

## **Introduction**

National Innovations on Climate Resilient Agriculture (NICRA) is a network project of the Indian Council of Agricultural Research (ICAR) launched in February, 2011. The project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration. The research on adaptation and mitigation covers crops, livestock, fisheries and natural resource management. The project consists of four components viz. Strategic Research, Technology Demonstration, Capacity Building and Sponsored/Competitive Grants. The project was formally launched by the Hon'ble Union Minister for Agriculture & Food Processing Industries Shri Sharad Pawarji on 2nd February 2011. Climate induced variability, over the years, has become a threat to farm based livelihood systems in the coastal part of Odisha. To a greater extent, the Kendrapara, Ganjam, Sonenpur and Jharsuguda region of the state is reeling under such climatologically distress condition. This refers to the susceptibility of the farmers and farm dependent communities to recurrent droughts, erratic rainfall, soil moisture stress, flood, flash floods, water logging etc. resulting in crop failures thereby severely impacting the lives of agricultural communities, medium and small farmers and agricultural labourers. The most affected are the poorest of the poor and specially women and children.

*Kendrapara is aptly considered the 'Kendra' of all disasters. Natural disasters like flood, cyclone, tornado, sunstrokes and drought have become serious problems not only in our district but to entire Odisha state.*

## **Approach**

Comprehensive field evaluation of new and emerging approaches of paddy cultivation like aerobic rice and SRI for their contribution to reduce the GHG emissions and water saving. Special attention to livestock and fishery sectors including aquaculture which have not received enough attention in climate change research in the past. In particular, the documentation of adaptive traits in indigenous breeds is the most useful step. Thorough understanding of crop-pest/pathogen relationship and emergences of new biotypes due to climate change. Simultaneous up scaling of the outputs both through KVKs and the National Mission on sustainable Agriculture for wider adoption by the farmers.

## **Background**

Rising temperature, increased climate variability and extreme weather events significantly impact food security in the coming decades. The most productive coastal areas are frequently drought and flood prone region of the country. Many coping strategies have been developed overtime but are inadequate to cope with the high extreme weather events and stress. Therefore there is need for using modern science combined with indigenous technical knowledge to enhance the resilience of Indian agriculture to climate change. Demonstration of existing management practices by enhancing resilience of crops/livestock to climate change in 100 most vulnerable districts by KVK.

## **Objective**

To enhance the resilience of Indian agriculture covering crops, livestock and fisheries to climatic variability and climate change through development and application of improved production and risk management technologies. To demonstrate site specific technology packages on farmers fields for adapting to current climate risks. To enhance the capacity of scientists and other stakeholders in climate resilient agriculture research and its application.

## **Technology demonstration & its performance**

Under this objective, an integrated package of proven technologies will be demonstrated in one village in each district for adaptation and mitigation of the crop and livestock production system to climate variability based on the available technologies. The districts to be covered for these demonstrations and list of KVKs are listed separately. The process of finalizing demonstration packages will have the following steps:

1. Analysis of climate constraints of villages based on long term data.
2. Assessment of the natural resources states of the villages.
3. Identification of major production systems.
4. Studying of existing institutional structures and identify the gaps.
5. Focus group discussion with the community to finalize the interventions.

The interventions in the village panchayats are finalized following a participatory approach through the Village Climate Risk Management Committee (VCRMC), after the PRA to assess the climate related problems in the village and baseline survey. The program was launched formally in all the villages by involving the state line department functionaries and leaders of the panchayats to ensure local ownership of the project from the beginning and convergence of related schemes currently in operation in the panchayat. In each village, the interventions are made in the following four modules:

### **Module I : Natural Resources**

Interventions related to in-situ moisture conservation, water harvesting, supplemental irrigation, improved drainage in flood prone areas, conservation tillage where appropriate, artificial ground water recharge and water saving irrigation methods.

### **Module II : Crop Production**

Introducing drought/temperature/flood tolerant varieties, advancement of planting dates of rabi crops in areas with terminal heat stress, water saving paddy cultivation methods (SRI, aerobic, direct seeding), frost management in horticulture through trash burning, community nurseries for delayed monsoon, custom hiring centres for timely planting, location specific intercropping systems with high sustainable yield index.

### **Module III : Livestock & Fisheries**

Use of community lands for fodder production during droughts/floods, augmentation of fodder production through improved planting material, improved fodder/feed storage methods, fodder enrichment, prophylaxis, improved shelters for reducing heat stress in livestock, management of fish ponds/tanks during water scarcity and excess water and promotion of livestock component as a climate change adaptation strategy.

### **Module IV : Institutional Interventions**

Institutional interventions either by strengthening the existing ones or initiating new ones relating to seed bank, fodder bank, commodity groups, custom hiring centre, collective marketing, introduction of weather index based insurance and climate literacy through a village level weather station.

Module on use of ICT for knowledge empowerment of the communities in terms of climate risk management is also being implemented in some KVKs for generation of locally relevant content and its dissemination in text and voice enabled formats. As an outcome of this exercise location specific climate resilient practices and constraints in its adoption are being documented.

### **Capacity Building**

Experiences of NICRA project are to be disseminated to all concerned development departments for upscaling the interventions across the country. Capacity building on various resilient practices/ technologies, location specific mitigation and adaptation strategies, use of farm machinery, seed bank, fodder bank etc. are being taken up to enhance capacities of communities for better adoption of resilient practices.

### **Outputs**

- Climate resilient technologies in terms of climate smart crop varieties, livestock breeds and management practices to bring climate resilience in agriculture.
- Improved preparedness for minimizing the impact of climate variability on Indian agricultural through site specific technology demonstration.
- Policy framework for promoting climate resilient agriculture, particularly among small and marginal farmers.
- Infrastructure at key research institutes for climatic change research.
- Adequately trained scientific man power to take up climate change research in the country.
- Empower farmers to cope with climate variability.

### **Outcome**

- Enhanced resilience of agricultural production in vulnerable regions of the country.