



Global warming: How the environment is affected

Dr. Pushpa Dewangan¹, Dr. Balbhadra Prasad Dewangan²

¹ Principal & Head, Department of Economics, K.P. College Bandhapali, Sarangarh, Chhattisgarh, India

² Principal & Head, Department of Economics, Ashoka College, Sarangarh, Chhattisgarh, India

Abstract

Independent evaluations from the National Oceanic and Atmospheric Administration (NOAA) and other research institutions closely match NASA's analysis. In comparison to the pre-industrial average temperatures recorded between 1850 and 1900, the Earth's temperature in 2023 rose by around 2.45 degrees Fahrenheit (1.36 degrees Celsius), according to global statistics. By absorbing solar energy and re-emitting heat that would otherwise escape into space, atmospheric aerosol particles—in particular, tiny dust trapped at high altitudes—play a crucial role in controlling the planet's thermal balance. This event has significant ramifications for our understanding of how the Earth's climate functions. Depending on the type of dust, the time of day, and the season, these two effects may cancel each other out. For instance, a layer of dust can tend to chill the summer and warm the winter. Both water vapor and ozone release ultraviolet radiation, which has a big impact on the atmosphere. The primary drivers of global warming are power plant greenhouse gas emissions, population growth, deforestation, the transportation sector, and the deterioration of wet land. The effects of global warming are felt in many aspects of life. Acidification of the weather seas Ozone depletion due to forest fires climatic change in the area Global warming has an impact on human health, agriculture, water shortages, and glacier retreat and disappearance. It has been determined that a 2°C increase in global temperatures might result in a drop-in rice yield of between 0 and 75 tons per hectare. Similarly, wheat production might drop by 0 to 45 tons per hectare if winter temperatures rise by 0.5°C. According to research, these results are probably the result of global warming. This essay looks at the root causes of global warming, its extensive ramifications, and the calculated steps being taken globally to lessen those effects.

Keywords: Green house, global warming, oxygen, climate change, pollution, agriculture

Introduction

Global warming is the term used to describe the phenomena of a consistent increase in temperature near the earth's surface. This phenomenon has been seen for the past century or two. This upheaval has altered the earth's climatic pattern. Scientists have generated relevant data to support the assumption that the earth's temperature is constantly rising, despite the fact that the concept of global warming is very controversial. The average annual global temperature has risen by somewhat more than 1 degree Celsius, or about 2 degrees Fahrenheit, since the Industrial Revolution. There was an average ten-year increase of 0.07% Celsius (0.131°F) from 1880, when precise records were first recorded, and 1980. The average global temperature has risen by around 0.18 degrees Celsius, or 0.32 degrees Fahrenheit, every year during the last forty years. Since 1981, this rising tendency has increased dramatically, causing the earth to warm to an unprecedented degree. Notably, the previous 20 years have seen nine of the 10 hottest years on record since 1880, with 2015 seeing the five highest temperatures ever recorded. Every month of last year was among the top seven warmest on record worldwide, according to the National Oceanic and Atmospheric Administration's (NOAA) 2023 Global Climatic Report from the National Centers for Atmospheric Information. Notably, the greatest recorded temperatures were from June to December, the latter half of the year. In addition, NOAA's historical data show that throughout the months of July, August, and September, global temperatures increased by more than 1.0°C (1.8°F). Climate change skeptics contend that there hasn't been a "pause" or "slowdown" in the increase in global temperatures, despite

several studies showing otherwise, and that the effects of global warming are already hurting people everywhere. According to climate experts, if we want to prevent a future in which catastrophic droughts, wildfires, floods, tropical storms, and other disasters collectively referred to as climate change characterize everyday life worldwide, we must limit global warming to 1.5 degrees Celsius by 2040. Everyone is impacted in some way by these effects, but the poor and economically marginalized are primarily affected. Globally, the environmental problem has become worse recently. Issues related to the global cycle are discussed, including ozone layer depletion, marine pollution, and rising carbon dioxide levels. Alternatively, tiny dust or aerosol particles that float high in the atmosphere can change the earth's thermal balance by warming the surface by reflecting heat that escapes back towards it (Mackenzie, 1997). The season, dust volume, and timing all affect how these two effects balance one other out. For instance, a layer of dust can tend to chill the summer and warm the winter. Greenhouse gases are what keep the Earth warm. They are a naturally occurring component of the atmosphere that absorbs solar energy to warm it. The "natural greenhouse effect" is the name given to this phenomena. The earth's surface would be around -18 degrees Celsius colder than the moon's if greenhouse gases didn't exist. The earth's surface really has an average temperature of around 15 degrees Celsius. The atmosphere has warmed by more than 0.5 degrees Celsius (c) during the past 150 years. Additional activities, such as vehicle emissions and wildfires, contribute to the atmospheric presence of carbon dioxide and sulfur dioxide in addition to the ongoing release of these gases from the burning of energy crops like gasoline, crude oil, and fossil

fuels. The Earth's surface temperature is predicted to rise considerably, maybe by 3 degrees Celsius, until the last ten years of the twenty-first century if current predictions of global warming are accurate. Undoubtedly, a substantial shift in the climate would have a profound impact on both the natural environment and human population. Sea levels, precipitation patterns, and the frequency and severity of extreme weather events like storms and flooding are just a few of the many expected effects of global warming. It is anticipated that access to clean water sources, agriculture, and public health would all be significantly impacted.

There is a connection between two significant global issues—climate change and agricultural practices. A number of climatic factors, including as precipitation levels, temperatures, carbon dioxide concentrations, glacier runoff rates, and precipitation pattern changes, are predicted to be significantly impacted by global warming. The capacity of the biosphere to sustainably supply enough food for human and domesticated animal populations worldwide depends on these interrelated factors. Additionally, the total effect of climate change on agricultural productivity will eventually depend on the balance of animal populations. The overall impact of climate change on agriculture will ultimately depend on how well its beneficial and negative impacts are balanced. Understanding the wide effects of global climate change on the agricultural sector and implementing the necessary changes are essential to maximizing agricultural output. Notably, studies have shown that agriculture itself contributes significantly to climate change. Emissions of greenhouse gases including carbon dioxide, methane, and nitrous oxide, as well as variations in the Earth's surface cover, are the main drivers of this phenomena. These changes can either improve or hinder the planet's capacity to absorb or reflect solar radiation, which in turn increases radiative forcing. While land-use changes like desertification and deforestation, as well as the use of fossil fuels, are the main human sources of carbon dioxide, methane and nitrous oxide emissions have increased mostly due to agricultural operations.

Current major causes of global warming

The rate at which the earth's temperature is increasing is concerning since it is preventing solar energy from spreading into space. Greenhouse gases are therefore in charge of absorbing this energy, which has a series of detrimental effects on our planet. Sea levels are rising, glacier deposits are melting, and extreme weather events are becoming more intense as a result of this phenomenon. Additionally, the environment and society are impacted by changes in natural systems and a decline in agricultural productivity. Interestingly, the main causes of this climatic disaster include—

Green house gases: The greenhouse effect is directly responsible for global warming, one of the most pressing issues facing the planet today. The latter is how some gases in the atmosphere absorb solar energy and then release it again, raising the Earth's temperature. These gases, which are also referred to as greenhouse gases, retain heat from the Earth and return some of it to the earth.

About 19% of the sun's energy is absorbed by the atmosphere, whereas 26% is reflected back into space by the atmosphere and clouds. The Earth's surface warms as a

result of the residual heat. Consequently, the planet releases infrared radiation, which causes the atmosphere to warm.

Convection then distributes this energy throughout the environment. It is important to realize that greenhouse gases are necessary to keep the balance needed for life to survive on Earth. However, the Earth's ambient temperature has increased as a result of their increased concentration.

Overfishing: Industry-related pollution is the term used to describe the kind of pollution that comes from industry. Growing industrialization and technological advancement were two outcomes of the industrial revolution. Unfortunately, this resulted in serious air, land, and water pollution worldwide. The worst kind of pollution is industrial pollution. This is because smoking outdoors causes ozone to be depleted in the atmosphere. It has an impact on both human and animal health in addition to global warming. The carbon footprint of fisheries rises as fish populations decline. Temperature rises, ocean acidification, and deoxygenation are all signs of climate change that are made worse by the additional carbon released into the atmosphere in order to capture fewer fish.

Industrial pollution: The phrase "industrial pollution" refers to pollution brought on by industry. Industrialization and technical advancement were made easier by the Industrial Revolution. But as a result, the Earth's atmosphere, land, and water have all been severely contaminated. Because the smoke released into the atmosphere thins the ozone layer, industrial pollution is the worst kind. The health of both humans and animals is impacted by climate change.

Agriculture: Agriculture is responsible for around 11% of greenhouse gas emissions. These greenhouse gas emissions from agriculture come from rice farming and livestock farms, such as those raising cows. Local ecosystems may be destroyed to make room for agriculture, which requires a lot of green space. Along with releasing a lot of rubbish, these species also emit a lot of greenhouse gases, such as methane. Climate change is made worse by industrial farming since it may generate more animals and pollution.

Transport and vehicles: One of the main sources of carbon dioxide in the atmosphere is vehicle emissions, including those from automobiles. Twenty percent of carbon dioxide released into the atmosphere comes from gasoline burning in automotive engines. On city roads, it is often preferable to drive a car built for urban driving.

Deforestation: Large-scale deforestation results from the annual logging and burning of an estimated 36 million acres of forest cover. Approximately 25% of all carbon dioxide emissions released into the atmosphere are caused by this phenomenon. Therefore, a major factor in the reported increase in atmospheric carbon dioxide levels is the loss of forest cover. Increased urbanization, the need for land for infrastructure development and industrial facilities, and the growing demand for wood products are further factors that exacerbate deforestation and hence exacerbate global warming.

Generating power: A significant amount of global emissions are caused by the burning of gas and petroleum to

provide heat and energy. Coal and petroleum products from natural gas are the main energy sources utilized to produce electricity. Large volumes of potent greenhouse gasses, including carbon dioxide and nitrous oxide, are released when these chemicals burn. The accumulation of these gases in the atmosphere, which traps solar energy, is the main driver of global warming. Additionally, the usage of fossil fuels puts ecosystems and species at peril, possibly rendering them uninhabitable due to negative consequences. In extreme cases, this might lead to the eradication of all vegetation, leaving areas lifeless.

Population: By 2024, there will likely be more than 8.1 billion people on the planet. A comprehensive understanding of demographic trends and causes is crucial to addressing the global climate crisis, as an additional 1 billion people are expected to join the human race by 2040 and another 1 billion by 2060. Emissions of climate-altering greenhouse gases usually rise in tandem with population expansion and consumption. The effects of climate change are exacerbated by the burden that rapid population development places on existing resources. Additionally, it increases the number of individuals who are susceptible to the effects of climate change.

Producing food: During the food production process, several greenhouse gases are released, including carbon dioxide and methane. The environmental impact of the food we buy and consume depends on a number of factors. Agricultural practices, food production locations, fertilizer and pesticide applications, and animal feed are among them, as was previously mentioned. This means that food production is a major contributor to climate change. Greenhouse gas emissions are also increased by the packaging and delivery of food.

Waste: The amount of human garbage produced has never been higher. This is caused by the short product life cycle and heavy packaging use. Landfills are where the great majority of trash and packaging that cannot be recycled end up. Poisonous gases are emitted into the atmosphere as lignor waste breaks down in landfills. These gases contribute to the phenomenon of global warming.

Consuming too much: Environmental effects are influenced by decisions made at home. This includes our dietary patterns and energy sources for everyday tasks. Greenhouse gas emissions are increased by our purchases of plastics, electronics, clothing, and other goods. It was found that the effects varied according on income level. Families with higher incomes emit carbon dioxide at least 10 times more than those with lower incomes. Consumers ought to understand the link between their choices and their environmental impact.

Manufacturing goods: Fossil fuel combustion is the primary cause of emissions in manufacturing and industry. This energy is used to make steel, cement, electronics, plastics, clothing, and other products. Thanks to industrial and technical advancements, consumers may now purchase any things at any time. This suggests that we are generating more items each year and going overboard. More than half

of the items we buy are not truly sustainable. There is more trash than ever before since gadgets and clothing have shorter lifespans.

Effect of global warming

The complex interplay of factors influencing weather patterns, including rainfall, snowfall, hailstorms, and sea level rise, presents enormous challenges for climate scientists as they forecast the implications of global warming. Furthermore, estimates of greenhouse gas emissions are very dubious due to the uncertainty surrounding future political decisions and technological advancements. Despite these challenges, certain adverse effects of global warming have been identified. In particular, rising atmospheric humidity leads to floods in many regions of the world, whereas faster land and sea evaporation processes worsen conditions in areas where precipitation is insufficient to offset evaporation rates, resulting in droughts. After rising sharply since the start of the twenty-first century, temperature anomalies are predicted to continue rising in the years to come. The expansion of industrial activities and the building of new power plants, both of which emit large volumes of greenhouse gases into the atmosphere, are mostly to blame for this trend. These findings are supported by extensive research conducted by several climatological and environmental organizations.

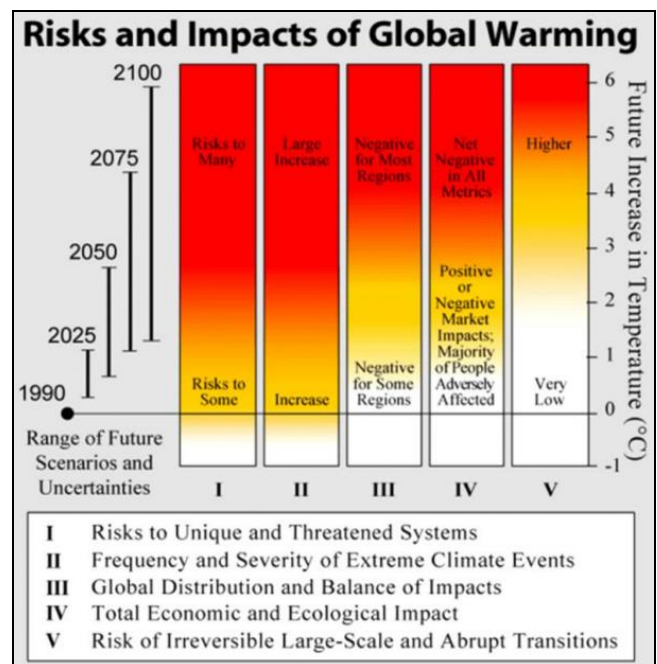


Fig 1

The risks and consequences of global warming in the upcoming years are explained in full in Fig. No. 1. According to the image, significant extreme weather events including earthquakes, floods, and thunderstorms are now occurring. Should no action be taken to eliminate this hazard, the extent of the harm will significantly rise. The National Aeronautics and Space Administration (NASA) provides the average global temperature over the last several years. This tendency clearly raises an important question for us. How will humanity be able to survive on Earth given the rising temperatures?

Effects on the environment

After World War II sparked an industrial revolution, pollution levels rose by the mid-18th century. reaches a 33% reduction in air pollution. Shoreline flooding extremely high levels of salt water seeping into the soil due to drought erosion There is a lot of rain, tropical cyclones, and hurricanes. The following effects have been seen worldwide: The cause is the recent increase in global temperatures. Rising sea levels are causing floods in a number of areas of the nation. Sea levels have risen 100% in the past century. Almost one meter as a result of global warming.

Unusual weather

Natural disasters brought on by global warming may be responsible for some historical trends, such as unusual weather. When severe tropical cyclones become more frequent, that is what will occur. That is going to occur. Examples of abnormally high sea levels are becoming more frequent.

Localized climate change

Catalina was the first hurricane recorded in the South Atlantic. In March 2004, a strike occurs in Brazil. Temperatures in the northern hemisphere's southern Arctic region have increased by 1 to 3 degrees Celsius in the past 50 years. Alaska, Canada, and Russia see the initial thawing of permafrost. This has the potential to destroy the ecosystem and make it flourish. Bacterial activity in the soil produces these zones. carbon sources rather than carbon sinks (Vladimir and Heaven Romanoff, 2007).

Retreat and disappearance of glaciers

Antarctica has all of the world's glaciers. Compared to the end of the 19th century, this is a 50% decrease. Currently, the Himalayas, Alps, Pyrenees, Andes, and stony mountains were seen to have higher rates of glacier retreat and mass balance loss. Mountains and the North Cascades. It extends beyond glacial retreat. Landslides, flash floods, and glacial lake flooding are all directly caused by them. However, river water levels also fluctuate annually.

Oceans

The ocean acts as a carbon sink, absorbing vast amounts of carbon dioxide. If not, it will grow while remaining in the atmosphere. Ocean acidification is a result of sea level rise because rising water temperatures reduce the ocean's ability to absorb CO₂. Among other consequences, global warming is expected to cause thermal waves that will raise sea levels. Ice sheets and glaciers are melting and growing.

Ocean-wide acidification phenomenon

Ocean acidification is currently happening 10 times quicker than it did during a devastating extinction event around 55 million years ago, according to a recent scientific research. Similar to the circumstances that led to the extinction of several armored deep-sea animals from the fossil record, this phenomenon has the potential to trigger a sharp decline in marine life. Scholars agree that animals with calcium carbonate in their biological systems experienced shell erosion as a result of the sharp decline in ocean pH levels that led to this earlier extinction event.

Increase in sea level

As the planet's average temperature rises and more water enters the ocean, the volume of water in the ocean is increasing. It was once surrounded by land-based glaciers. In most glaciers, the Antarctic and Greenland ice sheets As I anticipated, worldwide sales are expected to decline by an average of 60% by 2050. The yearly rate of ice melt in Greenland is 2.39 ± 23 cubic kilometers. In the Indian Ocean, the US, and some parts of Canada, the sea level increases to 6.5 meters.

Temperature increases in oceans

At depths ranging from the surface to 700 meters, worldwide ocean temperatures increased by around 0.10°C (10%) between 1961 and 2003. Significantly, throughout this time, the Southern Ocean had a more noticeable rise of 0.17°C (0.31°C). Additionally, between the 1950s and the 1980s, there were major changes to the world's waters.

Forest fires and their implications under climate change

According to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, mid-latitude areas will see substantial population expansion. As a result, rainfall patterns can worsen, making droughts more likely in places like Mediterranean Europe. Significant volumes of stored atmospheric carbon may be released into the environment as a result of the ensuing rise in forest fires. Nonetheless, by reviving the carbon cycle, this process can be lessened and even reversed naturally. Notably, a self-reinforcing feedback loop might be produced by the whole forest area on Earth. The creation of new forests and the movement of already-existing ones to higher latitudes, where the current climate offers the best conditions for preservation, can both contribute to this phenomena.

Ozone layer destruction

Two different processes that impact both the entire ozone molecule and its typical makeup cause the stratosphere's ozone layer to thin. This decline is mostly due to technical advancements that have increased atmospheric disturbances through the use of nitrogen-based fertilizers in agriculture, rocket missions, supersonic travel, refrigeration systems, and other activities. Ozone is abundant near the earth. The surface has an adverse effect on materials, woods, ornamental plants, agricultural products, human health, etc. Nitrogen emissions have been shown to be reduced. Using oxides may be necessary when ozone concentrations are high.

Release of methane from hydrate

The high concentration of methane molecules inside a crystalline structure is what distinguishes methane hydrate, often referred to as methane clathrate, from other types of water ice. Massive volumes of methane can be released into the atmosphere suddenly by natural gas released by unusual methane clathrate formations. According to earlier research, the greenhouse effect may be to blame for these emissions. However, it is predicted that future climate changes may cause these reserves to emit more methane, which might have a major impact on global warming.

Effects on farming

Temperature has a significant impact on agricultural productivity. It has been demonstrated that a temperature of

0°C lowers rice production by around 0.75 tons per hectare in areas with high yields. On the other hand, yields may increase with a 0.5°C temperature increase in the winter. Similarly, exposure to 0°C has been shown to reduce wheat yields by around 0.45 tons per acre. Notably, studies indicate that wheat productivity might decrease by 28–68% in the absence of carbon dioxide fertilization's advantages. Additionally, studies indicate that rice production decreases by around 6% for every degree that the temperature rises.

Countermeasures / Control against global warming

You are responsible for every gallon of gasoline you consume, so look for the car with the highest fuel economy for your class of purchase. That amounts to 25 pounds of heat-trapping atmospheric gas. Two advantages of using gasoline more efficiently include lower greenhouse gas emissions and thousands of dollars in savings over the course of your pump car:

Select energy that is clean: More than half of the electrical power used in all of America is produced in the selected geographic area. Facilities that use coal combustion have detrimental effects on the environment, regardless of their significance. These facilities' primary function is to supply thermal energy using gas-powered heating systems. The fact that such infrastructure is essential to human life must be acknowledged. Furthermore, several nations have effectively transitioned to using 50–100% renewable energy sources, lowering their carbon footprint and promoting sustainable growth, even if electricity is a necessary part of modern society.

Look for the energy star: When changing household equipment, it is essential to consider the energy needs. Notably, the biggest energy users in homes are usually freshly installed air conditioners, water heaters, freezers, ovens, and refrigerators. Significant advantages can result from putting energy-saving measures into practice at home. In particular, replacing all of America's households' current appliances with the most energy-efficient models on the market could save an estimated \$15 billion in energy costs and 175 million gallons of gasoline annually, which would reduce greenhouse gas emissions equal to millions of tons of carbon dioxide.

Take the freezer's plug out: One of the quickest ways to combat global warming is to avoid dismantling refrigeration appliances, including freezers and refrigerators, which significantly lowers carbon emissions in homes. As a result, this strategy produces a significant drop of around 10%, which helps to significantly reduce total emissions.

Plant a tree: Organize your neighborhood and consult an arborist or urban forester about planting trees on both public and private properties. In addition to storing carbon, trees planted in and around residences and cities may reduce energy expenses and the use of fossil fuels.

Let policy makers know you are concerned about global warming: People who are worried should speak up to our political officials and business executives. Become a member of the Union of Concerned Scientists Action Network to ensure that decision-makers have access to the

accurate and timely information they need to make educated decisions on climate change solutions.

Other solutions: Emissions of dangerous gases are the main cause of global warming, as was previously determined. One strategy to reduce such emissions is to reduce the number of cars that generate harmful pollutants. However, since many individuals are hesitant to limit their use of cars, this hasn't been very successful. Indeed, just a small portion of people like to walk, and others have begun using bicycles or public transit. Always remember that the vehicle's emissions and fuel efficiency are the most important factors to consider while choosing a car. Hybrid cars are more energy-efficient and emit less pollutants. Tire pressure should be maintained and air filters should be replaced often to reduce harmful emissions. Carpooling with a friend or coworker can help reduce the number of automobiles on the road. Newspaper circulation and social networking platforms could also aid in lessening the problem. Automobile advertising should be used to encourage drivers to reduce emissions and use less energy. Posters, logos, and posters can be used to start awareness campaigns.

The facts provided clearly demonstrates how global warming has a negative impact on the environment. It also draws attention to the possibility of reducing these negative effects by putting recycling procedures into place, which would help to slow down global warming. For most individuals, rechargeable batteries are better than disposable ones. Investing in durable, high-quality products is crucial. The only locations to shop are local markets, which reduces the need for traveling. Even little individual actions, like as lowering your thermostat in the winter or replacing incandescent lightbulbs with compact fluorescent ones, can help reduce global warming. To develop more trees, you need to start a tree planting program. To prevent deforestation and forest degradation, state governments must intervene. Nuclear energy can also be viewed as a solution since it reduces emissions. However, this strategy should be applied with caution since it might lead to disastrous accidents. Therefore, overcoming nuclear energy's safety, proliferation, waste management, and high cost would be the biggest barriers to its adoption.

International strategies to control global warming

The World Meteorological Organization is responsible for coordinating pertinent environmental issues (WMO). Climate encompasses the condition of the global air. Nearby, there is a build-up of CO₂, SO₂, and NO₂ of 7.4, 8.7, and 9.8%. Emissions avoided in 1997 and 1997 If equipment is used well, production can go on until 2075 (Shrestha *et al.* 1998) ^[7]. Dioxin emissions can be reduced by treating exhaust gas with bags. Fly ash is processed using thermal aldehydes, chlorinated, and other photolytic and chemical techniques, as well as filtration and sintering (melting and hardening) (Ahuja, 2008).

Copenhagen conference

The conclusion of talks on a new international agreement was the aim of the parties (police) meeting in Copenhagen. Laws addressing climate change had to be put into effect by 2012. Three people The Copenhagen Accord was approved unanimously by the Party conference (police). Point 1: The parties acknowledge and state that they are "aware" of the

scientific agreement that global warming should not exceed 2 degrees Celsius. Point 2: A significant reduction in world emissions is necessary. The IPCC's Fourth Assessment Report and scientific results support the need for swift action to keep the increase in global temperature to no more than 2 degrees Celsius. Techniques that are fair and grounded in science should be used to achieve this objective. Notably, efforts have been made to accomplish this goal by the US, China, India, Brazil, and South Africa. The other maintaining parties, including the European Union, have been asked to participate in these initiatives, although they are free to turn them down if they so want.

Conclusion and future strategies

There is broad scientific consensus about the existence of global warming and the contribution of humans to it. The present work is a first exploration of a complex area of research. Concerns about global warming need to be addressed quickly and forcefully to prevent disastrous outcomes. Regardless of its impact on human civilizations, global warming threatens biodiversity and ecosystems, causing devastating events like floods brought on by melting polar ice caps and sea level rise that may destroy whole regions' agricultural and fishing industries.

In order to properly address these significant issues, prompt and thorough action is required. These might include moving to different information sources, stopping deforestation, and coming up with innovative ways to counteract this serious threat. Fast-rising economies need to prioritize the development of energy-saving technology, while emerging economies are devising strategies to reduce greenhouse gas emissions. A stronger reliance on renewable energy sources derived from natural resources like wind and sunshine, as well as extensive reforestation efforts, are also essential. In order to reduce environmental harm, appropriate fertilization techniques must also be used.

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