

Global Warming and Its Effect on India

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Abstract:

Scientists have spent decades figuring out what is causing global warming. They've looked at the natural cycles and events that are known to influence climate. But the amount and pattern of warming that's been measured can't be explained by these factors alone. The only way to explain the pattern is to include the effect of greenhouse gases (GHGs) emitted by humans.

To bring all this information together, the United Nations formed a group of scientists called the International Panel on Climate Change, or IPCC. The IPCC meets every few years to review the latest scientific findings and write a report summarizing all that is known about global warming. Each report represents a consensus, or agreement, among hundreds of leading scientists.

One of the first things scientists learned is that there are several greenhouse gases responsible for warming, and humans emit them in a variety of ways. Most come from the combustion of fossil fuels in cars, factories and electricity production. The gas responsible for the most warming is carbon dioxide, also called CO₂. Other contributors include methane released from landfills and agriculture (especially from the digestive systems of grazing animals), nitrous oxide from fertilizers, gases used for refrigeration and industrial processes, and the loss of forests that would otherwise store CO₂.

Different greenhouse gases have very different heat-trapping abilities. Some of them can even trap more heat than CO₂. A molecule of methane produces more than 20 times the warming of a molecule of CO₂. Nitrous oxide is 300 times more powerful than CO₂. Other gases, such as chlorofluorocarbons (which have been banned in much lower quantities than CO₂, none of these gases adds as much warmth to the atmosphere as CO₂ does.

In order to understand the effects of all the gases together, scientists tend to talk about all greenhouse gases in terms of the equivalent amount of CO₂. Since 1990, yearly emissions in terms of the equivalent amount of CO₂ have gone up by about 6 billion metric tons of "Carbon dioxide equivalent" worldwide, more than a 20% increase.

Keyword: Climate Change, Green House Gases, Carbon Dioxide

Introduction:

Glaciers are melting, sea levels are rising, cloud forests are drying, and wildlife is scrambling to keep pace. It's becoming clear that humans have caused most of the past century's warming by releasing heat-trapping gases as we power our modern lives. Called greenhouse gases, their levels are higher now than in the last 650,000 years.

We call the result global warming, but it is causing a set of changes to the Earth's climate, or long-term weather patterns, that varies from place to place. As the Earth spins each day, the new heat swirls with it,

picking up moisture over the oceans, rising here, settling there,. It's changing the rhythm of climate that all living things have come to rely upon.

What will WE DO TO SLOW THIS WARMING? How will we cope with the changes we've already set into motion? While we struggle to figure it all out, the face of the Earth as we know it—coasts, forests, farms and snow-capped mountains—hangs in the balance.

Greenhouse Effect

The “Greenhouse effect” is the warming that happens when certain gases in Earth's atmosphere trap heat. These gases let in light but keep heat from escaping, like the glass walls of a greenhouse.

First, sunlight shines onto the Earth's surface, where it is absorbed and then radiates back into the atmosphere as heat. In the atmosphere, “Greenhouse” gases trap some of this heat, and the rest escapes into space. The more greenhouse gases are in the atmosphere, the more heat gets trapped.

Scientists have known about the greenhouse effect since 1824, when Joseph Fourier calculated that the Earth would be much colder if it has no atmosphere. This greenhouse effect is what keeps the Earth's climate livable. Without it, the Earth's surface would be an average of about 60 degrees Fahrenheit cooler. In 1895, the Swedish chemist Svante Arrhenius discovered that humans could enhance the greenhouse effect by making carbon dioxide, a greenhouse gas. He kicked off 100 years of climate research that has given us a sophisticated understanding of global warming.

Levels of greenhouse gases (GHGs) have gone up and down over the Earth's history, but they have been fairly constant for the past few thousand years. Global average temperatures have stayed fairly constant over that time as well, until recently. Through the burning of fossil fuels and other GHG emissions, humans are enhancing the greenhouse effect and warming Earth.

Scientists often use the term “climate change” instead of global warming. This is because as the Earth's average temperature climbs, winds and ocean currents move heat around the globe in ways that can cool some areas, warm others, and change the amount of rain and snow falling. As a result, the climate changes differently in different areas.

How global warming will effect India:

We keep reading about rising temperatures and sea-levels in other parts of the world like United States and the UK, but actually India is one of the most vulnerable countries when it comes to effects of global warming. India has a vast coastal line and the rising sea levels caused by global warming will cause an ecological disaster. This is according to a 1989 United Nations Environment Programme study. In India, the signs already back up forecasts that as the mercury rises the affected regions.”

Bengal Will Suffer

The Himalayan glaciers have started to melt and the average rate of retreat is almost twice (34 metres) per year as compared to the 1971 levels of 19 meters. The melting glaciers will cause temperatures and sea-levels to rise and there will be cascading effect on the crops and the monsoons. Worse – whole islands are expected to vanish. In fact **two have already gone under**- two islands in the Sunderbans, an area which India shares with Bangladesh. Temperatures in the group of islands have already gone up by one degree centigrade. You can get the details here.

“Rising sea levels have submerged two islands in the Sunderbans, where tigers roam through mangrove forests in the Ganges River delta, and a dozen more islands are under threat..... official records list 102

islands on the Indian side of the vast Sunderbans.... but Scientists found that two have been swallowed up.”

Rising sea-levels will be a disaster:

While some climatologists say that sea levels will increase by just 4-35 inches from 1990 levels in another hundred years.... Some feel that the range could be higher – 20 -55 inches. That is a lot; and will affect human habitat in a big way.

In fact, as far back as 1993 a study to evaluate the impact of rising sea levels on India was carried out by JNU (Jawaharlal Nehru University). They calculated what would happen if the sea-levels rose; by just 1 metre.... And they found that as many as 7 million people would be displaced and 5,764 sq km of land and 4,200 km of roads would be lost.

Orissa will suffer too

Orissa is another state which is already being hit hard by global warming. Whole villages in the coastal regions are disappearing.

“As village after village in Orissa’s coastal Kendrapara district vanishes into the bay of Bengal, one thing is clear: sea levels are rising the state’s geographical location at the head of the Bay of Bengal, with a landlocked sea and a deltaic plain, makes the state extremely vulnerable to rises in sea level caused by global warming.”

In September 2002, scientists at the National Centre for Agricultural Economics and Policy Research conducted a people’s perception survey on climate-induced natural disasters in the Kendrapara district of Orissa. The results showed that the frequency and intensity of droughts have increased and so have the incidents of flooding. Also, the intensity of cyclones have increased and people believed that the sea-water had become warmer. These poor villagers do not know why this is happening but climatologists know why. Global Warming, Ironically these poor villages hardly contribute to global warming..... they hardly emit any greenhouse gases.

This is because the Bay of Bengal is landlocked from three sides and there is a huge delta of the rivers Brahmaputra and the Ganga. These rivers will carry the water from the melting Himalayan snows. However this does not mean that the western coastal regions are immune just that the eastern coast is more vulnerable at this stage.

According to the Wiki greenhouse gases are “include water vapor, carbon dioxide, methane, nitrous oxide, and ozone components of the atmosphere that contribute to the greenhouse effect. Some greenhouse gases occur naturally in the atmosphere, while others result from human activities. You can learn more about the Greenhouse effect.

The planet is warming, from North Pole to South Pole, and everywhere in between. Globally, the mercury is already up more than 1 degree Fahrenheit (0.8 degree Celsius), and even more in sensitive polar regions. And the effects of rising temperatures aren’t waiting for some far-flung future. They’re happening right now. Signs are appearing all over, and some of them are surprising. The heat is not only melting glaciers and sea ice, it’s also shifting precipitation patterns and setting animals on the move.

Some impacts from increasing temperatures are already happening.

- Ice is melting worldwide, especially at the Earth’s poles. This includes mountain glaciers, ice sheets covering West Antarctica and Greenland, and Arctic sea ice.
- Researcher Bill Fraser has tracked the decline of the Adelie penguins on Antarctica, where their

numbers have fallen from 32,000 breeding pairs to 11,000 in 30 years.

- Sea level rise became faster over the last century.
- Some butterflies, foxes, and alpine plants have moved farther north or to higher, cooler areas.
- Precipitation (rain and snowfall) has increased across the globe, on average.
- Spruce bark beetles have boomed in Alaska thanks to 20 years of warm summers. The insects have chewed up 4 million acres of spruce trees.

Other effects could happen later this century, if warming continues.

- Sea levels are expected to rise between 7 and 23 inches (18 and 59 centimeters) by the end of the century, and continued melting at the poles could add between 4 and 8 inches (10 to 20 centimeters).
- Hurricanes and other storms are likely to become stronger.
- Species that depend on one another may become out of sync. For example, plants could bloom earlier than their pollinating insects become active.
- Floods and droughts will become more common. Rainfall in Ethiopia, where droughts are already common, could decline by 10 percent over the next 50 years.
- Less fresh water will be available. If the Quelccaya ice cap in Peru continues to melt at its current rate, it will be gone by 2100, leaving thousands of people who rely on it for drinking water and electricity without a source of either.
- Some diseases will spread, such as malaria carried by mosquitoes.
- Ecosystems will change – some species will move farther north or become more successful; others won't be able to move and could become extinct. Wildlife research scientist Martyn Obbard has found that since the mid- 1980s, with less ice on which to live and fish for food, polar bears have gotten considerably skinnier. Polar bear Biologist Ian Stirling has found a similar pattern in Hudson Bay. He fears that if sea ice disappears, the polar bears will as well.

Conclusion: Possible solutions:

Many people and governments are already working hard to cut greenhouse gases, and everyone can help.

Researchers Stephen Pacala and Robert Socolow at Princeton University have suggested an approach that they call “stabilization wedges.” This means reducing GHG emissions from a variety of sources with technologies available in the next few decades, rather than relying on an enormous change in a single area. They suggest 7 wedges that could each reduce emissions, and all of them together could hold emissions at approximately current levels for the next 50 years, putting us on a potential path to stabilize around 500 ppm.

There are many possible wedges, including improvements to energy efficiency and vehicle fuel economy (so less energy has to be produced), and increases in wind and solar power, hydrogen produced from renewable sources, biofuels (produced from crops), natural gas, and nuclear power. There is also the potential to capture the carbon dioxide emitted from fossil fuels and store it underground – a process called “carbon sequestration.”

In addition to reducing the gases we emit to the atmosphere, we can also increase the amount of gases we take out of the atmosphere. Plants and trees absorb CO₂ as they grow, “Sequestering” carbon naturally. Increasing forestlands and making changes to the way we farm could increase the amount of carbon we're storing.

Some of these technologies have drawbacks, and different communities will make different decisions

about how to power their lives, but the good news is that there are a variety of options to put us on a path toward a stable climate.

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