



## A STUDY OF CLIMATE CHANGE AND ITS INFLUENCE ON AGRICULTURE

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**ABSTRACT**

Climate change is one of the biggest issues facing the world today it is not a new phenomenon in the Earth's history. Climate Change refers to a significant variation in either the mean state of the climate or in its variability, persisting for an extended period, typically, decades or longer.

**KEYWORDS :** Climate, Agriculture, Impact**INTRODUCTION**

Climate is closely related to human activities and economic development including agricultural system, there is a serious concern about its stability. These human activities have led to increased atmospheric concentration of a number of greenhouse gases, including carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, and troposphere ozone in the lower part of the atmosphere. Just a few degrees increase in the earth's temperature can cause droughts and crop failures, ecosystem imbalances as well as melting ice caps causing sea levels to rise.

The temperature record is not the only indication of a changing climate. There are many other indicators such as the substantial retreat of mountain glaciers in many locations around the world, decreased snow cover in the Northern hemisphere, decreased tropical precipitation, increased mid-to-high latitude precipitation, sea level rise, increase in extreme events, decreased extent of Arctic ice and thinning of Arctic ice. All these proved that global climate is changing. At this point, it is to note that water vapor is the single most powerful greenhouse gas in the atmosphere. Water vapor has approximately twice the effect of the second most powerful greenhouse gas—carbon dioxide. Human activities do not have any significant direct impact on the level of water vapor in the atmosphere. However, as a result of global warming it is likely that human activities will have a significant indirect impact on the level of water vapor in the atmosphere. Water vapor is the most important greenhouse gas and the development of a better understanding of the effect of global warming on atmospheric water in all its forms (solid, liquid, and gas) is of critical importance.

**GLOBAL SCENARIO OF CLIMATE CHANGES**

Weather observations sign that the global average surface temperature has increased by 0.6 0 C since the 19th century (IPCC, 2001). The rate of warming is faster than at any other time, during the past 100 years, which is attributed to the increase in the proportion of carbon dioxide and other greenhouse gases in the atmosphere over the last century. Observations also indicated that all the warmest years during the past century across the globe occurred in the last two decades. Increasing concentrations of greenhouse gases are likely to accelerate the rate of climate change.

Other than the changes in air temperature, global warming has potential impact on global precipitation patterns and the frequency of droughts and flood. Many researchers are of the opinion that an increase in temperature could lead to a more intensive use of water. The rates of evaporation from soils and water as well as transpiration from plants could increase. Other impacts of global warming include mean sea level rise as a result of thermal expansion of the oceans and the melting of glaciers and polar ice sheets. The global mean sea level is projected to rise by 0.09 to 0.88 meter over the next century. Due to global warming and sea level rise, many coastal systems can experience increased levels of inundation and storm flooding, accelerated coastal erosion, seawater intrusion into fresh groundwater and encroachment of tidal waters into river systems. Climate change and global warming also affect the abundance, spawning, and availability of commercially important marine fisheries. Increase in sea surface temperature adversely affects coral and coral associated flora and fauna.

**CLIMATE CHANGES IN INDIA**

Confirmative evidences of climate variability and change are difficult to obtain, as often the signals are confusing. However, few evidences are available, which need further critical analysis for their confirmation. The All India Rainfall Series (AIRS) has to be considered as an overall generalization of rainfall over India as it does not reflect the year to year fluctuations for all the areas because the geophysical area of India is too large and it cannot be regarded as a single unit (Normand, 1953). Rainfall variability and trends over India show a high temporal and spatial characteristic of rainfall over India. Analysis of the long term changes in rainfall quantum across individual meteorological sub divisions indicate that not only there are regions which have recorded increase or decrease of annual rainfall on a long term basis (1871 -1999) but also there has been southward shift in the surplus rainfall zones, when one compares the last four decade means with the long term means (Schaefer, 2001).

**INFLUENCE OF CLIMATE CHANGE**

Climate change influence can be broadly divided into two groups biophysical and socio-economic as under:

**1. Biophysical influence:**

- Physiological effects on crops, pasture, forests and livestock
- Changes in land, soil and water resources
- Increased weed and pest challenges
- Shifts in spatial and temporal distribution
- Sea level rise, changes to ocean salinity
- Sea temperature rise causing fish to inhabit different ranges

**2. Socio-economic influence:**

- Decline in yields and production
- Reduced marginal GDP from agriculture
- Fluctuations in world market prices
- Changes in geographical distribution of trade regimes
- Increased number of people at risk of hunger and food insecurity
- Migration and civil unrest.

**INFLUENCE OF CLIMATE CHANGE ON AGRICULTURE**

The projected global climate change by several researchers due to warming of the atmosphere as a result of increased presence of green house could lead to a threat to future food security and natural resources directly or indirectly through anomalies in weather patterns particularly in fragile arid eco systems. The impact of projected climate change is more likely in arid ecosystem than in semi arid or sub humid regions of India by end of 21st several predictions have been made on the possible changes in climate due to increased concentrations of green house gases (GHG) and their impacts on agriculture. The general circulation models (GCM) indicate that doubling of CO<sub>2</sub> century. Agriculture has always been dependant on the variability of the climate for the growing season and the state of land at the start of the growing season. A temperature rise extends the growing season and the farmable area; it causes earlier maturity of grain and open up for the growing of new crops. While the temperature rise is beneficial to some crops, the extra heat also affects weeds, pests and insects tend to get better living conditions under high temperatures concentrations by 2030 will increase average global temperature by 1-3 0 C, which may result in decrease in cereal production and increase in

tropical cyclonic activity, posing serious flood damages along their tracks (Govinda Rao et al, 1994).

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