

Explain the mechanism of global warming. Which greenhouse gases contribute to global warming. Give its causes and effects.

Global Warming

Global warming refers to long-term rise in average temperature of the Earth due to enhanced green-house effect. According to NASA report published in 2023, there has been an increase of 1°C in average temperature of the Earth over past 122 years. According to Intergovernmental Panel on Climate Change (IPCC), Earth's average temperature would rise by 1.4°C till 240. There are various anthropogenic causes of global warming and it has drastic repercussions for the world.

1 Elucidating the Phenomenon of Global Warming

Enhanced

Greenhouse effect is central cause of Global warming. Greenhouse effect is defined as :

- “ The natural process in which certain gases present in Earth's atmosphere known as greenhouse gases trap heat in Earth's atmosphere, preventing them from escaping into space and thereby warming the planet. ”

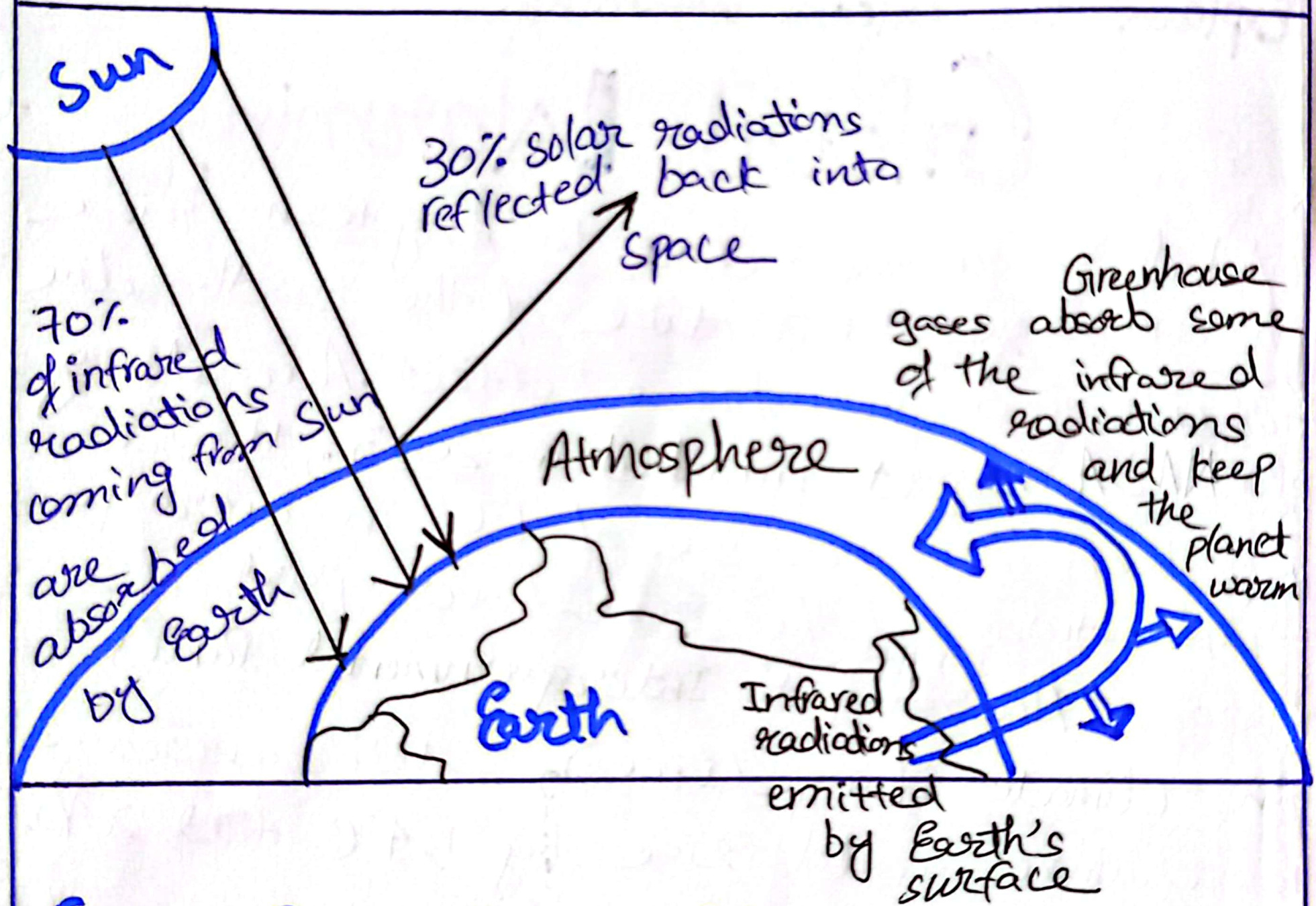


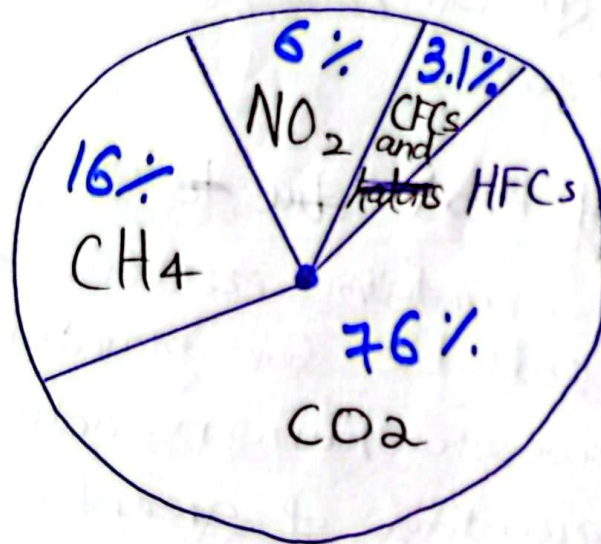
Fig:- GreenHouse Effect

2. Explicating Greenhouse Gases Contributing to Global Warming

The greenhouse gases which are major contributors to global warming are carbon dioxide, methane, nitrogen dioxide and chlorofluorocarbons and halons. Carbon dioxide is the largest contributor to global warming. It contributes upto

76% in global warming. Following is the percentage contribution of greenhouse gases in global warming.

Percentage Contribution of Greenhouse gases in Global Warming



These greenhouse gases are produced from various anthropogenic activities and coming from different sectors such as energy sector, industry, agriculture and wastes.

Percentage Contribution of Various Sectors in Greenhouse Gas emissions

Sector	Percentage Contribution in Greenhouse Gas emissions
Energy sector	73.2%
Industry	5.2%
Agriculture	23% 18.4%
Waste	3.2%

3. Expounding Causes of Greenhouse gas emissions leading to Global Warming

i. Population Explosion

According to US Census Bureau, in 2025 world's population is 8.16 billion and it is expected to reach 9 billion in coming 8 to 10 years. This increases vehicle, industrial emissions and solid waste generation thus causing global warming.

ii. Massive Deforestation

More than 12 million hectares of forests are deforested every year (Global Forest Watch, Growing Deforestation, Dec 2024). CO_2 content is increasing which causes global warming.

iii. Rapid Urbanization

Around 59% of the population of the world is living in urban areas. Projections indicate that this figure will rise upto 70% till 2030.

This rapid urbanization increases CO_2 , CH_4 , NO_2 and CFCs thereby causing global warming.

iv. Rapid Industrialization

China produces one half of the coal of the world, India produces 1085 million tonnes of coal, Indonesia produces 836 million tonnes of coal, and US produces 465 million tonnes of coal.

(Al-Jazeera, Rapid Industrialization, Jan 2025)

This industrialization is a major contributor to global warming.

v. Waste Generation

According to Global Waste Management Outlook published by UNEP in 2025, more than 34.6 billion tons of solid waste are produced in 2025.

This causes greenhouse gas emissions thereby causing global warming.

vi. Unsustainable Agriculture

Unsustainable agricultural practices contribute upto 9-12% in greenhouse gas emissions thus causing global warming (Bloomberg, Unsustainable Agriculture and Global Warming, Dec 2024).

4. Repercussions of Global Warming

i. Melting of Glaciers

According to International Commission on Ice and Snow:

“Due to global warming, there has been a glacial retreat of 11% in New Zealand, 18% in North USA, 25% in Tibetan glaciers and 50% retreat is observed in Russian glaciers.”

ii. Rising Sea levels

Due to global warming, there are melting of ice caps and thermal expansion of oceans which is causing rise in sea levels. For instance, there has been an increase of 8 inch in global sea level in past 122 years due to rising temperature of Earth (National Oceanic and Atmospheric Administration (NOAA), Rise in sea level, Oct 2025).

iii. Biodiversity Loss

Due to rising temperature of Earth, the world has lost nearly 73% of its wildlife species in past 50 years (World Wildlife Fund for Nature (WWF), Biodiversity loss, Aug 2025).

iv. Intense Wildfires

According to US EPA, one of the contributing factors to LA wild fires ^{of 2024}, which destroyed 57000 acres of land, is global warming.

v. Food insecurity

According to UN World Food Programme:

“One of the main causes of severe or moderate food shortages faced by 2.33 billion people of the world is

decline in food productivity caused by intense heat waves triggered by global warming.

vi. Energy Insecurity

Global warming is causing melting of ice caps which ~~leads to~~ affects hydropower generation. According to Climate Ministry report of Pakistan published in 2025:

“The country is facing energy insecurity due to melting of glaciers as it relies on hydropower for 37 to 39% of its electricity generation.”

vii. Health Crises

Global warming is causing heat stroke across the world. For instance, more than 36,000 cases of heat stroke have been reported in Europe in past four years (The Guardian, Global warming and heat stroke, July 2025).

viii. Migration and Social Displacement

Due to rising sea levels triggered by global warming, more than 52.6 million people have been displaced in recent years and till 2050 around 216 million

People would be displaced due to rising sea levels (Internal Displacement Management Centre, Social Displacement due to Global warming, April 2025).

Concluding Thoughts

Global warming is long-term rise in average temperature of Earth. Enhanced greenhouse effect is causing global warming. Anthropogenic activities are increasing quantity of greenhouse gases in atmosphere and contributing to global warming. This phenomenon is causing drastic repercussions for the world.
