



## Impact of Global Warming on Bio- Diversity and its Conservation- Present Status and Future Strategy

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### Abstract:

*Global warming, the sustained rise in the average surface temperature of the Earth, and its broader impacts on the planet's climatic system are both components of modern climate change. When we talk about climate change, we need also think about the longer-term shifts that the planet has experienced. The ongoing combustion of fossil fuels for energy production is a major contributor to the present increase in global temperatures. Burning fossil fuels releases greenhouse gases into the atmosphere, including carbon dioxide, methane, and nitrous oxide. Rising global temperatures are another consequence of deforestation. Constantly worsening environmental conditions are consequences of the threat of global warming, which necessitates the development of countermeasures. It discusses the problem, its origins and dangers, and offers possible remedies. Therefore, we must vigorously seek for renewable energy sources such as solar, wind, hydro, geothermal, and biomass. One way to successfully tackle the ever-increasing global warming is to find and use renewable energy sources.*

**Keywords:** *Greenhouse Gases, Climate Change, Energy Sources, Fossil Fuels, Global Warming, Carbon Dioxide, Bio-Diversity, Ecosystem, Renewable Sources.*

### 01. Introduction:

A slow but noticeable rise in average surface temperatures throughout the world is known as global warming. This occurrence has been noted over the last hundred or so years. The Earth's climate pattern has been disrupted by this upheaval. Although scientists have presented pertinent evidence showing the Earth's temperature is continuously increasing, the notion of global warming remains highly contentious. Concerns about global warming have been voiced by several scientists, engineers, and environmentalists (Alamsyah, et.al, 2020). All living things, from people to plants and animals, are negatively affected by the many factors that contribute to global warming. These reasons could originate in nature or be the result of something that humans have done. It is critical to recognise the detrimental effects of climate change in order to address the problems. The majority of people still don't know what global warming is and don't think it will be a major issue in the future. The vast majority of people are blissfully unaware that our planet is really warming up

and that we are already feeling its dwindling impacts (Bolaji, , & Huan, 2013). Ecosystems are already feeling the effects, and they will only become worse.

## **02. Objectives:**

- To study the impact of global warming on Bio-diversity and its conservation
- To discuss the present status and future strategy of the impact of global warming
- To know about the effects and consequences of greenhouse gases
- To study the impact of melting polar ice caps and its hazardous effects
- To find out about the effect of deforestation in rise in global warming
- To study how the species are becoming extinct and affecting the ecosystem
- To know about the urban planning incorporated to improve the worsening condition due to global warming
- To find out about the usage of eco- friendly products

## **03. Problems:**

Following are the problems faced in the study area:

Increasing numbers of plant and animal species that are in danger of becoming extinct. Deforestation forces animals to seek refuge in other areas, which in turn disturbs preexisting ecosystems. An imbalance in the ecosystem might result from a change in climate since the actions of several organisms are influenced by temperature. An upsurge in plant, animal, and human diseases may result from the persistence of pests like viruses, fungi, and parasites that normally die off at a certain low temperature.

As permafrost melts, it causes floods and boosts atmospheric carbon dioxide and methane emissions, both of which worsen climate change.

Rainfall increases in acidity

More frequent, larger, and more intense forest fires are the result of forests drying up earlier in the season. When hillside vegetation is cut down, the slope becomes more susceptible to landslides and erosion, which can cause more harm and even death.

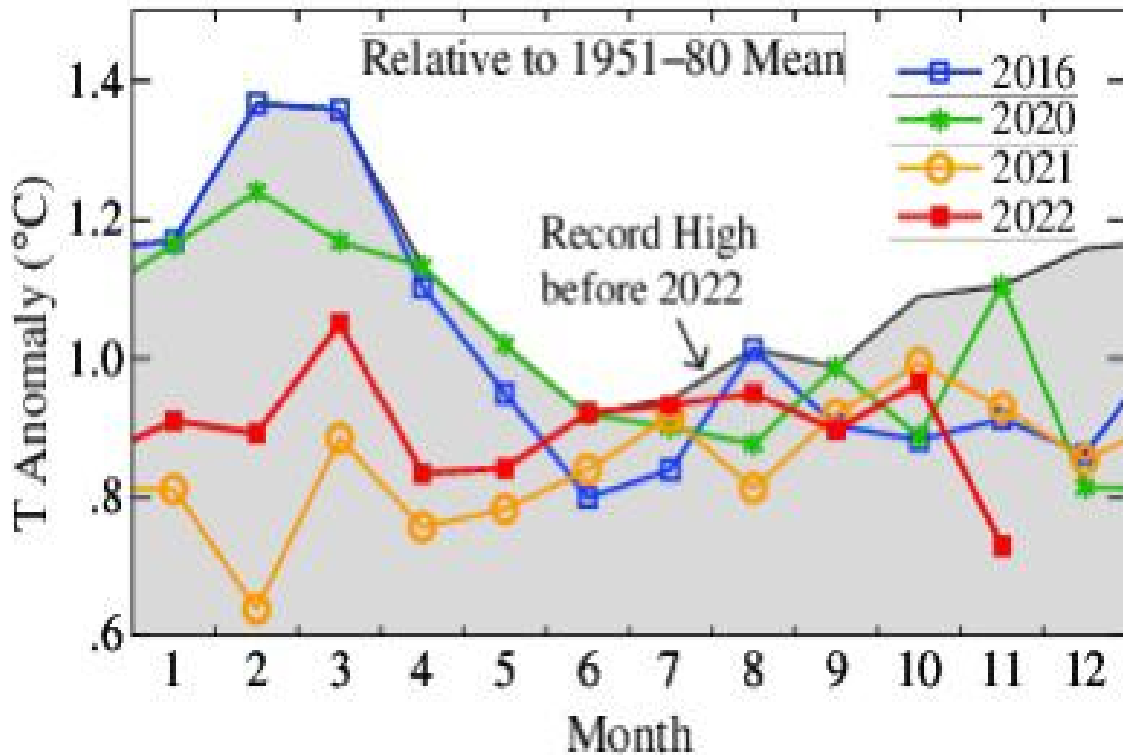
## **4.0 Database and Methodology:**

The methodological approach of the research is qualitative and quantitative, the main technique to collect and analyze content analysis and document records. The information is collected from secondary sources of data such as Internet, articles, vlogs, Wikipedia, etc.

## **5.0 Data Presentation and Analysis:**

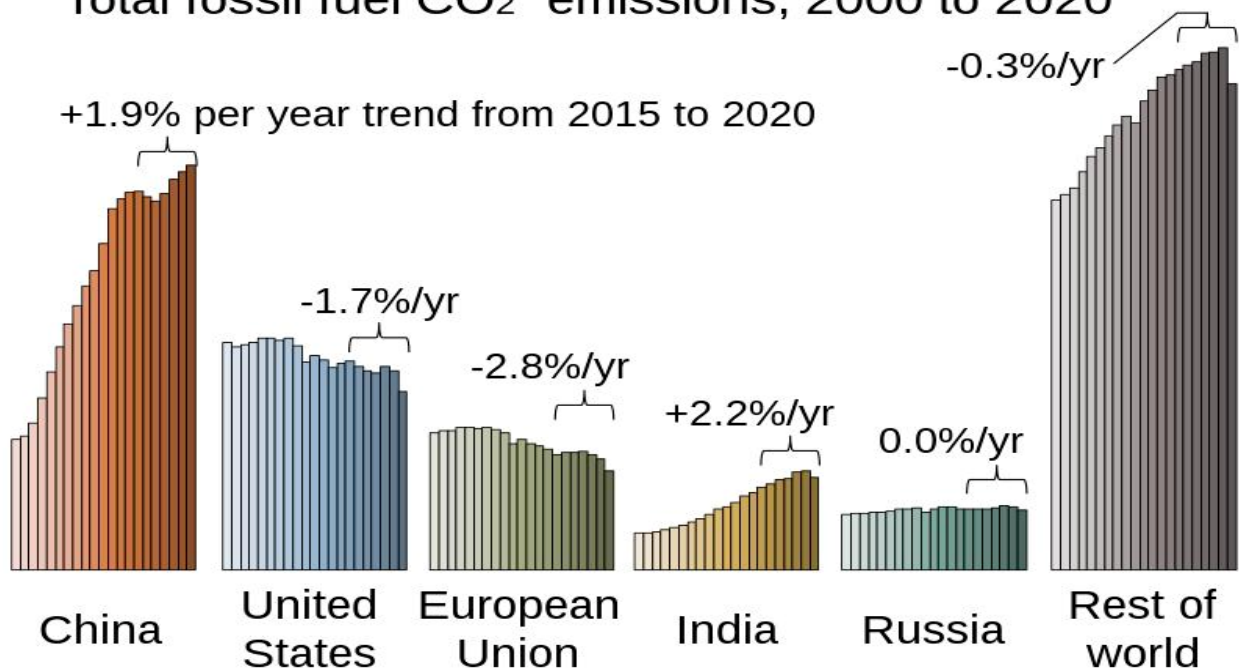
### **5.1 Present Status**

## Global Surface Temperature

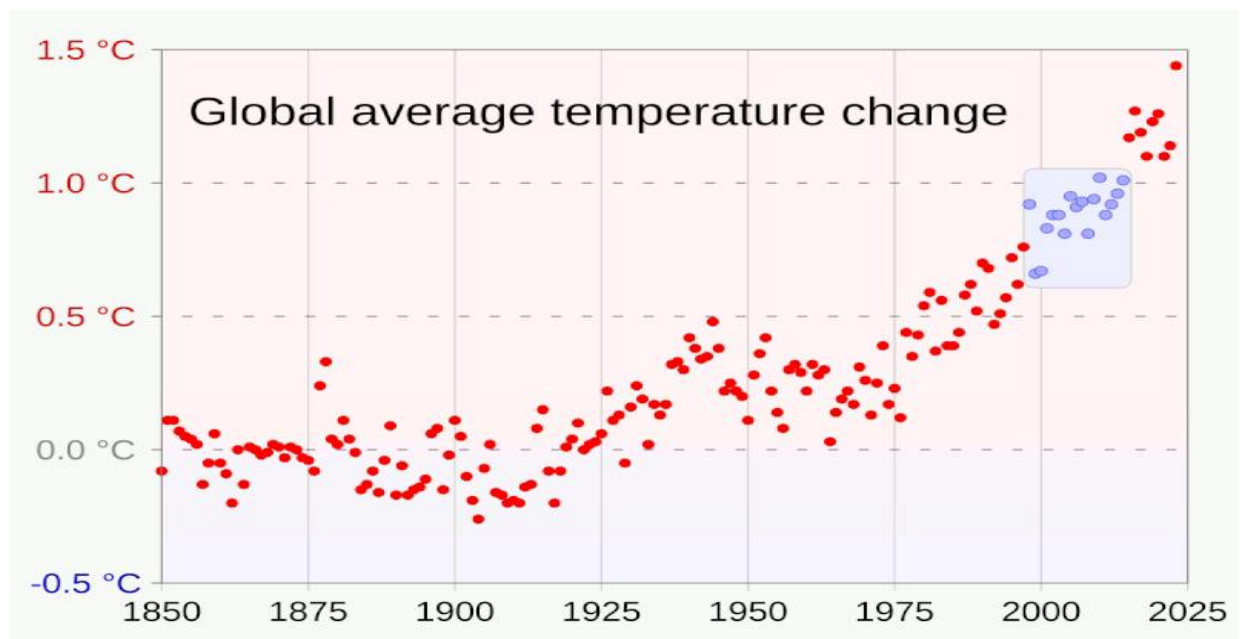
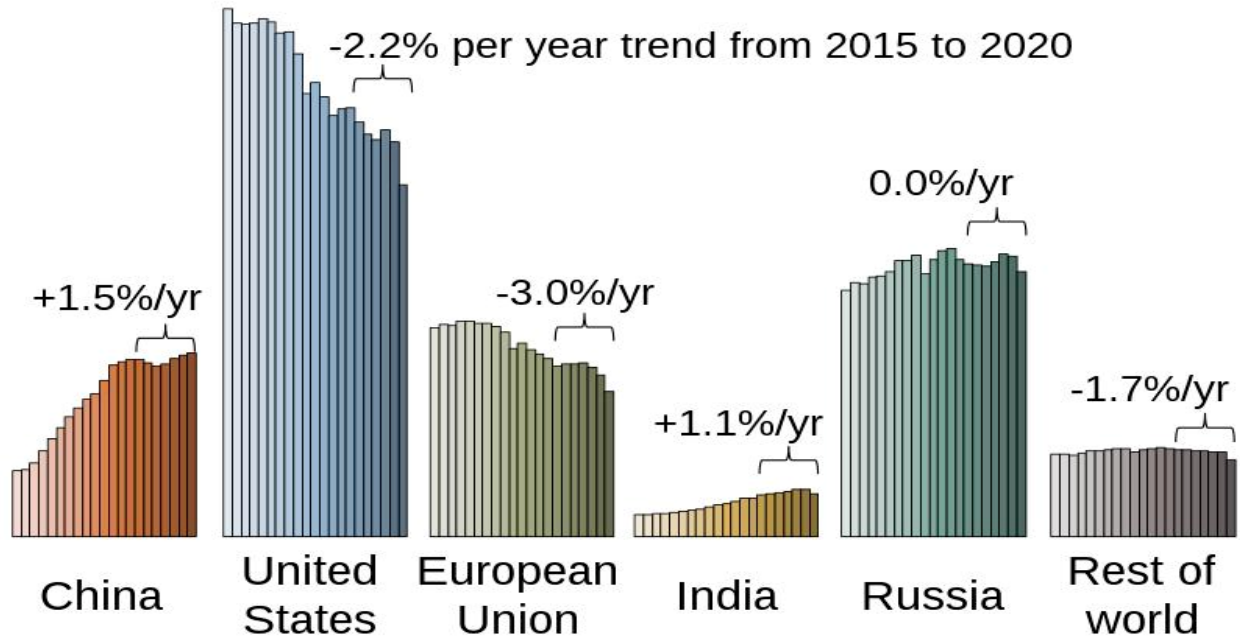


The above graph compares global monthly temperatures in recent years (2016-2022) with global record-high temperatures.

## Total fossil fuel CO<sub>2</sub> emissions, 2000 to 2020



## Per capita fossil CO<sub>2</sub> emissions, 2000 to 2020



Following two observations can be made from the illustration:

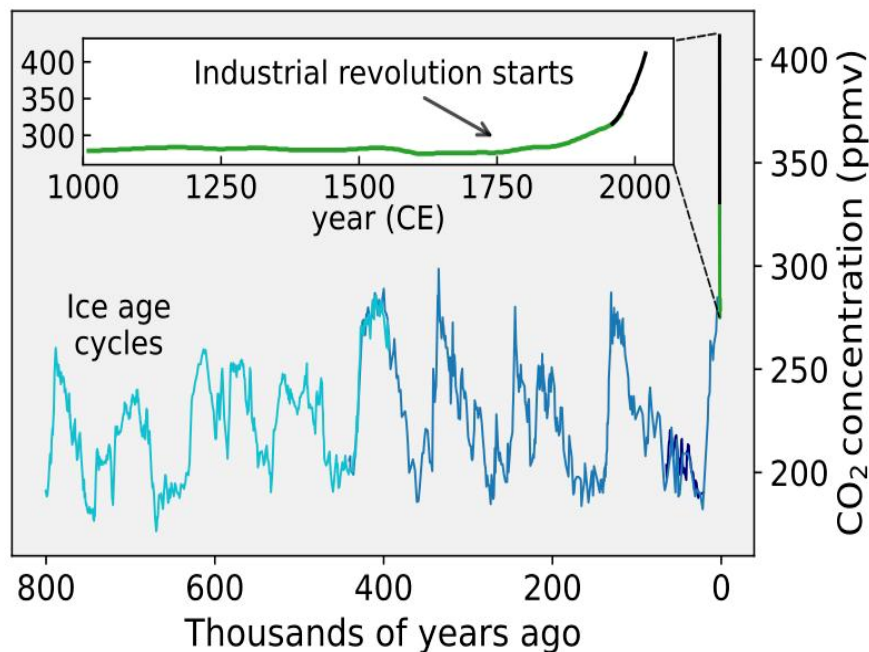
The global average surface temperature in July 2022 was 1.15°C above the average for the comparison period of 1880-1920

July 2022 was the 3rd warmest July since 1880

The graph supports the present viewpoint of climate change due to global warming. Furthermore, here are the causes of global warming, in detail:

### 5.1.1 Greenhouse Effect:

Greenhouse effect is a process that occurs when energy from a planet's host star goes through the planet's atmosphere and heats the planet, but greenhouse gases in the atmosphere prevent some of the heat from returning directly to space, resulting in a warmer planet.



#### Causes of Greenhouse Effect:

Burning of Fossil fuels

Deforestation

Farming

Industrial waste and landfills

Effects of Greenhouse Gases

The gradual rise in the Earth's average atmospheric temperature is known as a phenomenon. The primary reason for this environmental concern is the higher levels of greenhouse gases like carbon dioxide and methane emitted through fossil fuel combustion, as well as from vehicles, industries, and various human activities. The ozone layer, which safeguards the planet from the sun's harmful ultraviolet radiation, is located in the upper sections of the stratosphere. The thinning of the ozone layer allows harmful UV radiation to reach the Earth's surface, which can increase the risk of skin cancer and significantly alter the climate. The primary reason for this issue is the build-up of natural greenhouse gases such as chlorofluorocarbons, carbon dioxide, and methane.

#### Smog and Air Pollution:

Smog is created when smoke and fog mix together. It can result from both natural phenomena and human activities. Typically, smog is produced by the buildup of greenhouse gases, including nitrogen and sulfur oxides.

### **Acidification of Water bodies:**

The rise in total greenhouse gas emissions has caused the majority of the world's water bodies to become acidic. These greenhouse gases combine with rainwater, resulting in acid rain. As a consequence, the acidification of aquatic environments occurs.

### **Reduce the Greenhouse effect on the Earth:**

Plants play a crucial role in regulating the greenhouse effect on our planet. From towering trees to minute phytoplankton in seas, all plants absorb carbon dioxide and release oxygen. Additionally, the ocean sequesters a significant amount of excess carbon dioxide present in the atmosphere (Meehl, et.al, 2005). However, the increasing levels of carbon dioxide in the ocean alter its chemistry, resulting in higher acidity. This phenomenon is referred to as ocean acidification. More acidic waters can be detrimental to various marine life forms, including specific shellfish and corals. Rising ocean temperatures also pose risks to these species, as warming waters are a primary contributor to coral bleaching.

### **Consequences of Greenhouse Effect:**

Thawing of glacial masses

Flooding of islands and coastal cities

Hurricanes will be more devastating

Migration of species

Desertification of fertile areas

Impact on agriculture and livestock

#### **5.1.2 Melting of Polar Ice Caps:**

The polar ice caps have been the target of a misinformation campaign in the past. There has been a dramatic acceleration in the melting of inland glaciers across the world, including Greenland and Antarctica. (Hansen, & Sato, 2021). There has been a dramatic decline in the amount of ice in the Arctic Sea. Although the Southern Ocean is warming, Antarctic sea ice has been increasing, making it an exception in this ice loss trend.

Following are the roles of ice in regulating global temperature:

Ice sheet absorb a great deal of the Sun's heat

Ice caps reflect the Sun's rays keeping the Earth cooler

Hence the melting of polar ice caps will accelerate global warming, which will in turn cause more rapid melting.

Since the Industrial Revolution, increased amount of carbon dioxide and other greenhouse gases in the atmosphere have raised global temperatures, especially in the polar region. Some causes for the melting of polar ice are linked below:

Burning of fossil fuels

Oil and gas drilling

Deforestation

Ice-breaking ships

Following are the impacts of Polar Ice caps melting:

### **Increased Global Temperature:**

Ice is white and white reflects sunlight. The polar region acts as the planet's cooling system and aid in balancing out other regions of the world that strictly absorb heat.

### **Rising Sea level:**

To directly impacts the coastal communities. These regions are at greater risk of coastal storms, floods and erosion as tides rise.

### **Effect on Carbon cycle:**

For the survival of the ecological community, it is the most crucial process. The carbon cycle has been impacted by the melting of ice caps, which has resulted in significant biological changes.

### **Effect on Wildlife:**

The ice caps are linked with a number of factors that affect the tundra wildlife.

### **Scarcity of Freshwater:**

The melting of ice caps continuously would result in less downstream of fresh water.

### **Important Facts about Polar Caps:**

While ice caps do contain a small fraction of Earth's total water (1.7% of the total), they contain the vast majority of the fresh water on the planet (68.7%).

Seasonal changes cause ice tops to thaw and then refreeze.

A maximum of eight inches of sea level rise has occurred in the past century as a result of ice melting.

### **5.1.3 Deforestation:**

When trees are taken down over a wide region, it is called deforestation. Cutting down trees on purpose is known as deforestation. Clearing land for agriculture, building, grazing animals, and fuel wood has been a common practice throughout history and into the current day. There has been a severe impact on natural ecosystems, biodiversity, and climate due to the fast acceleration of deforestation caused by human activities since 1960. Deforestation is occurring at a pace of around 11.3 million km<sup>2</sup> each decade, according to the United Nations' Food and Agriculture Organisation (FAO).

### **Causes of Deforestation:**

#### **Agriculture(80%):**

Agriculture is responsible for around 80% of deforestation, according to the FAO. Subsistence farming, including that practiced by local peasants in developing nations, accounts for 33 percent of deforestation due to agriculture, as stated in the same research (Khandekar, et.al2005).

Roughly 40% of deforestation is caused by commercial or industrial agriculture. Notably, over 14% of the world's deforestation is said to be caused by cattle.

#### **Construction(15%):**

The construction of human infrastructure has also been draining forest cover. Statistically, 10% of deforestation can be attributed to new infrastructure focusing on public sectors like transportation, energy generation, etc.

#### **Urbanization:**

Deforestation is exacerbated by the urbanisation of formerly rural regions, which is itself caused by a change in population. Housing and consumption locations are seeing exponential increase due to the urbanisation trend, with 68% of the world's population projected to reside in cities by 2050.

#### **Consequences of deforestation:**

Soil erosion

Climate change

food insecurity in the future

indigenous local people and their livelihood

biodiversity loss

#### **5.1.4 Extinction of Species :**

The ~1°C increase in mean global temperature is producing substantial and often unanticipated repercussions on species, changing their number, genetic makeup, behaviour and survival.

- The services provided by nature to humans are in jeopardy due to species losses. These services include acting as carbon sinks and making us more resilient to climate change.

Environmental strategies that decrease carbon dioxide emissions are crucial in mitigating the effects of climate change on many species.

- Strategies to promote adaptation to climate change and a focus on nature conservation can increase the likelihood of species survival.

IUCN SSC Guidelines for Assessing Species' Vulnerability to Climate Change, the Integrated Biodiversity Assessment Tool, and the IUCN Red List are some of the tools that may help with species conservation in the face of climate change.

#### **Issue of the climate change:**

Human activities have caused an increase of around 1°C in mean world temperatures compared to preindustrial periods. Extreme weather events like drought, storms, and rising sea levels are also consequences of climate change, along with higher average temperatures.

#### **Species play an important role in maintaining the ecosystem:**

Species are important not just for their own sake, but also because of the services they give to people via the ecosystems in which they live. When climate change combines with other stressors, such deforestation and



overfishing, it worsens the demise of species even more. A feedback loop may be formed when species and ecosystems diminish, which in turn accelerates climate change.

#### **Altered food chains:**

The effects of climate change on even the smallest species can threaten ecosystems and other species across the food chain.

#### **Invasive alien species:**

Invasive alien species are among the main causes of biodiversity loss and species extinctions, and the proliferation of invasive species is often exacerbated by climate change.

#### **Carbon sinks become source:**

Climate change affects the ability of plant species to sequester carbon, turning carbon sinks into carbon sources.

#### **Reduce species extinction:**

Efforts to conserve species and mitigate the impacts of climate change require an approach that includes meeting climate targets, conserving and securing habitats, and helping species adapt.

To reduce CO2 emission

help nature to help people

help species cope, make use of conservation tools.

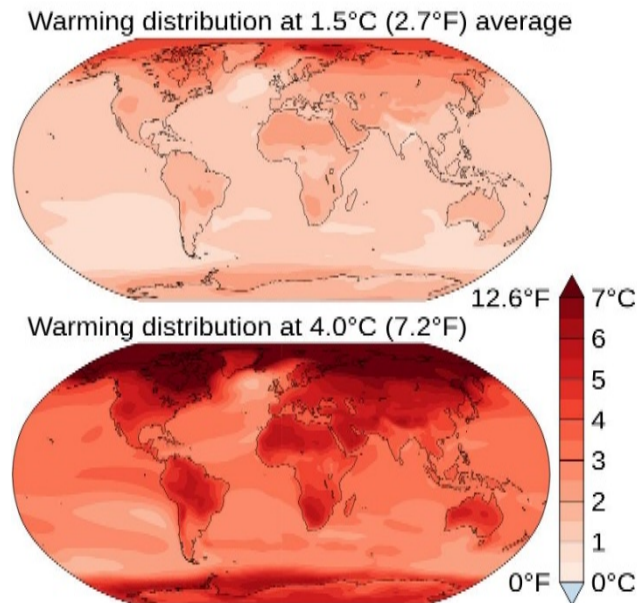
#### **Policies:**

##### *Climate justice*

Human rights and socioeconomic injustice are two of the main concerns that climate justice advocates want to address in their policies. The people who are most to blame for the climate crisis should foot the bill for adaptation efforts, say climate justice advocates, while the people who are most negatively affected by the situation should get financial compensation.

Half of the world's emissions in 2023 came from the richest 10% of the population, according to Oxfam's research. The poorest 50% were culpable for a mere 8%. If we also use emissions as a measure of blame, the top 21 fossil fuel firms would have to pay \$5.4 trillion in climate reparations between 2025 and 2050. For a fair transition to take place, it will be necessary to provide alternative employment opportunities for those now employed in the fossil fuel industry and to invest in their communities.

## Future Global Warming:



The World Meteorological Organization estimates there is almost a 50% chance of the five-year average global temperature exceeding +1.5 °C between 2024 and 2028. The IPCC expects the 20-year average to exceed +1.5 °C in the early 2030s.

Global warming is projected to reach 1.0-1.8 °C in a scenario with very low emissions of greenhouse gases, 2.1-3.5 °C under an intermediate emissions scenario, or 3.3-5.7 °C under a very high emissions scenario, according to the IPCC Sixth Assessment Report (2021). According to the high- and intermediate-emissions scenarios, warming will keep happening even beyond 2100, and by 2300, world surface temperatures will have returned to levels seen millions of years ago.

## 5.2 FUTURE STRATEGY

### 5.2.1 Renewable Sources of Energy;

A renewable source of energy is the name given to those sources of energy which can be replenished within a relatively short period of time. It is assumed that we can never run out of these energy sources due to the fact that they are easily replenished in nature.

Following are the various types of Renewable sources of energy:

#### Solar energy:

Sunlight is the prime source of all forms of energy on Earth. All other forms are directly or indirectly dependent on sunlight. Solar energy facilitates ocean currents, wind systems, tides, etc. Living things derive energy from the sun, the plants use solar energy to produce food and this energy moves all the way up in the animal world too. Solar energy can be hailed as the mother of all energy sources on our planet. Apart from creating other forms of energy, solar energy directly contributes to meeting energy demand. Solar farms are now established to trap solar energy and use it to generate electricity. The amount of sunlight received by our planet in one hour is more than the planet's energy requirement of an entire year. This might make it the most ideal source of energy. However, solar energy is not consistent as its intensity varies from place to place, season to season as well as with time of day, so harnessing in its optimal capacity is still a challenge.

**Hydro Energy:**

It is currently the largest source of renewable energy in the electricity sector. It harnesses energy from water. When water falls from a higher level to a lower level, the energy possessed by it is used to generate power. It is the most developed renewable source of energy. Large dams are built to tap hydro-energy. Although it has almost negative carbon impact, building large scale dams has some adverse effects on the ecosystem.

**Wind Energy:**

It is the energy derived from wind. It harnesses the kinetic energy of the moving air by using large wind turbines located on land or in sea. It is one of the oldest sources of energy used by man. Nowadays, huge wind farms are constructed in places receiving strong wind speeds. The drawback of harnessing wind energy is that the best locations are usually remote places. This hikes up the cost of electricity generated by wind.

**Geothermal Energy:**

It is the energy that utilizes thermal energy of the Earth's interior. In places of high volcanic activity, the usage of geothermal energy is quite common. Geothermal energy in the form of hot springs was used by the people since Palaeolithic times. It is also said to have healing properties. Today, geothermal plants have Geothermal Heat Pumps which tap thermal energy and use it to produce steam. This steam turns turbines and produces electrical energy. Though it is a clean source of energy, has low operation cost and possesses huge potential

geothermal energy firstly is limited to areas with high tectonic activity. Secondly, it triggers earthquakes and finally it can release a number of toxic gases and chemicals into the environment.

**Bio Energy:**

It is the energy derived from living or once living things. Animal and plant waste make up biomass energy. People have been using biomass energy since ancient times. The first biomass energy might have been wood fires for cooking and keeping warm. Biomass energy is organic and are also called biomasses feed stocks. It can be converted into liquid bio fuels such as ethanol and biodiesel. The major disadvantages of burning biomass is that it releases greenhouse gases like carbon dioxide, methane, carbon monoxides, nitrogen oxide, etc. into the atmosphere.

**Tidal Energy:**

It is the power that can be produced by transforming the kinetic energy of the tides into electricity. Turning the strength of the tides into something useful. Although tidal energy is not being used much, it has immense promise for future energy production due to the fact that the technology needed to produce it is still in its early stages. It is also comparatively difficult to harness tidal energy since the machines disrupt the tides whose energy they're trying to harness.

**Nuclear Fusion energy:**

Nuclear fusion is the process by which energy is generated in stars, like the Sun. Huge amount of energy is generated when Hydrogen atoms fuse together to form Helium atom. It is a clean energy source and thus has many advantages over other forms of energy sources.

It's does not produce radioactive isotopes like in nuclear fission reaction, requires very small amount of fuel to generate huge amount of energy

It had always been a challenge to conduct controlled fusion experiment due to immense temperature requirements to initiate the reaction. Recent advancements in the field have brought good results and soon the fusion energy shall be generated in a commercial scale.

### **Hydrogen:**

#### The Future of Energy Production

Hydrogen, the most common element in the universe, has great potential to become the leading source of energy in the future. As the need for energy grows at an exponential rate, the world needs a clean fuel that can release a huge amount of energy as well as not emit greenhouse gases. Hydrogen fulfils these criteria as it is a clean fuel that only produces water as the by-product as well as abundant in nature.

### **5.2.2. Sustainable Urban Planning:**

Urban planning encompasses the preparation of plans for and the regulations and managements of towns, cities and metropolitan regions. So to tackle the problem of Global warming and for the conservation of Biodiversity, people chose different ways, some of them are:

#### **Vertical Forest:**

When we talk about the concept of vertical forest, the first thing that comes in our mind is the IL Bosco vertical (building in Italy). It was inaugurated in October 2014 in Milan in the ParlaNuovaIsola area, as part of a wider renovation project led by Hines Italia. Eighty big and medium trees, three hundred little trees, eleven thousand covering plants, and five thousand bushes make up Milan's vertical forest, which spans two 80-and eleven2-meter towers, respectively. A total of 20, 000 square meters of woodland and vegetation, spread out across 1, 500 square meters of urban area.

An innovative architectural idea, the vertical forest uses the ever-changing polychrome of leaves as its walls, therefore displacing conventional arterials on urban surfaces. Bypassing the mechanistic and technical methods of environmental preservation, the biological architect instead depends on a canopy of plants to provide the necessary microclimate and increased sunshine.

Following are the features of a Vertical forest:

#### **Biological habitats:**

With an early estimate of 1, 600 specimens of birds and butterflies, it fosters the construction of an urban ecosystem where different kinds of plants produce a distinct vertical habitat that functions within the current network. This environment may be inhabited by birds and insects. This is how it serves as an innate component in the process of restocking the city's plant and animal life.

#### **Lesson Plan:**

The vertical forest creates a microclimate and filters out urban airborne pollutants. Microclimates are formed by a variety of plant life, which in turn generate humidity, absorb carbon dioxide and particulate matter, create oxygen, and shield humans from harmful radiation and noise.

So, as seen vertical forest is a very successful concept which helps increase the biodiversity by increasing the surface area in a limited area of land.

### 5.2.3 Eco-friendly Products

Merriam-Webster states that “not environmentally harmful” is the official definition of eco-friendly. What this means for products is that they must be environmentally safe throughout their entire lifecycle, from manufacturing to packaging.

Products that are kind to the environment can encourage people to reuse and recycle more of their trash, which in turn reduces garbage production. This will ensure that the planet does not transform into a massive landfill in the near future. In short, using eco-friendly products will preserve the planet and all its inhabitants from the ill effects of human activities.

But the Federal Trade Commission (FTC) has strict guidelines on eco-friendly chains, and here’s where it gets tricky: The FTC Green Guides say that in order for a product to be properly labeled as ‘eco-friendly’, the packaging must explain why it is environmentally responsible.

Following are the benefits of using eco-friendly products:

Save energy and money

Reduce pollution

Reduce carbon emissions

Helps to save natural resources

Maintain a healthy lifestyle

Following are the aims of an eco-friendly structure:

Life cycle assessment.

Energy, water, material efficiency.

Indoor environment quality enhancement.

Waste reduction.

A lot of individuals wish they could be more environmentally conscious, but they don’t know where to start. If you want to live a greener lifestyle, here are some things you can do:

Refrain from using plastics that have a single use; this includes straws, water bottles, shopping bags, cutlery, and more.

Whenever possible, try to choose items that need little or no packing at all.

Donate what you no longer need and only purchase what is absolutely necessary. Reducing methane emissions by composting biodegradables

Get more organic, locally grown produce; even better, plant your own!

Businesses and storage facilities may recycle the components of obsolete devices, so please donate them.

Turn down the heat, turn off the lights, and disconnect gadgets when they’re not in use to save energy around the house.

Refrain from using single-use plastic bags and instead bring your own bags to the store.

Invest in more energy-efficient models. Switch to LED lighting.

People are making the transition to more environmentally friendly items because they care about the planet. Seventy percent of American and Canadian customers consider it critical for a brand to be sustainable or environmentally friendly, according to research from IBM and the National Retail Federation. A Nielsen survey from 2014 indicated that sixty percent of users are prepared to pay a premium for environmentally friendly items.

A product's eco-friendliness may be determined in the following ways:

Find the labels that say "cruelty-free," "fair trade," or "made in a sustainable way."

The organic seal of approval from the Soil Association is one example of a reliable logo. Additionally, only items that fulfil stringent sustainability requirements may be found with the Rainforest Alliance frog emblem.

Pay attention to packing. Sustainable packaging isn't always an indicator that a product contains sustainable materials.

Keep in mind that the three R's: reduced, reused, and recycled are always important.

## **6.0 Findings:**

- It is found that global warming has drastically increased over the years, with record temperatures 1.15°C above the average in July 2022
- It was found that the greenhouse gases affect the average temperature, ozone layer
- It was found that the melting of polar ice caps is leading to rise in sea level
- It was found that using some strategies like better Urban planning, shifting to renewable energy and eco-friendly products will help in tackling global warming
- It was found that green urban planning is a viable strategy to venerate natural green spaces
- It was found that using eco-friendly products would lead to a healthy lifestyle.

## **7.0 Conclusion:**

The issue of global warming should not be underestimated. A record amount of greenhouse gases is contributing to the melting of the polar ice caps and the warming of the seas. Today, humans are confronted with the challenge of climate change, and it is humans themselves who are responsible for igniting these conflicts. We can't stop global warming from happening, but we can mitigate its effects. People will perish as a result of climate change and natural catastrophes if we do nothing to address this issue. It is time for humanity to transform themselves, as they are the ones who transformed the planet.

Changes in the global climate will impact people's ability to get water, produce food, stay well, and maintain their natural habitats. The globe is sounding the alarm that hundreds of millions of people may face issues including coastal flooding, water scarcity, and starvation. The assessment uses formal economic model findings to predict that the whole risks and costs of climate change will amount to losing at least 5% of world GDP year, indefinitely, if we do nothing. Damage estimates might reach 20% of GDP or more if a broader

range of hazards and repercussions are included. The costs of doing nothing, on the other hand, can be kept to a minimum of around one percent of global gross domestic product (GDP) annually in order to mitigate the most severe consequences of climate change.

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