results in the death of marine plants and animals
- Extreme weather events at regular intervals. Excessive precipitation, floods, earthquakes, tsunamis, high winds, hail, thunderstorms, downbursts, tornadoes, waterspouts, tropical cyclones, etc.

❑ *Causes of climate change*

There are many reasons for climate change. They can be divided into natural causes and anthropogenic causes:-

❑ *Natural causes of climate change*

The important natural factors causing climate change are appended below-

- ***Continental Drift -*** It changes the physical features of the water bodies and landmass, which further alters the flow of ocean currents and winds.
- ***Change in the variation of Earth's Orbit -*** It produces 'Milankovitch cycles,' h have an enormous impact on climate and have a notable correlation to glacial and interglacial periods.
- ***Pollution due to Volcanic Activities -*** During Volcano eruption, the outburst of gases and dust particles abrupt the incoming rays of the Sun. Also, Sulphur dioxide from volcanoes combines with the water to form tiny droplets of Sulphuric acid, which can stay in the environment for several years.
- ***Plate Tectonics -*** The continents' shifting also affects ocean currents' patterns as it changes the geometry of the oceans.
- ***Change in the pattern of Ocean Currents –*** Horizontal winds result in the displacement of the water against the sea surface. If it changes, it may change the climatic condition.

❑ ***Anthropogenic causes of climate change***

The various artificial factors affecting climate change are appended below-

- ***Excessive emission of Greenhouse Gases –*** It causes pollution in the atmosphere, resulting in climate change changes.
- ***Change in the composition of Atmospheric Aerosols -*** Aerosols cause scattering and absorption of solar and infrared radiation. Also, they can change the microphysical and chemical properties of clouds.
- ***Deforestation –*** Due to Cutting down trees and forests, the amount of sunlight reflected from the ground back into space is changing, which is changing the climate pattern. Also, forest acts as a carbon sink; if it decreases due to deforestation, it will disturb the balance in the atmospheric composition.
- ***Excessive exploitation of natural resources –*** Nature has a tremendous load on its natural resources due to population growth and demand increase.
- ***Policy Priority to industrialization than the environment –*** In a race for industrialization, governments worldwide are formulating policies with a tilt towards more industrialization, and environmental impacts are being ignored.
- ***Excessive emission of CO2 –*** Industrialization & increasing use of vehicle is increasing the emission of CO2.

❑ ***Impacts of climate change***

Our planet earth is experiencing some significant changes due to variations in climatic conditions. Some significant impacts of climate change are appended below:-

- Increased risk of extreme weather events
- Increased risk of forest fires
- Increased risk of floods
- Increased risk of Droughts
- Increased risk of Diseases and illness
- Increased economic losses caused due to extreme weather events
- A rise in the sea levels
- The surge in Global Temperature
- A threat to the Ecosystem and wetlands

India's effort to counter climate change

❑ ***National action plan on climate change (NAPCC)***

Govt has launched the following programs to address climate change under NAPCC:-

- The National Solar Mission has been launched to promote the use of solar energy for power generation.
- The Government of India has initiated the National Enhanced Energy Efficiency Mission for Energy Conservation in Industries.
- The government of India has initiated the National Sustainable Habitat Mission to promote energy efficiency technology in urban planning.
- For the conservation of water through pricing and other measures, the National Water Mission has been launched.
- To conserve biodiversity, forest cover, and other ecological values in the Himalayan region National Mission for Sustaining the Himalayan Ecosystem has been launched.
- The Government of India has initiated a "Green India Mission" for afforestation of more than 6 mn hectares of degraded forest land and to increase forest cover from 23% to 33%.
- To support climate-resilient agriculture National Mission for Sustainable Agriculture has been launched.
- Through the UN Convention to Combat Desertification (UNCCD), India has prepared a 20-year national action plan for combating desertification.
- For measuring the impact of industries on the environment, the Environment Impact Assessment Program has been launched by the Government of India.
- Eco-Sensitive Zone has been notified to protect Wildlife sanctuaries and National Parks better.
- India is promoting the use of renewable energy sources.
- India is making various policies for the conservation of the environment like - the Environment (Protection) Act, 1986, Forest (Conservation) Act, 1980, Wildlife Protection Act, 1972, etc.

Millennium Development Goals (MDGs)

- At the beginning of 20th century, world leaders held a meeting at the UN to provide a structure and vision to combat poverty in various dimensions; that was translated into 8 Millennium Development Goals (MDGs). The MDG framework has guided development work across the world for the past 15 years. All 191 United Nation members at that time and 22 international organizations committed to assist each other for achieving the following development goals:

- The Millennium Development Goals (MDGs) are a set of eight goals set by the United Nations:
  - Eradicate extreme poverty and hunger
  - Achieve universal primary education
  - Promote gender equality and empower women
  - Reduce child mortality
  - Improve maternal health
  - Combat HIV/AIDS, malaria, and other diseases
  - Ensure environmental sustainability

1. To Eradicate Extreme Poverty and Hunger

The target was to reduce the number of persons suffering from hunger by half.

2. Achieve Universal Primary Education

Providing and facilitating all boys and girls to have access to complete their primary education.

3. Promote Gender Equality and Empower Woman

Promoting gender equality and eradicating gender disparity in primary and secondary education by 2005, and achieving it by 2015.

4. Reduce child mortality

Reduce by two-thirds the mortality among children under 5.

5. Improve maternal health

Reduce by three quarter the maternal mortality ratio. To achieve this motive, access given to universal reproductive health by 2015.

6. Combat HIV/AIDS, Malaria and other diseases

Halt and began to reverse the spread of HIV/AIDS. Achieve access to treatment of HIV/AIDS persons and all the desired help by 2010.

7. Ensure environment sustainability

Integrate the principle of sustainable development in the country's policies and programs.

Ensuring access to safe drinking water and basic sanitation and its fulfilment to the remaining population.

Achieve significant improvement in lives of at least 100 million slum dwellers by 2020.

8. Global partnership for development

Develop an open rule-based, predictable, non-discriminatory trading with the financial system.

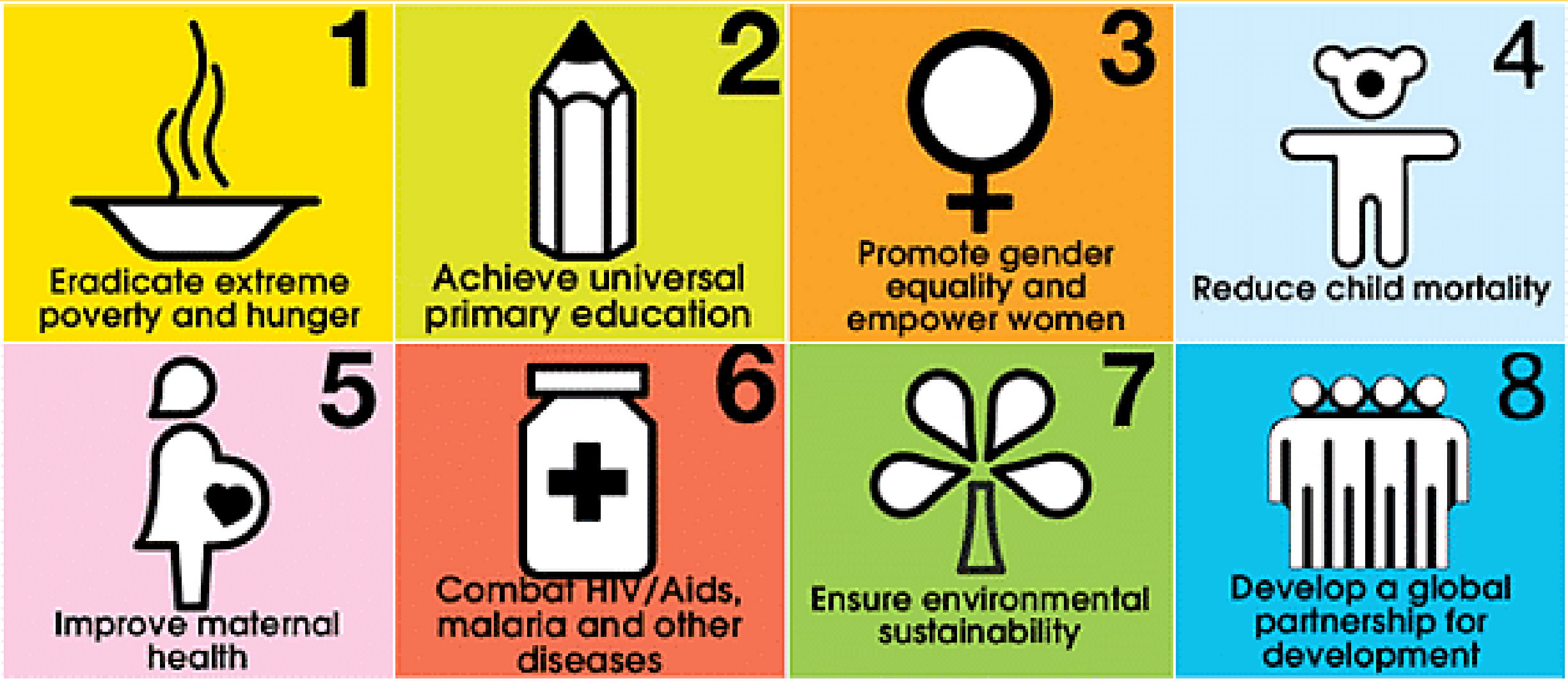
Promoting special needs of the less developed nation to have its access to various development goals.

Address the special needs of landlocked developing countries and small island countries/states (through the programme of action of sustainable development of small island developing states was the outcome of the 22nd session of General Assembly.

Deal comprehensively the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term.

Provide access to essential and affordable drugs to developing countries by cooperation with major pharmaceutical companies.

Dissipation of various new technologies to a less developed nation, especially information and communication through cooperation with the private sector.



Sustainable Development Goals: Most Important Points

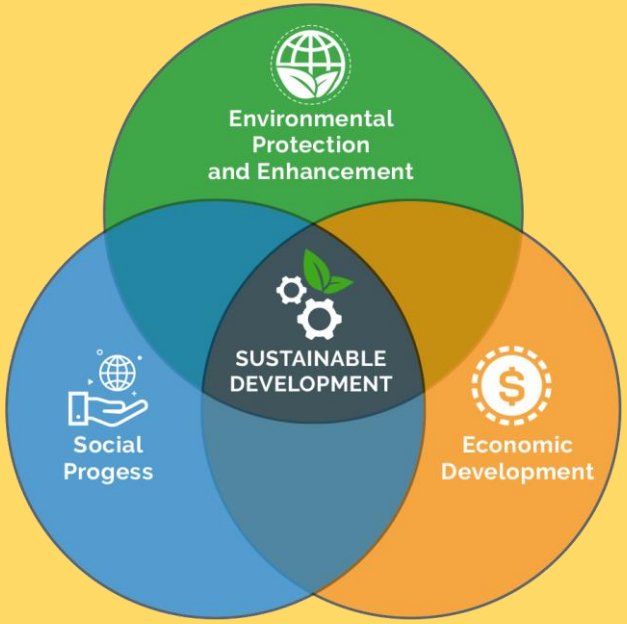
- In 1987, the ***United Nations World Commission on Environment and Development*** released the report ***Our Common Future***, commonly called the Brundtland Report.
- The Brundtland Report in 1987 defined sustainable development as **"development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs"**
- The Sustainable Development Goals are a series of measures to end poverty, protect the planet and ensure the global well-being of human beings.
- Sustainable development was first institutionalized with the Rio Process initiated at the 1992 Earth Summit in Rio de Janeiro. In 2015 the United Nations General Assembly (UNGA) adopted the Sustainable Development Goals (2015 to 2030) and explained how the goals are integrated and indivisible to achieve sustainable development at the global level.
- It is a group of 17 goals with 169 targets and 304 indicators and was proposed by the United Nations General Assembly to be achieved by 2030.
- The SDGs are a series of intergovernmental agreement formulated to end poverty, protect the environment and planet earth and ensure overall well-being and all-around development of human beings.
- Its predecessor was the Millennium Development Goals. The MDGs were 8 goals with measurable targets and deadlines to improve the lives of poor across the world. For the same, the historic millennium declaration at the UN Millennium Summit in 2000 was signed. The deadline to achieve the 8 targets was decided to be 2015.
- SDGs is the outcome of Rio+20 conference (2012) held in Rio De Janeiro and is a non-binding document.

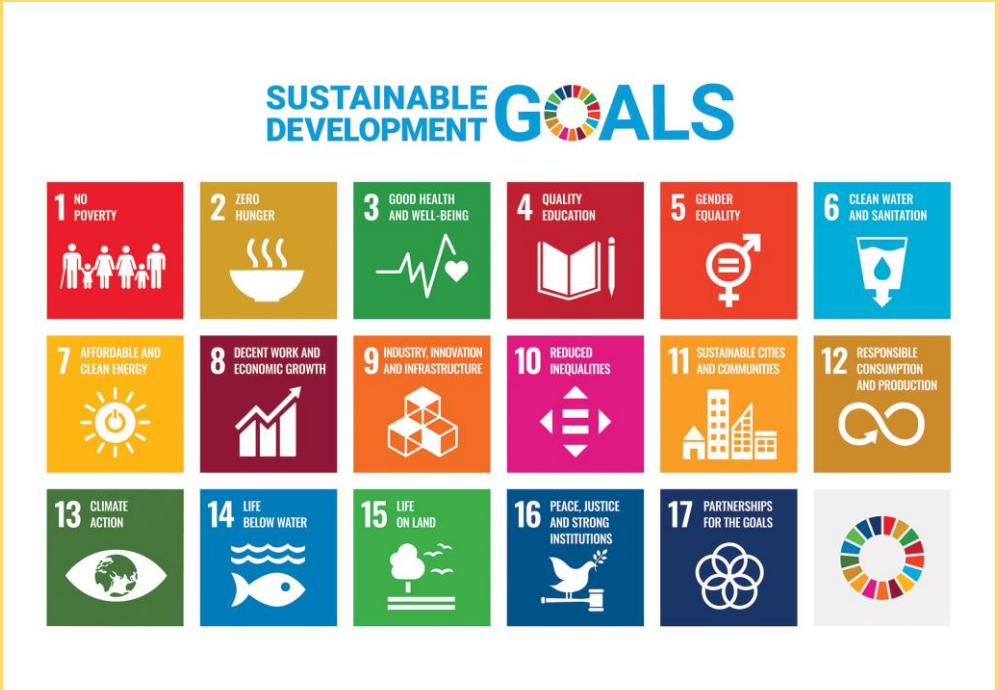
- Expected Question for UGC NET 2024
- 1. Sustainable Development Goals is the outcome of which conference? - Rio+20 Conference
- 2. Sustainable Development Goals has how many goals? - 17 goals

- The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

- The SDGs build on decades of work by countries and the UN, including the UN Department of Economic and Social Affairs
- In June 1992, at the Earth Summit in Rio de Janeiro, Brazil, more than 178 countries adopted Agenda 21, a comprehensive plan of action to build a global partnership for sustainable development to improve human lives and protect the environment.
- Member States unanimously adopted the Millennium Declaration at the Millennium Summit in September 2000 at UN Headquarters in New York. The Summit led to the elaboration of eight Millennium Development Goals (MDGs) to reduce extreme poverty by 2015.
- The Johannesburg Declaration on Sustainable Development and the Plan of Implementation, adopted at the World Summit on Sustainable Development in South Africa in 2002, reaffirmed the global community's commitments to poverty eradication and the environment, and built on Agenda 21 and the Millennium Declaration by including more emphasis on multilateral partnerships.
- At the United Nations Conference on Sustainable Development (Rio+20) in Rio de Janeiro, Brazil, in June 2012, Member States adopted the outcome document "The Future We Want" in which they decided, inter alia, to launch a process to develop a set of SDGs to build upon the MDGs and to establish the UN High-level Political Forum on Sustainable Development. The Rio +20 outcome also contained other measures for implementing sustainable development, including mandates for future programmes of work in development financing, small island developing states and more.

- In 2013, the General Assembly set up a 30-member Open Working Group to develop a proposal on the SDGs.
- In January 2015, the General Assembly began the negotiation process on the post-2015 development agenda. The process culminated in the subsequent adoption of the 2030 Agenda for Sustainable Development, with 17 SDGs at its core, at the UN Sustainable Development Summit in September 2015.
- 2015 was a landmark year for multilateralism and international policy shaping, with the adoption of several major agreements:
- Sendai Framework for Disaster Risk Reduction (March 2015)
- Addis Ababa Action Agenda on Financing for Development (July 2015)
- Transforming our world: the 2030 Agenda for Sustainable Development with its 17 SDGs was adopted at the UN Sustainable Development Summit in New York in September 2015.
- Paris Agreement on Climate Change (December 2015)
- Now, the annual High-level Political Forum on Sustainable Development serves as the central UN platform for the follow-up and review of the SDGs.





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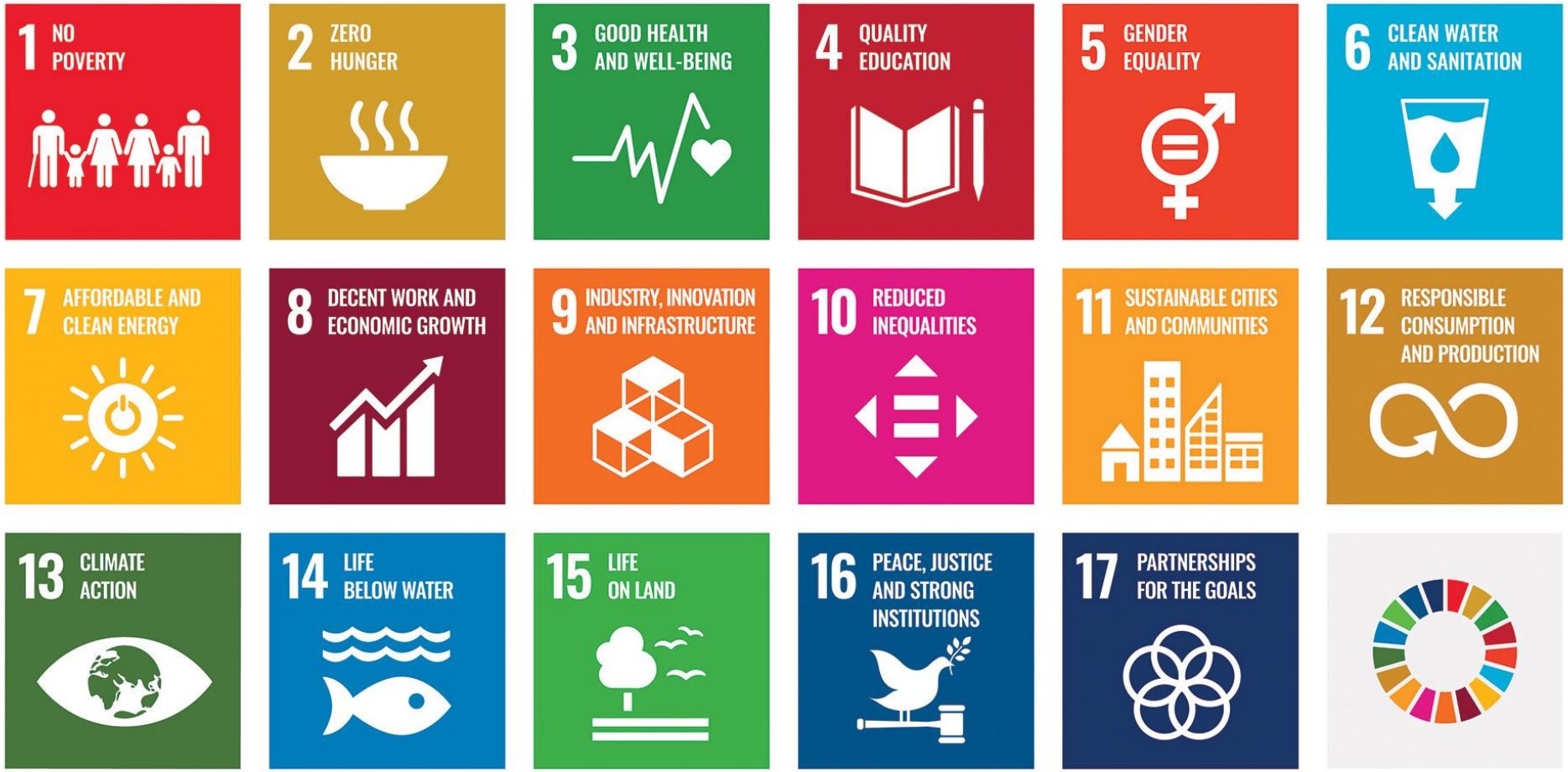
SUSTAINABLE DEVELOPMENT GOALS



Sustainable Development Goals and India: Most Important Points

- The SDGs are broader in scope and are set for the time period 2015-2030.
- With the collaboration of the Ministry of Statistics & Programme Implementation (MoSPI), Global Green Growth Institute and United Nations in India, the SDG India index was launched.
- The SDG index is composed of a composite score for each of the Indian states based on their performance across 13 SDG.
- The aim of the SDG index is to inculcate competition amongst the state to give an impetus to their performances towards achieving their SDG goals.
- According to NITI Aayog CEO Amitabh Kant and the UN among the Indian states, Himachal Pradesh, Kerala, and Tamil Nadu have topped the list in achieving key SDG goals while Assam, Bihar and Uttar Pradesh are the laggards.
- Kerala's performance can be attributed to its exemplary performance in providing good health, low incidents of hunger and malnourishment, gender equality and quality education. Himachal Pradesh stood where it is on account of its success in providing clean water and sanitation and preserving the mountain ecosystem. Tamil Nadu has succeeded on account of its provision of clean energy to people and reduced poverty.
- The nation in totality has a score of 58, according to the SDG India Index. It depicts that the country has reached a little more than the halfway mark in meeting the SDG goals.
- The index covers 13 out of the 17 goals. Left out goals include 12,13,14 and 17.

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