

**BACKGROUND**

- Increasing impact of climate variability on agriculture
- Need for coping with current climate variability, preparing for future climate change
- Damages/crop losses due to extreme events, responsibility of NARS for solutions
- Need for continuous data generation for identifying trends and building scenarios

**OBJECTIVES**

- 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 agricultural research and its application

**MISSION**

Enhancing the resilience of Indian Agriculture to climate variability and climate change through both application of improved technologies and new policies

**VISION**

To develop and promote climate resilient technologies in agriculture which will address vulnerable areas of the country and the outputs of the project will help the districts and regions prone to extreme weather conditions like droughts, floods, frost, heat waves, etc. to cope with such extremes

**PROJECT COMPONENTS**

The scheme involves 4 major components, viz. Strategic Research through network as well as Sponsored/Competitive Grants mode, Technology Demonstration Component (TDC), Dissemination, Knowledge Management and Capacity Building

**MAJOR MILESTONES OF XI PLAN**

- Research infrastructure facilities viz. High through put Plant Phenomics, 100-Automatic weather stations, Eddy-Covariance Flux Towers, Satellite data reception system, Custom designed animal shelter & Fishing vessel are now functional
- Identification of promising lines for heat and drought tolerance in rice, wheat, maize, pigeonpea

and tomato;

- Quantification and techniques for measurement of GHG emissions in the rice-based system and marine ecosystem;
- Quantification of carbon sequestration potential through agro-forestry systems across the country;
- A new technique of inter-specific grafting of brinjal root stock with tomato was successful in saving tomato crop from flooding damage
- Successfully pilot tested a block level agro advisory system linked to real time weather in Belgaum district of Karnataka
- Under Technology Demonstration, improved practices like water harvesting, direct seeded rice, community nurseries, Soil test based nutrient management, green manuring and feed supplements for livestock have been demonstrated on farmers' fields in 121 districts to cope with various climatic aberrations

**NICRA IN XII PLAN**

The scheme is formulated to build on the initiative taken during XI Five Year Plan, by strengthening the theme areas, viz. phenotyping/breeding programs in crops, horticulture and livestock, simulation modeling to understand the impacts at regional/national level, address crops and regions which could not be covered in the XI Plan such as onion, temperate horticulture etc. and expand the technology demonstration to more vulnerable districts. Hence, during the XII Plan, 19 additional partner institutes have been proposed under Strategic Research and additional 31 districts under Technology Demonstration component

**COLLABORATING INSTITUTES**

40 partner institutes under Strategic Research component (CRIDA, IARI, IIHR, NDRI, CMFRI, CIAE, ICAR-NEH, NRCPB, CRRI, DRR, IPR, IIVR, ICAR-RCER, NCIPM, DWM, NRCAF, PDFSR, IVRI, CIFRI, CIBA, NIASM, NBPGR, IIMR, IIWBR, DSR, DOGR, CITH, CPRI, CAZRI, CSSRI, IISWC, IGFRI, IISS, NBSS&LUP, NCAP, CIRG, CSWRI, DPR, NIVEDI, CIFA), 131 KVKs under TDC component are involved in the project. In addition several SAUs and other collaborating institutes are associated with the project under Sponsored and CGC component

## BEST TECHNOLOGIES / PRODUCTS

- Characterization of reproductive biology in relation to climate change have been carried out for 7 target fish species (*Channa punctatus*, *Eutropiichthys vacha*, *Johnius coitor*, *Mystus tengara*, *Mystus cavasius*, *Odontoamblyopus rubicundus*, and *Puntius sophore*) occupying different ecological niches in lower and middle stretches of River Ganga which reveal spatial and species level differences in impact of climatic variables on the breeding biology parameters.
- Out of 15 genotypes of pigeonpea, three genotypes namely JSA 59, ICP 6971 and ICP 348 were found to be tolerant to drought.
- Out of 22 tomato genotypes evaluated for various physiological parameters under in-vitro drought condition induced by application of PEG @ 30g/l of water, two genotypes namely Arka Vikash and Kashi Hemant were found to be promising at ICAR-NEH.
- The first ever district-level vulnerability atlas of India was prepared which is useful for prioritizing investments and to plan for research on adaptation interventions. The Atlas presents an analysis of relative vulnerability of 572 rural districts in terms of sensitivity, exposure and adaptive capacity
- Retention of paddy residue resulted in 10 % higher soil moisture content than removal in rainfed french bean at ICAR-NEH, Umiam, under NICRA, Meghalaya.
- Weather based insurance products were developed using Max T and Min T, Rainfall based indices for critical stages of the crops, viz. Wheat, groundnut and Cotton
- Out of 50 local rice cultivars studied, four namely Nepal Dhan, Pahelo Dalle, Kalo Dhan and Attey were found promising to severe water stress condition.
- GHG emissions due to implementation of climate resilient interventions in various production systems (annual and/perennial crops, irrigated rice, inputs, livestock, forestry and land use change) were converted to an equivalent value (tonne CO<sub>2</sub> equivalent) in 7 villages of Gujarat and Rajasthan which were found to be negative suggesting a sink in GHG emissions

- Supplementation of Chromium Propionate and Zinc in Murrah buffaloes ameliorated oxidative stress and enhanced immunity

## NEW INITIATIVES IN XII PLAN

### Crops & Horticulture

Onion, soybean, temperate fruits

### NRM

Management of salinity and sea water intrusion & High intensity rain events in flood prone region

### Livestock

Livestock diseases– surveillance strengthened

### Fisheries

Adaptation and mitigation strategies in fresh water aquaculture

### Technology demonstration

- To be expanded to 121 vulnerable districts (31 additional ) out of which 10 will be NGOs
- Knowledge portal - a dedicated portal on climate change and agriculture

### Convergence

Upscaling of output/outcome of NICRA through National missions (NMSA, etc) and other schemes of GoI

## FLAGSHIP PROGRAMMES

- Integrated systems modeling involving crops, natural resources and livestock for impact assessment and identifying adaptation strategies at regional level for near and long-term downscaled scenarios
- Monitoring of GHG emissions through flux towers & field measurements in major production Systems

## FINANCIAL OUTLAY

S. No	Components	Total (Rs.in crore)
I	<b>Strategic Research</b>	
	<i>Through Network mode</i>	450.52
	<i>Sponsored/ Competitive Projects</i>	73.39
II	<b>Technology demonstration on farmers' fields</b>	69.22
III	<b>Knowledge management, web portal &amp; communications</b>	1.25
IV	<b>Capacity Building</b>	5.62
	<b>Total</b>	<b>600.00</b>

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