

Climate Change: Causes, Effects and Solutions

1. Introduction

2. Causes of Climate Change:

- i) Burning of fossil fuels
- ii) Rapid Industrialization
- iii) Increasing Urbanization
- iv) Greenhouse gas emissions from unsustainable agriculture practices
- v) Deforestation

3. Impacts of Climate Change:

- i) Rising sea levels
- ii) Accelerate natural disasters
- iii) Threat to food security
- iv) Induce mass-migration
- v) Disrupt ecosystem and human health.
- vi) Extreme weather events.
- vii) Increase in global temperature.

4. Solutions for Climate Change:

- i) Climate-resilient infrastructure
- ii) Smart-cities through advanced technology
- iii) Green hydrogen revolution

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- iv) Awareness in society
- v) Renewable energy resources
- vi) Nature-based resilience beyond afforestation
- vii) International Cooperation among states.

Essay:

Climate change is the gravest issue across the world. States, whether developed or underdeveloped are facing consequences from it. There are several reasons that cause atmospheric pollution, and leads to climate change. The principle causes are burning of fossil fuels, rapid industrialization, urbanization and unsustainable agriculture practices in the environment. All have negative impacts in the form of rising sea levels, droughts, floods, and wind storms. In addition, disruption in ecosystem and human health also make states vulnerable to combat the climate change. The extreme weather events

cause food shortage, and threat to existence. The mass migration from the coastal areas has been a grassroots reason of inflation and displacement crisis. The consequences are serious threat to life. Therefore, an urgent solution is required, that must be adopted in near future to tackle the climate change impacts on the environment. The most advanced solution is the green-hydrogen revolution. It promotes safe industrialization, and processes either chemical or electrical to mitigate the climate change crisis. Climate resilient infrastructure is cornerstone to avoid mass loss. However, global cooperation is crucial to make such measures adoptable. The countries in North are promoting industries, but without safeguarding measures. In contrast, global South even contributing less than the north are suffering more from atmospheric pollution, that is root cause of climate change. Smart cities through

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advancement in some areas can also reduce the effect of climate on ecosystem. Infact, not a single state or a person could pursue the Confidence-Building measures to overcome the loss from climate change. The resistance is only possible if financial assistance would be added to the practical measures for the sustainability of clean and green environment.

Burning of fossil fuels is the leading cause of climate change. The population is dependent on fuel, and oil that produces greenhouse gases like CO_2 , Methane or nitrous oxide. These accumulate in the atmosphere and cause pollution. As per IPCC report 2024, only burning either complete or incomplete contributes to 20% in the global emissions. In Pakistan, 20% emissions are from combustion processes.

Rapid industrialization contributes in climate change as grassroot of pollution. The global north is running industries, but without safety gadgets for environment. Harmful gases like CO_2 , Carbon monoxide, and methane emit from chemical processes or cement production. They lead to a primary pollutants in the climate change. According to UN report 2023, 21% increase in pollution across the world is in pre-industrial era. In Pakistan industries contribute to 10% in regional pollution.

Increasing urbanization is the worst factor in climate change. The incremental increase in the use, production and waste of energy is due to increasing population in urban areas. This could not stop even unplanned crisis will continue. As per World Bank report 2023, the rapid urbanization will be continued.

to 60% in 2050. The more population will consume more resources, and contribute maximum in potential risks.

Unsustainable agriculture practices are making the more worsen environment. The excessive use of chemicals and fertilizers produce carbon monoxide, methane and nitrous oxide that lead to climate change. This also threaten to water by paddy rice agriculture, water logging and food security.

Deforestation also promotes the climate change adding in vulnerability to face the challenges. The carbon sinks are cutting, more CO_2 is accumulating in environment and atmosphere. Ultimately, causing global temperature to increase, that drives to climate variation. As per World's Forest Forum (2024), about 10 million hectares of forest have been reducing annually. So, this reduction is maximizing

environmental risks.

The foremost effect of climate change is the rising sea levels. The rising water level is due to melting of glaciers. This causes the floods and hurricanes. In Pakistan **2022 Floods**, about 3 million people displaced with \$ billion dollar loss of economy and infrastructure (World Bank report, 2022)

Climate change accelerates natural disasters. The droughts, floods, heatwaves and hurricanes cause massive destruction. The 2022 wildfires in Canada brought global disruption in environment. It also reduces the forests, which are carbon sinks.

It intensifies the threat to food security. The floods destroy the agricultural lands, ultimately causing food shortage and malnutrition. During floods, the

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deaths due to malnutrition are more than famine. Therefore, floods make the earth more worsen for living than normal inflation.

Climate Change induces mass migration. It is due to the rising sea levels. The population near coastal areas misplace due to the unfavourable living conditions. The migration resultantly cause mass explosion and unequal distribution of resources. In United States of America about 5 million people migrated during 2022 floods (UN report, 2024)

Disrupt in human health and ecosystem is an alarming ~~for~~ due to climate variation. The ecosystem disrupts due to the permanent destruction of inhabitants of wildlife. The destruction in the forest can't be recovered soon. The era becomes full of desparacy and hopelessness to recover it soon.

Extreme weather contribute more in destruction. The weather pattern changes due to imbalance in water cycle. The unusual heatwaves and floods cause disturbance in climatic conditions. In every year infrastructure disturbs the most in northern states due to tornadoes, and volcanoes add more in the deformation of environmental scenarios.

The global temperature rises due to the climatic conditions and its variability. The accumulation of CO_2 in the atmosphere, traps the high energy radiations around earth. It leads to global warming and heatwaves. In **USA** 2022, was observed as the most hottest summer in the history. Multiple deaths were linked with it.

Climate resilient infrastructure is the most effective solution to mitigate loss from it. The

schools, housing, and official buildings block the normal routine. Use green colored designs to protect the buildings from overheating. Use reusable materials in buildings and roads.

Through smart-cities using advanced technology, we can combat climate change. Use the grids, AI generated signals on roads to protect the people from heatwave days.

Green-hydrogen revolution has been highlighting as an effective remedy to reduce loss. In this process CO_2 is stored, and water vapours are emitted from it. This stored gas emissions will be then used for industries, and electrification process, where needed.

Awareness is crucial to make this process more faster. Through acknowledgement people would shift their lifestyle from the modern to adaptable. the

safer and careful use of energy is cornerstone to tackle contemporary climate relevant crisis.

Use renewable energy resources like water, solar and wind energy. In this process, clean and safe environment can be assured for the pursuance of goals, and to attain clean environment. In Balochistan, solar energy projects can be commenced due to approximate high area.

Nature-based resistance should be preferred beyond afforestation. In this process, conserve the mangroves, grass and it will absorb more CO_2 than forests. The resistance to the floods will be enhanced as a result, to make the opposition to disaster stronger. In Sindh 300% more mangroves have been grown itself. By protecting them, we can make our priorities to protect the

environment can be attained.

Transnational compromise is cornerstone to achieve the climate resilient goals. The global north is promoting their industries, exploiting the global south. Reason is the lesser contribution of global south in environmental exploitation, as they are dependent on agriculture. But regional and global compromise will collectively mitigate the future loss. The financial assistance to the countries like Pakistan was given in 2022 floods devastation.

We conclude that the climate change is not just a regional issues. It threatens the globe even in the near future 80% of glaciers would be melted and make this world disastrous to live. The climate change has potential to undertake the global powers and their economy. The only way to

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combat the burning of fossil fuels is use of renewable energy.

To confront the heatwave, use the green colored sheets or paints to resist the heat.

Increasing urbanization leads to an ~~use~~ excessive use of energy and resources. This can overcome by the use of AI generated tools to make people less-relianced on energy than the gas emissions.

Strict check and balance is required for the safe emission of gases from industries. The air cleaning and processing equipments must be adopted by the industrialist to attain the goal of less emissions annually.

The Kyoto and Montreal protocols must be enforced in all across the world to ensure the participation of all states, who want to make planet the "Earth" more safer. During floods dams must be constructed with collective

efforts to make states sustainable for economic growth. In addition, financial aid will add more to the rapid development of infrastructure significantly underdeveloped states. Therefore, we can say that this global interdependence must consider the role of climate in every aspect of human life. As, it is not a concern for a single, but for whole to achieve political, social and economic gains.