

Towards Viksit Bharat@2047 Technological Innovations and Policy Options for Eastern Region



ICAR Research Complex for Eastern Region

ICAR Parisar, P.O. Bihar Veterinary College
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Towards Viksit Bharat@2047: Technological Innovations and Policy Options for Eastern Region

Editors: Abhay Kumar, Anup Das, PC Chandran, SS Mali, DK Singh, P Bhavana, Kumari Shubha, Arti kumari and Sarfaraj Ahmad

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The Director,
ICAR-Research Complex for Eastern Region
ICAR Parisar, Patna- 800014, Bihar, India
Ph: +91-0612-2223962, FAX: +91-0612-2223956
E-mail: director.icar-rcer@icar.gov.in
Website: www.icarrcer.icar.gov.in

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Climate Resilient Model Villages Developed at Gaya and Buxar districts of Bihar

Period of development: 2019 - 2023 (Gaya); 2020 - 2023 (Buxar)

Developers:

Abhay Kumar, Ujjwal Kumar, DK Singh, Mohd. Monobrullah, Rakesh Kumar, PK Sundaram, RK Raman, Surajit Mandal, Anirban Mukherjee, Sudip Sarkar, Ramkewal, VS Meena

Background:

Climate change is a major issue affecting Indian agriculture. Bihar also faces significant challenges due to changing climate which includes, floods, droughts, frost, changing disease pest dynamics, rainfall pattern etc. The impact of climate change in the state is multi-dimensional and has far-reaching consequences for food security, and livelihood of farmers. Farmers need to adopt climate resilient crop varieties and techniques for profitable agriculture with sustained productivity and income. ICAR RCER, Patna implemented Climate Resilient Agriculture (CRA) Program in Gaya and Buxar district since 2019. This programme focuses on a community-driven approach for wider adoption of climate-resilient technologies. Development of Climate-Resilient Villages are essential for enhancing the adaptation capacity of farmers under changing climate scenario.

Description of the technology:

A total of 10 Climate Resilient Villages (Gaya: Rasalpur Nagar, Rasalpur Manpur, Takeya, Rahimbigha and Rupaspur, Buxar: Dalsagar, Balapur, Churamanpur, Harikishunpur, Ramobariya) has been developed under CRA Programme. Nine cropping systems were followed in the climate smart villages with mixing the coarse cereals millets including:

- Transplanted Puddled Rice (TPR)–wheat (conventional-till)-fallow (CS1),
 - TPR-wheat (zero-till)-mung (ZT) (CS2),
 - Conventional-till direct seeded rice (CTDSR)-mustard (ZT)-mung (ZT) (CS3),
 - ZTDSR-lentil (ZT)-fallow (CS4),
 - Maize (CT)-lentil (ZT)-mung (ZT) (CS5),
 - Bajra (CT)-lentil (ZT)-mung (ZT) (CS6),
 - Bajra (CT)-wheat (ZT)-mung (ZT) (CS7),
 - TPR-chickpea (ZT)-fallow (CS8), and
 - TPR-maize (CT)-fallow (CS9).

It is an integrated approach for adaptation and mitigation of long-term impact of climate change on agriculture sector by farming community. For the development of climate resilient villages, large scale demonstrations like climate resilient crop varieties, management practices and use of climate resilient machineries as well as other precision agriculture technologies like LCC, green seeker etc were laid out in selected villages from

2019-20 to 2022-23. After the initial survey and meetings with farmers, location specific package of climate resilient interventions were identified. Necessary inputs, technology backstopping and capacity development programs like farmers' trainings, exposure visits, awareness camps and farmer-scientists interaction were organized. On-farm demonstrations of climate resilient interventions like direct seeded rice, zero tillage of *rabi* crops (wheat, lentil, chickpea), raised bed of maize and potato, crop diversification with millets, introduction of mungbean in Rice wheat cropping system, intercropping of maize and potato, climate resilient irrigation scheduling and nutrient management, laser land levelling etc. were conducted at farmer's field. Every year, an area of 2936 acre (Kharif: 1190 acre, Rabi: 1246 acre and summer: 500) was covered under these technology demonstrations benefitting almost 1000 farmers in each district during last 3 years. Due to these climate resilient interventions, farmers of these villages now use climate resilient technologies using their own resources and the same is being adopted in nearby areas also.

Commercial potential:

The technology can be offered through consultancy services or outsourced to the State Agricultural Department, Veterinary Colleges, Development agencies, NGOs, and farmers' groups.

Impact:

CRA programme resulted in large scale adoption of climate resilient varieties and technologies. Area under introduced cropping system *i.e* rice-wheat – moong-bean expanded significantly which resulted in increase in system productivity from 85 q/ha in rice-wheat system to 122 q/ha (rice-wheat-moong). The developed villages will act as model village for nearby area and farmers can learn adaptation strategies by seeing fellow farmers.

Agro-ecoregions suitability area:

Bihar and other climate change affected states

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Technology certificate from ICAR, New Delhi, Number: ICAR-AEXT-RCER-Model-2024-084, Annual Report of ICAR RCER, Patna