A REVIEW

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Impact of climatic change on vegetable

B. AFROZA*, S.H. KHAN, K.P. WANI, M.A. CHATTOO, K. HUSSAIN, R. BHAT AND F. MUSHTAQ

Division of Olericulture, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, Shalimar, SRINAGAR (J&K) INDIA

ABSTRACT

When there is significant variation either in the state of climate or in its variability, persisting for an extended period, it is referred to as climate change. A significant change in climate on a global scale will impact agriculture and consequently affect world's food supply. Climate change *per se* is not necessarily harmful; the problems arise from extreme events that are difficult to predict (FAO, 2001). Unpredictable high temperature spells and more erratic rainfall patterns will consequently reduce crop productivity. Developing countries in the tropics will be particularly vulnerable. Vegetables are generally sensitive to environmental extremes, and thus high temperatures and limited soil moisture are the major causes of low yields in the tropics and will be further magnified by climate change. Climate changes will influence the severity of environmental stress imposed on vegetable crops. Moreover, increasing temperatures reduced irrigation water availability, flooding and salinity will be major limiting factors in sustaining and increasing vegetable productivity. Extreme climate conditions will also negatively impact soil fertility and increase soil erosion. Thus, additional fertilizer application or improved nutrient-use efficiency of crops will be needed to maintain productivity or harness the potential for enhanced crop growth due to increased atmospheric CO_2. The response of plants to environmental stresses depends on the plant developmental stage and the length and severity of the stress. Plants may respond similarly to avoid one or more stresses through morphological or biochemical mechanisms. Environmental interactions may make the stress response of plants more complex or influence the degree of impact of climate change.

Key words : Climate change, Effect on vegetables, Kashmir valley

According to United Nations Framework Convention on Climate Change (UNFCCC) climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. A planet's climate is decided by its mass, its distance from the sun and the composition of its atmosphere. The earth's atmosphere consists of 78% nitrogen, 21% oxygen and 0.93% argon (these gases have limited interaction with incoming solar radiation and outgoing infra-red radiations), carbon dioxide accounts for just 0.03%-0.04%, water vapour varying from 0-2%. Carbon dioxide and some other minor gases (methane, CH_4, nitrous oxide, N_2O and ozone, O_3) present in the atmosphere, absorb some of the thermal radiation leaving the surface (infra-red) and emit these radiations upward and downward, which tends to raise the temperature near the earth's surface. These radiatively active gases are known as greenhouse gases (GHGs).

Greenhouse gases:

Naturally occurring greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide and ozone. Several classes of halogenated substances that contain flourine, chlorine, or bromine are also greenhouse gases, but they are, for the most part, solely a product of industrial activities. Chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) are halocarbons that contain chlorine, while halocarbons that contain bromine are called bromofluorocarbons (*i.e.*,halons). The CFCs, HCFCs and halons are stratospheric ozone depleting substances.

Some other fluorine containing halogenated substances – hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6), do not deplete stratospheric ozone but are potent greenhouse gases. There are also several gases that, although do not have a direct radiative forcing effect, do influence the global radiation budget. These tropospheric gases including carbon monoxide (CO), nitrogen dioxide (NO_2), sulphur dioxide (SO_2) and tropospheric (ground level) ozone (O_3) are referred to as ambient air pollutants. The tropospheric ozone is formed by two precursor pollutants, volatile organic compounds (VOCs) and nitrogen oxides (NOx) in the presence of ultraviolet light (sunlight). The greenhouse gases listed in the Kyoto protocol include methane, nitrous oxide, HFCs, PFCs, SF_6 and those listed under the Montréal protocol and its amendments include CFCs, HCFCs and the halons. The reactive gases carbon monoxide, volatile organic compounds (VOC) and nitrogen oxides (NOx= NO +NO_2) are termed as indirect greenhouse gases because there pollutants are not significant direct greenhouse gases but they control the abundance of direct GHGs.

The GHGs act as partial blanket for thermal radiations

* Author for correspondence.