

A REVIEW :

Implications of climate change

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Asian Journal of Environmental Science | December, 2011 | Vol. 6 Issue 2 : 224 -229

Received:

September, 2011

Accepted :

November, 2011

SUMMARY

The Intergovernmental Panel on Climate Change has projected that the global mean surface temperature will rise by 2.0-4.5°C by 2100 due to increase in carbon dioxide concentration in the atmosphere. Climatic variability is also projected to increase, leading to uncertain onset of rainfall and more frequent extreme weather events. Global warming is projected to have significant impacts on conditions affecting agriculture, including temperature, precipitation and glacial run-off. These conditions determine the carrying capacity of the biosphere to produce enough food for the human population and domesticated animals. Rising carbon dioxide levels would also have effects, both detrimental and beneficial, on crop yields. According to 4th Assessment Report of IPCC, 2007, the 120 million to 1.2 billion people in Asia will experience increased water stress by 2020 and 185 to 981 million by 2050. The per capita water availability in India will drop from around 1900 cubic meter currently to 1000 cubic metres by 2025. According to the IPCC, potential global food production is projected to increase with local average temperatures rising over a range of 1–3°C, but projected to decrease over this level.

How to cite this paper: Dhaliwal, L.K., Buttar, G.S., Sandhu, S.K and Singh, Sompal (2011). Implications of climate change. *Asian J. Environ. Sci.*, 6(2): 224-229.

Key Words :

Climate change, Greenhouse gases, Fossil fuels,

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Worldwide, climate change and weather variability have become the topic of great concern in the recent years. Climatic change refers to long-term changes in mean temperature or precipitation as well as increased frequency of extreme climate effects that may affect the crops, cropping systems, livestock, pests and thereby threatening the food security. Global warming is becoming an universally acknowledged fact. It has likewise been accepted that climate change is largely caused by human activities and that the effects are inevitable, even if emissions of greenhouse gases (GHGs) are brought to an immediate end. There is an increasing concern that human activities may be inadvertently changing the climate of the globe through enhanced greenhouse effect, by past and continuing emissions of carbon dioxide and other greenhouse gases which will cause the temperature of the earth surface to increase – popularly termed as global warming.

The major cause to climate change has been ascribed to the increased levels of

greenhouse gases due to the uncontrolled activities such as burning of fossil fuels, increased use of refrigerants and changed land use pattern related practices. There is a general consensus that greenhouse warming would have major impact on agro-ecosystems. The atmospheric gaseous constituents which absorb thermal radiations and cause greenhouse warming include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), water vapour and chlorofluorocarbons (CFC's). The atmospheric concentration of carbon dioxide is increasing at alarming rates (1.9 ppm per year) in the recent years. The increase in mean air temperature over last 100 years (1850-1899 to 2001-2005) is 0.76°C, which is influencing the agricultural production system. The Fourth Assessment Report of Intergovernmental Panel on Climate Change, IPCC (2007) concluded “there is high confidence that recent regional changes in temperature had discernible impacts on many physical and biological systems”. Recent IPCC report and a few other studies indicated a