GREEN FARMING STRATEGIC VISION : 22
(Volume 5 Number 4 July-August, 2014)

Strategies to mitigate the Global Warming in relation to Indian Agriculture

Dr. R. MAHADEV SHELAKE*

Post-doctoral Researcher, Proteo-Science Center (PROS), Faculty of Science, Ehime University, Matsuyama, Ehime, 790-8577, Japan

E-mail : rahultnau@gmail.com

Global warming is the increase in the average measured temperature of the Earth's near-surface air and oceans; and its projected continuation. Global mean temperature has increased by 0.8°C since the 1850s, with the warming trend seen in three independent temperature records taken over land, seas and in ocean surface water. By the end of this century, the global mean temperature could be 1.8° to 4.0°C warmer than at the end of the previous century. The main factors contributing to climate change involves anthroponic activities such as the deforestation, modern agricultural practices, emission of greenhouse gases like methane, carbon dioxide, and nitrous oxide. Greenhouse gases trap the reflecting infrared radiations from earth's surface and increases the temperature of lower atmosphere. Methane is one of the major greenhouse gases contributing 15-20% in the global warming, mainly emitted from rice fields because of methanogenesis process in anaerobic conditions.

In India agriculture contributes roughly 20% of GDP and make available nearly 52% of employment (as compared to 1% of GDP and 2% of employment for the US). Indian agriculture is a gamble of monsoon which would have a major impact of climate change. For India, the area-averaged annual mean warming by 2020 is projected to be between 1.0 and 1.4°C and between 2.2 to 2.9°C by 2050. Relatively less rain in monsoon (*kharif*) season and uncertain rainfall in winter (*rabi*) can reduce the crop production drastically. Change in climate directly affects crop growth, distribution and production by altering crop growth rate, thus affecting the crop growth period, light and water use, also crop production arrangements and the length of developmental stages. It also severely affects the occurrence and development of crop pests and diseases. Changes in rainfall patterns, extreme weather, sandstorms, floods, desertification, melting of iceberg and rise in sea level are some other important outcomes of global warming in ecosystem and environment.

The various schemes being operated by Indian government, state government and research institutes such as drought prone areas programme (DPAP, Rs 19.0 billion, 180 districts of 16 states); desert development programme (DDP, Rs 8.5 billion, 40 districts of 7 states); watershed approach (WA, Rs 22.6 billion) need to be implemented efficiently. Adoption of new policies in India, effective regulation of institutions dealing with natural resources, electricity and water usage will definitely help to mitigate the impact of climate change in future.

There is an urgent need to address global warming issue globally on large scale. Farmer adaptations, such as switching crop varieties, introducing more suitable crops will definitely help to improve crop productivity with no adverse effects on soil health. Development (by either traditional breeding or biotechnology) of new varieties better able to withstand the effects of global warming (such as breed for tolerance of grain fertility to heat stress) is an emerging challenge in front of scientific community. Biopesticides and biofretilizers with minimum use of chemical fertilizers will definitely help to maintain soil fertility with good quality food production. Use of biofuels such as bioethanol will help to reduce emission of greenhouse gases. Renewable energy sources like solar, water and wind should be used and more efficient technology need to be developed to utilize these natural powers to the best.

Systematic studies showing the direct impact of climate change in specific region or overall in the world will give us clear idea and will help to design novel strategies against adverse effects of global warming. It is not the new issue but people awareness need to be renewed. Even without climate change, world food prices are expected to increase due to growing populations and rising incomes, as well as a greater demand for biofuels. Analytical and comprehensive studies of indirect impact of climate change on food supply, demand and security will be critical in designing new strategies to mitigate with global warming.

Dr. R.M. SHELAKE completed B.Sc. (Agric.) from V.N. Marathwada Agricul. University, Parbhani, India with University Gold medal in the subject of Agricul. Chemistry & Soil Science. He did M.Sc. in biotechnology as DBT-JRF fellow from T.N. Agric. University, Coimbatore, India. To gain experience in public and private sector, worked at prestigious organizations like CICR, Nagpur; Mahyco Life Science Research Center, Jalna, and NRC for Grapes, Pune on various aspects of life sciences and its practical applications. He has qualified ARS-NET for lecturer in Agricul. Biotechnology. He was awarded Japanese Government (Monbukagakusho) scholarship to pursue doctoral studies in Molecular Biology at Ehime University, Matsuyama, Japan. His doctoral study was focused on metal sensor proteins useful to enhance the bio-remediation of heavy metals. Presently he is working as a post-doctoral researcher at Proteo-Science Center, Ehime University, Japan under the supervision of Dr. Hidenori Hayashi and Dr. E. H. Morita.