

## Climate Change : Causes & Consequences

Climate change is primarily driven by factors that significantly increase the concentration of heat trapping gases in the Earth's atmosphere, thereby disturbing the natural balance of the climate system.

One of the most critical causes is the rapid rise in greenhouse gas emissions, particularly carbon dioxide and methane, which intensify the greenhouse effect and lead to a steady increase in global temperatures.

These emissions largely originate from energy production, transportation, and industrial activities that rely heavily on carbon-intensive technologies. Another major cause is the excessive dependence on fossil fuels such as coal, oil and natural gas to meet growing global energy demands. The continuous burning of these fuels releases enormous quantities of carbon dioxide, accelerating environmental degradation and contributing to ~~environmental~~ <sup>climatic</sup> instability. Furthermore, deforestation has become a serious environmental concern because forests act as natural carbon sinks that absorb greenhouse gases from the atmosphere. Large scale clearing of forests for agriculture, urban expansion, and commercial purposes reduces the Earth's capacity to regulate climate

effectively. Therefore, these interconnected factors collectively drive climate change and threaten environmental sustainability.

**Natural Processes** have long played a crucial role in shaping the Earth's climate by influencing temperature patterns and atmospheric conditions over extended periods. One prominent natural factor is solar variation, which refers to fluctuations in the amount of energy emitted by the sun. Even small changes in solar radiation can affect global temperatures, leading to periods of warming or cooling that influence weather systems and seasonal cycles. Another important natural cause is volcanic activity, which can temporarily disrupt climatic conditions through the release of ash, gases and aerosols into the atmosphere. These particles can block or reflect sunlight, resulting in short-term cooling effects, while certain volcanic gases may contribute to warming over time. In addition, ocean currents represent a vital component of the global climate system because they redistribute heat across different regions of the world. Changes in ocean circulation patterns can alter rainfall distribution, intensify extreme weather events, and

influence regional climate. Consequently, natural phenomena such as solar variations, volcanic eruptions, and ocean current dynamics remain significant forces that shape climate changes across the globe.

Human activities have become the most dominant contributors to modern climate change due to the large scale release of greenhouse gases and unsustainable patterns of development. One of the most significant contributors is the transportation sector which depends heavily on fossil fuel powered vehicles such as cars, buses, trucks and planes. The continuous burning of petrol and diesel produces substantial carbon emissions, intensifying global warming and worsening air pollution. Industrialisation also plays a critical role in accelerating climate change, as factories and manufacturing industries consume vast amounts of energy and often rely on coal based power sources. These industrial processes release harmful pollutants and greenhouse gases that contributes to atmospheric warming and environmental degradation. Moreover, rapid urbanisation has significantly increased energy

consumption and infrastructure expansion, leading to the growth of cities at the expense of natural ecosystems. The replacement of forests and green spaces with buildings and roads reduces vegetation cover and limits the environment's ability to absorb carbon dioxide.

Therefore, transportation, industrialisation, and urbanisation collectively intensify climate change and pose serious challenges to sustainable development.