Contributions of Biotechnology in Agriculture Combating Climatic Variations

Rajnandini Kumari¹*, Sudeep Pathak¹, Raushan Raj¹ and Sumira Malik²

¹UG scholar, Department of Agriculture, SDS University, Dehradun, India
²Assistant Professor, Department of Agriculture, Shivalik institute of professional studies, Dehradun, India

*Corresponding Author E-mail: nandini19835@gmail.com
Received: 3.06.2019 | Revised: 10.07.2019 | Accepted: 15.07.2019

ABSTRACT
Climatic change has an enormous effect on economy which eventually depends upon the agricultural practices of any densely populated developing country. Human activities has produced global warming, disturbed the agricultural ecology for crop production challenging food security through salinity, adverse temperature, arid and saline soil condition and affected water precipitation leading to enhanced water use demand, dry land and hunger problems. Here we summarize the contribution of conservative and contemporary approaches of biotechnology involved in negative regulation of climatic fluctuations and their consequences by utilization of energy-efficient farming, plant tissue culture techniques and formulation of bio fertilizers, carbon sequestration with breeding for adaptive varieties, development of genetically advanced stress tolerant transgenic crops contributing in improved food security.

Keywords: Conservative and Contemporary biotechnology, Global warming, Formulation of bio fertilizers, Carbon sequestration and Food security.

INTRODUCTION
The problem of high temperature and sea level are the major threat for development of agriculture rural livelihood and as food security reported by (UNDP, 2007) & (IPCC, 2007). The agriculture sectors contributes both in affecting climatic fluctuation as well as gets influenced by climatic variations (Aydinalp et al., 2008). Previously, it has been reported greenhouse gases (GHG’s) were produced through human activities as well as agricultural practices. The climatic fluctuations lead to global warming & extreme weather conditions such as droughts, heavy rainfall, thunderstorms, flood and cyclones which influence livelihood & economy causing poverty and economic loss (UNDP, 2002). The issues of loss of productivity before economic climatic tragedies, coping cost to overcome such calamities, loss of economy causing poverty and degradation of human opportunities has been reported by (UNDP, 2002). The environmental cop strains for agriculture & cultivation of crops includes 8.9 billion hectare waste land for cultivation globally because 19.8% soil are of poor quality,13.2% is extreme cold whereas 4.6% is highly steep with 2% wet.
The fluctuations could damage crops and affect their yield significantly (Rosenzweig, 2002). GHG's such as CO$_2$, methane & nitrous oxide are emitted through flood rice’s field, land conversion, production of livestock, nitrogen fertilizers and burning of biomass increases temperature of earth (Paroda, 2009) and contributes significantly in climatic change contributes significantly in climatic change. Drought is another consequence of climatic fluctuation and causes food security issues. The nitrogen supplementing fertilizers utilized for agriculture make release of nitrogen into water bodies or atmosphere. 13% of GHG’s emissions produced through livestock production, pasture, crop land & food processing industries (Paroda, 2009).

The field of biotechnology could serve as source of large scale solution to climatic change solution. This may act as a connecting link science and ecology for maintenance of sustainability of agriculture to combat issues of food security, renewable energy, rapid growth of population and declining resources. In this review we seek and address contribution of problems in various ways that are explained in Table 1.

### DISCUSSION

Biotechnology field play a significant role for the consumers of food, farmers who produce and the food manufacturers who process it. Therefore, there must be a limitation for the over the use of such foods where transgenic crops and animals were used. There should be a special precaution to ensure the regulation so the transgenic commodities do not cause health risks and environmental threat.

The peculiar field of biotechnology can be used for the betterment of mankind society through development of qualitative, nutritionally rich, insect-pest and disease resistant crops with enhanced cost of production. Biotechnology utilizes artificial genetic engineering technique for facilitating the benefits to humankind.

### CONCLUSION

Our chapter briefly explains the contributions of different methods & Biotechnological technologies to improve productivity of agriculture and food security issues developed because of climatic fluctuation. The field of biotechnology through carbon sequestration, reduction in over use of chemical fertilizers and pesticides with use of bio fertilizers and bio pesticides, genetically engineered modified crops with resistant genes against abiotic stress.
and use of environmental friendly bio fuels. The approach using biotechnological methods will contributes in response to climatic change fluctuations via adaptation and mitigation.

REFERENCES


change mitigation and adaptation in developing countries: Policy options for innovation and technology diffusion. ICTSD-IPC Platform on Climate Change, ATS Policy Brief 6, (http://ictsd.org/i/publications/77118/).


72/Green-Biotechnology - and Climate-Change.


