

CLIMATE CHANGE AND IT'S IMPACT ON AGRICULTURE

Keshav Mehra, R.K. Shivran, B.S. Kherawat, Richa Pant and

Naval Kishor

Krishi Vigyan Kendra, Lunkaransar

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Climate change is directly linked with agriculture in several means like crop yield, biodiversity, water & soil health and other natural resources. Climate change is one of the most defining concerns of today's world because its affect the temperature, precipitation and hydrological cycles. Production and productivity of agricultural crops is affected by climate change and weather.



Changes in the temperature, rainfall pattern and CO₂ concentration not only affects the growth the plants abut also the human health and the quality of life. India has also started to experience the more seasonal variation like longer summer and shorter winter season. The frequency of drought is also increases in

India due to climate change. Climate change is causing a great threat to the agriculture and food security. Water is the most important inputs in agriculture, in India 50-55 per cent of the total cultivated land don't have irrigation facilities. Extreme weather events like heavy rainfall, storms and heat waves etc cause potential crop failure.

Climate change is an additional burden for the developing countries like India, which is already facing the many problems like pandemic disease COVID-19, rapid population increase, industrialization, economic development etc. In India average food consumption at present is 550 gm per capita per day,

currently we are able to secure food supplies under these varying climate change conditions but the country will face the major challenges to increase its food production in order to feed its rapid growing population. The world population will be expected to reach 9.7 billion by 2050 which would magnify the pressure on agricultural lands to meet out the food demands. World Food Programme (WFP) report of 2018 revealed that increase in crop yield per hectare is significantly slower as compared to the rate of rising population. As per the report of Food and Agriculture Organization (FAO) published in 2016, if the greenhouse gas emission and climate change remain continues, then by the year 2100 it will cause severe reduction in the production of cereal crops (5-50 % in wheat, 20-30 % in rice and 20-45 % in maize).



Future effects of climate change

- **Temperature rise-** Due to the anthropogenic activities the average temperature has risen by 0.9 °C since nineteenth century. Wheat yields are predicted to fall by 5-10 per cent with the every increase of 1 °C and overall yield could be decreased upto 30 per cent in South Asia by the mid 21st century.
- **Growing season will lengthen-** The length of the growing season has been increasing globally and affecting ecosystems and agriculture. In a future in which heat-trapping gas emissions continue to grow, increases of a month or more in the lengths of growing seasons are projected across most of the countries.
- **CO₂ level-** Due to the climate change CO₂ concentration will be increase to about 450 ppmv (parts per million by volume in next 50 years. The response of CO₂ is expected to be higher in C₃ plants (wheat, rice, soybean etc) which accounts for more than 90-95 per cent of world's species than C₄ plants (corn and sorghum). C₃ weeds associated with the different crops responded very well to elevated CO₂ level, it will create weed pressure in the crop production and reduces the crop yield.
- **Changes in rainfall pattern-** A warmer climate will accelerate the

hydrologic cycle, altering rainfall magnitude and timing of run-off. It is very likely that there will be more rainfall at higher altitude and it is likely that there will be less rainfall in most subtropical land areas.

- **Droughts and heat waves-** Climate change will affect the water cycle. There are a number of ways climate change may contribute to drought. Warmer temperatures can enhance evaporation from soil, making periods with low precipitation drier they would be in cooler conditions. Summer temperatures are projected to continue rising, it will affect the soil moisture, groundwater recharge and frequency of flood and drought, reduction of soil moisture cause exacerbates heat waves.
- **Land degradation-** climate change causes high rate of land degradation



resulting into enhanced desertification and nutrient deficient soil. Land degradation rate is increased day by day which will be the major threat at global level. According to the report of GLADA (Global Assessment of Land Degradation and Improvement), a quarter of land areas around the globe can now be marked as degraded.

- **Water resources-** due to the climate change global sea level has risen by about 8 inches since reliable record keeping began in 1880. It is projected to rise another 1 to 8 feet by 2100. This is the result of added water from melting land ice and the expansion of seawater as it warms. In the next several decades, storm surges and high tides could combine with sea level rise and land subsidence to further increase flooding in many regions. The oceans will become more acidic in near future.



Climate change causes many threats but one of the most important consequences is bringing about the changes in temperature and rainfall pattern, it's directly affects the crop production and productivity. Extreme

drought condition frequently occurred due to the climate change it causes immobilization of nutrient and salt accumulation in soil and making them dry, unhealthy, saline and finally infertile. Such type of lands become non arable in later stages and ultimately abandoned by the farmers. Agriculture sector is very important sector because it has a direct bearing of billions of people. Hence it is a high time to reform our policies and prepare ourselves for the upcoming challenges faced in the future and ensure food security not only for the human beings but also for the others.

