

→ Sunday
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Essay:

Climate change: Challenges and solutions

1 Introduction:

Climate change is the global challenge of 21st century. It has a lot of challenges and ~~impacts~~ However, it must be mitigated by implementing proper solutions.

2 Challenges due to climate change:

2.1 Green House Gas Emissions:

- Human activities are increasing global carbon emissions annually increasing 1.1°C ^{temperature} globally since 1900 (Intergovernmental panel of climate change)

2.2 Fossil fuel combustions:

- fossil fuels combustion contribute 75% of carbon gases globally. (United Nations Environmental protection)

2.3 Deforestation:

- Human activities cut 10 billion of forests annually (Food and Agriculture organization)

2.4 Livestock emissions:

- Livestock contributes to 80% more harmful gas than carbon dioxide which is methane. (United Nations Environment protection)

2.5 Industrial emissions:

- Industries contribute to 21% of global carbon gases annually. (Intergovernmental panel on climate change)

2.6 Urbanization and Transportations:

- Due to transportation carbon emissions contribute to approximately 24% annually (Intergovernmental panel on climate change).

2.7 Energy inefficiency:

- Loss and transmission in energy sector contributes carbon emissions (United Nations Environment protection)

2.8 Agricultural emissions:

- Agriculture contributes to approximately 14% of global carbon emissions (Food and Agriculture organization)

3) Impacts due to climate change:

3.1 Rise in Temperature:

- Green house gas emissions increase the global temperature to 1.1°C . (Intergovernmental panel on climate change)

3.2 Heatwaves and Droughts:

- In 2023-2024; temperature in Asia and Africa was noted to more than 50°C . (World Meteorological Development)

3.3 Loss of Biodiversity:

- Due to deforestation; 1 million species are in danger. (International Research on forests)

3.4 Extreme weather events:

- Due to climate change; disasters occur and caused loss to \$120 billion annually. (The Nations)

3.5 Industrial pollution and Health damage:

- Air pollution contributes to 7 million damage of lives annually. (World Bank)

3.6 Urban flooding and Smog:

- cities like Delhi and Lahore's air quality reached PM 2.5. (Swiss Air quality control Department)

3.7 Energy crisis and increase cost of Bills:

- Loss in lines and transmission increase the cost and demand of electricity to 30% to 40% (International Energy Agency).

3.8 Impact due to Agriculture is reduction of crops:

- Climate change contributes to reduction of crops upto 10% to 20% annually. (Food and Agriculture organization).

4) solutions for climate change:

4.1 Decrease green house gas Emissions:

- Decrease carbon emissions to net carbon zero. (Intergovernmental panel on climate change).

4.2 Transfer to Renewable Energy sources:

- Usage of wind energy, and solar energy can decrease 75% emissions of carbon. (International Energy Agency).

4.3 Afforestation:

- case in point: Pakistan and Argentina
Bonn Challenge for afforestation.

4.4 Decrease livestock Emissions:

- Proper livestock management can reduce 30% methane globally. (United Nations Environment program).

4.5 Clean Industrial Technology:

- Green hydrogen and carbon capture can reduce industrial emissions. (Intergovernmental panel on climate change)

4.6 Improve Energy Efficiency:

- Energy Efficient Systems can cut energy emissions by 10-15%. (International Energy Agency)

4.7 Sustainable urban planning:

- promote green transport, mass transit and low emission zones (United Nations)

4.8 Climate Smart Agriculture:

- Drought resistant crops, Drip method and sprinkler methods in Agriculture can be promoted. (United Nations)

5 Conclusion:

"Climate change is the defining issue of our time and we are at defining moment," as per United Nations secretary general Antonio Guterres
climate change is the global threat of 21st century. There are many challenges due to climate change such as: Green house gas emissions, fossil fuel combustion, deforestation, livestock emissions, industrial emissions, urbanization, transportation, energy inefficiency and transmission losses and Agricultural emissions. The impacts of the climate change are rising temperatures, heatwaves and droughts, loss of biodiversity, extreme weather events, industrial emissions and air pollution, health deterioration, and smog. However, if proper solutions are implemented then the challenges can be tackled. The solutions include: Decrease green house gas emissions, transfer to renewable energy sources, Afforestation, decrease livestock emissions by proper management, shift to clean industrial technology, energy efficient systems can be implemented, sustainable urban planning and climate smart agriculture practices must be adopted to tackle with climate change issue.

The first challenge due to climate change is Green house gas emissions. Human activities are increasing global carbon emissions and increase the temperature of Earth since 1900 to 1.1°C globally according to Intergovernmental panel on climate change. Green house gases include: methane, carbon dioxide and water vapour. These gases have the ability to trap sunlight and absorb sunlight. Therefore, the trapped sunlight can easily be reflected in the atmosphere at intervals. For instance, it can increase the temperature of the Earth annually.

The second challenge due to climate change includes fossil fuel combustions and emission of gases. Fossil fuels include: coal, petrol and natural gas. According to International Energy Agency, fossil fuel contributes to 75% of global emissions of carbon dioxide. The use of fossil fuels have been increasing in recent times. Especially, for the manufacturing of electricity to meet the demands of the population - on the one hand, fossil fuels are useful for making of electricity. However, on the other hand, it produces harmful emissions in the atmosphere.

The third challenge due to climate change included deforestation. It has been observed by the food and agriculture organization that around 10 million of forests cut annually. Forests play a very important role in the Environment. Because, forests can trap carbon dioxide from the atmosphere and release oxygen gas which is Ecofriendly. When forests are cut down; it imbalance the system of photosynthesis and Breathing in species. And, therefore millions of species die every year due to deforestation.

The livestock sector is the major contributor of methane gas emissions. According to united nations environment protection, livestock contributes to 80% more harmful gas than carbon dioxide which is methane gas. Methane gas is made up of one carbon and four hydrogen atoms. This gas has the ability to trap more of the sunlight even 80% more than carbon dioxide. Therefore, methane gas emissions are very much harmful for the environment and the species that lives in the Environment.

The Industrial sector contributes to more than 24% of global carbon emission according to the Intergovernmental panel on climate change. The constant processes which are running in the industries involves chemical reactions. These chemical reaction involves uses of raw materials and reactants for the formation of product. However, with products there are other byproducts emit that are more harmful and release into the environment.

The transportation sector and urbanization is the major challenge for environment and climate change. Due to transportation, carbon gas emissions contributes to 24% globally as per Intergovernmental panel on climate change. The transportation sector involves the usage of oil and petrols. These fossil fuels emit out carbon dioxide and methane gases that trap sunlight and increase the temperature globally.

The energy sector is also responsible for climate change. The major challenge is loss and transmission in lines of energy. According to International Energy Agency the loss in lines and transmission involves carbon gas emissions. When carbon gas accumulate in the environment it traps sunlight. Therefore, it can increase the temperature in the atmosphere.

The contributions from agricultural sector are a major challenge of climate change. According to food and agriculture organization, agricultural sector contributes to 14% of carbon gas emissions in the atmosphere. The use of fertilizers, pesticides and insecticides over plants cause the emissions of gases which are not ecofriendly. Therefore, it raises the global temperature.

The major impact of greenhouse gas emissions are increasing temperatures. According to intergovernmental panel on climate change, earth's temperature have been risen to 1.1°C globally due to anthropogenic factors.

The other impact is heatwaves and droughts. In 2023 to 2024 it was observed by world meteorological department that in asia and africa temperature has been noted to 50°C plus. The usage of fossil fuels in transportation and other sectors increase the global temperatures.

Deforestation is causing a drastic impact over the species that lives on the forests. According to international research on forests approximately 1 million species are at stake due to deforestation. "climate change is the global threat of 21st century as per lancet commission."

The impact of climate change is disasters. The recent floods in Bannu district and Khyber pakhtunkhwa in Pakistan is a case in point. According to the nations, climate disasters induce \$120 billion damage annually. The floods of 2022 in Pakistan caused 1730 deaths, \$40 billion damage and 83 million peoples were affected as per World Bank.

The industrial sector has a drastic impact over the environment as well as on living organisms. According to World Bank, due to air pollution 7 million peoples have been affected annually. It is because of the harmful and poisonous gases that came out from the industrial sector and mix into the environment. It can cause air pollution.

The other factor is urban flooding and smog. It is the major impact of climate change. According to Swiss air quality index, cities like Delhi and Lahore had been facing PM2.5 air quality which is very dangerous.

The sector of energy had huge impact on climate. According to International Energy agency, less in lines and transmission increase the cost and demand of electricity to 30% to 40%. It has been seen that outdated lines are used, outdated infrastructure has been used, that caused huge loss of energy.

The major impact of climate change is the reduction of agricultural crops. According to food and agricultural organizations climate change contributes to reduction of crops upto 10 to 20% annually when agricultural productivity is affected by climate change's population can suffer and the demands of the population cannot be met.

The solution for high emission of green house gases includes less emission of green house gases.

To cope up with the climate change, there are many solutions to implement such as decrease green house gases. Paris agreement was signed in 2015 between developing nations and developed world. It was decided in this agreement that green house gases could be reduced. Its emission can be decreased and phase out completely until 2050. According to Intergovernmental Panel on climate change carbon net must be zero.

The fossil fuel emissions must be reformed. To change with renewable energy resources can become ecofriendly. The usage of wind energy, and solar energy can be enhanced instead of fossil fuels. According to International atomic energy usage of fossil fuels can be cut down comp.

leely and shifted to solar energy, wind energy can reduce carbon emissions to 75%. **Thimpu wind project, Sukkinnart, Quaid-e-Azam solar power plant in Bahawalpur** can contribute to many megawatts and reduce the usage of fossil fuels.

Afforestation can be increased to deal with the climate change. **Bonn challenge** was launched in Paris climate agreement for afforestation. However, in Glasgow Summit it was observed that only **Pakistan and Argentina** had met the challenge of Bonn. **Ten Billion Tree Tsunami** was successfully launched in Pakistan during year 2018. "Pakistan contributes less than 1% of greenhouse gases. However, major vulnerable country to climate change" as per German watch Global Climate Risk Index.

The livestock emissions must be reduced. According to United Nations Environment Program, livestock management can reduce 30% of methane globally. If livestock can be managed successfully, then it can reduce emissions of methane in the environment.

Clean Industrial Technology can be prevailed in the industrial sector. Usage of green hydrogen and carbon capture can reduce emissions of carbon

in the environment.

The usage of modern technologies in the energy sector can ~~be~~ majority mitigate energy related issues. According to United Nations, the new technologies in the energy sector can reduce emissions upto 10 to 15%.

The other solution is the sustainable urban planning. Promote green transport, mass transit and low emission zones can be useful to tackle with urban and transportation issues.

The usage of climate smart agricultural practices can be promoted. Climate smart agriculture strategies includes: Drip system, sprinkler method and Drought resistant seeds. "we do not inherit the Earth from our ancestors, we borrow it from our children," Native American proverb