

## climate change causes:-

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The contemporary climate crisis is predominantly a byproduct of intensified **anthrogenic activities** that have fundamentally altered the Earth's atmospheric chemistry.

At the forefront of these drivers is the relentless combustion of fossil fuels i.e. coal, oil and gas to power global energy grids, industrial complexes and transportation networks. This reliance on carbon intensive energy has led to a staggering surge in **Greenhouse gases (GHG)** emissions; notably, atmospheric  $\text{CO}_2$  levels have escalated by nearly **50%** since the pre Industrial era. This chemical imbalance is further exacerbated by widespread deforestation and **land use change**. It leads to the depletion of critical carbon sinks, such as **Amazon Rainforest**, surrenders to the demands of rapid urbanization and industrial farming. **Land use changes**, like forest conversion contribute **15%** of Global Emission. Loss of forest disrupts ecosystem, reducing biodiversity and increasing climate vulnerability. Furthermore, the modern **Industrial**

**agriculture** complex contributes significantly through the release of potent gases like Methane ( $\text{CH}_4$ ) from livestock and Nitrous Oxide ( $\text{N}_2\text{O}$ ) from Chemical fertilizers. Industrial agriculture contributes **25%** of Global GHG emission through fertilizers, livestock and energy use. It accelerates global Warming like Monoculture and pesticide use in Industrial agriculture degrade soil health, reducing biodiversity and increasing chemical pollution. Energy intensive farming practices lead to resource depletion and increase GHG emission. As **Industrialization** fuels economic growth but release massive GHG, as well **transportation** reliant on fossil fuels is a major contribute to  $\text{CO}_2$  emission, worsening air quality. Also Inadequate **waste management** lead to Methane emissions from landfills and pollution from incineration, compounding climate issues. These human-centric factors create compounding effects that accelerates global warming and Destabilizes the natural climate equilibrium.

While Anthropogenic activities are the primary of modern climate shifts, **natural factors** act as the foundational catalyst and feedback Mechanism that further complicate the global Climate Equation. These phenomenon, ranging from terrestrial shifts to extra-planetary cycles, have historically dictated the earth thermal state. Among these, **Earth orbital Changes** (Milankovitch cycles) & solar variations influence the intensity and distribution of solar radiation reaching the earth's surface. On the terrestrial front, **volcanic eruptions** introduce ash and sulfate aerosols into the stratosphere, while often viewed as minor contributors compared to human activity, they can cause short term cooling or localized climatic Disruptions. However the most critical catalyst in the current crisis is the **Albedo Effect**. As rising temperature cause polar ice to melt, the earth loses its white reflective surface, replacing it with dark, heat absorbent ocean water. This creates a dangerous "warming feedback loop" where melting leads to further heat

absorption, accelerating the process beyond human control. Furthermore the redistribution of heat through shifting **ocean currents** and increasing frequency of extreme localized events like **droughts**, demonstrate how natural systems respond to and amplify atmospheric instability. Understanding these factors is essential, as it often intersects with human induced warming to create a compounded, "synergistic" impact on the planet's delicate ecological balance.

Beyond the physical and natural drivers, the most profound hurdles of climate stability are the **systemic and policy failures** that prioritize short term gains over ecological survival. Our current global **economic system** are often criticized for an over emphasis on GDP growth and immediate profit, which leads to externalizing of environment costs, especially allowing the corporations to treat the atmosphere as a free dumping ground for carbon. Just 100 companies have been the source of over 70% of the world's GHGs since 1988. (Carbon Majors Report)

This fiscal myopia is compounded by **policy inaction** and contradictory incentives. For instance, despite global climate pledges, global fossil fuels subsidies surged to a record **\$7 trillion** in **2022** (according to IMF) effectively incentivizing the very pollution we aim to curb. Furthermore **Institutional inefficiencies** create a "governance gap" stifle the implementation of green technologies. Even when robust environment law exist, weak enforcement mechanisms render them toothless against powerful industrial lobbies. In many developing nations, economic development and environment protection are viewed as "zero sum game" rather than a synergistic partnership. Without addressing these structural flaws, technological solutions will remain inefficient against the tide of systemic neglect.