CLIMATE CHANGE AND CLIMATE RESTORATION

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Introduction

The rapid development and industrialization of the past years have led to one of the biggest challenges facing the world today: climate change. Climate change is a long-term change in temperature and weather patterns. From rising sea levels and intense heat waves to prolonged droughts, destruction of animal habitats, melting glaciers, and warming oceans, the entire world is bearing the brunt of climate change. The emission of greenhouse gasses –which leads to global warming and climate change –is mainly due to the burning of fossil fuels to generate energy for our daily activities. Since the start of the industrial revolution, the concentration of carbon dioxide (the largest chunk of greenhouse gasses) in the atmosphere has increased by 48% due to human activities such as deforestation, bush burning, and land-use changes. In order to preserve the environment and thus make the earth habitable for future generations, urgent measures need to be taken to tackle this problem in its infancy.

Climate restoration is the reverse of the event explained above; it involves the steps to be taken to return CO2 to levels humans have survived long-term, below 300 ppm. The steps include carbon sequestration, reduction of greenhouse gas emissions, and acceleration of natural methane oxidation.

Mitigating Climate Change

Mitigating climate change has to do with reducing/eliminating the causal agents of climate change– greenhouse gasses. In simpler terms, the main aim is to reduce global warming. Different strategies for mitigating climate change are explained below.

Using Renewable Energy

Burning fossil fuels to generate energy is not advisable in the long run if we want to combat climate change. The use of renewable energy sources (wind, solar, geothermal, ocean wave and tidal energy, waste and biomass energy, and hydropower) should be employed, as a matter of urgency, to drastically cut down the emission of greenhouse gasses. Before now, renewables used to be a more expensive option, however, new clean energy technologies are reducing costs and helping us to decarbonize the economy. Solar panel prices have decreased significantly over the years. With replicated success in other renewable sources like wind and hydropower, renewable energy generation technology makes up over half of all new power generation technologies developed globally in the last decade. We must double down on these alternative sources if we want positive results.

Ensuring Energy Efficiency

One of the most cost-effective ways to combat climate change is to ensure energy efficiency. Energy efficiency is the ratio of performance output to the amount of energy used (calculated in percentage). To cut down excess emissions, energy efficiency has to be high; we should be able to achieve more with less energy input. Most of the electronic devices we have at home draw power from power plants at different power stations in different countries. Currently, the majority of the power plants burn fossil fuels, such as natural gas and coal, to be able to generate the power they provide. Burning fossil fuels causes the release of greenhouse gasses, such as carbon dioxide, into the atmosphere. The whole process contributes to climate change in the long run. Technologies should be developed such that less energy can be utilized to perform the same amount of work. These technological products should cut across industries such as transportation, household appliances, aviation, power generation, power distribution, etc. When we make deliberate efforts to use more energy-efficient devices, we are one step into cutting down emissions drastically. Examples of ways we can use less energy include using LED bulbs instead of incandescent light bulbs, adding insulation to our homes, and adjusting the thermostat to be higher in the summer and lower in the winter, especially when no one is staying at home. Examples of technologies that make buildings energy efficient include heat-reflecting glass, low-flow water fixtures, smart thermostats, and air conditioners with refrigerants that don't cause warming. Added advantages of energy efficiency include reduction in air pollution, households meeting their budgets, and businesses boosting their net earnings.

Transportation with Little or No Emissions

Majority of the means of transportation we use currently are powered by burning fossil fuels, increasing the rate of emissions. There are various ways to reduce these emissions and ultimately mitigate climate change; carpooling, usage of bicycles, usage of electric vehicles, walking, using public transportation, and usage of hybrid cars.

Protecting and Increasing Carbon Sinks

Out of all the greenhouse gasses responsible for climate change, carbon is the most prevalent. We must find ways to keep it trapped for a long time in different natural ecosystems. The process of removing carbon from the atmosphere and trapping it in different natural ecosystems such as oceans, geological formations, plants, and soils, is called carbon sequestration. Plants, via photosynthesis, collect carbon dioxide from the atmosphere. Therefore, deforestation must be discouraged at all levels, and the planting of trees should be encouraged so that more carbon can be removed from the air. Soils are also great carbon sinks; agricultural practices like cover cropping and minimum tillage can keep soils healthy and keep carbon trapped in the soil. Summarily, we must conserve carbon sinks– wetlands, forests, grasslands, and peatlands which store about 40% of all soil carbon.

Recycle and Reduce the Use of Plastic Bags

Asides from the air pollution it causes, the burning of plastics contributes to greenhouse gas emissions. We should look into better ways of plastic disposal and also consider recycling them. Cutting down emissions is a joint effort from everyone and is summed up by daily activities we choose to do such as using reusable grocery bags, buying more glass, and paper packaging. A viable alternative to plastics is bioplastics which are plastic materials made from renewable biomass sources, such as wood chips, vegetable fats, and oils, starches, straw, sawdust, recycled food waste, etc. Using bioplastics is a better option because conventional plastics are made from fossil fuels.

Adapting to Climate Change

Adapting to climate change involves setting up systems or structures that will help us scale through the effects of climate change. It involves building resilience such that the risks attached to climate change are drastically reduced. Adapting to climate change is a responsibility of everyone; the government has to develop relevant public policies and construct key infrastructure while the citizens play their part too. Some ways of adapting to climate change are highlighted below.

Understand your Environment

Preparing for risks and adapting to effects of climate change starts from understanding your environment. Different regions are affected on various scales depending on topography, geography, and latitude. Some regions experience excess precipitation while others experience drought, and heat levels also vary by region. Taking time to comprehend these phenomena will help you access risks and adequately plan for the future.

Response to Temperature Changes

One of the effects of climate change is long, frequent, and extreme heatwaves. You can protect yourself by simply staying hydrated, fixing plants on your roof, using energy-efficient cooling appliances, adding insulation to your home, and ensuring cross ventilation as the case may be. Home insulation can also be helpful in winter.

Preparing for Flood

A rise in sea levels and excessive rainfall are effects of climate change in some regions. Building resilience in this case involves building levees and seawalls to prevent inundation of coastal areas. Coastal communities should collaborate with relevant agencies to create wetlands that can serve as a buffer between the coastline and habitable areas. The design of houses should be such that the houses are raised by pilings, piers, or stilts, to prevent flooding of the house. There are countries such as Maldives currently building innovations like floating cities to prepare for rising sea levels. Nevertheless, the most obvious solution is building effective drainage systems that can stand the test of time.

Response to Drought

While there is excessive or little rainfall in some regions, there might be a drought in some other places. Communities should learn to conserve water for neighbouring communities or for their own future use as the climate can be unpredictable. Farmers should look into ways they can use water efficiently and also maximize the cultivation of crops that are resistant to drought. Needless to say, food wastage must be reduced drastically to reduce the strain on limited resources.

Climate Restoration

As we can see mitigation and adaptation are not the solutions to remove the existing Co2 from the atmosphere, which is emitted by humanity at large. So we need a strategy to restore climate change by removing the existing greenhouse gasses from the atmosphere. Important methods by which we can remove Co2 from the atmosphere are direct air capture, whereas captured carbon can be used in oil production, produce jet fuel, fizzy drinks, and other consumer products, apart from the above mentioned the most permanent production is Synthetic limestone from Co2 which is used in cement productions. Marine permaculture, ocean revitalization such as kelp forest, and tree planting also plays important role in climate restoration.

Global Actions Taken so Far on Climate Change

The global consciousness of climate change began in the 20th century. The First International Climate Program was held in 1980. The World Climate Research Programme (WCRP) was established in 1980 by the World Meteorological Organization (WMO) in Geneva and the International Council of Scientific Unions (ICSU) in Paris. Since then, much research went into climate science, specifically as regards to the numerical simulation of atmospheric and oceanic phenomena. By November 1988, the United Nations set up the Intergovernmental Panel on Climate Change with a mandate to prepare and publish reports that give a comprehensible and recent view of the current state of scientific knowledge relating to climate change.

In June 1992, there was a second Earth Summit in Rio de Janeiro, Brazil, where the combat against climate change started. After the summit, 166 countries signed the United Nations Framework Convention on Climate Change (UNFCCC), with mutual agreement on the role of humanity in global warming. As of 2022, 197 countries have ratified the convention; they have a yearly conference to make legal, institutional, and administrative arrangements for the implementation of the convention.

Over the years, different global agreements have been reached: the Kyoto Protocol, the agreement in Copenhagen Climate Change Conference, and recently, the Paris Agreement. The Paris Agreement set a goal to limit global warming to “well below” 2°C in this century. All countries of the world unanimously agreed on the need for developed countries to provide financial support and technology transfers to developing countries. The agreement also made it clear that cities, regions, businesses, and individuals are not left out in the obligations of combating climate change. Another agreement was made at the 2010 Cancun Climate Change Conference to establish the Green Climate Fund, endowed with $100 billion a year from 2020, to help developing countries take on strategies to fight climate change and deforestation.

Following these global attention and subsequent agreements, many regions and countries have been involved in the fight against climate change. In 2005, Europe launched an emissions trading system where companies emitting high levels of carbon are granted a certain number of "emission allowances".

How War Affects the Environment

War is a devastating activity that no country should be involved in; over the years, there has been enough proof that it has harmful effects on the environment. In ancient times, soldiers were reported to have used salt to pollute the farmland of their enemies, forcing them to surrender or migrate. With further research being conducted, herbicides were synthesized in the 20th century. Herbicides are also known to be used by soldiers to decimate forests used as cover by their enemies. Destroying these forests means that there are no more trees in that area to sequester carbon, more carbon is released into the atmosphere, and consequently, climate change is worsened. Furthermore, when people migrate due to these crises, they might have to cut down trees in order to settle down in their new location. Further deforestation in this scenario aggravates the situation.

Oil facilities used for production and storage can also be weaponized during wars. Attacks on these facilities can lead to oil spillage, increase the rate of greenhouse gas emissions, and contribute to global warming. The attacks can also cause a fire in the facility and lead to more emissions as experienced in the Gulf War's oil fires that contributed more than 2% of global fossil-fuel CO2 emissions in 1991. This specific type of fire contained pollutants that were instrumental in the accelerated melting of Tibetan glaciers due to the soot deposited on the ice. Melting glaciers result in rising sea levels which in turn lead to stronger hurricanes, stultified agricultural activity, displaced coastal communities, health hazards, refugee crisis, and destroyed economies– the consequences are far-reaching. Besides, when a country's oil facility is attacked, the natural instinct is to quickly look for alternative energy sources to support their survival. These alternative options could be unsustainable and detrimental to the environment; some inexperienced persons may start refining oil and increase the emissions happening already. Other alternative options include aggressive deforestation for firewood and charcoal. All these activities have a cumulative effect on the environment.

How is Climate Change Impacting Chennai?

From flood to drought, strong winds, and heavy rains, the effects of climate change are visible in Chennai, the economic hub of India. Although the design of the capital city plays a role in the flooding, it has been reported that Chennai gets 80% of its annual rainfall from a strong and brief monsoon from the northeast. In the near future, environmental changes, heat waves, rise in sea levels, drought, weather anomalies, and extreme weather events could be drivers of migration. According to a report by the Intergovernmental Panel on Climate Change (IPCC), by 2050, internal climate migrants in South Asia are projected to be 40 million. Migration hotspots in South Asia include the Gangetic Plain and the Delhi–Lahore corridor, coastal cities such as Chennai, Chittagong, Dhaka, and Mumbai, which will be simultaneously exposed to climate change impacts. To make matters worse, the migrants might become more vulnerable as they get exposed to new risks.

Another impact of climate change in Chennai is the rise in sea levels. Projections for rise in sea levels of Chennai's 1076 km-long coastline could be about 1-7 mm/yr by the end of the century. Rise in sea levels can cause salt water intrusion in agricultural lands, devastating crop farming, and the natural ecosystem. It can also cause contamination of drinking water and consequently lead to health crises. Worse still, coastal land could be claimed and eroded due to the elevated sea levels. In view of all these, all hands must unite together to take immediate action.

Conclusion

Therefore, the goal is to reduce and remove the existing Co2 and other greenhouse gasses from the atmosphere by 2050 i.e., to limit global warming to "well below" 2°C, preferably to 1.5°C in this century, to make the atmosphere carbon-neutral, and to make the earth's atmosphere harmonious with the healthy human evolutionary process. The expected goal can be achieved by unity. It's time to take action. Be the change you wish to see.

References

1. The Effects of War on the Environment (treehugger.com)
2. How does war contribute to climate change? - CEOBS
3. Impact of Climate Change in Chennai - Vulnerability Assessment (spiritofchennai.com)
4. Countering Climate Change With Renewable Energy Technologies – Federation Of American Scientists (fas.org)
5. ENERGY EFFICIENCY: a weapon to combat climate change (thebftonline.com)
6. International Efforts to Combat Climate Change (planete-energies.com)
7. How Do We Reduce Greenhouse Gases? | Center for Science Education (ucar.edu)
8. Adapting to Climate Change | Center for Science Education (ucar.edu)
9. How to Adapt to Climate Change – New Jersey Climate Change Resource Center (rutgers.edu)
10. What Is Climate Change? | United Nations