



A Study On Climate Change And India's Efforts To Reduce Temperature Rise In Accordance With The Paris Agreement

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ABSTRACT

India has long had a commitment to combating climate change; it did not come about as a result of the UNFCCC or the Paris Agreement. In its 2014 Emission Gap Report, the United Nations Environment Programme (UNEP) identified India as one of the nations that is making excellent progress toward fulfilling its voluntary commitments to reduce climate change. Three percent of the total emissions between 1750 and the present are attributable to India. India is responsible for almost 13% of the total emissions. India was hesitant to accede to the Agreement's stipulation in 2015 that all nations establish national targets because of this. As of right now, India is the only significant economy whose NDC has been assessed at 2 degrees Celsius. In order to ascertain the impact of climate change on macroeconomic indicators over the study period, this study examines the dynamics of climate change based on greenhouse gas emissions. The country's changing climate is reflected in the temperature. As a result, the research uses the climate change model and makes calculations based on it. An analysis of the economic growth performance and climate changes from 2011–2012 to 2021–2022 was conducted using a multiple regression model. The model attempts to investigate the relationship between macroeconomic indicators and GHG emissions, temperature and GHG emissions, and indicators of climate change.

INTRODUCTION

One of the biggest environmental problems the world is currently facing is climate change. India is dealing with a number of issues. Numerous negative effects on agriculture, water resources, forests and biodiversity, health, coastal management, and temperature rise are linked to climate change. In recent times, there has been a growing complexity in the relationship between the environment and economic development processes. This is mostly because economic development has accelerated over the past few decades in all sectors, as seen by the sharp increases in fundamental statistical indicators like the gross domestic product, the amount of industrial output, and the level of urbanization. There is a decrease in environmental damage as the economy grows. It is believed that pollution will rise with economic expansion after the tipping point is reached and eventually reach its initial level. The industrial economy, which has a high energy consumption and emissions since the industrial revolution, has expanded quickly and is now the primary engine behind the global economy's steady expansion. On the other hand, sustained reliance on the industrial economy to spur economic expansion will unavoidably use a significant amount of fossil fuels, raising overall carbon emissions over time.

India, being a developing country, requires additional energy to implement structural modifications to the production process. As coal accounts for 70% of India's electricity supply, burning fossil fuels is necessary to produce electricity. Eighty-three percent of India's carbon dioxide emissions come from burning fossil fuels, which increases greenhouse gas emissions that cause global warming. Changes in land use, like deforestation, are another factor. Airborne carbon dioxide is released with the destruction of forest land. According to reports,

the annual cutting and burning of approximately 34 million acres is responsible for 25% of all carbon dioxide emissions that reach the atmosphere. According to estimates, the concentration of carbon dioxide in the atmosphere will have doubled from pre-industrial levels by 2030 if we continue to emit carbon dioxide into the atmosphere.

Statement of The Problem:

Climate change is the long-term shift in the patterns of average temperature that has been caused by human activity on Earth since the middle of the 20th century. It involves burning fossil fuels, which raises the atmospheric concentrations of heat-trapping greenhouse gases and raises the planet's average surface temperature—a phenomenon known as global warming. The earth's global average temperature has risen by approximately 1 degree Celsius, or 1.8 degrees Fahrenheit, due to human activity since the pre-industrial era. This number is currently rising by more than 0.2 degrees Celsius, or 0.36 degrees Fahrenheit, every decade. Since the 1950s, human activity has unquestionably contributed to the current warming trend, which is happening at a rate never seen in millennia. Countries committed to lowering greenhouse gas emissions through the Kyoto Protocol and the Paris Agreement, but the amount of carbon dioxide in the atmosphere is still rising and warming the planet at an alarming rate. The first legally binding climate agreement was the Kyoto Protocol, which was adopted in 1997 and went into effect in 2005. It set up a system to track nations' progress and mandated developed nations to cut emissions by an average of 5% below 1990 levels. However, the treaty did not force developing nations—including China and India, two of the biggest carbon emitters—to take action.

The study will be helpful in understanding the Paris Agreement, which was the most significant global climate agreement to date and required all nations to set pledges for reducing their emissions. The researcher is also interested in learning about the nationally determined Contributions (NDCs) set by the Indian government, which aim to keep global average temperatures below 1.5 degrees Celsius and to stop them from rising above 2 degrees. In the next fifty years, it also hopes to achieve global net-zero emissions, in which the quantity of greenhouse gases released into the atmosphere is equal to the amount removed from it.

As a result, the research has looked into how greenhouse gas emissions affect climate change and how that affects India's macroeconomic indicators. Even though India has made great strides toward fulfilling its emissions reduction obligations under the Paris Agreement, under the current course of events, total greenhouse gas emissions would nevertheless rise by more than 40% by 2030. In light of this, the study has concentrated on the intensity of emissions and the analysis of changes in climate to determine whether India has fulfilled its commitment under the 2015 Paris Agreement.

OBJECTIVES OF THE STUDY

- To ascertain India's climate change compatibility and to comprehend India's efforts to fulfill the objectives of the Paris Agreement.
- To investigate India's sources of greenhouse gas emissions and how they affect global warming.
- To evaluate the effects of greenhouse gas emissions and climate change on India's macroeconomic indicators.
- To determine whether India can eventually reach 1.5 degrees Celsius phrase according to the objectives of the Paris Agreement.

PERIOD OF STUDY

Eleven years, ranging from 2011–2012 to 2021–2022, were chosen for this investigation. Based on research conducted in India both before and after the Paris Agreement was put into effect. India made its initial commitment in 2015. Countries are required to "update" their pledges to make greater commitments to reducing greenhouse gas (GHG) emissions every five years in accordance with the terms of the Paris Agreement. There were three main goals for the first pledge, which was also known as a Nationally Determined Contribution (NDC). The first was bringing the economy's emissions intensity down to levels that were 33–35 percent lower than in 2005. The second was that by 2030, non-fossil energy sources would account for 40% of installed electric power. The third goal was to increase the amount of forest and tree cover by 2030 in order to produce an extra 2.5–3 gigatonnes of carbon dioxide equivalent carbon sink. Consequently, in order to ascertain the

effects of climate change on and the dynamics of climate change based on greenhouse gas emissions, and impact on macroeconomic indicators.

SOURCE OF DATA

This study is based completely on secondary data. The relevant data have been collected from the following, They are:

- Central Statistical Organisation Reports.
- Directorate General of Commercial Intelligence and Statistics Reports.
- Databook for use of Deputy Chairman, Planning Commission.
- RBI Bulletin.
- National Databook.
- World Bank Reports.
- Handbook of Statistics on The Indian Economy.

TOOLS OF ANALYSIS

The purpose of this research is to analyze the relationship between India's Climate Change, Greenhouse Gas emissions and economic growth. Therefore, the survey covers 11 years (ie., 2011-2012 to 2021-2022). Climate change refers to long term shift in temperatures. But since, the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels. Burning fossil fuels generates greenhouse gas emissions that act like a blanket wrapped around the earth, trapping the sun's heat and raising temperatures. The main greenhouse gases that are causing climate change include carbon dioxide, methane and nitrous oxide. Before analyzing the relationship between macroeconomic indicators and climate change, it has been verified that a steady trend on climate change indicator and causes of climate change which is GHGs emissions is the basic assumption of time series analysis. The least square is applied. This method is used to estimate the trend coefficients of selected variables of selected components and sources of the GHG emissions in India during the period of study and to fit a linear regression model.

The fitted model is as follows.

$$Y = a + bt + u$$

Where Y is the ratio between the selected GHG emissions and sources of GHG emissions, 't' is time, 'a' and 'b' are parameters (intersection and coefficient respectively) and 'u' is the error term.

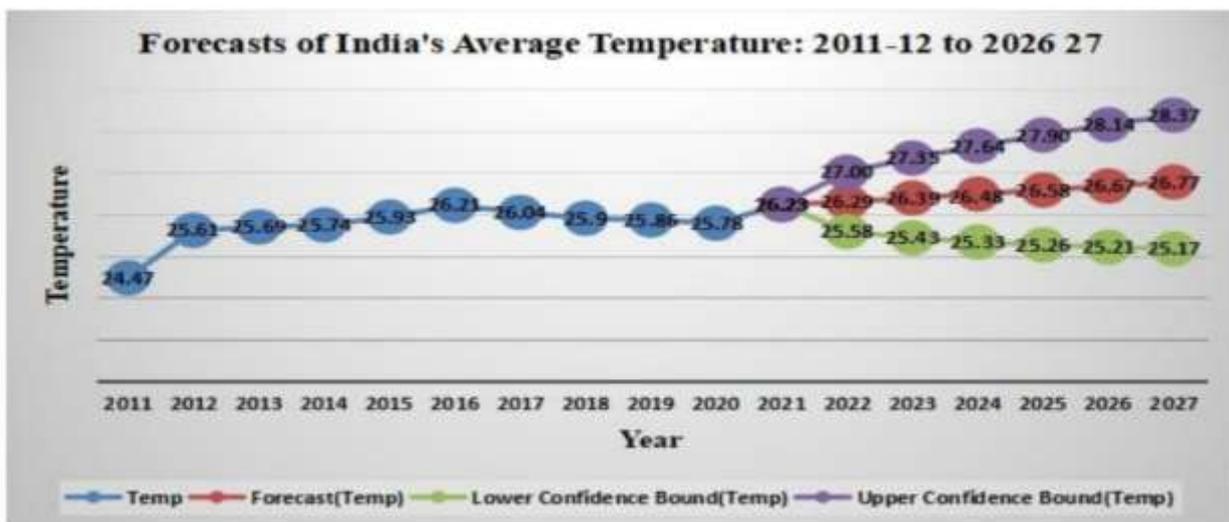
TABLE: 1.1
GROWTH RATE OF INDIA'S AVERAGE TEMPERATURE BEFORE PARIS AGREEMENT FOR THE PERIOD 2011-2012 TO 2015-2016

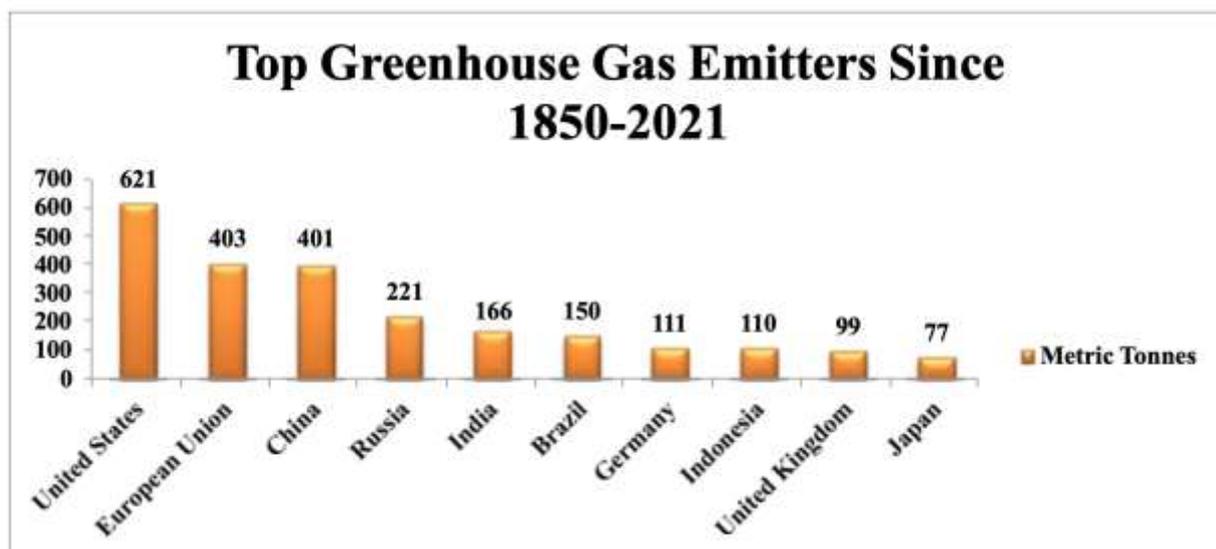
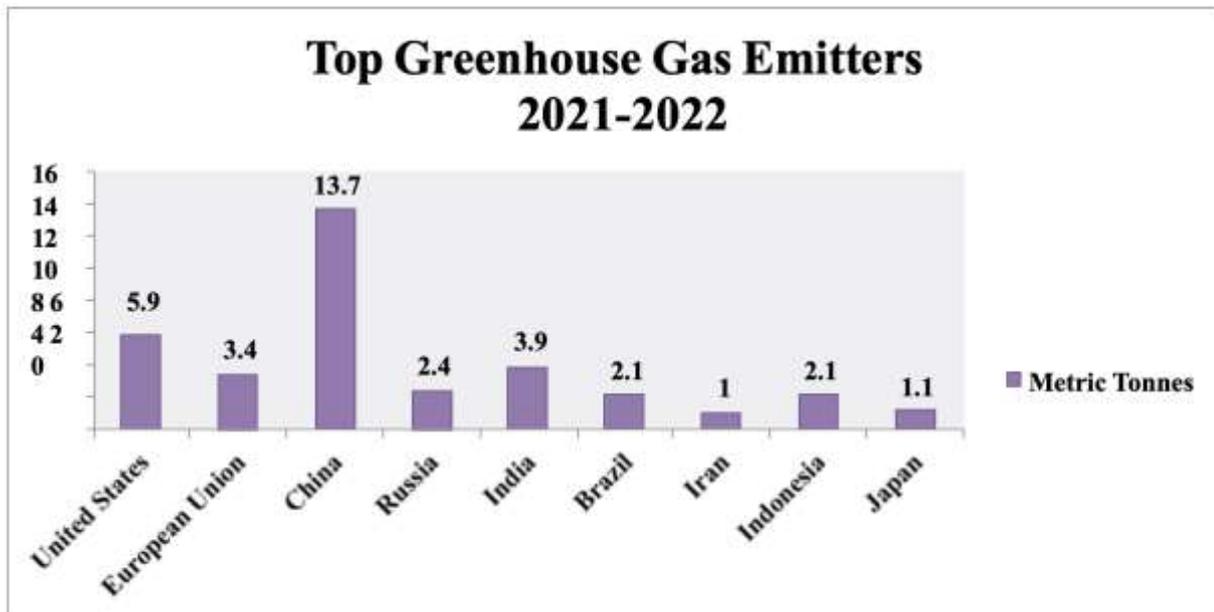
Year	Real Value	AAGR
2011-2012	24.47	1.06
2012-2013	25.61	4.45
2013-2014	25.69	0.31
2014-2015	25.74	0.19
2015-2016	25.93	0.73

TABLE: 1.2
GROWTH RATE OF INDIA'S AVERAGE TEMPERATURE AFTER PARIS AGREEMENT FOR THE PERIOD 2016-2017 TO 2021-2022

2016-2017	26.21	1.07
2017-2018	26.04	-0.65
2018-2019	25.90	-0.54
2019-2020	25.86	-0.15
2020-2021	25.78	-0.31
2021-2022	26.23	1.72

TABLE: 1.3





CONCLUSION :

Climate change is real and potential severe. Warming of earth's surface and lower atmosphere is caused by water vapour, carbon dioxide and other trace gases like methane, nitrous gases, etc., in the atmosphere. Global mean surface temperature increased less than 10 Celsius during 20th century. It does not seem all that high but it has caused conspicuous increase in storm, cyclones, floods, droughts and raging forest fires in the last 10 years. As per best estimates, during 21st century increase in temperature of the earth is 3 degree to 5 degree Celsius and is expected that temperature change in India is more intense. The Paris Agreement is an International treaty on climate change with the long term objective to keep the global mean temperature below two degree Celsius and to limit the rise in temperature to 1.5 degree Celsius. The Paris agreement is a land mark in the multilateral climate change process, because for the first time a binding agreement brings all nations together to combat climate change and adapt to its effects. Accordingly, during 2011-2012 to 2021-2022 India's average has increased by 0.7 degree Celsius. The table 5.1 illustrates growth rate of India's average mean temperature for the period 2011-2012 to 2021-2022. India is fourth economy which is affected by climate change in 2015-2016. In 2015 the agreement covers climate change mitigation, adaptation and finance. From the estimates it was observed that average mean temperature was highest during the period 2012-2013 about 4.45 percent. The rise in annual minimum temperatures is around 18%–21% higher than the rise in average temperatures.

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