



Capacity Building for
**Climate
Smart
Agriculture**

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Climate Smart Agriculture for Building Resilience and Improving Livelihoods in Rainfed Areas

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8.1 Introduction

The biggest challenge, human kind facing in the 21st century is to cope up with the impacts of the climate change which is affecting the sustainable development globally. The IPCC (Inter Governmental Panel on Climate Change) has clearly established that climate change is reality now and going to affect food security and sustainability in different regions (IPCC, 2013). Our generation is the first generation to assess the impacts of the climate change and also is the last generation which can do interventions to minimize/reverse the climate change on the globe. The dryland agriculture which is globally 80% and contributes 60% of the food is the most vulnerable systems for the impacts of the climate change. Dryland areas are also the hot-spots of poverty in developing countries of Asia, Africa and Latin America and are more vulnerable to the adverse impacts of climate change. In order to sustain the growth globally as well as the livelihoods and achieve the goals of food and nutritional security, there is an urgent need particularly in thickly populated countries like India and China. In India, 58% of arable land is dryland agriculture and will be severely affected as 1/3rd of the developing world will be facing physical scarcity of water by 2030 (Rockstorm et al., 2007). There is an urgent need to develop climate smart agriculture by adopting appropriate adaptation and

mitigation strategies to build the resilience of the systems as well as livelihoods for small farmholders in the country.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) is a global research and development organization addressing the issues of semi-arid tropics. Our Vision is "A prosperous, food-secure and resilient dryland tropics" and our Mission is "To reduce poverty, hunger, malnutrition and environmental degradation in the dryland tropics". ICRISAT in partnership with National Agricultural Research Systems, Development Agencies, Civil societies and farmers organizations is undertaking research for development to address the issues of climate change, water scarcity, land degradation and food insecurity for ever growing population which has already reached 1.2 billion in the country. The climate change scenario analysis for South Asia has demonstrated increased temperature during 2010-2039 by 0.54° to 1.17° and 1.71° to 3.16° during 2040-2069 with insignificant changes in precipitation. Although, total quantity of precipitation may not be affected but the intensity and distribution of the rains will be affected severely as already experienced during this decade itself. There are planetary boundaries for safe operation humanity and out of nine parameters already we have crossed the threshold limits for three of them viz., biodiversity loss, nitrogen cycle and climate change which have reached beyond its permissible threshold at planetary scale. Recent analysis of changes in space of agro-eco regions in the country using weather data sets from 1971-1990 and 1991-2004 have integrated increased semi-arid areas by 8.45 million ha with an overall increase of 3.45 million ha addition to the semi-arid tropical areas, mainly in the states of Madhya Pradesh, Bihar, Uttar Pradesh, Karnataka and Punjab. At micro level looking at different watersheds, clearly impacts of climate change in terms of reduced number of rainy days, increased frequency of occurrence of dry spells and high intensity rains as well as reduced length of growing period have been observed.

8.2 Adaptation and Mitigation Strategies

To cope with the climate smart agriculture is based on the principle of integrated adaptation strategies along with mitigation measures for achieving the food security and sustainable development. Smart agriculture calls for a holistic approach and its success depends on building the partnership between knowledge-generating institutions (research organizations) with knowledge-transforming institutes (extension agencies) with development programs of investors and governments through scaling-up of the proven approaches. Some of the adaptation measures of climate smart agriculture include improved rainwater conservation and management along with redeployment and retargeting of the available germplasm of climate ready crops and application of existing knowledge on diversification of crops/systems for improving the livelihoods. A catchment management approach through integrated watershed management with community participation has proven its ability to cope with the impacts of the climate change by bridging the yield gaps between current farmers' productivity and achievable potential in different eco regions (Wani et al., 2012). We refer to this initiatives as "Hypothesis of Hope" for developing adaptation strategies to cope with the impacts of the climate change and in due course by developing climate smart crop cultivars we can definitely minimize the impacts of the climate change.

We need to build the resilience and reduce the vulnerability for which there is a need to understand the concept of resilience and vulnerability. Through building the capacity of stakeholders as well as sensitizing the farmers and the policy makers using new science tools suitably. The case studies of selected watershedexperiences in the country as well as from other countries like China, Thailand and Vietnam will be discussed as examples to show how the resilience has been built for keeping with the impacts of the climate change through integrated watershed management experiences of scaling-up of technologies for achieving the impacts of large population through outcomes will be analyzed of the mission program like Bhoochetana in Karnataka and Andhra Pradesh as well as an integrated mission

approach for improving livelihoods through climate smart agriculture through programs like “Bhoo Samrudhi” in Karnataka and “Rythukosam” in Andhra Pradesh will be discussed. Drivers of success for scaling-up programs will be shared with the participants.

References

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