Climate Resilient Agriculture in India- Feasibility and Need for Upscaling

M. Prabhkakar
Principal Investigator (NICRA)

Central Research Institute for Dryland Agriculture
Indian Council of Agricultural Research (ICAR)
Hyderabad, India

4th Indian Agricultural Outlook Forum 2020, 15 Oct 2020
National Innovations in Climate Resilient Agriculture (NICRA)
A case study

(Launched in 2011)

CRA
Ability of a system and its component parts to anticipate, absorb, accommodate or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration or improvement of its essential basic structures and functions (IPCC, 2012)

A net work project of ICAR, to enhance the resilience of Indian agriculture to climatic variability and climate change

Targets of CRA
- Productivity
- Resilience
- GHG emissions
- Food security
Understand the Impact of Climate Change

(Elevated CO2, Temperature, GHG)

- Crops
- Livestock
- Fisheries
- Soil
- Water
- Pests & diseases
Risk and Vulnerability Assessment
(District level)

Prioritization of resources for climate change
Adaptation & Mitigation actions

(Climate Projections as per IPCC’s AR 5)
Climate Resilient Villages (CRVs)
Enhancing resilience and adaptive capacity of farmers to Climate Variability

One cluster village each in 151 climatically vulnerable districts
Package of Technologies

CLIMATE RESILIENT AGRICULTURE

- Natural Resource Management
- Crop Production Systems
- Livestock and Fisheries
- Enabling Support Systems

- Soil Health and Carbon Sequestration
- Rainwater Harvesting and Recycling
- In situ Moisture Conservation
- Integrated Farming Systems
- Resilient Cropping Systems
- Crops and Cultivars

- Feed and Fodder
- Health and Shelter
- Stress Tolerant Breeds

Custom Hiring Center
Seed and Fodder Bank
Climate Services and Agri-advisories
Village Climate Risk Management Committee
Each indicator is given a score ranging from 0 to 100 and averaged to arrive at the category index value and all categories averaged to arrive at the 'resilience score/index'.
## District Agriculture Contingency Plans

- User friendly, on-line tool for district administration and policy makers
- Plans for delay in monsoon and mid-season breaks
- Prepared in consultation with local departments
- Preparedness to face climatic risks more effectively
- Saving on input cost, time of spraying, irrigation scheduling and crop harvesting

http://www.crida.in:82/contingencyplanning/

### Online Crop Contingency Planning

District level contingency plans cover contingency strategies to be taken up by farmers in response to major weather related aberrations such as delay in onset and breaks in monsoon causing early, mid and late season droughts, floods, unusual rains, extreme weather events such as heat wave, cold wave, frost, hailstorm and cyclone. Read More

### Farming Situation

<table>
<thead>
<tr>
<th>Farming Situation</th>
<th>Crop</th>
<th>4 Weeks Delay</th>
<th>Varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfed red Soils</td>
<td>Maize</td>
<td>Maize</td>
<td>Maize (DHM-769, 115, Pankesh)</td>
</tr>
<tr>
<td>Rainfed red Soils</td>
<td>Pigeonpea</td>
<td>Pigeonpea</td>
<td>Manthi, PRG-100</td>
</tr>
<tr>
<td>Rainfed red Soils</td>
<td>Groundnut</td>
<td>Castor + Pearl millet / Finger millet (1:1)</td>
<td>-</td>
</tr>
<tr>
<td>Rainfed red Soils</td>
<td>Sorghum</td>
<td>Pearl millet</td>
<td>ICP-8200, ICVM-221, HHS-67, HHS-121</td>
</tr>
<tr>
<td>Rainfed black Soils</td>
<td>Maize</td>
<td>Maize</td>
<td>DHM-100, 115</td>
</tr>
<tr>
<td>Rainfed black Soils</td>
<td>Pigeonpea</td>
<td>Pigeonpea</td>
<td>LRG-41, MRG-69</td>
</tr>
<tr>
<td>Rainfed black Soils</td>
<td>Cotton</td>
<td>Cotton</td>
<td>LSA-5116, LK-861</td>
</tr>
<tr>
<td>Rainfed black Soils</td>
<td>Sunhemp</td>
<td>Sunhemp</td>
<td>KBSH-44, Moron, DRSF-108</td>
</tr>
<tr>
<td>Rainfed black Soils</td>
<td>Finger millet</td>
<td>Finger millet</td>
<td>Manthi, Surej, Champanathi</td>
</tr>
</tbody>
</table>
Impact of CSA Initiative

- **Carbon Positive Farming**: Carbon sink increased (6-96%)
- **Yield and income gains**: up to 12-36% in NICRA villages due to adoption of Resilient Technologies
- **Human resource**: 1,200 Scientists, 874 Research Fellows, 106 MSc/PhD
- **Publications**: 280 International research papers, 8 policy briefs
- **Capacity building**: 11,240 programs, 4.28 lakh stake holders
- **Up-scaling CRVs**:
  - Project on Climate Resilient Agriculture (PoCRA) in state of Maharashtra, 5000 villages, US $649 million (World bank)
  - Consortium for scaling up climate smart agriculture in South Asia, (C-SUCSeS) by C-CAFS being implemented in eight member states of SAARC, US $1.5 million (IFAD)
  - Drought proofing in Odisha State (State Govt.) under proposal
  - Karnataka State, 200 watersheds (NABARD) under proposal
Farm Innovations in Climate Resilient Agriculture

NICRA-TDC

ICAR - Central Research Institute for Dryland Agriculture
Hyderabad
Indian Council of Agricultural Research
New Delhi

Climate Resilient Villages in India

National Innovations in Climate Resilient Agriculture
ICAR-Central Research Institute for Dryland Agriculture
Hyderabad - 500 059
Way Forward

- Research-new resilient technologies
- Awareness & capacity building
- Mainstreaming CRA with developmental plans (State, Central)
- District Climate Action Plans
- SCR initiatives
Thank You

m.prabhakar@icar.gov.in