



Gender-Responsive Technologies: Pathways to Inclusive Agri-food Systems

A Coffee Table Book, Volume-I

ICAR- Central Institute for Women in Agriculture
Bhubaneswar, Odisha, India







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A Coffee Table Book, Volume-I

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कृषि एवं किसान कल्याण और
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संदेश

कृषि भारत की खाद्य एवं पोषण सुरक्षा, रोजगार सृजन तथा करोड़ों ग्रामीण परिवारों की आजीविका का प्रमुख आधार है। इस कृषि व्यवस्था को अधिक उत्पादक, समावेशी और सतत बनाने में महिला किसान एक महत्वपूर्ण परिवर्तनकारी शक्ति के रूप में उभर रही हैं। वे फसल उत्पादन, पशुपालन, मत्स्य पालन, उद्यानिकी, प्रसंस्करण एवं मूल्य संवर्धन सहित कृषि की संपूर्ण मूल्य श्रृंखला में उल्लेखनीय योगदान दे रही हैं। महिलाओं की बढ़ती भूमिका को सशक्त बनाने के लिए सरकार द्वारा नमो ड्रोन दीदी, राष्ट्रीय मधुमक्खी पालन एवं शहद मिशन (NBHM), तथा दीनदयाल अंत्योदय योजना-राष्ट्रीय ग्रामीण आजीविका मिशन (DAY-NRLM) जैसी अनेक पहलें संचालित की जा रही हैं। इन कार्यक्रमों के माध्यम से महिलाओं को आधुनिक प्रौद्योगिकियों, कौशल विकास, कृषि अवसंरचना, बाजार संपर्क तथा उद्यमिता से जोड़कर उनकी आय एवं आत्मनिर्भरता को बढ़ावा दिया जा रहा है।

कृषि अनुसंधान एवं नवाचारों को महिलाओं की आवश्यकताओं के अनुरूप विकसित एवं प्रसारित करना समय की आवश्यकता है। जेंडर-रिस्पॉन्सिव कृषि प्रौद्योगिकियाँ महिलाओं का श्रमभार कम करने, उनकी कार्यकुशलता एवं आय बढ़ाने तथा समावेशी, लचीली एवं सतत कृषि-खाद्य प्रणाली के निर्माण में महत्वपूर्ण भूमिका निभा सकती हैं।

इन्हीं उद्देश्यों को ध्यान में रखते हुए तैयार की गई कॉफी टेबल बुक “जेंडर-रिस्पॉन्सिव टेक्नोलॉजीज़: पाथवेज़ टू इन्क्लूसिव एग्री-फूडसिस्टम्स” महिला-अनुकूल कृषि प्रौद्योगिकियों, श्रम-बचत उपकरणों, उन्नत कृषि तकनीकों, मूल्य संवर्धन उपायों तथा जेंडर-रिस्पॉन्सिव कृषि मॉडल का उपयोगी संकलन प्रस्तुत करती है। मुझे विश्वास है कि यह प्रकाशन महिला किसानों, कृषि वैज्ञानिकों, प्रसार विशेषज्ञों, उद्यमियों तथा कृषि क्षेत्र के सभी हितधारकों के लिए महत्वपूर्ण सिद्ध होगा।

मैं भारतीय कृषि अनुसंधान परिषद के वैज्ञानिकों को इस उत्कृष्ट प्रयास के लिए हार्दिक बधाई देता हूँ और इस प्रकाशन की व्यापक सफलता एवं उपयोगिता के लिए अपनी शुभकामनाएँ व्यक्त करता हूँ।


(शिवराज सिंह चौहान)

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संदेश

भारतीय कृषि के विकास में महिलाओं की भूमिका सदैव अत्यंत महत्वपूर्ण रही है। कृषि-खाद्य मूल्य श्रृंखला के प्रत्येक चरण—फसल उत्पादन, कटाई-उपरांत प्रबंधन, प्रसंस्करण, मूल्य संवर्धन, विपणन तथा परिवार की खाद्य एवं पोषण सुरक्षा सुनिश्चित करने में उनका योगदान अमूल्य है। देश की लगभग 80 प्रतिशत ग्रामीण महिलाएँ अपने समर्पण, परिश्रम और दृढ़ संकल्प के माध्यम से कृषि उत्पादन, ग्रामीण आजीविका तथा खाद्य एवं पोषण सुरक्षा को सुदृढ़ बनाने में महत्वपूर्ण भूमिका निभा रही हैं। इनमें लगभग 48 प्रतिशत महिलाएँ स्वरोज़गार प्राप्त कृषक तथा 33 प्रतिशत कृषि श्रमिक के रूप में सक्रिय हैं।

भारत सरकार महिलाओं को कृषि विकास की मुख्यधारा में लाने हेतु वित्तीय सहायता, ऋण एवं अनुदान, संयुक्त भूमि स्वामित्व को प्रोत्साहन, कौशल विकास, महिला-अनुकूल एवं जेंडर-रिस्पॉन्सिव कृषि प्रौद्योगिकियों का विकास, बाजार संपर्क तथा कृषि योजनाओं में जेंडर बजटिंग जैसे अनेक प्रभावी कदम उठा रही है। ऐसी प्रौद्योगिकियाँ महिलाओं का श्रमभार कम करने के साथ-साथ कृषि उत्पादकता बढ़ाने, आजीविका सुदृढ़ करने तथा कृषि प्रणालियों की जलवायु-लचीलापन क्षमता को भी बढ़ाती हैं।

मुझे यह जानकर अत्यंत प्रसन्नता है कि भा.कृ.अनु.प.-केंद्रीय कृषिरत महिला संस्थान (ICAR-CIWA), भुवनेश्वर द्वारा " जेंडर-रिस्पॉन्सिव टेक्नोलॉजीज़: पाथवेज़ टू इन्क्लूसिव एग्री-फूडसिस्टम्स " विषय पर यह कॉफी टेबल बुक प्रकाशित की जा रही है। यह प्रकाशन महिला-अनुकूल कृषि प्रौद्योगिकियों, श्रम-बचत उपकरणों, उन्नत कृषि कार्य-पद्धतियों, मूल्य संवर्धन तकनीकों तथा प्रभावी कृषि प्रसार मॉडलों का एक उपयोगी संकलन है, जो महिला किसानों के सशक्तिकरण, समावेशी कृषि विकास तथा टिकाऊ कृषि-खाद्य प्रणालियों के निर्माण में महत्वपूर्ण योगदान देगा।

मैं भारतीय कृषि अनुसंधान परिषदके वैज्ञानिकों को इस सराहनीय पहल के लिए हार्दिक बधाई एवं शुभकामनाएँ देता हूँ। मुझे विश्वास है कि भारतीय कृषि अनुसंधान परिषद के सभी संस्थान लैंगिक समतामूलक कृषि अनुसंधान एवं प्रसार को और अधिक सशक्त बनाते हुए महिला किसानों के सशक्तिकरण, समावेशी कृषि विकास तथा विकसित भारत के निर्माण में महत्वपूर्ण योगदान देते रहेंगे।

(भागीरथ चौधरी)



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Foreword



Agriculture is the backbone of India's economy and a cornerstone of food, nutrition, and livelihood security. Women play a vital role across the agri-food system as cultivators, livestock keepers, processors, entrepreneurs, and custodians of natural resources. Recognizing their contributions and addressing their specific needs through science-led interventions are essential for building a productive, resilient, and inclusive agricultural sector.

The Indian Council of Agricultural Research (ICAR) is committed to developing and promoting technologies that enhance farmers' productivity, profitability, and sustainability. Integrating gender perspectives into agricultural research, extension, and innovation has become increasingly important to ensure that scientific advancements effectively reach and benefit women farmers.

The ICAR-Central Institute for Women in Agriculture (ICAR-CIWA) has been instrumental in generating evidence-based research, developing gender-responsive technologies, women-friendly farm tools, inclusive extension models, and policy interventions that improve women's access to technologies, reduce drudgery, enhance occupational safety, strengthen livelihoods, and promote entrepreneurship. These innovations demonstrate how gender-responsive agricultural research contributes not only to women's empowerment but also to enhanced agricultural productivity and sustainable rural development.

The publication "Gender-Responsive Technologies: Pathways to Inclusive Agri-food Systems - A Coffee Table Book" presents a compilation of selected ICAR-CIWA technologies, package of practices, women-friendly tools, value-added products, extension models, and policy initiatives that have the potential to transform the lives of women farmers across the country. It is particularly timely as 2026 has been declared the International Year of Women Farmers by the United Nations, highlighting the global importance of recognizing and supporting women's contributions to agriculture.

I congratulate the Director, scientists, and the entire team of ICAR-CIWA for bringing out this valuable publication. I am confident that this Coffee Table Book will serve as a useful reference for researchers, extension professionals, policymakers, development agencies, industry partners, and all stakeholders committed to promoting gender-responsive innovation and building a resilient, inclusive, and sustainable agricultural sector.

(M. L. Jat)



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Foreword



Modern agricultural technologies play a transformative role in enhancing the resilience and productivity of women farmers, particularly in the context of climate variability, evolving nutritional needs, and livelihood security. Women constitute a substantial proportion of the agricultural workforce in India and play a pivotal role in ensuring household food security, nutritional well-being, and sustainable farm livelihoods. Agricultural research and extension systems constantly engaged to adequately recognize and address the specific needs, constraints, and contributions of women in agri-food system. Bridging the gender gap is a matter of social equity and a strategic imperative for achieving enhanced productivity, resilience, and inclusive growth in agriculture. It is in this context that the work of ICAR-CIWA assumes national importance. The institute serves as a catalyst in integrating the perspectives of women farmers into agricultural research and development programmes. The research activities undertaken by the Institute have generated technologies, models, and best practices that can serve as a basis for developing targeted interventions and programmes benefiting women farmers by policy makers and implementing agencies.

The gender-responsive agricultural technologies, women-friendly farm tools and gender-responsive extension models for reducing drudgery, improving occupational health, and effectively outscaling scientific innovations enhance productivity for women farmers, and women entrepreneurs. By integrating gender perspectives into research planning, technology assessment, refinement and development as well as capacity-building programmes, ICAR-CIWA has provided valuable insights for mainstreaming gender perspectives within the broader agricultural research and extension framework of ICAR. This compilation is a testament to the Institute's sustained commitment to evidence-based research, participatory technology development, and empowerment-oriented extension strategies. It captures exemplary research outputs having strong potential for enhancement of livelihoods as well as women's agency, leadership, and entrepreneurship in agriculture and allied sectors.

I commend the Director of ICAR-CIWA for the dedicated efforts in generating knowledge products and practical solutions that address the needs of women in agriculture. The publication entitled Gender-Responsive Technologies: Pathways to Inclusive Agri-food Systems - A Coffee Table Book, showcasing gender-responsive agricultural technologies, package of practices, women-friendly tools, value added products, policy documents and gender inclusive extension models is a befitting coincidence as the United Nations has declared 2026 as International Year of Woman Farmer. I am confident that this Book will serve as an inspiring reference for researchers, extension professionals, policymakers, development practitioners, and all stakeholders committed to building a gender-equitable, sustainable and resilient agricultural sector in India.

(Rajbir Singh)



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Preface



Women form the backbone of Indian agri-food systems, contributing significantly to household food and nutritional security. They play important roles across crop production, livestock management, fisheries, and value addition, while also sustaining household responsibilities and community well-being. Their contributions extend beyond labour to preserve indigenous crops and varieties, managing resources, and conserving agro-biodiversity. Although women's participation in agricultural production and post-production activities continues to evolve with economic growth and development, the challenges they face and the associated outcomes remain influenced by persistent systemic gender inequalities. Women's access to essential productive assets and resources in agri-food systems—including land, inputs, extension services, finance, and digital technologies—remains lower than that of men. These disparities are further compounded by women's limited participation in decision-making. According to FAO (2023), closing the gender gap in farm productivity and agri-food system employment could increase global gross domestic product by 1% and reduce global food insecurity by about 2 percentage points, lifting approximately 45 million people out of food insecurity. Therefore, interventions should be designed to reduce gender inequalities and adopt transformative approaches that address discriminatory gender norms and attitudes.

Agricultural research that explicitly addresses gender dimensions is critical for ensuring inclusivity and equity in agricultural innovation systems. Conventional technologies often overlook women's ergonomic needs, time constraints, and socio-cultural realities. By integrating gender perspective into research design, testing, validation, and dissemination, the ICAR-Central Institute for Women in Agriculture (ICAR-CIWA) has demonstrated that gender-responsive innovations lead to higher adoption, improved occupational health, enhanced livelihoods, and sustainable agricultural growth. The Institute's efforts to mainstream gender in agricultural research and extension serve as a model for institutions committed to equitable agricultural development. The Institute has designed and validated several women-friendly farm tools and equipment to reduce drudgery and improve work efficiency. It has also developed and validated several gender-responsive packages of practices (PoPs) and extension models that strengthen women's access to knowledge, resources, institutions, and markets. These interventions have significant potential to enhance productivity and income while contributing to women's decision-making, entrepreneurship, and techno-socio-economic empowerment.

This Coffee Table Book, *Gender-Responsive Technologies: Pathways to Inclusive Agri-food Systems*, presents a compilation of institutional innovations, gender-responsive agricultural technologies, women-friendly tools, improved packages of practices, extension models, and other significant outputs developed by the ICAR-Central Institute for Women in Agriculture (ICAR-CIWA) and collaborating organizations. The technologies and models documented in this volume demonstrate the continued commitment of ICAR to integrate gender perspectives into agricultural research and extension. It is expected that this publication will serve as a useful reference for researchers, extension professionals and all other stakeholders working towards inclusive, equitable, and sustainable agri-food systems. The Institute gratefully acknowledges the contributions of its scientists, technical staff, field functionaries, and collaborating partners whose dedication and expertise have made this publication possible.

(Mridula Devi)

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INTRODUCTION

Women are central to India's agri-food systems, contributing significantly across crop production, livestock, fisheries, horticulture, post-harvest management, value addition, and household food and nutrition security. According to the Periodic Labour Force Survey (PLFS) 2023–24, nearly 80% of rural women are engaged in agriculture and allied sectors. Yet, despite their substantial contribution, women often have limited access to productive resources, modern technologies, mechanization, extension services, finance, markets, and decision-making opportunities. These constraints not only affect their productivity and livelihoods but also limit the overall efficiency and sustainability of agricultural systems.

Agricultural technologies have traditionally been developed without adequately considering the diverse roles, needs, work environments, and ergonomic characteristics of women. As a result, many technologies remain inaccessible, unsuitable, or underutilized by women. Integrating a gender perspective into agricultural research and technology development is therefore essential to ensure that innovations are responsive to the needs of both women and men. Such an approach promotes the design, refinement, validation, and dissemination of technologies that are technically efficient, ergonomically suitable, economically viable, and socially acceptable.

Recognizing the importance of integrating gender perspectives into agricultural research and innovation, ICAR-Central Institute for Women in Agriculture has developed and validated gender-responsive technologies, women-friendly farm tools, improved packages of practices, value-addition technologies, and extension models through participatory research with women farmers. These innovations reduce drudgery, improve occupational health, enhance productivity and livelihoods, strengthen women's participation in decision-making, and promote inclusive and sustainable agri-food systems.

This Coffee Table Book, Gender-Responsive Technologies: Pathways to Inclusive Agri-food Systems, presents a compilation of these technologies, innovations, extension models, and knowledge products developed by ICAR-CIWA and collaborating organizations. The technologies presented in this volume demonstrate how integrating gender perspectives into agricultural research can enhance productivity, reduce drudgery, improve occupational health, strengthen livelihoods, and promote women's entrepreneurship and empowerment. This publication during the International Year of the Women Farmers 2026, reaffirms the importance of gender-responsive science and innovation in building productive, resilient, equitable, and sustainable agri-food systems.



ICAR-CIWA

ICAR-CENTRAL INSTITUTE FOR WOMEN IN AGRICULTURE

श्री. कृ. अनु. प. केन्द्रीय कृषिगत महिला संस्थान



ABOUT ICAR-CIWA

ICAR-Central Institute for Women in Agriculture (ICAR-CIWA), located in Bhubaneswar, India, established in 1996 under the Indian Council of Agricultural Research (ICAR), Ministry of Agriculture and Farmers Welfare, Government of India. ICAR-CIWA is a unique institution emphasizing participatory research to tailor the farm technologies to suit the needs of the women farmers. The institute generates and disseminates knowledge to promote gender-sensitive decision-making to enhance the efficiency and effectiveness of women farmers. The All India Coordinated Research Project (AICRP) on Women in Agriculture with 13 centres in 12 states of the country is being coordinated by ICAR-CIWA. This AICRP addresses the region-specific issues related to women in agriculture with a specific focus on livelihood security, household nutrition, reduction of drudgery and occupational health hazards, and capacity building of agrarian families. A centre of All India Coordinated Research Project on Ergonomics and Safety in Agriculture' is also functioning at ICAR-CIWA with the mandate of application of ergonomic principles and anthropometric data for increasing productivity, reducing drudgery, and minimizing accidents and occupational health problems of workers in agriculture and allied sectors. ICAR-CIWA is dedicated to gender research to mainstream and empower women farmers so as to realize enhanced productivity, profitability and sustainability of agriculture.

01

**INSTITUTIONAL
INNOVATIONS**



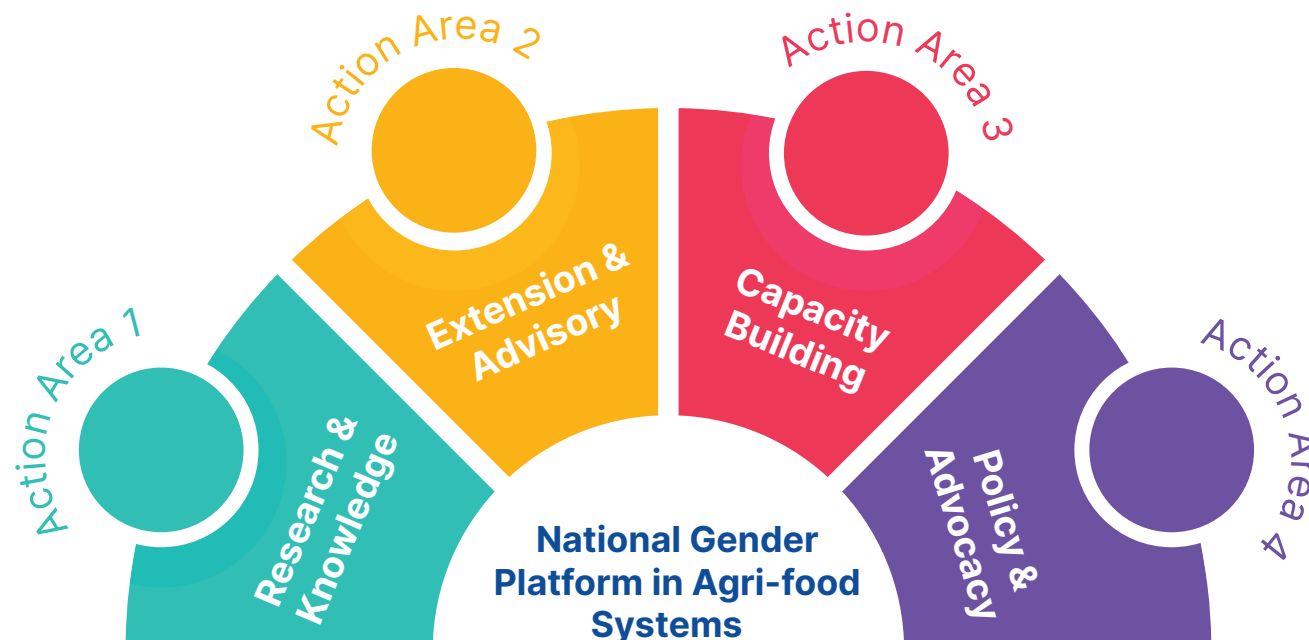


NATIONAL GENDER PLATFORM IN AGRI-FOOD SYSTEMS

- ICAR established the National Gender Platform in Agri-Food Systems to foster a collaborative mechanism for identifying, prioritizing, and addressing the diverse needs of women farmers across the country.
- The platform brings together key stakeholders to promote gender-responsive research, innovation, policy, capacity building, and institutional convergence.
- Through these collective efforts, it aims to enhance the productivity, livelihoods, decision-making power, and overall empowerment of women in agri-food systems, thereby contributing to inclusive, equitable, and sustainable agricultural development in India.

National Gender Platform in Agri-food Systems

**Connecting institutions, evidence
and action for gender-responsive
transformation**



ICAR'S GENDER STRATEGY

ICAR Gender Strategy seeks to

- Mainstream gender across all research, education, and extension of agricultural organizations
- Promote gender-responsive research and innovation systems that reflect the needs, roles, and constraints of women in agriculture
- Strengthen institutional mechanisms and capacities, including gender focal points and data systems, to enable evidence-based action
- Develop a 'Repository at ICAR-CIWA' and develop cross-institute collaborations to serve as a hub of gender expertise and innovation.



Guiding Principles



Integration

"Gender as a Core Lens
in Agricultural Research,
Education and Extension"



Inclusivity

"Recognizing Diversity,
Enabling Participation"

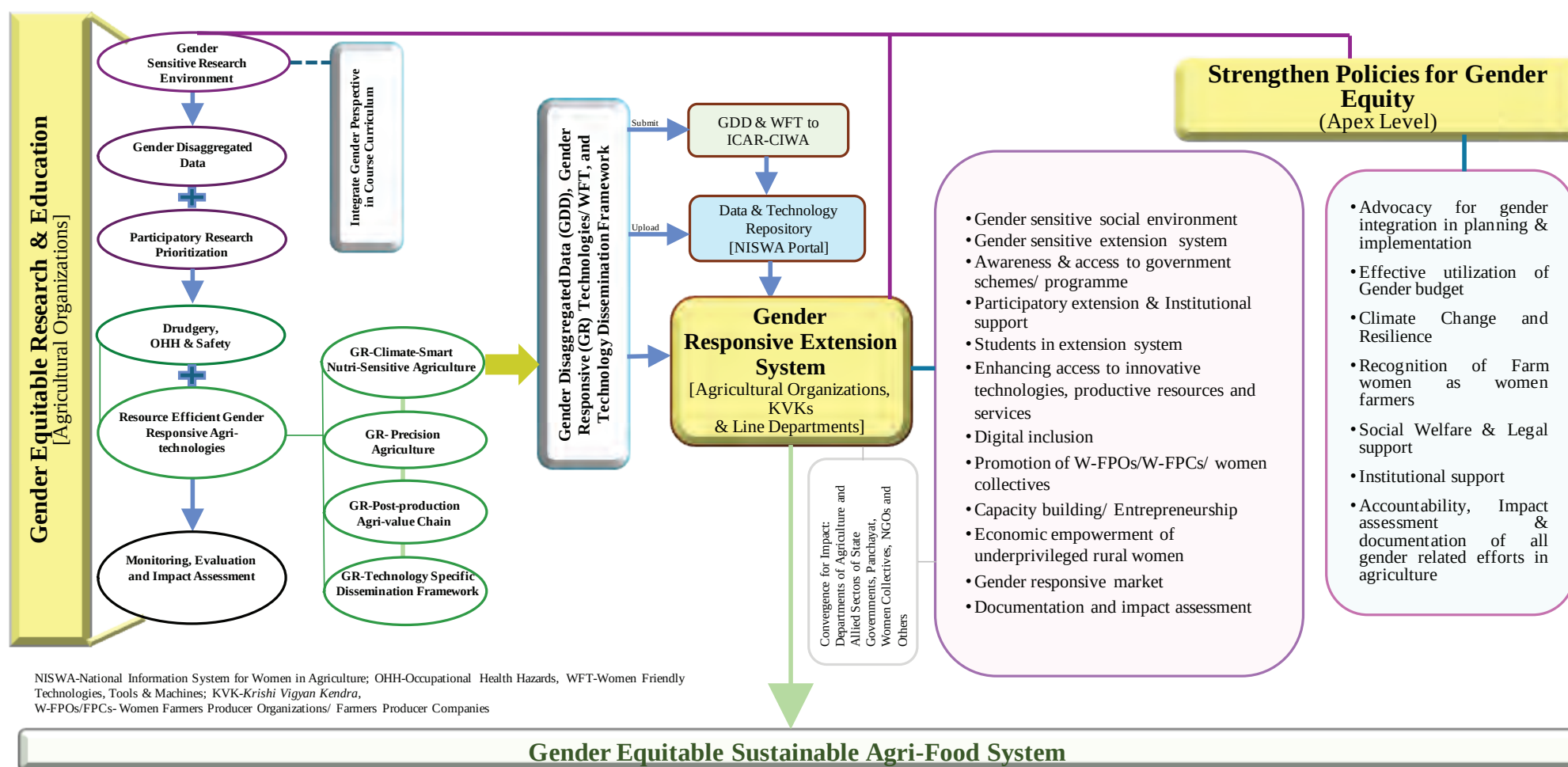


Equity

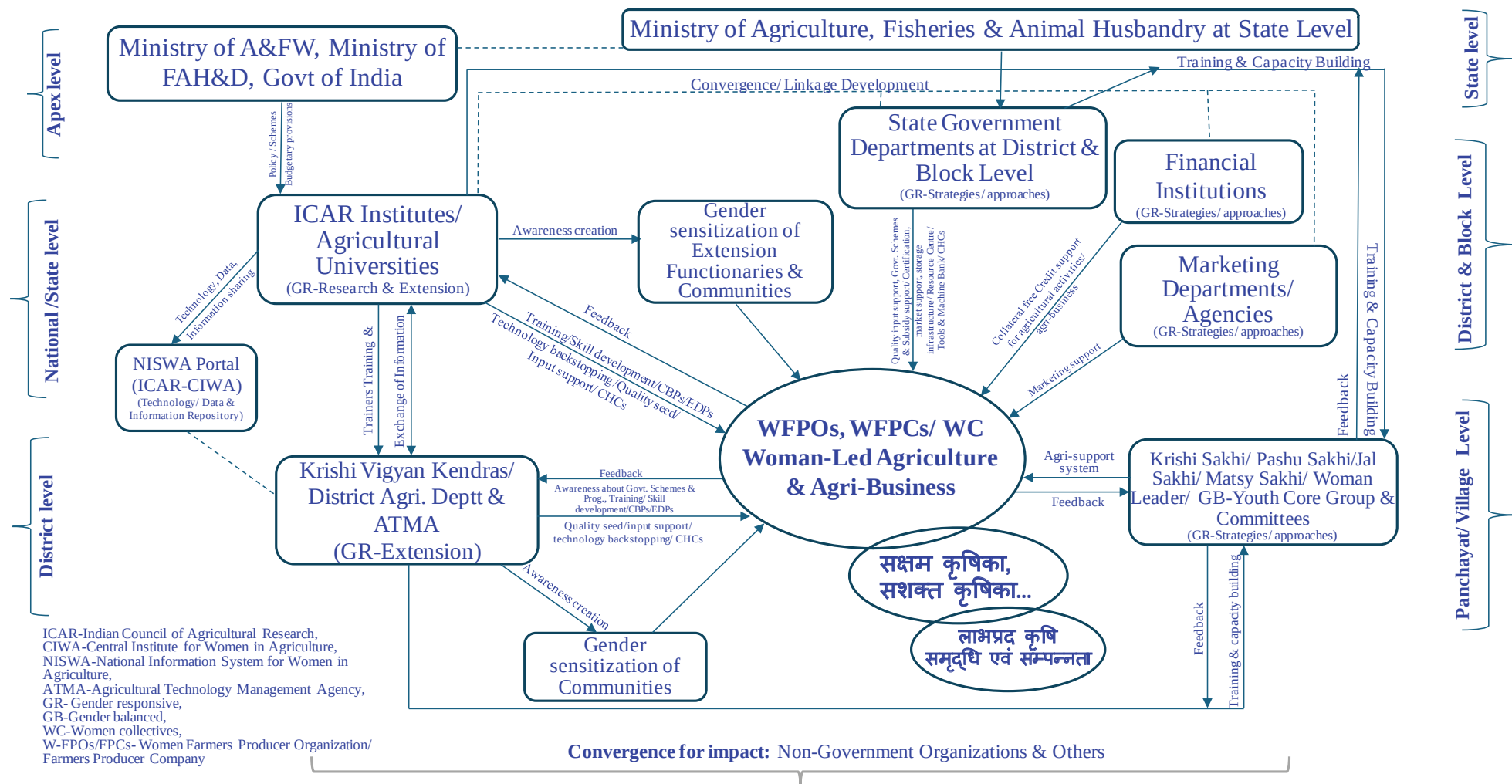
"Addressing Systemic
Barriers, Enabling Fair
Opportunities"



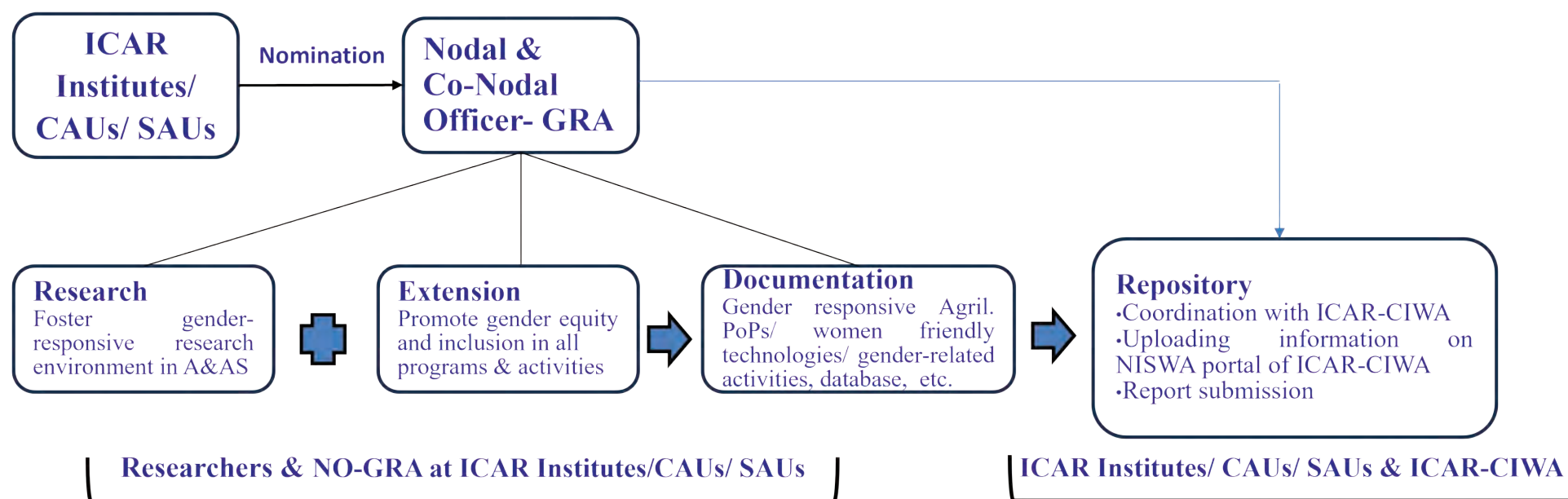
GENDER FRAMEWORK FOR NATIONAL AGRICULTURAL RESEARCH, EDUCATION & EXTENSION FOR 'KRISHIKA SHAKTI' & SUSTAINABLE AGRI-FOOD SYSTEMS (GF-KrISSA)



IMPLEMENTATION MODEL OF GENDER FRAMEWORK FOR SUSTAINABLE AGRI-FOOD SYSTEMS & EMPOWERMENT OF WOMEN



FRAMEWORK FOR STRENGTHENING GENDER-RESPONSIVE AGRICULTURAL RESEARCH THROUGH NODAL OFFICERS



A&AS- Agriculture & allied sectors; ICAR-Indian Council of Agricultural Research; CAUs- Central Agricultural Universities; SAUs- State Agricultural Universities; CIWA-Central Institute for Women in Agriculture; NO-GRA : Nodal Officer -Gender Research in Agriculture; NISWA- National Information System for Women in Agriculture; PoPs- Package of Practices

CHECKLISTS FOR THEORETICAL ASSESSMENT OF GENDER RESPONSIVENESS OF AGRICULTURAL TECHNOLOGIES

Scope

- **Crop production:** improved varieties, agronomic practices, pest and nutrient management strategies.
- **Horticulture:** fruits, vegetables, flowers, plantation crops, and their production practices.
- **Livestock and poultry:** breeds, feed and fodder technologies, animal health practices, and management systems.
- **Fisheries and aquaculture:** production technologies, harvesting practices, and value-addition.
- **Post-harvest and agro-processing:** storage, handling, processing, and value- chain innovations.
- **Farm mechanization:** tools, equipment, machines, and implements for various agricultural operations.
- **Extension methodologies and institutional innovations:** communication tools, capacity- building programme, and participatory methodologies/ models.



Checklist computes gender responsiveness (GR) scores to assess agricultural technologies

Category	Score Range (%)	Interpretation of gender responsiveness Scores
Low	≤25	Gender responsiveness – low; requires substantial redesign to address women’s needs and participation barriers.
Medium	25–50	Moderately gender responsive; incorporates some gender considerations but lacks comprehensive inclusion.
High	50–75	Gender responsive; adequately addresses gender concerns with scope for minor improvement.
Very High	≥ 75	Strongly gender responsive; effectively integrates women’s needs, priorities, and participation across all stages.



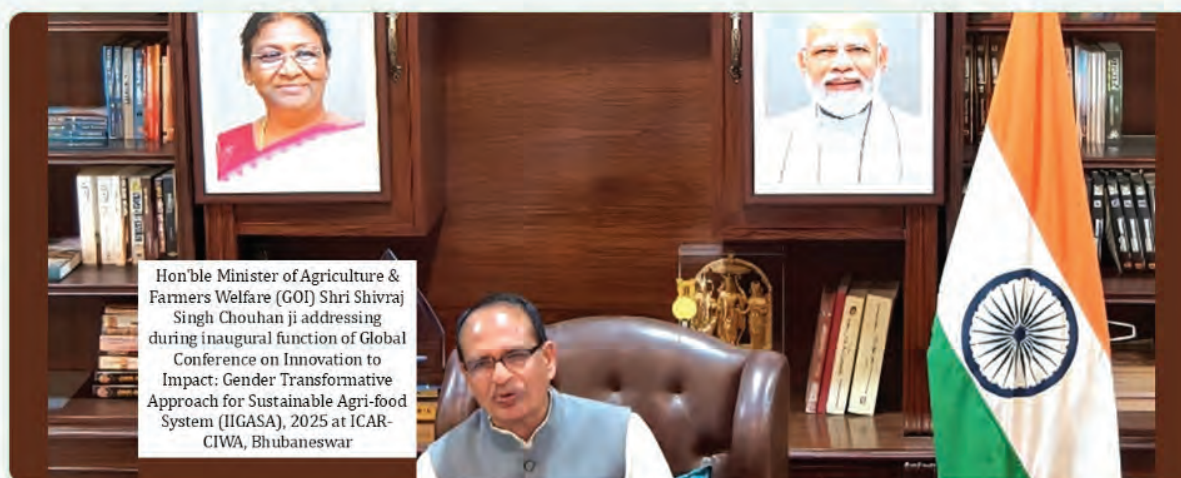
National Information System for Women in Agriculture

ICAR-CIWA, Bhubaneswar, India

NISWA

[Home](#) [About Us](#) [ICAR-CIWA](#) [Related Links](#) [Feedback](#) [Contact Us](#)

Aggregated Data across all Indian States Recognising and Empowering Women Innovators in Agriculture Explore Government Schemes & Programmes for Women Farmers Supporting Sustainable and Inclusive Agricultural Practices Welcome to NISWA



Hon'ble Minister of Agriculture & Farmers Welfare (GOI) Shri Shivraj Singh Chouhan ji addressing during inaugural function of Global Conference on Innovation to Impact: Gender Transformative Approach for Sustainable Agri-food System (IIGASA), 2025 at ICAR-CIWA, Bhubaneswar

Resources

Journals	Books
Databases	Institutions
Publications	Indicators
Terminologies	Reports
Grassroot Innovations	Successful Gender Model

Explore NISWA Modules

Technology Technologies for Women in Agriculture	Methodologies & Models Methodologies & Models for Gender Sensitive Research and Extension	Schemes & Programmes Schemes & Programmes for Women in Agriculture	Women Innovators Innovative Women Farmer/Entrepreneur
Gender Factsheet Inclusive database showcasing gender-specific data and trends across agricultural institutions	Gender Disaggregated Data (GDD) Participation in Agriculture (Secondary Sources)	Gender Disaggregated Data Participation in agricultural activities (Primary Sources)	WoPAS Women's Participation in Agricultural System (WoPAS)

NISWA : NATIONAL INFORMATION SYSTEM FOR WOMEN IN AGRICULTURE

- A comprehensive knowledge portal consolidating information on GDD (primary & secondary), gender factsheets of institutions, and WoPAS database.
- Collection, compilation and featuring of databases, journals, books, institutions, publications, indicators, terminologies etc. related to gender/ women in agri-food systems.
- Showcases GR/ WF technologies, methodologies & models, government schemes/ programmes & success stories of women innovators.
- Aims to strengthen evidence-based decision-making through better assessment of women's contributions, roles, and constraints across agricultural value chains.

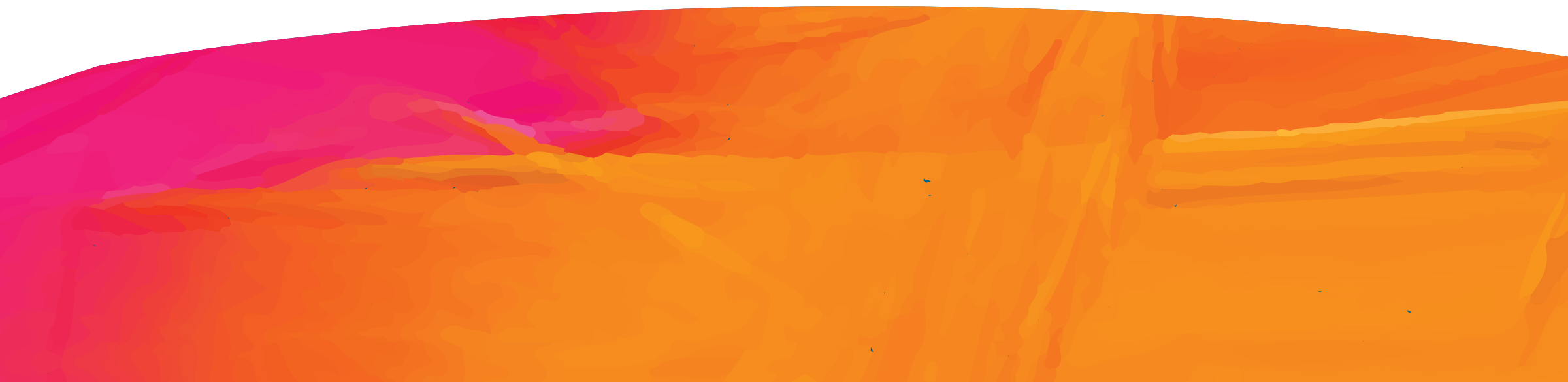
Women Innovators & Success Stories				
		Filter by Sector	Filter by State	
		All Sectors	All States	
Sl. No.	Profile	Name & Title	Sectors	Details
1		Smt. Shanta Patel Cultivating Change: The Inspiring Journey of Smt. Shanta Patel Dungarpur, Rajasthan	Crop Production, Post-harvest	View Full Detail
2		Smt. Mangala Kiran Neelagund Bhoo Tapasvini Mangala Neelagund's Journey from Progressive Farmer to Agri-Entrepreneurs Leader Gadag, Karnataka	Food Harvest, Diversified Farming	View Full Detail
3		Smt. Leela Dhiman Economic Empowerment through Value Addition of Non-Timber Forest Produce Mandi, Himachal Pradesh	Value Addition	View Full Detail
4		Smt. Anita Goyal Zaika- the Culinary Journey of Smt. Anita Goyal Cooking Ludhiana, Punjab	Food Harvest	View Full Detail
5		Smt. Veerpal Kaur Nurturing Health and Livelihoods: The Story of Smt. Veerpal Kaur Faridkot, Punjab	Post Harvest, B-Basket (Agro- Processing and Bio- Based Products)	View Full Detail

Women Innovators & Success Stories feature the pioneering changemakers of agri-food systems by blending indigenous wisdom with modern innovations, inspiring inclusive and sustainable rural transformation.

02

WOMEN-FRIENDLY

TOOLS





MANUAL DISC RIDGER

- Modified the conventional ridge-making operation by a push-pull disc mechanism and an ergonomic handle design enabling ridge-making in a standing posture replacing the traditional bending posture.
- Developed to reduce drudgery and improve comfort during ridge making for irrigation, sowing, and planting of vegetable crops on bunds.
- Requires two operators working in a push-pull action.
- Reduces cardiac cost by 73% per m² compared to traditional spade method.
- Ergonomically acceptable and safe.
- Unit Cost: Rs. 4000.



Developed by ICAR-CIWA, Bhubaneswar, India



FIELD CAPACITY:



Female workers: 427 m² h⁻¹



Male workers: 508 m² h⁻¹



POWER OPERATED GROUNDNUT DECORTICATOR-CUM-STRIPPER

- This is a small, compact, and women-friendly machine developed to reduce labour, time and drudgery during groundnut processing.
- Integrated two post-harvest operations—pod stripping and kernel decortication—into a single compact machine, through interchangeable shoe design.
- Performs two operations in a single unit (2-in-1 machine): Stripping of pods from groundnut plants and decortication of kernels from pods.
- Economical equipment suitable for small and marginal farmers.
- Significantly reduces drudgery and manual labour.
- Observed 96% stripping efficiency and 92% decortication efficiency at a feed rate of 30 kg/h, ensuring efficient processing.
- Unit Cost: Rs. 20,000.
- Design Registered.

Ensures good operational efficiency



96%

Stripping efficiency



92%

Decorticating efficiency

Developed by ICAR-CIWA, Bhubaneswar, India





Stripper Mode



Decorticator Mode



EASY HARVEST BAG

- Redesigned the conventional harvest collection method by shifting the harvest load from the hands/head to the torso through an ergonomic shoulder-supported bag, minimizing repetitive carrying and awkward postures.
- Women-friendly with ergonomic shoulder-supported design to improve the balance and stability but can be used by both, women and men.
- Supports quick loading and unloading.
- Suitable for fruits, vegetables, flowers and spices
- Capacity: 5 – 6 kg per batch.
- Ensures VO_2 remains within acceptable physiological workload limits.
- Decreases lower back muscle exertion by 23–55%.
- Reduces drudgery by 20–30%, enhancing operator comfort and efficiency.
- Unit cost: Rs. 900 (Canvas Fabric).
- Design Registered.
- Technology licensed to Entrepreneur & Industry.

PEDAL OPERATED WOMEN-FRIENDLY COCONUT DEHUSKER

- Replaced the conventional hand-operated dehusking principle with a pedal-operated mechanism that utilizes stronger leg muscles while enabling comfortable seated operation.
- Developed to provide a safe, affordable and drudgery-reducing alternative to traditional coconut dehuskers.
- Ergonomically designed using anthropometric data.
- Ensures comfortable sitting posture with leg-powered operation and safe blade positioning.
- Portable, affordable, easy to operate and suitable for small and marginal farmers.
- Reduced drudgery by 51% compared to conventional hand-operated dehuskers.
- Capacity (women): 65–90 coconuts per hour.
- Unit Cost: Rs. 8000.
- Design Registered.
- Technology licensed to the industry.



WOMEN-FRIENDLY INTEGRATED VERTICAL NUTRI-FARMING SYSTEM

Annual Production potential

Vegetables + mushroom system

- ▶ 80 kg vegetables and
- ▶ 50 kg mushroom
- ▶ Spent Mushroom Compost & crop residue

Vegetable + poultry system

- ▶ 80 kg vegetables
- ▶ 2016 eggs
- ▶ 35 kg meat
- ▶ 125 kg poultry manure & crop residue



Vegetable+Mushroom



Vegetable+Poultry

IVNFS



IVNFS ensures dietary diversity and household nutritional security of landless farm families

- Women-friendly Integrated Vertical Nutri-Farming System (IVNFS) with mushroom or poultry provides maximum production from limited area through efficient three-dimensional space utilization.
- Trough height designed ergonomically to reduce drudgery.
- Efficient space utilization (limited backyard area of 12.72 m²) allowing multiple activities.
- Developed to enhance dietary diversity, family nutrition, income and livelihood security of landless and marginal farm families.
- Improves women's resilience to climate vulnerability.
- B:C ratio for the system with Vegetable + Mushroom & with Vegetable + Poultry are 1.60 and 4.44, respectively.
- Unit Cost: Vegetables + Mushroom - Rs. 20,000.
- Unit Cost: Vegetable + Poultry - Rs. 25,000.
- Design Registered.
- Technology licensed to the Industry and NGOs.



MAIZE DEHUSKER-SHELLER

- Combined dehusking and shelling into a single integrated machine, eliminating sequential manual operations and reducing repetitive handling.
- Designed using mechanical and ergonomic considerations to reduce labour and drudgery during maize post-harvest processing and suitable for marginal, small and hill farmers.
- Dehusking-shelling efficiency: 98.8%
- Shelling output (manual mode): 60 kg grain h⁻¹
- Shelling output (power mode): 100 kg grain h⁻¹
- Maize dehusker-sheller (manual mode) reduced physiological cost by 40.2%
- The machine can also be operated with single-phase 1 hp electric motor.
- Reduced drudgery by 48.9% compared to manual operation and by 21.62% compared to the octagonal maize sheller, enhancing operator comfort and work efficiency.
- Unit Cost: Rs. 40,000.
- Technology licensed to the industry.



Maize dehusker-Sheller

ROTARY GOAT FEEDING SYSTEM

- An integrated structure consisting of inverted cone cage for supplying green fodder and semi-circular trough for concentrated feed mixture.
- Replaced repeated walking and manual fodder distribution with a centrally rotating feeding system that enables feeding multiple small animals/ goats from a single location.
- Fitted with wheels for easy mobility and transportation as needed.
- Developed to reduce labour, fodder wastage and drudgery in stall-fed goat production.
- Structure is user friendly and enables women farmers to easily load feed and fodder into the revolving system.
- Enables women to stand at one place and feed 15-20 goats comfortably.
- Reduced labour cost by 27% and feeding time by 30%, while reducing feed wastage by 25-30%.
- Ergonomic assessment indicated 30% reduction in drudgery compared to conventional horizontal rack feeding system (fixed type/ non-moving type).
- Unit Cost: Rs. 20,000 (Size: 6' diameter).
- Design Registered.
- Technology licensed to Industry and FPO.



03

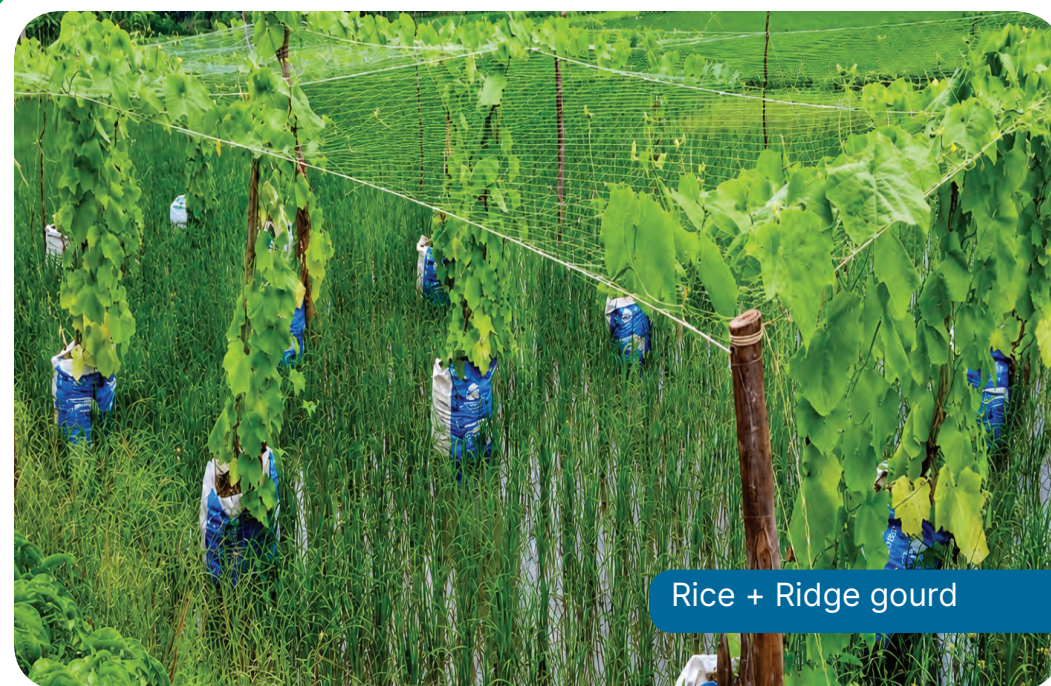
PACKAGE OF PRACTICES





GENDER RESPONSIVE PRACTICES FOR INTERCROPPING VEGETABLES IN WATERLOGGED PADDY FIELDS

- Production and income in waterlogged paddy fields can be increased by intercropping climbing type vegetables (bitter gourd, cucumber, ridge gourd, snake gourd, sponge gourd, and cowpea).
- Vegetables are grown in sacks containing 90 kg soil and 10 kg manure, placed in rice fields before puddling.
- Bags are spaced at 3 m × 3 m. The height of the bags (with soil) allows the plant base to remain >0.3 m above water level to avoid waterlogging stress.
- Rice equivalent yield (REY) increases to 15.3–29.0 t ha⁻¹, compared to REY of 4.9–6.5 t ha⁻¹ under sole rice cultivation.
- Higher land equivalent ratio (1.67–1.93) indicates efficient land and vertical space use.
- System enhances crop diversity, biodiversity, ecosystem services, net income and adds aesthetic value, offering a vertical farming solution for rainfed lowlands.



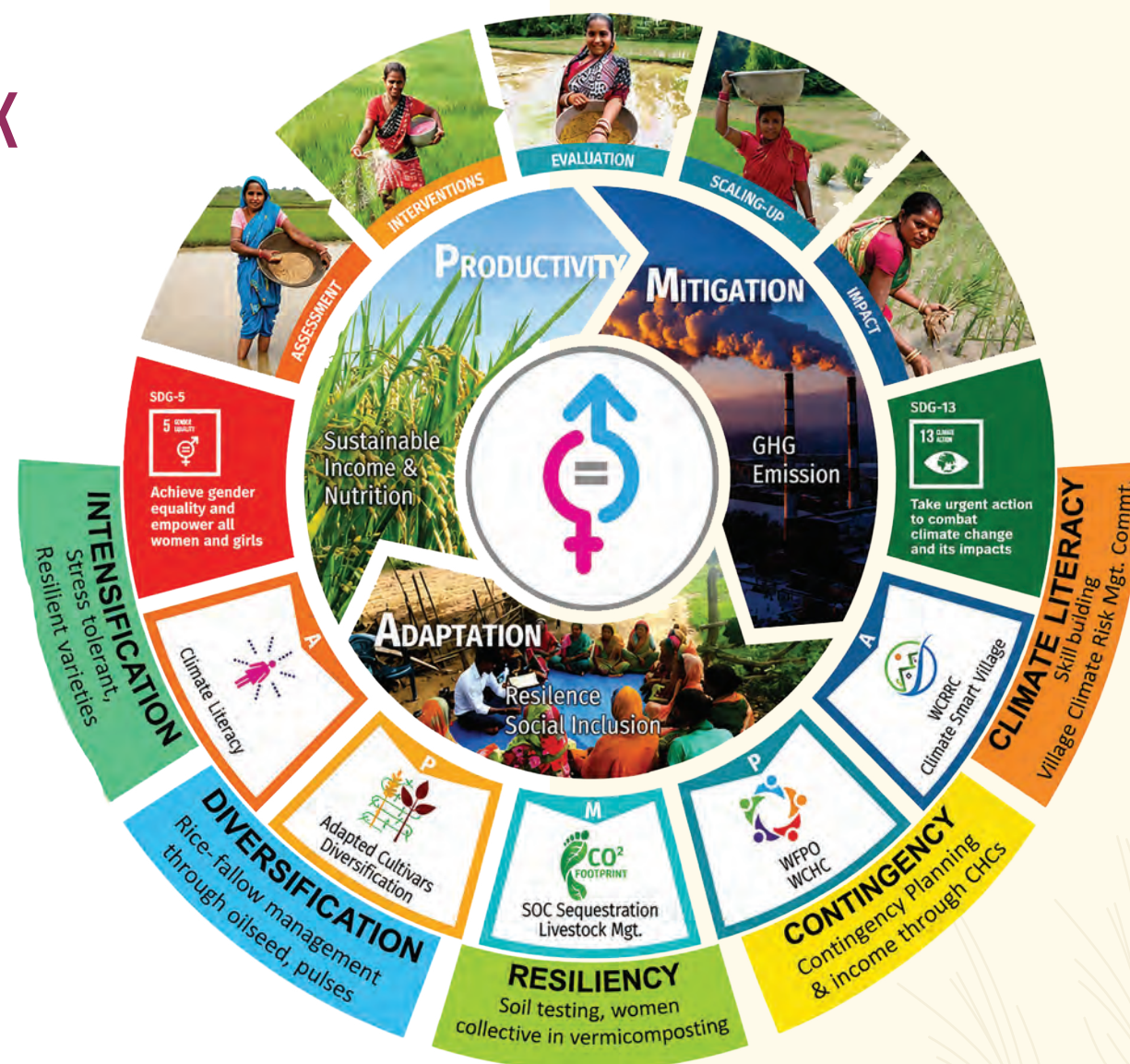
- Vegetables are cultivated in soil filled column in vertical space facilitating easy intercultural operations and harvesting of the vegetables by women farmers.
- Requires less time, reduce workload on women and thereby increase their leisure time.
- Requires less labour as tillage operation is avoided, weeds are suppressed in paddy field, and easy harvesting of vegetables from the vertical structure.
- Harvesting require less labour and reduce drudgery as harvesting operations are carried out in standing posture compared to bending posture in conventional vegetable cultivation.
- Predatory birds find place to sit on the platform and eat harmful insects of paddy and vegetables.
- Vegetable crops may also attract the honey bees for collection of honey from the flowers, these beneficial insects in turn favour the crops in pollination resulting higher yield of vegetables.
- Environmental friendly; boost species diversity and ecosystem services.



Rice + Bitter gourd

GENDER RESPONSIVE CLIMATE SMART AGRICULTURE FRAMEWORK

- Framework is based on the women friendly Climate Smart Agriculture interventions and practices (CSAP) in three pillars of climate smart agriculture: adaptation, mitigation and productivity that encompass assessment, evaluation and up-scaling of technologies.
- Executed in 24 villages in a command area (507 ha) of 7 Minor Irrigation Project (MIPs) of Ghasipura, Anandpur and Harichandanpur blocks of Keonjhar district of Odisha.
- Women centric impact include increased control on assets, participation in decision-making, knowledge, changes in behaviour, approach, awareness, empowerment, and improved economic status and food security and nutrition.
- Beyond CSA practices, the institutional involvement in climate change adaptation, mitigation and income generation, credit, access loans, improved nutrition and health services is also integral part of framework.





- **Yield enhancements:** Paddy (18.5%), Millets (21.5%), Groundnut (20.4%), Pulses (17.9%) and Oilseeds (15.3%).

- **Social Impact:** Increase in adoption of climate resilient technologies by farm women: Stress tolerant varieties (86.7%), Direct Seeded Rice (76.2%), and compost pits (68%).

- **Adoption of pulses and oilseeds cultivation by farm women** in management of rice-fallows (58%).

- **Leadership and decision making** of farm women improved with Women-led CHC's.

ZERO TILLAGE POTATO CULTIVATION WITH PADDY STRAW MULCHING

- Zero-tillage (ZT) potato cultivation is practiced immediately after harvesting *Kharif* rice, in the moisture saturated soil without land preparation.
- Treated tubers are planted at a spacing of 30 cm × 15 cm, ensuring optimum plant population and better tuber development.
- Tubers covered with compost @ 5 t ha⁻¹, followed by basal application of fertilizers.
- Uniform layer of paddy straw mulch @ 10 t ha⁻¹ is applied to cover the entire field surface.
- Mulch conserve soil moisture, suppress weeds, and reduce soil salinity by minimizing evaporation losses.



Developed by ICAR-CSSRI, Karnal, India



- This system reduce cost of cultivation (27%), labour requirement (50%) and irrigation water requirement (40%).
- Improves water productivity (146.5%), tuber yield (38.5%), soil moisture (8.0%) and reduce soil salinity (40%).
- Requires less time, reduce workload on women due to zero tillage and increase their leisure time.
- Harvesting requires less labour and easy. Reduce drudgery in all the operations.
- Better quality of potato tubers with higher nutritional quality.
- Enhances cropping intensity, yield stability, profitability, and sustainability of rice-based farming systems.



NUTRI-GARDEN : JANANI MODEL

- JANANI Nutri-garden is the integration of diversified crops (vegetables, bio-fortified tuber crops), vermicomposting, mushroom farming, bee keeping and poultry unit in 100 m² area.
- Around 470 kg of vegetables can be harvested annually from the area; depending upon the location and crop varieties.
- In the mushroom unit, approximately 185 kg of paddy straw mushroom and oyster mushroom can be obtained with proper management practices.
- Poultry unit has the potential to yield 2500 numbers of eggs and 42 kg meat.
- Two honey bee hives may produce about 5 kg honey annually.
- Total manure/compost production around 600 kg (poultry manure and spent mushroom substrate compost).
- Vermicomposting unit may generate around 1 ton vermicompost, which is sufficient for the area.



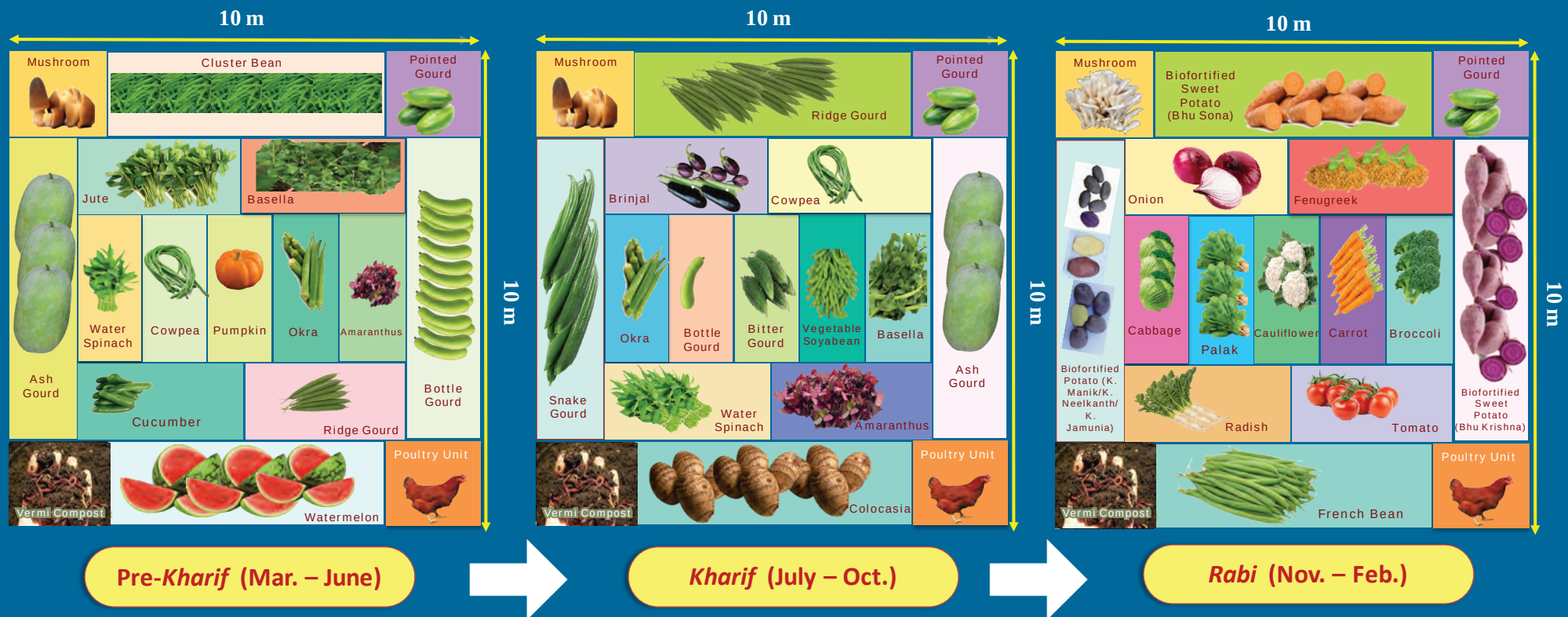
Developed by ICAR-CIWA, Bhubaneswar, India



J- Judicious
A- Affordable
N - Nature-positive
A - Adaptive
N - Nutritious
I - Inclusive & income-enhancing

JANANI Nutri-Garden is a gender-responsive multi-commodity based intensive farming system model to produce and ensure regular availability of diverse commodities as well as improve access to inputs and technical knowledge and popularize bio-fortified vegetables and address micronutrient deficiency of farm families.

Seasonal Vegetables: 31 nos., Perennial Vegetable: 1 no.
Poultry: 1 Unit, Mushroom: 2 types, Vermicompost: 1 unit
Bee Hives: 2 units

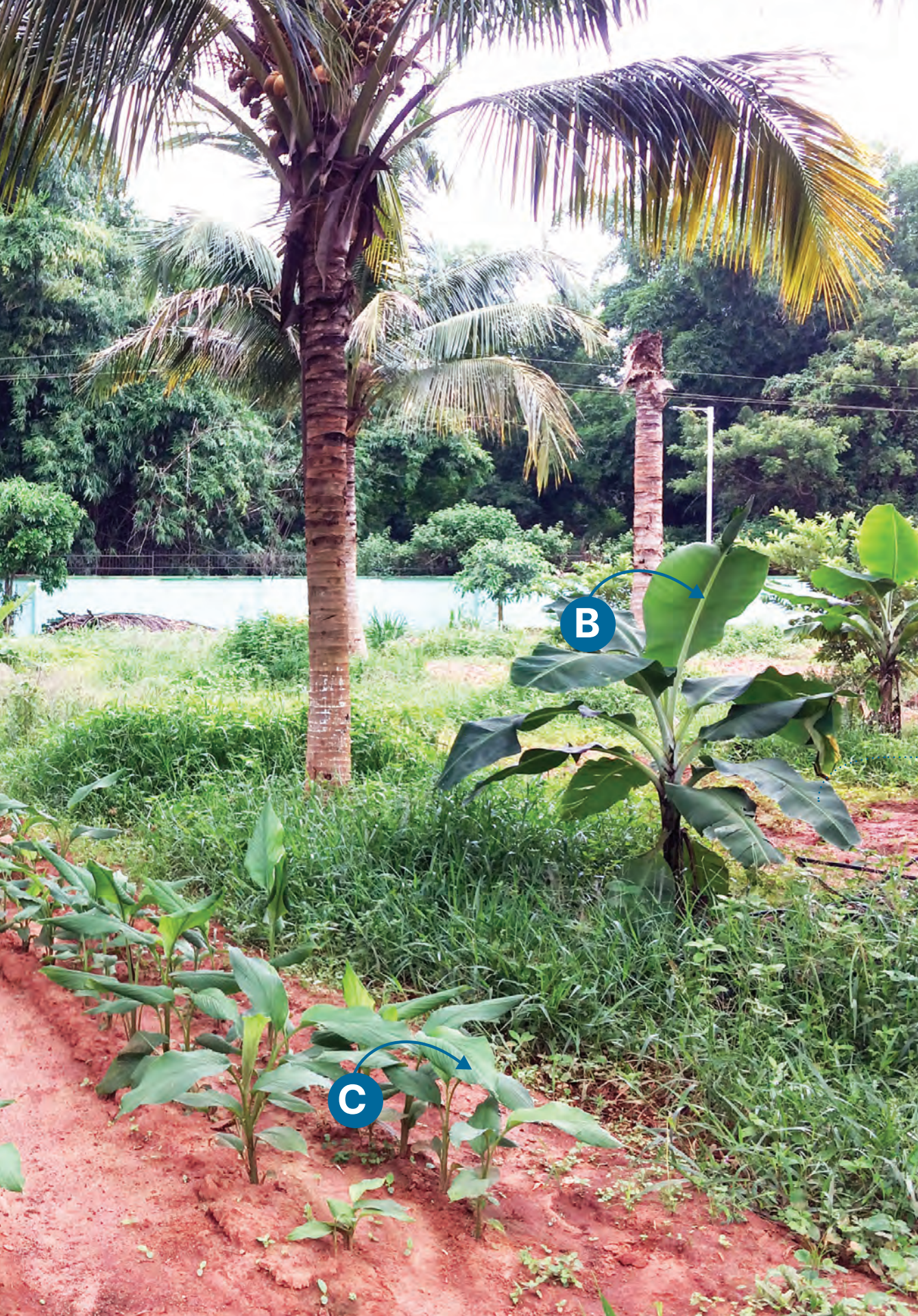


GENDER RESPONSIVE MULTI-STOREY CROPPING MODEL

- Climate-smart, resource-efficient system designed to maximize productivity per unit area through effective use of vertical space, sunlight, and growing season.
- Three-tier cropping system ensures minimum competition and maximum complementary effects among crops.
 - **Top storey:** Coconut
 - **Second storey:** Papaya, Banana, Guava, Moringa
 - **Ground storey/ spaces:** Pineapple, Cowpea, Turmeric, Elephant Foot Yam, Colocasia, Ginger



Developed by ICAR-CIWA, Bhubaneswar, India



- Diversified cropping provides year-round harvest, regular cash flow, and enhances dietary diversity and thereby family nutrition.
- Enhanced system productivity with a validated Benefit-Cost ratio of 1.91, outperforming than coconut mono-cropping.
- Improved soil health through legume inclusion, organic residue recycling, weed suppression, and better moisture conservation.
- Gender responsive model with reduced drudgery, distributed work division and opportunities in harvesting, value addition, and marketing.
- High scalability potential for coconut-based farming systems in the eastern tropical region.

A
Coconut in top storey

B
Banana in second storey

C
Turmeric in ground storey

A photograph of a mango orchard. In the foreground, a dense mango tree is heavily laden with green, unripe fruit. A dirt path leads through the orchard, flanked by rows of mango trees. The background shows more trees and a clear sky.

FRUIT CROPS-BASED INTERCROPPING MODELS

- Intercropping offers viable alternatives to the conventional mono-cropping method to boost profitability.
- The mango-pineapple intercropping is a sustainable model, generating a fruit yield of 14-14.5 t ha⁻¹ with additional gross income of ₹4.5-5.00 lakhs ha⁻¹ per cropping cycle.



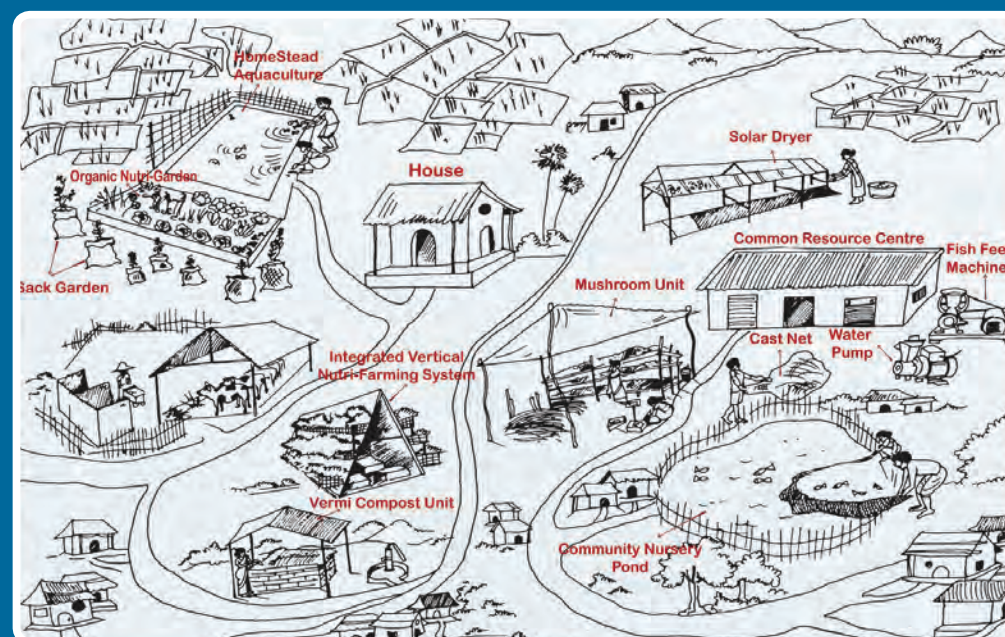
- In banana, intercropping with cow pea generated highest bunch weight. Maximum gross additional income was obtained from elephant foot yam (Rs. 4.00 lakhs ha⁻¹ per year).
- In guava, turmeric can be successfully intercropped. The guava + pineapple model generated the highest gross return of Rs. 5.50 lakhs ha⁻¹ per year.
- Lemon intercropping with cowpea resulted in maximum fruit yield per ha (58.30 q ha⁻¹). Highest economic profit was obtained from lemon + french bean (Rs. 3.15 lakhs ha⁻¹ per year).

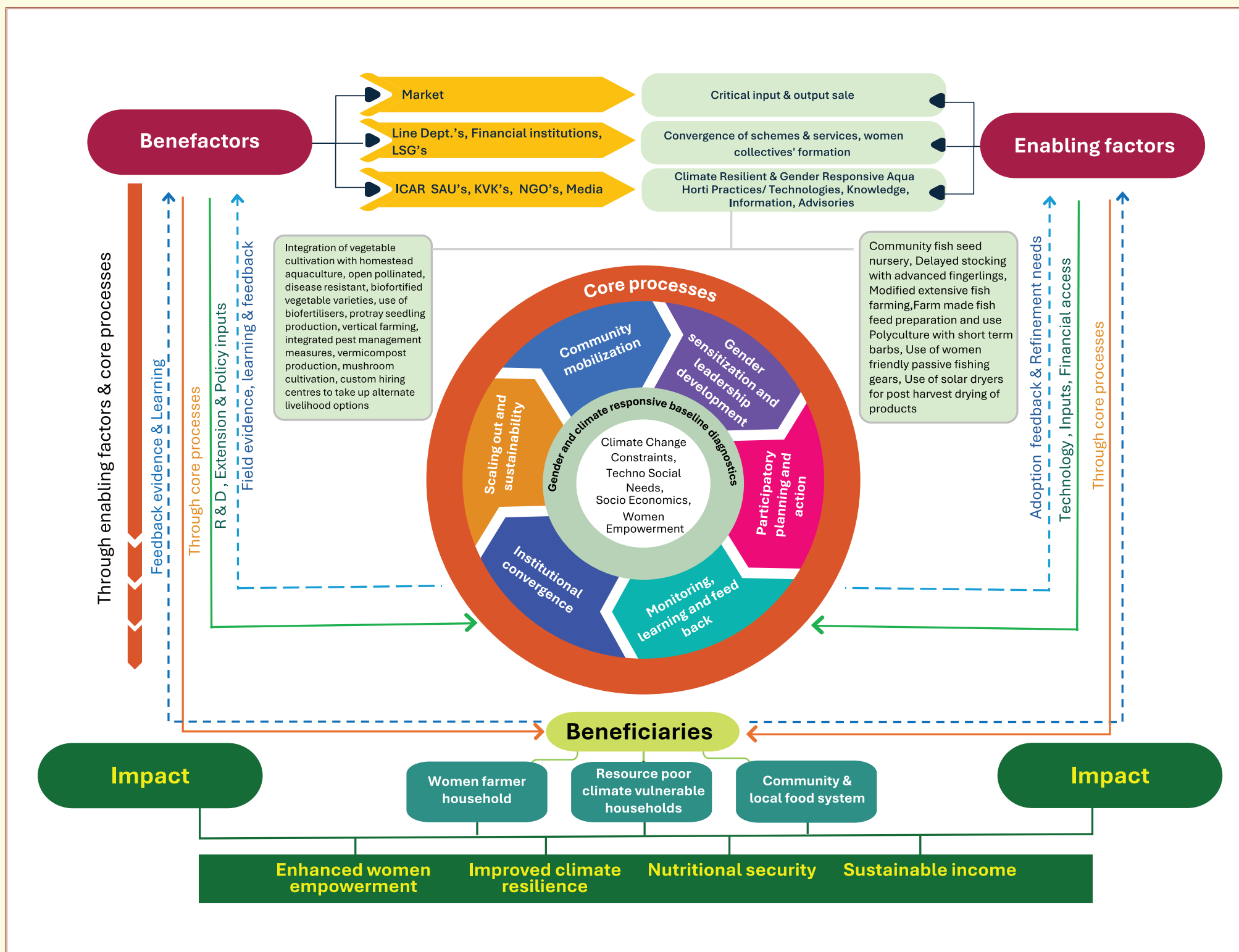


GRIHA - GENDER RESPONSIVE INTEGRATED HOMESTEAD AQUA- HORTICULTURE FOR FLOOD- PRONE REGION

- Focuses on community mobilization, capacity building, and participatory activity to empower women in utilizing homestead and community resources.
- Enables women to collectively adopt climate-resilient, and gender-responsive strategies in aquaculture and horticulture.
- Fish production increased by ~95% ($3.22 \text{ t ha}^{-1} \text{ yr}^{-1}$) and per-household fish availability rose from 15.2 kg to 45 kg/year and net income gain of Rs. 1.57 lakh $\text{ha}^{-1}\text{yr}^{-1}$.
- Integration of nutri-garden resulted in availability of 230g vegetables/person/day. Sale of surplus vegetables generated additional income.
- Impact: Increased household income, improved nutrition, strengthened women's skills, participation, and decision-making in farm, family, and community affairs.

INDICATORS	IMPACT	
Food availability	334% increase in per capita per day vegetable availability 196% increase in availability of fish (Indian major carps + minor carps) to the rural household through homestead aquaculture Share of fish harvested used in household consumption increased from 8 to 16%	
Income	95% increase in aquaculture production/Ha 92% increase in gross income through aquaculture	
Women Empowerment	Participation in climate smart aqua-horticulture	Participation in the different aquaculture and horticulture activities increased by around 5.2-83.0% 39% increase in participation in decision making regarding quantity of produce to be sold and retained for home consumption 37% increase in access to good quality fish and vegetable seeds
	Capability to manage alternate livelihood options	55% farmers adopted mushroom cultivation with an average daily net income of around Rs 500/-
	Access to technology and resources	45% increase in access to critical inputs for farming 60% farmers had access to community fish seed nursery
	Leadership	Two women farmer interest groups formed Community fish nursery managed by women FIG Two custom hiring centres managed by women Farmer Interest Groups





04

VALUE ADDED PRODUCTS





PBW 1 CHAPATTI: A WHEAT VARIETY

- Developed by Punjab Agricultural University, Ludhiana
- The variety is disease resistant: Incorporates genes for resistance to rust diseases, enhancing its resilience.
- Nutritious wheat for farmers and consumers in Punjab and adjoining states.
- Good Milling Properties: Offers excellent grain characteristics and good milling qualities.
- Rich in protein - around 12.13-12.72%
- Superior Chapati Quality: Produces soft, sweet, and puffy chapatis with a white color.
- Also remains softer even after several hours and retain their quality for hours after baking.
- Durability: The chapatis made from this variety remain soft and retain their quality for hours after baking.
- Agricultural Value: Offers a high yield with desirable traits, though some farmers choose it for its premium culinary quality over maximum output.



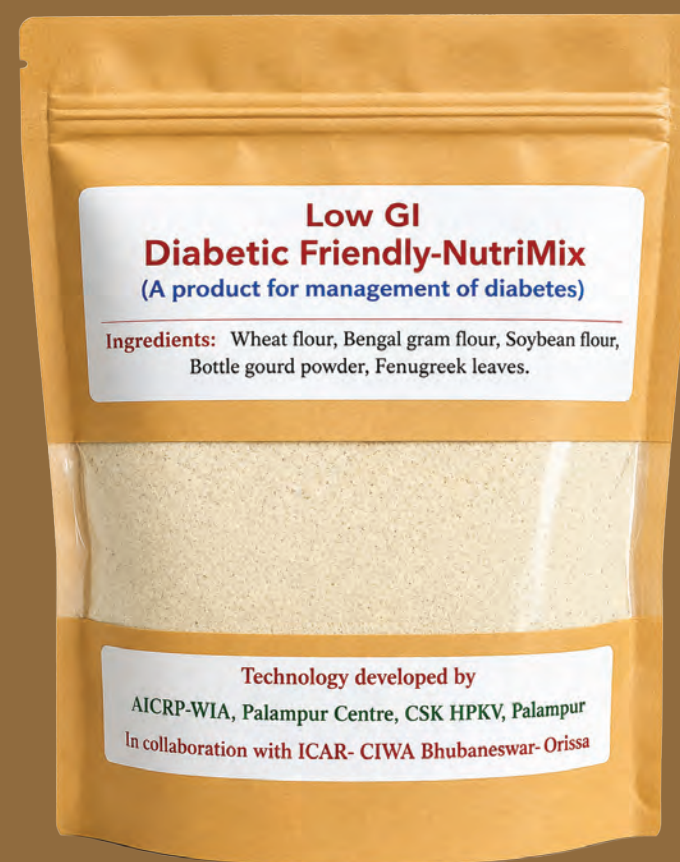
Parameters	PBW 1 Chapatti
Grain yield (q/ha)	42.9
Chapatti score (Max 10)	8.0
Sweetness/ Total sugars (mg/g)	48.8
Phenol reaction (dough shelf life wrt colour)	2.1
Keeping quality of chapatti (Max 5)	4.8
Stripe rustw	Moderately resistant
Leaf rust	Resistant
Plant height (cm)	103
Days to maturity	154
Year of release	2020

PROCESS FOR LOW GI DIABETIC-FRIENDLY MULTIGRAIN NUTRIMIX

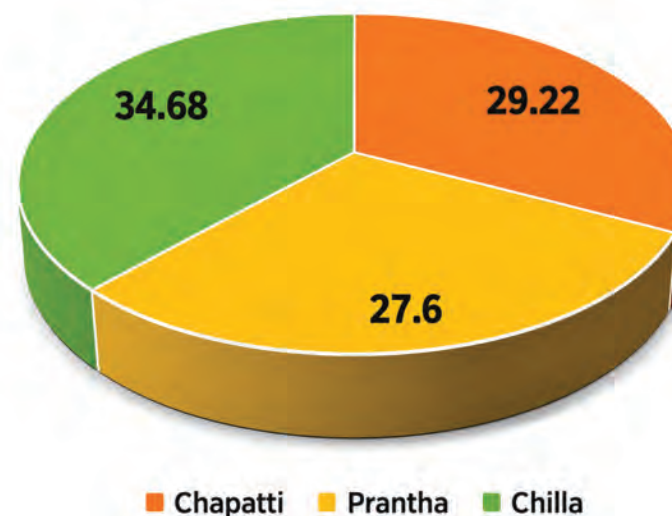
- Responding to the national push for "nutri-cereals," this technology standardizes the production of Millet-based Jaggery Cookies, offering a high-fiber, mineral-rich alternative to refined snacks.
- By synergizing diverse millets with functional ingredients like flax seeds and natural sweeteners, the formulation delivers micronutrient-dense profile rich in calcium and iron.
- The process is scientifically optimized for superior texture and shelf life while remaining cost-effective and "women-friendly," ensuring seamless adoption by SHGs and cottage industries.
- The product formulation is based on finger millet, wheat, flaxseed, coconut, jaggery and fat.
- The product is rich in calcium, iron, dietary fiber, and with good organoleptic characteristics.
- The typical shelf life of the product is 5 months when stored in cool, dry place in an airtight container.
- Cost: 120/- per kg approx.
- Technology commercialized.

Nutritional composition, g/100g	
Moisture - 13.21	Crude fat - 6.25
Protein - 18.48	Total minerals - 4.11
Crude fiber - 4.07	Total dietary fiber - 17.64
Energy - 320 kcal	Total carbohydrates - 60
Total phenols - 248.5 mg GAE/100g	
Total flavonoids - 246.68 mg RE/100g	

Developed by AICRP-WiA Centre, CSKHPKV, Palampur & ICAR-CIWA



Glycemic Index



HIGH FIBER FOOD MIX FOR MANAGEMENT OF OBESITY

- High Fiber Food Mix is a thoughtfully formulated multi-millet blend developed to support healthy weight management.
- Prepared using locally available, nutrient-rich ingredients such as finger millet, little millet, defatted soy flour, fenugreek, green gram, dehydrated drumstick leaves, curry leaves and cluster beans, the product reflects a perfect balance of tradition and science.
- It is 100% natural, rich in dietary fibre (22 g per 100 g) and protein (15 g per 100 g) and low in fat (2.6 g per 100 g), making it an ideal functional food for obesity management.
- The product has shelf-life of 3 months and well suit to prepare local cuisines.
- Cost: Rs. 200/- per kg approx.
- Technology commercialized.



Developed by AICRP-WiA Centre, UAS, Bangalore

PUSTI MALT: NUTRITIOUS HEALTH BEVERAGE

- Pusti Malt finds its roots since ages as a traditional beverage, consumed by all age groups.
- Made from germinated finger millet, wheat, whole greengram and aromatic cardamom.
- Its rich calcium (193 mg/100 g) content, along with 360 kcal of energy and 9.0 g of protein per 100 g, makes it a powerful food for growth, strength and vitality.
- Easily digestible nutri dense beverage mix.
- Good source of protein, calcium & iron.
- Ready-to-prepare weaning/beverage mix.
- The product has shelf-life of 3 months and well suitable to prepare beverage.
- Cost: Rs. 320/- per kg approx.
- Technology commercialized.





PUSTI MALT

Nutritious Health Beverage





Best before three months from packing

Ingredients: Germinated finger millet, wheat, whole green gram and cardamom

Nutrients	Content
Protein (g)	9.00
Fat (g)	1.50
Calcium (mg)	193
Iron (mg)	5.20
Energy (kcal)	360

- Mix well a tea spoon of malt powder in ½ cup of water. Add the mixture to boiling milk/water with desired quantity of sugar. Stir well. Cook for 2 minutes and serve hot.
- Easily digestible and nutritious health beverage for all age groups.
- The food mix can also be used as weaning food

Technology: AICRP-WIA, UAS (B)

Net weight:

MRP:

Packed on:




**All India Co-ordinated Research project
Women in Agriculture, UAS, Bangalore**




PUSTI HURIHITTU: AN ENERGY DENSE FOOD PRODUCT

- Pusti Ragi Hurihittu is a ready-to-eat supplementary food developed for preschool children, adults and the elderly.
- Prepared from popped finger millet, defatted soy flour, desiccated coconut, sugar, and delicately can be consumed directly into nutritious laddus.
- The product is 100 per cent natural and rich in calcium (164 mg) and essential minerals, providing balanced energy (387 Kcal) and protein (7 g) to support daily nutritional needs.
- Ready-to-eat millet based supplementary food.
- Highly nutritious and ready to eat food mix.
- The product has shelf-life of 3 months and well suitable for preparing beverage.
- Cost: Rs. 400/- per kg approx.
- Technology commercialized.





PUSTI HURIHITTU

Energy Dense Food Product





Best before three months from packing

Ingredients: Popped ragi, defatted soya flour, desiccated sugar and cardamom

Nutrients	Content
Protein (g)	07.00
Fat (g)	03.70
Calcium (mg)	164.00
Iron (mg)	06.30
Energy (kcal)	387

- Highly nutritious and ready to eat food mix
- Rich in Energy, Protein, Calcium and Iron

Technology: AICRP-WiA, UAS (B)

Net weight:

MRP:

Packed on:




All India Co-ordinated Research project
Women in Agriculture, UAS, Bangalore




POUSTIK LADDU: AN ENERGY DENSE TRADITIONAL FOOD

- POUSTIK LADDU is a nutrient-dense, traditional value-added food product developed to combat undernutrition.
- Prepared using locally available ingredients such as popped finger millet, popped rice, soy flour, groundnuts, sesame seeds, ghee, sugar, and cashew nuts, it offers concentrated nourishment in a familiar, appealing form.
- Prepared from locally available ingredients, this 100% natural functional food is rich in energy (496 kcal), protein (11.51 g), calcium, and iron, making it an ideal dietary supplement for improving nutritional intake across all age groups.
- Ready-to-eat nutritious product.
- The product has shelf-life of 2 months and well suitable by all age groups.
- Cost: Rs. 200/- per kg approx.
- Technology commercialized.





POUSTIK LADDU

Energy Dense Food Product





Best before three months from packing

Ingredients: Popped finger millet, rice, soya flour, groundnut, sesame seeds, ghee, sugar, desiccated coconut, milk powder, cardamom and cashew nuts

Nutrients	Content
Moisture (g)	01.83
Protein (g)	11.51
Fat (g)	21.33
Total minerals (g)	00.80
Carbohydrates (g)	64.53
Energy (kcal)	496
Total dietary fiber (g)	13.24
Iron (mg)	4.00
Calcium (mg)	200

- Rich in Energy, Protein, Calcium and Iron
- Helps in improving body weight and overall well being

Technology: AICRP-WIA, UAS (B)

Net weight:

MRP:

Packed on:




All India Co-ordinated Research project
Women in Agriculture, UAS, Bangalore




LEHYAM-GINGERPRASH

- The Ginger and Cauliflower Greens Lehyam is a formulation, designed to naturally boost micronutrient intake.
- A recommended 20g daily serving provides approximately 1.8mg vitamin C and 2.08mg iron, helping adult women meet their daily nutritional needs through an affordable, culturally familiar supplement.
- Good acceptability (hedonic score >8.5/9).
- Shelf-stable for 6 months under ambient storage.
- The process had been adopted by local entrepreneurs for manufacturing and marketing.
- Cost: Rs 95/- per 100g approx.



IRON-RICH MILLET BASED SUPPLEMENTARY HEALTH MIX (PROMIX)

- Standardized a process technology for producing millet-based iron-rich supplementary health mix (Promix) from cost-effective, locally available food materials.
- Rich in energy, protein, calcium, and zinc, providing nearly one-third of the Recommended Dietary Allowance (RDA).
- Demonstrated an 18.56% increase in haemoglobin levels following 90 days of regular consumption, indicating its potential to reduce iron-deficiency anaemia.
- Preservative-free and additive-free formulation with a shelf life of 90 days under ambient storage conditions.
- Suitable for regular consumption by all age groups, particularly women, children, and sportspersons.
- Cost: Rs. 340/- per kg approx.
- Technology commercialized.



Nutritional composition of Promix (g/100g)	
Moisture	7.71
Crude protein	13.5
Crude fat	2.45
Crude fibre	12.88
Carbohydrates	75.39
Energy, kcal	377
Iron, mg	6.87
Zinc, mg	6.62
Calcium, mg	271.05
Magnesium, mg	210.29

Developed by AICRP-WiA Centre, UAS, Bangalore & ICAR-CIWA

MINERAL AND FIBRE RICH MILLET COOKIES

- Responding to the national push for "nutri-cereals," this technology standardizes the production of Millet-based Jaggery Cookies, offering a high-fiber, mineral-rich alternative to refined snacks.
- By synergizing diverse millets with functional ingredients like flax seeds and natural sweeteners, the formulation delivers micronutrient-dense profile rich in calcium and iron.
- The process is scientifically optimized for superior texture and shelf life while remaining cost-effective and "women-friendly," ensuring seamless adoption by SHGs and cottage industries.
- The product formulation is based on finger millet, wheat, flaxseed, coconut, jaggery and fat.
- The product is rich in calcium, iron, dietary fiber, and with good organoleptic characteristics.
- The typical shelf life of the product is 5 months when stored in cool, dry place in an airtight container.
- Cost: Rs 320/- per kg approx.
- Technology commercialized.



Developed by AICRP-WiA Centre, CSKHPKV, Palampur & ICAR-CIWA

PROCESS FOR FINGER MILLET BASED TRADITIONAL FOOD: NUTRIPINNI

- The development of Nutritionally Optimized Ragi Pinni modernizes a traditional staple into a high-performance functional food.
- This process replaces refined sugars and with functional ingredients, ensuring superior sensory quality and extended shelf life.
- The product formulation is based finger millet, pulse, amaranths, oilseeds, coconut, jaggery and fat.
- By integrating finger millet with soy and amaranth, this standardized formulation offers a high fibre, calcium-rich alternative to conventional snacks.
- The product is rich in calcium, iron, fiber, and protein with the healthy fats and micronutrients and good organoleptic characteristics.
- To maximize nutrient bioavailability, scientific pre-treatments like thermal processing is employed to neutralize anti-nutritional factors.
- The typical shelf life of the product is 3 months when stored in cool, dry place in an airtight container.
- Cost: Rs 550/- per kg approx.
- Technology commercialized.

Nutritional composition g/100g	
Moisture -15.70	Crude protein -13.25
Crude fat - 25.90	Total Ash -2.34
Carbohydrate - 42.81	Energy -457.34
Iron, mg -10.12	Calcium, mg-315



AZOLLA BASED LOW-COST POULTRY FEED



- Developed Azolla based low-cost poultry feed by partially replacing soybean meal.



- Incorporating Azolla @ 10%, reduced the feed cost by Rs. 200 per quintal.



- Azolla based poultry feed increased the lutein and zeaxanthin contents in egg while maintaining the production efficiency.



• Poultry egg of Vanaraja

- It also results in dark yellow coloured egg yolk which is more accepted by the consumers.

PROCESS FOR FERMENTED FISH SILAGE MANURE

- Eco-friendly method for utilizing fish waste (intestines, skin, gills etc.).
- Prepared from visceral waste of freshwater carps through fermentation using carbohydrate sources.
- Rich in macro- (N, P, K, Ca) and micronutrients (Iron, Copper, Manganese and Zinc).
- Used as organic manure in liquid as well as powdered form.
- Validated on horticultural crops and observed the increased yield by 18% and 32% in cowpea and okra, respectively.
- Benefit-cost (B:C) ratio: 1.71.
- Technology licensed to the Industry.



Nutrients	Concentration
Moisture, %	14
Available N, %	2.92
Total P, %	0.32
Total K, %	0.903
Calcium, ppm	806
Iron, ppm	353
Copper, ppm	73.09
Manganese, ppm	278
Zinc, ppm	91.2

Developed by ICAR-CIWA, Bhubaneswar, India

05

EXTENSION MODELS





ମହିଳା ନେତୃତ୍ବାଧୀନ ସାମୁଦାୟିକ ଜୈବ ସମ୍ପଦ ଉତ୍ପାଦନ ଏକକ

महिला नेतृत्वाधीन सामुदायिक जैव संसाधन उत्पादन इकाई

Women-led Community Bio-resource Production Unit

Village: Dhanahara, Balipatna, Khordha

Project: Development of Horticulture (Fruits)-based Organic Farming Model for Entrepreneurship and Strengthening Self-Reliance (Atmanirbhar) among Farm Women

ଭା.ବି.ଅନୁ.ପ.-କେନ୍ଦ୍ରୀୟ କୃଷିରତ ମହିଳା ସଂସ୍ଥାନ, ଭୁବନେଶ୍ୱର

भा.कृ.अनु.प.- केन्द्रीय कृषिरत महिला संस्थान, भुवनेश्वर

ICAR - CENTRAL INSTITUTE FOR WOMEN IN AGRICULTURE, BHUBANESWAR



FRAMEWORK TO PROMOTE SHE-PRENEURSHIP IN CHEMICAL-FREE HORTICULTURE

- Framework focuses on income vulnerability of smallholders and enhance women's participation through agri-preneurship in chemical free horticulture.
- Key aspects of the framework include gender mainstreaming, women-led Bio-input Resource Units (BRUs), skill development, cluster-based chemical-free horticulture production, and market linkage.

Phase 1

- Formation of women farmers groups/ FIGs
- Awareness creation & Sensitization
- Promotion of Bio-input Resource Production Clusters



Women FIGs

Phase 2

- Establishment of Bio-input Resource production Units (BRUs)
- Community-based production of bio-inputs
- Market linkage development
- Product marketing & sales
- Promotion of cluster-based chemical-free horticulture



Women-led community-based enterprises in bio-input production

Phase 3

- Cluster-based Chemical free horticultural production
- Marketing of organic produce through local markets (Organic Haats)
- Establishment of Small Processing units & CHCs for P & VA



Cluster-based Chemical-free production of horticultural crops, Organic local markets & Horticultural processing units



SUSTAINABLE SHE-PRENEURSHIP IN MUSHROOM CULTIVATION MODEL (2S2M)

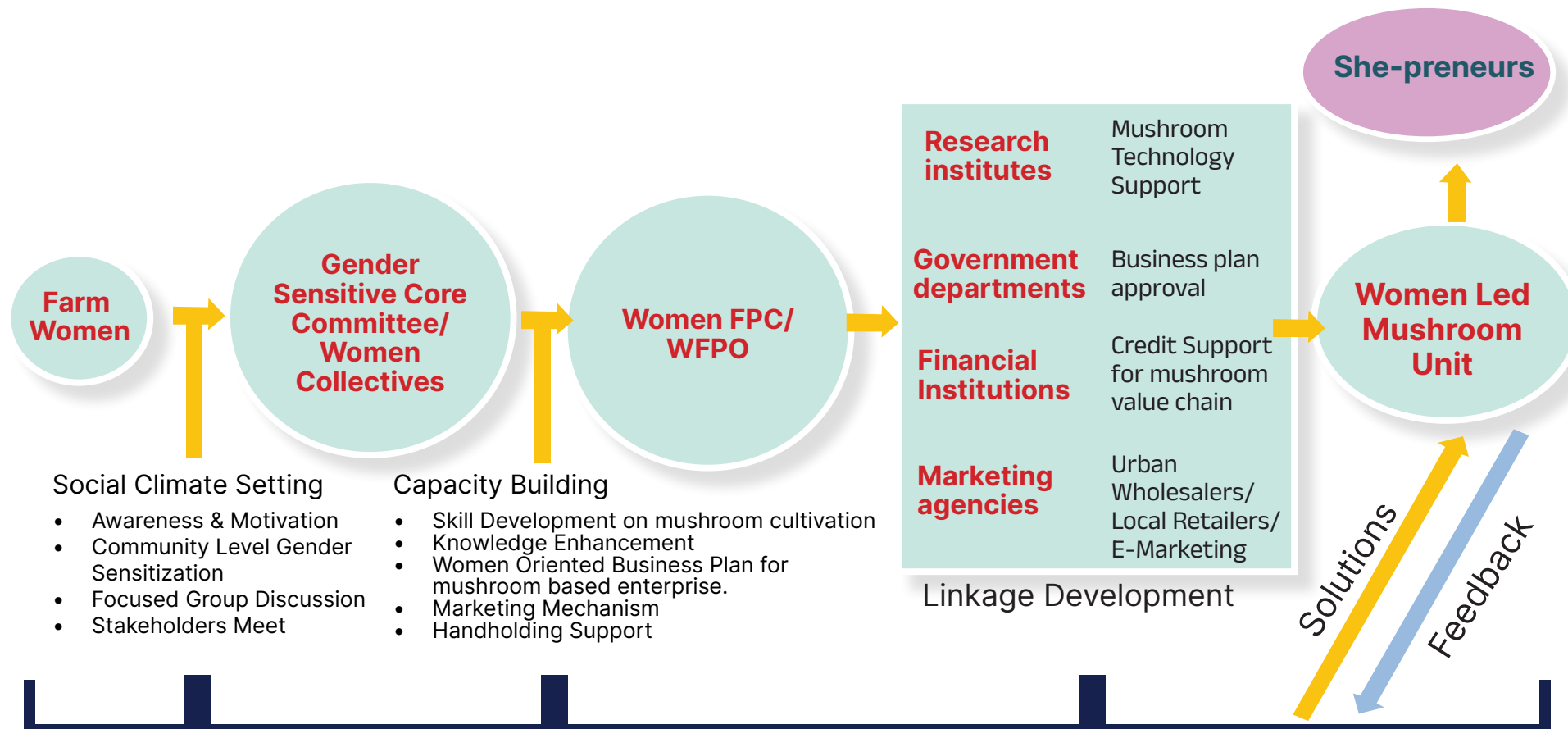
- Increased women's income from mushroom cultivation by over Rs. 1.5 to 2.0 lakh per month; improved access (>35%) to productive resources and services; higher consumption (>30%) of nutritious food items; drudgery reduction (>37%) due to introduction of small tools.
- Model fosters she-entrepreneurship and women empowerment by enhancing access to critical information and extension services.
- Addresses poverty, nutritional security, and unemployment by creating a support system for women.
- Provides assured marketing avenues and encourages active involvement of women in decision-making.



Developed by ICAR-CIWA, Bhubaneswar, India



Sustainable She-Preneurship in Mushroom Cultivation Model (2S2M)



Social Climate Setting

- Awareness & Motivation
- Community Level Gender Sensitization
- Focused Group Discussion
- Stakeholders Meet

Capacity Building

- Skill Development on mushroom cultivation
- Knowledge Enhancement
- Women Oriented Business Plan for mushroom based enterprise.
- Marketing Mechanism
- Handholding Support

Facilitating Organization (ICAR-CIWA)

OUTPUT OF THE MODEL

- Family Nutrition
- Income
- Knowledge and Skill
- Leisure time use
- Employment
- Decision Making
- Entrepreneurship
- Recognition

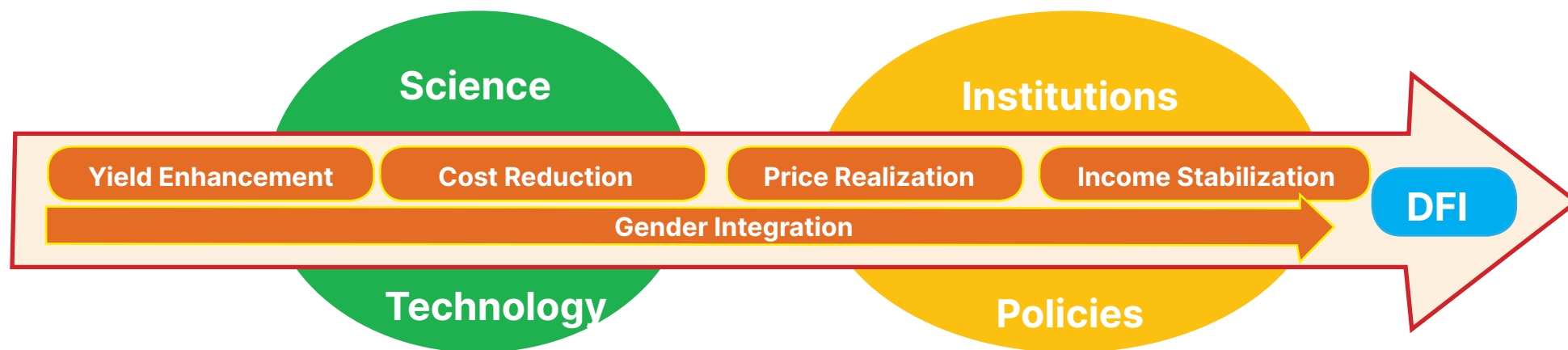
GENDER SENSITIVE MODEL FOR DOUBLING FARMERS' INCOME (DFI)

Implementation steps include:



Technological Interventions	Yield/Income/Outcome	
	Before	After
Varietal replacement in paddy (submergence tolerant varieties: Swarna-Sub-1, CR-1009-Sub-1)	37.5 q/ha (Rs. 41,250)	55.0 q/ha (Rs. 60,500)
Cauliflower: Varietal replacement and improved methods of cultivation (Var.: NS60N (F1 Hyb); Yield: 125 q/ha; Investment: Rs. 25000)	Rs. 1,00,000/ha	Rs. 1,87,000/ha
Improved methods of vegetable cultivation (Var.: Arka; Yield: 175 q/ha; Investment: 25000)	Rs. 1,12,500/ha	Rs. 1,75,000/ha
Plantations: Banana, Papaya (Var.: Bantala, Grand Naine and Red Lady; Investment: Rs. 4000)	Nil	Rs. 15,000 (backyard)
Backyard poultry (Breed: Vanaraja)	Rs. 3000/year	Rs. 6000/year
Drudgery reduction: Minor farm tools		Increased work efficiency
Nutrition: Green leafy vegetables		Family nutrition
Mobilization of community for building compost pits		Waste recycling

Developed by ICAR-CIWA, Bhubaneswar, India



Adopted and modified from Sendhil et al. (2017) Ind. J. Econ. Dev., 13 (1-8) & Dalwai, A (2017) Report of the committee on Doubling Farmer's income

Gender Integration

- Assessment/ address of gender concerns in accessing productive resources and extension services
- Consultation among the stakeholders about the challenges of men and women
- Counselling and gender sensitization of the community
- Equal opportunity for men and women in implementing the technological modules
- Promote community organizations - knowledge groups

Yield Enhancement

- Promoting high yielding varieties and hybrids-access to quality inputs
- Capacity building programme- Trainings and demonstrations
- Advisories on site-specific crop management/ allied activities
- Soil test campaigns
- Promoting drudgery reducing farm tools
- Development of knowledge and skill on primary processing/ value addition
- Awareness creation on market linkages
- Adoption of various enterprises with entrepreneurship mode

Cost Reduction

- Development of knowledge and skill on maintaining farm log books (expenditure and income)
- Development of knowledge and skill to reduce cost of cultivation/ cost cutting
- Development of knowledge and skill on waste reduction/ waste recycling
- Development of knowledge and skill to minimize post harvest losses
- Introduction of zero energy cooling chamber

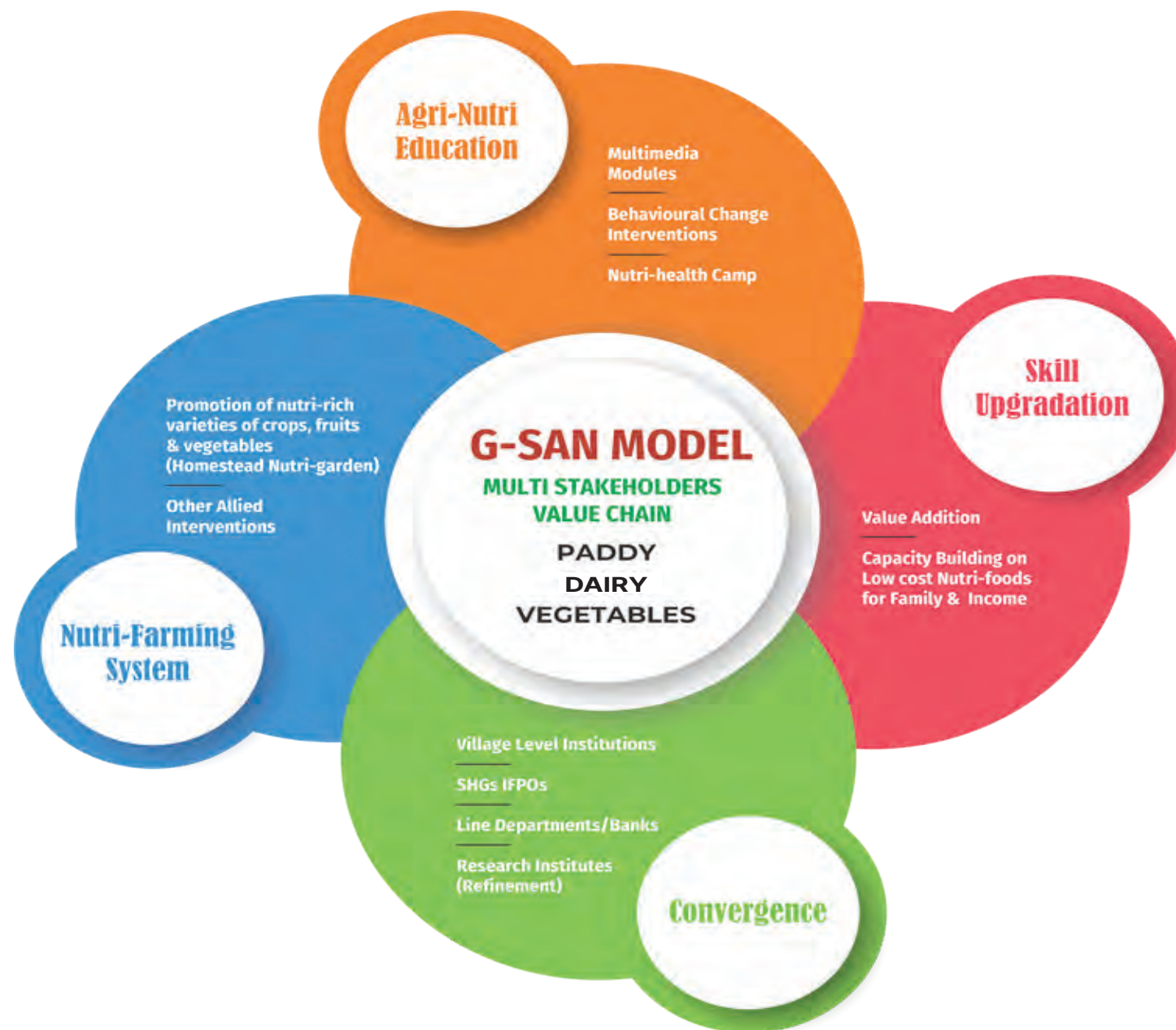
GENDER SENSITIVE AGRI-NUTRI FARMING SYSTEM MODEL

- The model encourages to cultivate vegetable, fruits, pulses in their farms or homestead area with active involvement of women farmers.
- The extension approaches adopted for the development of the GSAN Farming System Model are i) Sensitization, ii) Skill development and iii) Convergence.
- With improved high yielding rice varieties CR Dhan-312 and CR Dhan-409 and protein rich rice variety CR Dhan-311, the rice yield increased by 54.3% and the net returns increased by 75.7%. The income from homestead vegetable garden got doubled which can be attributed to better market connectivity as well as agri-nutri education.
- Through the technological interventions of horticultural crops, 57.50% farm women are now very well aware (>60%) about nutrition as compared to baseline status (17.50%).
- Package of improved feeding practices i.e. balanced ration incorporated with mineral mixture at the rate of 2% of the concentrated mixture to the dairy cows enhanced the milk yield by 18.9% and net returns by 54%.

High protein content rice CR Dhan 312 and CR Dhan 409 resulted in an additional protein yield of 3.26 and 3.30 q/ha.

High yielding and bio-fortified varieties adoption and cultivation by women farmers recorded benefit: cost ratio of 2.5 with effective gain of Rs 23,236/- per ha

Introduction of a combination of HYV with bio-fortified varieties important under G-SAN model for higher income along with women and farm families' nutrition.

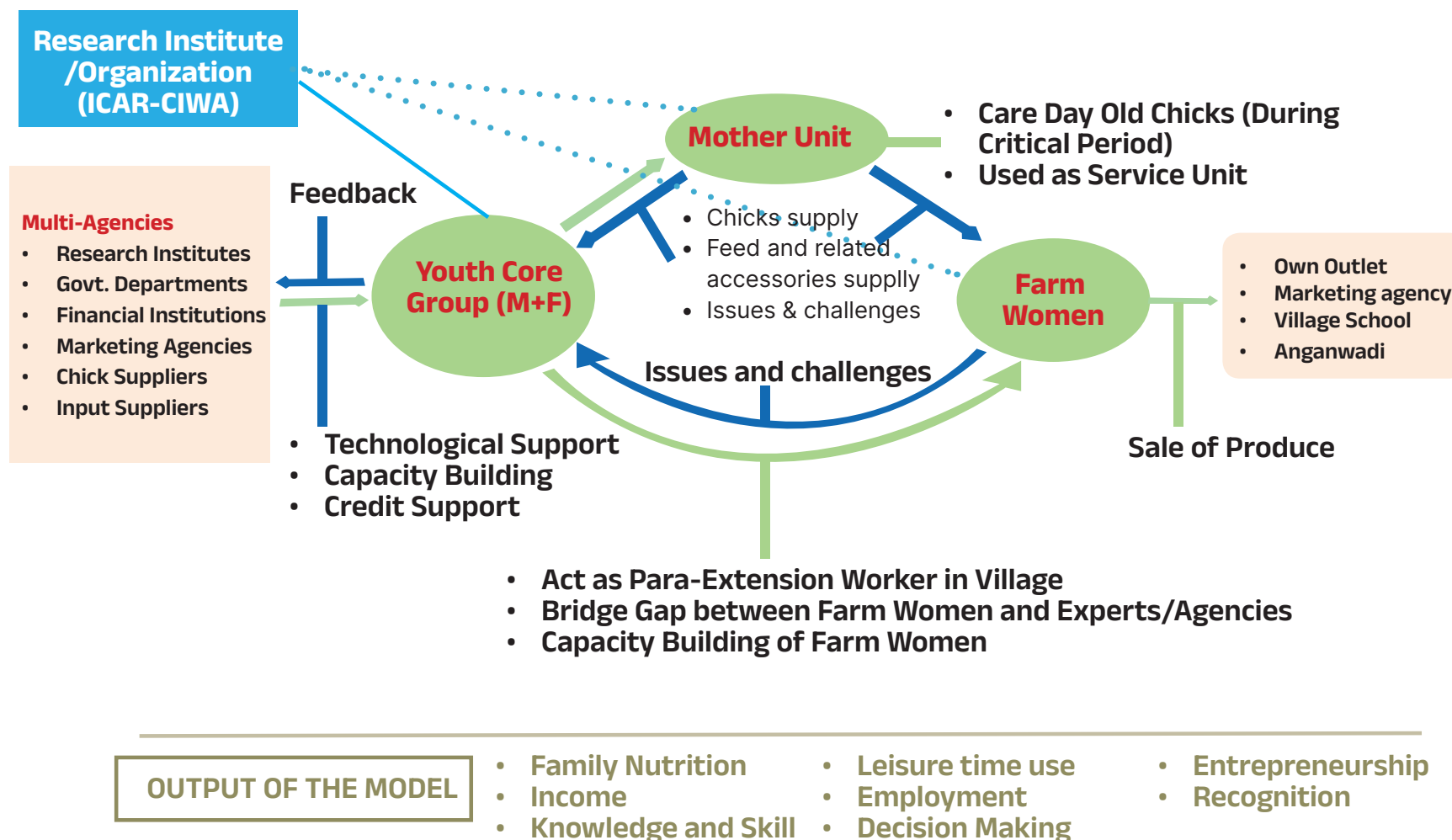


MULTI AGENCY PARTICIPATORY EXTENSION MODEL (MAPEM) FOR SUSTAINABLE POULTRY BY WOMEN FARMERS

- MAPEM was conceptualized and field-tested to address women's issues such as access to technology, information, and poor institutional support.
- Model integrates coordinated roles of multiple local and institutional agencies.
- A strong multi-agency network ensures sustainability after withdrawal of the institutional support.
- The model enhanced the per capita consumption of eggs and chicken by 33–50% in participating families.
- A family rearing 30 RIR birds with family support can earn an annual income of Rs. 35,200.
- Promotes women empowerment, income generation, and improved nutrition among farm families.



MULTI-AGENCY PARTICIPATORY EXTENSION MODEL (MAPEM)



FAMILY POULTRY PRODUCTION FOR NUTRITION AND INCOME

Family poultry unit is a small-scale poultry keeping (20-25 nos.) by households using family labour, utilizing locally available feed resources. Such units can successfully enhance nutritional benefits, income and overall livelihood of rural women.

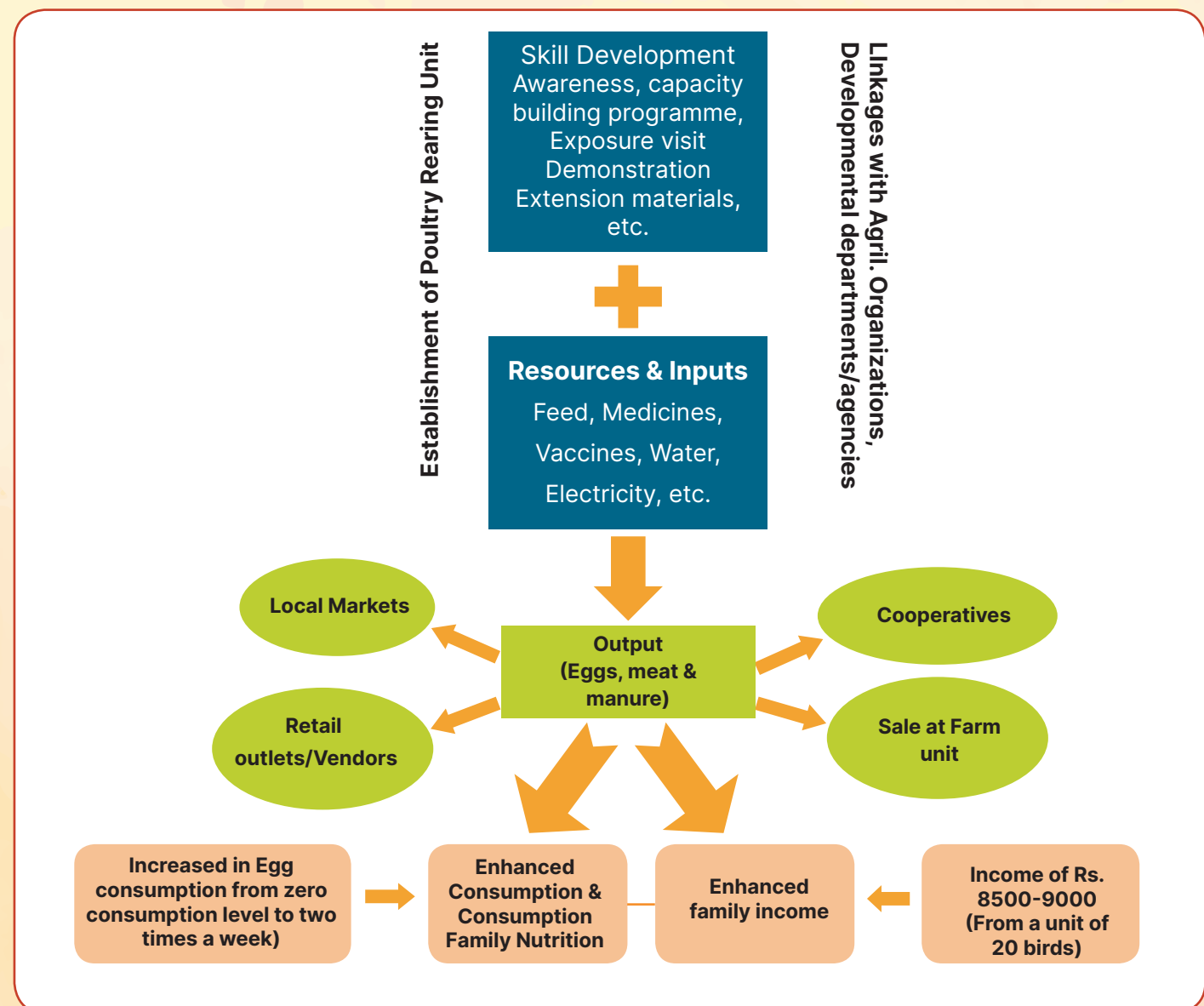
- Needs minimal use of land, labour and capital.
- Easy to handle by women with other activities.
- Generates small but regular income.
- Integrate well with other farming system.



Developed by ICAR-CIWA, Bhubaneswar, India



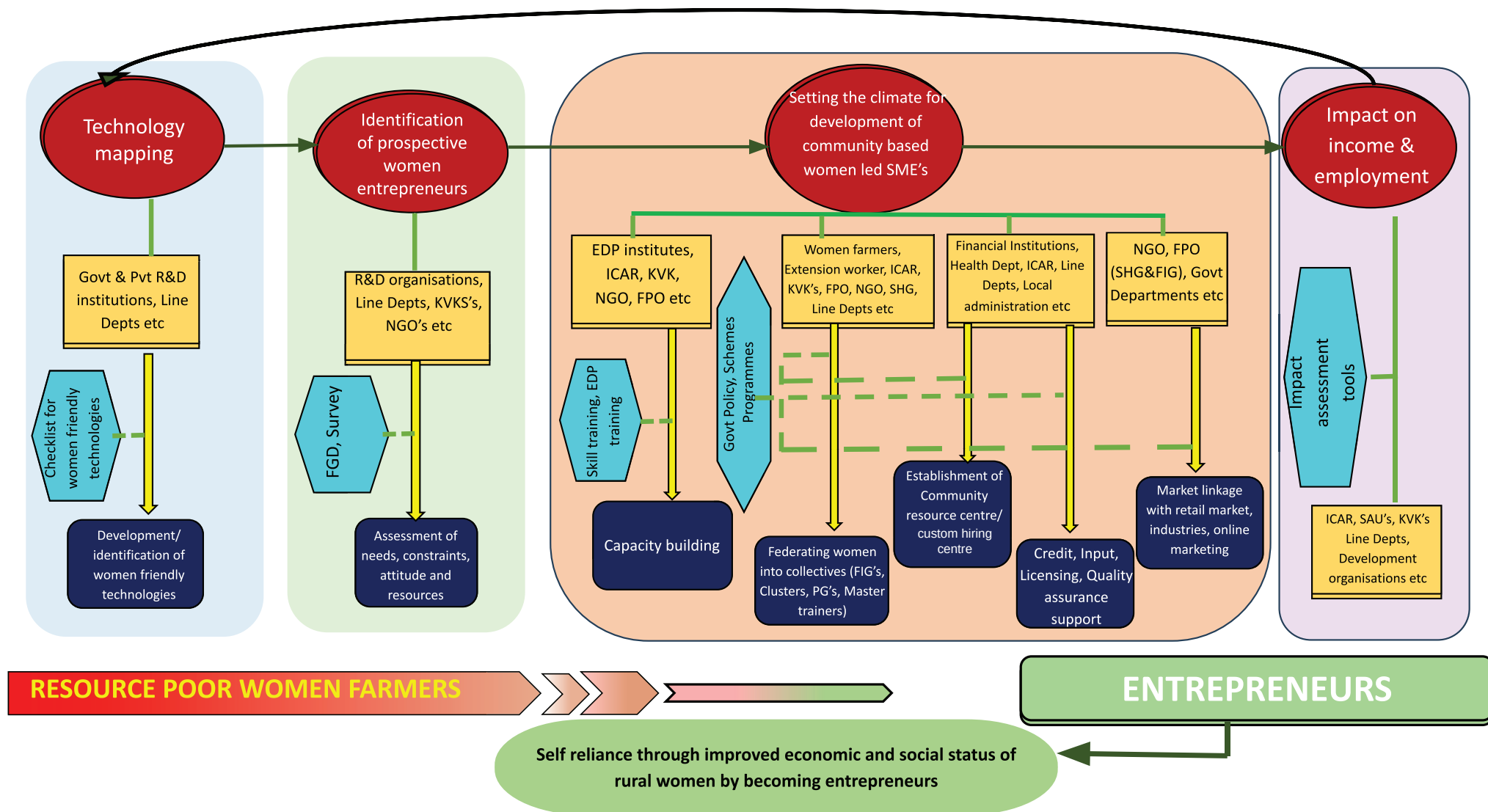
Family Poultry Production Model



GENDER-SENSITIVE COMMUNITY-BASED AGRIPRENEURSHIP MODEL THROUGH LIVESTOCK AND FISHERIES TECHNOLOGIES (GCAM-MODEL)

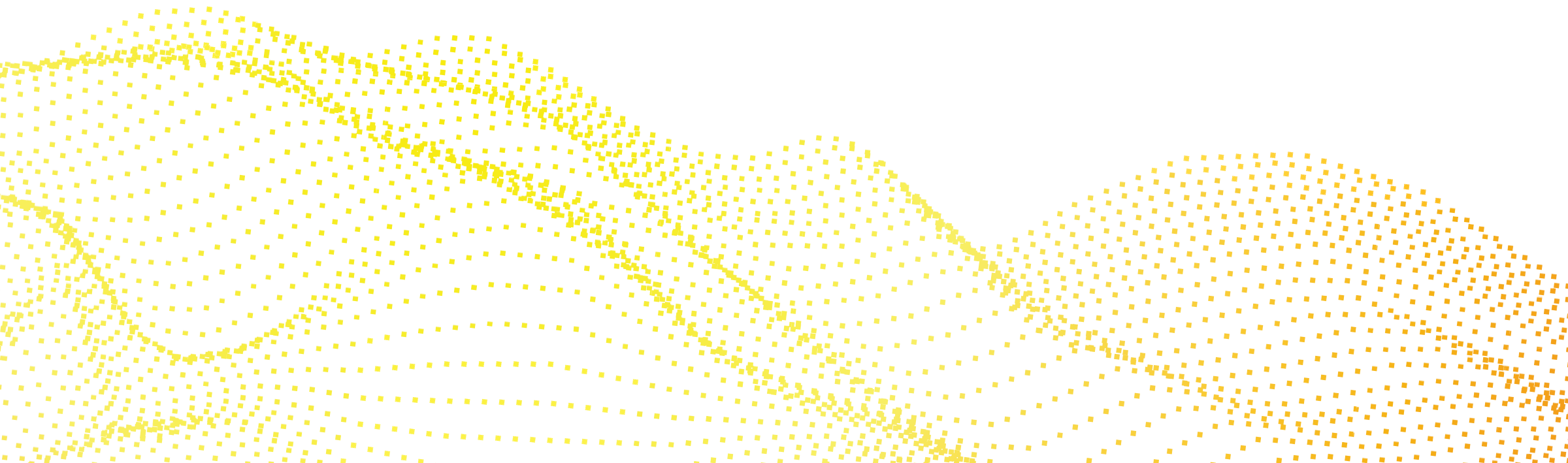
- GCAM Model is a replicable dynamic model for promoting agripreneurship among resource-poor rural women through livestock and fisheries technologies.
- Focuses on women-led enterprise development in value-added fish products, small-scale poultry production and broiler goat rearing.
- Implementation steps include resource mapping, capacity building and master trainer development, formation of women collectives, establishment of community resources and credit and market linkage creation.
- Small-scale poultry production, goat rearing, and value-added fish products enhanced income by 96%, 114%, and 67%, respectively.





06

AGRI-CHAMPIONS







KUMUDINI SWAIN

Srirampur, Khordha, Odisha

- Adopted diversified Farming: Crop-livestock-poultry system, including goats, dairy cows, and poultry birds, and fodder cultivation.
- Runs a women-led processing unit for making millet-based products.
- Drone Didi- First certified women drone pilot in Odisha through Namu Drone Didi Programme of Gol.
- Mentors women farmers, and inspires women to become Atmanirbhar.
- Chairperson, Maheera FPC Ltd., Balipatna, Khorda, Odisha.







ROSALIN DAS

Kulantirasasan, Khordha, Odisha

- Founder of 'Sishu Ananta FPC', Khorda.
- Drone Didi- certified women drone pilot in Odisha since 2023 through Namu Drone Didi Programme of Gol.
- Earned Ujjwala Didi Award.
- Adopted vegetables cultivation along with field crops.
- Role model for women farmers across 30 villages to adopt collective enterprises and entrepreneurship.







SEEMA SAINI

Mawana, Meerut, Uttar Pradesh

- An inspiring woman farmer through her dedication to sustainable sugarcane cultivation.
- Role model for fellow farmers, encouraging the adoption of improved cultivation practices.
- Community leader to empower women farmers through training and awareness on advanced farming techniques, irrigation management, and sustainable agriculture.
- Received recognition at the State Level for innovative sugarcane farming techniques.





GAURIPRIYA MOHAPATRA

Nimapara, Puri, Odisha

- Secretary of CIWANI Women Farmer Producer Company Limited.
- Facilitating procurement of pulses and oilseeds under Price Support Scheme of MARKFED-Odisha.
- Role Model for women agripreneurs and Master Trainer on mushroom cultivation.
- Mentoring and facilitating 1,000+ women in mushroom cultivation, and processing and value addition activities for sustainable income generation.







SASMITA MANGARAJ

Badagada Brit Colony, Bhubaneswar, Odisha

- Founded a Women-Led FPO 'Sai Samarpita Farmer Producer Organisation' with 800+ women to strengthen collective production, processing, value addition, and marketing of cereal- and pulse-based products.
- Community Leader - facilitated hundreds of rural women to access institutional credit, business management support to become successful agripreneurs.







SEEMA RANI

Gadarpur, U.S.Nagar, Uttarakhand

- CEO of Samridhi FPO.
- Converted traditional food preparation skills into a successful home-based nutri-enterprise.
- Produces value-added products like multigrain atta, desi ghee, and homemade bakery products.
- Improving household livelihood security of Self-Help Group members through economic activities.
- Role model for rural women through entrepreneurship and leadership.







TILOTTAMA MAJHI

Nunukua, Jagatsinghpur, Odisha

- Established a women-led 'Matrushakti Millet PG' for development of millet-based products and drying fish, boosting income and nutrition.
- Community leader: Inspiring women from nearby villages to adopt innovative products development, marketing skills, business model for better revenue generation.
- Recognition: Kalinga Kanya Samman-2024, Block level Fisheries and Animal Science Award 2025.







ANJU KUMARI

Dalsinghsarai, Samastipur, Bihar

- **Organic farming model:** Transformed 2.5 acres of farmland into a profitable organic farming enterprise, promoting chemical-free cultivation of millets, mushrooms, spices and oilseed crops.
- Successful agripreneur and processing mustard, sesame, linseed and niger into edible oils, oil cakes, laddus, powders and herbal beauty products.
- **National recognition:** Honoured by the Hon'ble President of India and also received the "Millionaire Farmer of India (MFOI) 2025" award from Krishi Jagran.
- **Community Leader:** Regularly trains and mentors farmers, Self-Help Groups (SHGs) and rural women on organic farming, millet cultivation, food processing and agripreneurship.
- Role model for sustainable agriculture.







RANJUKTA KUMARI BEHERA

Bhubaneswar, Khordha, Odisha

- Established successful manufacturing enterprise using 'Easy Harvest Bag' technology.
- Making the bag available to farmers across Odisha, West Bengal, Assam, and Tamil Nadu.
- Role Model for Women Entrepreneurs: Her journey demonstrates how technology licensing, institutional handholding, skill development, and market facilitation can transform a small enterprise into a sustainable business.







MAMATA MAYEE LENKA

Solagaon, Bhadrak, Odisha

- Adopted climate-resilient integrated aquaculture with vegetables cultivation for sustainable production and income.
- Managing and promoting community fish seed nursery.
- Preparing fish feed and facilitating other women through Custom Hiring Centre (CHC), improving access to quality inputs, and value-addition services.
- Serves as a local mentor, promoting gender-responsive climate-smart farming, entrepreneurship, and collective action.







SHANTILATA BARISAL

Begunia, Khordha, Odisha

- Diversified Farming Model: cultivating marigold, organic vegetables, and mushroom.
- Co-founded the Begunia Adarsh Mahila Chasi Utpadak Sanghatan Ltd. (FPC) and serves as a Member of the Board of Directors.
- Empowering 900+ Women farmers in millet value addition, mushroom cultivation, vegetable production, promoting Direct Seeded Rice (DSR) cultivation, and other climate-resilient enterprises, creating sustainable livelihood opportunities through collective marketing and value addition.











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