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ENVIRONMENTAL DEGRADATION & NATURAL RESOURCES

Unit Structure:

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1.0 OBJECTIVES

- To know about the basic concept of environmental degradation.
- To study the various types of environmental degradation.
- To understand the concept renewable and non-renewable natural resources.

1.1 CONCEPT OF ENVIRONMENTAL DEGRADATION

Environmental degradation is just like an umbrella concept as it includes a variety of issues like pollution, biodiversity loss, deforestation, land disturbance, and a lot more. It is a problem through which the natural environment deteriorates and depletes biological diversity and reduces the general health of the environment, which can be natural, or human-made.

Environmental degradation is harming our ecosystem. It is a distinct unit including both living and non-living elements that lives within it. Plants, animals, and we humans depend on the environment for survival directly or indirectly.

We can broadly understand our ecosystem, through the food chain and food web process. These living and non-living things are depends upon the other environmental components like ponds, streams, lakes, etc.

Therefore, a minor change in the environment can affect the whole system. Our environment has deteriorated for last two centuries. Sometime, human disturbance is the primary cause of this. The ‘want’

from nature turns into 'greed,' which causes our mother nature to deplete and destroy.

Degradation of environment is one of the essential subjects where our mother earth is dying because of its hazardous, irresponsible, unthinkable, and permanent cause in this present era. Mindless consumerism and the hunger for more economic development or growth started its dreadful effect on Mother Nature. In the present case, sustainable development becomes a meaningless word.

It happens in several ways, such as the extinction of species, pollution of common assets, deforestation, and most rapidly by population growth. Other causes include urbanization, increase in energy consumption, economic growth, and agriculture intensification.

1.2 TYPES OF ENVIRONMENTAL DEGRADATION

Basically there are the three types of Environmental degradation as follows –

1. Land degradation.
2. Water degradation.
3. Air degradation.

Degradation of these three types impacts the worldwide climate and living conditions to an excellent extent.

1. Land degradation:

The land degradation may be a process during which the worth of the biophysical environment is suffering from a mixture of human activities or disturbances acting upon the land. The deforestation accounts for the main land degradation problem because it leads to severe erosion, flood, and loss of fertile soil.

2. Water degradation:

The water degradation occurs when toxic substances enter water bodies like lakes, rivers, oceans and on by getting dissolved in them, lying suspended within the water or depositing on the bed. This degrades the quality of water.

3. Air degradation:

The quality of air can be degraded by natural or man-made sources. Natural sources include volcanic eruption, windstorm dust. Man-made sources include pollution from moving vehicles, toxic gases from industries, coal-powered plants, burning wood or other material within the outdoors, landfills. The most common diseases caused by pollution include ischemic heart condition, stroke, chronic obstructive pulmonary disease (COPD), carcinoma and acute lower respiratory infections in children.

1.3 NATURAL RESOURCES

The various types of natural resources are used in human life for maximum welfare. There are two types of resources used for the development of a country. These types are of renewable and exhaustible or non-renewable resources which are most important to any country's sustainable development.

1.3.1 RENEWABLE NATURAL RESOURCES:

Exhaustible resources are also known as Non-renewable resource. Such resources are natural substances which are not replenished with the speed at which they are consumed. It is a finite resource. Fossil fuels such as oil, natural gas, and coal are examples of Exhaustible resources. Humans constantly draw on the reserves of these substances while the formation of new supplies takes ages.

Exhaustible resources come from the Earth. Humans extract them in gas, liquid, or solid form and then convert them for their use, mainly related to energy. The reserves of these substances took billions of years to form, and it will take billions of years to replace the supplies used.

There are four major types of Exhaustible resources: Oil, Natural gas, Coal, and Nuclear energy. Oil, natural gas, and coal are collectively called fossil fuels. Fossil fuels were formed within the Earth from dead plants and animals over millions of years—hence the name “fossil” fuels. They are found in underground layers of rock and sediment. Pressure and heat worked together to transform the plant and animal remains into crude oil (also known as petroleum), coal, and natural gas.

All of these Exhaustible or Non-renewable resources have proved historically to be valuable energy sources that are inexpensive to extract.

Storage, conversion, and shipping are easy and cheap. Fuels created from non-renewable resources are still the primary source of all the power generated in the world due to their affordability and high energy content.

Other Types of Exhaustible or Non-renewable Resources:

Most non-renewable resources are formed from organic carbon material which is heated and compressed over time, changing their form into crude oil or natural gas. However, the term non-renewable resource also refers to minerals and metals from the earth, such as gold, silver, and iron. These are similarly formed by a long-term geological process. They are often costly to mine, as they are usually deep within the Earth's crust. But they are much more abundant than fossil fuels. Some types of groundwater are considered non-renewable resources if the aquifer is unable to be replenished at the same rate at which it's drained.

The problem of pollution and environmental degradation arise due the maximum and continuous use of exhaustible or Non-renewable resources.

1.3.2 NON-RENEWABLE NATURAL RESOURCES

A renewable resource is one that can be used repeatedly and does not run out because it is naturally replaced. Examples of renewable resources include solar, wind, hydro, geothermal, and biomass energy. Their supply replenishes naturally or can be sustained. The sunlight used in solar energy and the wind used to power wind turbines replenish themselves. Timber reserves can be sustained through replanting.

Renewable resource is important for sustainable development and environment protection of a nation. There are main two types of renewable resources i.e. biotic and abiotic. Animals, fish, plants are the biotic renewable resources whereas air, water, wind energy and solar energy are the examples of abiotic renewable resources. These two types of renewable resources stock don't diminish completely. But it is highly impossible to introduce exclusion principle for renewable resources. Now-a-days we are using all these renewable natural resource son large scale. So, in future we may face the problem of sustainable development and environment protection. Biofuel is popular renewable source nowadays.

Biofuel, or energy made from renewable organic products, has gained prevalence in recent years as an alternative energy source to exhaustible resources such as coal, oil, and natural gas. Although prices are still higher for biofuel, some experts project that, due to increasing scarcity and the forces of supply and demand, the prices of fossil fuels will grow higher, making the price of biofuel more competitive. Types of biofuel include biodiesel, an alternative to oil, and green diesel, which is made from algae and other plants. Other renewable resources include oxygen and solar energy. Wind and water are also used to create renewable energy. For example, windmills harness the wind's natural power and turn it into energy.

1.4 SUMMARY

This unit discussed about the relationship between the concept of environmentaldegradation and several types of environmental degradation. It also analysed and discussed types and importance of Natural resources like renewable and non-renewable natural resources.

1.5 QUESTIONS

Q1. Discuss the meaning and types of environmental degradation.

Q2. Write note on 'Renewable Natural Resources.'

Q3. Write note on 'Non-renewable Natural Resources.

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2

POLLUTION

Unit Structure:

2.0 Objectives

2.1 Introduction

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2.2.1 Causes of Land Pollution

2.2.2 Effects of Land Pollution

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2.3 Air Pollution

2.3.1 Causes of Air Pollution

2.3.2 Effects of Air Pollution

2.3.3 Measures of Air Pollution

2.4 Water Pollution

2.4.1 Causes of Water Pollution

2.4.2 Effects of Water Pollution

2.4.3 Measures of Water Pollution

2.5 Noise Pollution

2.5.1 Causes of Noise Pollution

2.5.2 Effects of Noise Pollution

2.5.3 Measures of Noise Pollution

2.6 Questions

2.0 OBJECTIVES

- To know about the concept of pollution.
- To study the causes, effects and measures of land pollution.
- To study the causes, effects and measures of water pollution.
- To study the causes, effects and measures of air pollution.
- To study the causes, effects and measure of noise pollution.

2.1 INTRODUCTION

The word pollution originates from the Latin word "Polluere" which means "to soil or defile". Pollution is the introduction of containments into the natural environment that cause adverse change. According to The National Academy's report review of US Water Management and Control defines, "pollution as undesirable change in the physical, chemical and biological characteristics of air, water and land, that will be or may be harmful to human and other life". Pollution causes an undesirable change in physical, chemical or biological characteristics of environment. We come across different types of pollution. Let us study the concepts of Land, Water and Noise pollution.

2.2 LAND POLLUTION

Land pollution is a serious problem that impacts humans, animals, and the earth. Without taking measures now to reduce pollution levels, permanent changes to the land can occur. The adverse changes to the environment due to land pollution are subtle, but the problem is much bigger than it appears.

Definition of Land Pollution:

The basic definition of land pollution is the destruction and contamination of the land through the direct and indirect actions of humans. The pollution results in changes to the land, such as soil erosion. Some of the changes are irreversible, while others are not.

2.2.1 Causes Of Land Pollution:

There are several known causes of land pollution. Of those, there are six factors that contribute more than others.

1. Deforestation and soil erosion:

When forests are cleared for development and to meet the demand for wood supply, the soil is loosened in the process. Without the protection of the trees, the land becomes barren over time and starts to erode.

2. Agricultural chemicals:

Part of the farming process often involves the use of harmful pesticides and insecticides to protect crops. However, the chemicals can cause the land to become barren. The once-fertile soil is then more susceptible to environmental elements, such as the wind.

3. Industrialization:

The Industrial Revolution may have resulted in significant positive changes to the economy and society, but it also led to significant pollution of the land. Through unsafe disposal practices for chemicals used in manufacturing, poor regulation, and the overwhelming number of industries and factories that are polluting the land daily, industrialization has become one of the main contributors to the pollution problem.

4. Mining:

The mining process can lead to the creation of large open spaces beneath the surface of the earth. This can result in the land caving in, which compromises the integrity of the land. Mining also results in harmful chemicals, such as uranium, being disturbed and released into the environment.

5. Landfills:

The garbage found at landfills is filled with toxins that eventually seep into the earth. During rains, the toxins are washed into other areas and the pollution is spread. As the population grows, the amount of garbage filling landfills also grows.

6. Human sewage:

Untreated human waste can produce toxic gases that can seep into the ground. As with air pollution, the soil quality is negatively impacted, and land nearby can be contaminated. In addition to this, the probability of human illnesses occurring increases.

7. Industrialization:

Due to an increase in demand for food, shelter, and house, more goods are produced. This resulted in creation of more waste that needs to be disposed of. To meet the demand of the growing population, more industries were developed which led to deforestation. Research and development paved the way for modern fertilizers and chemicals that were highly toxic and led to soil contamination.

8. Construction activities:

Due to urbanization, a large number of construction activities are taking place which has resulted in large waste articles like wood, metal, bricks, plastic that can be seen by naked eyes outside any building or office which is under construction.

9. Nuclear waste:

Nuclear plants can produce a huge amount of energy through nuclear fission and fusion. The left over radioactive material contains harmful and toxic chemicals that can affect human health. They are dumped beneath the earth to avoid any casualty.

2.2.2 EFFECTS OF LAND POLLUTION

The contamination of the land has far-reaching consequences that can be catastrophic for water, soil, and animals. There are several possible consequences of land pollution to the environment and animals.

1. Ground water poisoning:

Depending on the soil and whether the chemicals were improperly disposed of on the land, the chemicals could end up in the ground water. The process is known as leaching. It can occur on farms, industrial sites, and landfills.

2. Water nutrient enrichment:

Chemicals, such as nitrogen, are used frequently on farms. Only a small portion of the nutrients end up benefitting the crops. The remainder usually ends up in water that is populated by fish, algae, and other life forms. The nutrient-heavy water saps up most of the oxygen in the water, which leaves little for fish and other life. When this happens, the water is unable to support most lifeforms. For more information on water pollution.

3. Soil pollution:

Soil pollution is another form of land pollution, where the upper layer of the soil is damaged. This is caused by the overuse of chemical fertilizers, soil erosion caused by running water and other pest control measures; this leads to loss of fertile land for agriculture, forest cover, fodder patches for grazing, etc.

4. Air pollution:

Landfills across the city keep on growing due to an increase in waste and are later burned which leads to air pollution. They become home for rodents, mice, etc which in turn transmit diseases.

5. Shifting habitat:

As deforestation and soil erosion progress, animals are forced to move to find shelter and food. For some animals, the change is too traumatic, and this has led to some dying. As a result, some species are at a greater risk of extinction.

6. Environmental impact:

When deforestation is committed, the tree cover is compromised. This leads to a steep imbalance in the rain cycle. A disturbed rain cycle affects a lot of factors. The green cover is reduced. Trees and plants help balance the atmosphere, without them we are subjected to various concerns like Global warming, the greenhouse effect, irregular rainfall and flash floods among other imbalances.

7. Distraction for tourists:

The city loses its attraction as a tourist destination as landfills do not look good when you move around the city. It leads to a loss of revenue for the state government.

8. Effect on wildlife:

The animal kingdom has suffered most in the past decades. They face a serious threat with regards to the loss of habitat and natural environment. The constant human activity on land, is leaving it polluted; forcing these species to move further away and adapt to new regions or die trying to adjust. Several species are pushed to the verge of extinction, due to no homeland. Other issues that we face include increased temperature, unseasonal weather activity, acid rains, etc. The discharge of chemicals on land, makes it dangerous for the ecosystem too. These chemicals are consumed by the animals and plants and thereby make their way in the ecosystem. This process is called bio magnifications and is a serious threat to the ecology.

9. Effects of Land Pollution on Humans:

The impact of land pollution is not limited just to the earth and animals. Humans can also experience negative consequences that can influence quality of life and health. Some of the potential consequences include birth defects, the development of breathing disorders, skin diseases, and cancer. Most of these develop after exposure to waste from water poisoning and soil contamination. Chemicals that are commonly found in contaminated soil and water, such as lead, have can impact a child's cognitive development even if the exposure is very low.

2.2.3 MEASURES OF LAND POLLUTION

There are several possible solutions to land pollution, including conservation. Conservation focuses on preserving natural resources, such as soil and plants. The efforts to conserve resources can start with utilizing sustainable practices.

For instance, leaving some of the trees in a forest to naturally die and decay. This not only leaves the cover needed for the soil and other vegetation, but it helps to provide the nutrients that the soil needs to remain fertile.

Other solutions include:

- Proper waste disposal that focuses on treating waste and disposing it in the safest manner possible.
- Reusing materials to reduce the need for harvesting of resources. Products that are not reusable can likely be recycled.
- Reducing the usage of non-biodegradable materials, such as plastic shopping bags. The simple act of switching to a reusable cloth bag for groceries can help cut down on the need for non- biodegradable materials.
- Organic gardening can reduce the usage of pesticides and insecticides. Non-gardeners can help by buying organic food. Create dumping ground away from residential areas.

The negative consequences of land pollution can be greatly reduced with the cooperation of everyone. By making a conscious effort to contribute to a safer environment, the health and well-being of all can be protected.

2.3 AIR POLLUTION

Air pollution means presence of either undesirable gases or the excess of any of the gases in more than normal proportion or presence of both the above factors, in the atmosphere, as a result of which, the natural quality of air is adversely affected, hence, it becomes unfit to breathe.

2.3.1 CAUSES OF AIR POLLUTION

Several factors are responsible for air pollution –

1. Oxides of carbon:

The combustion of fossil fuels to provide a source of energy is the major means by which man pollutes the atmosphere. Carbon monoxide (CO), and carbon dioxide (CO2) are the gaseous pollutants produced in largest quantities from natural and anthropogenic sources. Consumption of transport fuels are the principal source of Co and CO2.

2. Oxides of Sulphur:

Gaseous sulphur dioxide (SO2) and sulphur trioxide (SO3) are serious pollutants of our atmosphere. Coal combustion, oil refineries, copper, lead and zinc smelting are the important sources of oxides of SO2 andSO3.

3. Oxides of Nitrogen:

Number of Oxides of Nitrogen exist in the polluted atmosphere play a significant role in air pollution. The principal sources of nitrogen oxides are combustion of coal, transport and industrial processes.

4. Industry:

Industries are a major contributor to air pollution. Industrial processes discharge pollutants such as nitrous oxide and hydro fluorocarbons into the air. Petroleum refineries also liberate lots of hydrocarbons into the air. Agricultural practices like livestock rearing and landfills also add to atmospheric methane concentrations. The overall effect is amplification in the global warming probability.

5. Vehicle Emissions:

Vehicle emissions are another source of fossil fuel emissions which invariably leads to air pollution. Cars, heavy duty trucks, shipping vessels, trains, and airplanes all burn lots of fossil fuels to work. Emissions from automobile engines hold both primary and secondary pollutants. This is a major cause of pollution and one that is very difficult to deal with as transportation is a major industry in itself. Private transportation accounts

for about 10 percent of an individual's carbon footprint, or the amount of carbon dioxide our activities and lifestyle contribute to the atmosphere.

6. Household and Farming Chemicals:

Fumigating homes, crop dusting, painting supplies, household cleaning products, over the counter insect/pest killers, fertilizer dust, all of these emit harmful chemicals into the air and lead to pollution. In many cases, when we use these chemicals at offices or homes with no or little ventilation, we may fall sick if we breathe them in for an extended period of time.

7. Deforestation:

Deforestation affects the atmosphere in more than a few ways. Forests act as sponges for carbon dioxide through a process called carbon sequestration. Trees amass carbon dioxide in their plant tissue as they take in this gas to undertake food-making. In effect, this action gets rid of carbon dioxide from the air. When forests are burned and destroyed on purpose and to tremendous extents, this storage area for carbon dioxide is removed, thus increasing the amount of atmospheric carbon dioxide. Wood fires are also another effect of deforestation and can be cause air pollution by discharging particulate matter into the air. These particles can become lodged in the respiratory system, causing irritation to lung tissues. The particles can also worsen existing health conditions such as asthma and other respiratory disorders.

8. Smoking:

One can still be at a risk of the dangers of smoking even if they are a non-smoker. The University of Minnesota estimated that up to 90 percent of the population is habitually exposed to second-hand smoke. Tobacco smoke contains up to 40 carcinogens, making it an especially fatal form of air pollution. If you have smokers in the family air purifiers will ensure that the other members don't suffers from second hand smoke.

9. Indoor Air Pollution:

Use of toxic products also called as Volatile Organic Compounds (VOCs), inadequate ventilation, uneven temperature, and humidity level can cause indoor air pollution, whether you are in office, school or at your comfortable home. House air pollution can take place due to ignorant factors, for instance, smoking tobacco inside a room or leaving mold infected wall untreated. Use of wood stove or space heaters is capable to increase the humidity level which can directly affect the health a person in no time.

10. Microbial Decaying Process:

Manufacturing, chemical, and textiles industries release a large number of carbon monoxides, hydrocarbons, chemicals and organic compounds which contaminate our environment. Bacteria and fungi play a fundamental role in the biogeochemical cycles in nature. They are the key

indicators of abnormal environmental conditions. Decaying of these microorganisms present in the surrounding releases methane gas which is highly toxic. Breathing toxic gas like methane may lead to death.

11. Open Burning of Garbage Waste:

Open burning of garbage is much more harmful to your health and the environment than one may think. As per Engage EPW, Delhi Air Pollution is choking public health. Delhi generates a whopping 9500 tons of waste every day, which makes it India's second waste dumping city. Exposure to open burning of garbage waste can pose serious health risk including cancer, liver issues, impairment of immune system, reproductive functions; can also affect the developing nervous system.

12. Agricultural Activities:

Agricultural activities have had a serious impact on the decreasing air quality. To begin with pesticides and fertilizers are the main source to contaminate the surrounding air. Nowadays, pesticides and fertilizers are mixed with new invasive species which are not found in nature, for quick growth of the crops and vegetation. Once they are sprayed over, the smell and the effect of the pesticides are left in the air. Some mix with water and some seeps into the ground which not only destroys the crops but also causes numerous health-related issues.

13. Use of chemical and synthetic products:

Talking about air pollution, we always consider outdoor air pollution dangerous for our lives but never talk about indoor air pollution. Household products cause indoor air pollution which is 10 times more harmful than outdoor air pollution. Volatile Organic Compounds (VOCs) found in paints, cleaners and personal care products such as perfume and deodorants are a reason for common heath issues. Risks like asthma or other respiratory issues and lung disease are other issues cause by inhaling poor house air quality.

The rate with which the air pollution is increasing in the country, immediate action has become an absolute necessity. Not only does it affect human lives but also causes havoc in nature.

Nelson Mandela once expressed his concern about the air pollution and particularly its effect on human lives, said, "Everyone has the right to an environment that is not harmful to their health or well-being; and to have that environment protected, for the benefit of present and future generations."

- Conserve the energy is the first step towards a better future with clean air to breathe.
- Understanding the concept and imbibing the habit of reducing, reuse, and recycle is crucial.
- Use public transport whenever it is feasible to save fuel and reduce vehicle pollution.

2.3.2 EFFECTS OF AIR POLLUTION

1. Accelerated Global Warming:

Air pollution directly accelerates the rate at which global warming happens by depleting the Ozone layer. Global warming refers to the increased temperatures Earth continues to experience. These higher temperatures lead to the melting of the polar ice caps and icebergs, which elevates sea levels and creates concern for the human race.

2. Human Respiratory and Heart Concerns.

Air pollution is known to cause irritation in the eyes, lungs, nose, and throat. It creates respiratory problems and exacerbates existing conditions such as asthma and emphysema. When continually exposed to air pollution, humans become at higher risk for cardiovascular disease. Air filled with toxins can have a number of adverse effects on the arteries, and have even been a contributor to heart attacks. The effects of air pollution are alarming. They are known to create several respiratory and heart conditions like asthma, chronic bronchitis, emphysema, heart attacks and strokes along with cancer, among other threats to the body. Several million are known to have died due to the direct or indirect effects of Air pollution.

3. Wildlife Endangerment:

Most diseases and conditions that humans are susceptible to, animals are as well. Air pollution creates many of the same issues that humans face. Heavily polluted areas force inhabitants to seek new homes, which can negatively impact the ecosystem. Toxic chemicals, which we'll discuss in the next bullet, also deposit over surfaces of water that can lead to the endangerment of marine life animals.

4. Acid Rain:

When air pollution, specifically sulfur oxides and nitrogen oxides, are released into sky through fossil fuel burning, it creates the phenomenon known as acid rain. Water, high in the atmosphere, combines with these chemicals and becomes acidic in nature. It then scatters the ground, disguised as normal rainfall. Acid rain has been known to cause harm to humans and animals alike, and even damage crops.

5. Child Health Problems:

Air pollution is detrimental to your health even before you take your first breath. Exposure to high air pollution levels during pregnancy causes miscarriages as well as premature birth, autism, asthma and spectrum disorder in young children. It also has the potential to damage early brain development in a child and cause pneumonia that kills almost a million children below 5 years. Children are at a greater risk of short term respiratory infections and pulmonary diseases in areas exposed to air pollutants.

6. Eutrophication:

Eutrophication is a condition where a high amount of nitrogen present in some pollutants gets developed on the sea surface and turns itself into algae and adversely affects fish, plants, and animal species.

7. Effect on Wildlife:

Just like humans, animals also face some devastating effects of air pollution. Toxic chemicals present in the air can force wildlife species to move to a new place and change their habitat. The toxic pollutants deposit over the surface of the water and can also affect sea animals.

8. Depletion of the Ozone Layer:

Ozone exists in the Earth's stratosphere and is responsible for protecting humans from harmful ultraviolet (UV) rays. Earth's ozone layer is depleting due to the presence of chlorofluorocarbons, hydro chlorofluorocarbons in the atmosphere. As the ozone layer becomes thin, it will emit harmful rays back on earth and can cause skin and eye-related problems. UV rays also have the capability to affect crops.

2.3.3 MEASURES OF AIR POLLUTION

1. Use thePublic Mode of Transportation.

Encourage people to use more and more public modes of transportation to reduce pollution. Also, try to make use of carpooling. If you and your colleagues come from the same locality and have the same timings, you can explore this option to save energy and money.

2. Better Household Practices

Discard fireplaces and/or wooden stoves used for heating homes. Use gas logs in place of wood. Also, eliminate the use of gas-powered lawn and gardening equipment. Avoid setting fire to garbage, dry leaves, or other materials in your yard, and lighting bonfires in the open. Try to mulch or compost your yard waste. Use cleaning products and paints that are environmentally friendly. When you're leaving home, be sure to turn off the lights, TV, and any other electronic appliances. Fossil fuel plants are a major cause of air pollutants, and the less energy you need, the less we have to rely on those plants to generate electricity.This also means turning to energy efficient devices when possible. Fluorescent light bulbs over the course of their lifespan can reduce energy consumption while adding significant savings to your pocket.

3. Conserve Energy

Switch off fans and lights when you are going out. A large number of fossil fuels are burnt to produce electricity. You can save the environment from degradation by reducing the number of fossil fuels to be burned.

4. Understand the Concept of Reduce, Reuse and Recycle

Do not throw away items that are of no use to you. Instead, reuse them for some other purpose. For example, you can use old jars to store cereals or pulses.

5. Emphasis on Clean Energy Resources

Use of Clean energy technologies like solar, wind and geothermal is on the rise these days. Governments of various countries have been providing grants to consumers who are interested in installing solar panels for their homes. Undoubtedly, this can go a long way to curb air pollution.

6. Use Energy-Efficient Devices

CFL lights consume less electricity than their counterparts. They live longer, consume less electricity, lead to lower electricity bills, and also help you to reduce pollution by consuming less energy.

7. Become An Advocate For Clean Energy.

Every day, technology continues to advance that improves the efficiency and cost of clean energy such as solar, wind, and geothermal. These types of energy sources create much less air pollution. Even nuclear is leaps and bounds better than traditional fossil fuel plants when it comes to air pollution. Find ways to promote and educate the public on clean energy alternatives. A small contribution goes a long way in the grand scheme of things.

2.4 WATER POLLUTION

Water is an essential resource of life on earth. The quality of water is the most important factor. Fresh water is a scarce commodity with greatest amount locked in glaciers and ice-caps. Water pollution simply means contamination of water due to any external material or in other words, introduction of something to natural water which makes in unsuitable for human consumption. WHO has defined water pollution as “any foreign material either from natural or other sources that may counterminate water and makes it harmful to life, cause of their toxicity leads to reduction of normal oxygen level of water causes aesthetically unpalatable afflicts as spread of epidemic diseases”.

Jacques Yves Cousteau said that “Water and air, the two essential fluids on which all life depends, have become global garbage cans”. In simple words, the contamination of water bodies is water pollution. It is the abuse of lakes, ponds, oceans, rivers, reservoirs, etc. Pollution of water usually occurs when substances discharged in it negatively modify the water. This discharge of pollutants can be direct as well as indirect.

2.4.1 CAUSES OF WATER POLLUTION

There are many causes of water pollution.

1. Industrial Waste:

Industries and industrial sites across the world are a major contributor to water pollution. Many industrial sites produce waste in the form of toxic chemicals and pollutants, and though regulated, some still do not have proper waste management systems in place. In those rare cases, industrial waste is dumped into nearby freshwater systems. When industrial waste is not treated properly (or worse, not treated at all), it can very easily pollute the freshwater systems that it comes into contact with.

Industrial waste from agricultural sites, mines and manufacturing plants can make its way into rivers, streams and other bodies of water that lead directly to the sea. The toxic chemicals in the waste produced by these industries not only have the potential to make water unsafe for human consumption, they can also cause the temperature in freshwater systems to change, making them dangerous for many water dwelling organisms.

2. Marine Dumping:

The process of marine dumping is exactly what it sounds like, dumping garbage into the waters of the ocean. It might seem crazy, but household garbage is still collected and dumped into oceans by many countries across the world. Most of these items can take anywhere from two to 200 years to decompose completely.

3. Sewage and Wastewater:

Harmful chemicals, bacteria and pathogens can be found in sewage and wastewater even when it's been treated. Sewage and wastewater from each household is released into the sea with fresh water. The pathogens and bacteria found in that wastewater breed disease, and therefore are a cause of health-related issues in humans and animals alike.

4. Oil Leaks and Spills:

The age-old phrase "like water and oil" is used when describing two things that do not mix easily or at all. Just as the saying states, water and oil do not mix, and oil does not dissolve in water.

Large oil spills and oil leaks, while often accidental, are a major cause of water pollution. Leaks and spills often are caused by oil drilling operations in the ocean or ships that transport oil. wildlife.

5. Agriculture:

In order to protect their crops from bacteria and insects, farmers often use chemicals and pesticides. When these substances seep into the groundwater, they can harm animals, plants and humans. Additionally, when it rains, the chemicals mix with rainwater, which then flows into rivers and streams that filter into the ocean, causing further water pollution.

6. Global Warming:

Rising temperatures due to global warming are a major concern in terms of water pollution. Global warming causes water temperatures to rise, which can kill water-dwelling animals. When large die-offs occur, it further pollutes the water supply, exacerbating the issue. There are many everyday ways we can help reduce global warming, which will in turn help lower water pollution. These methods include recycling, carpooling and using CFL bulbs in our houses.

7. Radioactive Waste:

Radioactive waste from facilities that create nuclear energy can be extremely hazardous to the environment and must be disposed of properly. This is because uranium, the element used in the creation of nuclear energy, is a highly toxic chemical. Unfortunately, accidents still occur at these facilities, and toxic waste is released into the environment. The coal and gas industries are, in many ways, no better. This is one of the major impetuses behind the development of alternative, clean sources of energy, including solar and wind.

8. Mining Activities:

Mining is the process of crushing the rock and extracting coal and other minerals from the underground. These elements, when extracted in the raw form, contain harmful chemicals and can increase the number of toxic elements when mixed up with water, which may result in health problems. Mining activities emit a large amount of metal waste and sulfides from the rocks, which is harmful to the water.

9. Chemical fertilizers and pesticides:

Chemical fertilizers and pesticides are used by farmers to protect crops from insects and bacterias. They are useful for the plant's growth. However, when these chemicals are mixed up with water, they produce harmful pollutants for plants and animals. Also, when it rains, the chemicals mix up with rainwater and flow down into rivers and canals, which pose serious damages for aquatic animals.

10. Urban Development:

As the population has grown exponentially, so has the demand for housing, food, and cloth. As more cities and towns are developed, they have resulted in increasing use of fertilizers to produce more food, soil erosion due to deforestation, rise in construction activities, inadequate sewer collection and treatment, landfills as more garbage is produced, increase in chemicals from industries to produce more materials.

2.4.2 EFFECTS OF WATER POLLUTION

1. Affects Aquatic Life:

Water contamination has a significant impact on aquatic life. It affects their metabolism and behaviour, as well as causing disease and death. Dioxin is a toxin that causes a variety of issues, ranging from reproductive issues to uncontrolled cell development and cancer. This chemical accumulates in fish, poultry, and meat. Chemicals like these make their way up the food chain before entering the human body.

2. Affects Food chain:

Water contamination may have a significant influence on the food chain. It upsets the food chain. Cadmium and lead are two hazardous chemicals that enter the food chain via animals (fish when ingested by animals and people) and can continue to disturb at greater levels.

3. Groundwater contamination:

Pesticides and fertilisers used in agricultural production pollute groundwater as well as our ecology. If this groundwater is directly delivered to our home via bore-wells or tube wells, it will cause a multitude of health issues.

4. Affects Human Health:

Pollution affects humans, and faecal matter in water sources can cause illnesses such as hepatitis. Poor drinking water treatment and contaminated water can always lead to an epidemic of infectious illnesses like cholera.Water pollution has very negative effects on public health. A lot of diseases result from drinking or being in contact with contaminated water, such as diarrhea, cholera, typhoid, dysentery or skin infections. In zones where there is no available drinking water, the main risk is dehydration obviously.

5. High TDS in water:

Water is the best solvent since it quickly dissolves a wide range of compounds. TDS in drinking water should be less than 500 mg/litre. The presence of a high level of TDS in water can cause a variety of health issues in humans.

2.4.3 MEASURES OF WATER POLLUTION

1. Wastewater treatment:

Wastewater treatment consists of removing pollutants from wastewater through a physical, chemical or biological process. The more efficient these processes are, the cleaner the water becomes.

2. Green agriculture:

Globally, agriculture accounts for 70% of water resources, so it is essential to have climate-friendly crops, efficient irrigation that reduces the need for water and energy-efficient food production. Green agriculture is also crucial to limit the chemicals that enter the water.

3. Storm water management:

Storm water management is the effort to reduce runoff of rainwater or melted snow into streets, lawns and other sites and the improvement of water quality" according to the US Environmental Protection Agency (EPA). It is important to avoid pollutants from contaminating the water and helps to use water more efficiently.

4. Air pollution prevention:

Air pollution has a direct impact on water contamination as 25% of human induced CO2 emissions are absorbed by oceans. This pollution causes a rapid acidification of our oceans, and threatens marine life and corals. Preventing air pollution is the best way to prevent this from happening.

5. Plastic waste reduction:

80% of plastic in our oceans is from land sources. In order to reduce the amount of plastic entering our ocean, we need to both reduce our use of plastic globally, and to improve plastic waste management.

6. Water conservation:

Without water conservation, we won't go very far. It is central in making sure the world has better access to clean water. It means being aware that water is a scarce resource, taking care of it accordingly, and managing it responsibly.

2.5 NOISE POLLUTION

Noise pollution can be defined as "an undesirable and harmful sound in the environment, the presence of which causes discomfort to individuals and also to the animals". By definition, noise pollution takes place when there is either an excessive amount of noise or an unpleasant sound that causes a temporary disruption in the natural balance. This definition is usually applicable to sounds or noises that are unnatural in either their volume or their production. Our environment is such that it has become difficult to escape the noise. Even electrical appliances at home have a constant hum or beeping sound. By and large, lack of urban planning increases the exposure to unwanted sounds. This is why understanding noise pollution is necessary to curb it in time.

2.5.1 CAUSES OF NOISE POLLUTION

1. Industrialization:

Most of the industries use big machines which are capable of producing a large amount of noise. Apart from that, various equipment like compressors, generators, exhaust fans, grinding mills also participates in producing big noise. We are familiar with the sight of workers in these factories and industries wearing earplugs to minimize the effect of noise. However, even after taking precautionary measures like these, extensive exposure to high levels of noise might damage their hearing abilities in the long run.

2. Poor Urban Planning:

In most of the developing countries, poor urban planning also plays a vital role. Congested houses, large families sharing small space, fight over parking, frequent fights over basic amenities lead to noise pollution, which may disrupt the environment of society. Noise pollution in urban settings may also be caused when residential properties and industrial buildings are in proximity. In situations like these, the noise from the nearby industrial property might hinder the basic well-being of the individuals living in residential properties. It doesn't just affect their sleep and hours of rest but also has an adverse effect on the development and well-being of children.

3. Social Events:

Noise is at its peak in most of the social events. Whether it is marriage, parties, pub, disc or place of worship, people normally flout rules set by the local administration and create a nuisance in the area. People play songs on full volume and dance till midnight, which makes the condition of people living nearby pretty worse. In markets, you can see people selling clothes via making a loud noise to attract the attention of people. While this may not seem like much at the outset, over time, it affects the hearing abilities of the individuals who are constantly exposed to these sounds.

4. Transportation:

A large number of vehicles on roads, airplanes flying over houses, underground trains produce heavy noise, and people find it difficult to get accustomed to that. The high noise leads to a situation wherein a normal person loses the ability to hear properly.

5. Construction Activities:

Under construction activities like mining, construction of bridges, dams, buildings, stations, roads, flyovers takes place in almost every part of the world. These construction activities take place every day as we need more buildings, bridges to accommodate more people. However, while this does help us to some degree, in the long run, the noise from construction activities hinders the hearing abilities of individuals exposed to this sound. A part of it includes construction workers who participate in these

activities, while another part of it consists of people who encounter this noise either from their homes or while traveling. Even remodelling buildings can cause hearing loss when performed in enclosed spaces. The sound of jackhammers chipping away at concrete is enough to upset nearby workers and residents.

6. Household Chores:

We people are surrounded by gadgets and use them extensively in our daily life. Gadgets like TV, mobile, mixer grinder, pressure cooker, vacuum cleaners, washing machine and dryer, cooler, air conditioners are minor contributors to the amount of noise that is produced. Still, it affects the quality of life of your neighbourhood in a bad way. While this form of pollution may seem harmless, it, in fact, has far reaching consequences. The adverse effects on the health of the environment are quite severe. Not only is the local wildlife affected by pollution, but humans also face a number of problems due to it.

7. Noise from Air Traffic:

While many find it difficult to believe, air traffic too contributes to significant levels of noise pollution. Noise from a single aircraft may produce sounds of up to 130 dB. Now, imagine the amount of noise produced by the numerous aircraft traveling our airspace.

8. Catering and Nightlife:

When the weather is good, restaurants, bars, and terraces spill outside. Late night parties continue with loud music and unnecessary noise made by the party mongers. These can produce more than 100 dB. The noise from pubs and clubs are also included.

9. Animals' Sound:

The noise made by animals cannot go unnoticed, particularly a howling or barking dog. These can produce noise around 60- 80 dB.

2.5.2 EFFECTS OF NOISE POLLUTION

1. Hearing Problems:

Any unwanted sound that our ears have not been built to filter can cause problems within the body. Our ears can take in a certain range of sounds without getting damaged. Man-made noises such as jackhammers, horns, machinery, airplanes, and even vehicles can be too loud for our hearing range. Constant exposure to loud levels of noise can easily result in the damage of our eardrums and loss of hearing, causing tinnitus or deafness. It also reduces our sensitivity to sounds that our ears pick up unconsciously to regulate our body's rhythm.

2. Psychological Issues:

Excessive noise pollution in working areas such as offices, construction sites, bars and even in our homes can influence psychological health.

Studies show that the occurrence of aggressive behavior, disturbance of sleep, constant stress, fatigue, depression, anxiety, hysteria and hypertension in humans as well as animals can be linked to excessive noise levels. The level of irritation increases with increased noise, and people tend to become less and less patient. These, in turn, can cause more severe and chronic health issues later in life.

3. Physical Problems:

Noise pollution can cause headaches, high blood pressure, respiratory agitation, racing pulse, and, in exposure to extremely loud, constant noise, gastritis, colitis and even heart attacks may occur.

4. Cognitive Issues & Behavioural Changes:

Noise affects brain responses and people's ability to focus, which can lead to low performance levels over time. Like other sound waves, too much noise when it goes to the brain leads to lower response rates as well as making the mind dull. It is also poor for memory, making it hard to study. The studies have shown that school children living near railway stations or airports have problems in learning. Research has shown that people who live near airports or busy roads, usually have a higher incidence of headaches, take more sleeping pills and sedatives, are more prone to minor accidents, and are more likely to seek psychiatric treatment.

5. Sleeping Disorders:

While it may not seem like much at this point, excessively high levels of noise are likely to hamper your sleeping pattern, thereby leading to irritation and uncomfortable situations. Without a good night's sleep, you might experience multiple problems related to fatigue. This will affect your performance in the office as well as at home. It is therefore recommended to take a sound sleep to give your body proper rest. If a certain noise is disturbing your sleep, take an actionable measure to reduce it. While in some instances, it is completely unavoidable; there are other instances (like noise from TV or gadgets) that can be easily avoided by making good lifestyle changes. Interestingly, our ears need rest for 16 hours and even more to make up for two hours of exposure to 100 dB.

6. Cardiovascular Issues:

Blood pressure levels, cardiovascular disease, and stress-related heart problems are on the rise. Studies suggest that high-intensity noise causes high blood pressure and increases heartbeat rate as it disrupts the normal blood flow. Since bringing these rates to a manageable level depends on our understanding of noise pollution, we need to be wary of the ill-effects and tackle these situations mindfully.

7. Trouble Communicating:

High decibel noise can put trouble and affect free communication between people. This may lead to misunderstanding, and you may get difficult

understanding the other person. Constant sharp noise can give you a severe headache and disturb your emotional balance.

8. Effect on Wildlife:

Wildlife faces far more problems than humans because of noise pollution since they are more dependent on sound. Animals develop a better sense of hearing than us since their survival depends on it. A recent study published in Biology Letters found that human-created noise affects a wide range of animals. The ill-effects of excessive noise begin at home. Pets react more aggressively in households where there is constant noise. They become disoriented more easily and face many behavioral problems. In nature, animals may suffer from hearing loss, which makes them easy prey and leads to dwindling populations. Others become inefficient at hunting, disturbing the balance of the eco-system.

9. Effects on Species Depending on Mating Call:

Species that depend on mating calls to reproduce are often unable to hear these calls due to excessive man-made noise. As a result, they are unable to reproduce and cause declining populations. Others require sound waves to locate and find their way when migrating. Disturbing their sound signals means they get lost easily and do not migrate when they should. To cope up with the increasing sound around them, animals are becoming louder, which may further add to the pollution levels. This is why understanding noise pollution can help us lower the impact it has on the environment.

2.5.3 MEASURES OF NOISE POLLUTION

World Health Organization agrees that awareness of noise pollution is essential to beat this invisible enemy. As of now, there are not many solutions to reduce sound pollution. However, governments can help in the following ways:

- Establishing regulations that include preventive and corrective measures.
- Governments can take measures such as protecting certain areas, parts of the countryside, areas of natural interest, city parks, etc. to ensure noise management and reduce noise pollution.
- The mandatory separation between residential zones and sources of noise, like airports.
- Creating pedestrian areas where traffic is not allowed to enter other than offload goods at certain times.
- Fines for exceeding noise limits.
- Other ways to battle noise pollution are by controlling the sound levels in clubs, bars, parties, and discos.

- Removal of public loudspeakers is another way in which pollution can be countered.
- Again, better urban planning can help create 'No-Noise' zones, where honking and industrial noise is not tolerated.
- Replacing traditional asphalt with more efficient options can also help reduce traffic noise by up to 3 dB.

2.6 QUESTIONS

Q1. What is the meaning of land pollution? Discuss the causes of land pollution.

Q2. What are the effects of land pollution?

Q3. Discuss the measures of land pollution.

Q4. What is the meaning of water pollution? Discuss the causes of water pollution.

Q5. What are the effects of water pollution?

Q6. Discuss the measures of water pollution.

Q7. What is the meaning of air pollution? Discuss the causes of air pollution.

Q8. What are the effects of air pollution?

Q9. Discuss the measures of air pollution.

Q10. What is the meaning of noise pollution? Discuss the causes of noise pollution.

Q11. What are the effects of noise pollution?

Q12. Discuss the measures of noise pollution.

3

ENVIRONMENTAL ACCOUNTING - 1

Unit Structure :

3.0 Objectives

3.1 Introduction

3.2 Meaning and Importance of Environmental Accounting

3.3 System of Environmental- Economic Accounting (SEEA)

3.4 Environmental and Natural Resources Accounting (ENRA)

3.5 Summary

3.6 Questions

3.0 OBJECTIVES

- To understand meaning of environmental accounting.
- To know the importance of environmental accounting.
- To understand the system of environmental-economic accounting.
- To study of environmental and natural resources accounting.

3.1 INTRODUCTION

Environmental accounting is a branch of accounting that tries to incorporate both economic and environmental data. It can be done at the level of a corporation or a country's economy through the integrated environmental and economic accounting system, a companion to the national accounts of countries (among other things, the national accounts produce the estimates of gross domestic product otherwise known as GDP).

Resource consumption is monitored, costs for an organization's or nation's economic impact on the environment are estimated, and fees are disclosed in the field of environmental accounting. There are extra expenses for trash management, environmental penalties, fines, and taxes. The price of remediating or cleaning up contaminated areas is also covered.

3.2 MEANING AND IMPORTANCE OF ENVIRONMENTAL ACCOUNTING

A) Meaning: An environmental accounting system consists of ecological accounting and traditional accounting that is environmentally differentiated. The financial impact that the environment has on a

corporation is quantified via accounting that considers environmental factors. Physical measurements are used in ecological accounting to evaluate a company's environmental impact.

B) Functions and Roles:

a) External Functions:

By publicly disclosing the objectively verifiable outcomes of its environmental conservation efforts, a firm can influence the decisions of stakeholders, such as consumers, investors, and communities.

b) Internal Functions:

An organization's environmental information system includes an internal function that enables cost management for environmental conservation, compares the price of conservation efforts to the benefits realized, and promotes cost-effective and efficient conservation efforts through informed decision-making.

C) Benefits/Importance:

The adoption of environmental management accounting approaches produces the most noteworthy benefits, even though environmental accounting might focus on environmental management accounting or financial accounting. The primary emphasis of this type of accounting is on the expenses associated with the use of energy and material resources like wood, metal, and coal. Accountants can use activity-based cost principles to more precisely connect these costs to particular projects or events by using environmental management accounting. Traditional accounting methods tended to group these expenses under the general heading of overhead. By being able to clearly monitor how these natural resources are used across many programmes, decision-makers can identify areas of synergy that enable them to reduce the amount of waste materials at the programme or company level.

Relevance: Environmental accounting should provide reliable data that assists stakeholders in decision-making regarding a company's costs for environmental conservation and gains from related activities.

Reliability: Environmental accounting should help stakeholders build a sense of dependability and confidence by eliminating data that is wildly distorted or incorrect.

Neutrality: information that is disclosed in a fair and objective manner.

Prudence: It's crucial to be explicit about the nature, scope, and basis of any information you handle that can be ambiguous or unclear.

Completeness: The scope of environmental accounting should encompass all pertinent data for all environmental conservation initiatives.

Understandability: By establishing understandability of disclosure of key environmental accounting data, environmental accounting should make it

difficult for anyone to make an erroneous assessment of the company's environmental conservation efforts.

Comparability: Environmental accounting allows a corporation to compare one year to the next. The information provided should be comparable to that provided by other companies in the same sector.

3.3 SYSTEM OF ENVIRONMENTAL-ECONOMIC ACCOUNTING (SEEA)

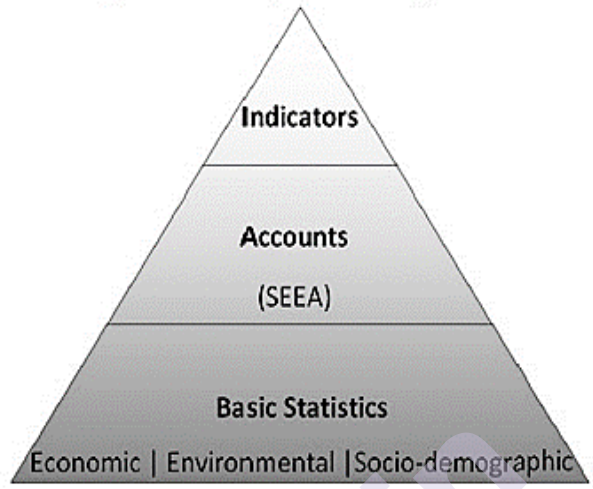
Introduction:
In order to provide a more comprehensive and flexible view of the interactions between the economy and the environment, as well as the stocks and changes in stocks of environmental assets, as they benefit humanity, the System of Environmental-Economic Accounting (SEEA) is a framework that combines economic and environmental data.

SEEA is a satellite system for the UN System of National Accounts, as stated in its definition (SNA). For the purpose of providing statistics and accounts that are comparable across national boundaries, it includes the internationally agreed standard ideas, definitions, classifications, accounting standards, and tables. The SEEA framework and the System of National Accounts both follow the same accounting concepts (SNA). To make it simpler to mix environmental and economic statistics, the framework makes use of SNA-compliant concepts, definitions, and classifications.

The SEEA is a flexible system that generates a variety of statistics, accounts, and indicators with a wide range of potential analytical applications. It is a versatile system that provides a common structure, ideas, vocabulary, and definitions while also being able to be adjusted to meet national objectives and policy requirements. The System of Environmental-Economic Accounting (SEEA) is a set of internationally recognised standard concepts, definitions, classifications, accounting rules, and tables that are required to generate statistics on the environment and how it affects the economy that are comparable across national boundaries. The SEEA framework uses ideas, definitions, and classifications that are compatible with the System of National Accounts (SNA), which has a comparable accounting structure, to make it simpler to combine environmental and economic data.

The SEEA is a system for organising statistical data for the development of consistent indicators, descriptive statistics, and monitoring of the interactions between the economy and the environment as well as the state of the environment to support decision-making. The SEEA does not offer even one headline signal. Instead, it is a flexible system that generates a variety of data and indicators with a wide range of potential analytical applications. It is a flexible system in that it provides a common structure as well as common ideas, terms, and definitions while also allowing its application to be modified to meet the goals and policy requirements of

many nations. The SEEA handbook contains more details on the advantages of environmental accounting, and many of the SEEA products are also available in other languages, such as Arabic, Chinese, French, Russian, and Spanish.



The System of Environmental-Economic Accounting is undergoing a multi-year revision project, which was started by the UN Statistics Division. The new SEEA, which the UN Statistical Commission recognised as the first worldwide standard for environmental-economic accounting in 2012, is organised into three sections: the Central Framework; Experimental Ecosystem Accounting; and Applications and Extensions of the SEEA. Subsystems of the SEEA framework that focus on specific resources or industries include those for energy, water, land and ecosystems, agriculture, forestry, and fisheries. While staying completely consistent with the overarching SEEA, these "sub-systems" make an effort to forge connections between the accounting community and the community of experts in each specific topic area (with thanks to the UN Statistics Division).

How is WAVES related to SEEA:

The World Bank is one of the co-authors of the SEEA Central Framework. By incorporating the significance of natural capital accounting into national accounting frameworks and development planning, the World Bank-sponsored WAVES worldwide collaboration seeks to enhance sustainable development. In order to assist governments in making economic decisions involving natural resources including minerals, wood, and fisheries, WAVES utilises a critical methodology called Natural Capital Accounting (NCA). WAVES seeks to strengthen nations' ability to carry out the SEEA and persuade decision-makers of its benefits.

In addition, WAVES works with the Policy and Technical Experts Committee (PTEC) to develop experimental ecological accounting methods that are based on solid scientific research.

3.4 ENVIRONMENTAL AND NATURAL RESOURCES ACCOUNTING (ENRA)

A) Introduction:

- The process of "natural resource accounting" is used to estimate the cost of resource depletion and environmental harm brought on by human activity.
- The NRA concept was created to convey the intimate connection between the many components of the natural environment and the economic development of a country.
- It is based on the notion that measurement leads to better resource management.

B) Historical Perspective:

- The requirement for The National Rifle Association (NRA) made its first step when the connection between economic growth and environmental degradation was first highlighted at the United Nations (UN) conference on Human Environment (Stockholm Conference) in 1970.

- In 1987, the UN-founded Brundtland Commission first advanced the idea that there is a close relationship between economic and environmental operations. Following environmental accounting was the 1992 Rio de Janeiro Earth Summit.

C) Initiative taken to promote NRA

i) Initiative at Global Level

- The formation of Natural Resource Accounts is required by a resolution voted by the UN General Assembly on September 25, 2016, titled "Transforming our world: the 2030 agenda for sustainable development," and backed by more than 190 countries.

- India's signature on this resolution serves as its support.

- In 2012, the UN approved the System of Economic and Environmental Accounting. (SEEA). The most recent NRA structure, it has gained widespread acceptance.

- With varied degrees of success, about 30 nations, including Australia, Canada, China, France, and Germany, have embraced environmental accounting.

- To carry out the Natural Capital Accounting and Valuation of the Ecosystem Services (NCAVES) Project, which is funded by the European Union, the United Nations Statistics Division (UNSD), the United Nations Environment Programme (UNEP), and the Secretariat of the Convention on Biological Diversity have worked together (CBD).

- The other four countries involved in this project are Brazil, China, South Africa, Mexico, and India.

- It serves as a general term for projects that make use of an accounting framework to provide a methodical way to measure and report on natural capital stock and movement.

ii) India-specific initiatives

- In 2002, the CAG formed the Government Accounting Standards Advisory Board (GASAB) in an effort to raise the bar for federal accounting and financial reporting standards, enhance the standard of decision-making, and increase public accountability.

- Members of it include state governments, regulatory organisations like the RBI and ICAI, as well as representatives from each accounting service under the GoI.

- The WGEA (Working Group on Environmental Auditing), a global association of Supreme Audit Institutions, urged (2010) that the audit institutions support the establishment of Natural Resources Accounts in their various countries. The CAG of India is a member of this organisation.

D) Significance of Natural Resource Accounting:

- Interrelation between Economy and Environment -
  It provides a quantitative evaluation of the harm done to the environment's resources by nonrenewal and aids in the measurement of development in the real world.

- Aid to Policy framing: sound Database -
  To help decision-makers comprehend the potential consequences of their choices.

- Managing SDGs -
  Since 4 of the 17 Sustainable Development Goals (SDGs) are specifically dedicated to managing and accounting for natural resources, the SDGs and NRA are closely related.

- Combatting climate change -
  Asset and flow accounting have been recognised as a useful paradigm for monitoring, quantifying, and analysing climate change.

- International agreements -
  It would help India attain the SDGs and join the exclusive group of countries that create Asset Accounts.

E) Challenges related to Accounting of Natural Resources:

- There is a lack of efficient training and capacity building for state officers.

- Restrictions on data periodicity mapping during asset account preparation.
- Multiple agencies are involved in the data gathering for resources, which could cause issues with data sharing and data dispute.

3.5 SUMMARY

Environmental accounting is a branch of accounting that tries to incorporate both economic and environmental data. It can be done at the level of a corporation or a country's economy through the integrated environmental and economic accounting system, a companion to the national accounts of countries (among other things, the national accounts produce the estimates of gross domestic product otherwise known as GDP). In order to provide a more comprehensive and flexible view of the interactions between the economy and the environment, as well as the stocks and changes in stocks of environmental assets, as they benefit humanity, the System of Environmental-Economic Accounting (SEEA) is a framework that combines economic and environmental data.

3.6 QUESTIONS

Q1. Explain the importance of Environmental Accounting.

Q2. Discuss in detail System of Environmental-Economic Accounting.

Q3. Elaborate Environmental and Natural Resources Accounting (ENRA).

4

ENVIRONMENTAL ACCOUNTING - 2

Unit Structure:

4.0 Objectives

4.1 Introduction

4.2 Green GDP

4.3 Concept of Green Growth and its indicators

4.4 Concept of Green Consumer and Green Business

4.5 Summary

4.6 Questions

4.0 OBJECTIVES

- To know about the concept Green GDP.
- To know the concept of Green Growth.
- To study the indicators of Green Growth.
- To understand the concept of Green Consumer and Green Business.

4.1 INTRODUCTION

Environmental accounting is a branch of accounting that tries to incorporate both economic and environmental data. It can be done at the level of a corporation or a country's economy through the integrated environmental and economic accounting system, a companion to the national accounts of countries (among other things, the national accounts produce the estimates of gross domestic product otherwise known as GDP).

Resource consumption is monitored, costs for an organization's or nation's economic impact on the environment are estimated, and fees are disclosed in the field of environmental accounting. There are extra expenses for trash management, environmental penalties, fines, and taxes. The price of remediating or cleaning up contaminated areas is also covered.

4.2 GREEN GDP

A) Introduction:

The term "Green GDP" refers to a measure of economic growth that incorporates environmental concerns in addition to a nation's regular GDP.

The green GDP includes costs associated with climate change and biodiversity losses. Indicators like the "Sustainable Development Index" can be constructed by combining physical measures like "garbage per capita" and "carbon dioxide per year."

B) Rationale behind Green GDP:

In support of Green GDP: The traditional GDP measurement is flawed in that it fails to reflect both optimum conditions of living and economic growth. The standard GDP just measures total economic output; it has no instruments for identifying the wealthy or assets that come from economic output. Additionally, the standard GDP is unable to forecast whether or not the level of income generated in a country would be sustainable. To get past this limitation, the green GDP is desired.

GDP doesn't consider them relevant, hence it can't fully explain National Capital. Future protective environmental project benefits relative to costs are not given adequate consideration by policymakers and economists. The favourable gains that can result from any forest or agricultural area are not taken into account due to the operational difficulties associated with assessing and evaluating such assets. Additionally, conventional GDP calculations take into account the consequences of the depletion of the natural resources needed to support the economy. It is necessary to have a complete macroeconomic indicator as well as sustainable development. Because it is incorrectly believed to be a measure of societal well-being, GDP is commonly used in the examination of political and economic policies. The Green GDP will be a suitable replacement in this situation.

C) How is Green GDP calculated?

To calculate green GDP, net natural capital consumption is deducted from GDP. This includes environmental protection programmes, environmental harm, and resource depletion. Another choice for these estimations is the net domestic product (NDP), which subtracts capital depreciation from GDP. Since national accounts reflect resource extraction activities in monetary terms, all resource extraction activities must be transformed into a monetary value.

D) GDP versus Green GDP:

Critics claim that some of the results that are predicted by calculations that take environmental variables into account are impossible to measure. When there is no established market for the environmental asset, which makes trading impossible, this is very difficult. Ecosystem services are examples of this type of resource. When valuation is carried out indirectly, there is a potential that calculations may be based on speculation or speculative assumptions.

Supporters of these modified aggregates can reply to this critique in one of two ways. First, as technology develops, more precise valuation approaches have arisen and will continue to do so. Second, even if

estimates of non-market natural resources aren't exact, the adjustments they necessitate are still superior to using traditional GDP.

4.3 CONCEPT OF GREEN GROWTH AND ITS INDICATORS

A) Introduction:

The world still faces two challenges twenty years after the first Rio Summit: expanding economic opportunities for everyone in the context of a growing global population and addressing environmental pressures that, if not addressed, may make it more difficult for us to take advantage of these opportunities. Green growth, which emphasises taking advantage of the opportunities to address both concerns at once, sits at the confluence of these two issues.

B) Definition:

Green growth refers to fostering economic growth and development in order to ensure that natural resources continue to provide the resources and environmental services that are crucial to our wellbeing.

Sustainable development cannot be supplanted by green growth. Instead, it provides a practical and flexible plan for achieving measurable, tangible progress in both the economic and environmental pillars, completely taking into account the social effects of the development dynamics of greening economies. Making ensuring that natural resources may sustainably realise their full economic potential is the core objective of green growth initiatives. In addition to the strong biodiversity necessary to support food production and human health, this potential includes the capacity to provide the needs of life, such as clean water and air. Green growth strategies take into account the finite nature of natural resource replacement.

C) Aim:

Green growth policies are a crucial part of the structural adjustments needed to encourage strong, more sustainable, and equitable growth. They are able to launch new development drivers by

- Increasing productivity by providing incentives for more efficient use of natural resources, reducing waste and energy use, opening avenues for innovation and value creation, and allocating resources to applications that will generate the highest returns.
- Increasing investor confidence by improving government predictability of serious environmental concerns.
- Developing new markets by increasing consumer demand for environmentally friendly goods, services, and innovations.
- Promoting fiscal consolidation by reducing subsidies that have a negative impact on the environment and earning money through

environmental fees. Additionally, by following these steps, money might be earned or made accessible for projects that help the poor, like ones that enhance sanitation and water delivery systems.

- Reducing the likelihood of unfavourable environmental effects that could last a lifetime as well as negative growth shocks brought on by resource shortages.

- Strategies for Greener Growth need to be tailored to fit specific country circumstances: When creating greener growth strategies, the demands of each individual nation must be taken into consideration. Careful thought will need to go into the best method to handle any trade-offs and benefit from the links between green growth and poverty reduction. Examples of the latter include addressing poor health brought on by environmental degradation, providing people with more effective infrastructure (such as in the areas of energy, water, and transportation), and introducing efficient technologies that can lower costs, increase productivity, while also reducing environmental pressure. Green growth strategies can enhance the security of the poor's livelihoods while lowering their sensitivity to environmental threats, given the importance of natural resources in developing countries.

- Green growth strategies also recognise that when GDP is used as the main gauge of economic progress, the importance of natural resources to prosperity, health, and well-being is sometimes disregarded. As a result, they must rely on a larger range of development indicators that consider the nature and content of growth as well as how it affects people's income and welfare.
- In order to implement green growth in a way that fosters employment opportunities, the eradication of poverty, and a strong and sustainable economy, the OECD is working to identify the policy combinations and measuring tools that countries in diverse contexts may apply.

D) Green Growth Indicators:

According to OECD Deputy Secretary-General Rintaro Tamaki, "Green Growth is about promoting growth and development while ensuring that natural assets continue to offer the resources and environmental services on which our well-being depends." In order to boost growth and open up new economic opportunities, governments that pursue green growth plans must encourage investment and innovation. They also need indicators that may be used to raise awareness, monitor progress, and identify opportunities and risks.

A conceptual framework for expansion Five elements that support high-quality growth in emerging countries are highlighted by quality.

- Equity and access,
- structural transformation,
- productivity and efficiency,

- balancing capital investments are the five main factors.
- Understanding the limits that exist in the social, political, and environmental spheres.

1. **Equitable access and distribution:** To what extent does economic growth ensure that basic needs for environmental resources are met? How much do governance structures support equitable access to the benefits of nature and cost-sharing for environmental deterioration?

2. **Structural change:** How quickly is the transition to a green economy happening if structural change is being accelerated by economic growth? How is the production capacity changing, and how quickly are decent jobs being created in the green sector? How much do monetary policy, financial investment, the development of human capital, and other policies stimulate structural change in the direction of green industries?

3. **Eco-efficiency:** To what extent do growth plans encourage the separation of economic expansion from the effects of the environment? How efficiently are energy and other resources used in consumption and production activities? How much do policies and institutions support eco-efficiency?

4. How are stocks and flows of natural capital changing as a result of investment? - in particular, the elements of the natural capital that are crucial for socioeconomic growth and may be under danger.

5. **The limits of the planet:** Which natural resources are essential but limited, or approaching critical levels? What risks do natural resource use pose to the economy, society, and environment? How well defined are the primary policy objectives and restrictions on resource utilisation (as well as emissions and waste) should be? What limitations on the use of natural resources should be put in place?

Green growth initiatives inside organisations as a policy strategy:

- IEA: In 2020, the IEA put up a proposal for a "Clean Energy New Deal," and its executive director Fatih Birol is a fervent advocate.
- IMF: In 2020, Kristalina Georgieva, the managing director of the IMF, suggested that countries reduce their support for fossil fuels, make emergency loans to green industries, and enact a carbon price.
- UNESCAP: In 2012, the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) released the Low Carbon Green Growth Roadmap for Asia and the Pacific to assess the opportunities that a low-carbon, green growth route presents for the region. The roadmap includes five tracks on which to push the economic system change in order to seek low carbon green growth as a new economic development path.

- OECD: In 2011, the OECD published a roadmap for green growth. In 2012, they also published a paper on green growth in underdeveloped countries.
- UNEP: The UN Environment Programme led the Green Economy Initiative in 2008. (UNEP).
- World Bank: In 2012, the World Bank published the paper "Inclusive Green Growth: The Pathway to Sustainable Development."
- The Green Economy Roadmap, a guide for business, policymakers, and society, was published in 2012 by the International Chamber of Commerce (ICC), which in 2010 created the first-ever global corporate Task Force on the Green Economy.

Green Growth in Developing Countries:

Natural resource exploitation is typically more significant to the economies of underdeveloped countries. Green technology and sustainable development are less readily available or affordable to them. Additionally, they are less equipped to protect themselves against the negative effects of environmental degradation and climate change. For instance, the contamination of the air and water could harm their health. Green growth therefore has the potential to improve the lives and wellbeing of people living in developing countries by protecting the environment and fostering economic development.

The Organization for Economic Co-operation and Development (OECD) compiled a report on "Green Growth and Developing Countries" in 2012 as a summary for decision-makers. The policy framework presented in this study is one that developing countries could use to achieve their socioeconomic and environmental goals. It also draws attention to a number of concerns that developing countries have regarding green growth, such as its ability to actually fight poverty and potential barriers with high costs for green technologies.

4.4 CONCEPT OF GREEN CONSUMER AND GREEN BUSINESS

A) Introduction:

"Green consumerism" refers to the consumer desire for products and services that were created in an environmentally responsible way, especially one that entails recycling and safeguarding the planet's resources. Or, to put it another way, green consumerism is the creation, promotion, and usage of goods and services based on their favourable effects on the environment.

Economic, social, and cultural influences have shaped the basis for green consumerism. This is because it is a societal attitude and movement in the modern era that is designed to especially urge people to be more aware of

the firms' production methods and to only buy or consume goods and services that do not harm the environment. This is why green consumerism, which focuses primarily on the sustainable and environmentally friendly consumer behaviour, has created a balance between consumer behaviour and business objectives.

B) The significance of green consumerism:

Green consumerism is a thorough and responsible management strategy that satisfies the requirements of all stakeholders while also preserving the natural balance of the environment and human health. The importance of green consumerism can be seen in the following ways:

1. Reduction of packaging waste:

Sustainable consumption encourages packing options that are cost-effective. It exhibits social behaviours including the propensity to purchase unpackaged commodities over loose ones like fruits and vegetables. It also encourages the recycling of paper and plastic packaging materials like tins and bags, which usually exacerbate environmental deterioration.

2. Increased energy efficiency:

Green consumerism encourages energy efficiency, which in turn lowers greenhouse gas emissions, lowers utility bills, and enables economies to meet rising energy demands. Through green consumerism, it has been possible to reduce the risk associated with inefficient industrial processes and to take advantage of the financial and environmental advantages of utility systems.

3. Lessening of emissions and other pollution release during production and transportation procedures:

Green consumerism has drastically reduced emissions from the industrial and transportation industries. In addition, tight emission standards have been put in place as a result of campaigns and initiatives for green consumerism, reducing emissions from engines and motors and promoting clean fuel sources.

4. Consuming more wholesome meals:

The promotion of green consumerism has made it imperative to produce food in a more environmentally responsible manner. Because they are not grown or produced using pesticides, antibiotics, hormones, or artificial chemical fertilisers, locally grown and organic foods may be healthier for consumers. As a result, consumers are gradually building a culture of buying more of these types of foods.

C) How to Become a Green Consumer:

As a result of the promotion of green consumerism, environmentally friendly food production has gained importance. Because they are not

grown or produced using pesticides, antibiotics, hormones, or artificial chemical fertilisers, locally grown and organic foods may be healthier for consumers. As a result, consumers are gradually building a culture of buying more of these types of foods.

1. Using less energy in your surroundings:

Using as little energy as possible at home and at work is only one example of what may be done on a personal level, even though it can be challenging to go door to door spreading the word about energy conservation. In order to comply with this, power sources must be turned off while not in use, both at home and at work. One might also develop the habit of spending more time in one particular area each day rather than use several electrical outlets by working in various places around a property.

2. Changing one's mindset:

Making people utilise services or buy products that prevent the exploitation of natural resources, the destruction of animal habitats, or environmental deterioration is difficult. Everyone must develop a daily green habit and alter their viewpoint on environmental protection and the dangers of environmental deterioration as a result.

3. Utilizing solar technology and other alternative energy sources:

Utilizing solar-powered equipment, which uses solar energy rather than electricity, is one of the most efficient ways to halt environmental degradation. Among the products are solar heaters, solar lamps, solar backpacks, solar geysers, and solar bulbs. While some of these products are more expensive than ordinary products, they often have longer lifespans and are more environmentally beneficial because they utilise natural energy.

It is also advised to employ renewable energy sources like wind. Governments, energy production facilities, industries, manufacturers, and consumers should collaborate to invest in renewable energy sources like biofuels, biogas, solar, and wind power.

4. Examining the energy labelling on everyday items:

One can practise green consumption by, for instance, examining the energy labels on appliances before making a purchase. Products that consume too much energy should be replaced with machinery that uses less energy. Green consumers should prioritise using green energy and use as much green electricity as they can.

5. Recycling and using eco-friendly products:

You may easily become a green customer by opting to recycle the items you use or by utilising eco-friendly ones. For instance, instead of buying bottled water, you could decide to obtain a water bottle that you can use every time. In addition, you can substitute cloth wipes for paper wipes,

which you can wash and reuse often. In general, contributing to this goal should involve making eco-friendly purchases.

6. Invest in locally sourced and organic food:

The use of synthetic pesticides and fertilisers, as well as carbon emissions associated with transportation, have a significant negative impact on the environment. Buying organic and locally grown food can help to mitigate these effects.

7. Purchasing a hybrid car:

These cars either use very little gasoline or very little of it. You may protect the environment from high carbon emissions, which are a key contributor to climate change, global warming, biodiversity loss, and habitat destruction, by driving a hybrid vehicle.

D) Green Consumerism Examples:

- Customers seek products bearing the Marine Stewardship Council's seal, which denotes that they were gathered with ethical environmental management, while buying seafood including cockles, herring, rock lobster, salmon, and Hoki.
- Coffee consumers in the US and Canada have expressed a desire to buy coffee that is produced in accordance with organic and shade growing standards. These beans bear the Bird-Friendly seals of the Smithsonian Migratory Bird Center.
- More than 25 million hectares of forest gardens in 54 different nations have received certification from the Mexico-based Forest Stewardship Council. These woods exceed the environmental and social standards for sustainable forestry and are more than twice as big as those that existed in 1998.
- In more than 20 European countries, beachgoers have discovered 2,750 marinas and beaches that are environmentally friendly and have hygienic and safety amenities.
- Thai customers used the information from the appliance-labeling programme to encourage the use of single-door refrigerators that are energy efficient. It was used by 96% of individuals in 1998, up from 12% in 1996.
- As a result of consumer acceptance of energy-efficient compact fluorescent lamps, the world no longer requires nearly 40 medium-sized coal-fired power plants.
- A move away from dependency on the main electrical grid and the construction of solar or wind energy systems by enterprises, governments, or private citizens.

E) Green Marketing Strategies:

The following strategies could promote consumer confidence in environmental protection;

1. Being Transparent:

Radicalism and outspokenness are needed for this. Businesses can gain a competitive edge by being as open as possible regarding their sourcing and production processes. For instance, Patagonia's "Footprint Chronicles," which it publishes, has made openness a trademark of its reporting on sustainability. Consumers should have access to information about business practises, goods, and services as part of a green marketing plan.

2. Making an effort:

Customers favour businesses they believe to be devoted and sustainable. Companies that support environmental sustainability ought to have a distinct vision for solutions that promote green products and services.

Companies should take the initiative to make comments that demonstrate leadership and assure investors of lower risks of environmental effect. The company's social responsibility strategy and principles must also be communicated and advanced if emotional connections are to be made with customers.

3. Emphasizing benefits and environmentally friendly solutions:

Since customers want information about the personal benefits of the items being supplied, businesses can focus on integrating more pro-environmental benefits of products. Businesses should think about things like if their goods enable customers to save money or if they appeal to people who are style-conscious.

American Apparel is one company that has benefited from portraying itself as one that supports equitable working conditions for its employees and the use of organic cotton.

4. Producing durable goods that may be used for an extended period of time:

Due to the fact that green consumers are constantly seeking out products that are both affordable and long-lasting over the course of their lifetimes, businesses who have taken the initiative to lessen the life cycle effects of their products have seen real rewards. Toyota vehicles are a great illustration; it is said that these vehicles have longer lifespans and experience breakdowns less frequently due to lean production and the Kaizen technique.

5. Cause marketing and environmental product declarations (EPDs) with outside help:

Cause marketing, eco-labels, and environmental product declarations are currently the most well-liked forms of third-party assistance offered (EPDs). Promotional campaigns or cause marketing, in which a business donates a portion of the product's sales to an important non-profit, can help brands stand out in the marketplace.

Eco-labels like Energy Star (93 percent), USDA Certified Organic (75 percent), and the chasing-arrows recycling logo might affect purchasing decisions (93 percent). EPDs provide consumers with thorough descriptions of products' effects throughout their life cycles.

4.5 SUMMARY

The term "Green GDP" refers to a measure of economic growth that incorporates environmental concerns in addition to a nation's regular GDP. The green GDP includes costs associated with climate change and biodiversity losses. Indicators like the "Sustainable Development Index" can be constructed by combining physical measures like "garbage per capita" and "carbon dioxide per year." Green growth refers to fostering economic growth and development in order to ensure that natural resources continue to provide the resources and environmental services that are crucial to our wellbeing. "Green consumerism" refers to the consumer desire for products and services that were created in an environmentally responsible way, especially one that entails recycling and safeguarding the planet's resources. Or, to put it another way, green consumerism is the creation, promotion, and usage of goods and services based on their favourable effects on the environment.

4.6 QUESTIONS

Q1. Explain Green GDP.

Q2. Elaborate the concept of Green Growth with its indicators.

Q3. Differentiate between Green Consumer and Business Principles.

5

SUSTAINABLE DEVELOPMENT

Unit Structure:

5.0 Objectives

5.1 Introduction

5.2 Concept of Sustainable Development

5.3 Characteristics of Sustainable Development

5.4 Dimensions of Sustainable Development

5.5 Sustainable Development Goals

5.0 OBJECTIVES

The major objectives of the present unit are as follows:

- To understand the concept and origin of Sustainable Development;
- To learn the various characteristics and Dimensions of Sustainable Development;
- To gain the knowledge about Sustainable Development Goals with reference to India.

5.1 INTRODUCTION

The need to understand the concept of sustainable development arises with the very central problem of Economics that is 'scarcity'. Since demand is continuously rising and resources are limited, we need to find the way to utilize resources wisely so that it can sustain for future generations too. With the increasing modernization and globalization, we have witnessed large-scale exploitation of all the physical as well as the human resources. Even at present, this exploitation is haunting us with numerous problems, such as global warming, climate change, depletion of the ozone layer, etc. It is very important for us to take immediate steps to protect our planet against all such mis happenings. Sustainable development is the only answer to solve all these problems. The present unit discusses all about the concept of sustainable development, its characteristics, dimensions and sustainable development goals.

5.2 CONCEPT OF SUSTAINABLE DEVELOPMENT

"Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs."Brundtland report

In other words, we can say that Sustainable development is a pattern of resources utilization which aims to meet human needs of present generation considering the needs of future generations. It focuses about the need to be in our environmental limits while making economic progress. It is also about ensuring a strong, healthy and just society. This means meeting the diverse needs of all people in existing and future generations, promoting personal wellbeing, social cohesion and inclusion, and creating equal opportunity. Sustainable development is about finding better ways of doing things, both for the future and the present. We might need to change the way we work and live now to obtain development that will be sustainable. The concept of sustainable development aims to create an attitude toward economic extension which ensures that the need of our future generation shall be given due consideration. With this principle, we aim toward sustainable growth with sensible use of resources. In sustainable development, the conservation, protection, and nurturing of all the resources of our environment are given paramount importance.

The concept of Sustainable Development was recognized first time in 1972 at the UN conference on Human Environment held at Stockholm. The concept became more popular in Brundtland report 'Our Common Future' in 1987. For the first time, the Brundtland Report introduced the need for the integration of economic development, environmental protection, and social justice and inclusion.
The need and challenge of Sustainable development was recognized during the United Nations Conference on Environment and Development (Earth Summit)held in Rio de Janeiro in 1992. The summit marked the first international attempt to draw up action plans and strategies for moving towards a more sustainable pattern of development. It was attended by over 100 Heads of State and representatives from 178 national governments.

Since the Earth Summit, the UN has created a wide range of programmes, agreements with the aim of achieving global sustainable development. The relevance of Sustainable Development deepens every day because the population keeps increasing but the natural resources available for the satisfaction of human needs and wants do not. Sustainable Development is an effort to maintain the balance among economic growth, environmental integrity and social well-being.

5.3 CHARACTERISTICS OF SUSTAINABLE DEVELOPMENT

The basic characteristics of sustainable development are following:

- **Rise in per capita income:**

  There should be an uninterrupted rise in real per capita income and economic welfare on a long-term basis then only development process can be considered sustaining and fulfilling the needs of future generation as well.

- **Use of Resources:**

  Sustainable development emphasizes that resources should be naturally used in such a way that they are not over-exploited. Resources should be used efficiently and wisely.Sustainable development aims at making use of natural resources and the environment for improving the standard of people in such a way that the ability of future generations to meet their own needs is not minimized. It regulates the use of non-renewable natural resources so that our future generation can also avail the benefit of it.

- **Clean technologies:**

  It tries to incorporate clean technologies in its production processes, to reduce pollution levels. Sustainable development aims at promoting environment-friendly and biodegradable products, while also making sustainable planning for replacement or replenishment of resource usage.

- **Biodiversity protection:**

  It is concerned with the conservation of biodiversity. This is a key element in the current context when we are facing the challenges of climate change, the thinning of the ozone layer and alarming diseases thereby.

- **Prediction of environmental impacts:**

  Sustainable development seeks to maintain the communication between the economic, technological and environmental areas, in order to predict the impact of the environmental protection measures adopted, especially in the medium and long term.

- **Improves the quality of life of society:**

  Sustainable Development creates awareness that the improvement in the quality of life should be for everyone. People are entitled to have a healthy and productive life in harmony with nature

5.4 DIMENSIONS OF SUSTAINABLE DEVELOPMENT

Four broad dimensions of SD are explained below:

1. **Economic Dimensions:**

   Sustainable development emphasizes the rationalization of economic approaches to achieve the target of growth and development without wasting resources. It focuses on using of tools that maximizes production efficiency and minimizes wastages. Following steps should be considered to achieve Economic sustainability:

a) Sustainable development means a deep and sustained reduction in the consumption of energy and natural resourcese specially in

developed countries. Steadily reducing the wasteful levels of consumption of energy and other natural resources through improvements in efficiency and through changes in lifestyles is essential to achieve sustainable development. Energy consumption from oil, gas, and coal is 33 times higher in the United States than in India, and in the Organisation for Economic Co-operation and Development (OECD) countries it is 10 times higher than in developing countries.

b) Sustainable development also means changing consumption patterns that unnecessarily threaten biodiversity in other countries.It is essential to ensure that environmental pressures are not exported to developing countries.

c) Industrial countries have a special responsibility to lead sustainable development, because of their past accumulated consumption of natural resources and thus their contribution to global pollution problems.Rich countries have the financial, technical and human resources to take the lead in the use of cleaner and less resource-intensive technologies. It cantransform all the economies towards sustainable development aligned with natural systems. Thus,providing leadership to support sustainable development in other countries is an important aspect of Economic sustainability.

d) Equal distribution of resources is another important aspect of Economic sustainability. An effective means of alleviating the poverty and improving living standards have become the responsibility of both rich and poor countries.Unequal access to education, social services, land and other natural resources, freedom of choice and other political rights are barriers to development. Equality helps to stimulate the development and economic growth necessary to improve living standards.

e) Sustainable development,means reducing the growing disparity in income and access to health care.It should be noted that the policy of improving access to land, education and other social services have played a crucial role in stimulating the rapid development and the growth of Asian tiger economies such as Malaysia, South Korea, and Taiwan.

f) Sustainable development must mean Reduction of military spending and transferring this fund to development needs. A reallocation of even a small portion of the resources would accelerate development significantly.Transferring money from military and defense expenditure to development needs is essential for economic as well as social development.

2. Environmental Dimension:

At the environmental level, sustainable development is the optimal use of agricultural land and water resources in the world, leading to a doubling of the green area on the Earth's surface.

a) Sustainable development means promotion of more efficient use of arable lands and water supplies.

b) By improving agricultural practices and by using better technologies yieldcan be increased manifolds with minimum resources.

c) Avoiding overuse of chemical fertilizers and pesticides is must for environment sustainable development.

d) Conserving water by ending wasteful uses and improving efficiency of water systems is another important step to achieve sustainability.Global consumption of water is doubling every 20 years, more than twice the rate of human population growth. By 2025, demand for freshwater is expected to rise by 56 per cent, more than is currently available, causing two in every three people on the planet to face water scarcity.Improving water quality and limiting surface water withdrawals is essential to protect the environment and human beings.

e) Conserving biodiversity byslowing down its use and, if possible, halting extinctions and habitat and ecosystem destruction are need for environment friendly development. Preventing de-stabilization of climate and destruction of ozone layer by human action need to be implemented.

f) Urban policies have very important implications for future levels of greenhouse gas emissions and the use of most resources. Greatest use of resources and wastage of resources are mostly observed in urban areas.Urbanization policies that encourage the construction of energy-efficient buildings and production units, play a key role in high greenhouse gas emissions.Urban policies, plans, and regulations should, play a central role in any national strategy to promote sustainable development.

3. Social Dimension:

At the humanitarian and social level, sustainable development seeks to stabilize population growth and stop the flow of individuals into urban areas by improving the level of rural health and education services and maximizing public participation in development planning.

a) Population control is one of the necessary requirements for sustainable development. Population is increasing about 80 million every year. And most of the increase (85%) in the third world countries, which is characterized by overcrowding, poverty, unemployment, social crime and underdevelopment.

b) Growing urbanization and migrationto cities are danger for sustainable development. There is need to control such migration through rural development and through standard of literacy.

c) Human Development is necessary to achieve Social and Economic sustainability. Every year, UNDP issues a report on "Human Development" which is measured by Decent standard of living, Education and Health criteria. The report classifies the countries of the world according to their success in achieving human development. Health and Education status are too low in most of the developing economies. The idea of human development has expanded the meaning of education and its goals. Are educational institutions able to make a positive contribution to development and social progress? Or do social burdens go to the fields of unemployment rather than to the labor market? Continued development requires us to reconsider the approach, methods, and institutions of education. Similarly, health facilities need to be expanded so that it can be accessible for each individual in the society. Making primary health care services more accessible will be helpful in achieving social sustainability.

d) The main pillars of the success of sustainable development are the active participation of peoplein the planning and implementation of national development.Such participation depends on social acceptance, which is the essence of democracy. Right information, guidance programs to enlighten people about their roles and beneficial actions can contribute positively in achieving sustainable development.

4. Technological Dimension:

Shifting to technologies that are cleaner and more efficient, minimizes consumption of energy and other natural resources and do not pollute air, water or land are considered technological dimension of sustainable development. The objective should be for technological processes or systems that cause lower waste or pollutants in the first place, recycle waste internally and work with natural systems.

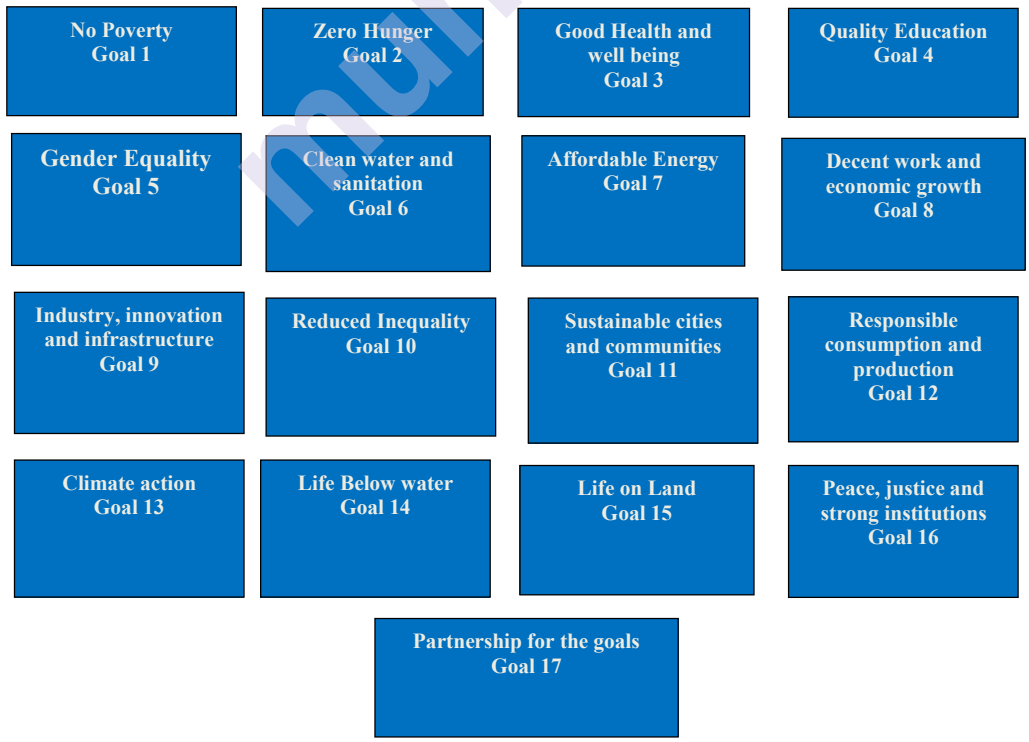
a) Sustainable development means accelerating the introduction of improved technologies, as well as the legal provisions for implementing the same. Technologies currently used in developing countries are often less efficient and more polluting than technologies available in industrialized countries.Technological cooperation - whether by developing or adapting cleaner and more efficient technologies to local needs - aimed at bridging the gap between industrialized and developing countries would increase economic productivity and also prevent further deterioration of the quality of the environment.

b) Administration of technical progress is necessary to measure the impact of progress. Sustainable development is the development that moves society to the era of clean industries and technologies that use the least amount of energy and resources, and produce the minimum gases and pollutants that lead to a rise in the surface temperature and ozone layer.

c) Sustainable development in this area aims to reduce the global rate of increase in greenhouse gas emissions.Industrial countries will have to take the first steps to reduce carbon dioxide emissions, develop new technologies for more efficient use of thermal energy, and provide non-thermal energy supplies that are safe and cost-effective. New technology is the dire need toprevent the degradation of the protective ozone layer of the Earth.Until such technologies are available, sustainable development cannot be achievable.

5.5 SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDGs) were adopted in September 2015 by all United Nation's members as a part of the resolution, 'Transforming our world: The 2030 Agenda for Sustainable Development'.The sustainable development goals are a wide-ranging list of goals integrating social, economic and environmental issues of development. The goals were developed to replace the Millennium Development Goals (MDGs) which ended in 2015. Unlike the MDGs, the SDG framework does not distinguish between "developed" and "developing" nations. Instead, the goals are applicable to all the nations. The Sustainable Development Goals (SDGs) are a collection of 17 global goals set by the United Nations. The SDGs build on the principle entitled "The Future We Want". The Principle is based on two themes'Challenge of moving to a Green Economy' and 'Future institution framework for Sustainable Development'. The world is facing crisis related to climate, economy, food, energy, ecology and poverty which are interlinked and should be addressed simultaneously under the one umbrella.These are the goals:



- Removal of poverty from all over the world by 2030
- Eradicate the problem of hunger and achieve food security by 2030
- Ensure healthy lives and promote well-being for all at all ages
- Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Achieve gender equality and empower for all women and girls
- Ensure availability and sustainable management of water and sanitation for all
- Ensure access to affordable, reliable, sustainable and modern energy for all
- Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Reduce inequality within and among countries
- Make cities and human settlements inclusive, safe, resilient and sustainable
- Ensure sustainable consumption and production patterns
- Take urgent action to combat climate change and its impacts
- Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and dry lands, in line with obligations under international agreements
- Promote inclusive and peaceful societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institution at all levels
- Strengthen and revitalize the global partnership for the generation of revenue and finance essential for sustainable development

To sum up, these 17 goals of Sustainable Development emphasize the 5 P need to be integrated to have desired outcomes. These P are as follows:

People: We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment.

Planet: We are determined to protect the planet from degradation, through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations. Prosperity: We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.

Peace: We are determined to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development.

Partnership: We are determined to mobilize the means required to implement this Agenda through a revitalised Global Partnership for Sustainable Development. The inter linkages and integrated nature of the Sustainable Development Goals are of crucial importance in ensuring that the purpose of the new Agenda is realised.

Major Initiatives by the Government of India:

In India, the ecosystem is confronting a severe crisis as the area of agriculture has decreased substantially. More than 10% of our flora and fauna are on the verge of extinction. Our prime sources of water- rivers, lakes are severely polluted from industrial wastage. Moreover, two-thirds of the land is degraded and not fit for cultivation. The modern waste, such as chemicals is left free in the running rivers which is endanger for our aquatic biodiversity.

In spite of that, our country has shown some positive signs to achieve the target of sustainable development. India is one of the first countries which participated in the Voluntary National Reviews to ascertain and measure the growth of sustainable development. Further, our country has constantly funded the United Nations to boost the agenda of sustainable development. It is also working rigorously with G77 to spread awareness regarding sustainable development in all the countries of the world.

In line with the spirit of sustainable development, India has passed numerous Acts to preserve our resources. Some of them are as follows:

1. The Water (Prevention and Control of Pollution) Act 1974
2. The Forest (Conservation) Act 1980
3. The Air (Prevention and Control of Pollution) Act 1980
4. The Environment (Protection) Act 1986
5. National Agriculture Policy, 2000, National Population Policy, 2000 and National Water Policy, 2002 have recognized the need for sustainable development in their specific contexts and formulated necessary strategies to give effect to such recognition.

6. National Environment Policy 2006 is a response to India's national commitment to a clean environment, mandated in the Constitution in Articles 48 A and 51 A (g) strengthened by judicial interpretation of Article 21. It is recognized that the maintenance of the healthy environment is not the responsibility of the state alone. It is the responsibility of every Citizen and thus a spirit of partnership is to be realized through the environment Management of the country.

7. The government has set up a National Green Tribunal (NGT) in the year 2010. The Tribunal is vested with exclusive powers to adjudicate the matters pertaining to the issue of the environment. In the last few years, it has passed various landmark judgements against the large multi-corporate houses, which were non-compliant with the protection of the environment. The Tribunal is not bound by the principles of the Civil Procedure Code (CPC) and works in accordance with the principle of natural justice.

8. India also implemented the National Clean Air Program 2019 to create awareness regarding the importance of clear air to our health. This program aims to reduce air pollution and improve the air quality index by adopting necessary steps at both the central as well as at state levels.

9. In 2014, Namami Ganges Mission was introduced to clean and rejuvenate our holy river, Ganga. Importantly, it aims to create a better sewage treatment infrastructure and factory handling to reduce pollution.

10. Apart from the Central government, the state governments have enforced the state action plans on climate change to build capacity and implement sector activities. Till now 27 states and 5 Union territories have adopted this strategy in sectors like water, land, air, migration tourism, forestry, agriculture and etc.

11. India is a signatory of the Paris agreement and created various specialized funds for environmental protection, such as the Coal Cess and the National Clean Energy Fund, the National Adaptation Fund of Climate Change, etc.

Role of SDGs in India has, over the past years, directed its development pathway to meet its priorities of employment, economic growth, food, water and energy security, disaster resilience and poverty alleviation. India has also aimed to restore its natural capital and adopt transparent and robust governance along democratic lines. However, emerging challenges of climate change impacts, increasing inequities, and lagging human development indices are well recognised by the citizens and the government. The post 2015 UN Sustainable Development Agenda framework provides an opportunity to renew and integrate efforts in order to meet, to a significant degree, national and global aspirations in a defined time frame.

5.6 SUMMARY

Thus, this unit is devoted to Sustainable Development. It studies the concept, characteristics, dimensions and Goals of Sustainable Development in detail. The concept of sustainable development is based on the effective use of resources in such a manner that not only our present requirement is fulfilled but also the needs of our future generation are not compromised. This concept gained popularity after the conference of 1992 in Rio De Janeiro. Talking about India, the government has taken various steps to implement the concept of sustainable development. Some notable steps include setting up NGT, signing of Paris agreement, Namami Ganges Mission, setting up a National Clean Energy Fund, etc.Thus, the unit also highlights the measures implemented by Government of India to achieve the sustainable Development goals in precise manner to make the concepts understandable for our leaners.

5.7 QUESTIONS

Q1. Discuss the concept of Sustainable Development and its characteristics in brief.

Q2. What is Sustainable Development? What are the different dimensions of Sustainable Development?

Q3. Explain the economic, environmental and social dimensions of Sustainable development.

Q4. Explain the sustainable development goals and the major initiatives taken by the Government of India to meet it.

Q5. Discuss the Sustainable Development Goals.

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6

SMART CITY MISSION AND NMSA

Unit Structure:

6.0 Objectives

6.1 Introduction

6.2 Smart City Mission in India

6.3 National Mission for Sustainable Agriculture

6.3.1 Objectives

6.3.2 Strategy

6.3.4 Components

6.4 Summary

6.5 Questions

6.6 References

6.0 OBJECTIVES

The major objectives of the present unit are as follows:

1. To understand the concept and scheme of Smart City Mission in India.
2. To learn about National Mission for Sustainable Agriculture and its objectives.
3. To understand the strategy and components of NMSA.

6.1 INTRODUCTION

Smart City Mission is an ambitious project of Ministry of Housing and Urban Affairs launched in 2015 to provide a smart solution of problems of cities which can play a significant role in the economic growth drive. Cities are engines of growth for the economy of every nation. This is the first time an Urban Ministry programme used the competition method to select cities for funding and used the strategy of area-based development. This unit tries to shed the light on features and strategies of Smart City Mission adopted for 100 selected cities in the country. National Mission for Sustainable Agriculture is another massive project of government to achieve the sustainability in agriculture. It is a much-needed mission especially in the rainfed areas. The mission focuses on integrated farming, water use efficiency, soil health management and synergizing resource conservation. NMSA derives its mandate from Sustainable Agriculture

Mission which is one of the eight Missions outlined under National Action Plan on Climate Change (NAPCC). The present unit elaborates the objectives, strategy and components of National Mission for Sustainable Agriculture.

6.2 SMART CITY MISSION IN INDIA

Smart City Mission was launched by the Hon' Prime Minister on 25 June, 2015. The main objective of the Mission is to promote cities that provide core infrastructure, clean and sustainable environment and give a decent quality of life to their citizens through the application of 'smart solutions'. The focus is on sustainable and inclusive development by creation of replicable models which act as lighthouses to other aspiring cities. 100 cities have been selected to be developed as Smart Cities through a two-stage competition. The Mission is operated as a Centrally Sponsored Scheme.

The Smart city proposals contained more than 5,000 projects worth over Rs. 2,00,000 crores, of which 45 percent is to be funded through Mission grants, 21 percent through convergence, 21 percent through PPP and rest from other sources.

What do we mean by Smart City?

Cities are unions of people; places where people live, come to meet, exchange ideas, earn livelihoods, access education, health and other services and enjoy a life of good quality. People are at the core of the city. Therefore, cities should work for their people. Cities that work for their people will continuously become better versions of themselves with each passing day.

"We shape cities, and they shape us." – Jan Gehl

Cities are engines of growth for the economy of every nation. Nearly 31% of India's population lives in urban areas and contributes 63% of India's GDP (Census 2011). With increasing urbanization, urban areas are expected to house 40% of India's population and contribute 75% of India's GDP by 2030. This requires comprehensive development of physical, institutional, social and economic infrastructure. All are important in improving the quality of life and attracting people and investments to the City. Development of Smart Cities is a step in this direction.

The core infrastructure elements in a Smart City would include - adequate water supply, assured electricity supply, sanitation, including solid waste management, efficient urban mobility and public transport, affordable housing, especially for the poor, robust IT connectivity and digitalization, good governance, especially e-Governance and citizen participation, sustainable environment, safety and security of citizens, particularly women, children and the elderly, and health and education.

Features of Smart City Mission:

- Promoting mixed land use in area-based developments — planning for 'unplanned areas' in order to make land use more efficient. The States will enable some flexibility in land use and building bye-laws to adapt to change.
- Housing and inclusiveness — Smart city Mission will expand housing opportunities for all.
- Creating walkable localities – Smart city Mission will work in the direction of reducing congestion, air pollution and resource depletion. It will boost local economy, promote interactions and ensure security. Road network to be created for not only vehicles and public transport, but also for pedestrians and cyclists.
- Preserving and developing open spaces —It focuses the development of parks, playgrounds, and recreational spaces in order to enhance the quality of life of citizens, and to promote eco-balance.
- Promoting a variety of transport options to improve connectivity.
- Giving an identity to the city — based on its main economic activity, such as local cuisine, health, education, arts and craft, culture, sports goods, furniture, hosiery, textile, dairy.
- Applying Smart Solutions to infrastructure and services in area-based development in order to make them better. For example, making Areas less vulnerable to disasters, using fewer resources, and providing cheaper services.

Smart city Mission Framework

Source: Ministry of housing and urban affairs

Strategy of Smart City Mission:

The purpose of the Smart City Mission is to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology that leads to Smart outcomes. Area-based development will transform existing areas **(Retrofit and Redevelop)**,

including slums, into better planned ones, thereby improving livability of the whole City. New areas **(Greenfield)** will be developed around cities in order to accommodate the expanding population in urban areas. Application of Smart Solutions will enable cities to use technology, information and data to improve infrastructure and services. Comprehensive development in this way will improve quality of life, create employment and enhance incomes for all, especially the poor and the disadvantaged, leading to inclusive Cities.

The strategic components of Area-based development in the Smart Cities Mission are city improvement **(Retrofitting)**, city renewal **(Redevelopment)** and city extension **(Greenfield development)** plus a **Pan-city initiative** in which Smart Solutions are applied covering larger parts of the city.

6.3 NATIONAL MISSION FOR SUSTAINABLE AGRICULTURE

National Mission for Sustainable Agriculture (NMSA) has been formulated for enhancing agricultural productivity especially in rainfed areas focusing on integrated farming, water use efficiency, soil health management and synergizing resource conservation.Agricultural growth can be sustained by promoting conservation and sustainable use of scarce natural resources through appropriate measures.Indian agriculture is predominantly rain fed covering about 60% of the country's net sown area and accounts for 40% of the total food production. So, the conservation of natural resources such as soil and water are the need to meet the burgeoning demands for food grains in the country.

6.3.1 Objectives:

- To make agriculture more productive, sustainable, remunerative and climate resilient by promoting location specific Integrated/Composite Farming Systems.
- To conserve natural resources through appropriate soil and moisture conservation measures.
- To adopt comprehensive soil health management practices based on soil fertility maps, soil test-based application of macro & micro nutrients, judicious use of fertilizers etc.
- To optimize utilization of water resources through efficient water management to expand coverage for achieving 'more crop per drop'.
- To develop capacity of farmers & stakeholders, in conjunction with other on-going Missions e.g., National Mission on Agriculture Extension & Technology, National Food Security Mission, National Initiative for Climate Resilient Agriculture (NICRA) etc., in the domain of climate change adaptation and mitigation measures.
- To pilot models in select blocks for improving productivity of rainfed farming by mainstreaming rainfed technologies refined through NICRA and by leveraging resources from other schemes like Mahatma

Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Integrated Watershed Management Programme (IWMP), RKVY etc.

- To establish an effective, inter and intra Departmental co-ordination for accomplishing key deliverables of National Mission for Sustainable Agriculture under the aegis of NAPCC (National Action Plan on Climate Change).

6.3.2 Strategy:

1. **Integrated farming system:** It will promote integrated farming system that will be covering crops, livestock & fishery, plantation and pasture based composite farming for enhancing livelihood opportunities, ensuring food security and minimizing risks from crop failure through supplementary production systems.

2. **Resource conservation technologies:** Resource conservation technologies (both on-farm and off-farm) will be popularized which will support mitigation efforts in times of extreme climatic events or disasters like prolonged dry spells, floods etc.

3. **Effective Water management:** For effective use of available water resources water use efficiency through application of technologies coupled with demand and supply side management will be promoted.

4. **Improved agronomic practices:** For higher farm productivity, improved soil treatment, increased water holding capacity, judicious use of chemicals/ energy and enhanced soil carbon storage improved agronomic practices will be encouraged.

5. **Creating database:**Proper Database on soil resources is required to facilitate adoption of location and soil-specific crop management practices& optimization of fertilizer use. Land use survey, soil profile study and soil analysis on GIS platform will be conducted for creating required database.

6. **Crop specific integrated nutrient management practices:** Crop specific integrated nutrient management practices will be promoted for improving soil health, enhancing crop productivity and maintaining quality of land and water resources.

7. **Climate change adaptation:** Involving knowledge institutions and professionals in developing climate change adaptation and mitigation strategies for specific agro climatic situations will enhance appropriate farming systems.

8. **Programmatic interventions:** As per land capability and conducive to climatic parameters blocks will be selected as pilots for ensuring integrated development through dissemination and adoption of rainfed technologies. Coordination with other programmes such as MGNREGS, IWMP, RKVY, National Food Security Mission (NFSM), Mission for Integrated Development of Horticulture (MIDH), National Mission for Agricultural Extension & Technology

(NMAE&T) etc. will be encouraged. A consortium approach may be evolved with various stake holders including knowledge partners like State Agricultural Universities, Krishi Vigyan Kendras, Indian Council of Agricultural Research (ICAR) Centres by the State Government to provide single window service/ knowledge provider system for the benefit of farming community.

9. **Supervision and monitoring:** State Government may engage reputed NGOs for implementation of cluster/village development plan in case of limited govt. infrastructure is available in that area through a transparent system of selection and defined process of supervision and monitoring. For Strong technical monitoring and feedback systems on climate change mitigation and adaptation issues the experts of central institutes and state agricultural universities would be involved.

10. **Platform** will be established to connect, review and coordinate the implementation of interventions outlined in Mission Document of NMSA under the guidance of National Action Plan on Climate Change.

6.3.3 Components:

NMSA has following Fourmajor components or activities:

1) Rainfed Area Development (RAD):

Rainfed Area Development (RAD) will adopt an area-based approach for development and conservation of natural resources along with farming systems. This component will introduce appropriate farming systems by integrating multiple components of agriculture such as crops, horticulture, livestock, fishery, forestry with agro based income generating activities and value addition. Besides, soil test/soil health card based nutrient management practices, farmland development, resource conservation and crop selection conducive to local agro climatic condition will also be promoted under this component. A cluster-based approach of 100 hectare or more will be adopted to derive noticeable impact of convergence and to encourage local participation.This component has been formulated in a 'watershed plus framework' to explore potential utilization of natural resources available through watershed development and soil conservation activities.

2) Sub-Mission on Agroforestry (SMAF):

Sub-Mission on Agroforestry has been launched in 2016-17 to encourage tree plantation on farm land "Har Medh Par Ped", along with cropping system. The scheme is being implemented in the States which have liberalized transit regulations for selected tree species.The implementation of the sub-mission will result in providing additional income opportunities for farmers, increase in tree cover that will lead to higher carbon sequestration and compliment the national initiatives on climate change adaptation. In order to make agriculture less vulnerable to climatic aberrations, Government of India formulated the National

Agroforestry Policy in 2014. The policy recommends for setting up of a Mission or Board to address development of agroforestry sector in an organised manner. The Sub-Mission on Agroforestry (SMAF) under NMSA is an initiative to this end. The aim of the submission is to expand the tree coverage on farmland in complementary with agricultural crops.Agroforestry not only provides environmental services, but also economic gains, as about 65 % of the country's timber requirement is met from the trees grown outside forests.

3) National Bamboo Mission (NBM):

Bamboo is a versatile group of plants which is capable of providing ecological, economic and livelihood security to the people. India has the highest area (13.96 million ha) under bamboo and is the second richest country, after China, in terms of bamboo diversity with 136 species (125 indigenous and 11 exotic). But India is a net importer of bamboo. It means there are greater opportunities to harness the market potential by increasing its production and ensuring establishment of proper value chain system. In most of the hilly States of the country, bamboo is used as building material, applications in industries like paper and pulp, construction, furniture, textile, food, energy production etc. Keeping in view the vast untapped potential of the bamboo sector, for boosting domestic cultivation of quality and appropriate species the restructured National Bamboo Mission (NBM) has been approved for implementation across the country.

4) Soil Health Management (SHM):

Soil Health Management (SHM) will aim at promoting location as well as crop specific sustainable soil health management. It includes organic farming practices through creating and linking soil fertility maps with macro-micro nutrient management, appropriate land use based on land capability, judicious application of fertilizers and minimizing the soil degradation.

Assistance will be provided for various improved package of practices based on land use and soil characteristics, generated through geographical information system (GIS) based thematic maps and database on land and soil characteristics through extensive field level scientific surveys.This component will also provide support to solve the problems of soils (acid/alkaline/saline). This component will be implemented by State Govt., National Centre of Organic Farming (NCOF), Central Fertilizer Quality Control & Training Institute (CFQC&TI) and Soil and Land Use Survey of India (SLUSI).

Given the limitations, such as staff and infrastructure, faced by the department of agriculture at the field level, a Public Private Partnership Model may be adopted by states to ensure that the soil testing is done in time as per requirement. The private parties can be encouraged to set up soil testing labs in selected areas in the district.

6.4 SUMMARY

Thus, this unit is devoted to two major projects of Government of India in direction to achieve Sustainable Development. The first is Smart City Missionaims to drive economic growth and improve quality of life through comprehensive work on social, economic, physical and institutional pillars of the city. The second is National Mission for Sustainable Agriculture, a comprehensive agricultural reform project aims at sustainable agricultural growth by adopting environment friendly technologies, energy efficient equipments, conservation of natural resources and promoting integrated farming. Its objectives, strategy and various components are discussed in precise manner to make the concepts understandable for our leaners.

6.5 QUESTIONS

Q1. Analyze the Smart City Mission programme of Government of India.

Q2. Write a note on Smart City Mission.

Q3. What is National Mission for Sustainable Agriculture? Discuss its objectives and strategy.

Q4. What is National Mission for Sustainable Agriculture? Explain the various components of NMSA.

Q5.Write a note on NMSA.

Q6. Explain the concept of Smart City Mission.

6.6 REFERENCES

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7

ENVIRONMENTAL POLICY IN INDIA – 1

Unit Structure:

7.0 Objectives

7.1 Introduction

7.2 Overview of Laws to improve the environment in India

7.3 Central Pollution Control Board

7.4 Industrial Pollution Control Measures in India

7.5 Summary

7.6 Questions

7.0 OBJECTIVES

- To know about the environmental regulations
- To overview thelaws to improve the environment in India
- To study about the Central Pollution Control Board
- To identify the Industrial Pollution Control Measures in India

7.1 INTRODUCTION

The enactment of environmental regulations is an essential component of every government. It is a collection of regulations and statutes that govern the standard of the air, water, and other aspects of the natural environment.

The environmental laws of India are grounded on the principles of environmental law, and its primary concern is the proper administration of natural resources such as fisheries, forests, and minerals.

The environmental laws of India are a direct product of what the constitution mandates should be done with regard to protecting the environment. Both the constitution of India and its international obligations discuss the necessity of protecting and preserving the environment and making use of natural resources in a manner that does not cause harm to such resources.

7.2 OVERVIEW OF LAWS TO IMPROVE THE ENVIRONMENT IN INDIA

The safeguarding of the natural world is included in the Constitution of India, where it is referred to as both a basic obligation and one of the Directive Principles of State Policy.

Directive Principles of State Policy (Part IV) Article 48A:

Protecting forests as well as animals and working to improve environmental conditions are both worthy goals. The administration will work to preserve and develop the environment, as well as to ensure the safety of the nation's woodlands and wild animals.

Fundamental Duties (Part IV A) Article 51A:

To preserve and improve the natural environment, including the woodlands, lakes, and rivers, as well as the native fauna, and to show compassion for all other forms of life.

History of Environmental Laws in India:

At a United Nations conference on the human environment that took place in Stockholm in 1972, a comprehensive strategy for safeguarding the environment was developed. As a consequence of this, the Science and Technology Department of the United States government established the National Council for Environmental Policy and Planning in the year 1972. This was done so that there would be a body in charge of keeping an eye on environmental issues and concerns. This was one of the reasons why this was done. In the end, this council was superseded by the jurisdiction of the Ministry of the Environment and Forests.

The government of India has been quite proactive in its efforts to preserve the natural world. The following is a list of some of the most essential and important environmental laws and acts, along with an explanation of each.

i) The Water (Prevention and Control of Pollution) Act, 1974:

The objective was to both prevent the water from being unclean and to stop the process of it becoming dirty. to maintain or restore the water's original purity and healthfulness after it has been exposed to a variety of contaminants. It bestows the authority to formulate regulations onto the Centre Pollution Control Boards (CPCB) as well as the State Pollution Control Boards (SPCB). Both the CPCB and the SPSB became official entities as a result of the Water Act of 1974. It grants the CPCB and SPCB the authority to establish guidelines for factories that discharge pollution into bodies of water and to ensure that these guidelines are adhered to. The CPCB is responsible for the same activities throughout the union territory. In addition to this, it devises policies to put an end to water pollution and acts as a coordinator for the work of various SPSBs. The SPCB regulates the discharge of sewage and industrial waste by accepting, denying, or giving consent to discharge. This is done in order to restrict the discharge.

ii) The Air (prevention and control of pollution) act, 1981:

The legislation intends to regulate and curtail the problem of air pollution in India. Its primary objectives are as follows:

- Ensure that measures are taken to avoid, control, and reduce levels of air pollution.
- To ensure that boards are established at both the state and federal levels in order to carry out the provisions of the act.

It states that things that pollute the air, such as internal combustion engines, industry, vehicles, power plants, etc., can't release more than the allowed amount of lead, carbon monoxide, sulphur dioxide, nitrogen oxide, volatile organic compounds (VOCs), or other toxic substances. Examples of these things include: internal combustion engines, vehicles, power plants, etc. It provides the state government with the authority to designate some locations as having poor air quality.

iii) The Environment (Protection) Act, 1986:

It is stated in Article 253 that this law was enacted (legislation for giving effect to international agreements). This law was enacted in December 1984, after the gas tragedy that occurred in Bhopal. The United Nations Conference on the Human Environment held in Stockholm in 1972 issued a declaration that was ratified into legislation so that it could be implemented. In accordance with the Environmental Protection Act of 1986 (EPA), the MoEFCC is required to notify ten-kilometer buffer zones surrounding environmentally sensitive or ecologically fragile protected areas.

The ozone-depleting substances (regulation and control) rules, 2000 is one such statutory body under this act. It controlled the manufacture, commerce, import, and export of commodities that include ozone depleting substances and established deadlines for the elimination of various compounds that are harmful to the ozone layer. These substances are known as "Ozone Depleting Substances" or "ODSs."In accordance with these regulations, the use of CFCs, halons, ODSs (such as carbon tetrachloride and methyl chloroform), and SFC is prohibited, with the exception of metered-dose inhalers and other applications related to medicine.

iv) The Energy Conservation Act, 2001:

It was approved as a means of making more efficient use of energy and reducing the amount of trash that is produced. It establishes the guidelines for how much energy can be consumed by various pieces of equipment and appliances. It provides customers with norms and guidelines for the amount of energy that they are permitted to use. It establishes guidelines for how commercial buildings have to be constructed in order to conserve energy. The law authorised the establishment of a government entity known as the Bureau of Energy Efficiency (BEE).

v) Biological Diversity Act 2002:

The CBD, also known as the Nagoya Protocol, was implemented so that it could function properly. In order to put an end to biopiracy and safeguard biological variety as well as local producers, a framework consisting of central boards, state boards, and local committees will be implemented. In order to establish the National Biodiversity Authority (NBA), State Biodiversity Boards (SBBS), and Biodiversity Management Committees (BMC), the purpose of this bill is: (BMCS).

vi) Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA):

The legislation enables people who have lived in these woods for centuries, known as Forest Dwelling Scheduled Tribes (FDST) and Other Traditional Forest Dwellers (OTFD), the ability to utilise and reside on land that is classified as forest. This statute falls within the jurisdiction of the Ministry of Tribal Affairs. The legislation also establishes who is responsible for making use of FDST and OTFD in a manner that is environmentally friendly, safeguards biodiversity, and maintains ecological equilibrium. It makes it much simpler to preserve the woodlands while while ensuring that the FDST and OTFD have a means of making a living and food to consume. It is an effort to make amends for the injustices committed by the colonial authority against the FDST and OTFD, both of which play a crucial role in ensuring the continued existence and well-being of the forest environment.

vii) The National Green Tribunal Act, 2010:

It was established in 1992 at the same time as the Rio Summit with the intention of providing those who had been harmed by pollution and other forms of environmental degradation with administrative and legal choices. Article 21, which states that every person has the right to a healthy environment, is supported by this argument as well. When a case is presented before the NGT, the NGT is required to make a decision on the matter within six months of the day on which the case was filed before it. When it comes to items that have to do with significant environmental concerns, the NGT has the last decision.

viii) Compensatory Afforestation Fund Act, 2016:

As a result of the passage of the CAF Act, the ad hoc Compensatory Afforestation Fund Management and Planning Authority was given the responsibility of managing the money designated for compensatory afforestation (CAMPA). When forest land is utilised for anything other than a forest, such mining or industry, the user agency pays for planting forests over an equivalent amount of non-forest land, or over double the area of degraded forest land if no other land is available. This is referred to as compensatory afforestation. According to the regulations, the money from the CAF should be distributed as follows: 90% to the states, and 10% shall be kept by the Center. The funds may be put to use in the treatment of catchment areas, the assistance of natural generation, the management

of forests, the protection and management of wildlife, the relocation of villages outside of protected areas, the resolution of conflicts between humans and wildlife, the training of individuals, the provision of wood-saving devices, and other activities of a similar nature.

7.3 CENTRAL POLLUTION CONTROL BOARD

The Central Pollution Control Board is a significant government organisation that plays a vital role (CPCB). The Central Pollution Control Board (CPCB) of India is a government organisation that is responsible for monitoring the quality of India's air and water as well as taking care of any other issues that are linked to pollution in India.

The Central Pollution Control Board is an organisation that operates under the auspices of India's Ministry of Environment, Forests, and Climate Change (CPCB).

The Water (Prevention and Control of Pollution) Act of 1974 led to the establishment of this organisation. The Air (Prevention and Control of Pollution) Act bestowed upon it both obligations and responsibilities in the year 1981.

1. Pollution of water bodies, often known as water pollution, is what the term "water pollution" refers to. The term "water pollution" refers to the contamination of various bodies of water, including rivers, lakes, seas, groundwater, and aquifers, by waste products from industrial and agricultural processes.

2. Air pollution refers to any alteration, whether it be physical, chemical, or biological, that takes place in the air. When hazardous substances such as gases, dust, and smoke are released into the atmosphere, it has a significant impact not only on people and animals but also on plants. Please visit this link for further information on pollutants in the air.

It does this by providing the state pollution control boards with technical assistance and guidance, as well as by mediating any differences that may arise between the boards.

The Central Pollution Control Board (CPCB) maintains its headquarters in New Delhi, along with seven zone offices and five laboratories. Research and evaluations of the environment are carried out by the board. Through collaboration with zonal offices, tribal governments, and municipal governments, its primary responsibility is to ensure that national standards remain consistent with a variety of environmental legislation. It is responsible for determining the level of pollution in the air and water and recording the findings of its investigations. In addition, the agency collaborates with private companies as well as all branches and levels of government on a diverse array of pollution prevention and energy conservation programmes and initiatives. It orders the central government to put an end to and regulate the air and water pollution that has been occurring. In addition to this, it provides the governments of Union Territories with guidance about the pollution that is caused by industries

and other locations. The Central Pollution Control Board (CPCB) and its equivalents, the State Pollution Control Boards (SPCBs), are tasked with the responsibility of ensuring that laws regarding the prevention and control of environmental pollution are adhered to.

The Chairman of the CPCB is in command of the organisation, followed by the Member Secretary and other members of the board. The CPCB is able to carry out its various duties with the assistance of the nine primary project budget heads that are listed below.

- Pollution assessment (survey and monitoring).
- Management of the laboratory and research and development (R&D).
- The establishment of standards and recommendations for emissions and effluent standards that are tailored to the requirements of each business.
- The development of pollution control technologies
- Enforcement of pollution control measures
- Raising public awareness and publishing literature
- Hazard waste management

Powers and Functions of CPCB:

The Central Pollution Control Board (CPCB) is charged with a number of responsibilities and powers, one of which is to provide guidance to both the Central Government and the individual State Governments about how pollution in the air and water might be reduced, eliminated, and otherwise managed.

- Developing strategies and plans for a variety of programmes to curb and eliminate water and air pollution
- Formulating strategies and putting together training programmes for those who work to reduce, eliminate, and manage the negative effects of air and water pollution.
- Collecting, compiling, and disseminating scientific and statistical information regarding pollution in the air and water These studies are intended to brainstorm potential solutions to the problem of pollution prevention and control.
- Putting together instructions, regulations, and codes for how to clean stack gas devices, stacks, and ducts, as well as how to treat and dispose of sewage and trade effluents; this includes determining how to treat and dispose of sewage and trade effluents.

7.4 INDUSTRIAL POLLUTION CONTROL MEASURES IN INDIA

Every nation on this globe has a significant challenge in the form of pollution brought on by industrial production. Because the negative effects of industrial pollution are worsening, many groups and individuals are working to reduce carbon footprints and to live and work in a way that is better for the environment. This effort is being driven by the fact that the negative effects of industrial pollution are getting worse.

However, factory pollution is still a significant issue, and it will take a considerable amount of time to successfully control and regulate it. There are a lot of different approaches that may be taken to address the issue once and for all.

The Water Act of 1974, the Air Act of 1981, and the Environment Protection Act of 1986 are the three primary laws that India use to manage pollution. Each of these laws was passed in its respective years (1986). The levels of pollution that companies are allowed to produce have lately been held to stricter restrictions, and older regulations that had been in effect for decades have been revised. However, there are still disparities between the best practises and the control mechanisms that are in place throughout the globe. The businesses that fall into the Orange and Green categories, for instance, are not monitored as thoroughly as the industries that fall into the Red category. The amount of progress made in technology is irrelevant to the measures and methods for controlling pollution.

In the past, when it came to preventing pollution, businesses followed the instructions given to them by the government. Companies are now pushing ahead and defining their own objectives as part of programmes relating to corporate stewardship. These goals include things like zero liquid discharge, carbon neutrality, and others. The importance of pollution control has been recognised by major corporations, and as a result, these businesses are making the transition to the "best available technology" (BAT) as well as other technological advancements such as renewable energy, biogas, Cloud solutions, motion sensors, waste utilisation, and waste heat recovery, etc., to further solidify their dedication to becoming environmental leaders. The government is providing assistance to companies in a number of other ways as well, including by promoting and instituting new programmes to combat pollution (such as the Delhi odd-even programme, which is a stopgap measure), Swatch Bharat projects, and so on.

The majority of individuals are mistaken about the role that businesses play in preventing and controlling pollution. Governance and mandated compliance are two key aspects of a company's operations, but businesses must also actively urge the members of their ecosystem—including workers, suppliers, stakeholders, and so on—to collaborate and provide assistance. Providing incentives and relaxing attendance limits during CSR events, holding regular seminars for vendors, and actively supporting

the cause via social and digital media, among other things, would go a long way toward generating awareness and support for their projects.

1. Confirming the original source:

Utilizing new technology, providing adequate training to personnel so they can use it properly, developing better technology for getting rid of trash, and using raw materials with more care are all ways in which pollution caused by industry may be controlled at its source.

2. Recycling:

Increased recycling efforts should be undertaken to recycle as much of the contaminated water as possible in order to cut down on the amount of industrial pollution that occurs.

3. Cleaning of Resources:

Organic approaches, such as the utilisation of microorganisms that consume heavy metals and garbage, should be utilised for the purpose of cleaning up the water and the soil. In order for enterprises to be able to recycle the water that they use, rather than dumping it back into a natural water source, cooling chambers or bins will need to be constructed.

4. Industry Site Selection:

If the locations of the sites and the potential impacts they may have on the surrounding environment are taken into account, negative consequences may be mitigated.

5. Proper Treatment of Industrial Waste:

It is possible to lessen the effects of pollution by changing people's behaviours and by constructing and operating facilities specifically designed to manage waste from industrial processes.

6. Rebuilding Habitats and Afforestation:

Restoring wildlife habitats by increasing the amount of trees and plants in an area can assist in providing displaced animals with new homes. The trees have the potential to aid in air purification and to provide a barrier from the surrounding environment.

7. Stricter Laws and Enforcement:

The Environmental Protection Agency (EPA) works to address the issues that have arisen as a result of the pollution produced by manufacturers. There should be more stringent regulations about how to punish businesses that do not follow the laws, and there should be larger benefits for businesses that operate in an ethical manner. It implies instituting regulations that prevent individuals from abusing the land in question.

8. Regular Environmental Impact Assessments:

It is important for a reputable industry or business to conduct environmental impact assessments on a consistent basis and submit the results for public scrutiny. During the course of the review, any unfavourable consequences that are discovered should prompt the formulation and implementation of measures designed to rectify the situation.

Noting the most effective methods:

United States of America:

The Environmental Protection Agency (EPA) of the United States provides the general public with unrestricted access to all of the data collected at CEMS-regulated monitoring stations regarding industrial emissions.

The European Union (EU):

Within the member states of the European Union, the European Environmental Agency is responsible for maintaining the European Pollutant Release and Transfer Register, also known as the E-PRTR (EU). It contains statistics on pollution from over 34,000 facilities located in 33 different EU nations.

People in Europe are able to keep track of data regarding industrial air pollution thanks to the data that is available from the E-PRTR register. This data includes information regarding the top polluters as well as how emissions from each industrial location have changed over time and in different locations.

When residents have access to data, they are better able to concentrate on the region in which they live. They are able to examine both the short-term and long-term patterns of industrial pollution in their neighbourhoods, and they may utilise this knowledge to guide the choices that they make.

These kinds of data have been used by environmental organisations in order to discover the sources of air pollution in a specific region, such as the Tata Steel mill in the Netherlands, and hold those responsible for the pollution accountable.

Since 2007, when the first statistics were exchanged throughout the Union, there has been a consistent decrease in the amount of pollution that is being produced by companies across the whole of Europe.

These case studies of successful policies and procedures from the United States and the European Union demonstrate how vital it is for the general people to be informed about the pollution that originates from stationary sources such as stacks and boiler plants. The individuals who control the companies become more accountable as a result of tracking emissions from industrial sources, and the general public is informed about potential sources of pollution in their immediate area.

7.5 SUMMARY

The environmental laws of India are grounded on the principles of environmental law, and its primary concern is the proper administration of natural resources such as fisheries, forests, and minerals.The Central Pollution Control Board is a significant government organisation that plays a vital role (CPCB)responsible for monitoring the quality of India's air and water as well as taking care of any other issues that are linked to pollution in India.The negative effects of industrial pollution are worsening, many groups and individuals are working to reduce carbon footprints and to live and work in a way that is better for the environment. This effort is being driven by the fact that the negative effects of industrial pollution are getting worse.

7.6 QUESTIONS

1. Outline the overview of laws to improve the environment in India.
2. Explain the Central Pollution Control Board.
3. List down the measures of Industrial Pollution Control in India.

8

ENVIRONMENTAL POLICY IN INDIA - 2

Unit Structure:

8.0 Objectives

8.1 Introduction

8.2 Pradhan MantriUjjwalaYojana (PMUY)

8.3 National Green Tribunal

8.4 Environmental Education in India

8.5 Summary

8.6 Questions

8.0 OBJECTIVES

- To understand about the Pradhan Mantri UjjwalaYojana (PMUY)
- To study about the National Green Tribunal
- To review the Environmental Education in India

8.1 INTRODUCTION

The directive principles of state policy (DPSP) section of the Constitution of India states that it is the duty of the state to protect and improve the environment, to safeguard the forests and wildlife of the country, and to give the citizens of the country the duty to protect the environment. The Constitution also states that it is the duty of the state to protect and improve the environment.

In point of fact, it was challenging for the government to initiate DPSPs immediately after the country gained its independence since there were a great number of other issues that were more pressing than the state of the environment. In order to address more pressing challenges, such as poverty, illiteracy, unemployment, and a lack of basic health care, environmental concerns did not get as much attention as they should have. The economy was able to produce a greater variety of goods as a result of the proliferation of manufacturing enterprises. The ecology in India has suffered a great deal as a result of this, and in the last decade, there has been an increased focus on the need of preserving the environment.

Environmental issues are significant for this reason: if they were not addressed, the world would be a much poorer place. It's possible that future generations won't want to live on our planet if environmental issues aren't resolved or addressed soon. The requirements of people and those of the earth are becoming more congruent.

There is no question that, in order for humans to be able to exist in the future, the environment will need to be safeguarded and maintained in a healthy state. In point of fact, the requirements of humans are becoming more stringent, which is causing a corresponding shift in the natural world. The capacity of nature to change and rejuvenate itself is impressive, but the planet can only accomplish so much, particularly given the ongoing expansion of both human population and technological capabilities. What is required is to maintain the delicate ecosystem that is always undergoing change, to safeguard it, and to enhance it.

8.2 PRADHAN MANTRI UJJWALA YOJANA (PMUY)

The Pradhan MantriUjjwalaYojana (PMUY) is a government initiative that was initiated by Prime Minister NarendraModi in the year 2016. At initially, the idea was to provide below-poverty-line women with a connection to LPG gas and then expand that to 50 million women. After that, the objective was to provide eight crore women with access to LPG by March of 2020 at the latest. But this objective was accomplished seven months earlier, in September 2019, when it was originally set.

Benefits of Pradhan Mantri Ujjwala Yojana:

- The majority of deaths that are attributed to unclean fuel for cooking are the result of diseases that cannot be passed on to others, such as coronary heart disease, stroke, chronic obstructive pulmonary disease, and lung cancer. It is possible to guarantee that every person in the nation has access to cooking gas by providing LPG connections to families living below the poverty line. Because LPG connections and clean cooking fuel may make cooking easier and take up less time, the plan has the potential to assist in the empowerment of women. In the majority of parts of India, only women are expected to take care of the kitchen. The programme also provides employment opportunities for young people living in rural areas inside the supply chain for cooking gas.

- As part of the PM GaribKalyan Scheme, the government has also announced a package of aid with a total value of Rs 1.70 lakh crore to assist those who are struggling to pay their expenses as a direct result of the spread of the Covid-19 virus.

- The Pradhan MantriUjjwalaYojana is a government programme that aims to provide low-income families with access to LPG.

- Under this programme, BPL households that have an LPG connection will get 1,600 INR for each connection. The costs associated with

operating this form of assistance are covered by the government. This discount applies to the cost of the security charge for the cylinder, the pressure regulator, the handbook, the safety hose, and any additional fees associated with fittings.

- As part of the initiative, oil marketing businesses will also provide interest-free loans for the purpose of purchasing stoves and replenishing their tanks.
- The Pradhan MantriUjjwalaYojana provides assistance to all BPL households, regardless of the type of gas distributorship from which they get their supply.
- Depending on the circumstances on the ground, gas cylinders of varying capacities (14.2 kg, 5 kilogramme, etc.) are distributed to the affected areas.
- The advantages of this plan are available to all of the Hilly States, which includes the states that are considered to be "Priority States" in the Northeast.
- The programme ensures that residents of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Assam, Nagaland, Manipur, Mizoram, Arunachal Pradesh, Meghalaya, and Tripura have access to LPG for cooking, despite the fact that this fuel can be difficult to come by in certain regions of the country.

The Pradhan MantriUjjawalaYojana aims to provide women who live below the poverty line with clean fuel as part of its overall mission. People put their health at risk when they cook using polluting fuels. The Pradhan MantriUjjwalaYojana seeks to accomplish the following objectives:

- To endow women with increased agency and to protect their physical well-being.
- To reduce the number of negative effects on one's health that are caused by the use of polluting fossil fuels and other types of fuels for cooking.
- To put an end to the indoor pollution brought on by the combustion of fossil fuels, which makes it difficult for people to breathe;
- To put an end to the contamination of the environment, which is brought on by the widespread use of polluting fuels for the purpose of cooking.

Eligibility: Applicants are able to submit an application for the Pradhan Mantri UjjwalaYojana if they satisfy the conditions listed below:

The individual who applies must be a woman over the age of 18 and must be a woman. Additionally, she needs to be a citizen of India.

- No one else in the house should have an LPG connection, and her family's total monthly income should not be greater than what the UT and State Governments say it should be.
- Her family should be living below the federal poverty level.
- The applicant's name must be on the list of SECC-2011 and correspond with the information included in the BPL database maintained by oil marketing firms. Additionally, the applicant cannot be engaged in any other government programme that is analogous to this one.

The steps that were taken to upgrade Ujjwala from phase 1.0 to phase 2.0:

At the beginning of 2016, when Ujjwala 1.0 was first introduced, it wasdecided to make it a priority to provide LPG connections to 5 crore BPL women.The programme was modified in April 2018 so that women from seven morecategories, including SC/ST, PMAY, AAY, most backward classes, tea gardeninhabitants, forest dwellers, and Islands, may also benefit. Additionally, the targetnumber of LPG connections was increased to 8 crores. This objective wasaccomplished in August 2019, which is seven months earlier than the target date.

It was stated in the Union budget for the fiscal year 21-22 that the PMUY plan will add one crore new connections for LPG appliances. This one crore additional PMUY connections are intended to deliver deposit-free LPG connections to low-income households who were unable to secure them during the first phase of the PMUY programme. This would be done through the Ujjwala 2.0 programme.

People who qualify for assistance via Ujjwala 2.0 will be given a free connection to LPG as well as a free first refill and hotplate. In addition, there will be a minimum number of papers required to complete the registration procedure.Migrants will not be required to provide their ration cards or any evidence of residence under the Ujjwala 2.0 programme. Both the "family declaration" and the "proof of address" may be satisfied by an individual's own self-declaration. With the support of Ujjwala 2.0, the Prime Minister's ambition of ensuring that everyone has access to LPG will become a reality.

Concerns around the use of the cylinder of LPG:

People who live in more remote places sometimes choose not to make use of LPG cylinders due to a variety of factors. Studies, stories in the press, and commentators have all drawn attention to these factors for their relevance.

To begin, the majority of houses throughout the nation, and particularly in the country's rural regions, make use of items like firewood, chips, crop

waste, and dung cake as a source of cooking fuel since these things can be obtained for very little cost.

Second, the present administration of the United States government has eliminated the cylinder price subsidy. People are now required to fill their cylinders before they can get the subsidy that is sent into their bank accounts as part of the direct benefit transfer programme. It might be challenging for low-income households to shell out the whole amount required to refill the LPG cylinder.

Recent calamities, such as the demonetization of currency and the widespread spread of the COVD-19 epidemic, have made matters even more precarious for an already vulnerable population. The need that a large portion of the Indian populace pay Rs 1000 per month to replenish their LPG tanks is an enormous financial burden that the majority of them are unable to manage.

8.3 NATIONAL GREEN TRIBUNAL

The National Green Tribunal (NGT) was established on October 18, 2010, as a specialised organisation to address environmental disputes that entail concerns from a variety of different disciplines. This was done in accordance with the NGT Act of 2010, which was passed in 2010. It was enacted at the same time as the National Environment Appellate Authority was struck from the statutes. Article 21 of the Constitution of India, which states that the people of India will have a healthy environment, is another foundational document for this policy.

About NGT:

By virtue of the National Green Tribunal Act of 2010, a specialised body known as the National Green Tribunal (NGT) was established. The speedy and efficient resolution of disputes relating to the preservation and protection of the natural world, including forests and other natural resources, is the organization's primary objective. After Australia and New Zealand, India has become the first nation in the developing world to establish a specialised environmental court. India is the third nation in the world to do so overall. The National Green Tribunal holds its hearings and other business at the following locations: Bhopal, Pune, New Delhi, Kolkata, and Chennai. The National Green Tribunal holds most of its hearings and other proceedings in New Delhi.

Objectives:

The National Green Tribunal (NGT) has a number of aims, but the following are some of the more important ones:

- Cases that involve the protection and preservation of the environment, forests, and other natural resources are handled in a prompt and efficient manner.

- To provide relief and recompense for any harm that was inflicted against individuals or property.
- Resolve a variety of environmental disagreements that draw on the expertise of specialists from a wide range of disciplines.

List of statutes that are covered in Schedule I of NGT Act, 2010:

1. The Water (Prevention and Control of Pollution) Act, 1974;
2. The Water (Prevention and Control of Pollution) Cess Act, 1977;
3. The Forest (Conservation) Act, 1980;
4. The Air (Prevention and Control of Pollution) Act, 1981;
5. The Environment (Protection) Act, 1986;
6. The Public Liability Insurance Act, 1991;
7. The Biological Diversity Act, 2002.

Structure of NGT:

Structure of the NGT The National Green Tribunal (NGT) is comprised of the Chairperson, the Judicial Members, and the Expert Members. These are the three primary components of the NGT.

In addition, there should be at least ten and no more than twenty full-time members on the NGT, each of whom should be a judge or an expert in their field.

All of these individuals are required to remain in their posts for a period of five years and are ineligible for reelection during that time.The Chief Justice of India advises the Central Government of India over the individual who ought to preside over the National Green Tribunal (NGT).

A Selection Committee is established by the federal government of India to determine the individuals who would serve as Judicial Members and Expert Members respectively.

The National Green Tribunal (NGT) has been an important body over the past several years, and as a result, it has been given the power to regulate the environment and issue stringent directives on pollution, deforestation, waste management, and other environmental issues. The following are some of the most significant capabilities that the National Green Tribunal possesses:

- The NGT offers a quicker, less formal, and less expensive way to settle various environmental disputes.

- It reduces the number of cases about environmental issues that have to go to the highest courts.
- It makes it possible for environmental law to change by creating a different way to settle disputes.
- It curbs activities that are harmful to the environment. The NGT monitors compliance with the Environmental Impact Assessment (EIA) protocol to ensure that it is carried out as intended. The NGT also provides assistance to individuals and companies that have been harmed as a result of initiatives.

Instructions for submitting either an application or an appeal:

The procedure to follow in order to submit a claim to the NGT for compensation for harm to the environment or an appeal against an order or decision made by the government is quite straightforward. The NGT mostly communicates in the English language. You may get the application or appeal form that you need to use to submit it with the NGT on their website.

Every application or appeal that does not entail a demand for compensation is subject to a cost of one thousand rupees, which must be paid in advance. If you choose to file a claim for compensation, the charge will be equivalent to one percent of the total amount of compensation, with a minimum payment of one thousand rupees.

It is possible to file a claim for compensation in the event that the following occurred: the return of damaged property; relief or compensation for those who have been wounded as a result of pollution or other damage to the environment, such as accidents involving toxic chemicals;

The NGT will determine the best course of action to take in order to improve the environment in these regions.

If a claim for compensation, relief, or the return of property or the environment is not submitted within five years of the date on which the need for compensation or relief was identified for the first time, it will not be taken into consideration.

When it came to environmental protection, the Central Government of India performed a commendable job when it established the National Green Tribunal (NGT).

8.4 ENVIRONMENTAL EDUCATION IN INDIA

Environmental education places a primary emphasis on those aspects of a person's behaviour that are more directly related to the manner in which that person interacts with the biophysical environment and the degree to which that relationship may be comprehended.

One of the most readily apparent challenges that the globe is confronting at the moment is pollution. The overexploitation of nature by humans has a negative impact on the natural world. It is imperative that people are made aware as soon as possible that the state of the environment is deteriorating. People's increased awareness and participation might lead to positive changes and improvements in the environment.

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) asserts that "environmental education is a tool to carry out the aims of environmental conservation." It is not its own distinct area of science; rather, it is a topic of study that many individuals devote their

entire careers to learning about. It implies utilising education as a tool for development in order to make people's lives better as well as using education as a tool to preserve and enhance the surrounding environment.

Evolution:

In 1970, the International Union for the Conservation of Nature (IUCN) gave formal recognition to the field of environmental education.The Tbilisi Declaration on Environmental Education was drafted all the way back in 1977. The primary objective was to increase people's awareness, knowledge, attitudes, skills, and desire to assist in the protection and improvement of the natural environment.The highest court in India issued a directive to the country's government in 1991 ordering that instruction on environmental issues be made mandatory at all educational levels. In the school year 2004-2005, the government mandated that students get environmental education as part of their regular coursework.

Objectives:

The following is a list of the goals that environmental education aims to achieve:

1. **Raising Awareness:** This refers to assisting social groups and people in gaining knowledge about pollution and the harm it causes to the environment.
2. **Knowledge:** To assist individuals and organisations in acquiring information about the environment that extends beyond their local surroundings, including information about the environment in distant locations.
3. **Attitudes:** To assist individuals and communities in the formation of a code of ethics pertaining to the preservation of the natural world.
4. **Skill Acquisition and Capacity Building:** To assist people and social groups in acquiring the knowledge and abilities necessary to differentiate between different items based on their appearance, size, sound, touch, behaviours, and habitats. In addition, to acquire the skills necessary to draw objective inferences and conclusions.

5. **Participation:** providing individuals and other social groups with the opportunity to take part in the decision-making process about the environment at all different levels.

There are four components that go into the process of making a decision: a. the different types of environmental issues on which decisions might be made; b. the physical setting of the potential environmental decision, including its size; c. the different types of social groups and individuals who might interact in a process leading up to an environmental decision; and d. the time frame within which the decision must be made.

Aims of Environmental Education:

The United Nations Educational, Scientific, and Cultural Organization (UNESCO) has outlined a number of objectives that should be achieved through environmental education, including the following:

- The purpose of environmental education is to demonstrate how the economic, social, political, and ecological systems of the contemporary world are all intertwined with one another, as well as how the choices and actions of one nation can have repercussions for other nations.
- Education on the environment should thus assist nations and regions in cultivating a feeling of responsibility and solidarity as the foundation for a new international order that will protect and improve the environment.
- The primary objective of environmental education on a local scale is to assist individuals and communities in comprehending the intricacy of the interplay between the natural and built environments.
- Additionally, to gain the information, beliefs, attitudes, and hands-on skills necessary to anticipate and address societal issues, as well as to maintain the quality of the environment in a way that is both responsible and successful.
- Therefore, the processes necessary for environmental education are as follows: making people aware of the environment, teaching them about it, changing their attitudes so that they wish to protect it, assessing environmental measures, and increasing their skills and talents in this area.
- According to Meadows, environmental educators on every continent come up with materials and approaches that are just as diverse as the various cultures and ecosystems that may be found across the world. He provides a rundown of some of the most fundamental concepts upon which all environmental education is founded. Consider the following: levels of being, complex systems, population increase and carrying capacity, environmentally sustainable development, socially sustainable development, knowledge, uncertainty, and sacredness. These are topics to ponder about.

The following are some of the underlying ideas that underpin environmental education:

1. Principles Regarding Resources -

In order to achieve growth that is genuinely sustainable, we will need to plan how we will use resources over an extended period of time. The utilisation of a source that is capable of being resupplied is an astute strategy for conserving resources and making optimal use of those resources. Unstable is a way of life that relies heavily on nonrenewable energy sources that are in the process of being depleted at an alarming rate, such as fossil fuel.

2. Principles Regarding Soil -

It is essential for the continuation of human civilization and habitation that soils be preserved and that farming be able to continue for an extended period of time. It is necessary to put a halt to soil erosion since it results in the loss of resources that cannot be replaced.

The maintenance of a healthy soil and the maintenance of a natural equilibrium in the environment both need the presence of a grass cover or a forest cover. They also constitute natural resources that may be put to productive use.

3. The Principles of Wildlife Protection -

Wildlife populations are significant for a variety of reasons, including their aesthetic value, their ecological significance, and their economic value.

The maintenance of healthy habitats for endangered animals is one way that nature preserves and other protected wild areas contribute to the conservation of those animals.

Because people and animals depend on the same mechanisms to maintain their lives, our existence is intricately connected to that of other species.

4. The four guiding principles of environmental management are as follows –

Good environmental management is beneficial to both people and the environment. The administration of natural resources ought to be rationalised in some way. The elimination of trash can be accomplished by activities such as recycling and the production of renewable energy. The activities and technologies of humans have a significant influence on nature and have the potential to alter the capacity of the natural world to sustain life, including human life.

5. Other Principles -

Culture is the connecting link between individuals and the world in which they live. It is essential to ensure the safety of our cultural, historical, and architectural legacy.

8.5 SUMMARY

The Pradhan MantriUjjwalaYojana (PMUY) was initiated by Prime Minister NarendraModi in the year 2016 with the objective to provide eight crorewomen with access to LPG by March of 2020 at the latest.The National Green Tribunal (NGT) was established on October 18, 2010, as a specialised organisation to address environmental disputes that entail concerns from a variety of different disciplines.Environmental education places a primary emphasis on those aspects of a person's behaviour that are more directly related to the manner in which that person interacts with the biophysical environment and the degree to which that relationship may be comprehended.

8.6 QUESTIONS

1. Write in detail about Pradhan MantriUjjwalaYojana (PMUY).
2. Elaborate the National Green Tribunal.
3. Explain the Environmental Education in India.

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Question Paper Pattern (For IDOL Students Only)
TYBA SEM VI (Economics) – for all Six papers

Time: Three Hours **Total Marks: 100 Marks**

Please Check whether you have got the right question paper.

N.B. 1) All questions are compulsory.Attempt Sub question (A) or (B) of Question no. 5
2) Figures to the right indicate marks.
3) Draw neat diagrams wherever necessary.

Q1. Answer any TWO questions of the following. 20

a.
b.
c.

Q2. Answer any TWO questions of the following. 20

a.
b.
c.

Q3. Answer any TWO questions of the following. 20

a.
b.
c.

Q4. Answer any TWO questions of the following. 20

a.
b.
c.

Q5. (A) Write short notes on any TWO of the following. 20

a.
b.
c.
d.

OR

(B) Multiple choice questions, select an appropriate option (20 MCQs) 20