

Urban Problems Related to Energy



Traditional housing in India required very little temperature adjustments as the material used, such as wood and bricks, handled temperature changes better than the current concrete, glass and steel of ultra-modern building


Cities are the main centres of economic growth, trade, education, innovations and employment

The urban growth is so fast that it is becoming difficult to accommodate all the industrial, commercial and residential facilities within a limited municipal boundary

Energy use is closely related to development in industry, transport, communication, commercial, household and agricultural activities

Industrialised developed countries use energy for these purposes

The two sources of energy are renewable and non-renewable energy sources




Due to high population density and high energy demanding activities, the urban problems related to energy are much more magnified as compared to rural population




Regardless of the level of economic development, it is essential to realize sustainable growth of the economies in order to maintain a world order, and restrictions on energy supply which may hinder a sustainable economic development should be avoided at all costs

Water conservation

Water conservation includes all the policies, strategies and activities to sustainably manage the natural resource of fresh water, to protect the hydrosphere, and to meet the current and future human demand



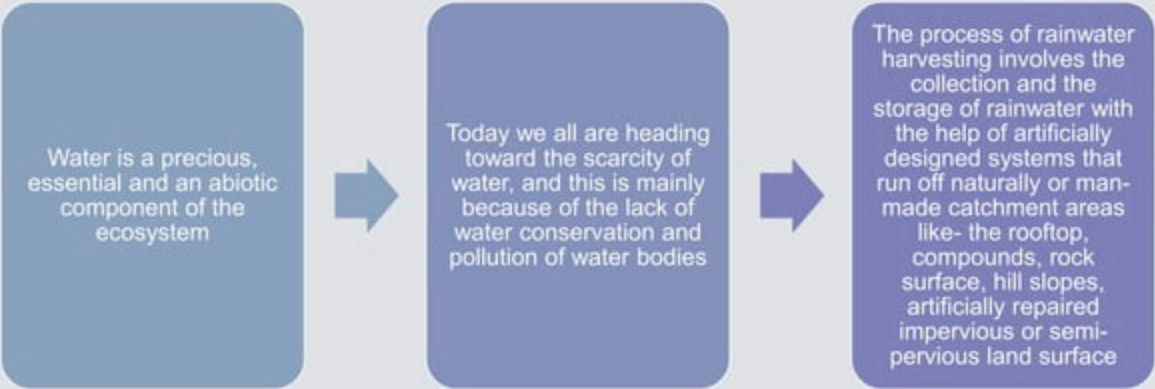
The key activities to conserve water are as follows: any beneficial reduction in water loss, use and waste of resources, avoiding any damage to water quality; and improving water management practices that reduce the use or enhance the beneficial use of water



Water conservation programs involved in social solutions are typically initiated at the local level, by either municipal water utilities or regional governments

Rain Water Harvesting


Water is a precious, essential and an abiotic component of the ecosystem



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graph LR; A[Water is a precious, essential and an abiotic component of the ecosystem] --> B[Today we all are heading toward the scarcity of water, and this is mainly because of the lack of water conservation and pollution of water bodies]; B --> C[The process of rainwater harvesting involves the collection and the storage of rainwater with the help of artificially designed systems that run off naturally or man-made catchment areas like- the rooftop, compounds, rock surface, hill slopes, artificially repaired impervious or semi-pervious land surface];
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Why do we Harvest Rainwater?

- The rainwater harvesting system is one of the best methods practised and followed to support the conservation of water
- Today, scarcity of good quality water has become a significant cause of concern
- However, rainwater, which is pure and of good quality, can be used for irrigation, washing, cleaning, bathing, cooking and also for other livestock requirements

Advantages of Rainwater Harvesting



Disadvantages of Rainwater Harvesting

In addition to the great advantages, the rainwater harvesting system has a few disadvantages like unpredictable rainfall, unavailability of the proper storage system, etc

Listed below are a few more disadvantages of the rainwater harvesting process



The importance of rainwater harvesting

- Rainwater harvesting is a sustainable process that helps in preserving water for future needs
- Water scarcity is a major concern in today's scenario
- The process of rainwater harvesting is a good way to conserve water

An aerial photograph of a rural landscape. The scene is dominated by green agricultural fields, some of which are divided into smaller plots. A river or stream flows through the lower portion of the image. In the upper left, there are a few small buildings and a road. The overall tone is natural and scenic.

The advantages of rainwater harvesting

- The factors affecting the amount of rainwater harvested:- The factors affecting the amount of rainwater harvested are:
 - Catchment features
 - Quantum of runoff

An aerial photograph showing a dark, winding river or stream cutting through a thick, vibrant green forest. The river meanders from the top left towards the bottom right, with several small islands and peninsulas of forested land protruding into the water. The overall scene is lush and natural.

Watershed Management

- □Watershed: oAbout: A watershed is an area of land that drains or “sheds” water into a specific waterbody
- oTypes of Watershed: They are classified depending upon the size, drainage, shape and land use pattern
- •Macro watershed

Watershed Management

It is the process of implementing land use practices and water management practices to protect and improve the quality of the water and other natural resources within a watershed

Watershed management helps to control pollution of the water and other natural resources in the watershed

It is also an efficient way to prioritize the implementation of watershed management plans in times when resources may be limited

Issues Faced by Watershed Management Programmes

§Project Related Issues: Factors such as outdated approaches, poor project design, inadequate and/or unsustained financial resources, very short time frames for project interventions and a lack of adequate understanding of the linkages between upland and lowland areas have contributed to under-achievement of watershed management programmes



oThe lack or inadequate national policies, strategies and action plans are recognised as principal constraints to implementing sustainable watershed management programmes



oThe nature of the institutional base influences the sustainability of the natural resources, ability of the communities to diversify and access support from different programmes

Way Forward

oSuch involvement builds a sense of community, helps reduce conflicts and increases commitment to the actions necessary to meet environmental goals

§Determine Priorities for Action: Watershed management planning should also determine what the opportunities are to reduce pollution or address other pressing environmental issues, prioritize those opportunities, and identify a time frame for accomplishing pollution reduction and resource and habitat improvements

oThere are many ways to involve and educate the public in watershed management; formation of citizen review groups and advisory committees can gain public support from the watershed

Environmental ethics: issues and possible solutions

Ethics is defined as a set of rules or principles that are followed by a broadly recognized race or group

The issues of environmental ethics are momentous, live and forced; that is to say, these issues involve moral choice of enormous importance that humans can make

Environmental ethics includes issues as: •If only people "matter" here why care about nature "for itself " Possible Solutions for Issues: Five different approaches are there for managing environmental issues

CLIMATE CHANGE

Weather describes the conditions outside right now in a specific place

Climate describes the weather conditions that are expected in a region at a particular time of year

A region's climate is determined by observing its weather over a period of many years—generally 30 years or more

Climate Change

Climate change describes a change in the average conditions — such as temperature and rainfall — in a region over a long period of time

Global climate change refers to the average long-term changes over the entire Earth

These include warming temperatures and changes in precipitation, as well as the effects of Earth's warming, such as: •Rising sea levels Earth's climate has constantly been changing — even long before humans came into the picture

But on average, global air temperatures near Earth's surface have gone up about 2 degrees Fahrenheit in the past 100 years

As Earth's climate continues to warm, the intensity and amount of rainfall during storms such as hurricanes is expected to increase

Causes Climate Change

There are lots of factors that contribute to Earth's climate

However, scientists agree that Earth has been getting warmer in the past 50 to 100 years due to human activities

Human activities — such as burning fuel to power factories, cars and buses — are changing the natural greenhouse

Global Warming

Since the Industrial Revolution, the global annual temperature has increased in total by a little more than 1 degree Celsius, or about 2 degrees Fahrenheit



Climate change deniers have argued that there has been a "pause" or a "slowdown" in rising global temperatures, but numerous studies, including a 2018 paper published in the journal Environmental Research Letters, have disproved this claim



Now climate scientists have concluded that we must limit global warming to 1.5 degrees Celsius by 2040 if we are to avoid a future in which everyday life around the world is marked by its worst, most devastating effects: the extreme droughts, wildfires, floods, tropical storms, and other disasters that we refer to collectively as climate change

Causes Global warming

Global warming occurs when carbon dioxide and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth's surface



These heat-trapping pollutants—specifically carbon dioxide, methane, nitrous oxide, water vapor, and synthetic fluorinated gases—are known as greenhouse gases, and their impact is called the greenhouse effect



Though natural cycles and fluctuations have caused the earth's climate to change several times over the last 800,000 years, our current era of global warming is directly attributable to human activity—specifically to our burning of fossil fuels such as coal, oil, gasoline, and natural gas, which results in the greenhouse effect

Causes Global warming

The good news is that countries around the globe have formally committed—as part of the 2015 Paris Climate Agreement—to lower their emissions by setting new standards and crafting new policies to meet or even exceed those standards

To avoid the worst impacts of climate change, scientists tell us that we need to reduce global carbon emissions by as much as 40 percent by

Global warming linked to extreme weather Scientists agree that the earth's rising temperatures are fueling longer and hotter heat waves, more frequent droughts, heavier rainfall, and more powerful hurricanes

The other effects of global warming

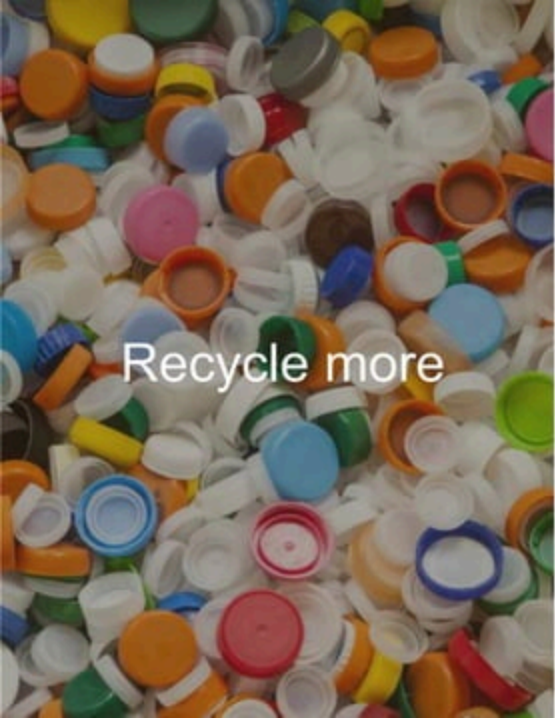


PRECAUTION OF GLOBAL WARMING

- Change a light Replacing one regular light bulb with a compact fluorescent light bulb will save 150 pounds of carbon dioxide a year

Drive less

- Walk, bike, carpool or take mass transit more often
- You'll save one pound of carbon dioxide for every mile you don't drive!



Recycle more

- You can save 2,400 pounds of carbon dioxide per year by recycling just half of your household waste
- Every gallon of gasoline saved keeps 20 pounds of carbon dioxide out of the atmosphere
- Avoid products with a lot of packaging You can save 1,200 pounds of carbon dioxide if you reduce your garbage by 10 percent

Acid Rain

Acid rain, or acid deposition, is a broad term that includes any form of precipitation with acidic components, such as sulfuric or nitric acid that fall to the ground from the atmosphere in wet or dry forms

This can include rain, snow, fog, hail or even dust that is acidic

Causes Acid Rain

This image illustrates the pathway for acid rain in our environment: Emissions of SO₂ and NO_x are released into the air, where the pollutants are transformed into acid particles that may be transported long distances

The SO₂ and NO_x react with water, oxygen and other chemicals to form sulfuric and nitric acids

The major sources of SO₂ and NO_x in the atmosphere are: Winds can blow SO₂ and NO_x over long distances and across borders making acid rain a problem for everyone and not just those who live close to these sources

Dry Deposition

Acidic particles and gases can also deposit from the atmosphere in the absence of moisture as dry deposition

The acidic particles and gases may deposit to surfaces quickly or may react during atmospheric transport to form larger particles that can be harmful to human health

The amount of acidity in the atmosphere that deposits to earth through dry deposition depends on the amount of rainfall an area receives

Measuring Acid Rain

- Acidity and alkalinity are measured using a pH scale for which 7.0 is neutral



OZONE LAYER DEFLECTION

- "The ozone layer is a region in the earth's stratosphere that contains high concentrations of ozone and protects the earth from the harmful ultraviolet radiations of the sun."
- The ozone layer is mainly found in the lower portion of the earth's atmosphere
- The main reasons for the ozone hole are chlorofluorocarbons, carbon tetrachloride, methyl bromide and hydrochlorofluorocarbons

Ozone Layer Depletion

- "Ozone layer depletion is the gradual thinning of the earth's ozone layer in the upper atmosphere caused due to the release of chemical compounds containing gaseous bromine or chlorine from industries or other human activities."



Ozone Layer Depletion

Ozone layer depletion is the thinning of the ozone layer present in the upper atmosphere



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graph TD; A["Ozone layer depletion is the thinning of the ozone layer present in the upper atmosphere"] --> B["The ozone-depleting substances that contain chlorine include chlorofluorocarbon, carbon tetrachloride, hydrochlorofluorocarbons, and methyl chloroform"]; B --> C["Montreal Protocol was proposed in 1987 to stop the use, production and import of ozone-depleting substances and minimise their concentration in the atmosphere to protect the ozone layer of the earth"]
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The ozone-depleting substances that contain chlorine include chlorofluorocarbon, carbon tetrachloride, hydrochlorofluorocarbons, and methyl chloroform

Montreal Protocol was proposed in 1987 to stop the use, production and import of ozone-depleting substances and minimise their concentration in the atmosphere to protect the ozone layer of the earth

A background image of laboratory glassware, including a graduated cylinder in the foreground filled with blue liquid, and various flasks and beakers containing yellow and green liquids in the background.

Causes of Ozone Layer Depletion

- Ozone layer depletion is a major concern and is associated with a number of factors
- The main causes responsible for the depletion of the ozone layer are listed below

The image shows three glass jars on a shelf, each containing different dried botanical specimens. The leftmost jar contains small, dark red berries. The middle jar is filled with bright yellow, dried flower heads. The rightmost jar contains thick, light brown, dried root pieces. The text 'Chlorofluorocarbons' is overlaid in white on the left side of the image.

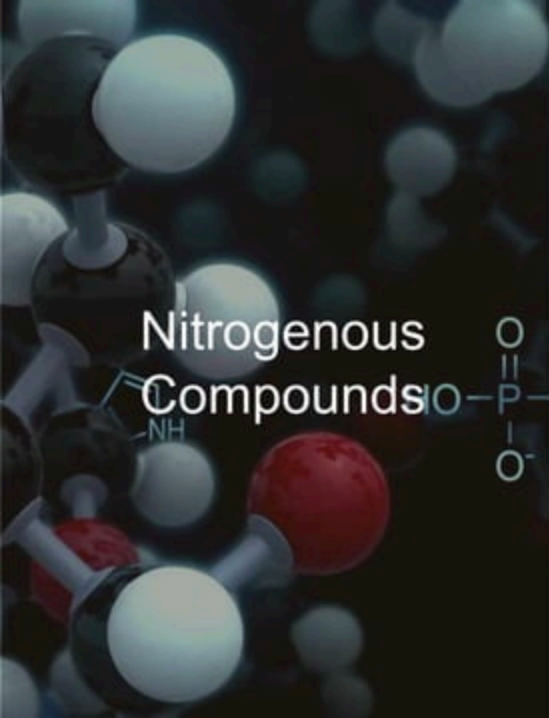
Chlorofluorocarbons

- Chlorofluorocarbons or CFCs are the main cause of ozone layer depletion
- These are released by solvents, spray aerosols, refrigerators, air-conditioners, etc
- The molecules of chlorofluorocarbons in the stratosphere are broken down by ultraviolet radiations and release chlorine atoms



Unregulated Rocket Launches

- Researches say that the unregulated launching of rockets results in much more depletion of the ozone layer than the CFCs do
- If not controlled, this might result in a huge loss of the ozone layer by the year



Nitrogenous Compounds

- The nitrogenous compounds such as NO_2 , NO , N_2O are highly responsible for the depletion of the ozone layer



Natural Causes

- The ozone layer has been found to be depleted by certain natural processes such as Sun-spots and stratospheric winds
- Ozone Depleting Substances "Ozone-depleting substances are the substances such as chlorofluorocarbons, halons, carbon tetrachloride, hydrofluorocarbons, etc. that are responsible for the depletion of the ozone layer."
- The depletion of the ozone layer has harmful effects on the environment

Effects on Human Health

Humans will be directly exposed to the harmful ultraviolet radiation of the sun due to the depletion of the ozone layer

This might result in serious health issues among humans, such as skin diseases, cancer, sunburns, cataract, quick ageing and weak immune system

Effects on Animals Direct exposure to ultraviolet radiations leads to skin and eye cancer in animals

Solutions to Ozone Layer Depletion

The depletion of the ozone layer is a serious issue and various programmes have been launched by the government of various countries to prevent it

However, steps should be taken at the individual level as well to prevent the depletion of the ozone layer

Use of Nitrous Oxide should be Prohibited The government should take actions and prohibit the use of harmful nitrous oxide that is adversely affecting the ozone layer

Nuclear Disaster

A nuclear and radiation accident is defined by the International Atomic Energy Agency as "an event that has led to significant consequences to people, the environment or the facility. Examples include lethal effects to individuals, large radioactivity release to the environment, or reactor core melt." The prime example of a "major nuclear accident" is one in which a reactor core is damaged and significant amounts of radiation are released, such as in the Chernobyl Disaster in



The impact of nuclear accidents has been a topic of debate practically since the first nuclear reactors were constructed



Some technical measures to reduce the risk of accidents or to minimize the amount of radioactivity released to the environment have been adopted

Impact

Benjamin K. Sovacool has reported that worldwide there have been 99 accidents at nuclear power plants

Fifty-seven accidents have occurred since the Chernobyl disaster, and 57% of all nuclear-related accidents have occurred in the USA. Serious nuclear power plant accidents include the Fukushima Daiichi nuclear disaster , Chernobyl disaster , Three Mile Island accident , and the SL-1 accident

Serious radiation accidents include the Kyshtym disaster,Windscale fire, radiotherapy accident in Costa Rica,radiotherapy accident in Zaragoza,radiation accident in Morocco,Golania accident,radiation accident in Mexico City, radiotherapy unit accident in Thailand,and the Mayapuri radiological accident in India

Nuclear power plant accidents

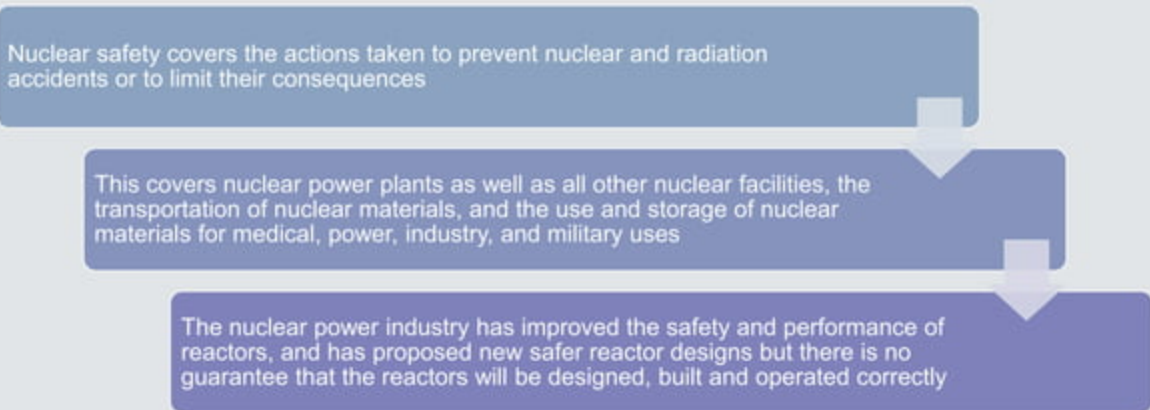
One of the worst nuclear accidents to date was the Chernobyl disaster which occurred in 1986 in Ukraine

A study published in 2005 estimates that there will eventually be up to 4,000 additional cancer deaths related to the accident among those exposed to significant radiation levels

Fifty-seven accidents have occurred since the Chernobyl disaster, and almost two-thirds of all nuclear-related accidents have occurred in the USA

Nuclear Safety

Nuclear safety covers the actions taken to prevent nuclear and radiation accidents or to limit their consequences



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graph TD; A[Nuclear safety covers the actions taken to prevent nuclear and radiation accidents or to limit their consequences] --> B[This covers nuclear power plants as well as all other nuclear facilities, the transportation of nuclear materials, and the use and storage of nuclear materials for medical, power, industry, and military uses]; B --> C[The nuclear power industry has improved the safety and performance of reactors, and has proposed new safer reactor designs but there is no guarantee that the reactors will be designed, built and operated correctly];
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Environment Protection Act

Introduction

The concern over the environment has grown as the quality is degrading




It has been evidenced by increasing pollution, the loss of biodiversity, loss of vegetal cover, growing risks of environmental accidents and also the harmful chemicals in the ambient atmosphere has possessed a threat to the environment




The most important statute is the Environmental Protection Act, 1986, as it is the general legislation for the protection of the environment

Objectives

It was enacted to implement the decisions which were made at the United Nation Conference on the Human Environment held at Stockholm in June



Scope and commencement of the Act The Environment Protection Act, 1986 extends to whole India and it came into force on 19th November



Section 2 of the Environmental protection Act, 1986 deals with some of the information about the definition of the Act and these definitions are as follows: "Environment" the word environment includes water, air, land and also the inter-relation between their existence

Objectives

Power of the Central government for measures to protect and improve the Environment. It is the power vested in the central government that they can take any reasonable and valid steps and measures for the purpose of the protection and improvement of the quality of the environment

These measures are taken for the prevention, control and abatement of environmental Pollution

Under Section 3 of the following act, the central government has the power to authorize or constitute other authorities for the accurate implementation of powers and duties which are mentioned above

Section 3 of the Environmental Protection Act holds importance due to the fact of a better regulatory mechanism

Objectives

- In the case of Vellore Citizens' Welfare Forum v Union of India, the Supreme Court has directed the central government to constitute the 'authority' for the implementation of powers under section

Conclusion

- Though many other Acts related to Environment have been introduced to the Indian legislature but the Environment Protection Act, 1986 has been drafted to cover all the aspects and problems of environment and hence, it is said to be beneficial to understand the provisions related to an environment specifically