



Climate Change in Relation to Agriculture in India

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“Everything else can wait but not Agriculture”, these were the famous words envisaged by our late Prime Minister Shri Jawaharlal Nehru. Over half a century after India gained independence, it has progressed by leaps and bounds, from a starving nation to a self-reliant country and one of the largest producers of agricultural commodities in the world. This was achieved through the adoption of high yielding varieties (HYV) and improved crop cultivation modules initiated during the 1960s that acted as harbinger of Green Revolution. At the forefront of this great progress are farmers. Even in 21st century India, agriculture maintains to serve as backbone of rural economy as it supports over 70% of Indian population who are directly or indirectly reliant on it. In the recent years, global climate has changed due to various anthropogenic activities. These changes manifests in the form of rise or fall in temperature, floods, droughts, shifts in seasonal patterns and more incidence of pests and diseases. India has 86% of its farm households coming under small and marginal category owning less than two hectares of arable land and it is these people who are most vulnerable to climate change. Though, climate change is a global phenomenon, people are affected by its local impacts. It has brought widespread misery and huge economic losses to farming community in India, adversely affecting agriculture, food security, public health, water resources and biodiversity.

It is estimated that with every 1°C rise in temperature, yield of major crops such as wheat could reduce by 5-10%. India could experience a 40% decline in total food production by 2080. It is also estimated that climate change could reduce annual agricultural incomes in the range of 15% to 18% on an average and up to one forth in unirrigated areas which account for 55% of total cultivated area. The quality of food grains is also significantly affected by the environment in many crops, which could in turn have great impact on the nutritional security aspects in a developing country like India. The vulnerability of agriculture to climate change may vary from area to area and sector to sector as farming practices vary substantially over different regions. For example, areas that are more dependent on rainwater are more vulnerable to even small changes such as a slight shift in monsoon pattern which could affect the

quality and quantity of their products. In response to climatic changes, farmers in Bihar and eastern Uttar Pradesh are changing their farming practices like changing sowing and harvesting timing, planting short cycle crops and adopting inter-cropping techniques. Similarly, in response to water scarcity, farmers in eastern Himalayan region were changing their transplanting and harvesting time in rice crops. One of the biggest threats of climate change lies in its subtlety as the changes are not abrupt and can often elude many individuals.



Impact of climate change on transplanting of paddy (Photograph - CIAT)

The threat of climate change has necessitated framing of policies at Union, State and local levels to mitigate the damages. India has been doing a balancing work between growth and sustainability in its climate change policies. The Indian Council of Agricultural Research (ICAR) has initiated the National Innovations on Climate Resilient Agriculture (NICRA) network project since 2011 to enhance resilience of Indian Agriculture to climate vulnerability through strategic research and technology demonstration. The ICAR, through the efforts of state agricultural universities and its various research centers as well as private sector have been pursuing their research work to develop new climate resilient cultivars to varying biotic and abiotic stresses as well as good agronomic practices (GAP) that are more adaptable to various changes in climatic conditions showing positive results. Ministry of



Agriculture and farmers welfare (MoA & FW) has also delineated its intended actions to mitigate climate change like increasing efficiency in water use, promotion of organic farming, conservation agricultural practices, plantation and agro-forestry etc

Addressing the problems of food security and climate challenges in a “business as usual” manner will make the task more difficult. Therefore, it is high time that the rationale of climate smart agriculture is understood and appreciated by decision makers at all the levels. Governments at central and state level should enhance funding and support for development of technologies and approaches to combat the scenario of climate variability. One of the major bottlenecks in climate change policy framework comes from lack of appreciation of changing climate in the local government level. There should be a structured training in capacity building of officials in relevant departments to convince and sensitize them to the diverse impact of global climate change events at local levels. These local governments must be given focus as any efforts made in the higher level of governance may not bear desired fruit until they are adequately educated on the matter. A sound and robust system to facilitate knowledge sharing between farmers, extension workers and researchers has to be established to ensure smooth flow of information and transfer of technology (ToT). Varieties that are resistant to biotic and abiotic stresses such as drought, high or low temperature, pest and diseases etc. should be made readily available to farmers as it could substantially reduce losses. Simple and affordable insurance products should be properly rolled-out to create safety net for the farmers, especially small and marginal land holders as they are often neglected part of the agriculture community.

As climate change is a threat not only to agriculture but to the ecosystem and our very existence, it has become a necessity that we address the matter and take actions to adapt to it and slow its progress. Combating climate change is a complicated issue that requires a concerted and coordinated effort from all quarters of our society. Through the use of climate resilient cultivars coupled with suitable policies from the government and the efforts of scientists and other professionals in the concerned field, ensuring a safe future of farmers and future generations can surely be achieved.