

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



ICAR Research Complex for Eastern Region

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

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Seed Based Technology Delivery Model through Farmers Producer Organization (FPO)

Period of development: 2019 - 2022

Developers:

Anirban Mukherjee, Ujjwal Kumar, DK Singh, Kumari Shubha, VK Yadav, Shubhadeep Roy, Kausik Pradhan

Background:

Farmers in many regions continue to rely on outdated crop varieties due to the unavailability of improved seeds at the right time. Existing seed-producing institutions, such as ICAR institutes, universities, and state seed farms, face resource constraints, limiting their capacity to meet demand. To bridge this gap, the Seed-Based Technology Delivery Model (SBTDM) leverages Farmer Producer Organizations (FPOs) as key stakeholders. FPOs, with their business-oriented approach and focus on profitability, are uniquely positioned to ensure timely and sustainable delivery of quality seeds.

Description of the technology:

This model comprises two sub-components: (A) Need-based variety selection and testing, and (B) multiplication at specialized FPO farmers' fields, certification, processing, and sale to other farmers. The Seed-Based Technology Delivery Model (SBTDM) is designed to enhance farmers' access to improved agricultural varieties, boost productivity, and strengthen Farmers' Producer Organizations (FPOs) in Eastern India.

The methodology follows a structured, multi-phase approach:

- I. Identification of Farmer Needs:** Baseline surveys and stakeholder consultations, using the Fuzzy AHP method, identified farmer-specific needs. Key criteria included crop duration, grain quality, disease resistance, water requirements, and yield potential.
- II. Variety Selection and Testing:** Collaborations with ICAR institutes provided access to diverse varieties. A team of 200 progressive farmers (100 FPO and 100 non-FPO) was formed, trained in variety selection, post-harvest handling, and marketing. Progressive FPO Farmers Index and Random Forest Classification identified factors influencing FPO participation. Social Network Analysis mapped communication networks, guiding targeted interventions.
- III. Multiplication and Certification:** FPOs established seed multiplication fields, ensuring genetic purity and quality through best practices. Certification was facilitated in collaboration with state agencies.
- IV. Seed Distribution and Marketing:** A robust seed value chain was developed. Partnerships with extension agencies and NGOs promoted improved varieties via awareness campaigns, training, and field demonstrations, positioning FPOs as central marketing agents.

- V. **Monitoring and Evaluation:** Farmers' Empowerment Index and PCA-based weightage assessed empowerment and functional effectiveness. Decision Tree Regression identified key factors influencing FPO operations. Regular feedback sessions informed continuous improvements.
- VI. **Scaling Up:** Successful models were replicated across new FPOs, supported by capacity-building initiatives and iterative refinements.



Process Model of Seed-Based Technology Delivery Model (SBTDM)

Commercial potential:

The technology can be offered through consultancy services, licensed, or outsourced to the State Agricultural Department, development agencies, FPOs, NGOs, and farmers' groups.

Impact:

Over the three-year period, these practices, coupled with the knowledge generating system, significantly enhanced farmers' productivity (rice: 18-22%; wheat: 15-25%; summer moong: 30-45%). The effectiveness of the model was calculated based on effectiveness index comprising (i) functional efficiency, (ii) sustainability (iii) Income (iv) empowerment. The effectiveness score of this model was calculated as 70.54.

Agro-ecoregions suitability:

Bihar

References:

Annual Report of ICAR-RCER Patna year 2021 and 2022