



ICAR-INDIAN INSTITUTE OF FARMING SYSTEMS RESEARCH ANNUAL REPORT 2024

वार्षिक प्रतिवेदन ANNUAL REPORT 2024



भा.कृ.अनु.प.-भारतीय कृषि प्रणाली अनुसंधान संस्थान
मोदीपुरम, मेरठ-250 110, (उ०प्र०) भारत
ICAR-INDIAN INSTITUTE OF FARMING SYSTEMS RESEARCH
Modipuram, Meerut-250 110, (U.P.) India

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PREFACE

Since its establishment in 1989, ICAR-IIFSR has evolved into a leading institution in the realm of Indian agriculture, particularly in advancing sustainable solutions for small and marginal farmers. The institute's pioneering work in Integrated Farming Systems (IFS) has been instrumental in addressing critical challenges related to food and nutritional security, sustainable productivity, efficient resource use, employment generation, and resilience to climate change.

In the current agricultural landscape—shaped by climate variability, resource degradation, and shrinking landholdings—the relevance of IFS is more significant than ever. With 86% of India's farmers being small and marginal landholders, IFS offers a comprehensive approach to farming that integrates crops, livestock, aquaculture, agroforestry, and other components. This holistic model not only diversifies income sources and enhances productivity but also strengthens resilience to environmental and economic uncertainties. By minimizing dependence on external inputs and encouraging year-round production, IFS helps to secure both livelihoods and ecological balance.

ICAR-IIFSR stands uniquely positioned in India and across South Asia as the only institution exclusively mandated to advance IFS, with a strong focus on smallholder agriculture. The institute's structure—comprising the Divisions of Integrated Farming Systems (IFS), Cropping Systems and Resource Management (CSRM), and Organic Agriculture Systems (OAS)—facilitates interdisciplinary collaboration to develop region-specific, sustainable farming practices. The Technology Transfer and Assessment (TTA) section plays a vital role in capacity building and technology dissemination, ensuring that innovations reach stakeholders effectively.

The institute coordinates two major national initiatives; namely All India Coordinated Research Project on Integrated Farming Systems (AICRP-IFS), encompassing 74 centers across 24 states and 1 UT, involving 34 State Agricultural Universities (SAUs), 6 ICAR institutes, and 1 Central University across 15 agro-climatic zones and All India Network Project on Organic Farming (AI-NPOF), including Natural Farming, with 20 centers in 16 states, involving 11 SAUs, 7 ICAR institutes, and 1 deemed university, covering 10 agro-climatic zones.

The scientifically developed IFS models have had a transformative impact on improving the livelihoods of small and marginal farmers. By promoting integrated and adaptive farming systems suited to diverse ecological zones—whether rainfed, irrigated, or resource-constrained—ICAR-IIFSR has enabled sustainable year-round productivity and economic stability.

Looking ahead, it is imperative that ICAR-IIFSR continues to foster innovation and strengthen collaborations with national agencies such as DST, DBT, DAC, academic institutions, and NGOs, as well as with international partners like UNEP, CIMMYT, BISA, ICRISAT and IWMI. The institute's multidisciplinary and cross-sectoral research ethos positions it well to address the evolving challenges of natural resource management, climate-resilient agriculture, and sustainable food systems. Its growing recognition on both national and global platforms is a testament to its leadership in integrated and organic farming, cropping system research, and resource conservation technologies.

Several impactful projects are being implemented to enhance agricultural sustainability and climate resilience. The Pilot Project on Crop Diversification (PPCD), led by ICAR-IIFSR, Modipuram, is underway in 75 districts across 18 states to replace rice with pulses, oilseeds, and vegetables. The Atlas on Climate Adaptation in South Asian Agriculture (ACASA), coordinated by BISA-CIMMYT and ICAR, involves multiple institutions across India and South Asia. The C-SUCSeS initiative,





led by ICAR-CRIDA and funded by SAC, IFAD, and SDF, promotes Climate Smart Agriculture in four Indian states. An ACIAR-funded project by CIMMYT focuses on additive intercropping in sugarcane across Bangladesh, Bhutan, and India. Transformational Agroecology is being promoted in Madhya Pradesh through a foreign-funded project with IWMI and JNKVV. Additional research includes nano-matrix urea formulations for nitrogen efficiency, improved extension methodologies for integrated farming systems, enrichment of fermented organic manure under the Gobardhan program, and development of a voluntary carbon market framework to support smallholder farmers, funded by the Ministry of Agriculture. Institute is working as nodal institute for coordinating scientific studies on organic and natural farming and preparing framework for National Mission on Natural Farming (NMNF).

ICAR-IIFSR has made significant advancements in current year towards sustainable agriculture through the development of four IFS models for Western Uttar Pradesh, reducing production costs and chemical use while tripling net income. Organic packages of practices were created for Kerala, Rajasthan, Sikkim, and West Bengal. Notable research includes isolation of 100 fungal strains with beneficial traits and mustard lines suited for organic systems. Collaborative efforts like the ACASA project with CIMMYT-BISA supports climate-resilient, village-scale agricultural planning. Innovations include two patents under commercialization and new tools such as redesigned IFS models, precision farming technologies, AI/IoT-based input management, and climate-resilient cropping systems. Translational outputs include IOFS models for seven states, nutrient optimization in organic rice-mustard systems, and conservation agriculture strategies. Capacity-building efforts involved 100 trainings across districts, workshops, campaigns, international delegations, and farmer-scientist interactions to promote knowledge exchange and climate-smart agriculture.

As we commemorate this milestone, we must also appreciate the institute's efforts in outreach and awareness-building. ICAR-IIFSR has actively participated in and hosted events of national and international significance—such as World Water Day, World Soil Day, World Food Day, International Women Farmers Day, Yoga Day, and commemorations of Mahatma Gandhi and Lal Bahadur Shastri. The institute has also conducted international conferences, ICAR-sponsored short courses, capacity-building programs, and technical workshops in collaboration with global partners to benefit a wide range of stakeholders.

I express my gratitude to Dr M L Jat, Secretary, DARE and Director General, ICAR, New Delhi; Dr. Himanshu Pathak, former Secretary, DARE and Director General, ICAR, New Delhi and Dr A K Nayak, Deputy Director General (NRM), ICAR, New Delhi, Dr S K Chaudhari, former Deputy Director General (NRM), ICAR, New Delhi for their constant guidance, encouragement and support. I also extend my appreciation and thanks to Dr A Velmurugan, ADG (SWM & AAFCC), Dr Rajbir Singh, former ADG (AAFCC) of ICAR, New Delhi and other staff members of the NRM division, ICAR HQ for their cooperation and support. The support of all the staff including scientific, technical, administrative, supporting and contractual is duly acknowledged for taking up Institute's programme and activities. Lastly, I would like to acknowledge the sincere efforts of the Heads of divisions/units/sections, PME Cell and editorial committee for compiling and publishing this reporting in a timely manner.

(Dr Sunil Kumar)

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कार्यकारी सारांश

1. संस्थान का नाम व पता: भाकृअनुप-भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम, मेरठ (उत्तर प्रदेश) 250110

2. बजट: 2024-25

क. संस्थागत (रु० लाख में): 2024-25

					बजट	व्यय		
	प्रावधान	व्यय	सरकारी अनुदान	परिषद के शेयर से मुख्यालय द्वारा प्रदान की गई अतिरिक्त राशि	कुल आवंटन (कॉलम 3+4)	कुल आवंटन से हुआ व्यय	सृजन राजस्व से हुआ व्यय	कुल व्यय (कॉलम 6+7)
	1	2	3	4	5	6	7	8
संस्थान	2671.90	2671.88	2671.90	0.00	2671.90	2671.88	0.00	2671.88
संस्थान योजनाएं	3684.49	3614.25	3684.49	0.00	3684.49	3614.25	0.00	3614.25
कुल योग	6356.39	6286.13	6356.39	0.00	6356.39	6286.13	0.00	6286.13

ख. बाह्य स्रोत (रु० लाख में): 2024-25

स्रोत	बजट	व्यय
बाह्य वित्त पोषित परियोजनाएं	620.14	521.58
कुल	620.14	521.85

ग. राजस्व प्राप्ति (रु० लाख में): 2024-25

स्रोत	धनराशि
प्रक्षेत्र उत्पाद — अन्न, फल, सब्जी, मत्स्य, दूध एवं पशु विक्रय	64.70
लाइसेन्स शुल्क/जल शुल्क	8.56
ऋण एवं अग्रिम राशि पर ब्याज	0.32
टी.डी.आर. पर ब्याज	6.25
अन्य (रॉयल्टी और संस्थान शुल्क)	-
विविध	26.09
कुल	105.92



कर्मचारियों की स्थिति (31.12.2024 तक)

श्रेणी	स्वीकृत	स्थिति	रिक्त
वैज्ञानिक वर्ग			
निदेशक	01	01	00
विभागाध्यक्ष	03	03	00
परियोजना समन्वयक – ए आई सी आर पी, आई एफ एस	01	01	00
प्रधान वैज्ञानिक	00	00	0
वरिष्ठ वैज्ञानिक	08	03	05
वैज्ञानिक	28	18	10
उप-योग	41	26	15
तकनीकी कर्मचारी वर्ग			
श्रेणी-3 (टी-6, 7/8, 7/9)	02	02	0
श्रेणी-2 (टी-3, टी-4 एवं टी-5)	19	03	16
श्रेणी-1 (टी-1 एवं टी-2)	06	03	03
उप-योग	27	08	19
प्रशासनिक कर्मचारी वर्ग			
वरिष्ठ प्रशासनिक अधिकारी	01	01	00
वरिष्ठ वित्त एवं लेखाधिकारी	01	01	00
सहायक प्रशासनिक अधिकारी	02	01	01
प्रधान निजी सचिव	0	0	0
सहायक	08	04	04
वरिष्ठ लिपिक	03	03	00
निजी सचिव	02	02	00
व्यक्तिगत सहायक	02	01	01
कनिष्ठ लिपिक	03	02	01
उप-योग	22	15	07
सहायक कर्मचारी वर्ग			
सहायक कर्मचारी	22	21	01
कुल योग	112	70	42

परिचय

भाकृअनुप-भारतीय कृषि प्रणाली अनुसंधान संस्थान (आईआईएफएसआर) अपनी स्थापना के बाद से देश स्तर पर फसल प्रबंधन प्रथाओं के आंकलन और मूल्यांकन के लिए पोषक तत्वों के कुशल उपयोग और उपयुक्त वैकल्पिक फसल प्रणालियों और पद्धतियों को प्रोत्साहित करने, कृषि प्रबंधन पद्धतियों के विकास के क्षेत्र में विगत 72 वर्षों से महत्वपूर्ण योगदान दे रहा है। यद्यपि, वर्ष 2010 के बाद से कृषि के समग्र मुद्दों को संबोधित करने के लिए संस्थान के कार्यक्षेत्र को फसल प्रणाली से कृषि प्रणाली के परिप्रेक्ष्य में बदल दिया गया। वर्तमान में कृषि प्रणाली अनुसंधान, कृषि में उत्पन्न चुनौतियों जैसे लाभप्रद खेती, निरन्तर उत्पादन, संसाधन प्रयोग दक्षता, खाद्य एवं पोषण सुरक्षा, रोजगार सृजन एवं जलवायु परिवर्तन का हल खोजने में महत्वपूर्ण उपाय के रूप में उभरा है।

संस्थान के संक्षिप्त विकास यात्रा का अवलोकन करें तो ज्ञात होता है कि वर्तमान आईआईएफएसआर के अनुसंधान की जड़ें भारत की स्वतंत्रता अवधि से पहले की हैं। इस दिशा में प्रयास चालीस के दशक में मैकाले इंस्टीट्यूट ऑफ सॉयल रिसर्च, एबरडीन यूनिवर्सिटी, डॉ. ए बी स्टीवर्ट को तत्कालीन इंपीरियल काउंसिल ऑफ एग्रीकल्चरल रिसर्च द्वारा सामान्य रूप से उर्वरता और विशेष रूप से उर्वरकों के संबंध में मिट्टी की स्थिति की समीक्षा करने और एक निष्कर्ष के रूप में आवश्यक कदमों का सुझाव देने के लिए आमंत्रित किया गया था, जो कि पर्याप्त जानकारी प्राप्त करने के लिए उठाए जा सके तथा बहुत ही कम समय में मिट्टी और जलवायु की अलग-अलग स्थितियों के लिए कृषि विभाग किसानों को फसल की पैदावार बढ़ाने के लिए प्रासंगिक निर्देश प्रदान कर सकें। वर्ष 1947 में प्रकाशित उनकी समीक्षा रिपोर्ट से देश में उर्वरक प्रयोग के दर्शन और अभ्यास के महत्व का पता चला। रिपोर्ट में किसानों के खेतों पर सरल उर्वरक परीक्षण और चयनित केंद्रों पर जटिल प्रयोगों के महत्व पर बल दिया गया, जिसके परिणाम स्वरूप सन् 1953 में भारत-अमेरिका प्रौद्योगिकी सहयोग समझौते के अन्तर्गत “मिट्टी की उर्वरता और उर्वरक” के माध्यम से किसानों के खेतों पर सरल उर्वरक परीक्षणों की शुरुआत हुई।

विकास की उत्तरोत्तर वृद्धि के क्रम में, मॉडल एग्रोनोमिक एक्सपेरिमेंट्स अर्थात्, सावधानी पूर्वक चयनित केंद्रों पर जटिल प्रयोगों को भी वर्ष 1956 में परियोजना की परिधि में लाया गया और इसका नाम बदलकर “अखिल भारतीय समन्वित सस्य प्रयोग योजना” (एआईसीईएस) कर दिया गया। कालान्तर में यह योजना विज्ञान और प्रौद्योगिकी के विकास के साथ तालमेल बनाए रखने और बढ़ती मांगों को पूरा करने के लिए विकास के विभिन्न चरणों

से गुजरी। सस्य क्रियाओं, सिंचाई, पोषण, रासायनिक खरपतवार नियंत्रण और एकाधिक फसलों को सम्मिलित करते हुए कृषि संबंधी अनुसंधान को शामिल करने के लिए अनुसंधान क्षेत्र का विस्तार किया गया। परन्तु फिर भी मृदा उर्वरता और उर्वरक उपयोग दक्षता पर ध्यान देने पर बल दिया जाता रहा। वर्ष 1968-69 में इस योजना को अखिल भारतीय समन्वित कृषि अनुसंधान परियोजना (एआईसीएआरपी) दो घटकों के साथ-मॉडल कृषि विज्ञान प्रयोग और सरल उर्वरक परीक्षण के रूप में स्वीकृति प्रदान कर दी गई।

यद्यपि, हरित क्रांति की शुरुआत के बाद भारत में कृषि अनुसंधान केवल कुछ चयनित फसलों पर केंद्रित रहा। किन्तु बहुत जल्द ही सतत् विकास के लिए एक प्रणालीगत दृष्टिकोण की आवश्यकता महसूस की गई। इस अहसास ने फसल प्रणाली उन्मुख अनुसंधान शुरू करने के लिए प्रेरणा दी और परियोजना को सातवीं पंच वर्षीय योजना के दौरान इस केन्द्र को एक निदेशालय के रूप में उच्चीकृत किया गया और इसे फसल प्रणाली अनुसंधान के लिए परियोजना निदेशालय (पीडीसीएसआर) के रूप में स्थापित किया गया, जो कि मार्च 1989 में मुख्यालय के रूप में कार्यात्मक हो गया था। ग्यारहवीं पंचवर्षीय योजना के दौरान वर्ष 2009-2010 में पीडीसीएसआर को कृषि प्रणाली अनुसंधान परियोजना निदेशालय (पीडीएफएसआर) के रूप में पुनः से नामित किया गया। वर्ष 2014 (बारहवीं पंचवर्षीय योजना) के दौरान पीडीएफएसआर को एक पूर्ण संस्थान में उच्चीकृत किया गया और इसका नाम बदल कर भाकृअनुप-भारतीय कृषि प्रणाली अनुसंधान संस्थान (आईआईएफएसआर) कर दिया गया। अखिल भारतीय समन्वित कृषि प्रणाली अनुसंधान परियोजना (74 केंद्र) एवं जैविक खेती पर अखिल भारतीय नेटवर्क कार्यक्रम (20 सहयोगी केंद्र) को संस्थान के अभिन्न अंग के रूप में जोड़ा गया जो कि देश के 26 राज्यों/केंद्र शासित प्रदेशों का प्रतिनिधित्व करते हैं। वर्तमान में, संस्थान के अधिदेश को पूर्ण करने के लिए तीन अनुसंधान प्रभाग और एक अनुभाग के अलावा एक परियोजना समन्वयन इकाई स्थापित है।

संस्थान का दृष्टिकोण, उद्देश्य एवं अधिदेश

दृष्टिकोण

एकीकृत कृषि प्रणालियों के माध्यम से छोटे और सीमांत किसानों के समग्र सुधार के लिए प्राकृतिक स्रोतों का प्रबंधन।

उद्देश्य

जलवायु अनुकूल एकीकृत कृषि प्रणालियों के माध्यम से छोटे और



सीमांत परिवारों के भोजन, पोषण और आजीविका में सुधार।

अधिदेश

- उत्पादकता और संसाधन उपयोग दक्षता में सुधार के लिए उत्पादन प्रौद्योगिकियों पर एकीकृत कृषि प्रणालियों में अनुसंधान।
- विभिन्न कृषि स्थितियों के लिए कुशल, आर्थिक रूप से व्यवहार्य और पर्यावरण की दृष्टि से टिकाऊ एकीकृत कृषि प्रणाली मॉडल विकसित करना।
- पद्धति आधारित कृषि उत्पादन प्रौद्योगिकियों का कृषक प्रक्षेत्रों पर परीक्षण, सत्यापन और परिशोधन।
- देश में एकीकृत कृषि प्रणाली अनुसंधान का समन्वयन एवं पर्यवेक्षण।

विगत वर्षों के दौरान भाकृअनुप-भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम निम्नलिखित तीन योजनाओं के माध्यम से क्रियाशील रहा।

भाकृअनुप-भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम

वर्तमान में, संस्थान चार प्रमुख विषय वस्तुओं जैसे, एकीकृत कृषि प्रणाली (आईएफएस), फसल प्रणाली एवं संसाधन प्रबंधन (सीएसआरएम), जैविक कृषि प्रणाली (ओएस) और प्रौद्योगिकी हस्तांतरण एवं मूल्यांकन (टीटीए) के अन्तर्गत शोध केन्द्र एवं कृषक प्रक्षेत्र आधारित अनुसंधान परीक्षण संचालित कर रहा है। इसके

अतिरिक्त, संस्थान राष्ट्रीय स्तर की दो परियोजनाएं यथा अखिल भारतीय समन्वित कृषि प्रणाली अनुसंधान परियोजना एवं जैविक खेती पर अखिल भारतीय नेटवर्क कार्यक्रम का समन्वयन एवं पर्यवेक्षण कर रहा है।

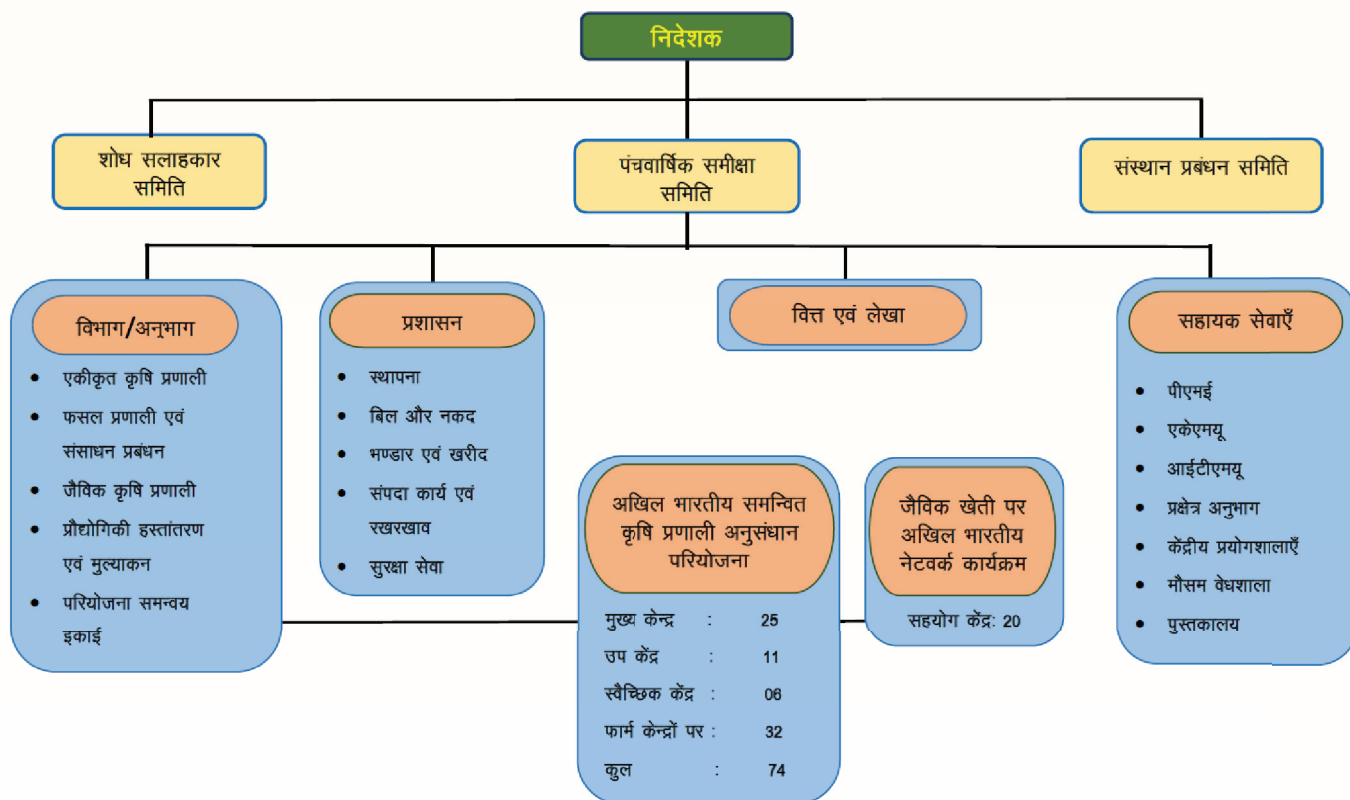
अखिल भारतीय समन्वित कृषि प्रणाली अनुसंधान परियोजना

अखिल भारतीय समन्वित कृषि प्रणाली अनुसंधान परियोजना, वर्ष 2010-11 से योजना के रूप में प्रारम्भ हुई। यह योजना वर्तमान में देश के विभिन्न 15 कृषि-जलवायु क्षेत्रों में स्थित 74 केंद्रों के साथ संचालित हो रही है। यह योजना 34 राज्य कृषि विश्वविद्यालयों, 1 केंद्रीय कृषि विश्वविद्यालय, 6 भारतीय कृषि अनुसंधान परिषद के संस्थानों और 2 सामान्य विश्वविद्यालयों में चल रही है, जो कि देश के 24 प्रदेशों एवं 1 केंद्र शासित प्रदेश का प्रतिनिधित्व करती है। इस प्रकार लगभग पूरे देश में कार्यक्षेत्र को विस्तारित करती है।

जैविक खेती पर अखिल भारतीय नेटवर्क कार्यक्रम

जैविक खेती पर अखिल भारतीय नेटवर्क कार्यक्रम भी वर्ष 2004-05 से प्रारम्भ की गई एक योजना है और वर्तमान में देश के 10 कृषि-जलवायु क्षेत्रों का प्रतिनिधित्व करने वाले 20 केंद्रों के साथ संचालित हो रही है। यह योजना 11 राज्य कृषि विश्वविद्यालयों, 7 भारतीय कृषि अनुसंधान परिषद के संस्थानों एवं 1 समतुल्य विश्वविद्यालय में चल रही है तथा देश के 16 राज्यों का प्रतिनिधित्व करती हैं।

संगठनात्मक संरचना



प्रमुख अनुसंधान उपलब्धियाँ

- पश्चिमी उत्तर प्रदेश के मैदानी क्षेत्र में 1.38 हेक्टेयर भूमि पर एक समेकित कृषि प्रणाली मॉडल विकसित किया गया, जिसमें फसल उत्पादन, डेयरी, बागवानी, मछली पालन, मशरूम उत्पादन तथा मेड़ पर रोपण को समेकित किया गया। इस मॉडल को पुनर्योजी कृषि पद्धति पर आधारित किया गया है, जो संसाधनों के पुनः उपयोग, आयवृद्धि और स्थायित्व पर बल देता है। इस मॉडल से गन्ना समतुल्य उपज 264.1 टन प्रति वर्ष प्राप्त हुई और ₹ 5.5 लाख का वार्षिक शुद्ध लाभ मिला, जिसमें लाभ-लागत अनुपात 3.42 रहा। इस प्रणाली द्वारा 774 मानव-दिवस का रोजगार सृजन किया गया एवं विभिन्न उत्पादों में अनाज में 3,021 किग्रा (92.8%), फलों में 1,671 किग्रा (94.6%) और दूध में 4,202 लीटर (93.7%) का विपणन योग्य अधिशेष प्राप्त किया गया, जिससे किसान परिवारों की आय एवं पोषण सुरक्षा हेतु उल्लेखनीय आंकड़ा दर्ज किया गया है।
- आईएफएस के मछली आधारित मॉड्यूल में, रोहू (*Labeo rohita*) की प्रजनन परीक्षण में 90% निषेचन दर के साथ 5.0 लाख निषेचित अंडों का उत्पादन हुआ। लगभग 4.0 लीटर स्पॉन प्राप्त हुआ, जिसे लगभग 4.0 लाख स्पॉन (1लीटर में 1 लाख स्पॉन) के रूप में आंका गया। एक्वेरियम मॉड्यूल में, घरेलू स्तर पर एक्वेरियम परिस्थितियों में गप्पी मछली का सफल प्रजनन किया गया। नवजात गप्पी स्पॉन को बेहतर वृद्धि और जीवित रहने के लिए जीवित आहार (लाइव फीड) दिया गया।
- एक पुनर्योजी कृषि वानिकी आधारित समेकित कृषि प्रणाली मॉडल में, मोरिंगा ओलिफेरा (सहजन), टेक्टोना ग्रांडिस (सागौन), और डालबर्जिया सिस्सू (शीशम) को वार्षिक फसलों के साथ ऐले क्रॉपिंग पद्धति के अंतर्गत एकीकृत किया गया। एकल फसल प्रणाली में सबसे अधिक उपज प्राप्त हुई, जिसमें मूंग की उपज 8.2 क्विंटल प्रति हेक्टेयर और चारा ज्वार की उपज 39.5 टन प्रति हेक्टेयर रही। वृक्ष आधारित संयोजनों में सागौन आधारित प्रणाली में मूंग की उपज 6.28 क्विंटल प्रति हेक्टेयर और चारा ज्वार की उपज 31.26 टन प्रति हेक्टेयर दर्ज की गई, जो सबसे अधिक थी। इसके बाद सहजन आधारित प्रणाली का स्थान रहा। सबसे कम उपज शीशम आधारित प्रणाली में मिली, जिसमें मूंग की उपज 5.1 क्विंटल प्रति हेक्टेयर और चारा ज्वार की उपज 28.5 टन प्रति हेक्टेयर रही।
- गेहूँ की वृद्धि, उपज और नाइट्रोजन गतिकी का अनुकरण करने के लिए DSSAT & CERES व्हीट मॉडल का मूल्यांकन किया जा रहा है। इसका परीक्षण पारंपरिक और संरक्षण जुताई स्थितियों में विभिन्न नाइट्रोजन प्रबंधन विकल्पों के तहत किया जा रहा है। मॉडल को विस्तृत फील्ड डेटा से कैलिब्रेट किया गया है, जिसमें किस्म-विशिष्ट गुणांक जैसे वर्नालाइजेशन आवश्यकता (P1V: 14 दिन), प्रकाश अवधि संवेदनशीलता (P1D: 70.10), दाना भरने की अवधि (P5: 976), छत्र भार पर दानों की संख्या (G1: 25), दाने का आकार (G2: 42 मि.ग्रा.), परिपक्व टिलर का वजन (G3: 4.1 ग्राम), और फाइलोकॉन अंतराल (PHINT: 113 डिग्री दिवस) शामिल हैं। साथ ही न्यूनतम दाना नाइट्रोजन प्रतिशत (GN:MN: 1.4%) को इकोटाइप पैरामीटर के रूप में शामिल किया गया है। आने वाले वर्षों के आंकड़ों का उपयोग मॉडल के प्रमाणीकरण के लिए किया जाएगा।
- बागवानी आधारित समेकित कृषि प्रणाली मॉडल में अमरुद के साथ हल्दी की अंतः फसल लगाई गई, जिसमें मातृ गांठों (*mother rhizomes*) से ली गई हल्दी ने सबसे अधिक उपज (252.94 क्विंटल/ हेक्टेयर) और सर्वोत्तम पौध वृद्धि (96.68 सेमी ऊंचाई, 98.45% जीवितता) दिखाई, जो प्राथमिक, द्वितीयक और तृतीयक गांठों की तुलना में बेहतर रही। सब्जी आधारित प्रणाली (अमरुद-हल्दी) से अधिकतम शुद्ध लाभ (₹2,25,187/ हेक्टेयर) प्राप्त हुआ, जबकि अनाज आधारित (₹76,020/ (₹2,25,187/ हेक्टेयर) प्राप्त हुआ, जो कि अनाज आधारित (₹76,020/ हेक्टेयर (₹53,520/ हेक्टेयर) प्रणालियों की तुलना में अधिक लाभदायक और टिकाऊ सिद्ध हुई।
- विकसित सब्जी-आधारित कृषि प्रणाली मॉडल में वर्ष 2024 में सकल और शुद्ध लाभ में क्रमशः 17% और 25% की वृद्धि हुई, जबकि खेती की लागत में केवल 6.7% की वृद्धि दर्ज की गई, जिससे लाभप्रदता में सुधार हुआ। लाभ-लागत अनुपात 2.35 से बढ़कर 2.58 पाया गया, जो फलों के उत्पादन और इनपुट्स के बेहतर उपयोग से प्राप्त आर्थिक दक्षता में वृद्धि को दर्शाता है। आर्थिक दक्षता में 17.9% का सुधार हुआ, जो वर्ष 2023 में ₹420.5 से बढ़कर 2024 में ₹495.75 पायी गई, जिससे इस मॉडल की बढ़ती व्यवहार्यता और स्थिरता स्पष्ट होती है।
- एक अध्ययन में पाया गया कि उत्तराखंड के ऊंचे पर्वतीय क्षेत्रों में फसल+बागवानी+पशुधन प्रमुख कृषि प्रणाली है, जिसे 50 प्रतिशत किसान अपनाते हैं। फसलें (रागी +काला सोयाबीन+ नौरंगी+कुल्थी+चौलाई- परती भूमि- सर्वां धान -गेहूँ +जौ) प्रमुख फसल प्रणाली पायी गयी। जबकि, सब्जियाँ और बागवानी (सेब/कीवी+दाल /सब्जी अंतः-फसल) अन्य प्रचलित फसल



प्रणालियाँ हैं। सिंचाई के लिए पानी की अनुपलब्धता, जंगली जानवरों का खतरा, सूखे की अवधि में वृद्धि प्रमुख बाधाएँ पाई गईं। पर्वतीय क्षेत्रों के लिए उपयुक्त उच्च उपज वाली किस्मों के माध्यम से फसल गहनता, जल प्रबंधन रणनीतियों, जैविक बाधाओं, मूल्य संवर्धन द्वारा रोजगार सृजन से सम्बंधित किसानों को व्हाट्सएप समूहों के माध्यम से जागरूक किया गया।

- पश्चिमी उत्तर प्रदेश के किसान नियमित रूप से कृषि प्रणाली गतिविधियों से संबंधित जानकारी के प्रमुख स्रोत के रूप में इनपुट डीलरों को प्राथमिकता देते हैं, इसके अतिरिक्त वे पड़ोसी किसानों और नवोन्मेषी किसानों से भी जानकारी लेते हैं। किसान गन्ना प्रसंस्करण उद्योग (82.35 प्रतिशत), राज्य कृषि विश्वविद्यालयों (58.8 प्रतिशत) एवं कृषि/बागवानी अधिकारियों (52.94 प्रतिशत) से विस्तार कार्यकर्ताओं के रूप में परामर्श करते हैं।
- खेती की प्रणालियों (IFS, INFS and IOFS) में मृदा का pH स्थिर रहा, जबकि कार्बनिक पदार्थ (SOC) का स्तर बेहतर हुआ। सभी प्रणालियों में मृदा में पोषक तत्वों की उपलब्धता बढ़ाई, जिसमें INFS प्रणाली में नाइट्रोजन और फॉस्फोरस की सबसे अधिक वृद्धि देखी गई। IFS 3 प्रणाली ने जल उत्पादकता में सर्वोच्च (₹6.5/प्रणाली ने जल उत्पादकता में सर्वोच्च IOFS और INFS ने कीटनाशक उपयोग को कम कर स्थिरता को बढ़ावा दिया। इन प्रणालियों से केंचुओं की संख्या और कीट विविधता में वृद्धि हुई, जिसमें IOFS में केंचुओं की सर्वाधिक वृद्धि देखी गई। INFS प्रणाली ने फसल विविधता और उत्पादकता में उत्कृष्ट प्रदर्शन किया, जबकि IOFS और IFS मॉडल ने अधिकतम लाभप्रदता दी, जिसमें IOFS से सर्वोच्च शुद्ध लाभ (₹54,563/हेक्टेयर) प्राप्त हुआ।
- IFS प्रभाव अध्ययन में पाया गया कि एकीकृत खेती का किसानों की आर्थिक स्थिति और आहार विविधता पर सकारात्मक और महत्वपूर्ण प्रभाव पड़ता है, जिससे ग्रामीण समुदायों की आजीविका में सुधार होता है। किसानों की आयु, शिक्षा, सामाजिक वर्ग, ऋण सुविधाएँ और बागवानी फसलों ने एकीकृत खेती को अपनाने के व्यवहार को प्रभावित किया। अध्ययन से यह स्पष्ट हुआ कि विशेष रूप से छोटे किसानों के लिए एकीकृत खेती आय में वृद्धि और कल्याण की दृष्टि से अत्यधिक संभावनाएं रखती है।
- संरक्षण कृषि प्रक्रियाओं पर आधारित प्रबंधन एवं फसल विविधीकरण के प्रभावों का आकलन फसल सघनीकरण, मृदा स्थिरता, उर्जा बजट व उर्जा-आर्थिक संबंध में पारंपरिक कृषि प्रक्रियाओं के मुकाबले, संरक्षण कृषि प्रक्रियाओं के पालन से बीज द्वारा सीधी बुआई किये धान की फसल की उपज में 15.2 व 17.1 प्रतिशत की कमी, धान-गेहूँ व धान-गेहूँ-मूँग फसल प्रणालियों के अंतर्गत पायी गयी। जबकि शून्य जुताई किये उगायी मक्का, सरसों व गेहूँ की फसलों में पारंपरिक कृषि प्रक्रियाओं के मुकाबले क्रमशः 12.2, 12.0 व 14.9 प्रतिशत फसल की उपज में वृद्धि देखी गयी। संरक्षण कृषि प्रक्रियाओं में ग्रीष्म

कालीन मूँग के समावेश से धान-गेहूँ-मूँग व मक्का-सरसो-मूँग फसल चक्रणों में क्रमशः 29.9 व 35.7 प्रतिशत नत्रजन का समावेश भी हुआ।

- धान के अवशेषों के प्रबंधन हेतु प्रक्षेत्र प्रयोग-अवशेषों के जलाने (टी-1), अवशेषों के सतह धारण (टी-2), अवशेषों के समावेश (टी-3), अवशेषों के सतह धारण + पूसा डीकम्पोजर छिडकाव (टी-4) एवं अवशेषों के समावेश+पूसा डीकम्पोजर छिडकाव (टी-5) उपचारों के साथ किये गये। सूक्ष्मजीव कंसोर्टिया (टी-4, टी-5) उपचारों ने ना कि केवल फसलों की बालों के भार में 4-9 प्रतिशत की वृद्धि हुई बल्कि पोषक तत्वों की उपलब्धता को भी बढ़ाया जिसका पता प्रत्येक बाली में पाया गया के 6-14 प्रतिशत तक अधिक भार व धान की कुल उपज में टी-1 उपचार के मुकाबले 13 प्रतिशत के सुधार से चलता है। कुल मिलाकर अवशेष प्रबंधन प्रक्रिया व सूक्ष्मजीव कंसोर्टिया के द्वारा अवशेष प्रबंधन से प्रणाली उत्पादकता में 8.7-6.8 प्रतिशत का सुधार क्रमशः टी-4, टी-5 उपचारों में देखा गया।
- उच्च मृदा कार्बन स्तर के अंतर्गत, बीज द्वारा सीधी बुआई किये धान में उर्वरकों की अनुशंसित खुराक से उगाये धान के मुकाबले ग्लोबल वार्मिंग की संभाव्यता में 53.5, 31.7, एवं 66.7 प्रतिशत की दर से कमी क्रमशः उर्वरकों की अनुशंसित खुराक+डाईसाइनाडाईअमाइड, कार्बनिक एवं प्राकृतिक खेती उपचारों में देखी गयी जबकि समान परिस्थितियों में पौध रोपण विधि द्वारा उगाये धान में यह कमी 45.9, 32.4 व 65.7 प्रतिशत रही। मध्य मृदा कार्बन स्तर की दशा में बीज द्वारा सीधी बुआई किये धान में ग्लोबल वार्मिंग की संभाव्यता में 52.6, 30.8, व 70.5 प्रतिशत की कमी क्रमशः उर्वरकों की अनुशंसित खुराक+डाईसाइनाडाईअमाइड, कार्बनिक एवं प्राकृतिक खेती उपचारों में देखी गयी जबकि पौध रोपण विधि द्वारा उगाये धान में कमी की यह दर 56.8, 31.0 व 69.4 प्रतिशत रही। दोनों ही विधियों से उगाये धान की अधिकतम प्रणाली उत्पादकता उर्वरकों की अनुशंसित खुराक+डाईसाइनाडाईअमाइड उपचार के अंतर्गत देखी गयी। पौध रोपण विधि द्वारा उगाये धान के मुकाबले सीधे बीज द्वारा उगाये धान की उपज 16-34 प्रतिशत कम पायी गयी। जबकि शून्य जुताई द्वारा उगाये गेहूँ की उपज में पारंपरिक कृषि प्रक्रियाओं द्वारा उगाये गेहूँ के मुकाबले 7.3-10.7 प्रतिशत की वृद्धि देखी गयी।
- छह उपचार संयोजनों जैसे कि किसान कृषि पद्धति (सामान्य बुवाई + बाढ़ सिंचाई), सामान्य बुवाई + 0.8 आई डब्ल्यू/सी पी ई, युगल पंक्ति बुवाई + 0.8 आई डब्ल्यू/सी पी ई, युगल पंक्ति बुवाई + 0.8 आई डब्ल्यू/सी पी ई, अरहर की अंतः फसल, युगल पंक्ति बुवाई + 0.8 आई डब्ल्यू/सी पी ई+लोबिया की अंतः फसल, युगल पंक्ति बुवाई + 0.8 आई डब्ल्यू/सी पी ई+द्वेचा की अंतः फसल को लेते हुए ग्रीन हाउस गैसों के शमन की रणनीतियाँ ग्रीष्म एवं शरद ऋतु कालीन गन्ने की फसल के लिए बनाई गयी। लोबिया, द्वेचा (हरी खाद) व अरहर (दाने के लिए) की फसले ग्रीष्म कालीन गन्ने में ली गयी जबकि शरद

कालीन गन्ने में चना, सब्जी मटर व मसूर की फसलों को लिया गया। किसान कृषि पद्धति के अंतर्गत कुल आठ सिंचाईयों की आवश्यकता पड़ी जबकि दिसंबर माह तक आई डब्ल्यू/सी पी ई पद्धति के अंतर्गत केवल पाँच सिंचाईयों की आवश्यकता पड़ी। अतः इस वैकल्पिक व्यवस्था के अंतर्गत पानी की उल्लेखनीय बचत हुई जो कि इसकी क्षमता को सिंचाई संसाधनों के संरक्षण के रूप में दिखाता है। अतः इन परिक्षणों में ग्रीन हाउस गैसों के शमन व गन्ना आधारित प्रणालियों की संसाधन उपयोग दक्षता की महत्वपूर्ण अंतर्दृष्टि की झलक मिलती है।

- कुछ क्ले सामग्रियों की सधारण व नैनो रेन्ज पाउडरो के साथ—साथ कुछ सेल्युलोजिक व हाइड्रो जेल पदार्थों के प्रयोग से बनाई गयी मैट्रिक्स में यूरिया को भरते हुए विभिन्न प्रकार के, निरंतर/विस्तारित रिलीज प्रकार के निरूपण बनाये गये। बनाये गये दानेदार निरूपणों जिससे कि 100, 75 व 50 कि. ग्रा. नत्रजन/हे. के हिसाब से नत्रजन प्राप्त हो सके की मात्रा को लेते हुए खरीफ के दौरान धान व मक्का की फसलों में उर्वरकों की अनुशंसित खुराक (150 कि.ग्रा. नत्रजन/हे यूरिया से) के सापेक्ष प्रतिकृति गमला परिक्षण किये गये। परिणामों के अंतर्गत दाने की उपज, ताजा जैव भार, शुष्क जैव भार, कल्लों की संख्या आदि में कोई भी उल्लेखनीय अन्तर नहीं देखा गया। सभी प्रतिकृति गमला परिक्षणों की औसत उपज कम से कम 20.77 ग्रा. से लेकर अधिकतम 25.0/गमला के बीच विस्तारित पायी गयी। कंट्रोल (150 कि.ग्रा. नत्रजन/हे यूरिया से) के मुकाबले, सभी सब्जियों, में टैबलेट्स के निरूपणों ने भी कम नत्रजन की मात्रा के प्रयोग से भी, बड़ी पौध वृद्धि, कम से कम 10–25 प्रतिशत अधिक उपज के साथ अच्छा प्रदर्शन किया।
- उत्पादकता, पोषण, आय और जलवायु लचीलापन बढ़ाने के लिए चौड़ी कतार वाले गन्ने की अंतःफसल की सतत गहनता मई 2023 में शुरू की गई। अप्रैल 2024 में शुरू किए गए ऑन-स्टेशन परीक्षणों में विभिन्न अंतःफसलों (दलहन, तिलहन, सब्जी और चारा फसलें) के साथ—साथ फलड, सतही और उप—सतही ड्रिप सिंचाई का पता चला कि गन्ने की जोड़ीदार पंक्ति रोपण में उपसतही ड्रिप सिंचाई के तहत मूंगफली ने सबसे अधिक उपज दी और 37.1% सिंचाई जल की बचत हुई।
- फसल विविधीकरण का क्षेत्रीय कार्यान्वयन 24 जिलों में 1689.5 हेक्टेयर क्षेत्र में किया गया है। विस्तार अधिकारियों के लिए 49 जिलों में कुल 52 प्रशिक्षण आयोजित किए गए, जबकि किसानों के लिए 47 जिलों में 48 प्रशिक्षण आयोजित किए गए। प्रतिभागियों का औसत पूर्व—प्रशिक्षण स्कोर 6.10 था, जबकि पोस्ट—प्रशिक्षण स्कोर 8.45 था। 5 राज्यों में 10 जिलों के लिए धान की फसल का स्थानिक वितरण और मानचित्रण ESRI ArcMap का उपयोग करके किया गया।
- आट्रिफीसियल इन्टैलीजेंस का इस्तेमाल करते हुए आम उत्पादकों के लिए एक बहु आयामी मोबाइल एप को विकसित किया गया। इस मोबाइल एप में आम की प्रजातियों के चुनाव, रोपण कार्यक्रम, बिमारियों, कीड़े, खतपतवार नियन्त्रण, मौसम,

उपज का पूर्वानुमान, मृदा परीक्षण प्रयोगशाला एवं सरकार की प्रमुख योजनाओं के बारे में जानकारी को इकट्ठा किया गया है। इसके अतिरिक्त यह एप विभिन्न कृषि एजेंसियों की वेबसाइट एवं आई.आई.एफ.एस.आर. किसान हेल्पलाइन के साथ जोड़ने में भी सुविधा प्रदान करता है।

- जैविक खेती में रूपांतरण अवधि के दौरान पोषक तत्व प्रबंधन के लिए विभिन्न खलियों के साथ गमलों में प्रयोग शुरू किया गया। सरसों की खली ने विभिन्न नाइट्रोजन स्तरों पर गेहूं की वृद्धि और उपज में उल्लेखनीय सुधार किया, जबकि अलसी और महुआ खलियों ने पौधे की ऊंचाई, कल्ले निकलने, दानों की संख्या और गेहूं के बायोमास संचय पर प्रतिकूल प्रभाव दिखाया। विभिन्न खलियों के एकीकरण के साथ पोषक तत्व रिलीज पैटर्न और माइक्रोबियल आबादी का आकलन करने के लिए ऊष्मायन अध्ययन किया गया। सरसों और नीम के खलियों के एकीकरण ने गोबर की खाद की तुलना में मिट्टी के जीवाणुओं की आबादी को अधिक बढ़ाया, ऊष्मायन के 4–7 दिनों के बीच अधिकतम गतिविधि देखी गई, हालांकि अलसी के खलियों ने सबसे कम माइक्रोबियल संख्या दिखाई, विशेष रूप से 100% आवेदन के तहत।
- मेरठ में 11 किसानों के खेतों पर किए गए ऑन-फार्म परीक्षणों में ट्रेंच विधि में लगाए गए ग्रीष्मकालीन गन्ने में सब्जी की अंतः-फसल का परीक्षण किया गया। ट्रेंच विधि में लगाए गए गन्ने की परिस्थिति में भिंडी सबसे अधिक लाभदायक साबित हुई, उसके बाद लोबिया और खीरा की फसल सबसे अधिक लाभदायक साबित हुई। मेरठ और मुजफ्फरनगर में 200 किसानों के एक आधारभूत सर्वेक्षण से पता चला कि गन्ने में अतिरिक्त अंतःफसल के बारे में सीमित जागरूकता (73%) है, हालांकि 80% से अधिक किसानों को अधिक लाभ की उम्मीद है। पसंदीदा अंतः-फसलों में क्रमशः फरवरी, अप्रैल और अक्टूबर में रोपण के दौरान सब्जियां, चारा और पत्तेदार सब्जियां शामिल थे।
- AINP&OF परियोजना के तहत दीर्घकालिक प्रयोग के तहत विभिन्न फसल प्रबंधन प्रथाओं ने फसल प्रणाली के प्रदर्शन को काफी प्रभावित किया। राज्य की सिफारिशों के तहत रागी और टमाटर की पैदावार सबसे अधिक थी, जबकि मसूर, भिंडी, उड़द और जौ की पैदावार एकीकृत प्रबंधन के तहत बेहतर रही। 100% जैविक खेती के तहत सब्जी मटर की पैदावार में वृद्धि हुई। 100% जैविक प्रबंधन के साथ उड़द—टमाटर—सनई प्रणाली में उच्चतम प्रणाली धान समतुल्य उपज और शुद्ध लाभ (2,65,655 रुपये प्रति हेक्टेयर) दर्ज किया गया।
- जैविक उत्पादन के अंतर्गत बारह बैंगन और सब्जी मटर किस्मों के प्रदर्शन का मूल्यांकन किया गया। रिपोर्टिंग अवधि के दौरान, बैंगन किस्म प्रगति ने सबसे अधिक उपज (17.1 टन/हेक्टेयर) दर्ज की, जबकि सब्जी मटर किस्म वसुंधरा ने सबसे अधिक फली उपज (6.2 टन/हेक्टेयर) पैदा की।



- मेरठ में 32 जैविक उत्पादकों के किए गए भू-टैग चरित्र सर्वेक्षण से पता चला कि उनके पास औसतन 0.49 हेक्टेयर जमीन है। किसानों के खेतों और शोध संस्थान पर पैदावार के बीच गेहूँ में 5.6% और गन्ने में 40.9% का अंतर देखा गया। प्रमुख बाधाओं में कम प्रारंभिक उत्पादकता, श्रम, सीमित विपणन सुविधाएँ और जैविक उत्पादों के लिए प्रीमियम मूल्य निर्धारण की कमी शामिल थी।
- मक्का + लोबिया – गेहूँ + चना प्रणाली में प्राकृतिक खेती के तरीकों का मूल्यांकन किया गया और आवश्यकता-आधारित रासायनिक कीटनाशकों के साथ एकीकृत फसल प्रबंधन के तहत उच्चतम मक्का समतुल्य उपज (8423 किग्रा/हेक्टेयर) दर्ज की गई, जिसके बाद AI&NPOF पैकेज का स्थान रहा। पूर्ण प्राकृतिक खेती में AI&NPOF की तुलना में खेती की लागत में 32.4% और ICM की तुलना में 15% की कमी आई।
- जैविक खेती के लिए देशी और विदेशी ब्रैसिका जुन्निसिया के संकरण के माध्यम से विकसित 15 उत्कृष्ट प्रजातियों के साथ उच्च उपज देने वाली सरसों की किस्मों पर शोध जारी है। दो प्रजातियों, MM16A 081 और MM16A 241 ने प्राकृतिक और जैविक दोनों ही कृषि प्रणालियों में मानक किस्म RH 749 से बेहतर प्रदर्शन किया, जिसमें MM 17A 008 ने सबसे अधिक उपज (38.26 क्विंटल प्रति हेक्टेयर) प्राप्त की।
- माइक्रोबियल कंसोर्टिया के विकास के लिए, विभिन्न स्रोतों से सेल्यूलोलिटिक, हेमिसेल्यूलोलिटिक, लिग्नोलिटिक और पोषक तत्वों को घुलनशील बनाने वाली गतिविधियों वाले कुल 100 फंगल आइसोलेट्स को अलग किया गया। एक खाद बनाने के प्रयोग में, आइसोलेट 8 (ट्राइकोडर्मा) के साथ टीकाकरण ने 50% चावल/बाजरा के भूसे और 50% गाय के गोबर के मिश्रण में थर्मोफिलिक चरण को 15 दिनों तक तेज कर दिया। हालाँकि, टीकाकरण ने पूरी तरह से तैयार खाद में पोषक तत्वों की मात्रा को महत्वपूर्ण रूप से प्रभावित नहीं किया।
- उत्तर प्रदेश में जैविक सब्जी की खेती के लिए कीट और रोग प्रबंधन पैकेज विकसित किया जा रहा है। एकीकृत कीट प्रबंधन के परिणामस्वरूप सबसे अधिक भिंडी की उपज (12,993 किलोग्राम/हेक्टेयर) प्राप्त हुई, जबकि जैविक और रासायनिक प्रणालियों ने तुलनीय परिणाम दिखाए। भिंडी की किस्म रुक्मिणी-711 ने कीटों के प्रति प्रतिरोधक क्षमता प्रदर्शित की। जैविक प्रणालियों ने मिर्च और लोबिया में अधिक रोग दिखाया, लेकिन अंतर सांख्यिकीय रूप से महत्वपूर्ण नहीं थे।
- हिमाचल प्रदेश के शिमला जिले के विभिन्न विकास खण्डों में किये सर्वेक्षण से पता चला कि केवल 10–27 प्रतिशत किसान ही जैविक खेती कर रहे हैं शेष सभी रासायनिक खेती कर रहे हैं। सभी किसानों ने गाय, बकरी, व कुक्कुट को सम्मिलित करते हुए लगभग 2–3 पशु पाले हुए हैं। एकल कृषि; कृषि+पशुपालन; कृषि+बागवानी; कृषि+पशुपालन+बागवानी यहाँ की प्रमुख कृषि प्रणालियाँ पायी गयी है। सेब, आड़ु, नाशपाति, जौ, कोदो, मक्का गेहूँ आदि यहाँ की प्रमुख फल व अन्न की फसले हैं।
- 15 राज्यों में 681 जैविक किसानों और 9 राज्यों में 193 प्राकृतिक खेती के किसानों के बारे में अध्ययन किया गया। सोयाबीन-फ्रेंचबीन (छत्तीसगढ़), अरहर + मूंग की सहफसलीकरण (कर्नाटक), चावल-बैंगन (महाराष्ट्र) और टमाटर- रागी –हरी खाद (तमिलनाडु) के 4 फसल प्रणालियों के लिए प्रथाओं का पैकेज विकसित किया गया और राज्य/केंद्र एजेंसियों के साथ साझा किया गया। 12 राज्यों में जैविक और प्राकृतिक खेती के विभिन्न पहलुओं को शामिल करते हुए कुल 52 प्रशिक्षण आयोजित किए गए, जिसमें 2187 प्रतिभागियों को लाभ हुआ। जैविक खेती के उम्मीदवारों पर सीएफए (प्रमाणित कृषि सलाहकार) के माध्यम से केंद्रों द्वारा तीन भागीदारी गारंटी समूह बनाए गए।

EXECUTIVE SUMMARY

1. **Name and Address of the Institute:** ICAR- Indian Institute of Farming Systems Research, Modipuram, Meerut- 250 110

2. **Budget:** 2024-25

A. **Institute Budget (₹ in Lakhs): 2024-25**

	Budget					Expenditure		
	Provision	Expenditure	Govt. Grant	Allocation internal + additional amount provided by Hqrs out of Council shares	Total Allocation (3+4)	Exp. out of Govt. Grant	Exp. out of revenue generation	Total expenditure (6+7)
	1	2	3	4	5	6	7	8
Institute	2671.90	2671.88	2671.90	0.00	2671.90	2671.88	0.00	2671.88
Institute Scheme	3684.49	3614.25	3684.49	0.00	3684.49	3614.25	0.00	3614.25
Total	6356.39	6286.13	6356.39	0.00	6356.39	6286.13	0.00	6286.13

B. **External sources (in ₹ Lakhs): 2024-25**

Source	Budget	Total expenditure
External funded projects	620.14	521.58
Total	620.14	521.85

C. **Revenue Generated (in ₹ Lakhs): 2024-25**

Source	Amount
Field produces and sale of grain, fruits, vegetables, fish, milk and animals	64.70
License fee/ water charges	8.56
Interest on loan and advances	0.32
Interest on TDR	6.25
Others (Royalty and Inst. Charges)	-
Miscellaneous	26.09
Total	105.92

**D. Staff Position (as on 31.12.2024)**

Category	Sanctioned	In position	Vacant
Scientists			
Director	01	01	00
Head of Division	03	03	00
Project Coordinator-AICRP, IFS	01	01	00
Principal Scientist	00	00	0
Senior Scientist	08	03	05
Scientist	28	18	10
Sub Total	41	26	15
Technical Staff			
Category- III (T-6, 7/8, 7/9)	02	02	0
Category - II (T-3, T-4 & T-5)	19	03	16
Category- I (T-1 & T-2)	06	03	03
Sub Total	27	08	19
Administrative Staff			
Sr. Administrative Officer	01	01	00
Sr. Finance & Account Officer	01	01	00
Assistant Administrative Officer	02	01	01
Principal Private Secretary	0	0	0
Assistant	08	04	04
Upper Division Clerk	03	03	00
Private Secretary	02	02	00
Personal Assistant	02	01	01
Lower Division Clerk	03	02	01
Sub Total	22	15	07
Supporting Staff			
Supporting	22	21	01
TOTAL	112	70	42



INTRODUCTION

ICAR-Indian Institute of Farming Systems Research (IIFSR) is contributing significantly towards the development of agronomic management practices, encouraging efficient use of nutrients and suitable alternative cropping systems and methodologies for assessment and evaluation of crop management practices at country level since its origin of 72 years. However, since 2010 onwards the mandate of institute was changed from cropping system to farming systems perspective in order to address the holistic issues of agriculture. At present, integrated farming system (IFS) research is considered an effective tool to address many challenges in agriculture today, including profitability, production sustainability, resource use efficiency, food and nutritional security, employability, and climate change.

Looking to the brief developmental history of the institute, it is found that the mandated research of the present IIFSR has its roots before India's independence period. Efforts in this direction were initiated with the visit of Dr. A. B. Stewart of Macaulay Institute of Soil Research, Aberdeen, U. K., in forties which led to the base for genesis of Cropping System Research Project. Dr. A. B. Stewart was invited by the then 'Imperial Council of Agricultural Research' to review the status of soil in respect of fertility in general, and manuring in particular, and as a solution to suggest necessary steps which might be taken to obtain adequate information under different conditions of soil and climate within a very short time so that the agricultural departments could provide relevant instructions to the farmers for increasing the crop yields. His review report, published in 1947, revealed significance of philosophy and practice of fertilizer experimentation in the country. The importance of conducting simple fertilizer trials on cultivator's fields and complex experiments at selected centres was emphasized in the report which on turn led to initiation of "Simple Fertilizer Trials on Cultivators Fields" in 1953 under Indo-American Technology Cooperation Agreement through "Soil Fertility and Fertilizer Use Project."

Subsequent to all these developments, Model Agronomic Experiments, i.e., complex experiments on carefully selected centres, were also brought under the purview of the project in 1956 and it was renamed as 'All India Coordinated Agronomic Experiments Scheme (AICAES)'. With the passage of time, the scheme went through various stages of evolution to keep pace

with the development in science and technology and to meet out the increasing demands. The research arena was expanded to include agronomic research encompassing cultural practices, irrigation, nutrition, chemical weed control and multiple cropping. But still the emphasis continued to give focus on soil fertility and fertilizer use efficiency. In 1968-69, the scheme was sanctioned as 'All India Coordinated Agronomic Research Project (AICARP)' with two components viz; "Model Agronomic Experiments" and "Simple Fertilizer Trials".

However, after ushering of the green revolution, the agricultural research in India remained centric only on individual crops in isolation. But very soon for the cause of sustainable development need was felt to have system approach. This realization might have given an impetus to start cropping systems-oriented research and the project was upgraded into a Directorate during 7th five-year plan and was established as the 'Project Directorate for Cropping Systems Research (PDCSR)', which became functional in March, 1989 with its headquarters at Modipuram, Meerut, U.P. Further, during 11th five-year plan PDCSR has been re-designated as 'Project Directorate for Farming Systems Research (PDFSR)' during 2009-2010. During 2014 (12th five-year plan), PDFSR was upgraded to a full-fledged institute and renamed as "ICAR-Indian Institute of Farming Systems Research" besides AICRP on IFS (74 centres) and AINP-OF (20 co-operating centres) as an integral part of institute, covering States/ UTs. Presently, the institute has three research divisions and one section besides one project coordinating unit to address the mandate.

Vision

Management of natural sources for holistic improvement of small and marginal farmers through Integrated Farming Systems.

Mission

Improve food, nutrition, and livelihood of small and marginal households through climate smart Integrated Farming Systems (to make marginal and small households as bountiful).

Mandate

- Research in integrated farming systems on production technologies for improving productivity and resource use efficiencies.



- Develop efficient, economically viable and environmentally sustainable integrated farming system models for different farming situations.
- On-farm testing, verification and refinement of system-based farm production technologies.
- Coordinate and monitor integrated farming systems research in the country.

Major Research Areas

- Farming system design and farm typology work intensified on the farmer's field (On-farm research) for appropriate designing and efficient resource utilization in IFS.
- Research on whole farm concept by the inclusion of agri-voltaic integrated farming systems.
- Development of sensor-based input management options of predominant cropping systems for sustainably enhancing use efficiencies.
- Carbon neutral farming, vertical cropping, regenerative agriculture and circular economy and waste-wealth generation.
- Capacity building and Human Resource Development for Integrated Farming Systems Research, Education and Extension.

During the year ICAR-IIFSR was operating through following three plan schemes:

ICAR-Indian Institute of Farming Systems Research, Modipuram

Presently, institute is operating to conduct on-station and on-farm research trials under four major themes viz., Integrated Farming Systems (IFS), Cropping Systems and Resource Management (CSRM), Organic Agriculture Systems (OAS) and Transfer of Technology and Assessment (TTA) besides a Coordination Unit (CU) to monitor and coordinate the two national level schemes viz., AICRP on Integrated Farming System (AICRP-IFS) and All India Network Project on Organic Farming (AINP-OF).

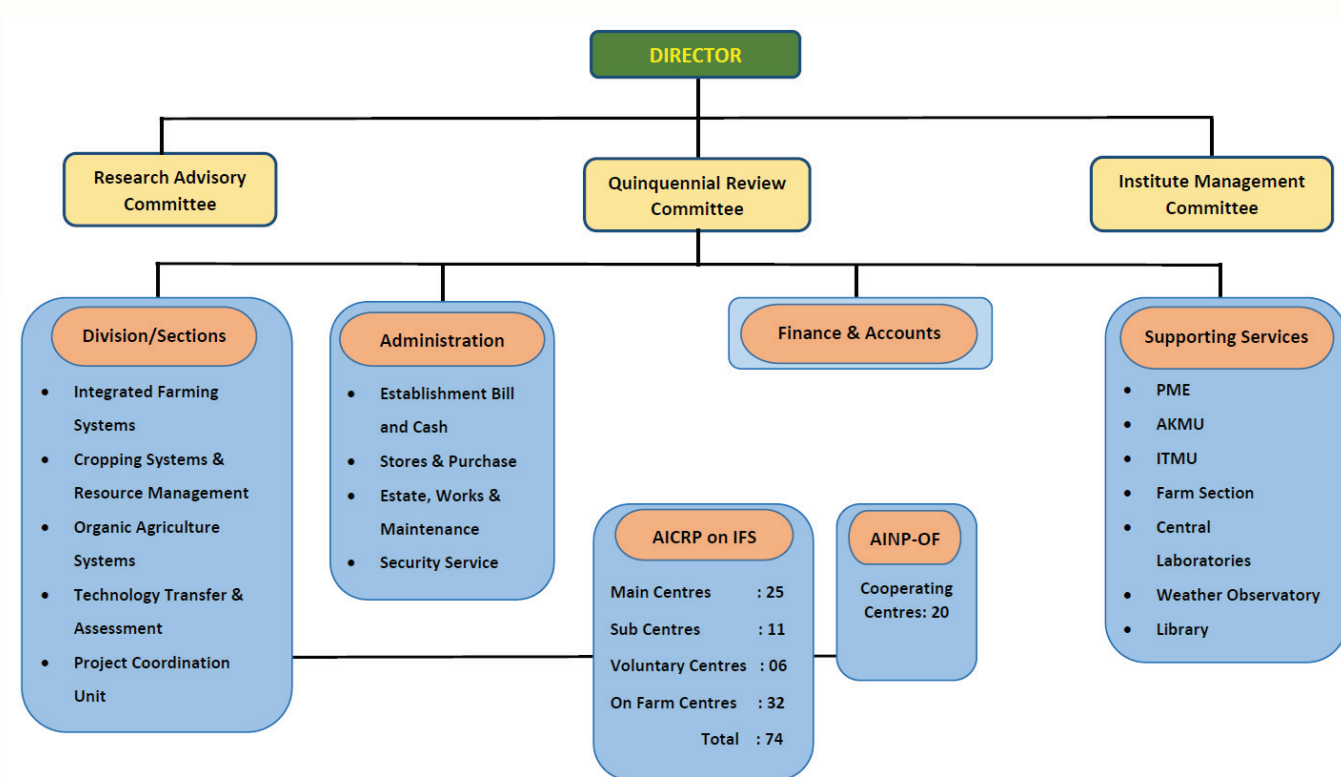
All India Coordinated Research Project on Integrated Farming Systems (AICRP-IFS)

AICRP on Integrated Farming Systems, a plan scheme initiated from 2010-11 operates currently with 74 centers situated in distinct 15 agro-climatic regions of country. The scheme is in operation at 34 SAU's, 1 central university, 6 ICAR institutes and 2 general universities and covers 25 states and 1 union territory, hence approximately covers the entire country.

All India Network Project on Organic Farming (AI-NPOF)

All India Network Project on Organic Farming (AI-NPOF) is also a plan scheme initiated from 2004-05 and operates currently with 20 centers covering 10 agro-climatic regions of the country. The scheme is in operation at 11 SAU's, 7 ICAR institutes and 1 deemed university and covers 16 states of India.

ORGANOGRAM





SALIENT RESEARCH ACHIEVEMENTS

- A comprehensive Integrated Farming System (IFS) model was developed on 1.38 ha in the Western Plain Zone of Uttar Pradesh, integrating crops, dairy, horticulture, fishery, mushrooms, and boundary plantations under a regenerative framework. The model achieved a sugarcane equivalent yield (264.1 t/year) and generated ₹5.5 lakh net annual return with a B:C ratio of 3.42. It enhanced household food and nutritional security, created 774 man-days of employment, and generated marketable surpluses of cereals (3,021 kg; 92.8%), fruits (1,671 kg; 94.6%), and milk (4,202 litres; 93.7%), significantly contributing to household income and nutritional security.
- In fish based module of IFS, the breeding trial of Labeo rohita resulted in production of 5.0 lakh fertilized eggs with 90% fertilization. Approximately 4.0 litres of spawn was collected which was estimated to be 4.0 lakh spawn i.e. 1 lakh spawn per litre. The spawn was then released in the small pond for rearing to the fry stage. In aquarium module, Guppy fish was bred successfully in the aquarium conditions as a backyard activity. Newly hatched Guppy fish spawn were fed live feed for better growth and survival. Juvenile fishes are being reared for adulthood.
- In a regenerative agroforestry-based Integrated Farming System (IFS) model, *Moringa oleifera* (Moringa), *Tectona grandis* (Teak), and *Dalbergia sissoo* (Sheesham) were integrated with annual crops using an alley cropping approach. The highest yields were recorded under sole cropping, with green gram yielding 8.2 q/ha and fodder sorghum 39.5 t/ha. Among the tree-based combinations, the Teak-based system recorded the highest yields of green gram (6.28 q/ha) and fodder sorghum (31.26 t/ha), followed by the Moringa-based system. The lowest yields were observed in the Sheesham-based combination, where green gram and fodder sorghum produced 5.1 q/ha and 28.5 t/ha, respectively.
- The DSSAT-CERES model is being evaluated to simulate growth, yield, and nitrogen dynamics in wheat (cv. DBW 222) under conventional and conservation tillage with varying nitrogen management practices. The model has been calibrated using detailed field data, and cultivar-specific coefficients have been defined, including vernalization requirement (P1V: 14 days), photoperiod sensitivity (P1D: 70.10), grain filling duration (P5: 976), kernel number per unit canopy weight (G1: 25), kernel size (G2: 42 mg), mature tiller weight (G3: 4.1 g), and phyllochron interval (PHINT: 113 °C days). Additionally, the minimum grain nitrogen content (GN%MN: 1.4%) has been incorporated as an ecotype-specific parameter. The data from the upcoming years will be utilized for model validation.
- In Horticulture based IFS model, guava intercropped with turmeric using mother rhizomes showed the highest yield (252.94 q/ha) and best plant growth (96.68 cm height, 98.45% survival) compared to primary, secondary, and tertiary fingers. The vegetable-based system (guava + turmeric) gave the highest net return (₹2,25,187/ha) and was more profitable and sustainable than cereal-based (₹76,020/ha) and fodder-based (₹53,520/ha) systems.
- In Vegetable-based farming system model, the gross and net returns increased by 17% and 25% respectively in 2024, with only a 6.7% rise in cost of cultivation, improving profitability over the years. The benefit-cost ratio rose from 2.35 to 2.58, highlighting better economic efficiency driven by fruit production and optimized inputs. Economic efficiency improved by 17.9%, rising from ₹420.5 in 2023 to ₹495.75 in 2024, highlighting the model's growing viability and sustainability.
- In a study, crop + horticulture + livestock was found to be the dominant farming system of high hills of Uttarakhand practiced by 50% of farmers. Crops with these compatible intercrops (Finger millets + black soyabean + naurangi + horsegram + amaranthus-fallow-barnyard millet + spring rice-wheat + barley) were the predominant cropping system. Whereas, vegetables and horticulture apple/kiwi + pulse/vegetable intercropping are other prevailing cropping systems. Non-availability of water for irrigation, wild animal menace, increasing dry spells was found to be the major constraints. Awareness regarding crop intensification through suitable HYVs, water management strategies, biological barriers, employment generation through value addition was created amongst farmers through WhatsApp groups.



- Farmers of Western Uttar Pradesh prefer input dealers followed by neighbour farmers and innovative farmers as a major source of information pertaining to farming system activities on frequent basis. They are consulting sugarcane processing industry (82.35%) followed by State Agricultural Universities (58.8%) and Agriculture/horticulture officers (52.94%) as extension functionaries.
- Soil pH remained stable, while SOC levels improved across treatments. Farming systems enhanced soil nutrient availability, with INFS showing the highest nitrogen and phosphorus gains. IFS 3 had the highest water productivity ($\text{₹ } 6.5/\text{m}^3$), while IOFS and INFS minimized pesticide use, promoting sustainability. Farming systems increased earthworm populations and enhanced insect diversity, with IOFS showing the highest earthworm growth. INFS demonstrated high crop diversity and yields, while IOFS and IFS models had the highest profitability, with IOFS achieving the best net returns ($\text{₹ } 54,563/\text{ha}$).
- The IFS impact study found that integrated farming has a positive and significant impact on farmers' economic well-being and dietary diversity, thus, it improves the livelihoods of rural communities. The variables like age, education, social class, credit facilities, and plantation crop of the farmers had influenced their adoption behavior concerning integrated farming. The study demonstrated that integrated farming has huge scope in income enhancement and the well-being of farmers, particularly the IFS based system can be promoted through convergence of government schemes to provide backward and forward linkages.
- Under conservation agriculture (CA), direct-seeded rice recorded 15.2% and 17.1% lower yields in the rice–wheat (R–W) and rice–wheat–green gram (R–W–GG) systems, respectively, compared to conventional practices. However, zero-tilled maize, mustard, and wheat under CA showed 12.2%, 12.0%, and 14.9% higher grain yields over conventional tillage-based practices. Compared to conventional methods, CA-based management in DSR rice and zero-tilled maize recorded 18.4%, 29.1%, and 5.3% higher GreenSeeker readings at 75 and 90 days after sowing. Furthermore, water-stable aggregates or WBC levels increased by 23.6%, 43.1%, 61.8%, and 31.7% in rice–wheat (R–W), rice–wheat–green gram (R–W–GG) (CA), maize–mustard–green gram (M–M–GG), and sugarcane+GG–ratoon+GG–wheat (Sr+GG–Rt+GG–W) in CA systems, respectively. Incorporation of summer green gram under CA in R–W–GG and M–M–GG systems also resulted in 29.9% and 35.7% higher nitrogen content. Availability of other nutrients such as phosphorus (P), potassium (K), and sulfur (S) increased by 30% to 60% in CA-based R–W–GG, M–M–GG, and Sr+GG–Rt+GG–W systems.
- Application of microbial consortia vis-à-vis residue management practices revealed an improvement in system productivity by 8.7% and 6.8% in treatments rice residue surface retention + Pusa Decomposer spray (RR+PD) and rice residue incorporation + Pusa Decomposer spray (RI+PD), respectively, compared to rice residue surface retention (RR) and rice residue incorporation (RI). The combined application of microbial consortia along with in-situ residue incorporation significantly improved (31–45% and 27–59%) non-labile C content (CNL) in RR+PD and RI+PD treatments over RR and RI treatments in 0–5 cm and 15–30 cm soil depth samples.
- Under high carbon strata situations, in DSR method, global warming potential (GWP) was reduced by 53.5%, 31.7%, and 66.7% respectively in treatments of RDF+DCD (Dicyandiamide), organic, and NF as compared to the RDF treatment however under similar conditions in the TPR method, the corresponding reductions were 45.9%, 32.4%, and 65.7%. In medium carbon strata conditions, GWP reductions under the DSR method were 52.6%, 30.8%, and 70.5% for RDF+DCD, organic, and NF treatments, respectively, while the reductions under the TPR method were 56.8%, 31.0%, and 69.4%. The highest system productivity was observed under the RDF+DCD treatment in both Direct Seeded Rice (DSR) and Transplanted Rice (TPR). As compared to TPR, rice yield in DSR was lowered by 16.0% to 34.4%. However, wheat yield increased by 7.3% to 10.7% under Zero Tillage Wheat (ZTW) compared to Conventional Tillage Wheat (CTW).
- Greenhouse gas mitigation strategies in summer and autumn-planted sugarcane through intercropping and water management was initiated by taking six treatment combinations viz., Farmer's practice (normal sowing + flood irrigation); Normal sowing + 0.8 IW/CPE; Paired sowing + 0.8 IW/CPE; Paired sowing + 0.8 IW/CPE + cowpea intercrop; Paired sowing + 0.8 IW/CPE + pigeonpea intercrop; and Paired sowing + 0.8 IW/CPE + sesbania intercrop. Cowpea, sesbania (green manuring) and pigeonpea (grain) were used in summer planted sugarcane while chickpea, vegetable pea, and lentil will be grown in autumn-planted sugarcane. A total of eight irrigations were applied under the farmer's practice however only five irrigations were required under the IW/CPE approach up to December 2024. This alternative method resulted in significant water savings, highlighting its potential to conserve irrigation resources while maintaining



crop performance. These experiments are expected to provide valuable insights into reducing greenhouse gas emissions and improving resource use efficiency in sugarcane-based systems.

- Slow or controlled-release formulations of urea were developed by impregnating the fertilizer into a composite matrix composed of suitable mixtures of simple and nano-sized clay powders, along with cellulosic and hydrogel materials. The nutrient-loaded matrix was shaped into granules of 5–10 mesh size for use in wheat and other grain crops, and into tablets of 3.0 cm and 2.0 cm diameter, weighing 20 g, 18 g, and 10 g, respectively, for use in transplanted vegetables such as brinjal, tomato, chili, cauliflower, and cabbage. Replicated pot experiments were conducted during the Kharif season on rice and maize crops. The developed formulations were applied at rates of 100, 75, and 50 kg N/ha and compared with the recommended dose of fertilizers (RDF) supplying 150 kg N/ha from commercial sources. The average yield across all treatments (RDF and 100, 75, and 50 kg N/ha of prepared granular formulations) ranged from a minimum of 20.77 g to a maximum of 25.0 g per pot. Compared to the control (RDF), the tablet formulations also performed well, enhancing plant growth and providing a 10–25% yield increase in all crops, even at comparatively lower doses of nitrogen (N), phosphorus (P), and potassium (K).
- A study on sustainable intensification of wide-row sugarcane intercropping to enhance productivity, nutrition, income, and climate resilience was initiated in May 2023. On-station trials initiated in April 2024 comprising different intercrops (legume, oilseed, vegetable and fodder crops) along with flood, surface and sub-surface irrigation methods revealed significantly higher yield of groundnut under subsurface drip irrigation in paired row planting of sugarcane with savings of 37.1% irrigation water.
- Field implementation of crop diversification has been made in 24 districts covering 1689.5 ha area. A total of 52 trainings were organized in 49 districts for extension officers while for farmers, 48 trainings were conducted in 47 districts. The average pre-training score of the participants was 6.10, while the post-training score was 8.45. Rice crop spatial distribution and mapping using ESRI ArcMap made for 10 districts in 5 States.
- A multifaceted Android mobile app has been developed in-house using Artificial Intelligence to assist mango growers. The app provides information on mango variety selection, planting schedule, diseases, pests, weeds, weather, yield forecasting (via an LSTM-based ANN model), soil testing labs, and government schemes. The ANN model achieved 78% accuracy.
- Incubation study to assess the nutrient release pattern and soil microbial population with application of different oilcakes indicated that integration of mustard and neem oil cakes enhanced soil bacterial populations more than bulky manures, with peak activity observed between 4–7 days of incubation though linseed oil cake showed the least stimulation, particularly under 100% application.
- On-farm trials at 11 farmers' fields in Meerut were conducted for evaluating intercropping of different vegetables in trench planted summer sugarcane. Okra proved most profitable, followed by vegetable cowpea and cucumber, under trench-planted sugarcane conditions.
- A baseline survey of 200 sugarcane farmers in Meerut and Muzaffarnagar districts showed limited awareness (73%) of additive intercropping in sugarcane, though over 80% expected higher profits. Preferred intercrops included vegetables, fodder, and leafy greens during February, April, and October plantings, respectively.
- Crop management practices under long term experiment significantly influenced cropping system performance under different management practices. Finger millet and tomato yields were highest under state recommendations, while lentil, okra, black gram, and barley excelled under integrated management. The highest system REY and net return (₹ 2,65,655/ha) were recorded in the black gram–tomato–sun hemp system under 100% organic management.
- The performance of twelve brinjal and vegetable pea varieties each was evaluated under organic production. During reporting period, brinjal var. Pragati recorded the highest yield (17.1 t/ha), while vegetable pea var. Vasundhara produced the highest pod yield (6.2 t/ha).
- A geo-tagged characterization survey of 32 organic growers in Meerut revealed an average landholding of 0.49 ha. Yield gaps of 5.6% in wheat and 40.9% in sugarcane were observed between farmers' fields and on-station yields. Major constraints included lower initial productivity, labor intensity, limited marketing facilities, and lack of premium pricing for organic produce.
- Natural farming practices were evaluated in maize + cowpea – wheat + chickpea system and highest maize equivalent yield (8423 kg/ha) was recorded under ICM with need-based



chemical pesticides, followed by the AI-NPOF package. Complete natural farming reduced cultivation costs by 32.4% compared to AI-NPOF and 15% compared to ICM.

- Research on high-yielding mustard strains continued with 15 elite lines developed through hybridization of indigenous and exotic *Brassica Juncea* for organic farming. Two lines, MM16A 081 and MM16A 241, outperformed the standard variety RH 749 in both natural and organic farming systems, with MM 17A 008 achieving the highest yield (38.26 q/ha).
- For development of microbial consortia, a total of 100 fungal isolates with cellulolytic, hemicellulolytic, lignolytic, and nutrient-solubilizing activities were isolated from diverse sources. In a composting experiment, inoculation with isolate 8 (*Trichoderma*) accelerated the thermophilic stage by 15 days in a mix of 50% rice/millet straw and 50% cow dung. However, inoculation did not significantly affect nutrient content in the fully matured compost.
- Integrated pest management resulted in the highest okra yield (12,993 kg/ha), while organic and inorganic systems showed comparable results. Okra variety Rukmini-711 exhibited resistance to pests. Organic systems showed higher disease incidences in chilli and vegetable cowpea, but differences were not statistically significant.
- A survey conducted in various blocks of Shimla District (H.P.) revealed that only 10–27% of farmers practice organic agriculture, while the rest follow conventional (inorganic) methods. On average, farmers rear 2–3 animals per household, including cows, goats, and poultry. The prevalent farming systems in the region include agriculture alone; agriculture combined with animal husbandry; agriculture combined with horticulture; and agriculture combined with both animal husbandry and horticulture. Apple, peach, pear, and plum are the major fruit crops, while barley, millets, maize, and wheat are the main cereal crops grown across the district.
- A total of 681 organic farmers in 15 states and 193 natural farming farmers in 9 states were characterized. Package of Practices for 4 cropping systems namely soybean-French bean (Chhattisgarh), pigeon pea + green gram intercropping (Karnataka), rice-brinjal (Maharashtra) and tomato-finger millet-green manure (Tamil Nadu) were developed and shared with state/central agencies. A total of 52 trainings in 12 States were organized covering various aspects of organic and natural farming in which 2187 participants benefitted. Three Participatory Guarantee Groups were created by Centres through CFA (Certified Farm Advisor) on Organic farming candidates.



WEATHER REPORT – 2024

This report analyzes monthly weather data for 2024, focusing on temperature, rainfall, humidity, evaporation and sunshine to support environmental and agricultural planning. A clear seasonal pattern was evident. Maximum temperatures rose from 15.1°C in January to a peak of 39.5°C in May, then declined to 22.5°C by December. Minimum temperatures increase from 6.5°C in January to 25.2°C in July, then drop to 7.1°C in December. This variation reflects a typical subtropical climate with distinct summer and winter periods. Rainfall was concentrated during the monsoon, beginning in June and peaking in July (356.3 mm), followed by

September (294.8 mm) and August (191.5 mm). Minimal rainfall occurs in January, May, October, and November. Evaporation was highest in May (293.2 mm), indicating extreme dryness, and drops sharply in July (67.5 mm) due to increased rainfall. Maximum relative humidity ranges from 61.3% in May to 96.3% in September, aligning with peak monsoon. Minimum humidity trends downward from 73.0% in January to 64.3% in December, reflecting drier conditions outside the rainy season. Sunshine was highest in May (9.6 hours) and lowest in January (1.4 hours).

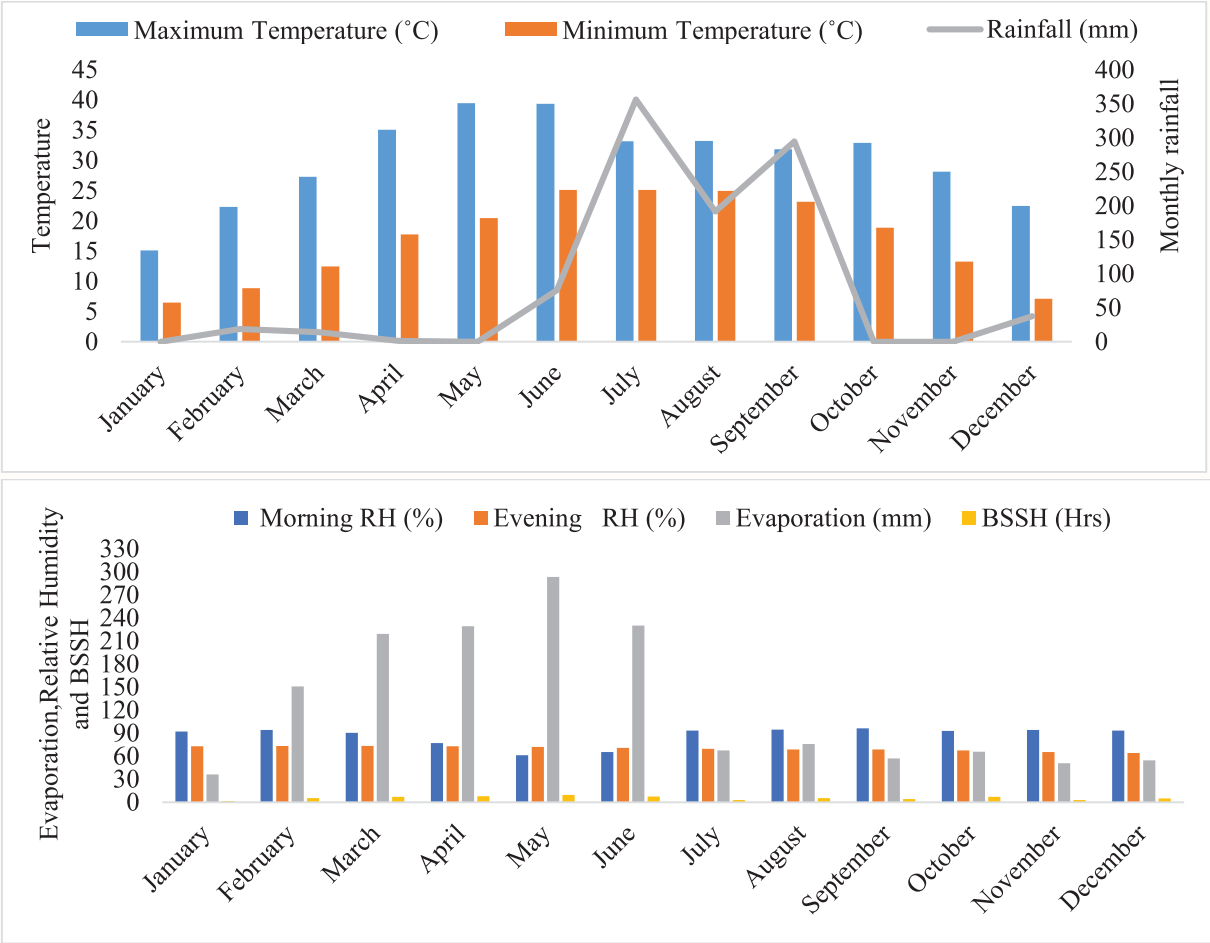


Fig. 1: Prevailing weather at ICAR-IIFSR Modipuram during January to December, 2024



RESEARCH ACCOMPLISHMENTS



INTEGRATED FARMING SYSTEMS





Standardization of IFS modules and model for different farming situations of western plain zone of U.P. (Project code: NRMIIFSRSIL202305000298)

Sugarcane-wheat cropping system has caused significant challenges, including groundwater depletion and soil degradation, necessitating the adoption of Integrated Farming Systems (IFS) for diversification and sustainability. It is imperative to devise area-specific integrated farming system models to address multifaceted challenges effectively. In the context of the Western Plain Zone of Uttar Pradesh, a comprehensive IFS model has

been developed, encompassing crop cultivation, dairy farming, horticulture, fishery, mushroom production and secondary agricultural activities. Spanning 1.38 ha, the model integrates crops, dairy, horticulture, aquaculture, mushroom cultivation and boundary plantations, emphasizing resource recycling and economic viability. The model demonstrated higher sugarcane equivalent yield (264.1 tonnes/year), with contributions from crops (43%), dairy (29%), horticulture (15%), and fisheries (7%), achieving net annual returns of ₹5,50,090 and a benefit-cost ratio of 3.42.

Table 1: Sugarcane equivalent yield (SEY), economics and employment generation of different components of IFS model developed on 1.38 ha land at IIFSR, Modipuram

Components	SEY (t/ha)	Gross return (₹/year)	Cost of cultivation (₹/year)	Net return (₹/year)	B:C ratio	Employment generation (man days)	Per cent man days generated
Field crops (1.04 ha)	113.5	3,97,250	1,61,000	2,36,250	2.47	256	33.0
Livestock production cum Dairy (1 cow + 2 buffaloes) + Vermicomposting	82.5	2,88,750	1,27,000	1,61,750	2.27	212	27.4
Orchard (0.20 ha)	38.50	1,34,750	51,000	83,750	2.64	148	19.1
Fish production (0.10 ha)	9.25	32,375	13,400	18,975	2.42	75	9.7
Mushroom (25 m ²)	15.4	49,900	13,500	36,400	3.70	45	5.8
Kitchen garden (20 m ²)	1.58	5,530	850	4,680	6.51	20	2.6
Boundary plantation (220 m running length)	3.41	11,935	3,650	8,285	3.27	18	2.3
Total IFS (1.35 ha)	264.1	9,20,490	3,70,400	5,50,090	2.49	774	100
Per hectare	195.7	6,81,844	2,74,370	4,07,474	1.84	573.3	

This model also generated 34 percent higher man-days (774) of annual employment, reducing seasonal unemployment. Components like fisheries, mushroom cultivation and boundary

plantations contributed significantly to income and ecological sustainability.

Table 2: System productivity, family requirements and marketable surplus of commodities in the integrated farming system (mean data of 3 years) (family size: 5)

Commodities	Production (kg/litre/number) (Average of 3 years)	Per person daily requirement (g/day) (according to ICMR)	Per family daily requirement (g/day)	Family requirement per year (kg)	Marketable surplus (kg/number)
Crop (1.04 ha)					
Cereals	3,478	250	1,250	456.25	3,021
Oilseeds	284.7	27	135	49.275	235
Pulses	710	85	425	155.125	555
Green Fodder	32,788				32,788

Commodities	Production (kg/litre/number) (Average of 3 years)	Per person daily requirement(g/ day) (according to ICMR)	Per family daily requirement (g/day)	Family requirement per year (kg)	Marketable surplus (kg/number)
Horticulture (0.22 ha)					
Fruit	1,854	100	500	182.5	1,671
Vegetable	780	400	2000	730	50
Dairy animals (2 buffaloes + 1 cow)	4750	300	1500	547.5	4202
Fish production (0.10 ha)	522				522
Mushroom (25 m ²)	252				252
Boundary plantation (200 running meter) fruit production	450				450

The IFS approach enhanced food and nutritional security by fulfilling household needs and generating marketable surpluses of cereals, fruits, milk, fish and mushrooms. Notably, marketable surpluses were recorded for cereals (92.8%), fruits (94.6%), and milk (93.7%). This comprehensive system provides a sustainable solution to the challenges of mono-cropping, boosting both

income and resilience for farm households. Further, detailed characterizations covering 800 households across 8 districts have been completed to develop farm typologies, enabling targeted redesign of farming systems tailored to different types of farms of the region.



Plate 1: Crop diversification and boundary plantation in integrated farming system

Development of regenerative Agroforestry based IFS model for sustainable production and livelihood (Project code: NRMAIFSR SIL202005000251)

To promote sustainable production and livelihood security, a study was undertaken to develop a regenerative agroforestry-based Integrated Farming System (IFS) model. The research aimed to evaluate food-feed agroforestry systems and assess their ecosystem services. Three prominent tree species, *Moringa oleifera* (Drumstick), *Tectona grandis* (Teak), and *Dalbergia sissoo* (Shisham), were integrated with different cropping systems using an alley cropping design. Among the treatments, sole cropping

(without trees) recorded the highest yields, with green gram yielding 8.2 q/ha and fodder sorghum 39.5 t/ha. Among the tree-based combinations, the Teak-based system recorded the highest yields for both crops—6.28 q/ha for green gram and 31.25 t/ha for fodder sorghum—followed by the Moringa-based system. The lowest yields were observed in the Sheesham-based system, with green gram at 5.1 q/ha and fodder sorghum at 28.5 t/ha. These results suggest that tree species selection significantly influences intercrop productivity in agroforestry systems, with Teak-based combinations showing relatively better compatibility in terms of crop yield performance.



Moringa + green gram



Guinea grass

Plate 2: Agroforestry based IFS model

Sustainable livelihood generation through IFS involving uneconomic cattle (Project code: NRMAIFSRSL201910000254)

The project was continued with crop and dairy animals. All suitable fodder crops for the Western Uttar Pradesh were evaluated under the project to economise the rearing of animals. Among the different fodder crops, Bajra Napier Hybrid recorded the highest system productivity (282.1 t/ha), supplying 14136 kg from 500 m² area in five cuts. This was followed by oat (84.20 t/ha in two cuts), berseem (82.35 t/ha in four cuts), sorghum (80.05 t/ha during kharif), summer fodder pearl millet (71.70 t/ha), and fodder maize (59.70 t/ha). With the exception of summer fodder maize, all other crops performed exceptionally well. This was followed by oat (84.20 t/ha in two cuts), berseem (82.35 t/ha in four cuts), sorghum (80.05 t/ha during kharif), summer fodder pearl millet (71.70 t/ha), and fodder maize (59.70 t/ha). During the rabi season of 2024–25, *Brassica napus* (Gobhi Sarson) also performed well

and showed good compatibility as an intercrop with sugarcane in farmers' fields. Among the Bajra Napier Hybrid varieties, BNH (CO-5) stood out for its superior field performance and quality as animal feed, with no adverse effects on animal health or productivity. It offers a year-round fodder supply, especially valuable during the lean summer months (April–May). Although its growth slightly declined during the severe winter months (December–January) in North India, it remained vigorous throughout the year. BNH (CO-5) also had minimal pest, disease, and weed issues, requiring only limited intervention during crop establishment and at the end of winter. The newly released BNH (CO-6) was also evaluated under the project but showed poor performance, with weak tillering and inferior panicle emergence, making it less suitable for animal feed. Despite pest and insect challenges during the kharif season, BNH (CO-5) and *Brassica napus* (for rabi) have shown promising results and will be promoted through the institute's outreach programs.

Table 3: Fodder yield of different crops during 2023-24

Area (m ²)	Fodder yield (q)					
500	Berseem	42.11	Sorghum	71.70	Sorghum	80.05
500	Mustard	1.69				
1500	Wheat grain straw	8.90 9.05	*	*	Pearl millet	69.75
1000	Oat	82.35	Maize Fodder	38.30	Maize Fodder	59.70
500	Bajra Napier Hybrid (CO-5)	24.60	Bajra Napier Hybrid (root sapling)	28.50 + 28.05	Bajra Napier Hybrid (root sapling)	28.70 + 31.51

*Due to unseasonal rain, summer crop skipped.

Dairy component: During the reporting year, the project continued with four cows and three male growers. The total milk production from the cows was 1102 liters, generating a gross income of

₹ 55,625 from milk sale. In addition, 218.2 quintals of farmyard manure (FYM) and 17.5 quintals of vermicompost were produced.

Inclusion of goatry component: From this year onward, goatry component was introduced into the Integrated Farming System (IFS) model. The unit currently maintains a total of 21 goats. Preliminary observations indicate good performance, with strong potential to complement the dairy unit and enhance overall farm returns through diversified livestock integration.

Economics of IFS Model: The model consisting of only crop and dairy modules. The highest net income was contributed by cropping system module, amounting to ₹ 1,03,622 with a B:C ratio of 6.03. The overall net return (including labour cost) from the system was ₹ 57,492 with a B:C ratio of 1.31. When excluding labour costs, the overall net return increased to ₹1,25,688, with a B:C ratio of 2.05. (Table 4).

Table 4: Economics of one acre IFS model consisting of uneconomic cattle

Component	Total yield	Variable cost (₹)	Gross return (₹)	Net return (₹)	B:C ratio
Cropping system	8.90 q grain + 1.69 q oil seed	20,608	1,24,230	1,03,622	6.03
Dairy (05 cows + 03 male growers)	1102 l milk + 218.2 q FYM + 17.5 q vermicompost	1,50,169	1,21,567	-28,602	0.81
Including family labour	Total	1,88,305	2,45,797	57,492	1.31
Excluding family labour	Total	1,20,109	2,45,797	1,25,688	2.05



Plate 3: Glimpse of different new components under the project

Development of fruit based integrated farming systems for western plain zones of U.P. (Project code: NRMAIFSRSL202205000255)

The Guava + Turmeric model recorded the highest net income ₹ 2,41,086 and benefit-cost (B: C) ratio of 3.8:1 indicating superior economic performance compared to other models. The Mango + Vegetable system also proved highly profitable, particularly due to continuous harvests across seasons. Although the Sorghum + Mustard + Maize model was lower in profitability, it served as a valuable reference for field crop-based integration. Peach

cultivation on a 0.06 ha plot demonstrated promising returns, with a benefit-cost ratio of 3.5:1. The gross income generated was ₹7,200 and the net return was ₹25,800 indicating the economic viability of integrating fruit crops into the farming system. The dairy enterprise, consisting of one cow and one buffalo integrated with vermicomposting, generated a gross income of ₹ 2,47,950 and a net return of ₹1, 40,233 from an area of 0.04 ha. The benefit-cost ratio stood at 1.3:1, demonstrating moderate profitability while contributing to nutrient recycling through organic manure production.

Table 5: Yield and Economic Returns from Various Integrated Farming System Modules

S. No	Farming System	Area (ha)	Yield (Q)			Cost of Cultivation (₹)	Gross Return (₹)	Net Income (₹)	B:C Ratio
			Kharif	Rabi	Zaid				
1	Mango + Vegetable	0.30	38.5	70.1	30.5	55,234	2,20,060	1,73,826	3.2:1
2	Guava + Turmeric	0.30	58.50			62,664	3,03,750	2,41,086	3.8:1



S. No	Farming System	Area (ha)	Yield (Q)			Cost of Cultivation (₹)	Gross Return (₹)	Net Income (₹)	B:C Ratio
			Kharif	Rabi	Zaid				
3	Sorghum + Mustard + Maize	0.30	90	5.4	90	28,971	84,510	55,539	1.9:1
4	Peach	0.06	13			7,200	33,000	25,800	3.5:1
5	Dairy (1 Cow + 1 Buffalo)	0.04	Milk (liter)	Vermi-compost (q)		1,07,717	2,47,950	1,40,233	1.3:1
			2835	90					



Plate 4: Guava + Turmeric model

Refinement of vegetable based farming system models for food and nutritional security of farmers of Western Uttar Pradesh (Project code: NRMAIFRSIL202201000262)

i) Economics

Under the developed vegetable-based farming system model, the gross returns (GR) increased from ₹4,09,958 in 2023 to ₹4,79,975 in 2024, showing a growth of approximately 17%. The net returns (NR) obtained from the model increased from ₹2,35,804 in 2023 to ₹2,94,230 in 2024, reflecting 25% increase in profit. The higher growth rate in NR compared to GR indicates greater operational efficiency, possibly due to better input management and cost reduction. The cost of cultivation slightly increased from

₹1,74,154 to ₹1,85,745 (approx. 6.7% increase). The benefit-cost ratio (B:C) improved from 2.35 in 2023 to 2.58 in 2024. This upward shift in the B:C ratio indicates enhanced economic efficiency, for every ₹1 spent, returns increased from ₹2.35 to ₹2.58. The data demonstrated that the economic viability of the farming model improved in year 2024 compared to year 2023 due to production of fruits particularly of mango from the fruit module. Higher gross and net returns alongside a relatively stable cost base have resulted in a more profitable and efficient system. The model exhibits sustainability and replicability, making it a strong candidate for promotion among smallholder farmers aiming for economic resilience and enhanced livelihood outcomes.

Table 6: Economic analysis of vegetable-based farming system model

Parameter	2023	2024	Change (%)
Gross Returns (GR)	₹4,09,958	₹4,79,975	+ 17.1%
Net Returns (NR)	₹2,35,804	₹2,94,230	+ 24.7%

Parameter	2023	2024	Change (%)
Cost of Cultivation (COC)	₹1,74,154	₹1,85,745	+6.7%
B:C Ratio	2.35	2.58	+9.8%

In 2023, Economic efficiency of the model was reported to be ₹420.5 whereas in 2024, it rose to ₹495.75. The increase of ₹75.25 represents an approximate 17.9% improvement in economic efficiency reinforcing the model's potential as a viable

and impactful solution for sustainable agriculture and rural prosperity. The data presented in Fig 2 represents the quantities of different food groups produced, possibly as part of a diversified farming system.

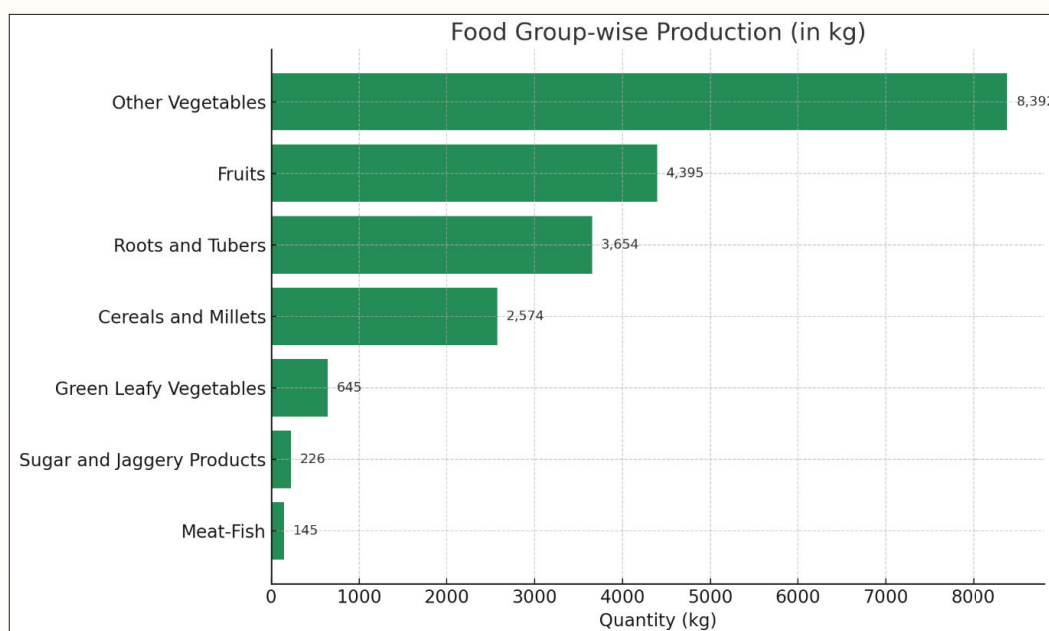


Fig. 2: Different food produced from vegetable-based Farming system model

ii) Component wise Production from the model:

The highest production was reported from other vegetables (8392 kg), followed by fruits (4395 kg) and roots and tubers (3654 kg). These categories dominated the output, indicating the model's strong orientation toward diverse and high-volume vegetable and fruit cultivation. Moderate levels of production were seen in cereals and millets (2574 kg), an important source of staple foods, while green leafy vegetables (645.25 kg) contributed less significantly possibly due to differences in cultivation requirements and prioritization within the model. The lowest yields were found in sugar and jaggery products (225.65 kg) and meat and fish (145 kg), suggesting limited integration of animal-based production or sugar crops. The model excelled in producing a wide range of vegetables and fruits, while showing limited output in animal-based and sugar products. This food group-wise production profile revealed a nutritionally diverse and self-reliant farm model. It aligned well with nutrition-sensitive agriculture objectives and can serve as a replicable model for improving household food and nutrition security, especially in rural or smallholder farming contexts.

iii) Water requirement and water use efficiency of the modules:

The line graph presented in Fig. 3 shows the "Water Requirement of Modules for 2024 (m³)" illustrates the estimated water requirements for four different modules in 2024. Among the modules, Module 3 (Field Crop Based System) exhibits the highest water demand at approximately 23,000 m³, suggesting extensive or water-intensive operations. Module 1 (Fruits+Intercropping with vegetables) also shows a high requirement, around 20,000 m³, possibly indicating large-scale or moderately water-demanding activities. In contrast, Module 2 (Vegetables) requires significantly less water, approximately 12,500 m³, pointing to either a smaller scale or more efficient water usage. Module 4 (Pond-Dyke system) has the lowest water requirement at just 7,000 m³, indicating either a highly water-efficient system or limited operations. The substantial variation in water needs across modules highlights differences in land use, crop types, or irrigation practices. Notably, Module 3 uses over three times the water of Module 4, emphasizing the need for careful water management and potential efficiency improvements in higher-use modules.

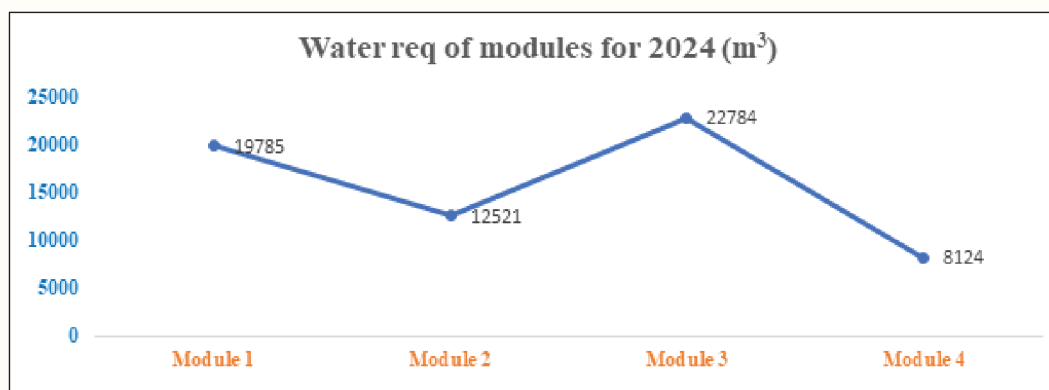


Fig. 3: Water Requirement of Modules under study

The Fig. 4 shows water use efficiency (SEY kg/m³) across four modules. Module 4 demonstrates the highest efficiency at 14.36 kg/m³, followed by Module 1 with 12.89 kg/m³. Module 2 and Module 3 have the lowest efficiencies at 10.95 and 10.72 kg/m³,

respectively. This indicates that Module 4 produces the most yield per unit of water used. Overall, Module 3, despite high water use, has low efficiency, suggesting room for optimization.

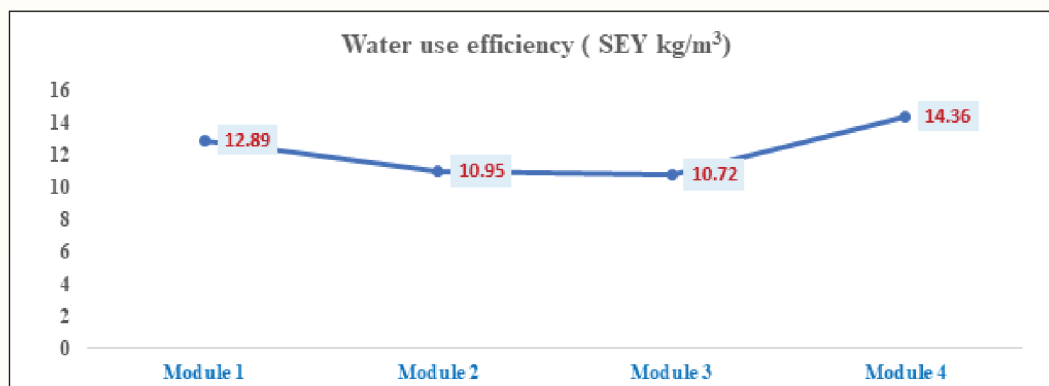


Fig. 4: Water use efficiency (SEY kg/m³) of the farming system Model

iv) Soil fertility status under different modules:

The data presented in Table 7 reflects soil pH, electrical conductivity (EC in dS/m), and soil organic carbon (SOC in %) across four farming modules and two soil depths (0–15 cm and 15–30 cm). Module 1 (Fruits + Intercrops) has a moderately acidic surface soil (pH 5.70), increasing to 7.34 at 15–30 cm, indicating liming effects or nutrient movement. The surface EC was reported to be 1.030 dS/m and SOC of 0.711%, suggesting high fertility due to organic inputs from fruit and intercrop residues. At 15–30 cm depth, EC and SOC drop to 0.773 dS/m and 0.547% respectively. Module 2 (Vegetables) shows a surface pH of 7.10 and deeper higher pH of 7.94, both near-neutral. The EC drops from 0.775

to 0.390 dS/m, and SOC from 0.474 to 0.301 %, indicating possible rapid organic matter breakdown or low input. Module 3 (Field Crops) recorded the highest pH, increasing from 8.09 to 8.44, showing alkaline soil. EC is low (0.205 to 0.131 dS/m) and SOC ranges from 0.620 to 0.492%, suggesting minimal input and lower biological activity. Module 4 (Pond Dyke) maintains moderate pH levels (7.53 to 8.17), low EC (0.272 to 0.107 dS/m), and the highest SOC (0.860% at surface and 0.648% at depth), likely due to organic matter accumulation from surrounding water or vegetation. Overall, Modules 1 and 4 exhibited better soil health in terms of SOC and EC, while Modules 2 and 3 reflected lower fertility, particularly at deeper layers.

Table 7: Soil chemical properties under different modules

Systems	Soil depth (cm)	pH	EC (dS/m)	SOC (%)
Module 1 (Fruits+Intercrops)	0-15	5.70	1.030	0.711
	15-30	7.34	0.773	0.547

Systems	Soil depth (cm)	pH	EC (dS/m)	SOC (%)
Module 2 (Vegetables)	0-15	7.10	0.775	0.474
	15-30	7.94	0.390	0.301
Module 3 (Field Crops)	0-15	8.09	0.205	0.620
	15-30	8.44	0.131	0.492
Module 4 (Pond dyke)	0-15	7.53	0.272	0.860
	15-30	8.17	0.107	0.648

The data presented in Table 8 shows the macro- and micronutrient concentrations (N, P, K, S, Fe, Cu, Zn, Mn in mg/kg) across four farming modules and two soil depths (0–15 cm and 15–30 cm). Module 1 (Fruits + Intercrops) showed higher surface levels of nitrogen (98.41), phosphorus (17.37), and potassium (235.5), reflecting organic inputs and fertilization. Nutrient concentrations declined with depth, especially for P (11.80) and K (202.3). Micronutrients such as Fe (12.580), Cu (0.97), Zn (1.191), and Mn (8.25) were found to be sufficient at the surface, decreasing with depth. Module 2 (Vegetables) data reflects the moderate surface nutrients (N: 81.62, P: 13.38, K: 217.2), but a sharp

decline at depth, especially in K (117.8) and Zn (0.818), indicating nutrient depletion due to intensive cropping. Surface micronutrient levels were fair, though Cu (0.595) is relatively low. Module 3 (Field Crops) had lower K levels (116.6 to 81.9) and moderate N and P values. While Zn and Cu are low, Mn (10.90) and Fe (11.560) were adequate at the surface but drop significantly with depth. Module 4 (Pond Dyke) had the highest surface N (133.24), P (19.46), and Fe (15.135), likely due to nutrient-rich runoff and organic accumulation. Micronutrients were found to be well-balanced across depths, especially Cu and Mn. Overall, Module 4 is nutrient-rich, while Modules 2 and 3 show signs of depletion.

Table 8: Soil chemical properties under different modules

Systems	Soil depth (cm)	N (mg/kg)	P (mg/kg)	K (mg/kg)	S (mg/kg)	Fe (mg/kg)	Cu (mg/kg)	Zn (mg/kg)	Mn (mg/kg)
Module 1	0-15	98.41	17.37	235.5	18.4528	12.580	0.97	1.191	8.25
	15-30	87.66	11.80	202.3	14.6415	8.475	0.45	0.3	6.32
Module 2	0-15	81.62	13.38	217.2	15.9434	11.930	0.595	1.687	10.99
	15-30	69.28	9.82	117.8	9.1038	9.550	0.25	0.818	9.10
Module 3	0-15	85.21	15.23	116.6	18.7736	11.560	0.671	1.832	10.90
	15-30	80.09	12.06	81.9	16.6509	6.515	0.222	0.333	7.49
Module 4	0-15	133.24	19.46	155.5	17.8302	15.135	1.065	0.955	9.77
	15-30	95.22	14.44	105.0	14.6509	11.860	1.042	0.628	7.85

Table 9 presents the highest population of bacteria and fungi was found in the soil of Guava orchard which may be due to the minimum disturbance, continuous leaf litter fall. The lowest

bacterial and fungal population was found under pond dyke system.

Table 9. Microbial count under different components in horticulture-based farming system model

Sample	Bacteria ($\times 10^6$ CFU/g dry soil)	Fungi ($\times 10^3$ CFU/g dry soil)
Crop component (Sugarcane)	49	42
Vegetable component	75	52
Fruit (Mango)	66	59



Sample	Bacteria ($\times 10^6$ CFU/g dry soil)	Fungi ($\times 10^3$ CFU/g dry soil)
Fruit (Guava)	98	74
Pond dyke system	32	19

The activities of different enzymes involved in nutrient mineralization were found highest in the soil of Guava orchard followed by the soil of vegetable component which may be due to the continuous

leaf litter fall. The lowest enzyme activity was found under pond dyke system. (Table 10).

Table 10. Activity of different enzymes under components of horticulture-based farming system model

Sample	Dehydrogenase activity (μ g TPF/g soil/h)	Phosphatase activity (μ g PNP/g soil/h)	B-glucosidase activity (μ g PNP/g soil/h)	Urease activity (mg urea/g soil/h)
Crop component (Sugarcane)	20.95	56.32	16.51	11.18
Vegetable component	23.09	77.18	16.59	14.24
Fruit (Mango)	21.76	64.23	13.76	12.32
Fruit (Guava)	25.37	71.39	16.62	12.87
Pond dyke system	19.10	39.61	12.94	10.62

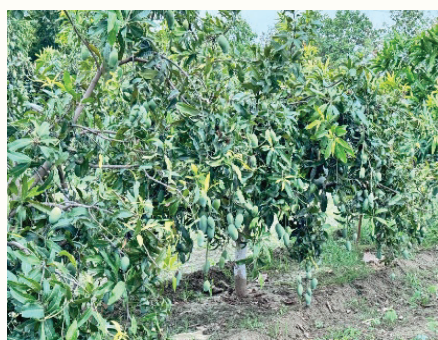


Plate 5: View of different modules under study in the developed vegetable based IFS Model at Siwaya Farm

Establishment of ornamental and Biofloc fisheries modules for farm livelihood improvement (Project code: NRMAIFRSIL202205000257)

Ornamental fish keeping is one of the most popular hobbies in the world today. In India, especially in the northern region there is a considerable gap in demand and supply, whereas demand is

high for the ornamental fish. During the reporting period, fishes were acclimatized to the aquariums and rearing of six species of aquarium fishes was stabilized. Live feed culture of moina/daphnia was also initiated for feeding to the juveniles produced. The module as carp breeding hatchery unit was made operational for production of quality seed to be used in pond culture and Biofloc system. Breeding for production of juveniles for the Biofloc

culture was also undertaken and success was obtained. Two set of breeding trial for *Labeo rohita* was undertaken. For each set, two female fish weighing 1.2 kg each were injected with Ovaprim @.05 mg/kg body weight and male fishes (four numbers) were

injected with 0.2 mg/Kg body weight for inducing spawning in the evening. After overnight induction fishes spawned in the morning and fertilized eggs were transferred to the hatching unit through centrifugal action.



Plate 6: Injecting brood fishes with Ovaprim



Plate 7: Comma Shaped fertilized eggs



Plate 8: Hatched spawn in spawning pool



Plate 9: Collected Spawn from hatching pool



Plate 10: Spawn ready for stocking



Plate 11: Spawn being stocked in the pond

The breeding trial resulted in production of 5.0 lakh fertilized eggs with 90% fertilization, which were incubated in the hatching pool for 48 hrs. The hatched spawn was then reared in the hatching pool with continuous circulation for three days for yolk

sac absorption and there after collected in the spawn collection chamber. Approximately 4.0 litres of spawn was collected which was estimated to be 4.0 lakh spawn i.e. 1 lakh spawn per litre. The spawn was then released in the small pond for rearing to

the fry stage. Biofloc culture was initiated in the FRP tanks with continuous aeration in the tanks. Culture was inoculated with the multi-strain probiotic of *Bacillus* species and enzymes @300 gm per 10,000 litres of water. The culture was initiated in the circular FRP tank in 2000 litre with the inoculum. Constant aeration was

provided and the floc formation was observed in the initial phase but due to frequent power breakdowns, the culture could not be sustained. Another set was initiated with higher dose of the inoculum and flock formation was observed but could not sustain the flock for feeding purpose or stocking.



Plate 12: Biofloc inoculation and culture in the month of April, 2024

The aquarium fishes namely, gold fishes of different varieties, Koi carp, black and silver molly, Guppy of various varieties were reared and acclimatized for confined culture with filters. Aeration was provided into the tanks and regular water exchange/cleaning is being undertaken. Trail set for Guppy fish breeding was initiated with providing optimal conditions and stimulus to the brooders. The Guppy fish was bred successfully in the aquarium conditions

as a backyard activity. Newly hatched Guppy fish spawn were fed live feed for better growth and survival. Juvenile fishes are being reared for adulthood and further breeding shall be undertaken upon maturity to develop breeding protocols and rearing of the young ones. Extension material was prepared for the training of women and youth during the reporting period.





Plate 13: Aquarium setup for rearing of aquarium fishes

Table 11: Growth parameters of the aquarium fishes

Species	Initial Size (mm)	Initial Weight (g)	After 12 months (mm)	After 12 months (g)
Gold Fish	30	25	120	100
Molly	20	10	60	25
Sword Tail	20	10	60	25
Tetra	25	10	60	30
Koi	50	30	120	150
Angel fish	30	10	60	20

Sustainable resource management for climate smart IFS under AICRP on Integrated Farming Systems (NRMIIFSRSOL202104000269)

An Integrated Farming System (IFS) model was developed on a 0.72 ha area for marginal farmers in Western Uttar Pradesh, aiming to address ecological and economic viability under climate change conditions. The key objectives of the model included identifying region-specific, climate-resilient farming enterprises; resource

budgeting with a systems perspective focusing on soil, water, nutrients, and energy; evaluating low-carbon production modules; and exploring avenues for secondary agriculture to engage rural youth. The IFS model integrated multiple components: crops, agri-horti systems, multi-layer farming, boundary plantation, dairy, and secondary agriculture. The system achieved a total sugarcane equivalent yield of 127.2 tonnes, with cropping contributing 42% and dairy 39% to the overall productivity.

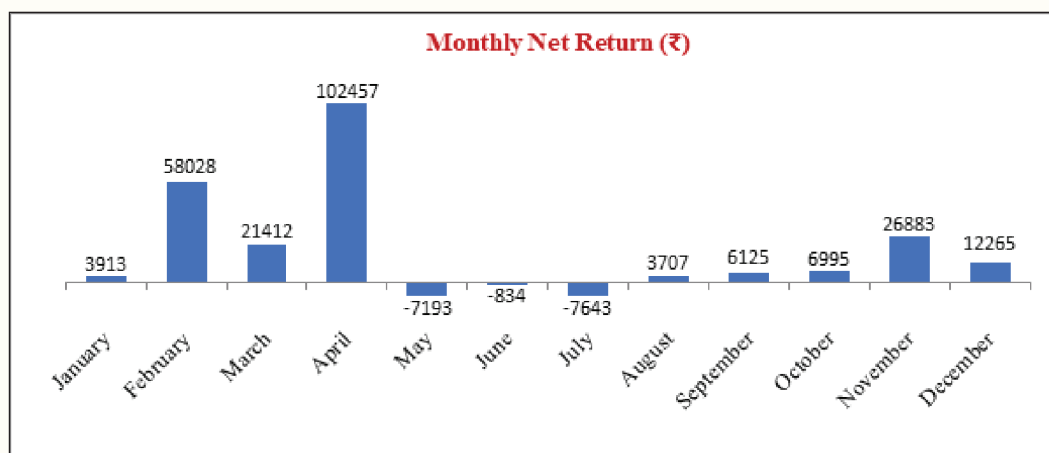


Fig. 5: Monthly net returns from IFS model (0.72 ha) at Modipuram

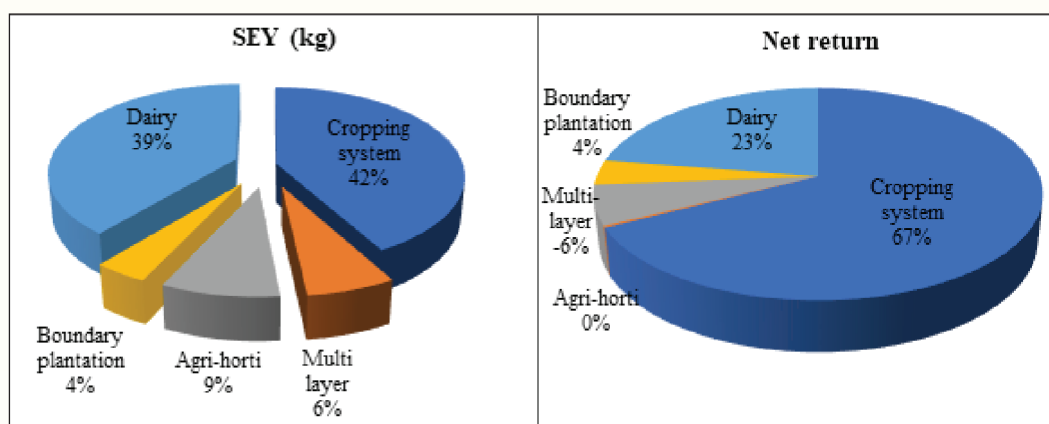


Fig. 6: Production (Sugarcane Equivalent Yield) and income (%) from different components of IFS model

The model generated a net annual return of ₹1.94 lakh and generated 393 man-days. Nutritionally, the system met the dietary requirements of a four-member household, producing sufficient

quantities of cereals (1319 kg), pulses (105 kg), oilseeds (54.3 kg), vegetables (2265 kg), fruits (792 kg) and milk (2283 litres), with available marketable surpluses.

Table 12: Economics of IFS model (0.72 ha)

Parameters	Values (Rs.)
Market input cost including animal feed but excluding labour (Rs) (A)	118556
Cost of purchased animal feed (Rs)	45005
Value of recycling excluding family labour (Rs)(B)	37524
Cost of hired labour (Rs)(C)	137550
Cost of family labour (Rs)(D)	0
Total Cost (Rs)(A+B+C+D)	293630
Gross returns (Rs)	450796
Net returns (Rs) (without family labour) (Gross returns-A-C)	194690
Net returns (Rs) (with value for family labour) (Gross returns-A-C-D)	194690

Internal recycling of farm residues contributed significantly to nutrient needs, meeting 64.7% of nitrogen, 24.5% of phosphorus,

and 66.6% of potassium requirements. Over four years, the soil organic carbon content improved from 0.57% to 0.64%, reflecting

positive soil health impacts. The model also demonstrated strong sustainability metrics, including a Sustainable Value Index (0.68), Sustainable Yield Index (0.83) and Simpson's Diversity Index (0.926). Further, using the IPCC Tier 2 methodology, the model was found to be carbon-negative, with a net greenhouse gas (GHG) emission of -857.7 kg CO₂ equivalent. These results highlight the IFS model's potential as a sustainable, climate-smart solution for marginal farmers in the region.

AICRP on Integrated Farming Systems (On-station National) (Project Code: NRMAIFSRCOL 20214000266)

Under All Indian Coordinated Research Project (AICRP) on

Integrated Farming Systems (IFS) on station experimentation Sustainable resource management for climate smart IFS were implemented (25 main, 2 sub and 5 ICAR institute centres) starting from 2017-18 with revised objectives, across different agro-climatic zones, and continued through reporting period of 2023-24. Development of region-specific IFS models at 9 sub centres and Carbon crediting and GHG emission estimation and measurement in IFS models (25 main, 11 sub and 5 ICAR institute centres) during the reporting period. Mean system production from IFS models in terms of REY was found to be 25.6 tonnes (Fig. 7).

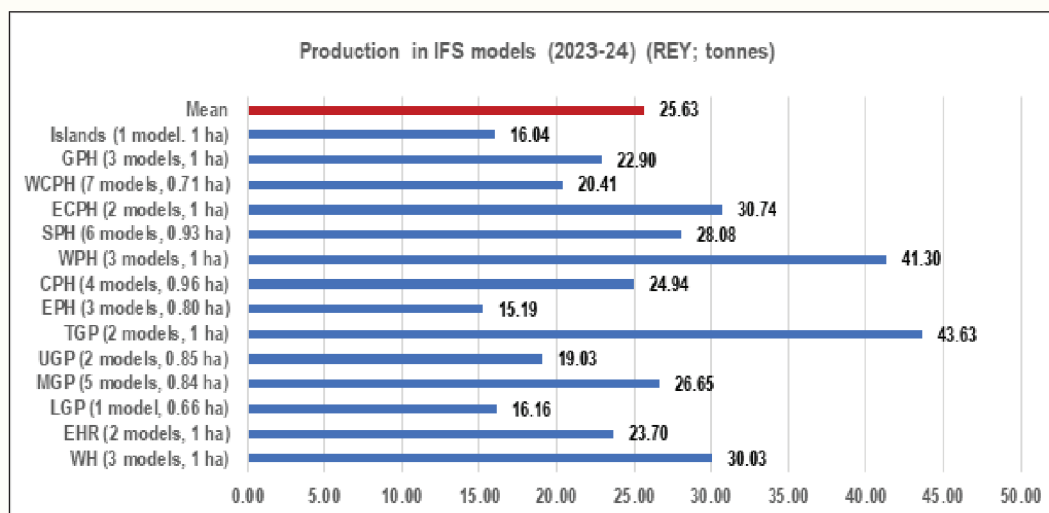


Fig. 7: System productivity (REY in tonnes) from IFS models of different agro-climatic zones

Similarly, Mean Net return from IFS models of different ACZ was found to be ₹270198 while it varied from ₹96677 in Eastern Plateau and Hills (EPH) to ₹546615 in Trans Gangetic Plains

(TGP) while Mean Net returns per rupee invested was found to be 2.1 (Fig.8).

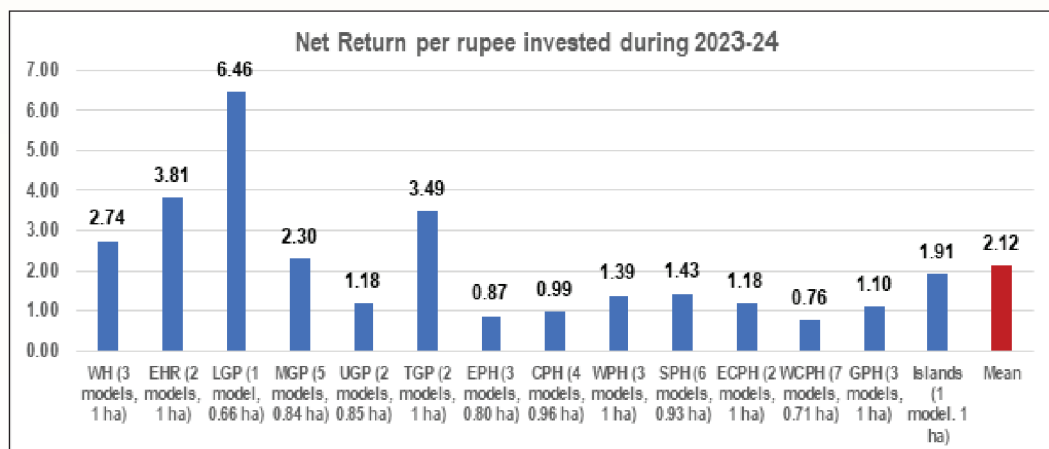


Fig. 8: Mean Net return from IFS models of different ACZ

Similarly, other key performance indicators like recycling values within IFS models, improvement in soil organic carbon, employment generation (mandays) and GHG emissions (estimated

through empirical factors based on IPCC Tier II) were recorded for the IFS models and presented as mean of IFS models of different ACZ and presented in Fig. 9-12)

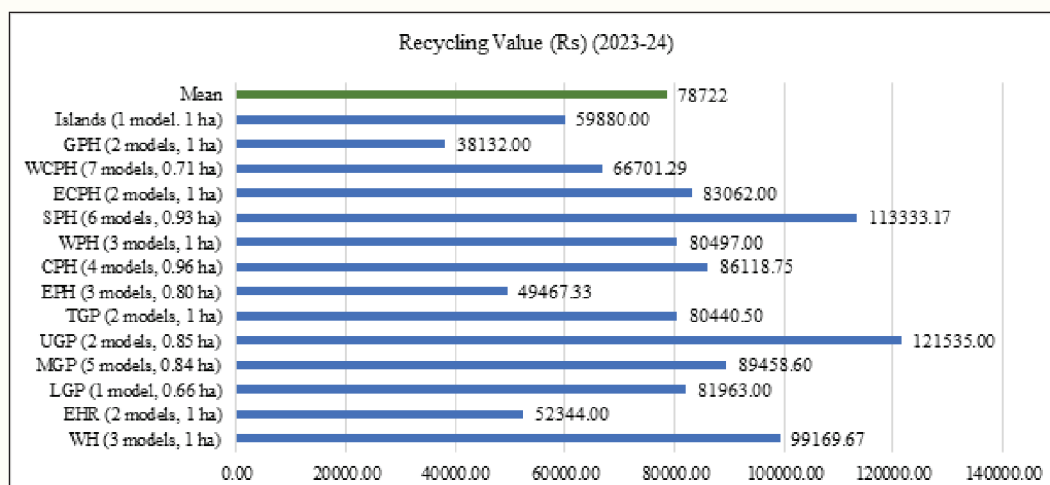


Fig. 9: Mean value of recycling (Rs.) in IFS models

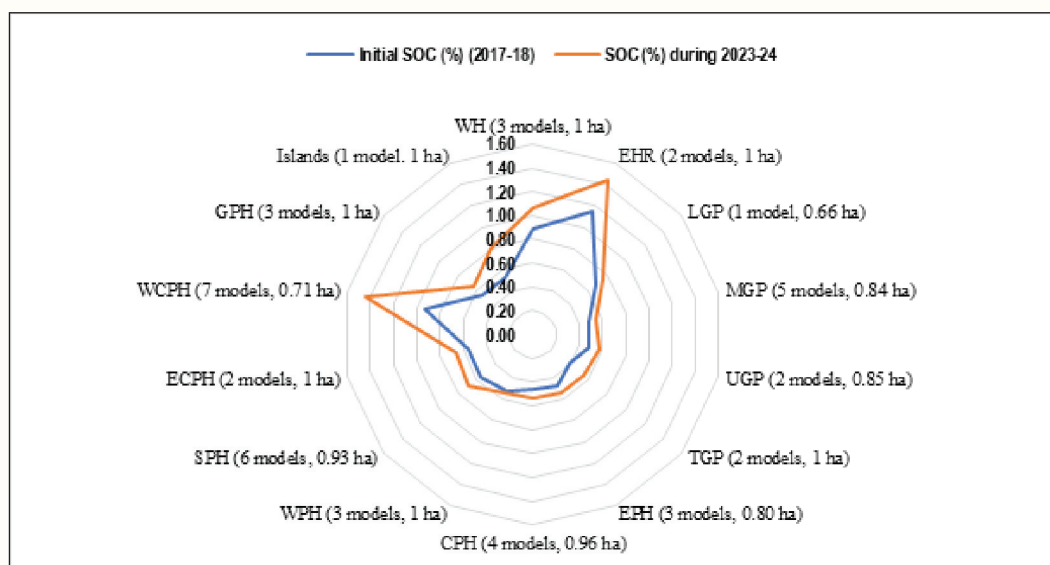


Fig.10: Improvement in SOC (%)

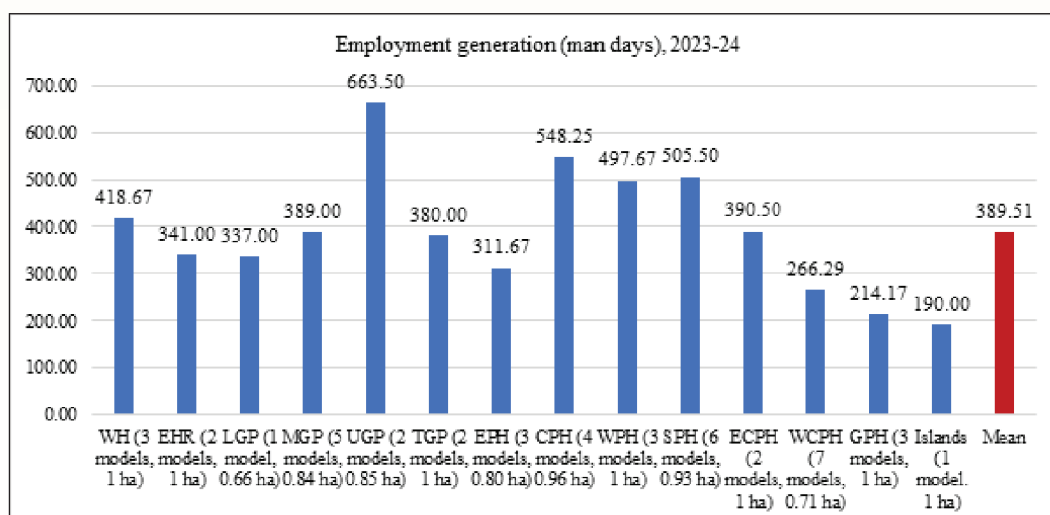


Fig. 11: Employment generation from IFS models (Mandays)

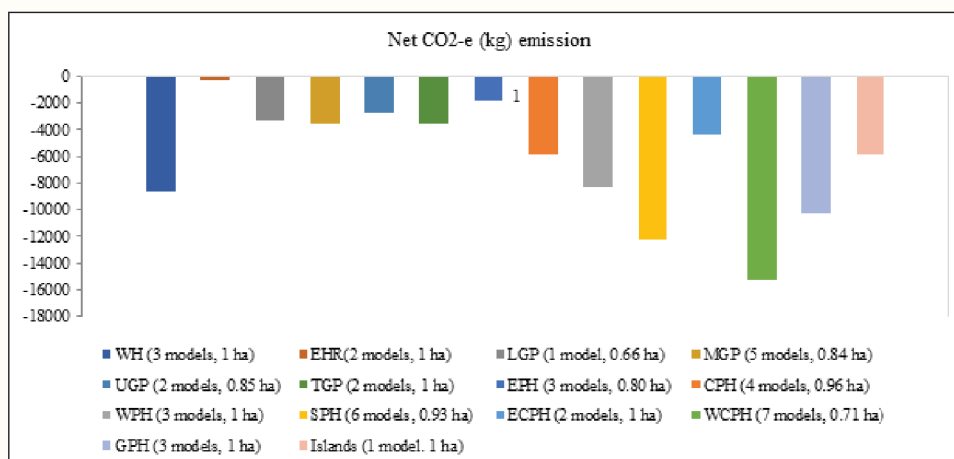


Fig. 12: Net GHG emission from IFS models

Mean recycling value in IFS models was found to be ₹ 78721 with highest being ₹ 121535 in UGP and lowest being ₹ 38132 in Gujarat Plains and Hills (GPH). Mean improvement in soil OC over initial status was found to be 24.57%. Mean employment generated from IFS models was observed as 389 mandays. In most of the IFS models of different ACZ, the net emission of GHG i.e. source and sink difference as estimated using IPCC Tier II coefficients were found to be negative suggesting environmental suitability of these IFS models.

AICRP on Integrated Farming Systems- On-Farm Research (National) (Project code: NRMAIFSRCOL202104000268)

1. On-Farm evaluation of different management practices in pre-dominant cropping systems (OFR-1)

Table 13: Farmer practices Vs Nature-Positive Farming

ACZ	Location	Cropping system	FP	OF	NF	ONF
WH	Kullu	Maize-wheat/barley	3300	4300	3300	4100
	Almora	Finger millet-wheat	2171	2505	3405	3572
MGP	Saharsa	Rice-wheat	7885	8081	8208	7693
EPH	Saraikela	Rice-wheat	4870	7170	6440	7023
WPH	Solapur	BG-Soybean	2575	2509	2336	2506
SPH	Dindigul	Maize-maize	8750	8160	7318	9397
		Groundnut-Sorghum	4411	4028	3636	4816
	Rangareddy	Rice-maize	9286	8970	8439	9341
ECPH	Khordha	Rice-Groundnut	10132	10632	10027	11133
		Rice-groundnut	5946	5997	5504	6471

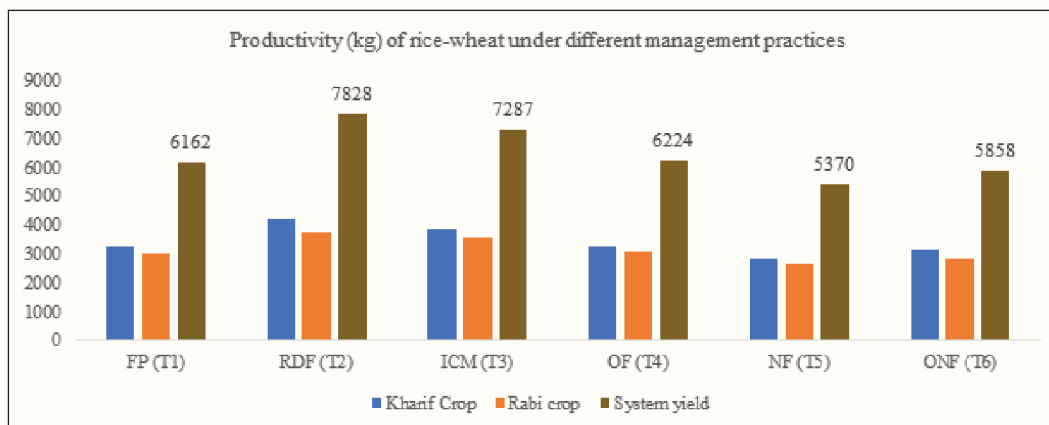


Fig. 13: Productivity (kg) of rice-wheat system under different management practices

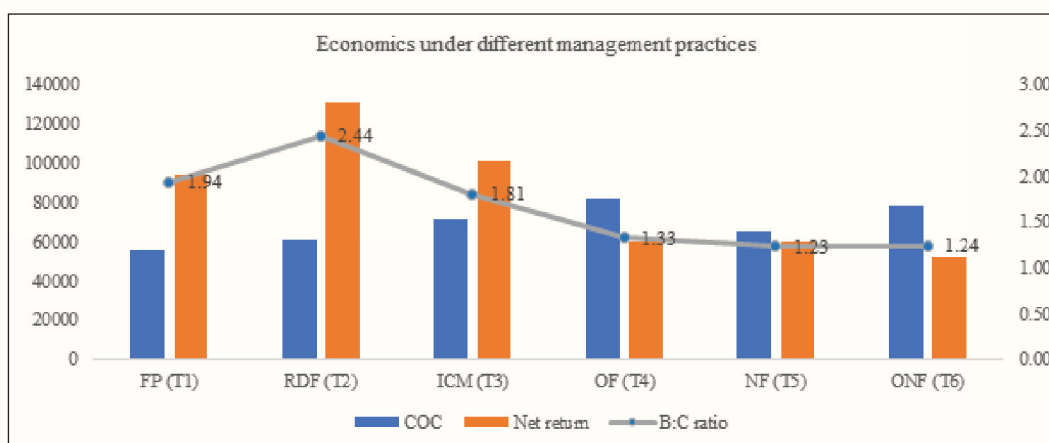


Fig. 14: Economic performance of rice-wheat system under different management practices

- In first year there was 30% yield gap in RDF vs organic and 60% yield gap in RDF vs natural farming this yield gap may narrow down as transitional period over.
 - Organic farming can give almost equal yield to farmer's practices in first year itself. However, increase in cost of cultivation in organic practices is major issue which effect overall net return reduction. To compensate this, a provision of 25% higher premium price could be a solution.
- 2. Diversification and improvement of existing farming systems under small and marginal household conditions (OFR 2)**

Integrated Farming Systems (IFS) with location-specific, module-based, low-cost interventions were undertaken as part of the on-farm research component of the AICRP-IFS-OFR. These interventions involved farmer-participatory refinement of IFS practices across cropping systems diversification, livestock diversification, product diversification and capacity building modules to enhance food security, nutrition, environmental sustainability, and income for small and marginal farmers. These

interventions, implemented in a participatory manner from 2022-23, which aim to double farm incomes while promoting food and nutrition security, environmental health, and eco-friendly agriculture. Two blocks were selected from each OFR centre (district), among these, one is high productive block and the other is low productive block. Block was selected based on the average district productivity, if block productivity is below the district productivity, then, it is considered low and if it is above the district productivity, then, it is considered high productive block. From each block, three villages were selected and, in each village, six farmers were covered on a random basis. So, in total 36 farmers were covered in each centre. A total 23 districts were covered from 14 agroclimatic zones, so, in total, 828 farmers were covered across the country.

a. Characterization of Existing Farming Systems

Across the country, a total of 25 types of farming systems were recorded which were based on the combination of different farming components suitable for the specific agro-eco region. It was found that the Crop + Dairy system generates a net income of ₹1.35

lakh from an average landholding of 0.96 ha. With the integration of horticulture and vegetable components along with Crop + Dairy system, this provided additional returns. The highest net income per household and per unit of landholding was recorded in the Crop + Dairy + Horticulture system (₹1.78 lakh) followed by the Crop + Dairy + Vegetable system (₹1.44 lakh). This could be attributed to differences in resource availability between irrigated and rainfed areas. In irrigated areas, resource-rich farmers prefer

high-value components, whereas, in rainfed areas, farmers often opt for goatry due to its lower water requirements. Backyard poultry was not taken up by resource-rich farmers due to social obligations, while goatry faces challenges such as high mortality rates due to diseases, disorganized selling practices, lack of dry fodder throughout the year, and shrinking grazing lands. These factors collectively contributed to lower returns from goatry interventions in existing farming systems.

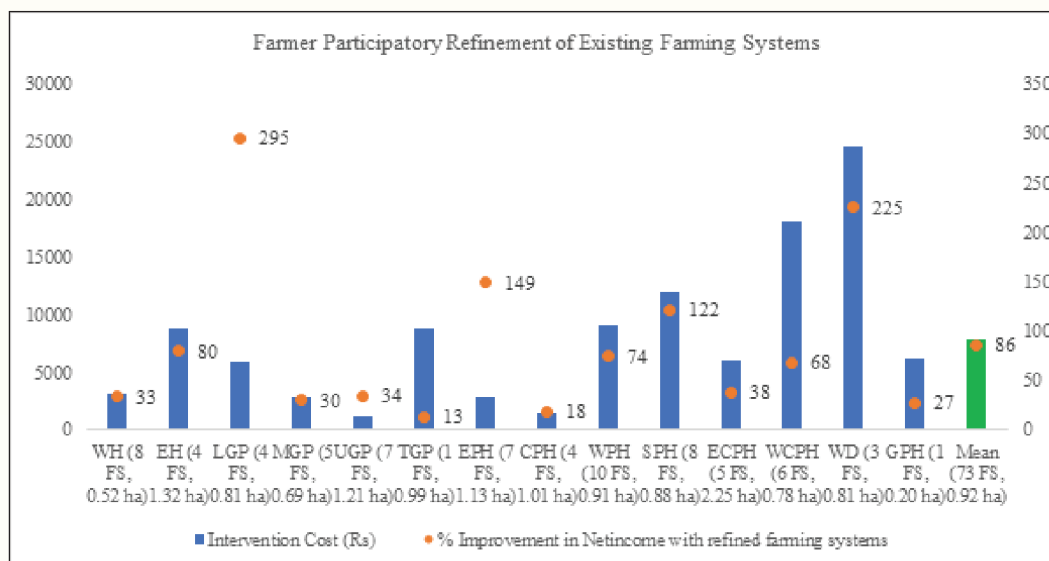


Fig: 15: ACZ wise percent increase in net return along with intervention cost

By investing just ₹7,889 through on-farm refinement of existing farming systems achieved an 86% increase in net income within two years of implementation (2022-24), showcasing its potential to improve the livelihoods of small and marginal farmers effectively as observed under AICRP-IFS-OFR (All India Coordinated Research Project on Integrated Farming Systems–On-Farm Research) programme.

b. Model Value Chain Development for Integrated Farming Systems

Table 14: Detail of MVCD activities during 2022-23

District (State)	Farmers involved	Crop production area (ha)	Livestock (dairy, goat, poultry etc)	No of interventions made	SHG/JLG/FPO
Vizianagaram (AP)	391	154	1528	16	20 SHG + 58 JLG 2 FPO (Deeksha & Arogya Millets)
Dahod (GJ)	300	234	2803	9	2 SHG (Masala Producer group-Ambali & Vadva)
Thane (MH)	300	158	1981	12	12 SHG, 1 FPO (Ekatmic Sheti Gat, Vanai)
Kendujhar (OD)	120	57	726	1	1 FPO (Bidu Chandra FPC Ltd)

District (State)	Farmers involved	Crop production area (ha)	Livestock (dairy, goat, poultry etc)	No of interventions made	SHG/JLG/FPO
Chikkaballapur (KN)	612	440	8465 (Poultry 4350)	5	5 SHG 2 FPO (Sri Ambaji Durga FPO & Sri Chennakesahav FPC)
Patiala (PB)	300	1485	1232	7	2 FIG
Salem (TN)	400	362	2098	16	5 SHG + 2 FPO (Thiruvalluvar & Vasista FPC)
Total	2,423	2,890	18,833	66	44 SHG + 58 JLG + 2 FIG + 8 FPO



Plate 14: Different preparation training given to women under MVCD

Assessing the role and contribution of integrated farming systems for addressing One Health at household and landscape levels (Project code: NRMAIFRSIL202111000275)

The study is conducted at IFS on-station research centres falling under Semi-arid, Sub-humid, Humid and Coastal agroecosystems. In the semi-arid agroecosystem at SK Nagar, focused on terminal quantification of resource flow in IFS and identifying the best cropping systems for environmental sustainability and livelihood

enhancement. The sub-humid agroecosystem at Patna involved resource flow quantification and evaluating the impacts of various farming models. The humid agroecosystem at Jorhat examined both resource flow quantification and optimal cropping systems for ecosystem health. Similarly, the coastal agroecosystem at Karmana studied the rice-based IFS model and its potential for improving environmental health and productivity. The analysis evaluated the impact of integrating livestock, aquaculture, and crops within these farming systems, assessing their contributions

to nutrient recycling, soil health, and economic viability. The major components analyzed included cattle, rice cultivation, vegetables, leguminous crops, organic waste management, and aquaculture systems like fish and duck farming. The study emphasized the importance of resource recycling within IFS, such as utilizing dung, nutrient-rich water, and crop residues to enhance soil fertility while minimizing external input dependencies. A key finding of the study was the substantial water use efficiency improvement observed in IFS. Among various cropping models, the Ridge Gourd-Broccoli-Okra sequence demonstrated the highest water use efficiency, yielding 293.0 kg of produce per cubic meter of water used, making it an optimal choice for regions facing water scarcity. Additionally, the rice-*Sesbania*-red gram-groundnut cropping system exhibited the highest organic carbon content at 1.41%, indicating significant soil fertility enhancement through the use of leguminous crops and organic inputs. Another major highlight was the role of IFS in mitigating climate change impacts through carbon footprint reduction. The rice-okra-Amaranthus sequence emerged as the most efficient system in reducing greenhouse gas (GHG) emissions, achieving a carbon footprint reduction of 6,270 kg CO₂ equivalent. This demonstrates the potential of IFS in promoting low-carbon agriculture while ensuring food security and sustainability.

In conclusion, the findings from this study underscore the significant role of IFS in advancing One Health principles through a synergistic approach to agriculture that balances productivity, resource efficiency, and environmental sustainability. The study

demonstrates how integrating crops, livestock, and organic waste recycling enhances ecosystem health while mitigating challenges like water scarcity, soil degradation, and greenhouse gas emissions. By embracing these strategies, farming communities can achieve sustainable food production, improve livelihoods, and contribute to a resilient agricultural landscape that supports human, animals, and environmental well-being.

Scaling and impact assessment of integrated farming system for livelihood of farmers (Project code: NRMAIIFSRCIL202109000277)

Integrated Farming Systems (IFS) is a sustainable agricultural model integrating enterprises such as crops, livestock, and fisheries to maximize resource efficiency and boost productivity. By promoting the cultivation of diverse crops and livestock, IFS enables farm households to access a wide range of dietary options. This diversity improves nutrition, fosters balanced diets and enhances human well-being. Three states, viz. Kerala, Tamil Nadu, and Telangana selected for study as the states implement the promotion of IFS. 10% of the samples from beneficiaries and non-beneficiaries will be selected randomly from each district. The sample farmers were chosen through Simple Random Sampling (SRS). Table 15 presents the impact of the adoption of IFS on farmers' income and cost. From the adoption of IFS models, the cost of cultivation has been increased by Rs 3097 per ha; similarly, the gross return also increased by ₹18838 per ha, leading to higher returns of 12 % income. The study did not find significance for net income and NIPRI variables.

Table 15: Impact of IFS adoption on selected outcome variables

Sl. No.	Outcome variable	Coefficient	Constant	P value
1	Cost of cultivation (Rs/ha)	3097.148 ** (1366.224)	43807.48 (978.37)	0.024
2	Gross return (Rs/ha)	18838.25 ** (5051.92)	155681.7 (3617.7)	0.033
3	Net returns (Rs/ha)	7741.204 ^{NS} (4956.18)	111874.2 (3549.19)	0.119
4	Net income per rupee invested (NIPRI)	0.028 ^{NS} (0.152)	2.734843 (0.109)	0.853

Note: Standard error provided in parenthesis; ** significant at 5% level; NS- non-significant

Fig. 16 illustrates the percentage of households consuming various food groups across three categories of Dietary Diversity Score (DDS): Low DDS (<5), Medium DDS (5.01–7.5), and High DDS (>7.51). The data highlights how food consumption patterns vary significantly among these groups, reflecting differences in dietary

quality and nutritional intake. In the low DDS category, 77% of households consume cereals, making it the dominant staple food. However, the intake of nutrient-rich foods is notably low, with only 33% consuming meat, 14% consuming fruits, and a mere 8% consuming fish/seafoods. This suggests that households

with low DDS primarily rely on staple foods like cereals and root/tuber crops, leading to potential nutrient deficiencies. For the moderate DDS group, cereals remain the most consumed food group (91%), followed by milk & milk products (78%) and vegetables (72%). However, the consumption of fish/seafoods and eggs was relatively low at 28% each, indicating limited protein

and micronutrient intake despite moderate dietary diversity. Households in the high DDS category exhibit a greater variety in food consumption, with over 90% consuming cereals, milk & milk products, oils/fats, and vegetables. This group demonstrates a balanced diet, incorporating diverse protein, vitamin, and mineral-rich foods, leading to better nutritional outcomes.

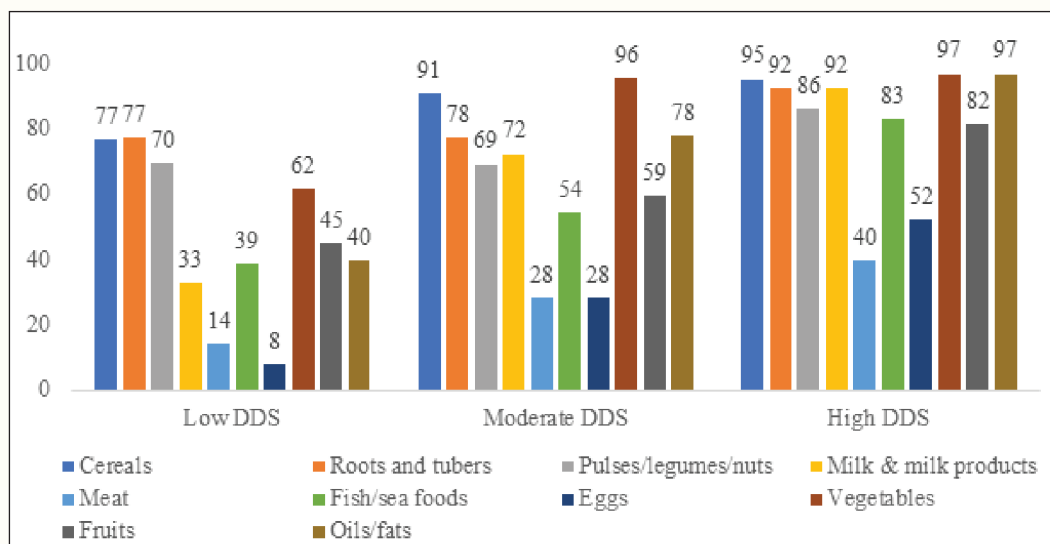


Fig. 16: Consumption of different food groups across DDS groups (%)

Preparation of detailed project report (DPR) and providing technical backstopping for establishment of model IFSS including Agro-Ecotourism at identified agricultural farms (4 farms in Odisha) (Project code: NRMALIFSRCL202203000280)

ICAR- Indian Institute of Farming Systems Research, Modipuram,

signed MoU with the Directorate of Agriculture & Food Production and the Directorate of Horticulture, Govt. of Odisha and prepared Detailed Project Report (DPR) for 3 farms, namely Nayagarh, Sakhigopal and Semiliguda farm which Govt of Odisha approved. The reports were submitted, and the project has been concluded.





Plate 15: Architectural sketch of Sakhigopal Farm by Spire Consultancy based on DPR

Transformational agroecology across food, land and water systems (INALL) (Project code: NRMAIIFSRCOL202301000308)

The project, “Transformational Agroecology across Food, Land, and Water Systems,” has been implemented in Narayangani block of Mandla district, Madhya Pradesh, a tribal region in the catchment of the Narmada River and its tributaries in November 2023. The project has two objectives 1) Identification of household level technology gaps and resource constraints for establishing IFS, IOFS, and NFS models to improve livelihoods and achieve economic and environmental benefits in water, soil, and ecology, and 2) Refinement of existing farming systems through farmer’s participation for better farm productivity through reducing negative yield contributing factors. The brief result of the preliminary study is described below.

i) Agroecological Study: Soil health, water productivity and pesticide use level

The agroecological study conducted as part of the project focuses on assessing various aspects of sustainable agricultural practices, particularly soil health, nutrient uptake, water productivity (WP), and pesticide use levels. This study aims to understand the interaction between crop cultivation, horticulture, dairy farming,

and poultry systems in improving soil fertility, enhancing nutrient efficiency, and optimizing water usage. Additionally, it evaluates the pesticide use practices to promote environmentally friendly approaches, ensuring long-term sustainability of the farming systems while maintaining high productivity and soil health across the diverse farms. The findings from this study will contribute to developing integrated solutions for improving agricultural resilience and sustainability in the region. The study is focused on water productivity and pesticide usage across different models. The results show that the IFS 3 model had the highest water productivity (₹ 6.5 per cubic meter), while IFS 2 had the lowest water productivity (₹ 5.6 per cubic meter). In terms of active ingredient application, IFS 1 had the highest amount of active ingredient used (0.54 kg/ha), while IFS 3 used the least (0.30 kg/ha). Both the IOFS and INFS models showed no active ingredient application, indicating that these models either adopted minimal or no pesticide use. The varying levels of pesticide application across the models highlight the differences in integrated pest management strategies and their potential implications on both cost and environmental sustainability in agricultural practices (Table 16).

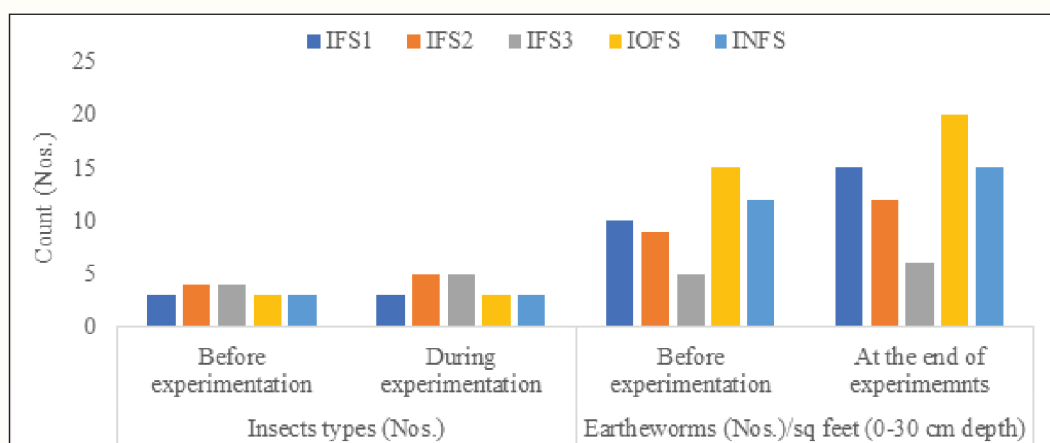
Table 16: Water productivity and pesticide use level during kharif season 2024

Models	Water Productivity (₹ /m³)	Pesticide use level active ingredient (kg/ha)
IFS 1 (Crop + Dairy + Poultry + Fishery)	6.3	0.54
IFS 2 (Crop + Horticulture + Dairy + Poultry)	5.6	0.41
IFS 3 (Crop + Dairy + Poultry)	6.5	0.30
IOFS (Crop + Horticulture + Dairy + Goatry)	10.3	0.0
INFS (Crop + Horticulture)	8.9	0.0

ii) Biodiversity study: Insect types and earthworm population density

In relation to biodiversity study, the abundance of insects and earthworms in different treatments were recorded. The results reflected the biodiversity and soil health across the models. The data indicates the impact of various treatments on the number of insect types and earthworm populations. In terms of insect diversity, IFS2 and IFS3 showed an increase from 4 types before

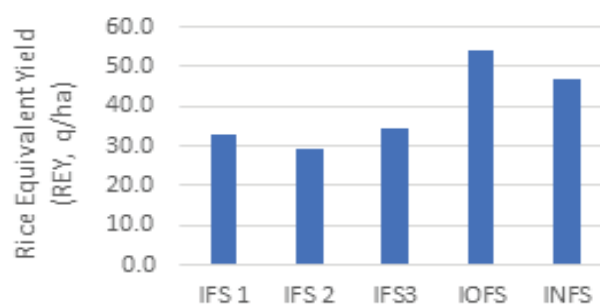
experimentation to 5 types during experimentation, while other treatments (IFS1, IOFS, INFS) maintained their initial count of 3 types. Regarding earthworm populations, significant increases were observed across all treatments, with IOFS showing the highest growth (from 15 to 20 nos. earthworms/sq.ft.). IFS1 and INFS also exhibited notable increases, from 10 to 15 and 12 to 15 nos. earthworms/sq. ft., respectively. These findings highlight the positive effects of the treatments on soil biodiversity, particularly in enhancing earthworm abundance (Fig.17).


Fig. 17: Insect types and earthworm population density in different IFS, IOFS and INFS models

iii) Crop productivity

The findings from the cropping systems in the study reveal varying yields in terms of Rice Equivalent Yield (REY) across different models. Among the models, IOFS recorded the highest REY at 54.16 q/ha, followed by INFS with 46.87 q/ha. IFS 3 also

performed well, achieving a REY of 34.25 q/ha, while IFS 1 and IFS 2 reported slightly lower yields of 33.07 q/ha and 29.30 q/ha, respectively. These results demonstrate the superior productivity of IOFS and INFS compared to other farming models in terms of REY.


Plate 16: Yield of kharif crops in various models

Fig. 18: Rice equivalent yield in various models

iv) Economics: Cost of cultivation, gross return, and net return and BC ratio (included Kharif crop only)

The economic performance of different models in terms of cost of cultivation (CoC), gross return, net return, and benefit-cost (B:C) ratio shows significant variation across the different farming systems. In the IFS 1 model, the cost of cultivation (CoC) was recorded to the tune of ₹ 42,500 per ha, with gross returns of ₹ 76,063 per ha. After accounting for the costs, the net return was ₹ 33,563 per ha, leading to a favourable B:C ratio of 1.8, indicating that for every rupee spent, ₹ 1.80 was earned in return. For the IFS 2 model, CoC was slightly higher at ₹ 45,000 per ha, but the gross return was lower at ₹ 67,395 per ha. This led to a net return of ₹ 22,395 per ha, resulting in a B:C ratio of 1.5. Although still positive, the B:C ratio indicates a lower profitability compared to IFS 1. The IFS 3 model showed a CoC of ₹ 46,000

per hectare, with gross returns of ₹ 78,775 per ha. The net return was ₹ 32,775 per ha, yielding a B:C ratio of 1.7. While the profitability was not as high as IFS 1, it remained favourable and reflected a reasonable return on investment. The IOFS model demonstrated the highest economic return. With a CoC of ₹ 70,000 per hectare, the Gross Return was ₹ 124,563 per hectare, resulting in a substantial Net Return of ₹ 54,563 per hectare. This model also had the highest B:C ratio of 1.8, suggesting that despite the higher costs, it yielded a significant return, making it one of the most profitable systems. The INFS model had a CoC of ₹ 65,000 per hectare and gross returns of ₹ 107,800 per ha. The net return was recorded at ₹ 42,800 per ha, leading to a B:C ratio of 1.7, which was comparable to IFS 3. This model, incorporating a diverse range of crops, offered a relatively good return on investment with a reasonable cost of production.

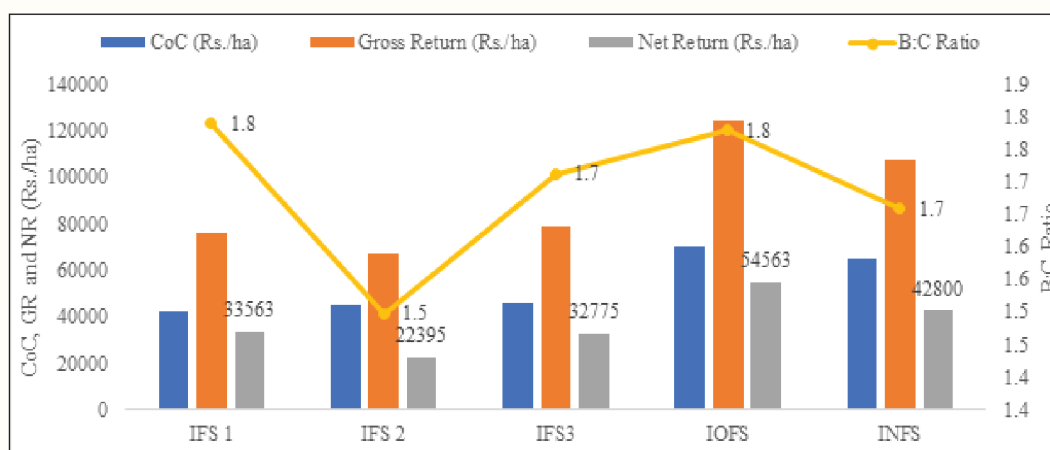


Fig. 19: Cost of cultivation, gross return, net return and BC ratio in different IFS, IOFS and INFS models

Overall, the study indicates that while IOFS had the highest overall profitability, the IFS models, particularly IFS 1 and IFS 3, showed good profitability with relatively lower input costs. The B:C ratios

for all models were above 1, indicating positive returns from all the systems.



CROPPING SYSTEMS AND RESOURCE MANAGEMENT



Evaluation of different cropping systems for crop intensification under conservation agriculture practices (Project code: NRMAIFSR SOL201505000286)

A field experiment is continuing since 2015 to assess the impacts of location specific conservation agriculture (CA) based management practices and crop diversification on crop intensification, soil sustainability, energy budgeting and energy-economic relationship. The experiment comprises three different scenarios i.e. business as usual including puddled transplanted

rice-conventionally tilled wheat (PTR-CTW) and sugarcane-ratoon-wheat (CT-CT-CT); improved production, income and soil nutrition through intensification including rice-wheat- green gram (CT-CT-CT); maize-mustard- green gram (CT-CT-CT); sustainable intensification to address the issues of labour, water, energy and soil health degradation including rice-wheat (DSR-ZTW); sugarcane+ green gram-ratoon+ green gram -wheat (RT-ZT-ZTW); rice-wheat-green gram (DSR-ZTW-ZT) and maize-mustard-green gram (ZT-ZT-ZT).

Yield and yield attributes

Table 17: Crop yield of different crops as influenced by tillage, crop residue and diversification

Cropping systems	Yield of different crops (t ha ⁻¹)	
	Kharif	Rabi
R-W (CP)	5.51	5.66
R-W (CA)	4.67	6.43
R-W-GG (CP)	6.49	5.94
R-W-GG (CA)	5.38	6.90
M-M-GG (CP)	8.79	2.76
M-M-GG (CA)	9.86	3.09
S-R-W (CP)	136.80	5.91
S+GG-R-W (CA)	121.40	6.53
SEm±	2.21	0.25
CD (P=0.05)	6.77	0.76

CP: Conventional Practice; CA: Conservation agriculture

The data showed that the direct seeded rice recorded 15.2 and 17.1% less yield in R-W (CA) and R-W-GG (CA) over the conventional practices. Similarly, the sugarcane crop grown under reduced tillage practices recorded 11.2% lower cane yield over the conventional method. But, the zero tilled maize, mustard and

wheat recorded 12.2%, 12.0%, and 14.9% higher grain yield over the conventional tillage based practices. The system productivity in terms of sugarcane equivalent yield (SEY) observed that the yield of different cropping systems both in CA and CP were at par with each other (Fig. 20).

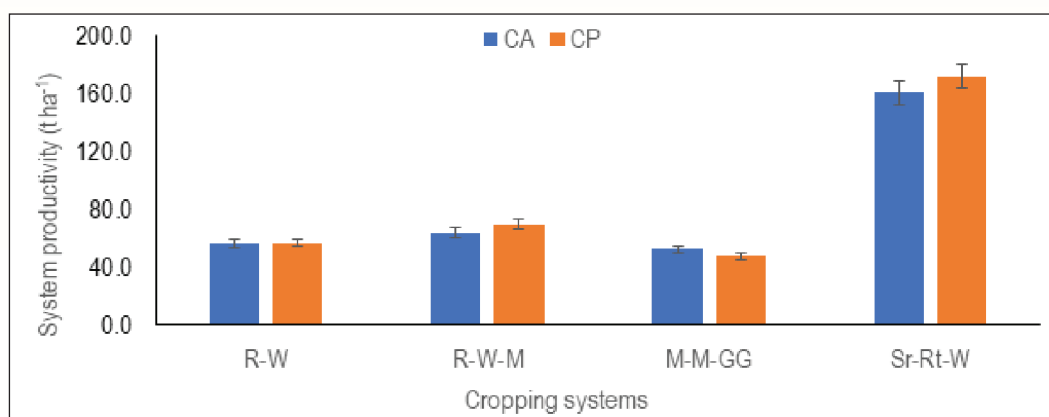


Fig. 20: The system productivity in terms of sugarcane equivalent yield (t ha⁻¹)



(a) Experimental field view



(b) Zero tilled wheat crop



(c) Zero tilled green gram

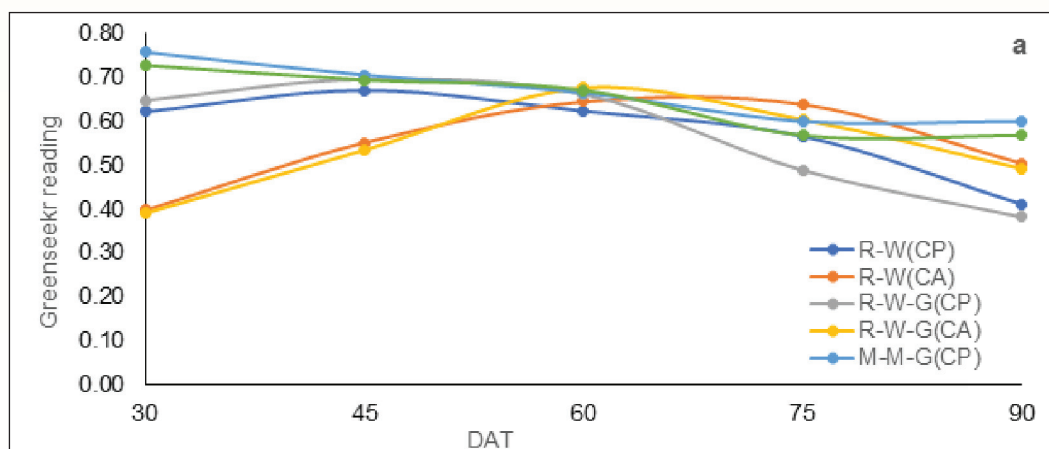


(d) zero tilled mustard crop

Plate 17: Experimental field view and different crops under CA based management practices

Conservation agriculture (CA) based management practices are considered as one of the important components of climate smart farming (CSF) and precision farming. NDVI values using green

seeker and crop nitrogen status using SPAD were recorded at the 15 days' interval among all the cropping systems.



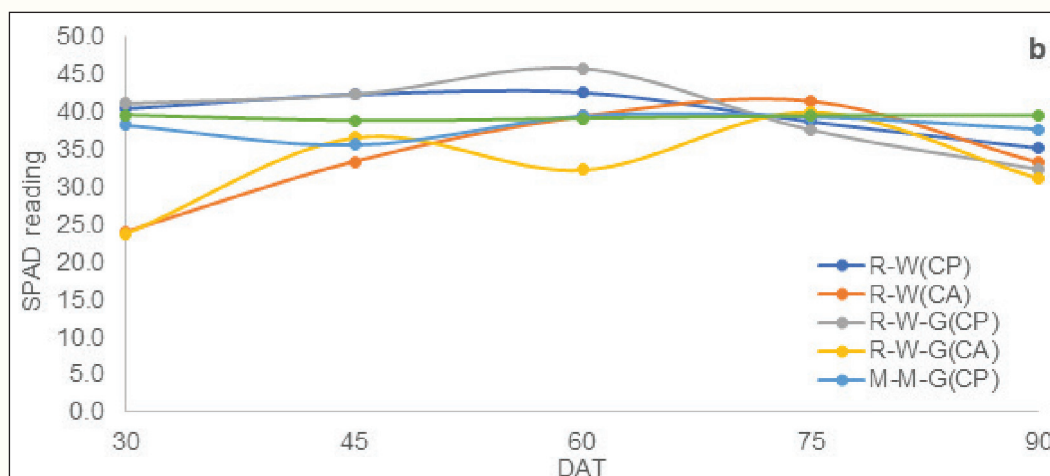


Fig. 21: Changes in greenseeker (a) and SPAD (b) values influenced by tillage, crop residues and crop diversification in kharif season crops.

The data depicted in Fig. 21a showed 56.7%, 39.8% and 3.9% lower green seeker values in DSR rice and ZT maize as compared to conventional practices at 30 days after sowing. Interestingly, the CA based management practices in DSR rice and ZT maize recorded 18.4%, 29.1% and 5.3% higher green seeker value over the conventional practices at 75 and 90 days after sowing. SPAD value are used for better nitrogen management in different crops.

The data related to SPAD value in different crops are presented in Fig. 21b. Results showed 68.3%, 26.7%, 8.0% and 42.3%, 13.7%, 29.6% lower SPAD value in DSR rice under R-W (CA) and R-W-GG (CA) cropping systems at 30, 45 and 60 days after sowing. This can be related to the lower yield in the DSR as compared to transplanted rice.

Soil physico-chemical and biological properties

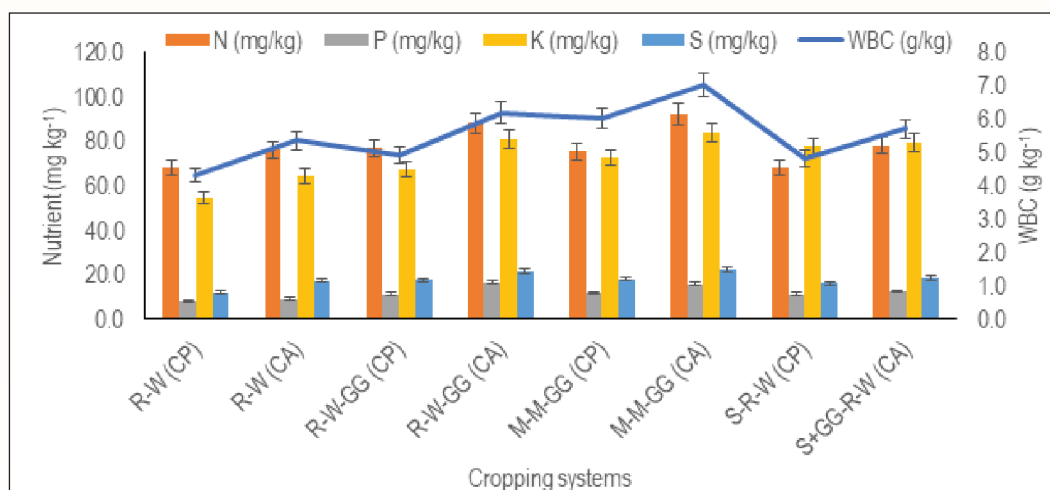


Fig. 22: Impact of crop diversification and CA based practices on various soil chemical attributes

The data presented in Fig. 22 shows that 23.6%, 43.1%, 61.8% and 31.7% higher WBC in R-W (CA), R-W-GG (CA), M-M-GG (CA) and Sr+GG-Rt+GG-W (CA) treatments over the conventional practices. At the same time 29.9% and 35.7% higher N due to incorporation of summer green gram along with CA practices were recorded in R-W-GG and M-M-GG cropping systems as compared to business as usual practices. P availability increased by 43.1%, 61.8% and 31.7% in CA based R-W-GG, M-M-GG and

Sr+GG-Rt+GG-W systems. CA practices improved K availability in sugarcane by 45.8% over the farmer's practices. S availability in maize and mustard crop increased by 50.7% and 48.3%.

The data related to changes in WBC and soil BD over the years of conservation agriculture practices are depicted in Fig. 23a and 23b. A significant improvement in soil organic carbon measured using the Walkley Black method was recorded in CA

based management practices over the years. Data showed 49.5% increase in WBC across the CA based treatments in 2024 over the year 2017. WBC also showed an improvement in conventional practices, which might be due to inclusion of green gram in the

cropping systems. At the same time significantly 16.3% reduction in soil bulk density across the CA based management practice were also recorded after 9 years of CA management practices in diverse cropping systems.

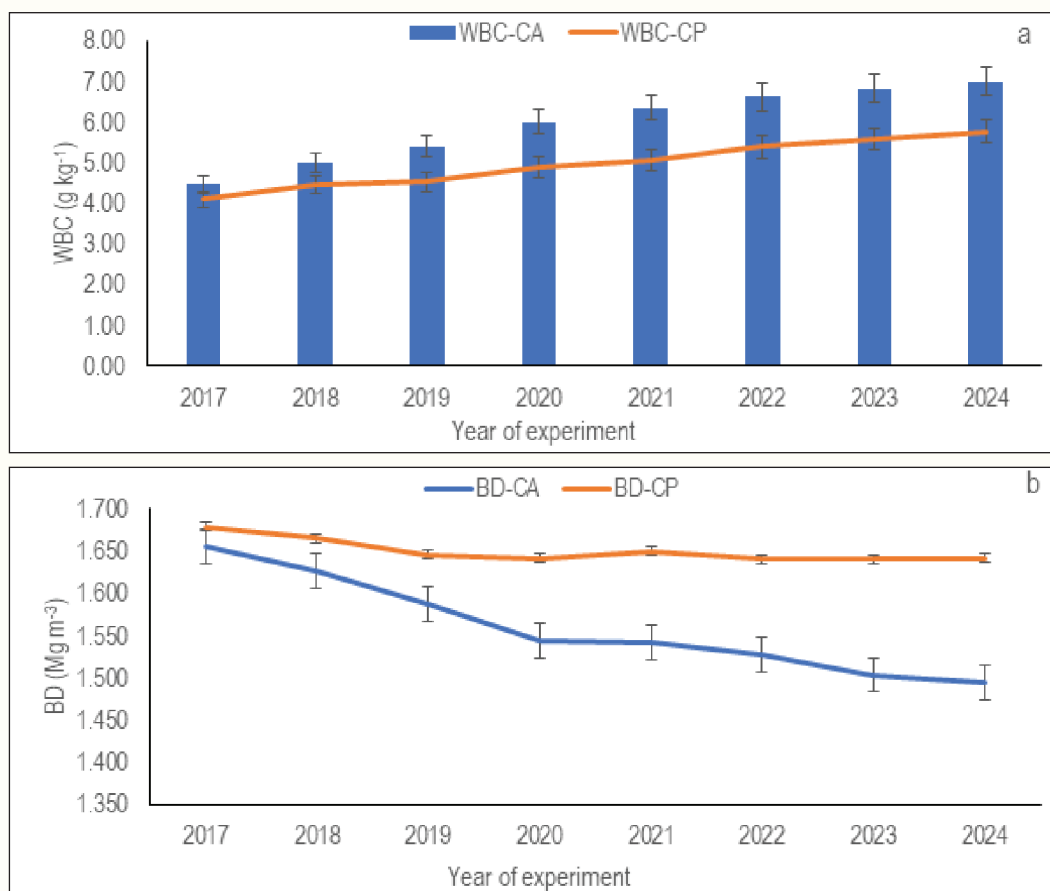


Fig. 23: (a) Changes in Walkley Black Carbon (WBC) and (b) Soil bulk density over the years in CA and CP based management practices.

Soil samples were analyzed for various carbon fractions, C stock, C accumulation and C sequestration in the diverse cropping systems under CA based management practices. Data depicted in Fig. 24 showed that CA based management practices in R-W, R-W-GG, M-M-GG and Sr+GG-Rt+GG-W cropping system

recorded 28.5%, 52.8%, 69.4% and 39.4% higher labile carbon (C_{VL} and C_L) over the R-W (CP) system. Similarly, 10%, 44.5%, 63% and 37.5% increase in recalcitrant pools (C_{LL} and C_{NL}) in these cropping systems over the R-W (CP) system.

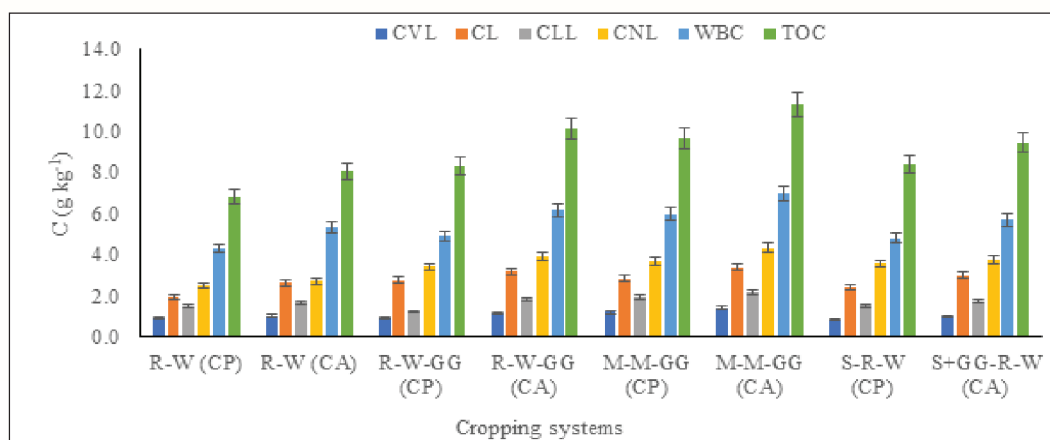


Fig. 24: Influence of crop diversification and CA based management practices on various carbon fractions

Over a period of 10 years of CA based management practices in diverse cropping systems significantly influenced the total organic carbon in soil. Incorporation of maize-mustard and greengram residue significantly increase the soil TOC content. Over the

conventional R-W system, 16.1%, 54.0%, 61.7% and 39.7% higher soil TOC content was recorded in R-W, R-W-GG, M-M-GG and Sr+GG-Rt+GG-W systems under CA based management practices as compared to conventional R-W system.

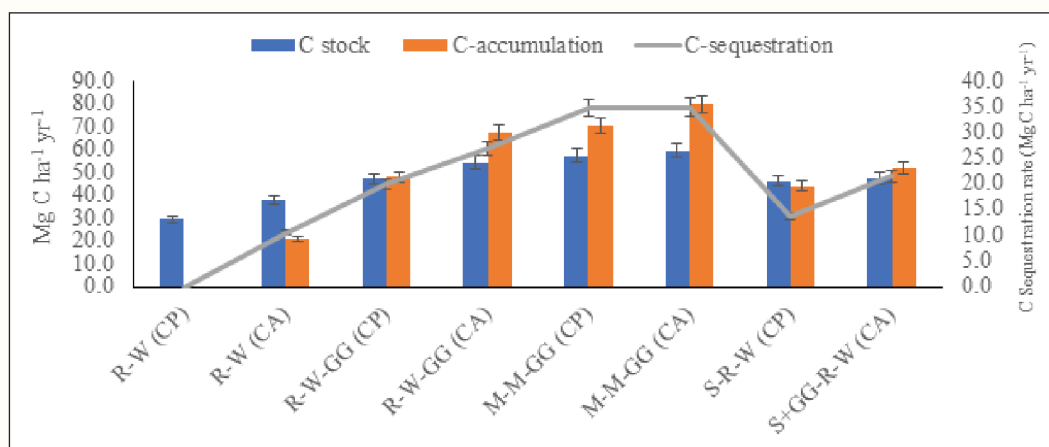


Fig. 25: Soil C stock, C accumulation and C sequestration as influenced by crop diversification

Measurement of soil carbon stock (C stock) and carbon accumulation (C accumulation) is an important parameter for baseline carbon accounting, impact of land use planning and carbon credits and trading. The data related to soil C stock and C accumulation calculated for diverse cropping systems and CA based management practices are presented in Fig 25 showed significant improvement in C stock and C accumulation in long-term CA based management practices. Significantly, 13.0%, 55.4%, 78.9% and 12.1% higher C stock was recorded in R-W, R-W-GG, M-M-GG and Sr+GG-Rt+GG-W systems under CA based management practices over the conventional R-W system. Likewise, these treatments were 11.2%, 35.8%, 36.8% and 22.3% superior for C accumulation over the conventional R-W systems after 10 years of CA based management practices. Soil C sequestration leads to C accumulation in soil, which increases the C stock. Significant improvement in C sequestration was recorded among the different treatments. Among the different cropping systems, M-M-GG (CA) system recorded 27.5% higher C sequestration over the conventional R-W systems.

Effect of rice straw retention, incorporation and residue decomposition on productivity, profitability, soil health and environment under rice wheat system (Project code: NRMAIFRSOL202104000287)

Rice residue management is a significant environmental and agricultural issue in North-West India because of narrow window between the harvesting of kharif crops and sowing of rabi crops. Thus, farmers burn the stubble of rice crops. Keeping this in view, a field experiment is continuing since April 2021 to evaluate the effect of in-situ rice residue management of rice residue. The experiment comprises five treatments i.e. T_1 - rice residue burning (RB); T_2 - rice residue surface retention (RR); T_3 - rice residue incorporation (RI); T_4 - rice residue surface retention + Pusa decomposer spray (RR+PD); and T_5 - rice residue incorporation + Pusa Decomposer spray (RI+PD). Soil samples from 0-5, 5-15 and 15-30 cm soil depths were collected at the harvest of wheat crop in April 2024. These soil samples were analysed for various soil physicochemical and biological attributes.



(a) Experimental field view



(b) Wheat sowing in full residue retention



(c) Wheat crop in residue incorporated plots



(d) Performance of wheat crop in residue plots

Plate 18: Experimental field view and wheat crop under different in-situ residue management practices

Yield and yield attributes

Table 18. Effect of in-situ rice residue management on different plant parameters

Treatments	Spike length (cm)	No. of grains/spike	Spike weight (g)	grain weight/spike (g)
T ₁	14.39	42.73	2.59	1.91
T ₂	14.71	43.80	2.60	1.92
T ₃	14.95	44.27	2.67	1.98
T ₄	15.41	45.87	2.71	2.02
T ₅	15.17	46.40	2.93	2.19
SE(m)±	0.311	2.141	0.128	0.073
C.D.	NS	NS	NS	NS

The data related to different yield attributes are presented in Table 18. Results showed 7.1% and 5.4% improvement in spike length in treatment T₄ and T₅ over the treatment T₁. At the same time, these treatments recorded 7.3% and 8.6% higher number of grains/spike over the treatment T1. Application of microbial consortia

(Pusa decomposer) improved the spike weight by 4.3% and 9.7% in treatments T₄ and T₅ over the T₂ and T₃ treatments, respectively. Microbial consortia improved the nutrient availability in treatments T4 and T5 as these treatments recorded 6.1% and 14.7% higher grain weight/spike over the crop residue burning.

Table 19: Impacts of in-situ residue management on crop grain yield (t ha⁻¹) and system productivity (REY)

Treatments	Rice yield (t ha ⁻¹)	Wheat yield (t ha ⁻¹)	System productivity (REY t ha ⁻¹)
T ₁	5.24	5.68	11.23
T ₂	5.53	5.98	11.83
T ₃	5.62	6.16	12.11
T ₄	5.96	6.55	12.86
T ₅	5.93	6.65	12.94
SE(m)±	0.286	0.337	0.594
C.D.	NS	0.973	1.703

The data presented in Table 19 showed significantly 13.7% improvement in rice grain yield in treatments T₄ and T₅ over the treatment T₁. Similarly, these treatments recorded 15.3% and 17.1% improvement in wheat grain yield as compared to treatment

T₁. At the same time, application of microbial consortia along with residue management improved the system productivity by 8.7% and 6.8% in treatments T₄ and T₅ as compared to treatments T₂ and T₃, respectively.

Table 20: Impact of in-situ rice residue management on soil carbon fractions of different oxidizability

Very labile carbon (C_{VL})						
	T1	T2	T3	T4	T5	Mean A
0-5 cm	2.07	2.46	2.55	2.74	2.92	2.55
5-15 cm	1.27	1.70	1.84	1.91	2.33	1.81
15-30 cm	0.57	0.85	1.06	1.20	1.49	1.03
Mean B	1.30	1.67	1.82	1.95	2.25	
	Factor (A)	Factor (B)	Factor (A×B)			
SE(m)±	0.023	0.030	0.052			
C.D. (<0.05)	0.068	0.087	NS			
Labile carbon (C_L)						
	T1	T2	T3	T4	T5	Mean A
0-5 cm	1.08	1.00	1.00	1.02	1.26	1.07
5-15 cm	1.30	1.10	1.31	1.38	2.23	1.46
15-30 cm	0.73	0.92	1.07	1.28	1.56	1.11
Mean B	1.04	1.01	1.12	1.23	1.68	
	Factor (A)	Factor (B)	Factor (A×B)			
SE(m)±	0.051	0.066	0.114			
C.D. (<0.05)	0.149	0.192	0.333			
Less labile carbon (C_{LL})						
	T1	T2	T3	T4	T5	Mean A
0-5 cm	3.06	3.22	4.51	5.00	5.52	4.26
5-15 cm	1.27	1.95	1.44	1.35	1.27	1.46
15-30 cm	1.85	1.22	1.06	1.34	1.65	1.43
Mean B	2.06	2.13	2.34	2.56	2.82	
	Factor (A)	Factor (B)	Factor (A×B)			
SE(m)±	0.209	0.270	0.467			
C.D. (<0.05)	0.608	0.785	1.36			
Non labile carbon (C_{NL})						
	T1	T2	T3	T4	T5	Mean A
0-5 cm	3.54	3.80	4.59	4.99	5.53	4.49
5-15 cm	1.69	2.09	2.02	2.04	2.57	2.08
15-30 cm	1.07	1.02	1.08	1.30	1.60	1.21
Mean B	2.10	2.31	2.57	2.78	3.23	
	Factor (A)	Factor (B)	Factor (A×B)			
SE(m)±	1.08	1.11	1.18			
C.D. (<0.05)	3.16	3.22	3.44			



The data depicted in Table 20 showed the carbon fractions of different oxidizability as influenced by in-situ residue management practices. Data showed a significant improvement in C_{VL} content in all the residue incorporated plots over the residue burning treatment across the soil depths. Conjoint application of microbial consortia along with the residue incorporation in treatments T4 and T5 increased very labile C by 32.4% and 41.1%; 50.4% and 83.5%; 110.5% and 161.4% in 0-5, 5-15 and 15-30 cm soil depths as compared to crop residue burning treatment (Table 4). Interestingly, treatments T2, T3 and T4 recorded 7.4% and 5.6% lower labile C content (C_L) as compared to residue burning plots in 0-5 cm soil depth. While, these treatments were 26.0%, 46.6%, 75.3% and 113.7% superior as compared in T1 in 15-30 cm soil depth. Less labile C (C_{LL}) which is part of recalcitrant carbon showed significant improvement in 0-5 and 5-15 cm soil depth in all the residue incorporated treatments as it showed 5.2% to 80.4% increment in these treatment over the residue burning. Interestingly, the C_{LL} content was 34.1%, 42.7%, 27.6% and 10.8% lower in residue incorporated treatments as compared to T1 in 15-30 cm soil depth. The combined application of microbial consortia along with in-situ residue incorporation significantly improved the non-labile C content (C_{NL}) in T4 and T5 treatments as these treatments recorded 31.3% and 45.5% increase in C_{NL} over the T2 and T3 treatments in 0-5 cm soil depth. Similarly, these

treatments recorded 27.5% and 56.9% improvements in 15-30 cm soil depths as compared to sole in-situ residue management treatments.

Adaptation and mitigation potential through cropping systems/farming systems approaches (NICRA) (Project code: NRMAIFRSOL20214000288)

Rice-wheat cropping system

The emission levels of greenhouse gases from the rice-wheat cropping system were assessed under different crop establishment methods and nutrient management treatments. The results indicated that among the crop establishment methods, direct-seeded rice (DSR) significantly reduced the global warming potential (GWP) compared to transplanted rice (TPR). Under high carbon strata conditions in the DSR method, GWP was reduced by 53.5%, 31.7%, and 66.7% in the RDF+DCD, organic, and NF treatments, respectively, compared to the RDF treatment. Under similar conditions in the TPR method, the corresponding reductions were 45.9%, 32.4%, and 65.7%. In medium carbon strata conditions, GWP reductions under the DSR method were 52.6%, 30.8%, and 70.5% for RDF+DCD, organic, and NF treatments, respectively, while the reductions under the TPR method were 56.8%, 31.0%, and 69.4% (Table 21).

Table 21: Seasonal flux of GHG from the rice under different establishment methods vs different source of nitrogen combinations during kharif 2024

Main plot	Subplot	High carbon			Medium carbon		
		CH ₄ Emission (kg ha ⁻¹)	N ₂ O Emission (kg ha ⁻¹)	GWP (kg CO ₂ -eq/ha)	CH ₄ Emission (kg ha ⁻¹)	N ₂ O Emission (kg ha ⁻¹)	GWP (kg CO ₂ -eq/ha)
DSR	Control	3.32 ± 0.6	0.08 ± 0.02	112.1 ± 3.21	2.81 ± 0.5	0.04 ± 0.01	81.2 ± 6.53
	RDF	17.16 ± 1.72	0.17 ± 0.03	474.1 ± 28.1	13.69 ± 1.1	0.22 ± 0.04	410.2 ± 27.3
	RDF+DCD	7.30 ± 0.75	0.11 ± 0.02	220.5 ± 8.1	6.50 ± 0.72	0.10 ± 0.02	196.8 ± 12.8
	Organic	11.02 ± 1.4	0.15 ± 0.03	323.6 ± 19.4	9.03 ± 1.0	0.17 ± 0.03	283.7 ± 19.5
	NF	5.20 ± 0.81	0.08 ± 0.02	157.8 ± 4.14	4.39 ± 0.68	0.04 ± 0.01	121.1 ± 9.41
TPR	Control	4.56 ± 0.72	0.02 ± 0.01	117.3 ± 2.13	3.34 ± 0.56	0.03 ± 0.01	92.0 ± 8.23
	RDF	20.60 ± 1.8	0.16 ± 0.03	562.6 ± 32.2	19.03 ± 1.6	0.18 ± 0.03	522.3 ± 30.1
	RDF+DCD	11.11 ± 1.4	0.08 ± 0.02	304.6 ± 12.1	8.42 ± 0.92	0.06 ± 0.02	225.7 ± 16.3
	Organic	14.08 ± 1.6	0.12 ± 0.03	380.2 ± 21.3	13.96 ± 1.1	0.07 ± 0.02	360.6 ± 22.8
	NF	6.83 ± 0.9	0.07 ± 0.02	192.9 ± 6.23	5.68 ± 0.81	0.06 ± 0.02	160.0 ± 11.6

DSR=Direct seeded rice; TPR=Transplanted rice; RDF= Recommended dose of fertilizers; DCD=Dicynadiamide; NF=Natural farming; CH₄= Methane; N₂O= Nitrous oxide; GWP=Global warming potential.

The study revealed that system productivity, expressed as rice equivalent yield, was significantly influenced by crop establishment methods and nutrient treatments. The highest system productivity

was observed under the RDF+DCD treatment in both Direct Seeded Rice (DSR) and Transplanted Rice (TPR). Rice yield in DSR was notably lower by 16.0% to 34.4% compared to TPR.

However, wheat yield showed an increase of 7.3% to 10.7% under Zero Tillage Wheat (ZTW) compared to Conventional Tillage Wheat

(CTW), indicating the potential benefits of conservation agriculture practices for system sustainability and productivity enhancement.

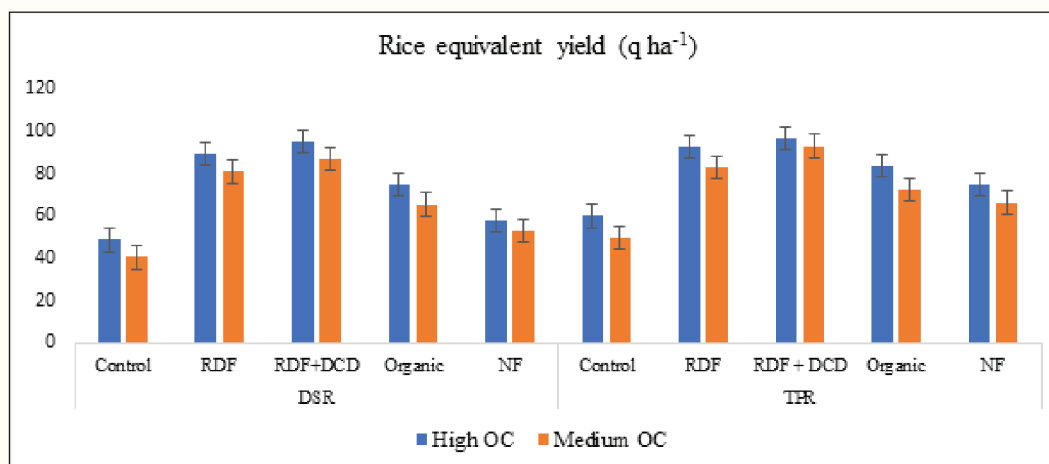


Fig. 26: Effect of crop establishment method and nutrient management treatments on crop system productivity of rice-wheat cropping system

GHG mitigation in sugarcane based inter-cropping system

A new experiment on greenhouse gas mitigation strategies in sugarcane through intercropping and water management was initiated under the NICRA project. This initiative aims to explore sustainable agricultural practices by integrating intercropping with optimized irrigation scheduling. In this experiment, the sugarcane variety CoS 13235 was planted during the summer season of 2024. The experiment consists of six treatment combinations, namely: Farmer's practice (normal sowing + flood irrigation); Normal sowing + 0.8 IW/CPE; Paired sowing + 0.8 IW/CPE; Paired sowing + 0.8 IW/CPE + cowpea intercrop; Paired sowing + 0.8 IW/CPE + pigeonpea intercrop; and Paired sowing + 0.8 IW/CPE + sesbania intercrop. The intercropping of leguminous crops not only contributes to nitrogen fixation but also improves soil health and biomass productivity. In this study, cowpea and sesbania were used for green manuring, producing biomass yields of 26.1 and 29.0 t ha⁻¹, respectively. The pigeonpea intercrop was retained

for seed production and yielded 1.06 t ha⁻¹, demonstrating the potential of legume intercropping to enhance system productivity and biomass availability. Regarding water management, the study compares the conventional farmer's practice of flood irrigation with a more efficient approach using an IW/CPE ratio of 0.8. A total of eight irrigations were applied under the farmer's practice, while only five irrigations were required under the IW/CPE approach up to December 2024. This alternative method resulted in significant water savings, highlighting its potential to conserve irrigation resources while maintaining crop performance. A similar experiment has also been initiated with autumn-planted sugarcane, incorporating chickpea, vegetable pea, and lentil as intercrops, along with irrigation scheduling based on a 0.8 IW/CPE ratio. These experiments are expected to provide valuable insights into reducing greenhouse gas emissions and improving resource use efficiency in sugarcane-based systems through the combined benefits of intercropping and improved irrigation scheduling.



Sugarcane + Pigeonpea



Sugarcane + Cowpea



Sugarcane + *Sesbania*



Green manuring of sesbania in sugarcane

Plate 19: Experimental field view and sugarcane crop with different intercrops and green manuring

Development and evaluation of novel Nano matrix intercalated formulations for enhancing nitrogen use efficiency in crops (Project code: 80/S/IPP/NRMAIFRSIL20235000301)

Granular formulations preparation and performance: In laboratory, slow/control release formulations of urea were made by impregnating the fertilizer in a composite matrix. It was devised by taking suitable mixtures of simple and nano range powders of clay materials along with some cellulosic and hydrogel materials. The ratio of various auxiliaries in matrix was identified and adjusted in way to hold ample amount of fertilizer/N and allow to release the nutrient constantly in several fractions as per plant need by mechanisms of osmotic system and erode of cellulosic materials under the influence of moisture, enzymes and proteins. By following drum rotating technique, the nutrient loaded matrix shaped to granular form of 5-10 mesh size for wheat and other grain crops. For rice crop, the same granular formulation was further encapsulated with alginate slurry prepared by taking natural alginate (10 g), methanol:water (90:10), urea 10 g. Alginate slurry prepared so was found sufficient to coat about 250-300g of granular formulation. To see the performance of developed granular formulation replicated pot experiments were conducted during kharif in rice and maize crops. The experiments for both of the crops were laid out in four replications by using doses of prepared formulations so as to provide 50, 75 and 100 kg N ha⁻¹ along with recommended doses of P and K and the performance was evaluated against two checks conducted by applying recommended dose of fertilizer viz., 150, 75 and 50 kg of NPK along with a separate set conducted without applying N with recommended doses of P and K. In case of rice, as compare to RDF treatments no significant differences in grain yield, fresh biomass, dry biomass, number of tillers among the treatments was observed. As far as yield is concerned average yield of replicated pots of all the treatments i.e. RDF (commercial fertilizers), 100,

75 & 50 kg N ha⁻¹ (prepared granular formulations) ranged from a minimum of 20.77 g to a max. of 25.0 g. Crop performed well even at lowest dose i.e. 50 kg N ha⁻¹ by giving average yield pot⁻¹ to the tune of 20.77g in case of nano material based simple granular formulation and 22.17 g in case of encapsulated granular formulation. However, the average yield pot⁻¹ of RDF treatment was received 25.0 g (Table 22). In case of maize similar pattern was observed for crop physiology and growth.

Tablets formulation preparation and performance: For use in transplanted vegetables viz., brinjal, tomato, chilli, cauliflower, cabbage, etc. nutrient (N, P₂O₅ & K) rich tablets of diameter 3.0 and 2.0 cm as weighted 20, 18 and 10 g were developed to release the nutrients in the close proximity of rhizosphere. The tablets were successfully manufactured by taking matrix constituted with hydro gel (4.6%), cellulose (2.30%), wood dust (2.76%), nano clay (6.40%), nano-alabaster (15.69), alabaster fine powder (23%), urea (21.53%), phosphoric acid (13%) and potassium chloride (10.46%). Each 20, 18 and 10 g tablet contains 2.01, 1.035, 0.86; 2.35, 1.035, 1.24 and 1.12, 0.575, 0.07 g N, P₂O₅ and K nutrients, respectively. The composition of tablet matrix was adjusted to release nutrients slowly for a period of three to four months in various cycles after absorbing moisture as and when field is irrigated. Presently the tablets are under observation for their above said release mechanism. The performance of developed tablets was evaluated in vegetable crops i.e. brinjal, tomato, broccoli, coloured cauliflower in replicated field experiments conducted by using three different concentrations viz., 3, 2 and 1 g of N; 0.75, 0.5 and 0.25 g of P and K nutrients plant⁻¹. The entire experiment was arranged in four replications. A set of replicated control was also maintained by giving recommended doses of fertilizers (RDF) provided by simple fertilizers i.e. Urea, DAP, Muriate of potash. The one tablet of each kind was put nearly 5-10 cm underneath the root system at the time of transplanting.

As compared to control (RDF), the tablets performed well as exhibited in enhanced plant growth, approximately 7-10 days early curd initiation, vigour curd diameter and more weight in case of all kinds of cauliflowers, more number of flowers and branches in case of brinjal and tomato. A minimum 10-25% yield gain in all the crops at comparatively low doses of N, P_2O_5 and K was also observed. Since fertilizer is highly translocated in the

close proximity of rhizosphere therefore, the root system entirely covered the tablets thereby 25-30% less weed population as well as their biomass was also observed as an extra benefit. Dry and fresh weight of weeds in one square meter plot of every treatment was recorded. As compared to control (RDF by fertilizers) nearly 30% reduction in dry weight of weeds was recorded in treatments of nano material-based fertilizer tablets plots.

Table 22: Effect of nano formulations on yield and yield attributing parameters of rice

Treatment	Concentration N: P_2O_5 : K_2O (Kg ha ⁻¹)	Average number of tillers (No.)	Fresh weight of vegetative part (g)	Dry weight of vegetative part (g)	Average grain yield pot ⁻¹ (g)
Control (Without nitrogen)	0: 75: 50	5.5	36.04	12.66	4.8
RDF normal fertilizer	150:75:50	20	145.42	58.27	25.08
Nano material based simple granular formulation	100:75:50	18.5	163.06	55.75	24.74
	75:75:50	21.75	169.61	55.71	21.79
	50:75:50	18.75	138.24	45.00	20.77
Encapsulated granular formulation	100:75:50	23.5	176.28	61.14	24.83
	75:75:50	18.75	134.79	46.18	22.62
	50:75:50	22.5	136.73	47.09	22.17



Plate 20: Developed tablets and granular formulation



(a) Rice crop



(b) Maize crop

Plate 21: Effect of nano material based formulations on (a) rice and (b) maize crops**Modeling the effect of nitrogen options under conventional and conservation tillage on growth, yield and nitrogen dynamics in maize and wheat (Project code: NRMAIFSRIL202306000299)**

This project aims to evaluate the DSSAT model for its effectiveness in simulating crop growth, yield, and nitrogen dynamics under different tillage and nitrogen management practices. Understanding these interactions is crucial for optimizing nitrogen use efficiency, improving soil health, and enhancing sustainable crop production. The study utilizes the CERES-Wheat model, integrated within the DSSAT (Decision Support System for Agro-technology Transfer), to simulate various aspects of crop growth, yield, and nitrogen dynamics in wheat cultivar DBW 222 under both conventional and conservation tillage systems. Model calibration was conducted

using detailed field data, including key growth parameters such as anthesis and physiological maturity, dry matter accumulation, leaf area index (LAI), biological yield, and grain yield. In addition, genotype-specific coefficients and ecotype parameters were developed for DBW 222 to improve model accuracy and reliability. The study is expected to provide valuable insights into the influence of different nitrogen management and tillage systems on soil nitrogen availability, plant uptake, and overall productivity. The upcoming years' field data will be utilized for model validation to further refine its predictive capability. This research will contribute to the development of efficient nitrogen management strategies, promoting sustainable agricultural practices while maintaining high crop yields.

Table 23: Phenologically defined growth stages defined as cultivar coefficient Specific to a cultivar and climatic condition

S.No.	Parameters	Acronym	Value
1.	Days, optimum vernalizing temperature, required for vernalization	P1V	14
2.	Photoperiod response (% reduction in rate/10 h drop in pp)	P1D	70.10
3.	Grain filling phase duration	P5	976
4.	Kernel number per unit canopy weight at anthesis (#/g)	G1	25
5.	Standard kernel size under optimum conditions (mg)	G2	42
6.	Standard, non-stressed mature tiller wt (incl grain) (g dwt)	G3	4.1
7.	Degree days it takes for a leaf tip to emerge (Phyllochron interval) (C d)	PHINT	113
	Ecotype coefficients		
8.	Minimum grain N (%)	GN%MNI	1.4

Development of an intelligent model for predicting mango yields using Artificial Neural Networks (ANN) (Project code: NRMAIFSRIL202008000285)

The study comprehensively explores the capabilities of Artificial Neural Networks (ANN) and Long Short-Term Memory (LSTM)

algorithms within the realm of deep learning, focusing on their application in creating an intelligent framework designed to predict mango yields with higher accuracy. By analysing various agronomic factors, such as soil quality, water availability, and crop management practices, alongside environmental influences

like temperature, humidity, and rainfall patterns, the framework intends to provide a holistic view of the conditions affecting mango production. The developed ANN model, which forms a core component of this framework, demonstrated an impressive accuracy rate of 78% under consistent and stable conditions using LSTM algorithm in comparison to Recurrent Neural Networks

(RNNs) and Feed forward Neural Networks (FNN). However, it is important to note that deviations in yield predictions were observed during extreme environmental scenarios, indicating the need for further refinement of the model to enhance its reliability in diverse conditions.

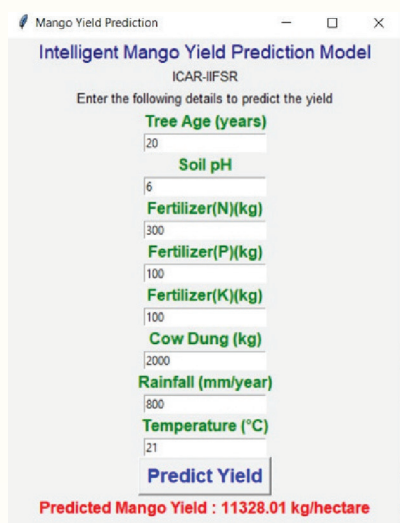


Fig. 27: Developed Desktop Application

In comprehensive productivity analysis, a 3D surface plot illustrates the interaction between rainfall, fertilizer application, and predicted productivity. A heat map showing the combined effect

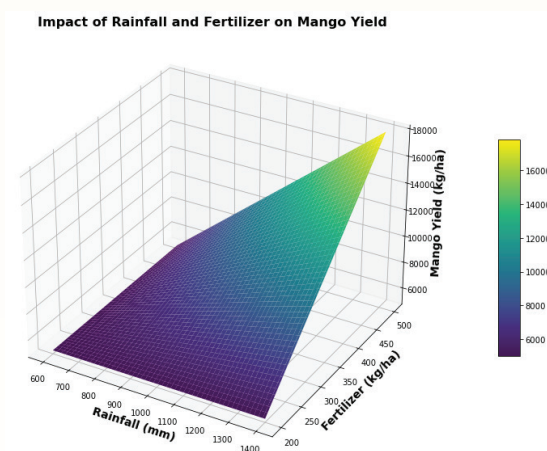


Fig. 29: Impact of Rainfall and Fertilizer

Pilot project for crop diversification (Project code: NRMAIFSR20234000278)

The goal of the project is to identify alternative crops to reduce rice dominance in areas of lower yields while establishing a few pilot demonstrations with more profitable crops like pulses, oilseeds, vegetable etc. besides training farmers and agricultural extension officers to promote broader adoption, scaling, and dissemination.

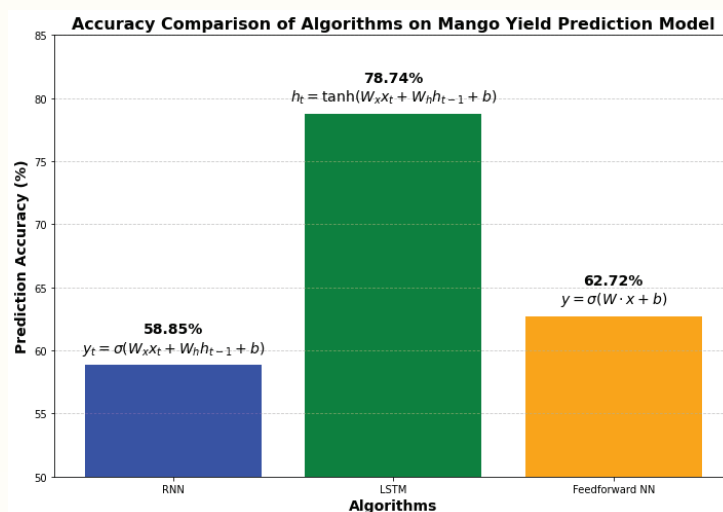


Fig. 28: Algorithm Accuracy Comparison

of rainfall and temperature on productivity. However, deviations occurred under extreme or anomalous weather patterns not well-represented in the dataset.

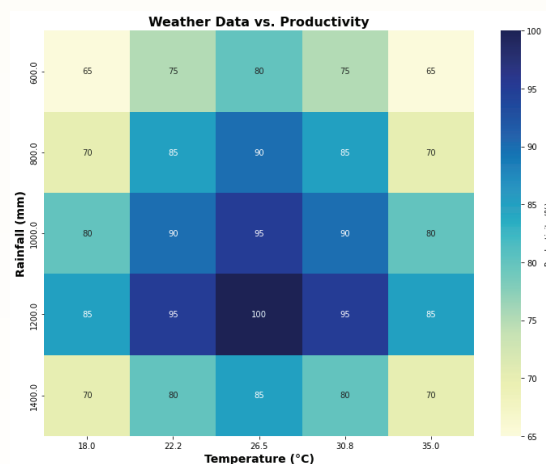


Fig. 30: Effect of Rainfall and Temperature

During the year, implementation of interventions was made in 18 districts namely Nalgonda (Telangana), Chindwada (MP), Mandi (HP), Vijayapura and Belagavi (Karnataka), Pune, Sangli and Solapur (Maharashtra), Paschimi Singhbhum (Jharkhand), Kandhamal and Ganjam (Odisha), Paschimi Champaran (Bihar), Sri Ganganagar and Bhilwara (Rajasthan), Vadodara, Panchmahal and Mahesana (Gujarat), Kadappa (Andhra Pradesh), and Dibang



Valley (Arunachal Pradesh). The project has 4 basic aspects, namely, (i) implementation of rice crop diversification, (ii) training of Extension Officers (iii) training of farmers, and (iv) district-wise rice crop spatial distribution and mapping.

Implementation of rice crop diversification: Field implementation of crop diversification has been initiated in twenty-six (26) districts (18 district in 2024-25 + 8 districts continuing from 2023-24) covering 1689.5 ha area. The preferred and subsequently implemented crop types for diversification in these districts include chickpea, vegetable pea + mustard, groundnut + green gram, groundnut, soybean + pigeon pea, and maize + black gram + green gram, finger millet, horse gram, red gram, little millet, sugarcane, okra, onion, chilli, marigold and sorghum. For effective utilization of water resources, technologies such as drip and sprinkler irrigation were implemented, while, sowing technologies such as flatbed, broad bed and furrow (BBF), etc. were adopted. Further, moisture conservation practices such as ridges and furrows were also demonstrated during the field implementation.

Extension Officers training: A total of 52 trainings were organized in 49 districts during 2024. A total of 1968 personnel attended the programs of which 71% are males and 29% are females.

Farmers training: A total of 48 trainings were conducted in 47 districts. A total of 1096 farmers attended the training out of which 48% were males, while, 52% were females. The impact of training was assessed by conducting a multiple choice question type of examination before and after the training. The average pre-training score of the participants was 6.10, while the post-training score was 8.45.

Rice crop spatial distribution and mapping: Maps were developed in ESRI ArcMap for 10 districts in 5 States. The area under paddy cover was then compared with the acreages as mentioned in Agriculture and Production Statistics (APS), Ministry of Agriculture & Farmer Welfare, Government of India (available from: aps.dac.gov.in). The percent change (either increase or decrease) for the 04 districts is given in Table 24.

Table 24: Rice cover indices following GEE estimates and APS data for the 17 aspirational districts

Sl. No.	District	State	Estimated rice cover-GEE (ha)	Rice cover-APS (ha)	% increase/decrease	Probable plantation date	Year (APS data)
1.	Shimla	Himachal Pradesh	696	765	-9.02	16 to 30 June	2019-20
2.	Udaipur	Rajasthan	5501	4692	+17.24	01 to 15 June	2019-20
3.	Tiruppur	Tamil Nadu	10625	9185	+15.68	16 to 30 November	2019-20
4.	Sabarkantha	Gujarat	8582	6964	+23.23	16 to 30 June	2019-20
5.	Upper Siang	Arunachal Pradesh	7647	6754	+13.22	16 to 30 June	2019-20
6.	West Siang		5939	6250	-4.98	16 to 30 June	2019-20
7.	Upper Subansiri		4657	4356	+6.91	16 to 30 June	2019-20
8.	East Kameng		6245	6393	-2.32	16 to 30 June	2019-20
9.	West Kameng		1145	964	+18.78	16 to 30 June	2019-20
10.	Kurung Kumey		592	639	-2.32	16 to 30 June	2019-20

FLD on Oilseeds

Total 60 FLD conducted and two training for Extension Officers/workers/input dealers (2023-24) in which 60 participants trained and five training organized for farmers in which 340 trained

**Table 25: Detail of performance at farmer field during 2023-24**

Crop	Season	Location (ecosystem)	Number of FLD conducted	Improved Package	Variety released	Increase in yield (%)	Increase in net return (%)
Soybean	Kharif	Kota	20	Soybean variety (JS-20-34); Seed rate-80; Seed treatment; Fungicide, Rhizobium and PSB	2014	13.0	17.2
Groundnut	Summer	Chikkaballapura	20	KCG 6 with line sowing	2016	23.4	34.4
Groundnut	Summer	Yethapur	20	TMV-14 with seed treatment	2019	16.2	18.5
Total	60	-					

Atlas of Climate Adaptation in South Asian Agriculture (ACASA) (Project code: NRMAIFRSOP 202312000306)

SLR and Meta-analysis on potato

Potato cultivation is vital for food security and economic stability in South Asia, yet the region faces significant climate change (CC) risks. This study aimed to identify effective climate-smart adaptation strategies through a systematic review and meta-analysis of research from 2010 to 2023. A search for publications on potato production adaptations in India, Nepal, Sri Lanka, and Bangladesh was conducted using climate change and adaptation-related keywords. Only English-language articles were included, excluding conference proceedings, book chapters, reviews, editorials, and commentaries. Following PRISMA guidelines, 95 relevant articles were selected for meta-analysis. The review revealed substantial yield improvements from strategies like mulching and date adjustment by planting pattern by 28.0%, adoption of stress tolerance genotypes improved the yield by 23.0%, and irrigation management also improved the yield by 23%. High variability in practices like mulching ($\tau^2 = 12.0$) and organic farming ($\tau^2 = 7.2$) emphasized the need for site-specific customization, while consistent results for intercropping, nutrient management, crop rotation, and stress tolerance ($\tau^2 = 0.00$) indicated broad applicability. The absence of significant publication bias (Egger p-value > 0.05) and a robust sensitivity analysis confirmed the reliability of the findings. The study recommends adapting strategies to local conditions, strengthening policy support, and promoting long-term, site-specific research to enhance potato cultivation and build resilience against climate risks in South Asia. These findings provide actionable insights for improving potato yields through climate-smart agricultural practices.

Adaptations to increase the productivity of pulses in South Asia

The adoption of stress-tolerant chickpea varieties presents

significant potential for farmers in South Asia, particularly in regions like India and Pakistan. These varieties are well-suited for semi-arid and sub-humid areas, offering substantial benefits in improving crop resilience. Supplemental irrigation proves advantageous for many farming households, emphasizing the need for targeted adaptation measures to optimize irrigation practices. Proper fertilizer management is also crucial in enhancing chickpea productivity across most cultivated areas. In pigeon pea cultivation, stress-tolerant varieties are highly suitable in countries like India, Bangladesh, and Nepal, although some regions are less favourable for these adaptations. Areas in eastern, northern, and central India, as well as parts of Nepal and Bangladesh, show strong suitability, while other regions, such as southern India, are less suitable. Zero tillage with residue management is effective in some areas, particularly in central and eastern India, but a significant portion of South Asia remains unsuitable for this adaptation approach.

CIMMYT Project: Additive Intercropping in Wide row crops for Resilient Crop Production in Bangladesh, Bhutan and India (Project Code: NRMAIFRSOP202308000305)

A Project was initiated in May 2023 with the aim to sustainably intensify smallholder farmers' wide-row crop production to improve productivity, food, nutrition & income security, and climate change resilience through wide-row, additive intercropping in sugarcane. The project comprises on-station and on-farm experiments along with detailed characterization of initiate, mid-term and final knowledge, attitude and perspective (KAP) towards intercropping in sugarcane for production, family nutrition and women empowerment.

On-station experiment

An on-station experiment was initiated in April 2024 to develop agronomic package of practices for additive intercropping in sugarcane. The experiment comprised 15 treatments, involving

different crop establishment methods (farmers' practice and paired row trench), irrigation methods (flood, surface drip and sub-surface drip) and intercrops (legume, oilseed, vegetable and fodder) in summer planted sugarcane. The highest groundnut pod yield was recorded under subsurface drip irrigation, followed by surface drip irrigation with 150 cm paired row planting. Among the different intercrops, highest sugarcane equivalent yield was

recorded in groundnut followed by okra under subsurface drip irrigation with 150 cm paired row planting. Significant saving in irrigation water was recorded under drip irrigation systems. Tensiometer based sub-surface drip irrigation saved 37.1% irrigation water, followed by surface drip method, which saved 31.4%, compared to IW/CPE based flood irrigation.

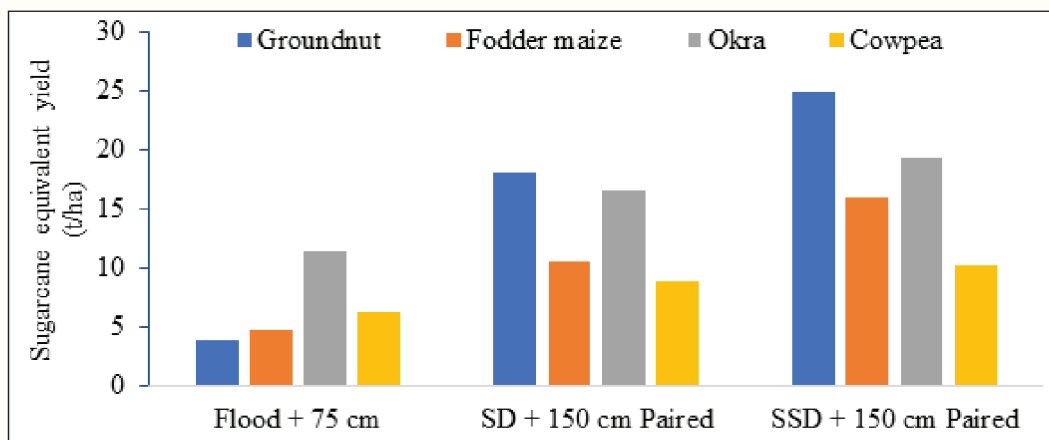


Fig. 31: Sugarcane equivalent yield of different intercrops under on-station experiment



Plate 22: General Field view of the experiment

On-Farm Experiment

On-farm experiments were conducted at 11 farmer's field for intercropping of different vegetables in summer planted sugarcane in Meerut district. Crops like okra, vegetable cowpea, cucumber,

coriander, chilli, brinjal, urd bean etc. were tested under trench planted sugarcane. Among different tested intercrops, highest profitability was realized from okra followed by vegetable cowpea and cucumber.

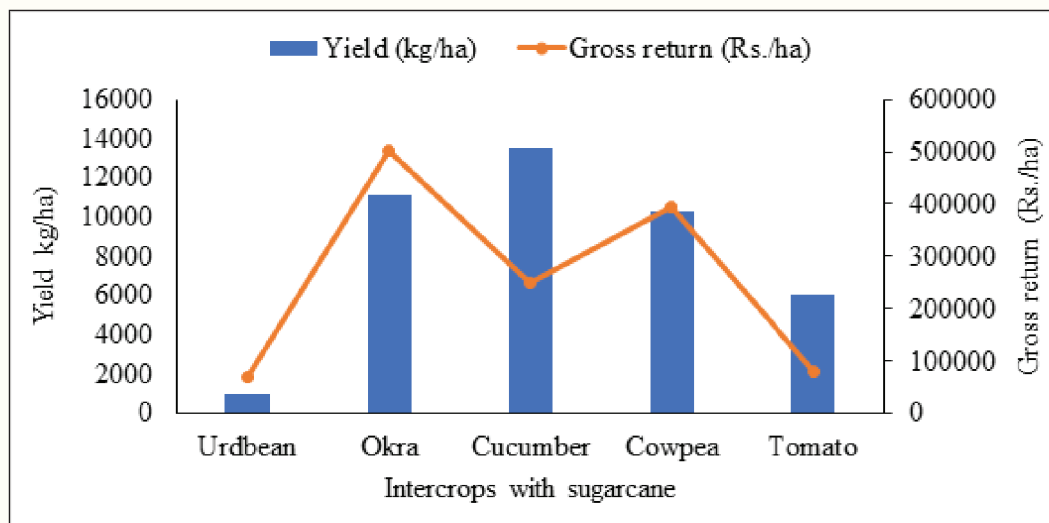


Fig. 32: Performance of different intercrops with sugarcane under on-farm experimentation

KAPs Survey

Further, baseline survey to capture initial knowledge, attitude and perspective was conducted among 200 farmers from Meerut and Muzaffarnagar districts. The results indicated that average land holding of sugarcane growers of Meerut is 0.98 ha and Muzaffarnagar is 1.71 ha. Around 73% farmers in both the

districts are not aware about additive intercropping in sugarcane. More than 80% believe that sugarcane intercropping will increase net profit along with higher labour requirement. Vegetables, fodder crops, and leafy vegetables are the preferred intercrop choices among sugarcane growers during February, April, and October planting seasons, respectively.

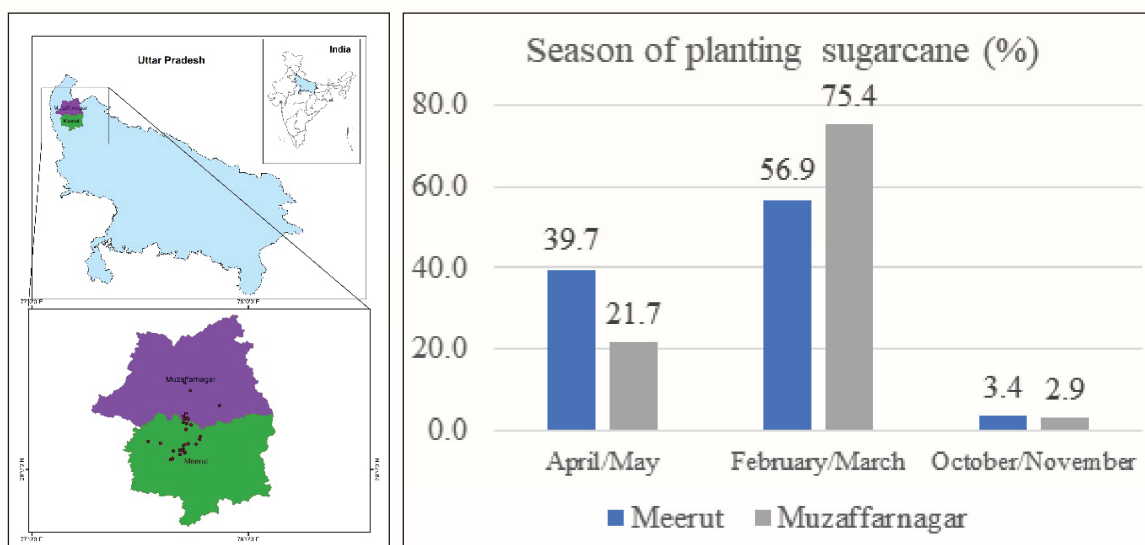


Fig. 33: Survey sites and major sugarcane planting seasons in study regions.



ORGANIC AGRICULTURE SYSTEMS



Crop improvement for organic production system (Phase – II) (Project code: NRMAIFSRIL 201805000290)

The work on development of high-yielding strains of mustard for organic and natural production systems was continued. During the year 15 elite lines developed from hybridization of indigenous and exotic parental lines of Indian mustard (*Brassica juncea* L.) followed by continuous selfing and homozygosity stabilization. These lines were field evaluated for organic and natural farming production systems and compared with locally adapted mustard

variety RH-749. It was found that two lines viz., MM16A 081 and MM16A 241 performing better under both natural (30.6, 32.06 q ha⁻¹) and organic (29.47, 29.11 q ha⁻¹) production systems maintaining significant superiority over standard check RH 749 (26 q ha⁻¹). The yield potential of the selected lines were further improved when foliar application of seaweed extract was done @ 5% for 4 times starting from 45 days after sowing. The highest yield was recorded for MM 17 A 008 (38.26 q ha⁻¹) followed by MM 16 SA 081 (36.23 q ha⁻¹).

Table 26: Seed yield (q/ha) of promising mustard lines under different management systems

Lines	Organic + Seaweed extract	Natural Farming inputs	Organic inputs
MM 16 A 001	30.47	19.76	22.36
MM 16 A 002	26.52	26.63	25.29
MM 16A 003	29.79	24.91	28.96
MM 16 A 008	29.69	24.79	27.60
MM 16 SA 081	36.23*	32.07*	29.12*
MM 16 A 082	27.68	27.48	27.95
MM 16 A 083	27.22	23.57	24.72
MM 16 A 241	34.12*	30.62*	29.48*
MM 16 A 242	33.75*	28.17	25.74
MM 16 B 001	27.61	25.88	27.46
MM 16 B 002	35.84*	29.30*	26.32
MM 17 A 008	38.26*	28.55	24.98
RH 749 (SC)	29.23	26.11	25.78
C.D.	3.46	2.81	3.10
C.V.	6.705	6.381	7.301

* Superior lines of mustard identified for organic/natural production systems



Plate 23: Field view of Experimental block for evaluation of promising Mustard lines

Development and validation of microbial consortia for crop residue recycling under organic farming system (Project code: NRMAIFSRSL201805000293)

During this year, total 100 fungal isolates having cellulolytic, hemicellulolytic and lignolytic activities, have been isolated from different samples collected from sugar mills, compost pit, decaying bark, long term organic plots, forest area, coal mine area, biodiversity park. The isolates were also having greater P, Zn solubilization potential and some of the isolates were also having K solubilization activity. During the year, a composting experiment was conducted using different combination of feed stock materials viz., rice straw, millet straw and cow dung to check

the effect of inoculation of best decomposing isolate (isolate 8) on thermophilic stage. The feed stock materials were shredded and moistened before filling the composting pit. The materials were filled in layers alternating with cow dung. The top layer was plastered with cow dung paste and moisture content of the pit was maintained at field capacity moisture by periodic watering. The temperature was recorded twice in a day (10.00 AM and 4.00 PM) at 30, 60 and 90 cm depth after filling the tanks. The thermophilic stage in the composting process started 15 days early (35-40th day) in the treatment having 50% PS/MS + 50% dung inoculated with isolate 8 as compared to composting without addition of microbial isolates inoculated.

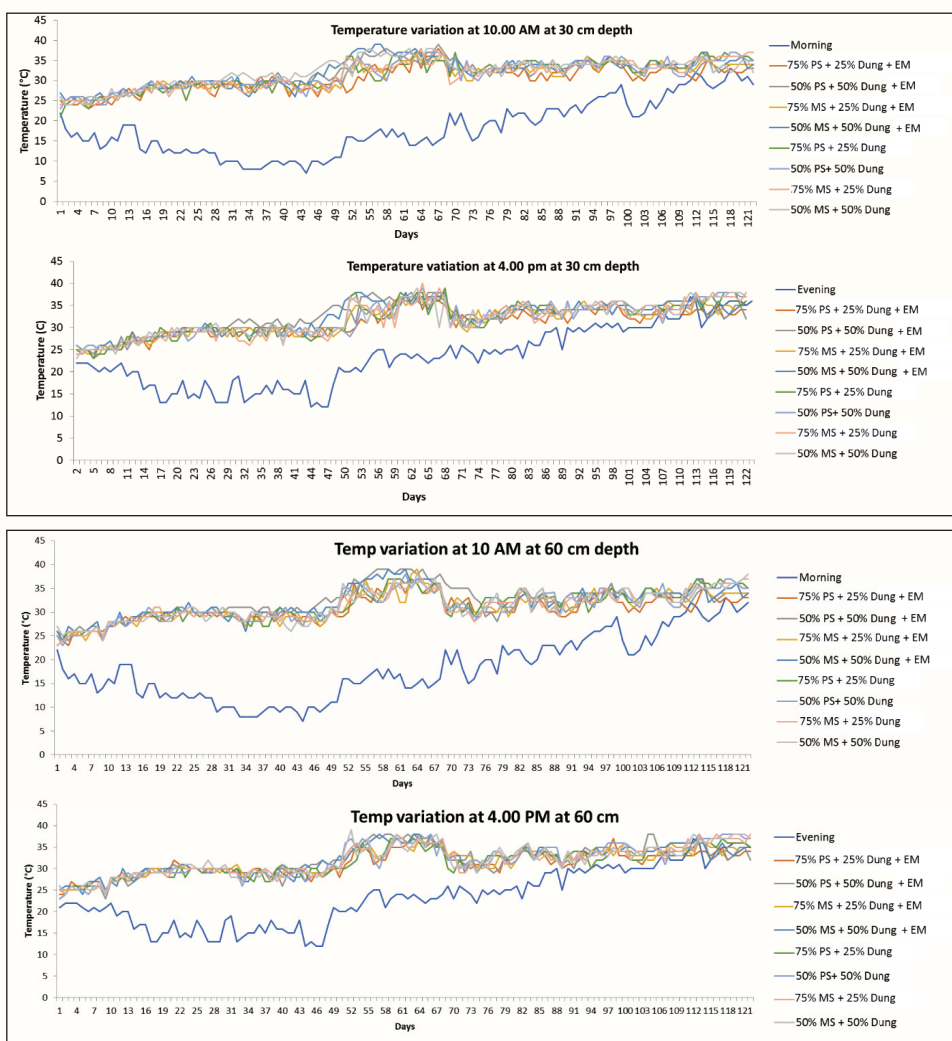


Fig. 34: Variations in temperature during the composting process

There was no significant difference in the temperature during the various stages of composting in the other treatments. Inoculation of isolate 8 (*Trichoderma*) does not seem to have any effect on nutrient content in fully matured compost (Table 27). The atmospheric temperature during the whole incubation period (13

December, 2023 to 15 April, 2024) was very low therefore the rise in the temperature during thermophilic stage was up to 41°C but the difference between atmospheric temperature and heap temperature was significantly higher.

Table 27: Nutrient concentration of final compost under different feed stock with and without inoculation of Isolate 8

Treatment	Nutrient concentration (mg kg ⁻¹)			OC (%)	OM (%)
	N	P	K		
25% Paddy straw + 75% Dung + Isolate 8	445.2	31.06	2142	2.65	5.93
50% Paddy straw + 50% Dung + Isolate 8	4312	37.74	2197	3.38	7.58
25% Millet straw + 75% Dung + Isolate 8	4788	37.74	3842	3.53	7.91
50% Millet straw + 50% Dung + Isolate 8	425.6	38.37	3677	4.85	10.88
25% Paddy straw + 75% Dung	4396	26.25	1712	3.38	7.58
50% Paddy straw + 50% Dung	4900	37.74	2374	4.12	9.23
25% Millet straw + 75% Dung	442.4	30.22	2637	3.24	7.25
50% Millet straw + 50% Dung	4676	35.03	2728	5.74	12.85

**Plate 24: Field evaluation of promising microbial consortia**

All India Network Programme on Organic Farming (AINP-OF), Modipuram center (Project code: NRMAIFSR SOL200405000294)

Evaluation of organic, inorganic and integrated production system

Crop management practices significantly affected the performance of different cropping systems. Yield of finger millet and tomato was recorded highest under state recommendation. However, yield of lentil, okra, black gram and barley was recorded higher under integrated crop management. Vegetable pea yield was highest

under 100% organic crop production. Irrespective of cropping systems, highest system REY was found under 100% organic management if 25% premium prices are provided over normal prices. Among the different cropping system, highest REY (19.2 t/ha) was recorded under black gram-tomato-sunhemp green manuring system followed by okra-vegetable pea-sesbania green manuring system. Similarly, system net return (₹265655/ha) was also recorded highest under black gram-tomato-sunhemp green manuring system and 100% organic management.

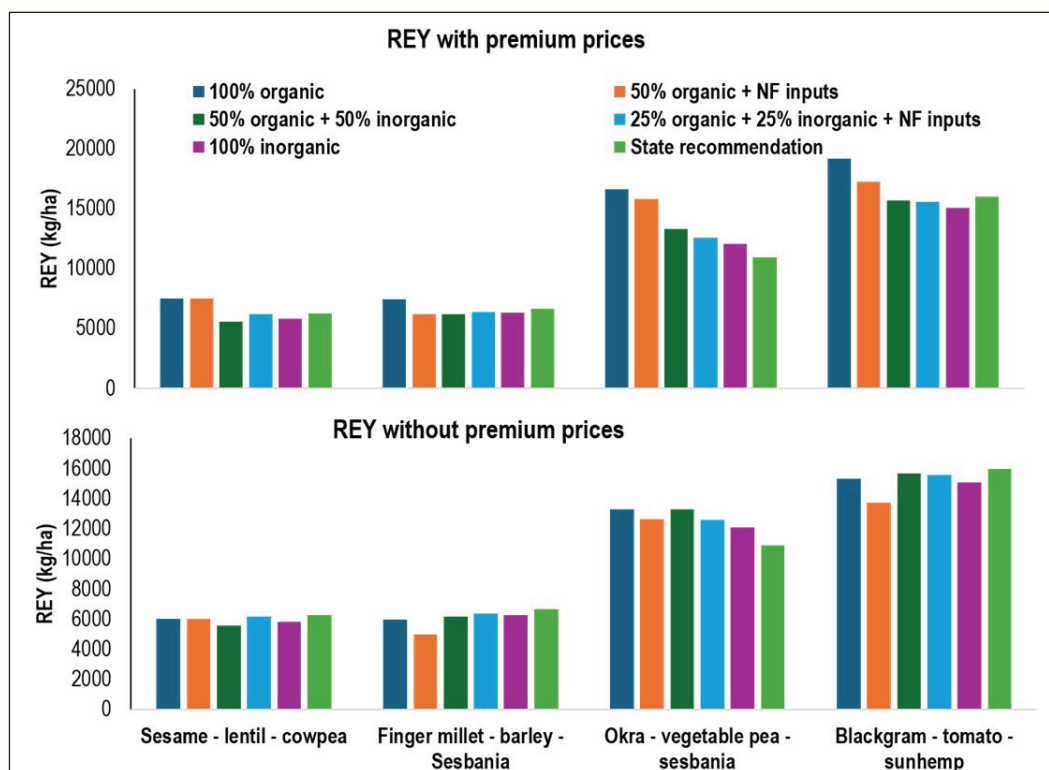


Fig. 35: Performance of various cropping systems under different production systems

Evaluation of different varieties of major crops for organic farming

Performance of twelve different varieties each of brinjal and vegetable pea under organic production was evaluated since 2021. During the year, highest fruit yield of brinjal was recorded

for Pragati (17.1 t/ha) followed by Pant Rituraj (16.3 t/ha) and Krishna (16.2 t/ha). Among the varieties of vegetable pea, highest pod yield was recorded for Vasundhara (6.2 t/ha) followed by Maxima (5.2 t/ha).



Plate 25: Evaluation of different vegetable pea varieties under organic production system

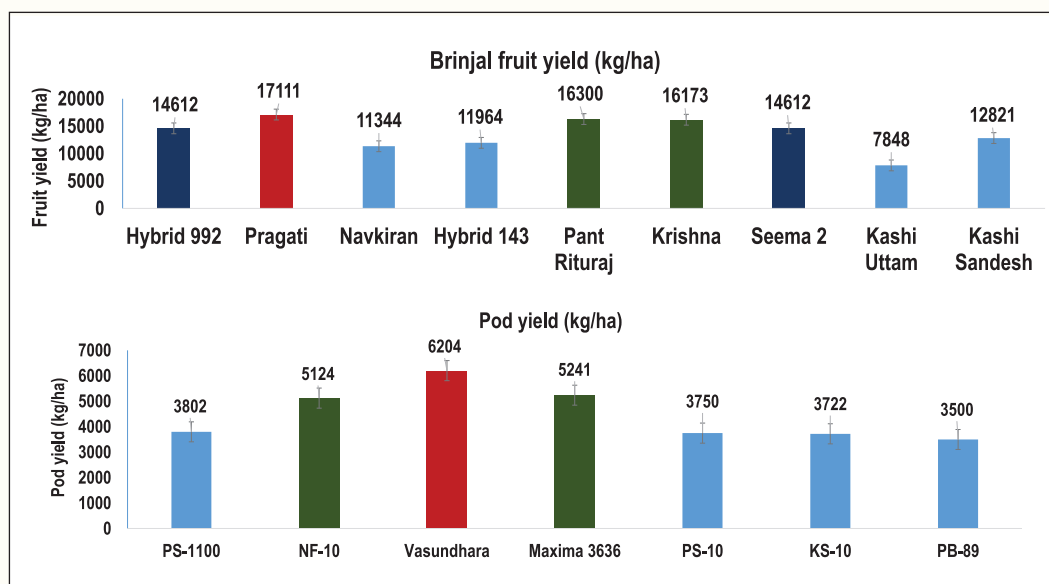


Fig. 36: Yield of different varieties of brinjal and vegetable pea under organic farming

Geo-referenced characterization of organic/SPNF farmers

A survey was conducted among 32 organic growers in Meerut district for geo-referenced characterization. The results indicated that average land holding of organic growers were 0.49 ha and around 5.6% and 40.9% yield gap was observed in wheat and sugarcane between farmers field and on-station yields,

respectively, under organic farming. The FYM, vermicompost, mustard oilcake and PROM were used as organic nutrient sources, while herbal preparations and neem oil were reported to be used for pest and disease management. Lower productivity during initial years, labour intensiveness, lack of marketing facilities and lack of premium price for organic produce were identified as major constraints during the survey.





Plate 26: Glimpses of Geo-reference survey of different organic growers

Evaluation of natural farming practices in different agro-ecology

Natural farming practices were evaluated for maize + cowpea – wheat + chick pea cropping system since 2022. The field trial was conducted in RBD with five treatments viz., control (T1), complete natural farming (T2), scientific organic package (AI-NPOF package, T3), integrated crop management (ICM) with NF

pesticides (T4) and ICM with need based chemical pesticides (T5). During 2023-24, the system productivity in terms of maize equivalent yield (MEY) was recorded highest under integrated crop management with need based chemical pesticides (8423 kg/ha) followed by AI-NPOF package (6926 kg/ha). The cost of cultivation was reduced by 32.4% and 15.0% under complete natural farming as compared to AINP-OF package and integrated crop management, respectively.

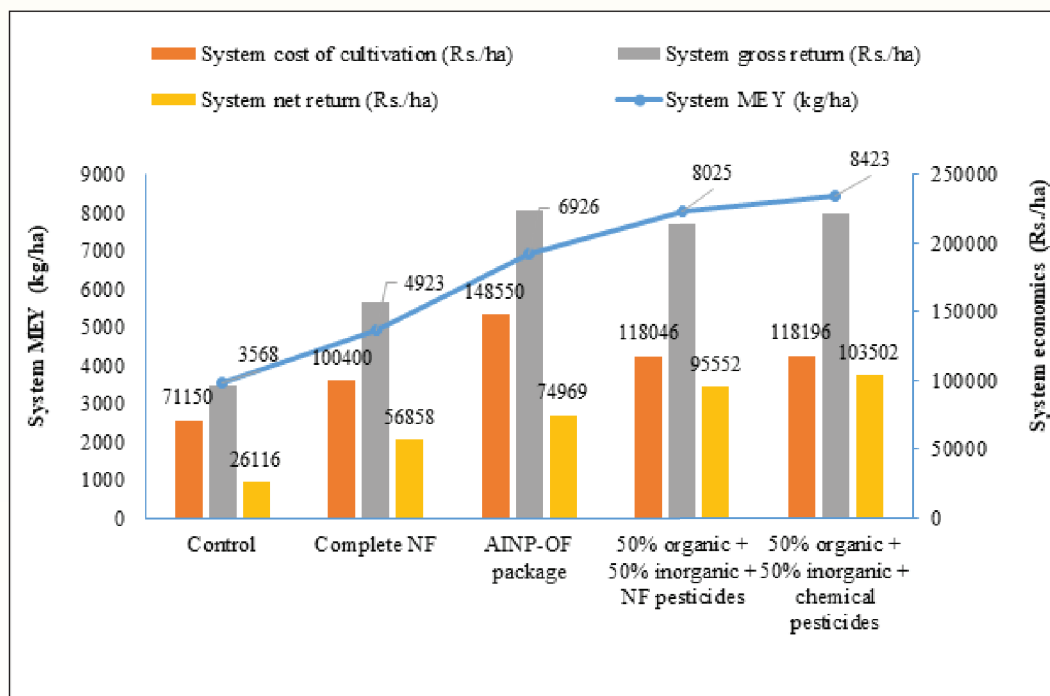


Fig. 37: Productivity and profitability of maize+cowpea- wheat+chickpea system under natural farming

The analysis of surface soil samples for chemical and biological properties indicated no significant differences in soil pH (7.58 – 7.78) and EC (0.45 – 0.53) between the treatments. There was a slight increase in percent organic carbon (0.39 to 0.45%), available nitrogen (235 to 257 kg ha⁻¹) and potassium (199 to 223 kg ha⁻¹)

under complete Natural Farming. The soil microbial population viz., bacteria, fungi, *Rhizobium*, free living nitrogen fixing bacteria, *Trichoderma* and *Actinomycetes* were found to be significantly higher under scientific organic farming (AI-NPOF) followed by complete Natural Farming. The soil enzyme activity also recorded

similar trend with no significant differences between scientific organic farming (T3) and Natural farming (T2) in different enzyme

activities viz. urease, dehydrogenase, alkaline phosphatase and β -glucosidase activities.

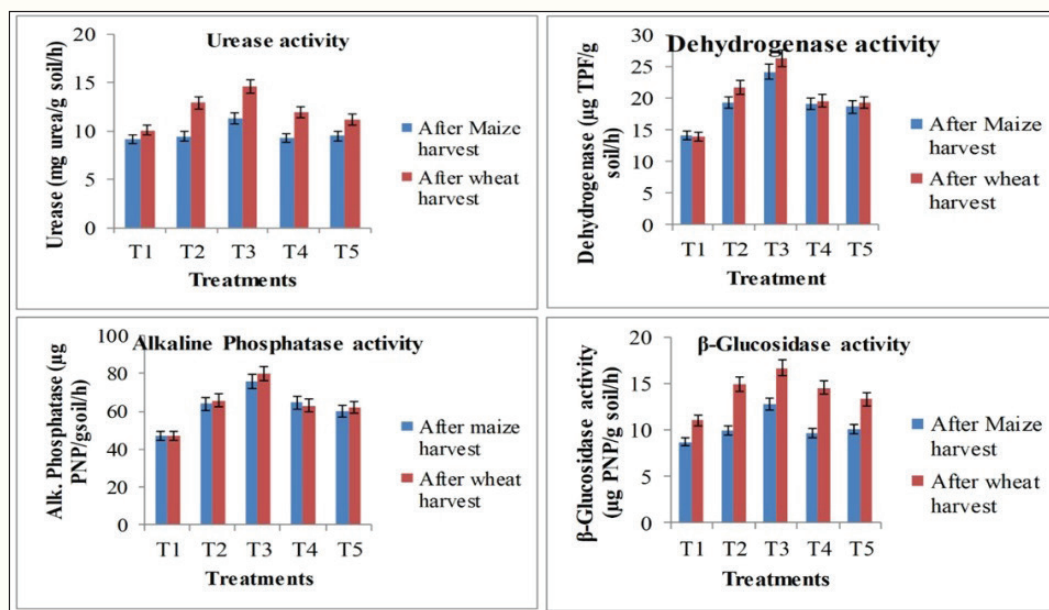


Fig. 38: Soil enzymes activity under different treatments after harvest of maize and wheat



Plate 27: Field view of Natural Farming experiment at research farm of ICAR-IIFSR

Development of pest and disease management package for important vegetables under organic production system (Project Code: NRMAIIFSRSL202305000304)

The project aims to develop comprehensive pest and disease management packages for the organic cultivation of key vegetables viz. chilli, muskmelon, cucumber, fenugreek, okra, and cowpea in Western Plain Zone of Uttar Pradesh. The above vegetables were evaluated for organic, integrated and inorganic pest and disease management practices under three cropping

systems viz., chilli–fenugreek, muskmelon–okra–fenugreek, cucumber–vegetable cowpea–fenugreek. Integrated pest and disease management systems recorded the highest fruit yield of okra at 12,993 kg/ha, which was statistically at par with the yield under organic pest and disease management system (12,955 kg/ha). In contrast, inorganic production systems resulted in the lowest fruit yield among all treatments. Notably, the okra variety used (Rukmini-711, RK Seeds) exhibited resistance to all major biotic stresses, and as a result, no significant pest or disease incidence was observed on okra crop (Fig. 39).

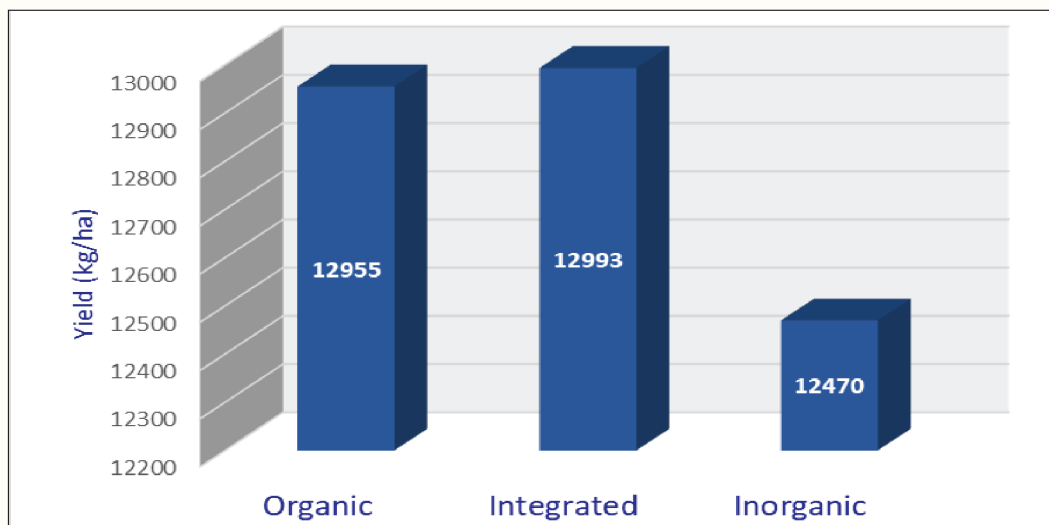


Fig. 39: Yield of Okra under various pest and disease management systems

Yield performance of vegetable cowpea

The highest fresh pod yield of vegetable cowpea was observed under the organic pest and disease management system, though

it was statistically at par with the yields obtained from integrated and inorganic management systems (Fig. 40).

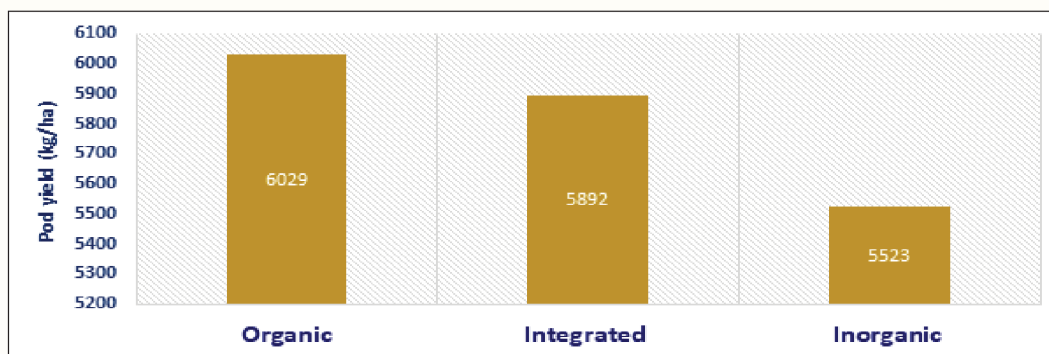


Fig. 40: Yield performance of vegetable cowpea under various pest and disease management systems

Pest and Disease incidence in vegetable cowpea

Fruit rot and yellow mosaic were identified as the major diseases, while the red hairy caterpillar emerged as the predominant insect-pest affecting vegetable cowpea. Although the organic cropping

system exhibited the highest incidence of all recorded pests and diseases, the differences were not statistically significant when compared to other management systems.

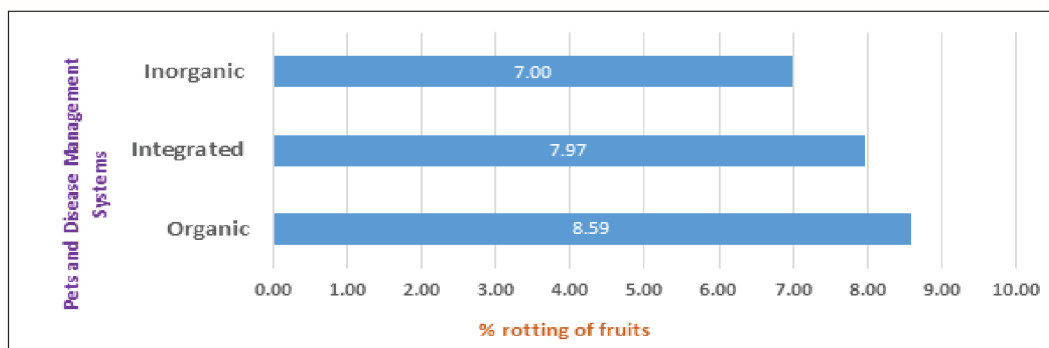


Fig. 41: Fruit rot incidence in vegetable cowpea

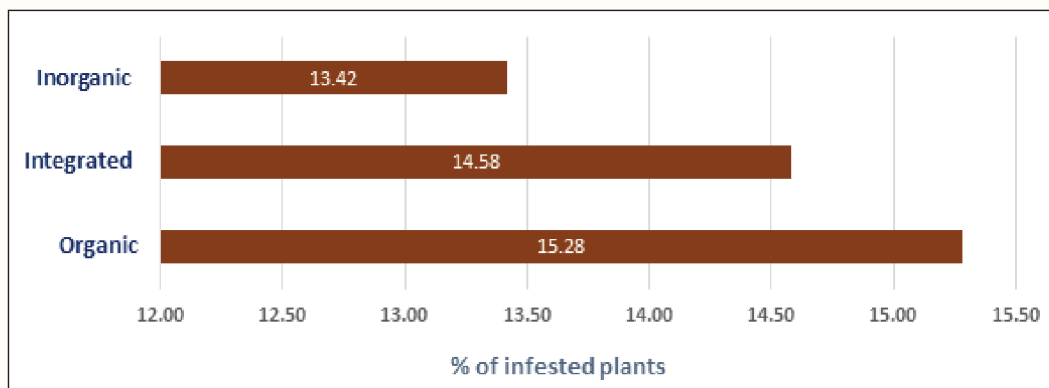


Fig. 42: Incidence of Red hairy Caterpillar in cowpea

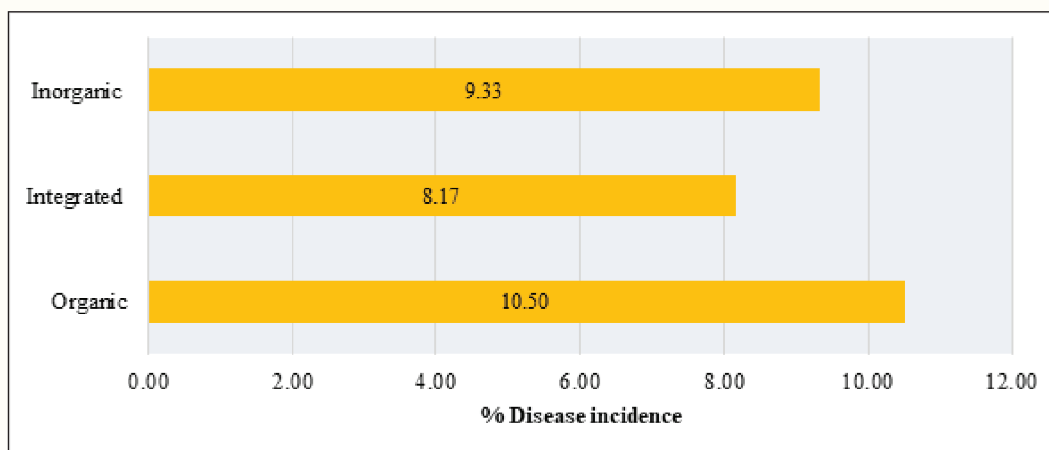


Fig. 43: Incidence of yellow mosaic disease in cowpea

Yield performance of chilli

The highest fruit yield of chilli was recorded under the organic pest and disease management system, followed by the integrated system. The inorganic pest and disease management system was found to be inferior compared to all other management practices (Fig. 44).

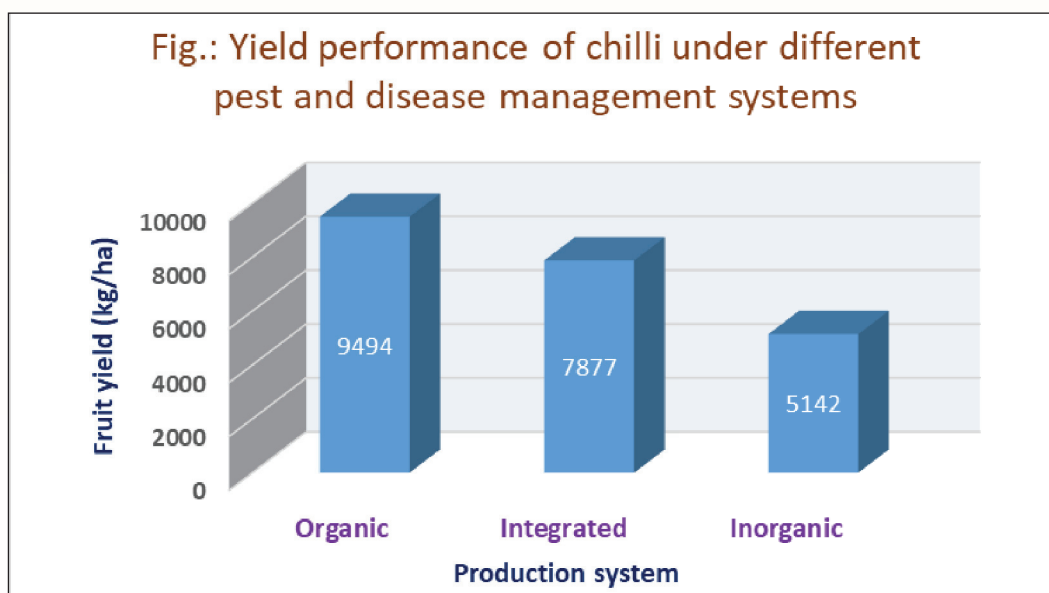


Fig. 44: Yield performance of chilli under different pest and diseases management systems

Pest and Disease incidence in chilli

Choaneophora blight emerged as the major biotic stress affecting chilli. The highest incidence of the disease was observed under the organic treatment, followed by the inorganic and integrated pest and disease management systems. The Preeti variety (BASF

India) demonstrated resistance or tolerance to other major biotic stresses, which contributed to its superior performance under organic conditions.



Plate 28: Field view of experiment on pest and disease management in vegetables

Integration of concentrated manure for organic nutrient management in different cropping systems (Project Code: NRMIIFSRSL202305000303)

An incubation study cum pot experiment was initiated during *Rabi* 2023-24 with different concentrated manures [mustard oil cake (MoC), neem oil cake (NC), castor oil cake (CC), linseed oil cake (LC), mahua oil cake (MaC)] to study the nutrient release pattern and growth of wheat under pot experiment. The study indicated that growth and yield parameters of wheat were affected significantly

with the application of different concentrated manures. Highest plant height (75.8 cm), number of tillers/meter row length (5.7) was found with application of 33% of recommended dose of nitrogen (RDN) through mustard oil cake. No. of grains/spike and biomass/pot were highest with the application of 100% RDN through mustard oil cake followed by 50% RDN through FYM + 50% RDN through mustard oil cake. Application of linseed and mahua oil cake have negative effect on wheat growth.

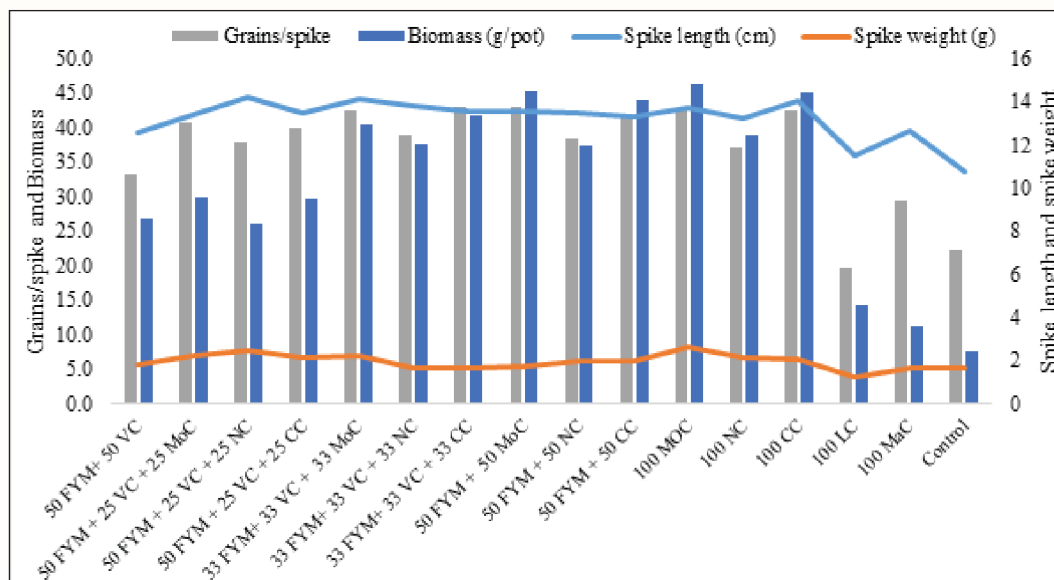


Fig. 45: Yield attributes of wheat under pot experiment.



Plate 29: Performance of wheat under different treatment under pot experiment.

The impact of different treatments on soil microbial population revealed that bacterial population was found higher under concentrated manure application over bulky organic manure application. Among the different oilcakes, higher bacterial population was found under mustard and neem cake applied treatments and least under linseed cake application. Lower bacterial population was found under 100% linseed oil cake application

whereas highest bacterial population was recorded under 100% mustard oil cake applied pots. The highest bacterial population was observed mostly between 4-7 days of incubation which may be due to the growth and multiplication of bacterial population with the already available nitrogen in concentrated as well as bulky organic manures.

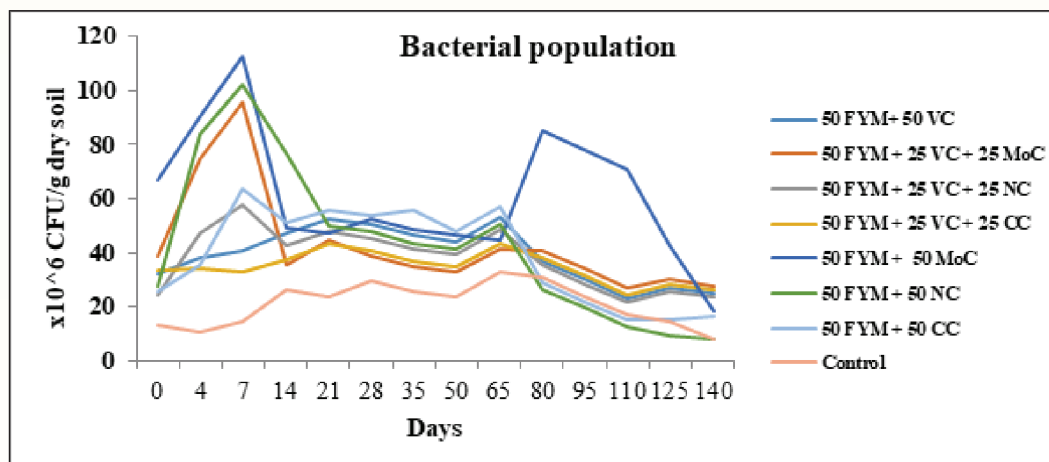


Fig. 46: Bacterial population as influenced by different treatments under pot experiment.

All India Network Programme on Organic Farming (National) (Project code: NRMAIFSR COL 202104000265)

Characterization of organic and natural farming inputs

A total of 681 organic farmers in 15 states and 193 natural farming farmers in 9 states were characterized with geo-tagging. Yield gaps between farmers practice of organic/natural farming and scientific

organic farming packages were found to be 4.9% (basmati rice) to 76.5% (black pepper) in organic farming and 12.5% (lentil & soybean) to 73.3% (black pepper) in natural farming due to lack of adoption of scientifically developed organic farming packages. Mean cost of manuring was found to be higher under organic farming (₹ 21,038/ha) compared to natural farming while the cost of weeding and pest management were higher under natural



farming (₹ 4187/ha and ₹ 14,111/ha respectively) compared to organic farming. Cow/buffalo rearing was found to be higher (5-6 animals/household) under natural farming compared to organic farming (3-4 animals/household). Bio-chemical characterization and molecular identification of microbial population of indigenous organic inputs were made for 9 inputs namely 9 (Beejamrit, Jeevamrit, Ghanjeevamrit, Brahmastra, Agniashtra, Neemastra, Vermi wash, compost tea and verimicompost). Organic carbon, total phenolics, alkaloids, flavonoids, gibberellins and tanins estimated from Brahmastra and Neemastra with native and cross breed cow urines indicate significantly higher organic carbon, total alkaloids and tannins in brahmastra and neemastra prepared with native cow urine while total flavonoids was higher in neemastra prepared with native cow urine. Further confirmatory analysis with different native breeds are in progress. Documentation and validation of Organic ITKs were made for 5 nutrient and pest management practices in fenugreek, maize, cotton, vegetables; cabbage, okra and cucurbits.

Development of scientific packages for organic and natural farming practices

Evaluated 351 existing varieties of 20 crops and identified 90 varieties for 20 cropping systems covering Traditional, HYV and Specialty purpose. Key characters for selection of varieties for different crops identified with stake holder's consultation as per recommendation of previous Annual Group meeting. Insect management practices for 13 crops (Soybean, toria, coriander, fennel, cabbage, maize, large cardamom, ginger, cotton, okra, brinjal, tomato and chilli) in 4 states and Disease management practices for 9 crops (coriander, fennel, maize, large cardamom, ginger, okra, brinjal, tomato and chilli) in 3 states developed. Package of Practices for 4 cropping systems namely soybean-French bean (Chhattisgarh), pigeonpea + green gram intercropping (Karnataka), rice-brinjal (Maharashtra) and tomato-fingermillet-green manure (Tamil Nadu) were developed and shared with state/central agencies. Net returns of crops evaluated under organic farming indicated significantly higher values with vegetables followed by tuber crops, pulses and oilseeds. Lower net returns were observed in cereals under organic farming. Evaluated 8 cropping systems under natural farming at 20 locations in 16 States. Significantly lower cost of cultivation (paid out costs) was observed under natural farming compared to organic and integrated crop management in all the 8 cropping systems. Package of practices developed for natural farming for groundnut + sesame - fennel + cabbage (Gujarat and Rajasthan), soybean + maize-wheat + mustard (Chhattisgarh and Madhya Pradesh) cropping systems in consultation with stakeholders and shared with DA&FW for pre-kharif 2024 discussion. Draft

PoPs developed for Cassava, okra, amaranthus, cucumber, chilli, vegetable cowpea and bitter gourd for Kerala in consultation with stakeholder and are under finalization. Farmer participatory validation of organic and natural farming have been made in 5 cropping systems in 5 States involving 59 farmers. Groundnut, vegetable pea + coriander, fodder sorghum and cassava recorded higher yield under natural farming package compared to farmers practice.

Organic farming systems assessment

A total of 8 IOFS models for 7 states are established. Development of 3 IOFS models for Uttarakhand, Uttar Pradesh and Punjab are in progress. Higher net income of Rs 1.85 lakhs /acre (Sikkim) was recorded in IOFS model comprising cropping systems + dairy + poultry + fishery + pest repellent plants + recycling unit during 2023-24. On an average 88 % of inputs required for manuring and pest and disease management were made with in the IOFS model. One acre Integrated Organic Farming Systems (IOFS) model developed for Tamil Nadu has been established in 14 KVKs of the state during 2022-23 and 2023-24 for capacity building of farmers with funding of Rs 35 lakhs from Tamil Nadu state government (₹ 2.5 lakhs per KVK). Based on the pre-kharif discussion, area share and cost components of IOFS models shared with DA&FW for including the IOFS in the Project Proposals from States for promotion of organic farming by states.

Capacity building including policy support to central and state agencies

Implemented the model value chain development by collaborating with existing FPOs covering 13 villages in 5 districts of 5 States by involving 275 farmers. Major commodities covered are spices (turmeric, ginger), vegetables (broccoli, cabbage, cauliflower, pea, carrot, brinjal), cereals (basmati rice, rice, wheat, maize) and legumes (chickpea). A total of 15 technologies were shared with states such as Rajasthan, Kerala, Tamil Nadu and Sikkim as per demand for promoting technologies through KVKs, PKVY and RKVY. A total of 52 trainings in 12 States were organized covering various aspects of organic and natural farming in which 2187 participants benefitted. Three Participatory Guarantee Groups were created by Centres through CFA (Certified Farm Advisor) on organic farming candidates.

Development of Integrated Organic Farming System (IOFS) model for Uttar Pradesh, Uttarakhand and Punjab (Project code: NRMAIFSRIL202310000307)

Demand for organically produced products are increasing in Uttar Pradesh, Uttarakhand and Punjab and technologies to reduce the external inputs and ensure timely availability of quality inputs



are required for stakeholders in these states. The project aims to develop integrated organic farming system models for Uttar Pradesh, Uttarakhand and Punjab. The details of the IOFS models

being developed are given in Table 28. State-wise progress is described below.

Table 28: Location and components of IOFS models

Sl. No	ACZ	NARP	Location	Area (ha)	Components
1.	Upper Gangetic Plains	Western Plain zone (UP-1)	Modipuram (UP)	1.0	Food system + fodder system + Fruit Garden + Kitchen Garden + livestock cum bio-input unit including dairy and pest repellent plants + boundary plantation
2.	Upper Gangetic Plains	Bhabar and Tarai zone (UK-2)	Pantnagar (UK)	0.40	Food system + fodder system + dairy + fish+ pest repellent plants
3	Trans Gangetic plains	Central Plain zone (PB-3)	Ludhiana (PB)	0.40	Food system + fodder system + dairy + pest repellent plants

Uttar Pradesh

One hectare integrated organic farming system model comprising of 5 modules such as food system (0.40 ha), fodder system (0.15 ha), fruit garden (0.26 ha), kitchen garden (0.06 ha) and livestock cum bio-input unit (including dairy; 1 cow and 1 buffalo and pest repellent plants) (0.13 ha) with lemon as boundary plantation was established. Performance of different modules during *kharif* 2024 are given below.

Food system: Food system comprised of 5 cropping systems namely rice (coarse grain)-chickpea-sesbania (0.06 ha), basmati rice-mustard-green gram (0.06 ha), basmati rice-wheat-sesbania (0.06 ha), maize (grain)-wheat-green gram (0.06 ha) and sugarcane-ratoon-wheat (0.16 ha). Grain yield of 181, 142, 113 and 390 kg were recorded during *kharif* 2024 in rice (coarse grain), basmati rice in 2 systems and maize in the cropping systems. These systems also produced 362 kg of residues which was recycled in to the system. Per ha yield of these crops were 3.01, 2.3, 1.88 and 6.50 t/ha under organic farming which is found to be comparable with that of conventional yield level in farmer's field.

Fodder system: Fodder system comprised of 3 cropping systems namely sorghum + cowpea -oat (0.05 ha), maize + cowpea -berseem (0.05 ha) and perennial fodder (bajra napier hybrid) (0.05 ha). Besides these systems, bajra napier hybrid fodder was grown in all the bunds of fruit and kitchen garden. Sorghum +

cowpea and maize + cowpea during *kharif* 2024 recorded yield of 4700 kg from 0.05 ha (94 t/ha) and 4900 kg in 0.05 ha (98 t/ha) respectively. Yield level obtained during *kharif* 2024 was significantly higher than the *kharif* 2023.

Fruit garden: Fruit Garden intercropped with vegetables were established in 2600 m². Mango (10 numbers), Peach (12 numbers), Pear (12 numbers), Guava (35 numbers), Litchi (6 numbers) and Pomegranate (5 numbers) were planted during the year.

Livestock cum bio-input unit (includes dairy and pest-repellent plants): One cow and one buffalo were integrated. Cow (Gir) gave a milk yield of 614 litres during the period of 26 September to 31 December 2024 under organic management with a gross return of Rs 24,560/-. Buffalo (Murrah) gave a milk yield of 1964 litres during the period of 20 April to 31 December 2024 under organic management with a gross return of Rs 1,27,644/-. Month-wise milk production and gross income obtained from livestock component is given in Fig. 47 Analysis of cost purchased inputs indicated that 65 % (Fig) was towards Chickpea peels (27 %), mustard cake (20%) and wheat bran (20 %) and rest is for medicine, salt, calcium, concentrate, cotton seed cake and others. Since, wheat, mustard and chickpea is grown within the system, these materials required for livestock can also be produced with in the farm using mini feed mills. Cow & buffalo dung and urine produced from the unit were utilized for preparing the vermicompost and natural farming concoctions and used in the IOFS mode.

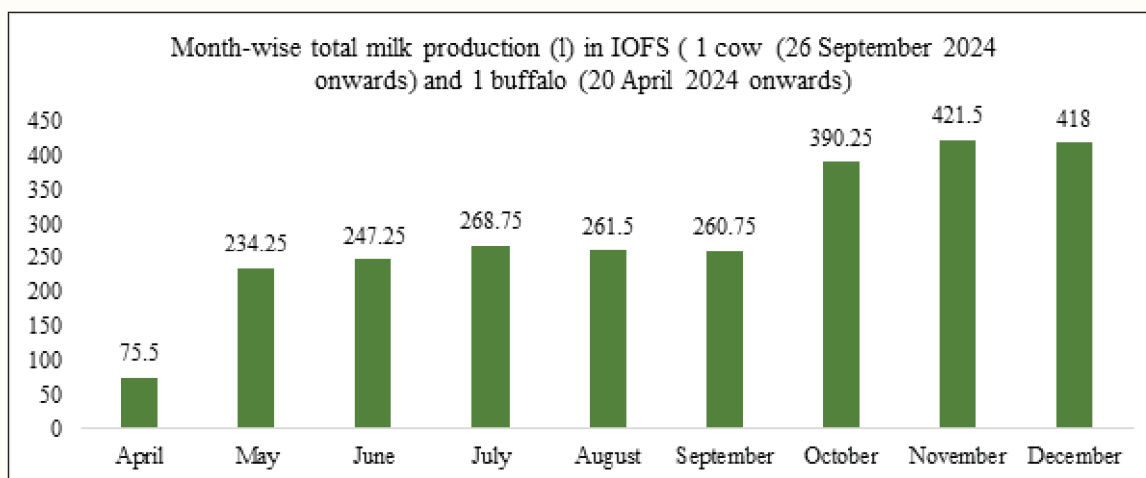


Fig. 47: Month-wise total milk production (l) in IOFS

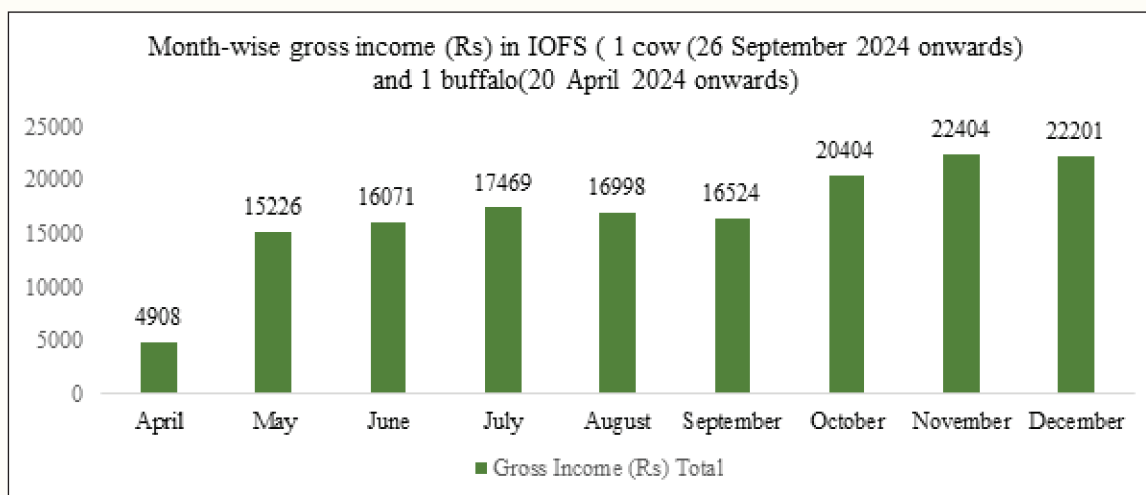


Fig. 48: Month-wise gross income in IOFS

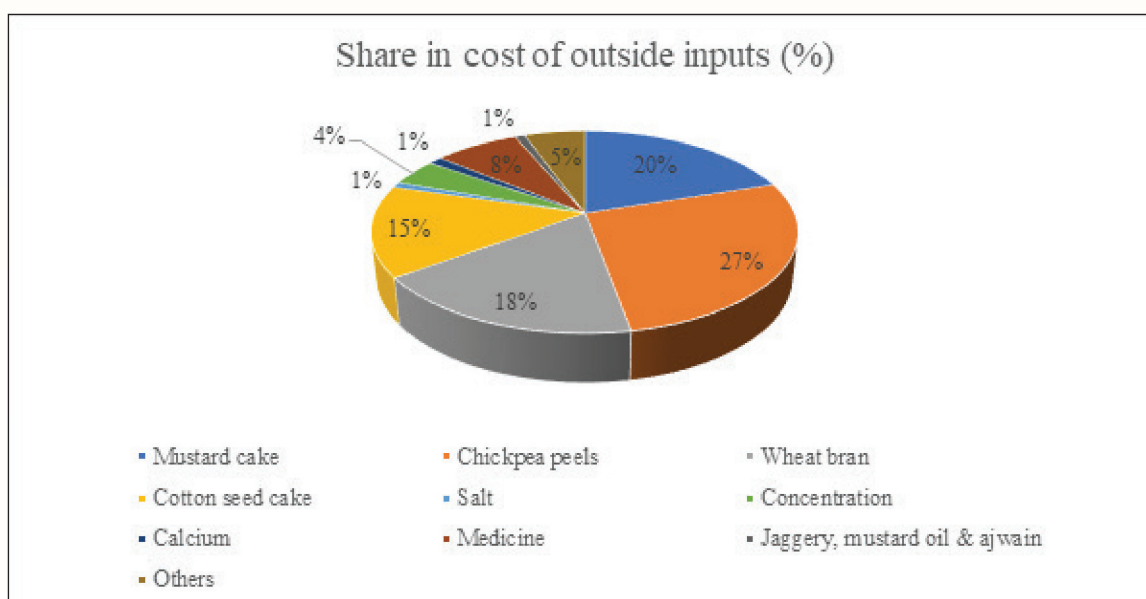


Fig. 49: Percentage share of outside purchase cost for inputs

Uttarakhand

One acre integrated organic farming system model comprising 3 modules such as food and fodder system (0.31 ha), livestock (0.06 ha), and fish (0.03 ha) is being established for evaluation. Winter vegetables such as onion, Knotted Cabbage, Capsicum, Purple cabbage, Cabbage, Tomato, Cauli flower and chilli and

summer vegetables such as Lady Finger, Tinda, Cucumber, Ridged Gourd, Squash and Bitter Gourd were also grown. The performance of different modules is given in Table 29. The food system recorded a net income of ₹ 83,738 with a B:C ratio of 3.2 (Table 30).

Table 29: Yield of different crops under IOFS (Uttarakhand)

Crop	Area (m ²)	Yield (kg)	Sale Price (₹ /kg)	Crop	Area (m ²)	Yield (kg)	Sale Price (Rs /kg)
Kharif				Rabi			
Rice (Type-3)	750	212	35.3	Wheat (Sarbat)	750	300	28.0
Rice (Tilak Chandan)	750	318	35.3	Black Wheat	750	216	28.0
Rice (PB-1509)	750	270	35.3	Sugarcane + lentil + garlic -wheat	750	6568 (Sugarcane) + 1066 (lentil) + 467 (Garlic) and 192 (black wheat)	3.6 80 200 28.5

Table 30: Economics of Food system under IOFS (Uttarakhand)

Crops	Cost of cultivation (₹)	Net returns (₹)	B:C ratio
Rice (Type-3)	3567	3919	2.1
Rice (Tilak Chandan)	3567	7658	3.1
Rice (PB-1509)	3567	5964	2.7
Wheat (Sarbat)	2607	5821	3.2
Black wheat	2607	3441	2.3
Sugarcane + lentil + garlic	4361	32756	8.5
Wheat	2607	2894	2.1
Winter vegetables	8230	16335	3
Summer vegetables	6180	4950	1.8
Total system	37293	83738	3.2

Punjab

One acre integrated organic farming system model comprising 3 modules such as food and fodder system (0.40 ha), livestock (0.10 ha) is being established for evaluation. The performance of different modules are given below. The food and livestock system recorded a net income of ₹ 59,987 with a B: C ratio of 1.01. Greenhouse emission was lower in maize-gobhi sarson

followed by turmeric. Basmati rice-wheat system recorded higher emissions. Significant improvement in bacteria, fungi, and actinomycetes populations was observed in all the cropping systems evaluated under the organic farming system (Table 31 to 33).

Table 31: Performance of cropping systems under IOFS (Punjab)

Cropping system	Area (m ²)	Yield (kg)			GHG emission (kg CO ₂)
		Kharif	Rabi	Summer	
Green gram-wheat-green gram	500	30	218	39	53.3



Cropping system	Area (m ²)	Yield (kg)			GHG emission (kg CO ₂)
		Kharif	Rabi	Summer	
Maize – gobhi sarson	500	282	120	-	32.1
Basmati rice -wheat	1000	340	374	-	70.5
Maize – berseem (fodder)	1000	3344	9773	-	37.3
Sugarcane	500	3790			44.6
Turmeric	500	1150	-	-	33.2

Table 32: Microbial population (CFU/g soil) under different cropping systems under IOFS (Punjab)

Cropping systems	Bacteria (10 ⁷)		Fungi (10 ³)		Actinomycetes (10 ⁴)	
	Initial	After second cycle	Initial	After second cycle	Initial	After second cycle
Green gram-wheat-green gram	34.1	57.2	11.8	26.7	33.4	42.9
Maize- gobhi sarson	34.4	46.8	10.2	18.9	33.5	36.4
Basmati rice- wheat	32.7	45.5	10.8	19.4	33.8	40.8
Maize-berseem (fodder)	33.6	44.5	11.5	21.3	34.0	35.3
Sugarcane	34.7	50.6	11.0	19.6	33.5	38.4
Turmeric	31.8	47.5	10.8	18.5	32.9	40.4

Table 33: Economics of IOFS (Punjab)

Economics	Components		Total
	Crops	Dairy	
Gross returns (₹)	70843	48563	119406
Cost of cultivation/inputs (₹)	27258	32161	59419
Net returns (₹)	43585	16402	59987
B:C	1.60	0.51	1.01

Estimation and valuation of ecosystem services from organic and natural farming systems in different agro-ecology (Project code: NRMAIIFSRSL202104000276)

The experiment was conducted under AINP-OF at eight locations namely Modipuram, Ludhiana and Panthagar in maize + cowpea (fodder) - wheat + chickpea; Bajaura, Gangtok and Almora in soybean + maize for grain -vegetable pea + green coriander and Coimbatore and Dharwad in Cotton + green gram -rabi sorghum + chickpea cropping systems to monitor soil health, estimate and value the ecosystem services from organic and natural farming systems. All the parameters were monitored under Control (CM₁), Complete Natural farming package (CM₂), AI-NPOF package (CM₃), Integrated Crop Management (50 % nutrient application through organic manures and 50% nutrient application through inorganic Sources) (CM₄) and Integrated Crop Management (50 % nutrient application through organic manures and 50% nutrient

application through inorganic sources with application of need-based pesticides for pest management) (CM₅). In maize + cowpea (fodder) - wheat + chickpea across the three locations (Modipuram, Ludhiana and Panthagar), on an average system base provisioning (economic yield) ecosystem services recorded 73, 69 and 42 higher in CM₅, CM₄ and CM₃, respectively over complete natural farming package (CM₂). Similarly, regulating ecosystem services soil organic carbon was 10% higher in CM₃ over CM₂, while CM₄ and CM₅ observed 2.3 and 6.1 % less SOC than CM₂. In other regulating services like available N (8.8%), P (25.7%) and K (4.4%) was significantly (p<0.05) higher in CM₃ as compared to the CM₂ package. In Cotton + green gram -rabi sorghum + chickpea system, highest provisioning services (cotton yield) was recorded in CM₄ (92%) followed by CM₅ (80%) and CM₃ (53%) over CM₂ package at Coimbatore, while 15% higher cotton yield was recorded in CM₃ at Dharwad over CM₂.

In, soybean + maize for grain -vegetable pea + green coriander of two locations (Bajaura and Almora), CM₅ recorded the significantly highest (43%, $p < 0.05$) systems-based provisioning services (economic yield) followed by CM₄ (34%) and CM₃ (28%). Subsequently, the net value of provisioning services was also recorded higher in CM₅ (48%) > CM₄ (35%) > CM₃ (26%). SOC

as regulating ecosystem services indicator was highest under AI-NPOF package (11%) over complete natural farming. Other regulating ecosystem services viz. Avail N, P and K was highest in integrated crop management (CM₄ to CM₅), Avail N: 9 to 11%, Avail. P: 10% and Avail K: 5% over CM₂ followed by AI-NPOF Package at Bajaura centre.



Plate 30: Wheat + chickpea intercropping at Modipuram

The Economics of Ecosystems and Biodiversity: Agriculture and Food initiative in Uttar Pradesh, India (Project code: NRMAIFRSOL202110000282)

a. Predicts climate impacts on hydro-sedimentological response and valuation using SWAT and GCM in India

This study analyses the water and sediment response (WSR) in a sub-basin in Uttar Pradesh, India, using SWAT for two periods (2000-2020 and 2020-2050). For the 2000-2020 period, weather data from NASA POWER LaRC and storm runoff from NASA GLDAS-2.2 were used for model validation, achieving good performance (NSE 0.766, PBIAS +19.766, RSR 0.4832). For future scenarios, three land use policies (BaU, optimistic, pessimistic) were coupled with RCP 4.5 & 8.5 projections to create six land use scenarios for 2030 and 2050. Results indicate that the optimistic policy leads to higher WSR, with greater groundwater contributions and percolation. The study also estimates WSR and its monetary value for four districts (Meerut, Bulandshahr, Aligarh, and Mirzapur). The findings emphasize the importance of

increasing organic farming and agroforestry to enhance water and soil management in the region.

b. Prioritizing catchment conservation using morphometry, land use, soil characteristics, statistical analysis and MCDM techniques

This study presents an integrated approach for prioritizing sub-watersheds for conservation, utilizing morphometric, land use, and soil data within a GIS-assisted framework. By employing Principal Component Analysis for dimension reduction and the CRITIC method for weighting, the research identifies key morphometric parameters, such as drainage density, stream frequency, and slope, and evaluates them comparatively, addressing the ambiguity in their relative influence. The approach is applied to 11 sub-watersheds in the Upper Ganga Basin, Uttar Pradesh, revealing that approximately 69% (~21,636 sq. km) of the drainage area falls under high (39.7%) and very high (29.44%) priority classes for conservation interventions. The methodology provides an effective, data-driven solution for identifying

areas vulnerable to land degradation, especially in resource-constrained contexts. While the study demonstrates the utility of compounded prioritization for soil and water conservation, it also

highlights limitations related to data granularity and recommends incorporating semi-distributed hydrologic models to improve precision, especially in high-priority regions.

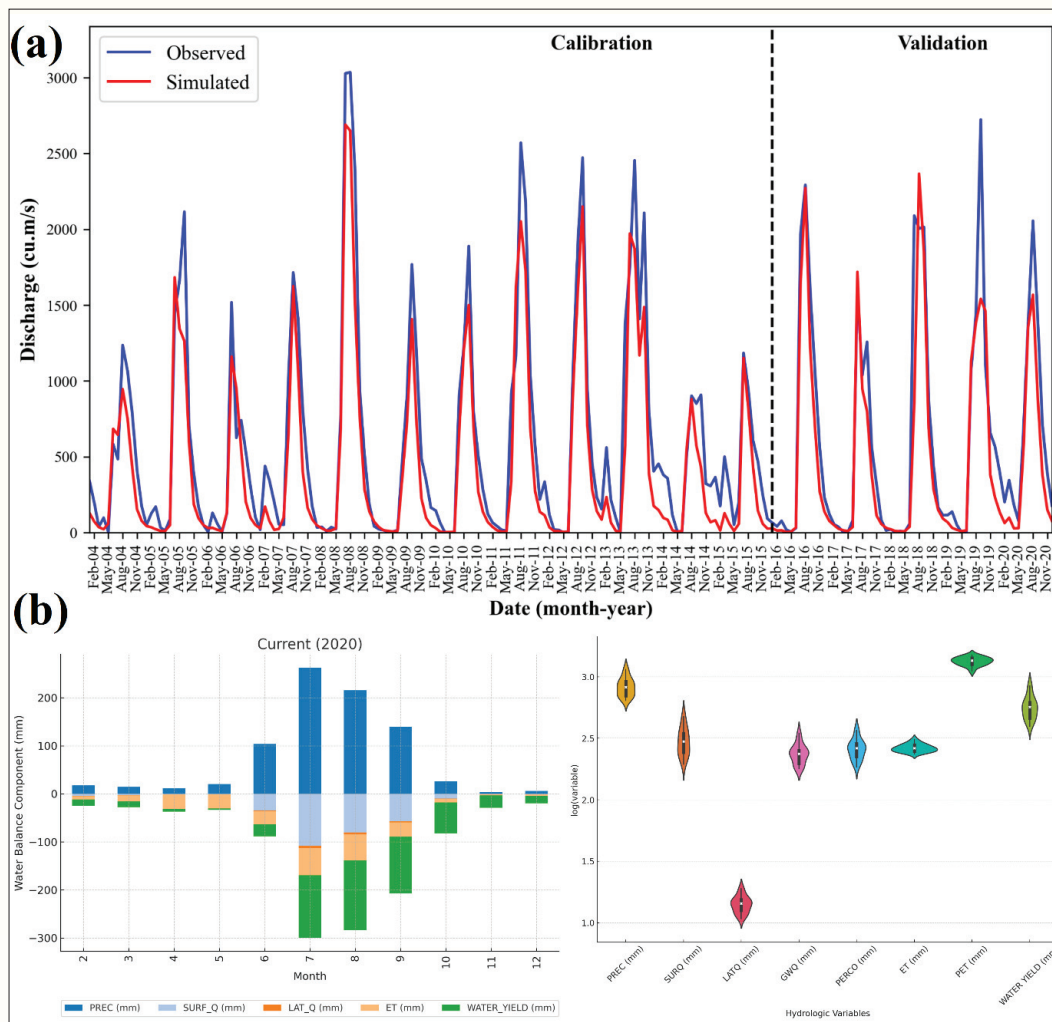


Fig. 50: Observed and simulated streamflow for the best simulation, and (b) Monthly water balance indices & violin plot for the calibrated model (2000-2020)

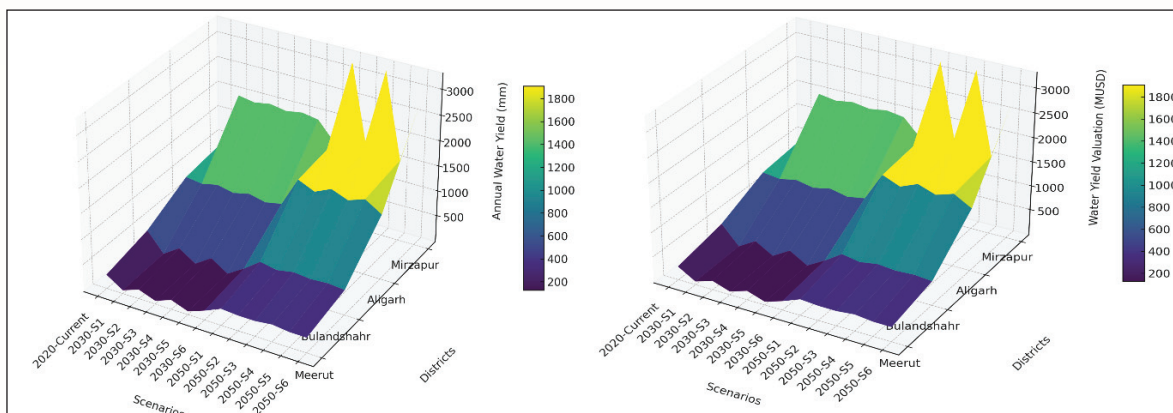


Fig. 51: Annual water yield and its valuation for the target districts

TECHNOLOGY TRANSFER AND ASSESSMENT



**AICRP- IFS OFR, Modipuram Centre (Project code: NRMAIFSR SOP202004000259)****OFR1: On-Farm evaluation of different management practices in pre-dominant cropping systems**

Under OFR 1, On farm crop response to balance plant nutrient management in predominant cropping systems (Sugarcane-Ratoon-Wheat and Rice-Wheat), the RDF and ICM practices both in high and low productive block showed 3.8 to 18.0% higher rice yield and an increase of 7.7% to 21.8% was recorded in wheat yield in both the practices over the farmer's practices. Significantly highest B:C ratio was recorded in 75% OF + NF concoction treatments (3.76 and 3.57) both in high and low productive blocks due to lower cost of cultivation.

OFR2: Diversification and improvement of existing farming systems under small and marginal household conditions

Under OFR 2, Diversification of existing farming systems under marginal household conditions was carried out. In crop+ dairy farming system, crop diversification and providing feed and fodder supplements to livestock recorded an additional income of ₹ 40425/- and ₹ 37300/- in high and low productive blocks households, respectively. In crop+ dairy+ horticulture farming system, crop diversification, high yielding vegetable seeds, fruit plant saplings and providing feed and fodder supplements to livestock recorded an additional income of ₹ 50400/- and ₹ 45550/- in high and low productive blocks households, respectively. The comparative analysis of different farming treatments across high

(Rohta) and low (Daurala) productivity blocks reveals significant variations in cost efficiency, profitability, and overall economic returns. Among all the treatments, the 75% Organic + Natural farming concoction stands out with the highest Benefit-Cost Ratio (B:C R) of 3.76 in Rohta and 3.57 in Daurala, indicating that it offers the best return per rupee spent, despite having relatively moderate net returns (₹133,895 in Rohta and ₹118,919 in Daurala) and lower cultivation costs (₹48,560 and ₹46,360 respectively). The ICM (Integrated Crop Management) system, while producing the highest net returns (₹161,667 in Rohta and ₹149,372 in Daurala), has the lowest B:C ratio (2.38 and 2.30), mainly due to its higher cost of cultivation, making it less efficient from an investment standpoint. In contrast, Natural farming and Organic farming were cost-effective (having the lowest cultivation costs among all systems) and maintain respectable B:C ratios above 3, showcasing their viability for resource-limited farmers. RDF (Recommended Dose of Fertilizers) offered a good balance with relatively high net returns and a solid B:C ratio (3.11 in Rohta, 3.01 in Daurala), making it a reliable option for those aiming for moderate input and output balance. Meanwhile, the traditional farmer's practice method, although still yielding a decent B:C ratio (~2.94 average), has outperformed by the more modern and strategic approaches in terms of both profit and efficiency. Overall, the data suggest that while ICM provided maximum gross returns, the 75% Organic + Natural farming approach offers the most economically efficient and sustainable model, especially valuable in diverse agro-ecological conditions like those of Rohta and Daurala.

Table 34: Economics of rice-wheat system under demonstration

Treatments	Cost of cultivation (₹/ha)			Net returns (₹/ha)			B:C ratio		
	HPB Rohta	LPB Daurala	Mean	HPB Rohta	LPB Daurala	Mean	HPB	LPB	Mean
Farmer's Practice	64850	61560	63205	126273	118347	122310	2.95	2.92	2.94
RDF	66530	63250	64890	140131	127213	133672	3.11	3.01	3.06
ICM	67790	64910	66350	161667	149372	155519	2.38	2.30	2.34
Organic farming	54900	52380	53640	120366	111966	116166	3.19	3.14	3.17
Natural farming	47550	45810	46680	103715	94740	99227	3.18	3.07	3.13
75% Organic + Natural farming concoction	48560	46360	47460	133895	118919	126407	3.76	3.57	3.67

HPB- High Productivity Block; LPB- Low Productivity Block

The yield and productivity data across different cropping treatments reveal distinct patterns of performance for Kharif (rice), Rabi (wheat), and Summer (sugarcane) crops in both high (Rohta) and low (Daurala) productivity blocks. Integrated Crop Management

(ICM) emerged as the most productive system overall, delivering the highest system productivity of 19958 kg/ha in Rohta and 18712 kg/ha in Daurala (mean: 19335 kg/ha). This superior output is supported by its consistently high grain yields across all

three cropping seasons, particularly in wheat (6800/6450 kg/ha) and sugarcane (8400/8000 kg/ha). RDF (Recommended Dose of Fertilizers) also performed well, especially in wheat (6550/6350 kg/ha) and recorded the second highest system productivity (mean: 18753 kg/ha). The results suggested that optimized chemical inputs can significantly enhance yield stability and overall output across different crop seasons.

Among the alternative approaches, 75% Organic + Natural Farming concoction presents a strong case with notable yields especially in rice (4650/4200 kg/ha) and sugarcane (7800/7350 kg/ha) leading to a mean system productivity of 17656 kg/ha, surpassing that of farmer's practice and organic farming. Organic farming and Natural farming, while showing comparatively

lower crop yields, particularly in wheat and rice, still maintained reasonable system productivity levels (16671 kg/ha and 16283 kg/ha respectively), reflecting their sustainable nature with less reliance on chemical inputs. The farmer's practice, which is likely the traditional method, ranked the lowest in system productivity (mean: 16101 kg/ha), indicating a potential gap in efficiency when compared to more modern or integrated approaches. The data suggested that ICM is the most productive system, while RDF and the 75% Organic + Natural Farming Concoction provided a promising mix of yield and sustainability. For long-term viability, however, organic and natural farming systems remain attractive alternatives due to their relatively good outputs with environmentally friendly practices.



Plate 31: View of OFR 1 and OFR 2 demonstrations at farmers' field

Ensuring food and nutritional security through integrated farming systems in Western Plain Zone of Uttar Pradesh (Farmer FIRST-2nd Phase) (Project code: NRMAIIFSR SOL201606000261)

The second phase of the project was initiated from April 2022 in six villages namely, Mubarikpur, Rukanpur, Tigai, Tabita, Dudhli and Madkarimpur in Khatauli block of Muzaffarnagar district of Uttar Pradesh. Enterprise specific technological interventions in IFS approach continued in adopted villages namely, Rukanpur,

Mubarikpur, Dudhli, Tabeta, Madhkareempur, Tigai as well as impact assessment and demonstrations in adopted villages of first phase namely Bhaingi-Bhangela and Sathedi during the reporting period of 2024-25.

Crop based technological Interventions

Improved variety and package of practice for cereal crops

Under cropping systems, specific interventions for crops like



wheat and rice through integrated nutrient management coupled with improved variety was evaluated at farmer's field and results were compared with the farmers practice which suggested higher performance of technological interventions. Under wheat crop 3 improved varieties viz. DBW-187, DBW-222 and DBW-303 were evaluated keeping in mind the higher yield and lodging tolerance of wheat varieties and other desirable characters. All three improved varieties showed significant yield increases over the farmer's variety (PBW-226). DBW-303 had the highest percentage increase in yield (13.76%), while DBW-187 had the

highest absolute yield (55.15 q/ha). DBW-187 gave the highest net return (₹ 68,073.32/ha) and gross return, making it the most profitable variety in this comparison. All three varieties showed strong Benefit-Cost (B:C) ratios, indicating profitability. Improved practices across all varieties resulted in better yields and higher returns, reinforcing the value of using high-yielding varieties and improved methods. DBW-187 stands out as the top performer both in terms of agronomic output and economic benefit, making it a strong recommendation for wider adoption.



Plate 32: Wheat varieties under demonstration



Plate 33: Field day and wheat harvest for different varieties in adopted villages

Similarly, under rice crop, varieties namely PB-1847 and PB-1885 performance evaluation of rice varieties are presented in Table 35. were demonstrated at 47 and 23 fields respectively. The results of

Table 35: Performance evaluation of rice varieties under demonstration

Variety	No. of demonstration	Yield (q/ha)		Yield difference/ha	% Increase	Gross returns (₹/ha)	Cost of cultivation (₹/ha)	Net returns (₹/ha)	B:C ratio
		Improved Practice	Farmer's practice						
PB-1847	47	35.45	31.89	3.56	11.15	81523.50	41980.00	39543.50	1.95
PB-1885	23	39.93	34.80	5.13	14.75	91846.67	45744.67	46102.00	2.02



Plate 34: Rice variety PB-1847(left) and PB-1885 (Right) under demonstration

Improved variety and package of practice for oilseed crops

Under promotion of oilseed crops, improved mustard seed (RH 725) for higher yield and quality mustard oil were planned

and implemented during the reporting period at farmer's field (315 demonstrations covering 8 villages). Results obtained are presented in Table 36.

Table 36: Performance of mustard under demonstration vis-à-vis farmers practice

Village	No of demonstrations (315 nos.)	Yield (q/ha) Improved Practice (RH-725)	Yield (q/ha) Farmer Practice (T-59 and local)	Yield difference /ha	% increase	Gross return/ha	Cost of cultivation/ha	Net return/ha	BC ratio
Bhangela	29	21.96	17.90	4.06	22.7	120800.86	26529	94271	4.56
Tabita	44	22.09	18.01	4.08	22.7	121518.75	26249	95268	4.63
Madhkarimpur	34	22.11	18.111	4.00	22.1	121606.62	26427	95179	4.61
Satehri	43	22.09	18.022	4.07	22.6	121498.84	26486	95012	4.59
Rukanpur	42	22.02	17.972	4.05	22.5	121111.31	26255	94855	4.62
Mubarikpur	35	22.11	18.111	4.00	22.1	121606.62	26427	95179	4.61
Tigai	47	22.02	18.05	3.97	22.0	121117.02	26201	94915	4.63
Dudhli	41	22.20	18.214	3.98	21.8	122078.54	26394	95683	4.63
Avg.		22.08	18.05	4.03	22.3	121417.32	26371	95045	4.61



Plate 35: Oilseed crops mustard (RH-725) and Gobhi Saron (GSC-7) under demonstration

*Promotion of intercropping in sugarcane with pulses and oilseeds*

Predominant cropping systems of western Uttar Pradesh being sugarcane-ratoon-wheat and more than 80% of the farmers are having sugarcane based cropping system, diversification of sugarcane crops/cropping systems through intercropping in lean growth period of sugarcane after sowing in summer season was demonstrated with use of intercrops such as black gram, green gram etc which not only resulted in improvement in system yield but also ensured availability of pulses for

the households contributing towards family nutrition. Under sugarcane + blackgram, prevailing sugarcane variety CO-0238 was intercropped with PU-31 (Black gram) at 70 households. Similarly, under sugarcane + greengram, prevailing sugarcane variety CO-0238 was intercropped with Virat GS-6 (Green gram) at 68 households. Further, Gobhi sarson (GSC-7) was evaluated and demonstrated as intercrop in Rabi season in standing crop of sugarcane for fodder as well as oil purpose also. Results are presented in Table 37.

Table 37: Performance evaluation of intercropping in sugarcane with pulses

Interventions	No of demonstrations	S.cane yield (q/ha)	Intercrop yield (q/ha)	SEY (q/ha)	S.cane yield as sole crop (q/ha)	Yield diff. (q/ha)	% increase	Gross return/ha	Cost of cultivation /ha	Net return/ha	B:C ratio
S.cane (CO-0238) + Black gram (PU-31)	70	912.35	80.24	980.31	925.20	55.11	5.9	362716	128437	234278	2.83
S. cane (CO-0238)+ Green gram (Virat GS-6)	68	910.8	4.5	975.7	915.2	60.5	6.6	361015	127490	233524	2.8
S. cane (CO-0238)+ Gobhi Sarson (GSC-7)	84	920.14	480.72	-	-	-	-	-	-	-	-

Interventions undertaken under horticultural module

Under horticultural module, nutritional kitchen gardening kit containing bitter gourd, bottle gourd, okra, radish, carrot, spinach, coriander, chilli, brinjal and seasonal cucurbits were included as

technological intervention for enhancing household nutritional security through diverse nutritionally rich vegetables and green leafy vegetables which can be grown at the backyard in small areas. Details of no. of households in different villages is presented in Table 38.

Table 38: No. of demonstrations pertaining to nutritional kitchen gardening for family nutrition

Village	No of Households
Mubarikpur	38
Rukanpur	58
Tigai	42
Madkareempur	46
Dudhli	35
Tabeta	54
Sathedi	30
Bhaingi-Bhangela	25
Total	328

Nutritional kitchen gardening kit with seasonal vegetables were provided to households which could save around 3200-4300 through vegetables besides it also contributed towards household

food diversity in enhancing family nutrition. Further, nutrient management and plant protection measures for already planted fruit plants were carried out during reported period.



Plate 36: Distribution of vegetable kits for nutritional kitchen gardening and field

Round the year fodder management for livestock

One of the major constraints being lack of quality fodder and required quantity throughout the year for livestock which is important part of mixed farming systems of western plain zones of Uttar Pradesh, Technological interventions were carried out for making round the year availability of green fodder and reduce the dependency of farmers towards using sugarcane top, which

is devoid of quality nutrition for livestock, in the absence of green fodder. Under this intervention demonstration of improved practices through fodder maize (African tall), Sorghum (CSV-32), Oat (BL-10 and HJ-8) Berseem (BL-42), Gobhi sarson (GSC-7) and Napier Bajra Hybrid (CO-5) (Table 39). This ensured round the year availability of green fodder for their livestock ensuring enhanced milk yield.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maize				S								
Sorghum					S							
Oat										S		
Berseem											S	
Gobhi sarson											S	
Gobhi sarson Intercrop											S	
Hybrid Napier						S						

*S- denotes sowing month

Fig. 52: Yearly calendar of availability of green fodder after introduction of improved fodder varieties

Table 39. Performance of fodder crops

Fodder crop	Variety	No of demonstration	Yield (q/ha)
Maize	Africal tall	80	469.57
Sorghum	CSV32	139	444.9
Oat	OL10, HJ8	76	459.55
Berseem	BL42	121	640.18
Gobhi sarson	GSC7	84	480.25
Napier Bajra Hybrid	CO5	37	965.25



Plate 37: Different fodder crops under demonstration for round the year fodder availability

Animal health management through balanced nutrition, vitamin mineral supplement, calcium mixture, salt bricks besides

deworming kit for better upkeep of animal health resulted in higher milk yield (Table 40).

Table 40: Impact of improved fodder and animal health management through supplementation of mineral mixture, calcium etc. on milk yield

Animal	No. of adopters	Milk yield. l/animal/day (FP)	Milk yield. l/animal/day (IP)	Improvement (%)
Cow	85	6.80	7.90	16.17
Buffalo	176	7.25	8.50	17.24





Plate 38: Animal health management through different practices

Backyard Poultry for landless farmers

Kadaknath and Chabra which are best fit for backyard poultry and can be reared round the year procured from CPDO, Chandigarh were provided as livelihood source for landless farmers. These

birds are also resistant to many diseases. 56 farm households with 20 birds each (10% male) given for enhancing livelihood.



Plate 39: Integration of backyard poultry for livelihood enhancement of landless farmers

Intervention in Fisheries (Development of fish based IFS model)

A fish-based IFS model (0.5 ha) was developed with integration of Papaya (200 plants) and vegetables on pond dyke as well as Poultry birds (250 no's). Further outer dyke of pond was used for Hybrid Bajra napier for their livestock. Kitchen Gardening was

integrated for family nutrition through seasonal vegetables. During first year 500 kg fish was harvested from fish pond along with production of 1000 kg papaya from dyke.



Plate 40: Initiation of fisheries component



Plate 41: Integration of Papaya and vegetables on pond dyke and kitchen gardening



Plate 42: Established fish-based IFS and visit to model site by QRT team

Agro-advisory Services for Farmers

Under this project anticipated weather based agroadvisory have been disseminated to the registered farmers under the project. The Agroadvisory was based on the forecasted weather mainly rainfall intensity and number of rainy days. The weather information

was amalgamated with the various improved technologies of the integrated farming systems with the objective to reduce the aberrant weather risk and also to curtail the cost of cultivation such as though upholding the irrigation, agrochemicals spray etc.

Secondary agriculture and value addition of farm produce

Under the programme training and capacity building were regularly conducted imparting value addition training such as turmeric powder, jaggery blocks, pickles, holi colours, dyeing of clothes using natural extracts etc in their leisure time for making them self-reliant especially targeting farm women. Farmers self-help group members also provided handholding support during the reporting period. The SHG members were facilitated for their participation

in agricultural exhibitions and for demonstration and promotion of their value added products. On campus training programme on “Technology demonstration of agro-processing tools and equipments for drudgery reduction” under Farmer FIRST project with the linkage of ABI to women SHG’s and an ABI incubatee on 18th October 2024. Total no of participants were 16, women participants were 15 and ABI incubatee was 01.



Plate 43: Training on agro-processing tools and equipments



Plate 44: Demonstration of paneer pressing device (left) & potato slicer (Right)



Plate 45: Demonstration of Solar Cabinet Dyer

Characterization of existing farming systems of Uttarakhand (Project code: NRMAIFRSIL 201810000263)

The study area encompasses the existing farming systems of high hills of Uttarakhand. A survey was conducted to characterize the existing farming systems, income pattern (farm and off farm), mechanization and income level, constraints and technological solutions identified in existing farming systems of high hills of Uttarakhand. The total sample comprises a random sample of 60

households i.e. (1 District $\times$ 2 block/district $\times$ 6 villages/block $\times$ 10 households) using a stratified sampling frame. Musethi, Kaproli and Gangau villages of Thailisain block (high productive), located at 29°98'57' N to 30°14.77' N and 79°02'26' E to 79°03.31' E whereas Sarna, Marora and Bidoli villages of Pabo block (Low productive), located at 30°12.96' N to 30°14.78' N and 78°84.55' E to 78°89.54' E of Pauri Garhwal district was surveyed. The area is characterized by the average altitudes ranging from 1569 to 1933 m amsl. Both the quantitative and qualitative data were used



in the study. Data was collected by personal interview method using pre-tested structured questionnaire through face to face

interaction with the men and women farmers. Socio-economic status of the farmers of the study area was as follow.

Table 41: Socio Economic status of farmers in existing farming systems

Variables	Farm households	
Blocks	Thailisain	Pabo
Operational Landholding (ha)	0.35	0.09
Leased in (ha)	0.002	0.01
Total (ha)	0.35	0.10
Uncultivated Landholding (ha)	0.18	0.17
Farm Fragments (nos.)	9.26	5.4
Off Farm Enterprises (%)	96	93
Family Size (nos.)	6.4	4.2
FFHD's (%)	20	10

*FFD's = Female Headed Households

Table 41 reveals that in Thailisain block (high productive) of Pauri Garhwal District, mean operational landholding was found to be 0.35 ha farm household⁻¹, whereas mean leased in land was found to be 0.002 ha farm household⁻¹. The total landholding was noticed to be 0.35 ha farm household⁻¹. However, 0.18 ha area was found to uncultivated. The mean farm fragments were 9.26. The farm households are having 96 per cent off farm enterprises. Around 20% farm households are female headed. Similarly, in Pabo block (low productive) of Pauri Garhwal District, mean operational landholding was found to be 0.09 ha whereas mean

leased in land was found to be 0.01 ha farm household⁻¹. The total landholding was noticed to be 0.10 ha farm household⁻¹. However, 0.17 ha area was found to uncultivated. The mean farm fragments were 5.4. The farm households are having 93 per cent off farm enterprises. Around 10% farm households are female headed. The uncultivated area is being used for grass collection purpose in order to feed their milch animals in both the blocks. Crop + Horticulture+ Livestock was found to be the dominant farming system in High hills of Uttarakhand followed by Crop + Livestock farming system (Fig 53).

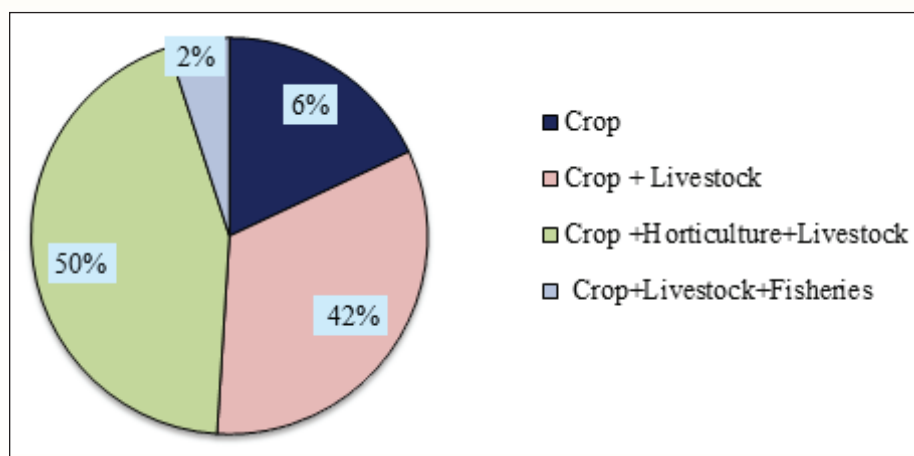


Fig. 53: Characterization of farming system of High Hills

Cropping pattern in existing farming systems

CS : Crops (Finger millets+ black soyabean+ pulse+ horsegram+ amaranthus- fallow barnyard millet+ spring rice-wheat+ barley + mustard) – 90 % Two-year crop rotation (*Sari system*).

CS : Vegetables (french beans/amaranthus/raddish/pea/potato/onion/garlic/ginger/turmeric/chilly/capsicum)- 24%

CS : Horticulture (Apple/kiwi+ pulse/vegetable intercropping) 6% one-year crop rotation.



Plate 46: a) and b) Horticultural based farming system, c) Rootstock development for entrepreneurship



Plate 47: (a) Beekeeping, (b) Goatary production and (c) Feed and fodder management for livestock

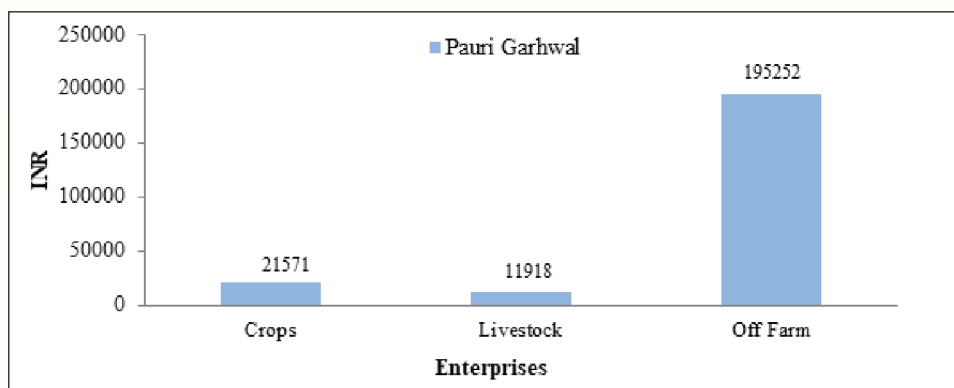


Fig. 54: Income pattern in existing farming systems

The economy of hill farming systems is mainly dependent on the off farm income earned by out-migrated male members of the families (85.35%). Meager farm income share (9.43%) from

crops and (5.2%) from livestock to total income was found in Pauri Garhwal District.

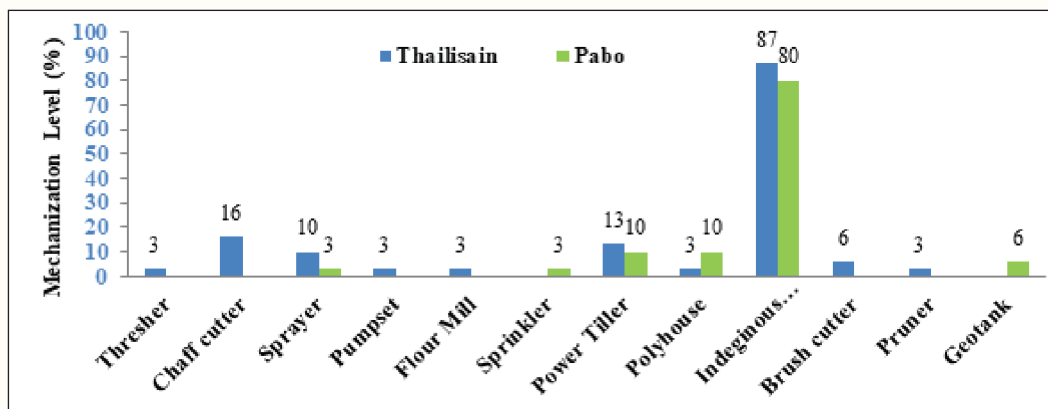


Fig. 55: Mechanization level in existing farming systems

The less availability of machineries due to terrain farming system showed that the mechanization level is very low in high hills of Uttarakhand. However, around 10-13% per cent farmers found to be using power tillers for land preparation purpose. Majority of the farmers (80-87%) are still using indigenous plough along with bull energy for the land preparation. Likewise, 16% of farmers are using chaff cutters in Thailisain block. However, 10% farmers of Pabo block are using polyhouse, 10 % farmers are using sprayers of

Thailisain block. Brushcutter and geotanks are also being used by 6% of farmers belong to Thailisain and Pabo block respectively. The highest mandays in terms of human labour and bullock labour was found in Finger millets + black soyabean + *naurangi* + horsegram + amaranthus production system for Pabo block (310 and 8.4 man days/ha respectively) whereas the highest mechanical labour was found in apple + pea production system for Thailisain block (7.8 man days/ha).

Table 42: Productivity of major components of Farming Systems of Uttarakhand

Components	Mean productivity (kg/ha, l/animal/annum, eggs/annum, kg/animal/annum)		Net returns (₹/ha, ₹/animal/annum, ₹/ flock/annum)	
	Thailisain	Pabo	Thailisain	Pabo
Crops/cropping system				
Finger millet	1340	1492	27945	34245
Barnyard millet	1699	1179	38694	24063
Barely	1069	1230	12737	11200
Spring rice	1909	1182	39452	16098
Black soyabean	841	571	71384	42043
White soyabean	930	556	39528	10131
Horsegram	703	536	59181	26177
Wheat	1154	1185	9262	3235
Maize (Fodder)	14947	12954	44843	36871
Mustard	558	553	8453	7707
Blackgram	507	752	18888	49576
Ricebean	-	523	-	10438
<i>Naurangi</i>	788	639	45045	25887
<i>Rajma</i>	1103	1115	79293	73599
Pea	3612	4982	87211	111626

Components	Mean productivity (kg/ha, l/animal/annum, eggs/annum, kg/animal/annum)		Net returns (₹/ha, ₹/animal/annum, ₹/ flock/annum)	
	Thailisain	Pabo	Thailisain	Pabo
Potato	7722	-	100269	-
Frenchbeans	4235	5138	75585	104752
Ginger	5979	7189	309566	282589
Amaranth	1271	1432	38208	32585
Apple	4521	3986	150172	149023
Pear	3321	3404	104761	110824
Apple + Pea	-	18392	-	308351
Apple+soybean	-	12113	-	180982
Chilly	3930	1494		
Garlic	6278	4137	443298	227845
Onion	5231	3587	93987	26556
Turmeric	7972	5646	391280	223486
Cucumber		26905		324020
Capsicum	56231	42850	1092900	570258
Fish	-	4133	-	278585
Poultry	720	-	2785	-
Goatary	34.4	38.3	8425	17000
Cow	525	649	10287	11976
Buffalo	624	-	18266	-

The mean productivity of all the field crops were low (40-60% lower than national average). Lower crop productivity also affects the net returns (lowest in case of wheat). Mean productivity of milk was 605 litres/annum which is (50-60% lower than national average). There is a scope for enhancing the net returns by increasing the productivity of local pulses, millets and maize in hilly regions by using suitable high yielding varieties and improved agronomic package and practices. These crops are also helpful in increasing the soil health and soil structure leads

to decrease in soil erosion. There is a huge scope in protected cultivation of horticultural crops like capsicum and cucumber, whereas turmeric, ginger and garlic crops could realize ~ 3-4 lakhs ha⁻¹ annum⁻¹ by the farmers of high-hills in open cultivation. System equivalent yield of pea and soyabean was found higher in apple+pea intercropping and apple+soyabean intercropping as compared to sole apple cultivation. Fishery is also found to be another remunerative enterprise in high hills of Uttarakhand.

Table 43: Labour use pattern in existing farming systems of Pauri Garhwal District

Crops/cropping system	Labour Use (Man-days/ha)					
	Mechanical		Human		Bullock	
	Thailisain	Pabo	Thailisain	Pabo	Thailisain	Pabo
Fingermillets+ black soyabean+ <i>naurangi</i> + horsegram+ amranthus	3.25	2.6	295	310	7.2	8.4
Spring rice+ barnyard millet	2.80	2.3	250	265	6.4	7.0

Crops/cropping system	Labour Use (Man-days/ha)					
	Mechanical		Human		Bullock	
	Thailisain	Pabo	Thailisain	Pabo	Thailisain	Pabo
Wheat+ mustard+ barely	2.4	1.8	185	190	4.8	5.2
Apple+ soyabean	7.2	6.4	162	164	-	-
Apple+ pea	7.8	7.2	184	192	-	-

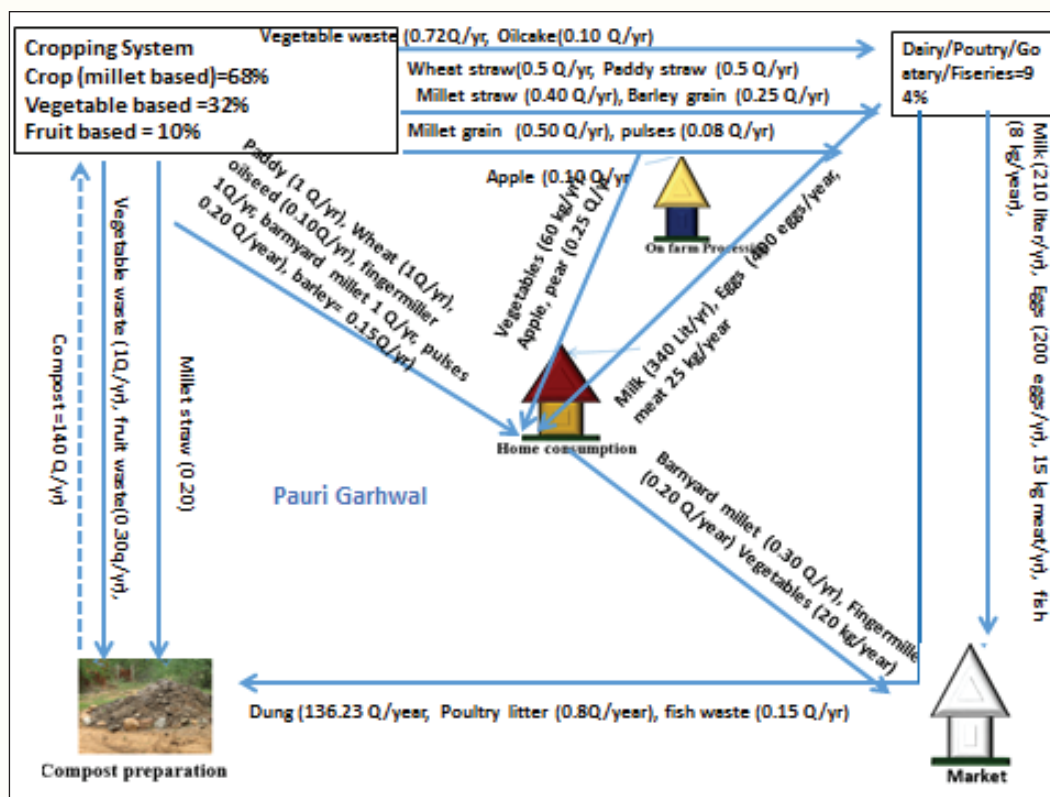


Fig. 56: Resource Map of Pauri Garhwal District

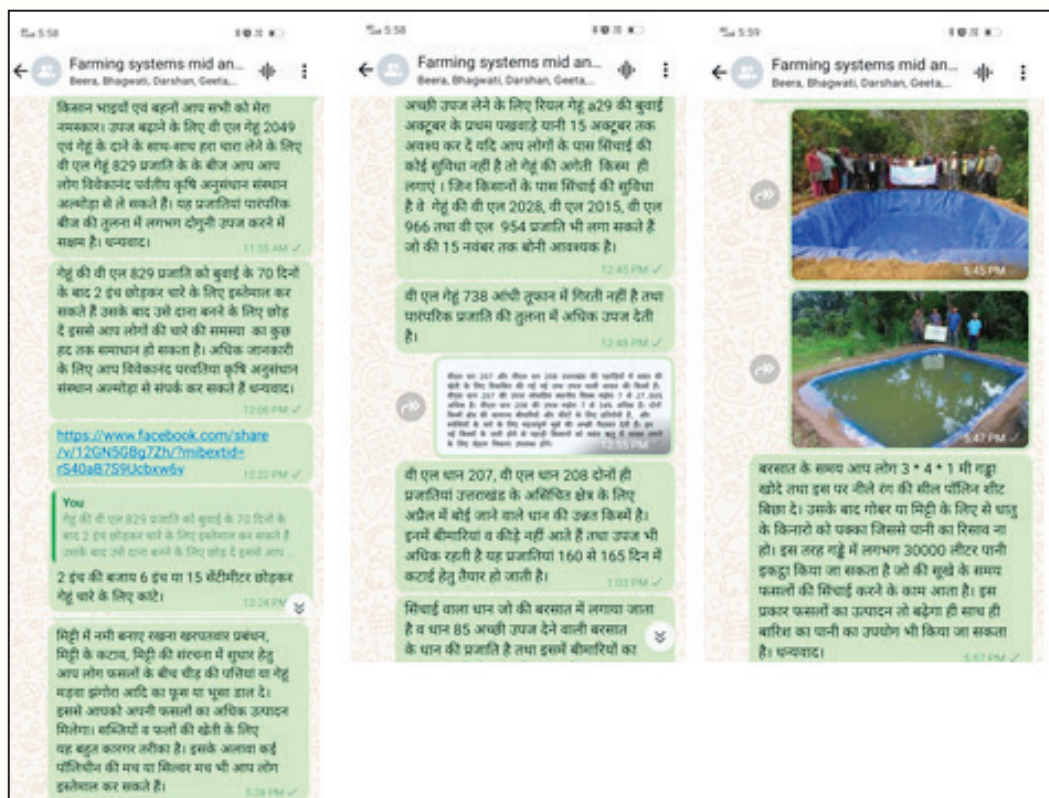
Resource Mapping

Data pertaining to Fig. 56 depicted that farming systems of Pauri Garhwal is having limited farm resource base but efficient utilization was observed. The farm resources are utilized both for home consumption and recycling purposes. However, very less farm produce is being marketed due to less productivity and subsistence farming systems.

Constraints identified and transferring knowledge through creation of whatsapp group

Increasing non-availability of water for irrigation (85%) and crop damage due to wild animal attack (78%) and declining crop

productivity due to increase in dry spells (75%) found to be the major constraints of hilly region. Awareness pertaining to development of water harvesting structures, use of biological barriers, crop compensation, and employment generation through value addition was created amongst farmers through creating whatsapp groups.



Status of Agriculture in Jammu and Shimla Division of Western Himalayan Region (Project code: NRMAPDFSRIL201801000160)

The cropping and farming systems of households in the Jammu region were analysed based on primary data collected from a sample of 480 farmers in the year 2023. The study area encompassed Jammu, Samba, Reasi, Udhampur and Shimla districts. Predominantly, the study area exhibited cereal-based and livestock-based farming systems. Livestock and cereals served as the primary sources of farm income across all districts, while non-farm activities contributed significantly to their overall income. The research aimed to assess the livelihood diversification of rural farmers in the state of Jammu. The purposive sampling technique was employed to select sample communities, from which a total of 480 households were randomly chosen for the study. Data collection involved both quantitative and qualitative methods. The quantitative approach employed a structured questionnaire, while the qualitative approach involved the use of Participatory Rural Appraisal (PRA) tools. The study revealed that the mean age

of the sampled farmers was 38.3 ± 0.6 years, falling within the range of 19 to 68 years and above. Additionally, there were more adults aged 43.8 ± 1.7 years in the range of 20 to 70 in the study area. In terms of gender distribution, males constituted 71.15% of the sample, while females constituted 28.85%. Educational levels were distributed across four categories: illiterate (63.54%), primary (20.2%), secondary (12.5%), and university (3.75%). The primary occupation for income generation within the communities was trading, whether related to farming or non-farm activities, with proportions of 90.2% and 9.8%, respectively. Household sizes ranged from a mean of 7.4 ± 0.3 individuals, constituting 27.5% of the variation. Access to land ownership, rentals, and community use stood at 73.05%, 21.22%, and 5.72%, respectively. Mechanization tools such as tractors, trolleys, ploughs, cattle, and others were used in percentages of 2.45%, 2.15%, 16.9%, 19.5% and 59%. These findings underscore rural farmers' limited access to productive assets, leading them to rely heavily on non-farm activities for income.

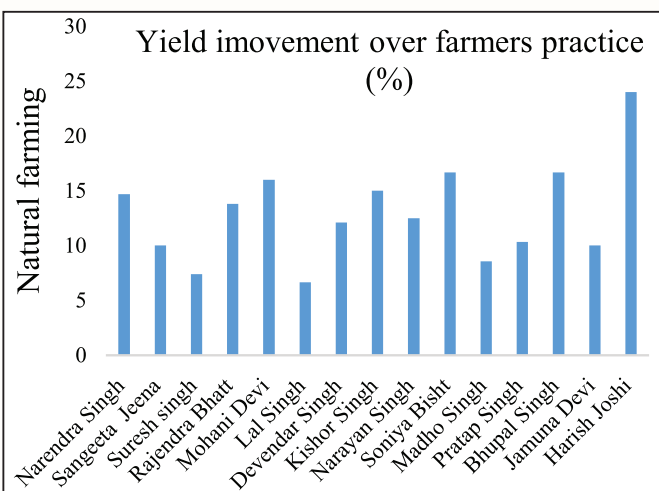
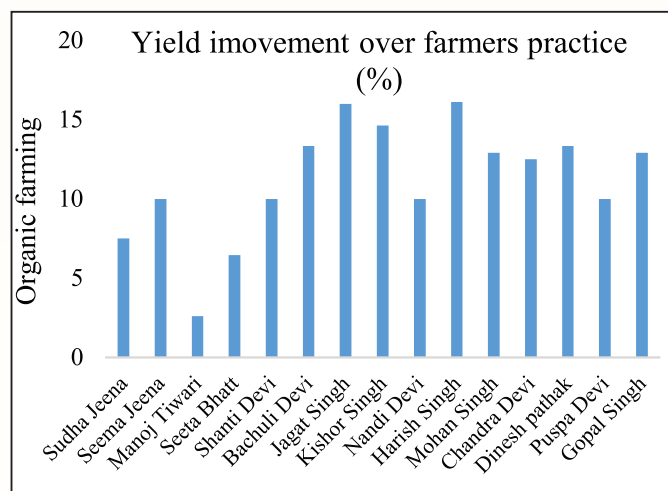


Plate 48: Interaction with farmers during the survey for Shimla District

Consortium for Scaling-up Climate Smart Agriculture in South Asia (C-SUCSeS) Project code: NRMAIFSR SOL 202212000283)

Demonstrations on farm experimentation were conducted during 2024 on Natural farming, Organic farming and on Integrated farming systems in hill ecosystems (Almora, Uttarakhand). These demonstrations showed substantial improvements in both productivity and income over local practices. In the 15 number of participatory demonstrations of organic farming of finger millet + soybean cropping systems gave 12.9% yield improvement over farmer practices. It also enhanced net income by 17.3% as compared to Farmers practices. Similarly, in another set of demonstration on 15 farmers field, the adoption of improved

natural farming practices led to an 11.1% increase in yield and a 14.6% improvement in net income over farmer's practice. The integrated farming systems also demonstrated at 30 farmers field in the participatory mode at Champakhali, Salla, Deolikhan, Khunt, Kharkiya, Matila and Gairoli village of Almora. The implementation of improved integrated farming systems increased yield by 6.2% compared to farmers' traditional practices. The 2 numbers of capacity building programme were organized on improved organic and natural farming, integrated farming systems and 60 number of beneficiaries were benefited. In 2024, organized awareness programme on sustainable farming practices and more than 285 farmers attended the awareness programme.



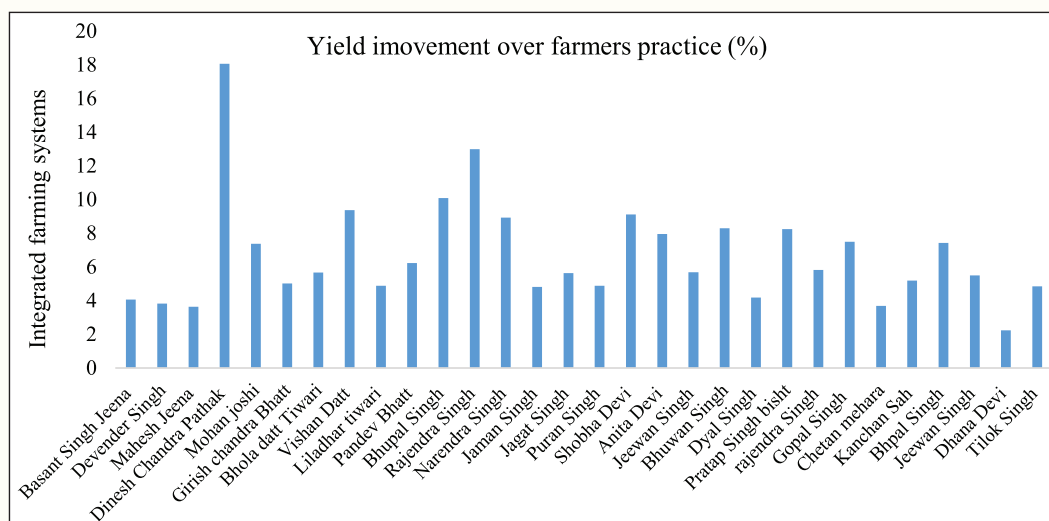


Fig. 57: Yield improvement in improved organic, natural and integrated farming systems over farmers practice



Plates 49: Training programme on improved sustainable farming practices at Almora, Uttarakhand

Co-creating sustainable water use in the Hindon sub-basin: A multiscale participatory approach (Project code: NRMAIFRSOL202204000279)

The major objectives of this project are to i) assess the contribution of agricultural practices to water depletion and pollution in the Hindon basin, and ii) identification and development of agricultural pathways in participatory fashion which can reduce the pressure on the river system while remaining productive and competitive. Typology of farming systems of the basin revealed four farm types identified namely, SF = small farms (15%); MM = medium monoculture (33%); MD = medium diversified (11%) and LF = large farms (41%) with a statistical typology in collaboration with WUR researchers. Small diversified farms with low income due to limited revenues from farming. These farms are dependent on livestock and off-farm income. Two groups of medium sized farms. The medium-sized and diversified farms were had high input levels (fertilizer, manure, pesticides). Large farms specialized

mainly on sugarcane. These farms operate their farms relatively efficient with lower inputs of fertilizers and pesticides than average. They generate the largest income. During the reported period Demonstration of crop diversification using oilseed crops (30 ha area sown with mustard in rabi) to have higher system productivity and improved water and fertilizer use efficiency. Shifting of sugarcane -wheat intensive system to diversified 3-year cycle by integrating mustard in rabi after kharif crop which reduced disease incidence as well as results in reduced chemical usage (15-20% reduced chemical fertilizer usage). Saving of 54% water through diversification of water intensive sugarcane based systems by introducing oilseeds in rabi and fodders. Introduction of hybrid bajra napier and intercropping of gobhi-sarson in sugarcane to address fodder need of animals providing quality fodder as compared to conventional feeding of low quality fodder sugarcane top. This addressed upto 9 months of green fodder requirement from 4-5 cuttings of Napier and further 3 months with berseem as intercrop in Napier field from October, thus providing



year round green fodder (100%) contributing towards livestock nutrition while reducing dependency on sugarcane top. Improved varietal introduction of wheat to address low productivity issue

and enhanced water productivity. Study of water quality during rainy season improved significantly due to flushing of rain water and increase in flow of the river.



Plates 50: Field day organized under the project at Atali village on 25th October 2024.

Evaluation of extension methods for effective dissemination of integrated farming interventions (Project Code: NRMAIFSRIL202308000300)

Farmers from the two districts of North Western plain region viz. Meerut and Muzaffarnagar have been selected for study. Chillora,

Jeetpur villages from Meerut district and Pachenda Kalan and Lisoda villages from Muzaffarnagar District have been selected through simple random selection technique. 100 farm households have been selected from each District. A total of 200 farm households have been taken for the study.

Table 44: Socio-economic status of farmers in existing farming systems

Variables	Farm Size (ha farm household ⁻¹)
Operational Landholding	
Male ownership	1.92 (0.56-4.8)
Female ownership	0.04 (0-0.37)
Leased in	
Male	1.20 (0-10.11)
Female	Nil
Off Farm Enterprises	27%

Table 44 reveals that around 1.92 ha of landholding was found under male ownership ranges from 0.56-4.8 ha whereas under female ownership only 0.04 ha of landholding was found ranges from 0-0.37 ha. Around 1.20 ha of land was taken on lease by males ranges from 0 to 10.11 ha.

Farming System Characterization

Crop (Sugarcane/sorghum/paddy-Wheat/mustard/blackgram) + Dairy (1-2 C+1-2 B) farming system is found to be the dominant farming system (47%) in the surveyed population followed by crop (sugarcane/sorghum/paddy-wheat/mustard/oat).

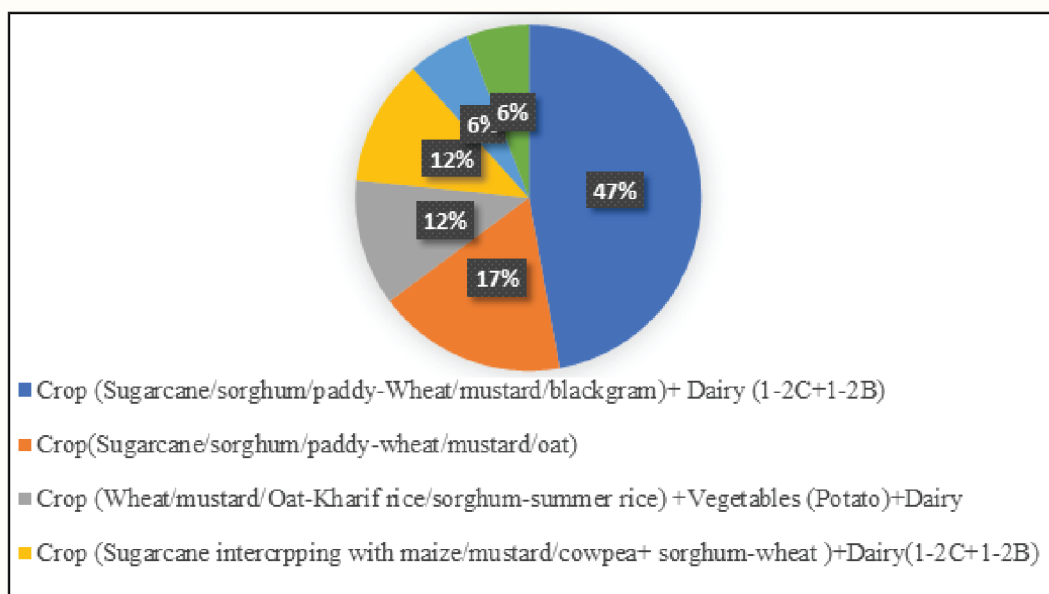


Fig. 58: Farming System Characterization

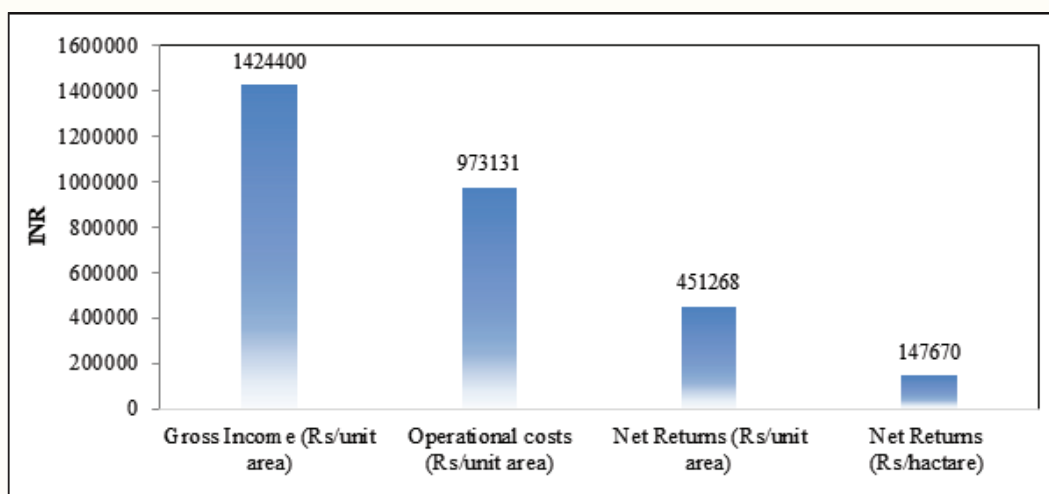


Fig. 59: Income pattern in prevailing farming systems

Farmers are receiving only Rs 147670 hectare⁻¹ annum⁻¹ as net income due to high operational costs. However, the net returns per unit area was found to be Rs 4,51268/-

Table 45: Sources of information about farming system practices

Sources	Frequency (%)			
	Not at all	Rarely	Sometimes	Frequently
Television	17.6	64.7	17.6	-
News papers/magazines	64.7	35.3	-	-
Input dealers	5.5	11.1	55.5	29.7
Relatives	5.8	38.8	44.4	5.5
Neighbour farmers	11.1	16.6	44.4	27.0

Sources	Frequency (%)			
	Not at all	Rarely	Sometimes	Frequently
Rural leaders	-	35.3	58.8	5.8
Innovative farmers	-	23.5	70.5	5.8
Kisan call centre	88.8	11.1	-	-
Internet	50	-	11.1	27.7
Kisan Melas	38.8	22.2	27.7	11.1
Telephones/Mobiles	38.8	44.4	16.7	-
Boards/Hoardings	94.4	5.5	-	-

Farmers prefer input dealers followed by neighbour farmers and innovative farmers as a major source of information pertaining to farming system activities on frequent basis (Table 46).

Approach to extension functionaries for farming system practices

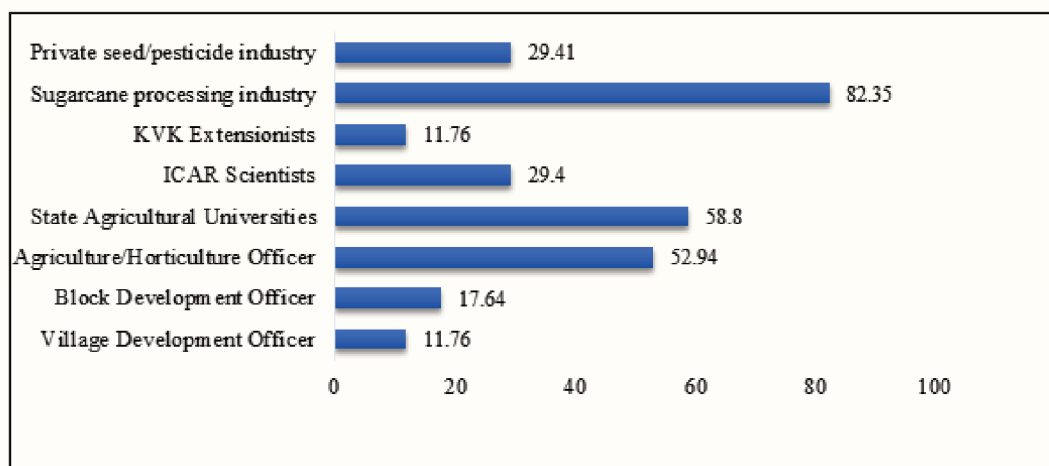


Fig. 60: Approaches to extension functionaries

Farmers are consulting sugarcane processing industry (82.35%) followed by State Agricultural Universities (58.8%) and Agriculture/horticulture officers (52.94%) as extension functionaries (Fig. 60).

Table 46: Farmers' perception regarding major constraints of prevalent farming system

Constraints	Perception (%)				
	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
Non-availability of high yielding varieties/ technologies	16.6	33.3	-	38.8	11.1
Non-availability of quality seed/ planting material	5.5	22.2	16.6	44.4	5.55
Fertilizers & pesticides' quality (adulteration problems)	5.5	11.1	38.8	38.8	5.55
High cost of cultivation/ operation	50	38.8	-	11.1	-
High incidence of insect pest and diseases	16.6	72.2	-	11.1	-

Problem of diseases in cattle (cows)	5.5	33.3	11.1	50	-
Problem of infertility in buffalos	-	27.7	11.1	61.1	-
Lack of remunerative and assured prices of crops	22.2	50	-	38.8	-
Scarcity of farm labour (high wage rates)	33.3	55.5	-	11.1	-
Smaller and fragmented landholding	11.1	27.7	5.55	55.5	
Climate change effect	5.5	63.3	31.1	-	-
Non availability of improved farm tools and equipments	5.5	50	16.6	22.2	-

Table 46 reveals that high cost of cultivation followed by scarcity of farm labour perceived as the major constraint (50% and 33%, respectively) by the farmers in prevalent farming systems.

Strategies adopted by farmers for improved farming system

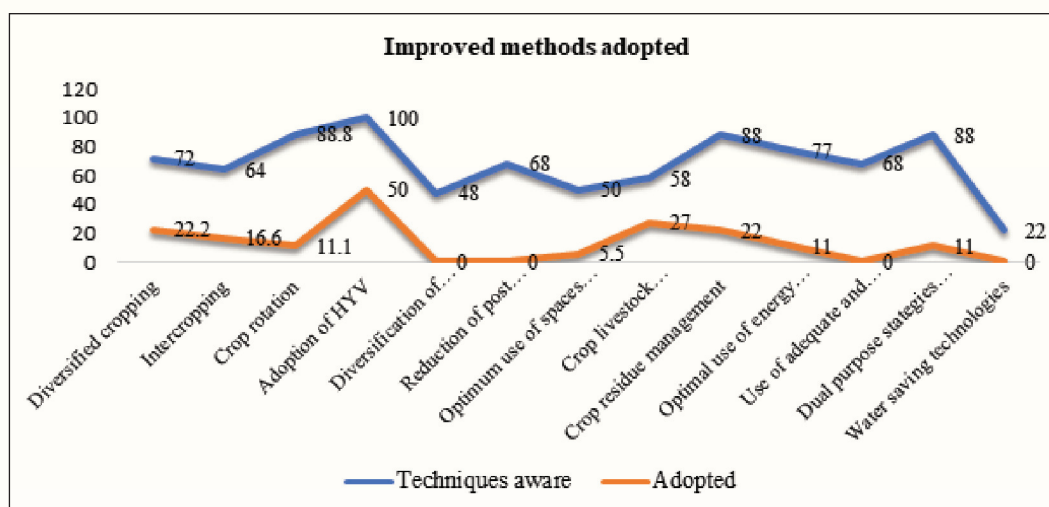


Fig. 61: Improved methods adopted by the farmers

Improved methods viz high yielding varieties and crop-livestock integration technologies are being adopted by 50 % and 27% of farmers respectively.

Multi-criteria assessment of Integrated Farming System schemes design and its impact on farmers livelihood

The National Mission on Sustainable Agriculture - Rainfed Area Development (NMSA-RAD), launched in 2014 by the Ministry of Agriculture and Farmers Welfare (MoAF&W), aimed at enhancing sustainable agricultural practices in rainfed areas. It initially covered 1.7 million hectares across 16 states, focusing on improving productivity, soil health, and water use efficiency. Similarly, the Integrated Farming Clusters (IFC) program under the National Rural Livelihood Mission (NRLM), initiated in 2020 by the Ministry of Rural Development (MoRD), targets 21 states. The IFC program focuses on promoting integrated farming systems to increase income and improve livelihoods through a combination

of agriculture, horticulture, livestock, and aquaculture activities. In Odisha, the promotion of Integrated Farming Systems (IFS) under the state plan, which started in 2021, has reached 3,122 farmers across 30 districts. This initiative aims to diversify farming practices and increase farm productivity while improving farmers' income and resilience. In Jammu and Kashmir, the adoption and promotion of IFS began in 2022, with the goal of covering 20,000 farmers over five years across 20 districts, focusing on building sustainable farming systems in a region with unique challenges. Kerala's Jaivagriham scheme, launched in 2019, has successfully integrated coconut and fisheries-based farming systems across 14 districts, benefitting 19,472 IFS units. The scheme aims to enhance sustainable farming while diversifying agricultural income sources. Tamil Nadu's IFS program, which started in 2018, has expanded across 34 districts, covering 34,290 IFS units. The program provides a holistic approach to farming, combining crop cultivation with livestock and horticulture to ensure more reliable



and diversified farm incomes. Additionally, NABARD introduced a bankable project for IFS in 2021, starting in Maharashtra, Tamil Nadu, and Uttarakhand, and extending across 14 states. This

initiative helps farmers secure financial support for adopting integrated farming practices, promoting sustainable agricultural models on a larger scale.

Table 47: Area covered and financial expenditure under Rainfed Area Development (RAD) for promoting IFS

Year	Beneficiaries (No.)	Area targeted (ha)	Area achieved (ha)	Financial expenditure (Crore ₹)
2014-15	17120	45,087.96	40,333.46	118.36
2015-16	18511	42,380.63	35,593.51	124.04
2016-17	20,498.0	55,848.54	43,821.14	161.18
2017-18	39,139.0	72,600.37	50,678.87	182.79
2018-19	70904	1,05,623.67	84,626.23	204.89
2019-20	30,524.0	29,66,495.56	61,951.25	153.21
2020-21	27,602.0	43,39,114.54	12,63,781.55	130.17
2021-22	24,700.0	91,943.57	68,881.65	94.18
2022-23	21,342.0	77,625.87	48,295.72	67.35
Total	2,70,340.0	77,96,720.71	16,97,963.38	1,236.16

The data related to rural and agricultural initiatives over different financial years under NRLM components, with estimation for 2023-24 suggests, Mahila Kisan schemes cover women farmers over years have increased from 32.4 lakh in 2017-18 to 86.1 lakh in 2019-20. The expected number for 2023-24 is 146 lakh, indicating significant growth. Adopting Agri Nutri Gardens have tremendous growth trend from 12.8 lakh households in 2017-18 to 39.2 lakh in 2019-20. The projected number for 2023-24 is 66.2 lakh households. Custom Hiring Centre established over time has increased from 6,222 centres in 2017-18 to 14,710 centres in 2019-20. A significant projected increase to 35,164 centres in 2023-24. Number of Krishi Sakhi (Agriculture Advisors) and Pashu Sakhi (Livestock Advisors) under NRLM increased from 14,151 in

2017-18 to 32,718 in 2019-20. For 2023-24, projected numbers are 66,695 Krishi Sakhi and 48,000 Pashu Sakhi, highlighting a major expansion.

Sampling design and sample size selection under each state

As per sampling design, in identified states, samples will be selected for study in a multistage level. 300 farmers from beneficiary and 300 non-beneficiary will be selected randomly from each state. The sample farmers will be selected through Simple Random Sampling. The line department officials will be selected 30 per state to understand their knowledge level and learning attitude.

Table 48: Selection of samples from identified states for impact study

Sl. No.	States	Sl. No.	States
1	Assam	7	Karnataka
2	Bihar	8	Maharashtra
3	Haryana	9	Odisha
4	Jammu & Kashmir	10	Uttar Pradesh
5	Gujarat	11	West Bengal
6	Kerala	12	Tamil Nadu

National Agriculture Innovation Fund (NAIF): ABI IIFSR (Component II)

NAIF, ABI-IIFSR

ABI-IIFSR centre organized various activities benefitting different participants including entrepreneurs, farmers, women self-help groups and students. During the period 4 entrepreneurs and incubators were admitted for incubation and 3 of them successfully graduated and all three of the entrepreneurs or startups initiated their business.

Entrepreneur Development Programme (EDPs) organized

1. Entrepreneurship development in youths through training on components of integrated farming systems/ organic farming” was organized on 29-31 January, 2024 jointly by Organic Agriculture System and ABI IIFSR Modipuram centre.
2. Technology Transfer Programme (TTP) on entrepreneurship development in youths through training on round the year mushroom production technology organized on 9-11 December 2024.



Plate 51: EDP on Integrated Farming Systems/ Organic Farming” 29-31 January, 2024



Plate 52: EDP on Mushroom Farming on 10th December 2024



Development and demonstration of different products

Development and demonstration of pasta and macaroni extrusion using millets

Pasta cum macaroni products using millets were developed and demonstrated under the project to an ABI incubatee Mr Rakesh Kumar and other entrepreneurs from Agri-Farm Buddy on 10th May 2024 and to 25 Women of SHG's of Uncha, Karnal on 9th July 2024.



Plate 53: Demonstration of pasta cum macroni extrusion to Mr Rakesh Kumar

Sensory attributes of finger millet macroni was also assessed by the panel of 21 judges using 9 point hedonic scale (Jones et al.,



Plate 54: Demonstration of pasta cum macroni products to women SHG's of Uncha Karnal

1955) where (score 1-extremely disliking to score 9- extremely liking)

Table 49: Sensory attributes of finger millet macroni

Attributes	Mean	SD
Appearance	7.45	1.02
Flavour	7.48	1.17
Taste	7.38	1.01
Texture	7.5	1.02
Overall acceptance	7.75	0.83

All the sensory attributes of finger millet macroni was found in between like moderately (7) to like very much (8).

Training cum demonstration of Alovera squash

Technology of Alovera squash developed by ICAR-IIFSR (applied for patent) has been demonstrated to an ABI incubatee (Mr. Raj Kumar, village Gabor, Shamli on 5th August 2024



Plate 55: Training cum demonstration of Alovera squash to Mr Raj Kumar, village Gabor



Plate 56: Training cum demonstration of different value added products to Self Help Groups & FPO under the ABI on 18th October 2024.

Participation of women SHG's in competition

Women SHG's developed under Farmer FIRST project, further linked to ABI for entrepreneurial expansion, have participated in Potato recipe competition organized by ICAR-CPRI, Modipuram. One of the participants Mrs. Sangeeta, Secretary of Devanjali

Mahila Svayam Sahayata Samuh won a consolation prize for presenting the potato halwa recipe prepared by her under boiled potato products in National Potato Festival 2024 organized on 9th March, 2024 by ICAR-CPRI, RS Modipuram.



Plate 57: Participation of women SHG's in Potato recipe competition organized by ICAR-CPRI, Modipuram on 9th March 2024.

Awareness programmes cum exposure visits

Awareness programme towards SHG formulation and self-employment was organized on 13th May 2024 Khurja, Bulandshahar



Plate 58: Co-ordinated awareness programs towards SHG formulation and self-employment



Plate 59: CAT exposure visit & training program from 09th July 2024 at ABI, IIFSR



Plate 60: training of Meerut district, farmers under the ABI on 09th September 2024

New products/ technologies developed



Plate 61: Organic jaggery and Shakkar



Plate 62: Aonla pickle



Plate 63: Murabba



PUBLICATIONS

Research Papers

i) International

- Adamala S, Velmurugan A, Swarnam T P, Mahesh P, Subramani T, Jaisankar I and Nanda B K. 2024. Soil moisture mapping in Indian tropical island ecosystem using C-band SAR data and neural network models. Research Square. <https://doi.org/10.21203/rs.3.rs-4010135/v1>.
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- Choudhary V K, Kumar L, Mishra D, Malik S, Verma N and Singh P. 2024. Data-driven techniques for enhancing mango productivity in India's western plain zone: A mobile app approach. International Journal of Applied Research on Information Technology and Computing, 15(1-3): 1-13 (NAAS rating: 3.41).
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SEMINARS / SYMPOSIA / WORKSHOPS / MEETINGS ATTENDED

Title of training/seminar/ symposia/ workshop/ meeting	Period	Venue	Name of participant
QRT Meeting of AICRP-IFS and AINP-OF for the States of Tamil Nadu, Karnataka, Telangana, Andhra Pradesh and Goa	10-11 January, 2024	UAS, Dharwad	Dr. Sunil Kumar Dr. N. Ravisankar Dr. Raghavendra Singh
International Webinar series on "Climate smart agriculture (CSA) for sustainable agriculture production	16 January, 2024	C-SuCSeS project	Dr. A. L. Meena
International Workshop on Research Ethics and Integrity on Nuances of Scientific Publishing	16 January, 2024	Shobhit University, Meerut	Mr. Vipin Kumar Choudhary
Launching of Accreditation Protocols for Agroforestry Nurseries	23 January, 2024	Krishi Bhawan, New Delhi	Dr. Nirmal
Quarterly Review Meeting (QRM): Sandarbh of NAIF ABI	29 January, 2024	Virtual	Dr. R.P. Mishra Dr. Nirmal
3 rd Indian horticulture summit- cum- international conference on technological interventions for boosting horticultural production	1-3 February, 2024	Rajasthan Agricultural Research Institute, Durgapura Campus, Jaipur, Rajasthan	Dr. R.P. Mishra Dr. Peyush Punia Dr. Suresh Malik Dr. P.P. Singh Dr. Sunil Kumar
14 th Asian Fisheries and Aquaculture Forum meet	12-15 February, 2025	NASC complex, New Delhi	Dr. Peyush Punia
28 th meeting of the ICAR Regional Committee for Zone VIII	16 February, 2024	Virtual	Dr. Sunil Kumar Dr. Poonam Kashyap Dr. M Shamim
Review meeting of the Foreign Aided project (NRM Division)	16-17 February, 2024	ICAR-CAZRI, Jodhpur	Dr. M. A. Ansari Dr. Raghavendra K.J.
National Seminar on Smart Technologies for Sustainable Agriculture and Environment	22-23 February, 2024	Indian Society of Agrophysics, New Delhi and ICAR-CRIDA, Hyderabad	Dr. Kamlesh Kumar Dr. A. L. Meena
Bayesian Statistics: From Application to Theory, and From Theory to Applications	23 February, 2024	Society of Statistics, Computer and Applications (SSCA), New Delhi	Mr. Vipin Kumar Choudhary
ISVS Golden Jubilee National Seminar on Technological Innovations in vegetable production under changing climate regime	24-26 February, 2024	ANDUAT, Kumarganj, Ayodhya, U.P.	Dr. P.P. Singh Dr. R.P. Mishra Dr. Peyush Punia Dr. Suresh Malik Dr. Sunil Kumar
National Conference on Novel Strategies for Mitigating Biotic and Abiotic Stresses for Agricultural and Environmental Sustainability	28-29 February, 2024	ICAR-NIBSM, Raipur	Dr. Sunil Kumar Dr. Chandra Bhanu Dr. Sunil Kumar Dr. Mohd. Arif



Title of training/seminar/ symposia/ workshop/ meeting	Period	Venue	Name of participant
National Symposium on sustainable agriculture practices for food security and environmental conservation	15-16 March, 2024	SVPUAT, Modipuram, Meerut	Dr Raghavendra Singh Dr. P.P. Singh Dr. R.P. Mishra Dr. Peyush Punia Dr. Suresh Malik Dr. Sunil Kumar Dr. P.C. Ghasal Dr. Nirmal Mr. Vipin Kumar Choudhary
Second meeting of National Committee on Natural farming	15-16 March, 2024	GNFSU, Halol	Dr. Sunil Kumar Dr. N. Ravisankar
ITU/FAO workshop and meeting of a focus group on AI and IoT for Digital agriculture	18-19 March, 2024	NASC complex, ICAR New Delhi from	Mr. Vipin Kumar Choudhary
Precision Agriculture Conclave for public private partnership	20 March, 2024	NASC Complex, ICAR New Delhi	Mr. Vipin Kumar Choudhary
QRT meeting of AICRP-IFS and AINP-OF	6-7 May, 2024	ICAR-RC-NEH, Umiam	Dr. Sunil Kumar Dr. N. Ravisankar Dr. Raghavendra Singh
Natural Farming certification	10 May, 2024	Gurukul, Kurukshetra	Dr. Sunil Kumar Dr. N. Ravisankar
Annual Review and Planning Meeting of CIMMYT project Wide row intercropping	13-15 May, 2024	ICAR-IIFSR	Dr. Sunil Kumar Dr. Poonam Kashyap Dr. P. C. Ghasal Dr. Raghuvveer Singh Dr. Raghavendra K. J.
Round Table Discussion on Climate Resilient Agriculture Technologies for Islands	14 May, 2024	ICAR-CIARI, Port Blair	Dr. T. P. Swarnam
Meeting on IFS with Kisan Mazdoor commission	14 May, 2024	Delhi (Virtual mode)	Dr. N. Ravisankar
Regional consultation on Science of Natural Farming	16 May, 2024	Yashwantrao Chavan Academy of Development Administration (YASHADA), Pune	Dr. N. Ravisankar
QRT meeting of AICRP-IFS and AINP-OF	17-18 May, 2024	IGKV, Raipur	Dr. Sunil Kumar Dr. N. Ravisankar Dr. Raghavendra Singh
5 th Meeting of Research Council	28 May, 2024	Agricultural University, Kota	Dr. Sunil Kumar
Third meeting of National Committee on Natural farming	29 May, 2024	Virtual	Dr. Sunil Kumar Dr. N. Ravisankar
Panel discussion NAAS, AGM	4-5 June, 2024	NASC Complex, New Delhi	Dr. Sunil Kumar
Leveraging CSR for Innovation	6 June, 2024	State Bank of India (SBI)	Mr. Vipin Kumar Choudhary



Title of training/seminar/ symposia/ workshop/ meeting	Period	Venue	Name of participant
QRT meeting of AICRP-IFS and AINP-OF	7-8 June, 2024	ICAR-CTCRI, Thiruvananthapuram	Dr. Sunil Kumar Dr. N. Ravisankar Dr. Raghavendra Singh
Review Meeting of FLDs and other Extension Activities	12 June, 2024	IIR, Hyderabad	Dr. Raghuvir Singh
IP awareness week organised by IPTM unit of ICAR New Delhi and ICAR-IISWC Dehradun	12-19, June, 2024	Virtual	Dr. Sunil Kumar Dr. Poonam Kashyap
Regional Consultation on Science of Natural Farming	14 June, 2024	MANAGE, Hyderabad	Dr. T.P. Swarnam
ITU/FAO Workshop on The Future of Digital Agriculture: Role of Artificial Intelligence	17-18 June, 2024	Utrecht, Netherlands. (Virtual mode)	Dr. Vipin Kumar Choudhary
Meeting for discussion on draft operational guidelines for Climate Resilient Agriculture (CRA)	18 June, 2024	NITI Ayog, New Delhi	Dr. Sunil Kumar
National Conference on Living with Nature: Soil, water and society in Ecosystem Conservation (LNSWSEC-2024)	20-22 June, 2024	Himalayan Cultural Center, Dehradun (Uttarakhand)	Dr. Sunil Kumar Dr. PC Jat Dr. Nisha Verma Dr. Nirmal
QRT meeting of AICRP-IFS and AINP-OF	22-23 June, 2024	ANDUAT, Faizabad	Dr. Sunil Kumar Dr. N. Ravisankar Dr. Raghavendra Singh Dr. M A Ansari
Institute Research Committee meeting	25-29 June, 2024 & 2 July, 2024	ICAR-IIFSR, Modipuram	All Scientists IIFSR
Project Steering Committee Meeting of TEEB, UNEP Project	3 July, 2024	New Delhi	Dr. Sunil Kumar Dr. M. A. Ansari
QRT meeting of AICRP-IFS and AINP-OF	6-7 July, 2024	CSKHPKV, Palampur	Dr. Sunil Kumar Dr. N. Ravisankar Dr. Raghavendra Singh
Mission LiFE: Adopt Sustainable Food Systems	10 July, 2024	MOEFCC, New Delhi (Virtual)	Dr. Sunil Kumar Dr. T.P. Swarnam
Regional consultation on Science of Natural Farming	19 July, 2024	Hotel Centrum, Lucknow	Dr. N. Ravisankar
32 nd International Conference of Agricultural Economists	2-8 August, 2024	NAAS, New Delhi	Dr. Raghavendra K.J.
Foreign aided Half Yearly Review Meeting	13-14 August, 2024	ICAR-CRIDA, Hyderabad	Dr. Sunil Kumar Dr. M Shamim
Fifth meeting of National committee on Natural Farming	23 August, 2024	Virtual	Dr. Sunil Kumar Dr. N. Ravisankar
ACASA project workshop at ICAR-IARI, New Delhi	28 August, 2024	New Delhi	Dr. M. A. Ansari
NRM Directors visit and consultation meeting on Natural Farming	3 September, 2024	Gurukul Kuruukshetra, Haryana	Dr. Sunil Kumar
UNEP project Phase-II meeting with DDG, NRM, ICAR, New Delhi on	4 September, 2024	New Delhi	Dr. Sunil Kumar Dr. M. A. Ansari



Title of training/seminar/ symposia/ workshop/ meeting	Period	Venue	Name of participant
International workshop on cutting edge innovations in soft computing communication and artificial intelligence	10-14 September, 2024	Department of Mathematics, Chaudhary Charan Singh University, Meerut	Dr. Sunil Kumar, Mr. Vipin Kumar Choudhary
International Conference on Enabling Sustainable Food Systems through Natural Farming	13 - 14 September, 2024	Dr. YS Parmar University of Horticulture & Forestry Nauni, Solan, Himachal Pradesh	Dr. Sunil Kumar
Hindi Pakhwara	14-28 September, 2024.	ICAR-IIFSR, Modipuram, Meerut	All staff-IIFSR
Meeting on Implementation of Rainfed farming systems	23 September, 2024	RFS division, DA&FW, New Delhi	Dr. N. Ravisankar
68th Foundation Day ICAR-CAZRI	1 October, 2024	CAZRI, Jodhpur	Dr. Sunil Kumar
Visit cum interaction on APCNF model for implementation of natural farming	11-12 October, 2024	Amaravati and West Godavari districts, Andhra Pradesh	Dr. Sunil Kumar
National Workshop on How to Write a Research Paper (Virtual mode)	18 October, 2024	Training and Education Centre, ICAR-Indian Veterinary Research Institute, Pune and the Indian Society for Veterinary Surgery (ISVS)	Mr. Vipin Kumar Choudhary
XIX Annual Group meeting of "AINP-OF	8-9 November, 2024	ICAR-NRCSS, Ajmer	Dr. Sunil Kumar Dr. N. Ravisankar Dr. T.P. Swarnam Dr. P.C. Ghasal Dr. Jairam Choudhary
Mid-Term Review Meeting of the 26 th Regional Committee Meeting (RCM)	12 November, 2024	Virtual	Dr. Sunil Kumar Dr Poonam Kashyap Dr. M Shamim
International conference on Agrifood systems in the fall of climate change and energy transitions	12-15 November, 2024	PAU, Ludhiana	Dr. Sunil Kumar
XXVII ICAR Regional Committee No. IV	14 November, 2024	Virtual	Dr. Sunil Kumar Dr Poonam Kashyap Dr. M Shamim
National Goat Fair and Agro-Industrial Exhibition and Interface Meeting	18-19 November, 2024	ICAR-CIRG, Mathura	Dr. Sunil Kumar
Global Soil Conference on "Caring Soils Beyond Food Security -Climate Change Mitigation and Ecosystem services	19 November, 2024	NASC, New Delhi	Dr. Sunil Kumar Dr. N. Ravisankar Dr. Raghavendra Singh Dr. Poonam Kashyap Dr. M.A. Ansari Dr. Nisha Verma Dr. A. L. Meena Dr. P.C. Ghasal Dr. T.P. Swarnam Dr. Jairam Choudhary Dr. Mohd. Arif



Title of training/seminar/ symposia/ workshop/ meeting	Period	Venue	Name of participant
28 th Regional Committee-I Meeting	22 November, 2024	Virtual	Dr. Sunil Kumar Dr. Poonam Kashyap Dr. M. Shamim
International Farming workshop on Modern Approaches under CGIAR Flagship programme -SI-MFS	24 November, 2024	ICRISAT, Hyderabad	Dr. Sunil Kumar
3 rd Expert Committee Interaction cum Demo Farm Lab Visit" at Karbi Anglong and Biswanath, Assam, under North East Centre for Technology Application and Reach (NECTAR)	26-27 November, 2024	Karbi Anglong and Biswanath, Assam	Dr. M. A. Ansari
VIII (XXXVI of project) Biennial workshop of AICRP on Integrated Farming Systems	2-5 December, 2024	Punjab Agricultural University, Ludhiana during	Dr. Sunil Kumar Dr. N. Ravisankar Dr. R.P. Mishra Dr. A.K. Prusty Dr. M. Shamim Dr. M. A. Ansari Dr. Raghuvveer Singh Dr. Raghavendra K.J. Dr. Vipin Kumar Smt. Himanshu Chauhan
Meeting of National Technical Committee for implementing Himalayan Agroecology Initiative (HAI)	6 December, 2024	NASC, New Delhi	Dr. N. Ravisankar
Panel discussion on the constraints and opportunities of regenerative agriculture in Mandla, Bhopal	17 December, 2024	Hotel Taj, Bhopal	Dr. M. Shamim
RAC Meeting	17-18 December, 2024	ICAR-IIFSR, Modipuram, Meerut	All Scientists, ICAR-IIFSR
Workshop on long term CA/RA based experiments in India organized by CIMMYT	19 December, 2024	NASC Complex, New Delhi	Dr. M. Shamim
Millets Mahotsav	13 December, 2024	IIMT University, Meerut	Dr. N. Ravisankar
National Workshop on Advancing Agroecology: Pathways to Sustainable Food Systems organized by IWMI, New Delhi	17 December, 2024	Hotel Taj, Bhopal	Dr. M. Shamim
Brainstorming workshop on National Mission on Natural Farming (NMNF)	23-24 December, 2024	MANAGE, Hyderabad	Dr. N. Ravisankar



TRAININGS ATTENDED

Name of training	Institute	Duration	Scientist name
Artificial Intelligence for Water Resource Management in Agriculture (21 days winter School)	College of Agricultural Engineering and Technology, PAU, Ludhiana	18 January to 07 February, 2024	Dr. Mohd. Arif
The recent of big data and artificial intelligence in the field of computer science and agriculture engineering	Department of Information Technology & Department of Agriculture Engineering, SCRIET Chaudhary Charan Singh University, Meerut	5-12 February, 2024	Dr. Sunil Kumar
Nature Positive Farming in view of Climate Change and Food Security	ICAR-IIFSR, Modipuram	19-23 February, 2024	Dr. Mohd. Arif
21 Days of winter school training on quantitative analysis for policy making	ICAR-NIAP, New Delhi	8-28 March, 2024	Dr. Raghavendra KJ
Role of artificial intelligence and machine learning in modern agriculture	Department of Information Technology & Department of Agriculture Engineering, SCRIET Chaudhary Charan Singh University, Meerut	21 March, 2024	Dr. Sunil Kumar
Promoting Scientific Beekeeping for Livelihood Security	Virtual by MANAGE, Hyderabad	29-31 July, 2024	Dr. M Shamim
Training programme on Multivariate analysis using R software	ICAR-NAARM, Hyderabad	26-30 August, 2024	Dr. M Shamim Dr. A.K. Prusty
Artificial Intelligence and Machine Learning (Online certificate course)	DIAT (Defence Institute of Advance Technology, DRDO, Govt of India)	26 August, 2023 – 30 April, 2024	Mr. Vipin Kumar Choudhary
Online training programme on Participatory Extension Approaches for Climate Risk Management	ICAR-CRIDA, Hyderabad.	17-19 September, 2024	Dr. Nisha Verma
Modern Approaches in Systems Analysis for Designing Actionable Systemic Strategies Towards Sustainable Mixed Farming System	ICRISAT, Hyderabad, India	25-29 November, 2024	Dr. Kamlesh Kumar Dr. Mohd. Arif
13 th Advanced International Course on Conservation & Regenerative Agriculture: Gateway for Sustainable and Climate Resilient Agrifood Systems	BISA, Ludhiana and ICAR-CSSRI, Karnal	4 -22 December, 2024	Dr. Mohd. Arif
Foreign Deputation			
ACASA climatic risks and adaptation options write-shop	CIMMYT, Kathmandu, Nepal	10-12 September, 2024	Dr. M. A. Ansari



TRAININGS / WORKSHOPS / SCHOOLS / MEETINGS ORGANIZED

Title of Training/workshop/school organized	Venue	Period	Number of participants	Name of Organizers
18 th Annual Group Meeting of All India Network Programme on Organic Farming	UAS, Dharwad	8-9 January, 2024	50	Dr. Sunil Kumar Dr. N. Ravisankar Dr. A.K. Prusty Dr. M. Shamim Dr. M.A. Ansari Dr. Raghuveer Singh Dr. Raghavendra K.J. Dr. Vipin Kumar Shri D. Tripathi
Annual Group Meeting of AICRP on Integrated Farming Systems	IGKV, Raipur	29-31 January, 2024	90	Dr. Sunil Kumar Dr. N. Ravisankar Dr. A.K. Prusty Dr. M. Shamim Dr. M.A. Ansari Dr. Raghuveer Singh Dr. Raghavendra K.J. Dr. Vipin Kumar Shri D. Tripathi
Three days training programme on Entrepreneurship Development in Youths through Training on Components of Integrated Farming Systems/Organic Farming	Shikhera village, Muzaffarnagar	29-31 January, 2024	32	Dr. R.P. Mishra Dr. Chandra Bhanu Dr. Sunil Kumar Dr. Nisha Verma Dr. Nirmal Dr. P C Ghasal Dr. Jayram Choudhary
Visioning and LISP workshop, along with a workshop on Co-design of Innovation and field visits aims to finalize sites for activities, including IFS	Mandla, MP	14-15 February, 2024	40	Dr. M. Shamim
Nature positive farming in view of climate change and food security	ICAR-IIFSR, Modipuram, Meerut	19-23 February, 2024	-	Dr. Sunil Kumar Dr. T.P. Swarnam Dr. Chandra Bhanu Dr. P.C. Ghasal Dr. Jairam Choudhary
International Women's Day with the theme "Invest in women-accelerate progress"	ICAR-IIFSR, Modipuram	8 March, 2024	110	Dr. P C Jat Dr. Poonam Kashyap Dr. Nisha Verma
National Symposium on Sustainable Agriculture Practices for Food Security and Environmental Conservation	SVBPUAT, Meerut	15-16 March, 2024	300	Dr. R. P. Mishra, Dr. P.P. Singh Dr. Nirmal
Farm and Laboratory Management Training for Technical Staff of Agriculture University, Kota	ICAR-IIFSR, Modipuram, Meerut	20-25 May, 2024	24	Dr. Sunil Kumar Dr. Suresh Malik Dr. Chandra Bhanu Dr. Poonam Kashyap



Title of Training/workshop/school organized	Venue	Period	Number of participants	Name of Organizers
				Dr. M. A. Ansari Dr. Sunil Kumar Dr. Mohd Arif Dr. Raghvendra K.J. Dr. Nirmal
Mission LiFE Campaign on Crop diversification	Modipuram and virtual campaign	27-31 May, 2024	125	Dr. Sunil Kumar Dr. Raghuvveer Singh Dr. N. Ravisankar Dr. A.K. Prusty Dr. M. Shamim Dr. M.A. Ansari Dr. Raghavendra K.J. Dr. Poonam Kashyap Dr. P C Jat
One day interface meeting under IWMI Project	Mandla, MP	11 June, 2024	35	Dr. M Shamim Dr. Raghavendra K.J.
हिंदी कार्यशाला	ICAR-IIFSR, Modipuram	11 June 2024	-	Dr. Chandra Bhanu Mrs. Deepshikha
Interactive Meeting on Hazards and Adoption strategies of various crops for Heuristic Model under ACASA Project	ICAR-IIFSR, Modipuram	12 June, 2024	-	Dr. Sunil Kumar Dr. M A Ansari
Coordinated training cum demonstration of Aloe vera Juice to an ABI incubatee	ICAR-IIFSR, Modipuram	5 August, 2024	01	Dr. R. P. Mishra Dr. Nisha Verma
Parthenium Awareness week	ICAR-IIFSR, Modipuram and Tabita village of Khatauli block district Muzaffarnagar	16-22 August, 2024	210	Dr. Raghavendra Singh Dr. Mohd. Arif Dr. A.L. Meena Dr. Sunil Kumar Dr. Chandra Bhanu Dr. Raghuvveer Singh
2 nd interface meeting under the project "Agroecology Initiative: Transformational Agroecology Across Food, Land, and Water Systems".	KVK, Mandla	12 September, 2024	-	Dr. Sunil Kumar Dr. M. Shamim
Study visits for delegates from Nepal sponsored by IWMI, Nepal	Modipuram and Almora	17-21 September, 2024	16	Dr. M. Shamim Dr. N. Ravisankar Dr. A.K. Prusty Dr. M.A. Ansari Dr. Raghuvveer Singh Dr. Raghavendra K.J. Dr. Poonam Kashyap Dr. P C Jat
Swachta hi Sewa programme 2024	Village Tabita (Farmer First Project)	19 September 2024	80	Dr. P.C. Jat Dr. A.K. Prusty Dr. Poonam Kashyap Dr. M. Shamim Dr. Sunil Kumar Dr. Raghuvveer Singh Dr. Nisha Verma Dr. Raghavendra KJ
हिंदी कार्यशाला	ICAR-IIFSR, Modipuram	25 September 2024		Dr. Chandra Bhanu Mrs. Deepshikha



Title of Training/workshop/school organized	Venue	Period	Number of participants	Name of Organizers
Technology demonstration of agro-processing tools and equipment for drudgery reduction	ICAR-IIFSR, Modipuram	18 October, 2024	50	Dr. P.C Jat Dr. Nisha Verma
On campus training programme on “Technology demonstration of agro-processing tools and equipments for drudgery reduction” under Farmer FIRST project to women SHG’s	ICAR-IIFSR, Modipuram	18 October, 2024	16	Dr. P C Jat Dr. Nisha Verma Dr. Poonam Kashyap Dr. A.K. Prusty Dr. M. Shamim Dr. Raghuvveer Singh Dr. Raghavendra K.J. Dr. Sunil Kumar
Vigilance Awareness Week	ICAR-IIFSR, Modipuram	31 Oct- 6 November, 2024.	70	Dr. P. Punia Dr. Chandra Bhanu Dr. Sunil Kumar Dr. Jairam Choudhary Dr. Nirmal
19 th Annual Group Meeting of All India Network Programme on Organic Farming	ICAR-NRC Seed Spices, Ajmer	8-9 November, 2024	52	Dr. Sunil Kumar Dr. N. Ravisankar Dr. A.K. Prusty Dr. M. Shamim Dr. M.A. Ansari Dr. Raghuvveer Singh Dr. Raghavendra K.J.
NICRA-NRM partner institutes Review Meeting	ICAR-IIFSR, Modipuram	26 November, 2024	-	Dr. Sunil Kumar Dr. Raghavendra Singh Dr. A. L. Meena Dr. Mohd. Arif Dr. P. C. Ghasal Dr. M. Shamim
VIII (XXXVI of project) Biennial workshop of AICRP on integrated farming systems	PAU, Ludhiana	2-5 December, 2024	130	Dr. Sunil Kumar Dr. N. Ravisankar Dr. A.K. Prusty Dr. M. Shamim Dr. M.A. Ansari Dr. Raghuvveer Singh Dr. Raghavendra K.J.
Stakeholder workshop under DST NOW project	Atali, Meerut	8 December, 2024	250	Dr. Poonam Kashyap
Entrepreneurship Development in Youths through Training on round the year mushroom Production Technology	ICAR-IIFSR, Modipuram	9-11 December, 2024.	23	Dr. R.P. Mishra Dr. Chandra Bhanu Dr. Nisha Verma Dr. Nirmal Dr. Sunil Kumar Dr. Kamlesh Kumar
हिंदी कार्यशाला	ICAR-IIFSR, Modipuram	30 December, 2024		Dr. Chandra Bhanu Mrs. Deepshikha

RADIO / TELEVISIONS TALK / SOCIAL MEDIA

Topic	Broadcasted/telecasted	Date	Name of speaker
Integrated Nutrient Management in Basmati rice	All India Radio, Akashwani Najibabad	6 July, 2024	Prakash Chand Ghasal
Video recording (MOOC) on Importance of biodiversity and its assessment tools in NF	MANAGE Hyderabad	14 August, 2024	M A Ansari



NEW RESEARCH INITIATIVES

- Transformational agro ecology across food, land and water system
- Additive intercropping in wide row crops for resilient crop production
- Gobardhan flagship programmes of GOI a project on “Enrichment of FOM produced from CBG plants and development of package of practices (PoP) for major crops”
- Achieving Sustainable Development Goals Through Adoption of Livestock-Based Natural farming System in Bundelkhand Region of Uttar Pradesh
- Pilot project on Voluntary Carbon Market (VCM)”
- Development and on farm validation of organic package for commercial Horticultural crops for WPZ of UP
- Sustainable intensification of farming systems-food-value chain for ensuring food, nutritional and livelihood security of Buxa tribes”
- Evaluation of Lentus organic NPK on productivity, quality and soil health of rice-wheat system under organic production system.



NEW INFRASTRUCTURE CREATED



Inauguration of VIP Guest House by Dr Himanshu Pathak, Secretary DARE and DG, ICAR and Dr S.K. Chaudhari, DDG, NRM at ICAR-IIFSR



Inauguration of International Standard Referral Laboratory for Organic Farming by Dr Himanshu Pathak, Secretary DARE and DG, ICAR and Dr S.K. Chaudhari, DDG, NRM at ICAR-IIFSR



Inauguration of Technology Park by Dr. S.K. Chaudhari DDG, NRM at ICAR-IIFSR

OTHER PROGRAMMES ORGANIZED

Republic Day – 26th January, 2024

The Institute celebrated Republic Day on 26th January 2024. The Director of the Institute, Dr. Sunil Kumar, hoisted the national flag to commemorate the occasion. In his address, he emphasized the Institute's commitment to sustainable farming systems and its pivotal role in enhancing farmers' livelihoods. The event also featured cultural programs and the recognition of outstanding staff contributions.



Institute Celebrated its 35th Foundation Day on 01 April, 2024



The ICAR-Indian Institute of Farming Systems Research, Modipuram, celebrated its 35th Foundation Day on 1st April



2024 in hybrid mode, with active participation from scientists, farmers, FPOs, SHGs, and various stakeholders from across the India. The event was inaugurated by Hon'ble DDG (NRM), Dr. S. K. Chaudhari, who delivered the Foundation Day lecture, highlighting the institute's remarkable journey and the critical importance of research focused on climate change and resource sustainability. Dr. K. K. Singh, Vice Chancellor of SVPUAT, Meerut, graced the occasion as Chief Guest. The Director of the Institute, Dr. Sunil Kumar, presented the Annual Report, outlining major achievements, including the development of 73 prototype IFS models that have enhanced farmer incomes, improved soil



health, and reduced fertilizer use. Guests of Honour Dr. Rajbir Singh (ADG, AAFCC), Dr. A. Velmurugan (ADG, SWM), Dr. A. K. Mohanty (Director, ICAR-CIRC), and Dr. R. K. Singh (Head, ICAR-CPRI-RS, Modipuram) commended the institute's contributions and offered valuable suggestions for future research directions. The celebration also featured the inauguration of a Technology Park, research

site visits, release of publications, cultural programmes, and the distribution of awards recognizing outstanding contributions by staff, scientists, and agri-preneurs.

Awareness Campaign on “Crop Diversification” Under LiFE Mission



An awareness programme on “Crop Diversification” under the LiFE Mission was organized at ICAR-IIFSR, Modipuram, on 27th May 2024. The Chief Guest, Smt. Shubha Thakur, Additional Secretary, Government of India, emphasized the urgent need for crop diversification, particularly the integration of oilseeds and pulses into cropping systems to reduce dependence on edible oil imports. She also advocated intercropping in sugarcane to promote sustainable agriculture. Dr. Sunil Kumar, Director, ICAR-IIFSR, presented the highlights of pilot project being implemented across 75 districts, aimed at ensuring food, nutrition, and livelihood security while reducing market dependency. A total of 55 farmers from five villages participated in the event and received inputs for Kharif crops. During the event a LiFE Mission pledge was administered, and social media content was released to raise public awareness on sustainable agricultural practices.

Celebration of World Environment Day



On June 5, 2024, the institute organized a World Environment Day programme under the theme “Our Land, Our Future” in Pepala village, Rohta block, Meerut, as part of the LiFE Mission initiative. The event included a farmers’ seminar and a plantation drive focused on promoting sustainable food systems, with the participation of 60 farmers and students. More than 1,000 fruit and multipurpose tree saplings were distributed for on-field demonstrations to promote ecological balance and long-term sustainability. The programme reinforced the importance of environmental stewardship through practical action and active community participation.

संस्थान द्वारा ‘दसवे’ अंतर्राष्ट्रीय योग दिवस’ का आयोजन





भाकृअनुप-भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम, मेरठ में दिनांक 21 जून 2024 को दसवें अंतर्राष्ट्रीय योग दिवस का आयोजन किया गया जिसमें संस्थान के वैज्ञानिकों, अधिकारियों, कर्मचारियों, उनके परिवारजनों व पल्लवपुरम कालोनी के निवासियों ने बढ़-चढ़कर भाग लिया। योग शिक्षिका डॉ निशा लोहिया ने कार्यक्रम में उपस्थित सभी प्रतिभागियों को, विशेषकर महिलाओं के स्वास्थ्य को ध्यान में रखते हुए, विभिन्न प्रकार के सूक्ष्म व्यायाम व योगासन के बारे में विस्तृत रूप से प्रदर्शन करवाया। योग गुरु श्रीमती सोनिया सिंधू ने विभिन्न प्रकार के शारीरिक विकारों हेतु विशेष योगासनों एवं प्राणायाम के बारे में विस्तृत रूप से प्रदर्शन करवाए। डॉ मनोज कुमार राना ने स्वस्थ जीवन हेतु दैनिक योगासन, प्राणायाम व ध्यानयोग के महत्व के बारे में सभी को परिचित कराया।

ICAR-IIFSR Launches “Ek Ped Maa Ke Naam” Campaign



ICAR-Indian Institute of Farming Systems Research

The Institute launched the “Ek Ped Maa Ke Naam” initiative on 21st August 2024, with the goal of planting 500 trees on its campus. The campaign was inaugurated by the Director of the Institute, Dr. Sunil Kumar, who led the ceremonial plantation drive. In his inaugural address, he emphasized ICAR-IIFSR's commitment to organizing the Government of India's flagship campaign on a large scale. He highlighted the importance of trees and added that agroforestry and horticulture-based farming systems not only enhance environmental sustainability but also contribute to increased farmer incomes, making them essential to resilient agricultural development. The inaugural event witnessed enthusiastic participation from Heads of Departments, scientists, officers, and staff members, who collectively planted trees to mark the beginning of the campaign. ICAR-IIFSR plans to continue organizing similar initiatives as part of its ongoing commitment to environmental stewardship and sustainable agriculture.

Kisan Gosthi and Ghar-Ghar Tiranga Programme



A “Kisan Ghosthi and Ghar-Ghar Tiranga Programme” was organized on August 14, 2024, at Sethri village, Block Khatouli, District Muzaffarnagar, as part of the Farmer First Programme. The event was attended by farmers and children of Sethri village, along with a team from ICAR-IIFSR, Modipuram, Meerut. A total of 80 farmers actively participated in the event.

स्वतंत्रता दिवस समारोह का आयोजन





भाकृअनुप-भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम, मेरठ द्वारा दिनांक 10 से 15 अगस्त 2024 के दौरान 'स्वतंत्रता दिवस समारोह' एवं 'हर घर तिरंगा अभियान' का आयोजन किया गया। कार्यक्रम का शुभारंभ करते हुए संस्थान के निदेशक डॉ सुनील कुमार ने बताया कि संस्थान के कर्मचारियों, उनके परिवारजनों, किसानों एवं जन-जन में देश एवं राष्ट्रध्वज तिरंगा के प्रति सम्मान की भावना प्रबल करने के उद्देश्यों के लिए यह कार्यक्रम काफी प्रभावी साबित होगा। दिनांक 12-15 अगस्त 2024 के दौरान संस्थान के संस्थान के मनोरंजन एवं कल्याण क्लब की ओर से आयोजित खेलकूद प्रतियोगिताओं एवं सांस्कृतिक कार्यक्रमों में संस्थान के सभी वर्ग के कर्मचारियों एवं उनके परिवार जनों ने बढ़-चढ़कर भाग लिया। दिनांक 15 अगस्त 2024 को स्वतंत्रता दिवस कार्यक्रम के अंतर्गत संस्थान के निदेशक डॉ सुनील कुमार द्वारा झंडारोहण एवं स्वतंत्रता दिवस भाषण के साथ कार्यक्रम का समापन किया गया। इसी दौरान दिनांक 12-15 अगस्त, 2024 के मध्य, संस्थान में आयोजित खेलकूद प्रतियोगिताओं एवं सांस्कृतिक कार्यक्रमों के विजयी प्रतिभागियों को निदेशक महोदय द्वारा पुरस्कार देकर सम्मानित भी किया गया। दिनांक 10 अगस्त 2024 को संस्थान की महिला क्लब द्वारा स्वतंत्रता दिवस पर्व के अंतर्गत तीज महोत्सव का आयोजन भी किया गया जिसमें संस्थान की महिला कर्मियों एवं कॉलोनी की महिलाओं ने बढ़-चढ़कर भाग लिया। निदेशक महोदय ने भारतीय कृषि अनुसंधान परिषद, नई दिल्ली, द्वारा कृषि प्रणाली संस्थान को 2023 का सर्वश्रेष्ठ स्वच्छता पुरस्कार मिलने पर सभी वैज्ञानिकों, अधिकारियों एवं कर्मचारियों को बधाई दी एवं स्वच्छता गतिविधियों को संचालित करने वाले सभी वर्ग के कर्मचारियों को पुरस्कार देकर सम्मानित भी किया।

Parthenium Awareness Week



ICAR-Indian Institute of Farming Systems Research, Modipuram, organized "Parthenium Awareness Week" from 16th to 22nd August 2024 to educate staff, farmers, villagers, and students about the harmful effects of parthenium and encourage its eradication. The week commenced with a parthenium uprooting drive at the institute's farm, led by Dr. Sunil Kumar, Director, ICAR-IIFSR, Modipuram. Programme was organized by Division of Cropping Systems and Resource Management (CSRM) of the institute. Dr Raghavendra Singh, Head, CSRM elaborated the health hazards of parthenium, including skin inflammation, asthma, and allergies in humans, and dermatitis and diarrhea in livestock. A Parthenium Awareness Camp and kisan gosthi were held in Tabita village, Khatauli block, to educate farmers on the weed's impact on crop productivity and livestock health. Scientists demonstrated control measures and urged continued vigilance. Students at Tabita Primary School were also sensitized about parthenium's harmful effect and encouraged to share the knowledge with their families.

संस्थान द्वारा "स्वच्छता ही सेवा" कार्यक्रम का आयोजन



संस्थान में दिनांक 16 सितंबर 2024 को स्वच्छता ही सेवा कार्यक्रम का आयोजन किया गया जिसमें संस्थान के सभी वैज्ञानिकों, अधिकारियों



एवं कर्मचारियों ने बढ़-चढ़कर भाग लिया। संस्थान के निदेशक डॉक्टर सुनील कुमार ने सभी कार्यालय कर्मियों को स्वच्छता की शपथ दिलाई और यह संदेश दिया कि स्वच्छता सभी के स्वभाव में होनी चाहिए और सभी के संस्कारों में भी झलकनी चाहिए। हमें एक जिम्मेदार नागरिक के रूप में स्वच्छता के प्रति सजग रहते हुए नई पीढ़ी को भी इसके प्रति उतना ही जिम्मेदार बनाने के नितांत आवश्यकता है। वर्ष 2024 में भारत सरकार की ओर से दिनांक 15 सितंबर से 2 अक्टूबर के मध्य आयोजित होने वाले “स्वच्छता ही सेवा” कार्यक्रम का प्रसंग “स्वभाव स्वच्छता, संस्कार स्वच्छता” रखा गया है। उन्होंने अपने संबोधन में यह भी रेखांकित किया कि, भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम, मेरठ इस दिशा में अपनी संसाधन चक्रीकरण तकनीकों के माध्यम से खेती-बाड़ी में फसल अवशेषों, पशु अवशेषों व अन्य कूड़े कचरे को चक्रीकृत करके, कृषि फसलों के पोषण को बढ़ावा देता है जिससे फसलोत्पादन पर होने वाला खर्चा भी कम होता है और बाजार से खरीदी जाने वाले रासायनिक उर्वरकों पर निर्भरता भी कम होती है। कार्यक्रम के दौरान संस्थान के प्रांगण में निदेशक महोदय, सभी विभागाध्यक्षों, वैज्ञानिकों, अधिकारियों और कर्मचारियों ने झाड़ू लगाकर सफाई की और स्वच्छता का संदेश दिया। निदेशक महोदय व सभी अधिकारियों ने संस्थान को स्वच्छ बनाने हेतु फूल वाले पौधों का पौधारोपण भी किया।



Review Meeting of NICRA-NRM



Institute organized a Review Meeting of the NICRA for the Natural Resource Management (NRM) theme on 26th November 2024 in which nine NRM based ICAR institutes participated. The meeting was chaired by Dr. B. Venkateswarlu, Former Vice Chancellor of VNMKV, Parbhani, with Dr. S. K. Chaudhari, DDG (NRM), ICAR, gracing the occasion as the Chief Guest. In his address, Dr. Venkateswarlu emphasized that all scientists engaged in NICRA (NRM) should generate robust datasets and produce actionable knowledge for various stakeholders involved in climate-resilient agriculture. The Chief Guest, Dr. S. K. Chaudhari, stressed the importance of covering all facets of agriculture in the NICRA programme, including enhancing resource use efficiency, resource conservation and recycling, precision nutrient and water management, farming system diversification, long-term carbon sequestration, and good management practices beyond crop production. He also encouraged expanding partnerships beyond the National Agricultural Research System (NARS), involving organizations such as CSIR, DST, and MoEF. Dr. V. K. Singh, Director, ICAR-CRIDA, provided an overview of ongoing NICRA research activities and future plans for strengthening the programme. Dr. Sunil Kumar, Director, ICAR-IIFSR, welcomed the dignitaries and presented highlights of the Institute's progress in integrated farming systems, and organic and natural farming research with a focus on climate resilience. Principal Investigators and Co-Principal Investigators from nine ICAR institutes and State Agricultural Universities under the NRM theme of NICRA presented updates on their current research and outlined roadmaps for future initiatives. Participants also visited ongoing NICRA experiments at the Modipuram Centre, including research on organic, natural, and integrated farming systems.

Celebration of World Soil Day

The Institute celebrated World Soil Day on 5th December 2024 in Jangethi village, Meerut district. The event witnessed the active participation of over 115 individuals, including 60 students, 10 teachers from the village's Upper Primary School, and 40 farmers. Programme was coordinated by Dr. Chandra Bhanu, Principal Scientist, who emphasized the judicious use of natural resources



like soil and water to safeguard the well-being of present and future generations. He stressed the importance of integrated nutrient and pest management in preventing soil degradation. Young Scientists of the institute namely Dr. Amrit Lal Meena, Soil Scientist, Dr P C Ghasal (Agronomy) and Dr Jairam Choudhary (Soil Microbiology) highlighted the significance of soil in agriculture and guided students on career opportunities in the agricultural sector.

Celebration of Kisan Diwas under Swachhta Pakhwada



As part of the Swachhta Pakhwada (16–31 December 2024), institute celebrated Kisan Diwas on 23rd December 2024 in Shahpur-Jainpur village, Meerut. The event witnessed the participation of 78 individuals, including farmers, farm women, children, and students. Activities included the Kisan Samman, where farmers were honored for their contributions, followed by a Farmer-Scientist Interaction on key topics such as the diversification of sugarcane-based farming systems, integrated nutrient management (INM) in seasonal crops, and the use of artificial intelligence in agriculture. The programme also focused on awareness about general cleanliness and hygiene for a healthy lifestyle, and the use of waste decomposer for residue recycling under the Swachhta mission.

Farmers-Scientist Interaction with NGO

A one day Farmers-Scientist Interaction meeting was organized on 29.04.2024 in collaboration with MATI-Biodiversity Conservation and Social Research Organization, Dehradun. A group of 26 farmers practicing organic strawberry cultivation from Bijnor District of Uttar Pradesh participated during the programme. Programme was chaired by Dr Sunil Kumar, Director, ICAR-IIFSR. Director stressed upon scope and opportunities for organic farming at local, regional, national and international levels. Programme was coordinated by the experts of institute which included lecture cum exhaustive discussion by Dr Chandra Bhanu, (Plant Pathology), Dr P C Ghasal (Agronomy), and Dr Peyush Punia (Fisheries), Dr Poonam Kashyap (Fruit Science).

राजभाषा संबंधी गतिविधियाँ



हिंदी पखवाड़े का आयोजन

भाकृअनुप—भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम, मेरठ में राजभाषा हिंदी के अधिकाधिक प्रयोग को बढ़ावा देने एवं समस्त कार्यालय कर्मियों में राजभाषा हिंदी के प्रति अभिरुचि पैदा करने के उद्देश्य से 10–26



सितंबर 2024 तक हिंदी पखवाड़े का आयोजन किया गया। इस दौरान हिंदी से संबंधित विभिन्न कार्यक्रमों/प्रतियोगिताओं जैसे निबंध लेखन, आशुभाषण, हिंदी सामान्य ज्ञान प्रश्नोत्तरी, हिन्दी टंकण, टिप्पण एवं प्रारूप लेखन के साथ-साथ वर्ष 2023–24 के दौरान हिंदी में सर्वाधिक कार्य/लेखन करने संबंधी प्रतियोगिताओं का आयोजन भी किया गया। सभी प्रतियोगिताओं के विजयी प्रतिभागियों को प्रथम, द्वितीय, तृतीय एवं प्रोत्साहन पुरस्कार देकर सम्मानित किया गया।

उक्त प्रतियोगिताओं में सभी संवर्ग के अधिकारियों एवं कर्मचारियों ने बढ़-चढ़ कर प्रतिभागन किया। पखवाड़े के समापन के अवसर पर संस्थान के निदेशक डॉ. सुनील कुमार ने विजयी प्रतिभागियों को बधाई देते हुए सभी वैज्ञानिकों एवं अधिकारियों से अपने अधिक से

अधिक कार्यालयीन कार्यों को हिंदी में करने तथा शोधकार्यों को हिंदी पत्रिकाओं में लोकप्रिय लेखों के माध्यम से किसानों तक पहुँचा कर उनकी समस्याओं का समाधान करने का आग्रह किया।

वर्ष 2024 के दौरान संस्थान में आयोजित हिंदी कार्यशालाओं का विवरण

क्र. सं.	कार्यक्रम का नाम	दिनांक	माध्यम	प्रतिभागी
1	हिंदी कार्यशाला	एक दिवसीय / 21.03.2024	वर्चुवल	कार्यालय कर्मी एवं आमंत्रित अथिति
2	हिंदी कार्यशाला (कार्यालय एवं प्रयोगशाला सुरक्षा)	एक दिवसीय / 11.06.2024	फिजिकल	कार्यालय कर्मी एवं आमंत्रित अथिति
3	हिंदी कार्यशाला	एक दिवसीय / 25.09.2024	फिजिकल	कार्यालय कर्मी एवं आमंत्रित अथिति
4	हिंदी कार्यशाला	एक दिवसीय / 30.12.2024	वर्चुवल	कार्यालय कर्मी एवं आमंत्रित अथिति



फोटो: हिंदी कार्यशाला (25 सितंबर, 2024)



फोटो: हिंदी कार्यशाला (11 जून, 2024)

कार्यालय एवं प्रयोगशाला सुरक्षा' पर हिंदी कार्यशाला का आयोजन

भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम, मेरठ में दिनांक 11 जून, 2024 को त्रैमासिक हिंदी कार्यशाला का आयोजन किया गया। कार्यशाला का मुख्य विषय 'कार्यालय एवं प्रयोगशाला

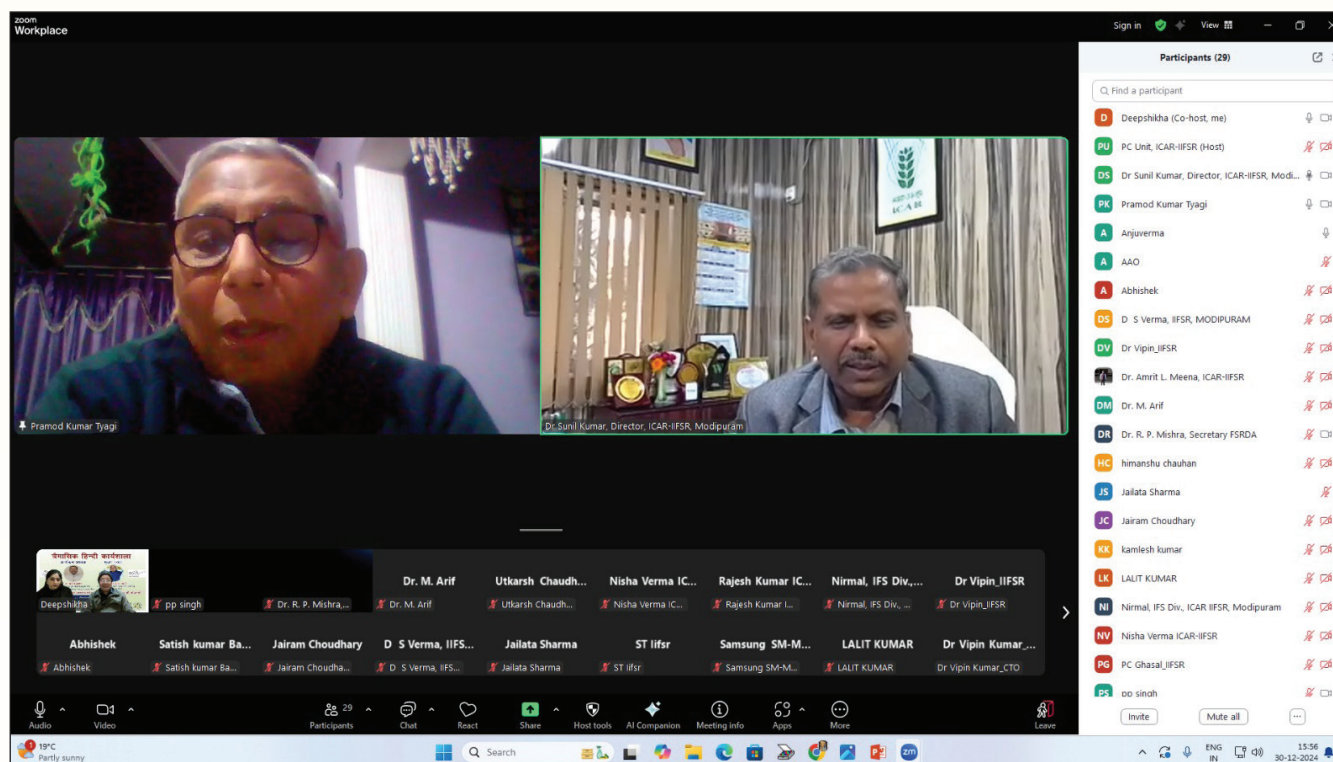
सुरक्षा' पर केंद्रित रहा। कार्यक्रम का उद्घाटन संस्थान के निदेशक एवं कार्यक्रम अध्यक्ष डॉ सुनील कुमार ने किया। निदेशक महोदय ने अपने संबोधन में बताया कि आज के बदलते परिवेश एवं पर्यावरण

में विभिन्न मानव निर्मित एवं प्राकृतिक आपदाओं जैसे आग लगने, गैस रिसाव इत्यादि की घटनाएं आम हो चली हैं और शोध संस्थानों में जहां पर कि प्रयोगशालाओं में विभिन्न प्रकार के रसायनों का प्रयोग होता है, वहां पर इस तरह की आपदाओं की चुनौती निरंतर बनी रहती है। इसलिए सभी संबंधित कार्यालय कर्मियों को इसके प्रति जागरूक एवं प्रबंधन तकनीकी के प्रायोगिक ज्ञान से परिपूर्ण होना चाहिए। कार्यक्रम के मुख्य वक्ता एवं प्रधान वैज्ञानिक डॉ ललित कुमार ने प्रयोगशाला एवं कार्यालय में रसायनों के प्रयोग के दौरान सावधानियों के ऊपर अपना विस्तृत व्याख्यान दिया। कार्यक्रम के

विशिष्ट अतिथि एवं अग्निशमन अधिकारी मेरठ श्री आकाश चौहान ने विभिन्न प्राकृतिक एवं मानव निर्मित आपदाओं जैसे आग लगने, गैस रिसाव, भूकंप इत्यादि के दौरान लिए जाने वाले बचाव व सुरक्षात्मक उपायों के ऊपर अपना व्याख्यान दिया और सभी कार्यालय कर्मियों को आकस्मिक आग की घटनाओं से निपटने हेतु प्रायोगिक टिप्स दिए। उन्होंने घरेलू स्तर पर गैस सिलेंडर में लगने वाली आग एवं उससे निपटने वाले व्यावहारिक तरीकों को प्रयोग करके सिखाया। कार्यक्रम में संस्थान के सभी वर्ग के कर्मचारी, प्रयोगशाला के शोध कर्मियों, वैज्ञानिकों एवं अधिकारियों ने भाग लिया।

संस्थान में वर्ष 2024 के दौरान रा.का.स. की त्रैमासिक बैठकों का विवरण

क्र. सं.	कार्यक्रम	दिनांक
1	रा.का.स. की त्रैमासिक बैठक	06.02.2024
2	रा.का.स. की त्रैमासिक बैठक	10.06.2024
3	रा.का.स. की त्रैमासिक बैठक	23.08.2024
4	रा.का.स. की त्रैमासिक बैठक	27.12.2024



फोटो: हिंदी कार्यशाला (21 मार्च, 2024)



TECHNOLOGY / METHODOLOGY RECOGNIZED BY ICAR, NEW DELHI

Name of Technology	Category	Technology Code	Name of Recipients
Bankable integrated farming systems models for up scaling to the landscape level	Technology	ICAR-NRM-IIFSR-Technology-2024-086	M. Shamim, N. Ravisankar, A.K. Prusty, Raghuvveer Singh, Raghavendra K.J., M.A. Ansari, A.S. Panwar, S. Bhaskar, Rajbir Singh, Sunil Kumar and Pls of AICRPs
Integrated Organic Farming Systems (IOFS) models for Chhattisgarh, Gujarat, Kerala, Meghalaya, Rajasthan, Sikkim and Tamil Nadu	Technology	ICAR-NRM-IIFSR-Technology-2024-087	N. Ravisankar, Amit Kumar, P.C. Jat, M. Shamim, Meraj Alam Ansari Debashis Dutta, Suresh Malik, Poonam Kashyap, Chandra Bhanu, Lalit Kumar, Anup Das, Jayanta Layak, C.K. Thankamani, E. Somasundaram, R. Krishnan, S.K. Sharma, Ravikant Sharma, Ravikant Avasthe, Shaon Kumar Das, Raghavendra Singh, G. Suja, L.J. Desai, M.C. Bhambri, Adikant Pradhan, A.K. Prusty Raghuvveer Singh, Raghavendra, K.J., A.S. Panwar, S. Bhaskar Sunil Kumar and Rajbir Singh
Quantitative analysis of integrated farming systems through typology	Product	ICAR-NRM-IIFSR-Product-2024-088	A.K. Prusty, N. Ravisankar, A.S. Panwar P.C. Ghasal, Mohammad Shamim Poonam Kashyap, M.A. Ansari Sunil Kumar, Jashnjot Kaur J.P. Tetarwal and Jacob D.
Optimizing nutrient management in basmati rice-mustard system during the organic conversion period.	Technology	ICAR-NRM-IIFSR-Technology-2024-089	P.C. Ghasal, Chandra Bhanu, D. Dutta, Jairam Choudhary, Amit Kumar, Chethan Kumar G., A.L. Meena, Lalit Kumar, Kamlesh Kumar, R.P. Mishra, T.P. Swarnam and Sunil Kumar
CA based management practices for major cropping systems of upper Indo-Genetic plain	Technology	ICAR-NRM-IIFSR-Technology-2024-090	Amrit Lal Meena, Raghavendra Singh, L.R. Meena, Sunil Kumar P.C. Ghasal, Chandra Bhanu, Jairam Choudhary Kamlesh Kumar, P.C. Jat and Sunil Kumar

ICAR-NRM-IIFSR-Product-2024-088



INDIAN COUNCIL OF AGRICULTURAL RESEARCH

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(Lead Developer)

Associate Developers

N. Ravisankar, A.S. Panwar
P.C. Ghasal, Mohammad Shamim
Poonam Kashyap, M.A. Ansari
Sunil Kumar, Jashnjot Kaur
J.P. Tatarwal, Jacob D.

of

ICAR-IIFSR, Modipuram

has developed the technology

**Quantitative analysis of integrated
farming systems through typology**

16th July, 2024
New Delhi



(Rajbir Singh)
Assistant Director General (AAF&CC)



(S.K. Chaudhari)
Deputy Director General (NRM)

ICAR-NRM-IIFSR-Technology-2024-089



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Amit Kumar, Chethan Kumar G., A.L. Meena
Lalit Kumar, Kamlesh Kumar, R.P. Mishra
T.P. Swarnam, Sunil Kumar

of

ICAR-IIFSR, Modipuram

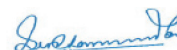
has developed the technology

**Optimizing nutrient management
in basmati rice-mustard system during
the organic conversion period**

16th July, 2024
New Delhi



(Rajbir Singh)
Assistant Director General (AAF&CC)



(S.K. Chaudhari)
Deputy Director General (NRM)

ICAR-NRM-IIFSR-Technology-2024-086



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Raghuvir Singh, Raghavendra K.J.
Meraj Alam Ansari, A.S. Panwar
S. Bhaskar, Rajbir Singh
Sunil Kumar and Pls of AICRPs

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has developed the technology

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systems models for upscaling to
the landscape level**

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(S.K. Chaudhari)
Deputy Director General (NRM)

ICAR-NRM-IIFSR-Technology-2024-087



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N. Ravisankar
(Lead Developer)

Associate Developers

Amit Kumar, P.C. Jat, M. Shamim, Meraj Alam Ansari
Debashis Dutta, Suresh Mallik, Poonam Kashyap, Chandra Bhanu
Lalit Kumar, Anup Das, Jayanta Layak, C.K. Thankamani
E. Somasundaram, R. Krishnan, S.K. Sharma, Ravikant Sharma
Ravikant Avasthe, Shaon Kumar Das, Raghavendra Singh,
G. Suja, L.J. Desai, M.C. Bhambri, Adikant Pradhan, A.K. Prusty
Raghuvir Singh, Raghavendra, K.J., A.S. Panwar, S. Bhaskar
Sunil Kumar, Rajbir Singh

of

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**Integrated Organic Farming Systems (IOFS)
models for Chhattisgarh, Gujarat, Kerala, Meghalaya,
Rajasthan, Sikkim and Tamil Nadu**

16th July, 2024
New Delhi



(Rajbir Singh)
Assistant Director General (AAF&CC)



(S.K. Chaudhari)
Deputy Director General (NRM)

ICAR-NRM-IIFSR-Technology-2024-090



INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Certified that

Amrit Lal Meena
(Lead Developer)

Associate Developers

Raghavendra Singh, L.R. Meena, Sunil Kumar
P.C. Ghasal, Chandra Bhanu, Jairam Choudhary
Kamlesh Kumar, P.C. Jat, Sunil Kumar

of

ICAR-IIFSR, Modipuram

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**CA based management practices
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16th July, 2024
New Delhi



(Rajbir Singh)
Assistant Director General (AAF&CC)



(S.K. Chaudhari)
Deputy Director General (NRM)



AWARDS AND HONOURS

Name of Recipient	Name of Award/Honours	Year of Awards	Awarding Organization and Event Venue
Dr. Sunil Kumar	NAAS Fellow	2024	National Academy of Agricultural Sciences (NAAS)
Dr. M A Ansari	NAAS Associate	2024	National Academy of Agricultural Sciences (NAAS)
Dr. N Ravisankar Dr. M A Ansari	Best Policy Paper Award	2024	ICAR-NAARM, 49 th Foundation Day, Hyderabad
Dr. Kamlesh Kumar	Dr. R. P. Singh Gold Medal for Excellence in Academics and Research	2024	ICAR-IARI, New Delhi
Dr. Nirmal Dr. Kamlesh Kumar Dr. R P Mishra Dr. Sunil Kumar Dr. Raghavendra K J	Best Oral Presentation	2024	SVPUAT, Modipuram, Meerut
ICAR-IIFSR	Best Stall Award (Natural Farming and Nutri-Cereal Cultivation for Farmers' Prosperity – Kisan Mela)	2024	Dr. Rajendra Prasad Central Agricultural University, Pusa, Samastipur, Bihar (24–26 Feb 2024)
ICAR-IIFSR	ICAR Swachhata Pakhwada Award	2024	ICAR
Dr. P C Ghasal	FSRDA Young Scientist Award	2023	FSRDA (Farming Systems Research and Development Association)
Dr. Sunil Kumar	FSRDA Associate Award	2023	FSRDA (Farming Systems Research and Development Association)
Dr. R P Mishra Dr. S Malik Dr. A K Prusty Dr. Amit Nath Dr. Debasish Dutta Dr. Kamlesh Kumar Dr. M Shamim Dr. N Ravisankar Dr. Poonam K ashyp Dr. P C Ghasal	Best Research Team Award	2024	ICAR-IIFSR, Foundation Day, 1 st April 2024, Modipuram
Dr. N Ravisankar Dr. M Shamim Dr. A K Prusty Dr. M A Ansari Dr. Raghuveer Singh Dr. Raghavendra KJ	Team Award for Research on "Sustainable Resource Management for Climate Smart IFS" (AICRP-IFS, Modipuram Centre)	2024	ICAR-IIFSR, 35 th Foundation Day, Modipuram
Dr. M A Ansari	Best Young Scientist Award	2024	ICAR-IIFSR, Foundation Day, 1 st April 2024, Modipuram

Name of Recipient	Name of Award/Honours	Year of Awards	Awarding Organization and Event Venue
Dr. R P Mishra Dr. P Punia Dr. S Malik Dr. P P Singh Dr. Nirmal Dr. Kamlesh Kumar	Best Division Award (Integrated Farming System Division)	2024	ICAR-IIFSR, Foundation Day, 1 st April 2024, Modipuram
ICAR-IIFSR	Cricket Champions – North Zonal Sports Meet	2024	ICAR, North Zone Sports Meet



Dr Sunil Kumar, Director receiving NAAS fellow on 14th July, 2024 at NAAS complex New Delhi



ICAR-IIFSR received Swachhata Pakhwada award- 2023 by ICAR



RECOGNITIONS

- Dr. Sunil Kumar, Member, Committee on mainstreaming Natural Farming Research, Education and Extension.
- Dr. Sunil Kumar, Member, Committee on Regional Consultation on Science of Natural Farming.
- Dr. Sunil Kumar, Member, National Execution Committee, National Mission on Natural Farming.
- Dr. Sunil Kumar, Member, Committee on Draft Operational Guidelines for Climate Resilient Agriculture (CRA) Program.
- Dr. Sunil Kumar, Co-Member, Sub-Committee for preparation of SOP/GFR/POP for generating organic fertilizer and biofertilizer recommendation in Soil Health Care.
- Dr. Sunil Kumar, Member, ICAR-IIFSR representative, working group No.2D: Agriculture Sector-Inter-ministerial working group on commitments on Net zero and to propose strategies.
- Dr. Sunil Kumar, Member, Project Steering Committee (PSC) of TEEB-Agrifood.
- Dr. Sunil Kumar, Member, ICAR-IIFSR representative, Pilot Projects on Carbon Credit against different sustainable farms.
- Dr. Sunil Kumar, ICAR-IIFSR, Anchor, Identification of 100 Clusters in different Agro-climatic zones for implementation of IFS under R&D Program.
- Dr. Sunil Kumar, Member, Institute Management Committee, ICAR-DWR, Jabalpur.
- Dr. Sunil Kumar, Member, Subject Matter Expert for AICRPDA, ICAR-CRIDA, Hyderabad.
- Dr. Sunil Kumar, Member, Selection Committee of ASRB for CAS/ DR, Scientists, Head RRS.
- Dr. Sunil Kumar, Member, Committee on understand APCNP model for the implantation of Natural Farming.
- Dr. N. Ravisankar, Chairman of the subcommittee constituted to formulate common syllabus and curriculum for Diploma and Certificate programmes for Organic Agriculture.
- Dr. M A Ansari, Member of the Agricultural Systems and Management Sectional Committee, BIS, New Delhi.
- Dr. N. Ravisankar, Subject Matter Expert for Crop Production for AICRP on Rapeseed and Mustard -committee constituted by Crop Science division, ICAR, New Delhi.
- Dr. N. Ravisankar, Member of Knowledge Platform committee of MSTC (*Jaivik Kheti* Portal) constituted by Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi.
- Dr. N. Ravisankar, Member of the committee constituted for preparation of Training Manual on Organic Farming and Certification.
- Dr. N. Ravisankar, Member, National Advisory Committee, National Mission on Natural Farming.
- Dr. N. Ravisankar, Member, National Technical Committee for implementing Himalayan Agroecology Initiative (HAI).
- Dr. N. Ravisankar, Member of Institute Management committee for CAZRI, CSSRI, NRRI, ICAR-RCER.
- Dr. N. Ravisankar, Served as Member of the Assessment committee for Scientists under CAS for ICAR-ISRI, Lucknow.
- Dr. Raghavendra Singh, Member of the Assessment committee for Technical Personal under CAS for ICAR-CRIDA, Hyderabad.
- Dr. Raghavendra Singh, Member Secretary of Quinquennial Review Team (2018-2023) of ICAR-IIFSR, Modipuram, AICRP-IFS and AI-NPOF.
- Dr. Raghavendra Singh, Member Secretary Research Advisory Committee of ICAR- IIFSR, Modipuram, Meerut.

MONITORING AND VISITS

University	Centre	Date	Monitored by
PDKV, Akola	Akola (Main)	5-7 April, 2024	Dr. N. Ravisankar Dr. Raghavendra KJ
PDKV, Akola	Warda (OFR)	5-7 April, 2024	Dr. N. Ravisankar Dr. Raghavendra KJ
ANDUAT, Ayodhya	Ayodhya	22-23 June, 2024	Dr. Sunil Kumar
CSKHPKV, Palampur	Palampur	6-7 July, 2024	Dr. N. Ravisankar
PAU, Ludhiana	Ludhiana, Patiala	8 July, 2024	Dr. N. Ravisankar
ANDUAT, Ayodhya	Faizabad	20 July, 2024	Dr. N. Ravisankar
PJTSAU, Hyderabad	Rajendranagar	14 August, 2024	Dr. N. Ravisankar Dr. M. A. Ansari
JNKVV, Jabalpur	Jabalpur	11 September	Dr. Sunil Kumar
BHU, Varanasi	Varanasi	7 October, 2024	Dr. Sunil Kumar
AU, Kota	Kota	7 October, 2024	Dr. N. Ravisankar
SKNAU, Jobner	Durgapura, Bharatpur	8 October, 2024	Dr. N. Ravisankar Dr. M. A. Ansari
TNAU, Coimbatore	Coimbatore, Yethapur	24-28 October, 2024	Dr. N. Ravisankar
CSAUA&T, Kanpur	Kanpur	25 October, 2024	Dr. M. A. Ansari Dr. Raghavendra Singh
ICAR-NRCSS, Ajmer	Ajmer	7 November, 2024	Dr. Sunil Kumar Dr. N. Ravisankar Dr. A. K. Prusty Dr. M. Shamim Dr. M. A. Ansari Dr. Raghuveer Singh Dr. Raghavendra KJ
PAU, Ludhiana	Ludhiana	14 November, 2024	Dr. Sunil Kumar
PAU, Ludhiana	Ludhiana	30 November, 2024	Dr. N. Ravisankar Dr. A. K. Prusty
PAU, Ludhiana	Ludhiana	1 December, 2024	Dr. M. Shamim Dr. Raghuveer Singh Dr. Raghavendra KJ
PJTSAU, Hyderabad	Rajendranagar	23 December, 2024	Dr. N. Ravisankar



MoUs SIGNED

- Signed MoU between ICAR-IIFSR and CIMMYT.
- Signed MoU between ICAR-IIFSR and Department of Fertilizers (DoF).
- Signed MoU between ICAR-IIFSR and Motherhood University Roorkee, Uttarakhand.
- Signed MoU between ICAR-IIFSR and IIWBR, Karnal.
- Signed MoU between ICAR-IIFSR and Prithvi Crop Care Pvt Ltd, Madhya Pradesh.
- Signed MoU between ICAR-IIFSR and NAARM/a-Idea, Hyderabad, Telangana.
- Signed MoU between ICAR-IIFSR and M A Ghani & Sons for a uniform bar tool (Technology license agreement).
- Signed MoU between ICAR-IIFSR and M A Ghani & Sons for a multi-purpose scissor for agriculture (Technology license agreement).
- Signed MoU between ICAR-IIFSR and Acharya Narendra Dev University of Agriculture & Technology, Ayodhya.

IIFSR IN PRESS AND MEDIA



Photo: Podcasting of Integrated Farming System (IFS) and Organic Farming (OF) Technologies by Surya Foundation on 21 October, 2024

ग्रीन इंडिया। ३०-११-२०२४

मेरठ **ग्रीन इंडिया 03**

समेकित कृषि प्रणाली से आय बढ़ा सकते हैं किसान

ग्रीन इंडिया

माछरा। श्रीधर शिवनाथ सिंह सहित्य पोली कारलेज माछरा के बी. एससी कृषि अभिगम वर्ष के छात्र-छात्राओं ने शैक्षिक भ्रमण के दौरान केन्द्रीय आनु अणुसंधान संस्थान तथा भारतीय फसल प्रणाली अनुसंधान संस्थान, मोदीपुरम का भ्रमण किया।

प्रोफेसर विजय कुमार उमराव के नेतृत्व में माछरा डिग्री कालेज के कृषि संकाय के छात्र डिजिट पर गये। शैक्षिक भ्रमण के दौरान छात्रों ने आनु उपादन की एयरोकॉनस तकनीकी की कार्यप्रणाली के बारे में सीखा। परम भ्रमण से पूर्व आनु वैज्ञानिक डॉ. असोक चौहान ने छात्रों को विभिन्न उपस्थेती के लिए उपयुक्त आनु की प्रजातियों के बारे में जानकारी दी। आनु अनुसंधान संस्थान द्वारा विकसित की गयी आनु की विभिन्न किस्मों के बारे में जानकारी दी। यहां से विजय बनने के लिए विजयोना-1, विजयोना-2 एवं विजयोना-3 जैसी कई किस्में, फ्रेम फ्राई बनाने के लिए फ्राई सोन तथा उन्नत फोटोवर्कड किस्में के बारे में बताया। वीडियो के माध्यम से आनु उत्पादन में ड्रेण के इलेमाल के महत्व को बताया गया। फसल रोग विज्ञानी डॉ. मोही लाल ने आनु में लगने वाले विभिन्न रोग, बीमारियाँ एवं उनकी रोकथाम के बारे में जानकारी प्रदान की।

प्रोफेसर विजय उमराव ने आनु अनुसंधान संस्थान के वैज्ञानिकों का आभार एवं धन्यवाद प्रेषित किया। भारतीय फसल प्रणाली अनुसंधान संस्थान भ्रमण के दौरान प्रधान वैज्ञानिक डॉ. वीरूष पुनिष ने समेकित कृषि प्रणाली के माध्यम से खेत एवं किसानों की आय में की मुक्त बढ़ोतरी करने के उपायों के बारे में जानकारी प्रदान की। समेकित कृषि प्रणाली में मछली पालन, पशु पालन, मधुमक्खी पालन, मुर्गी पालन, बागवानी तथा खर उत्पादन की सभी कृषि क्रियाएँ एक साथ एक ही परम में करके किसान अपनी आय एवं बचत को दोगुना या इससे भी अधिक बढ़ा सकते हैं। इस दौरान छात्रों ने मेरठ क्षेत्र में सेब उत्पादन, डूंगन फुट, आड़ उत्पादन, कम्पेस्ट खाद, औषधीय पौधे, मईसम ककज घुर्वानुमान हेतु अल्लवर्बेटरी, परापालन, पशुओं की किस्में, गन्ना की विभिन्न किस्में आदि के बारे में विस्तार से जानकारी प्राप्त की।



डॉ. असोक चौहान ने छात्रों को विभिन्न उपस्थेती के लिए उपयुक्त आनु की प्रजातियों के बारे में जानकारी दी। आनु अनुसंधान संस्थान द्वारा विकसित की गयी आनु की विभिन्न किस्मों के बारे में जानकारी दी। यहां से विजय बनने के लिए विजयोना-1, विजयोना-2 एवं विजयोना-3 जैसी कई किस्में, फ्रेम फ्राई बनाने के लिए फ्राई सोन तथा उन्नत फोटोवर्कड किस्में के बारे में बताया। वीडियो के माध्यम से आनु उत्पादन में ड्रेण के इलेमाल के महत्व को बताया गया। फसल रोग विज्ञानी डॉ. मोही लाल ने आनु में लगने वाले विभिन्न रोग, बीमारियाँ एवं उनकी रोकथाम के बारे में जानकारी प्रदान की।

प्रोफेसर विजय उमराव ने आनु अनुसंधान संस्थान के वैज्ञानिकों का आभार एवं धन्यवाद प्रेषित किया। भारतीय फसल प्रणाली अनुसंधान संस्थान भ्रमण के दौरान प्रधान वैज्ञानिक डॉ. वीरूष पुनिष ने समेकित कृषि प्रणाली के माध्यम से खेत एवं किसानों की आय में की मुक्त बढ़ोतरी करने के उपायों के बारे में जानकारी प्रदान की। समेकित कृषि प्रणाली में मछली पालन, पशु पालन, मधुमक्खी पालन, मुर्गी पालन, बागवानी तथा खर उत्पादन की सभी कृषि क्रियाएँ एक साथ एक ही परम में करके किसान अपनी आय एवं बचत को दोगुना या इससे भी अधिक बढ़ा सकते हैं। इस दौरान छात्रों ने मेरठ क्षेत्र में सेब उत्पादन, डूंगन फुट, आड़ उत्पादन, कम्पेस्ट खाद, औषधीय पौधे, मईसम ककज घुर्वानुमान हेतु अल्लवर्बेटरी, परापालन, पशुओं की किस्में, गन्ना की विभिन्न किस्में आदि के बारे में विस्तार से जानकारी प्राप्त की।

किसानों की चुनौतियों का समाधान के लिए नवाचारी समाधान करें विकसित

● जनवाणी संवाददाता, मोदीपुरम

भारतीय कृषि अनुसंधान परिषद के महानिदेशक डॉ. हिमांशु पाठक और प्राकृतिक संसाधन प्रबंधन डिवीजन आईसीएआर के उप महानिदेशक डॉ. एसके चौधरी ने सोमवार को भारतीय कृषि प्रणाली अनुसंधान संस्थान के नवनिर्मित गेस्ट हाउस और अंतरराष्ट्रीय मानक रेफरल ऑर्गेनिक फार्मिंग लैब का उद्घाटन किया। इस दौरान उन्होंने आलू अनुसंधान केंद्र का भी निरीक्षण किया और विभिन्न विषयों पर वैज्ञानिकों से मंत्रणा की। कार्यक्रम में उत्कृष्ट वैज्ञानिकों को तकनीकी प्रमाण पत्र देकर सम्मानित किया गया। इसके अतिरिक्त गोबरधन योजना के तहत जैविक कृषि पर केंद्रित एक परियोजना का भी उद्घाटन किया गया। डॉ. हिमांशु पाठक ने कहा कि यह दृष्टिकोण वर्तमान राष्ट्रीय आवश्यकताओं के अनुरूप होना चाहिए। उन्होंने वैज्ञानिकों से अनुरोध किया



कि वे भारतीय किसानों की चुनौतियों का समाधान करने के लिए नवाचारी समाधान विकसित करें और विकसित भारत के दृष्टिकोण में योगदान दें।

आईआईएफएसआर के निदेशक डॉ. सुनील कुमार ने संस्थान की प्रमुख अनुसंधान उपलब्धियों और किसानों तक पहुंचने के



प्रयासों के बारे में जानकारी दी। उप महानिदेशक डॉ. चौधरी ने कहा कि ये संस्थान के समग्र विकास के लिए अत्यंत आवश्यक हैं। डॉ. पाठक ने भविष्य के फार्म की अवधारणा के बारे में भी बताया जिसमें सिमुलेशन मॉडलिंग और आधुनिक तकनीकों के उपयोग के माध्यम से कृषि

योजना और वास्तविक समय निर्णय-निर्माण को सशक्त बनाने का विचार शामिल है। इस दौरान संस्थान के निदेशक डॉ. सुनील कुमार, केंद्रीय पशु अनुसंधान संस्थान के निदेशक डॉ. एके मोहंती और केंद्रीय आलू अनुसंधान संस्थान क्षेत्रीय स्टेशन के प्रमुख डॉ. आरके सिंह समेत सभी वैज्ञानिक मौजूद रहे।

कृषि प्रणाली संस्थान में बैठक का आयोजन



मोदीपुरम (जनवाणी) : भारतीय कृषि प्रणाली अनुसंधान संस्थान की 10वीं शोध सलाहकार समिति की बैठक का आयोजन किया गया। बैठक की अध्यक्षता भारतीय कृषि अनुसंधान परिषद, नई दिल्ली के पूर्व उप-महानिदेशक डा. केएम वजरबरुआ ने कहा कि कृषि प्रणाली संस्थान की शोध उपलब्धियों की सराहना की। भारतीय कृषि अनुसंधान परिषद के सहायक निदेशक डा. राजवीर सिंह ने बदलती हुई जलवायु परिस्थितियों के अंतर्गत, खेती के खर्च को घटाने एवं पर्यावरण को संरक्षित रखने के लिए कृषि में प्रीसीजन फार्मिंग एवं प्राकृतिक खेती के तरीकों के समावेश की सलाह दी। विभिन्न विभागों के विभागध्यक्षों ने अपने-अपने विभागों की प्रगति रिपोर्ट को प्रस्तुत किये। समिति के सदस्य सचिव डा. राघवेंद्र सिंह ने कार्यक्रम का समन्वयन किया।



हर खबर के लिए सख्त

सक्षम पंजाब

PUNHIN01933-TC



भारत सरकार द्वारा मान्यता प्राप्त हिंदी समाचार पत्र, मुख्य संपादक केवल कृष्ण, 98884-72903, 70091-30672

5 दिवसीय MSME प्रायोजित कौशल विकास प्रशिक्षण कार्यक्रम का आयोजन 'कृषि अपशिष्ट से धन: जैविक खेती के घटकों के माध्यम से अवसर और उद्यमिता'

केवल कृष्ण
जालंधर : डॉ. बी.आर. अंबेडकर राष्ट्रीय प्रौद्योगिकी संस्थान (ठकड़) जालंधर के कौशल विकास केंद्र द्वारा 20 से 24 जनवरी 2025 तक 'कृषि अपशिष्ट से धन: जैविक खेती के घटकों के माध्यम से अवसर और उद्यमिता' विषय पर 5 दिवसीय कौशल विकास प्रशिक्षण कार्यक्रम आयोजित किया गया। यह कार्यक्रम भारत सरकार के सूक्ष्म, लघु और मध्यम उद्यम मंत्रालय (MSME) द्वारा प्रायोजित था। इस कार्यक्रम का उद्देश्य नवोदित उद्यमियों, किसानों और छात्रों को कृषि अपशिष्ट के सतत धन-सृजन के लिए नवीन तरीकों से परिचित कराना था। इस पहल ने जैविक

खेती के घटकों का उपयोग कर लाभदायक व्यावसायिक अवसरों के निर्माण और पर्यावरण के अनुकूल कृषि पद्धतियों को बढ़ावा देने पर ध्यान केंद्रित किया।

कार्यक्रम का उद्घाटन प्रो. अजय बंसल, रजिस्ट्रार, NIT जालंधर ने मुख्य अतिथि के रूप में किया। इस अवसर पर भारतीय कृषि प्रणाली अनुसंधान संस्थान (IIFSA) के विशेषज्ञ भी उपस्थित रहे। उद्घाटन समारोह में प्रो. एस. के. सिन्हा (डीन, फैकल्टी वेलफेयर), प्रो. रोहित मेहरा (डीन, रिसर्च और कंसल्टेंसी), प्रो. एच. एम. मित्तल (प्रमुख, भौतिकी विभाग), प्रो. ए. एल. संगल (प्रमुख, कंप्यूटर विज्ञान और अभियांत्रिकी



विभाग) और डॉ. प्रवीन मलिक (प्रमुख, कौशल विकास केंद्र) जैसी प्रमुख हस्तियां मौजूद रहीं। कार्यक्रम का समन्वयन डॉ. समयवीर सिंह (कंप्यूटर विज्ञान और अभियांत्रिकी विभाग) और विजय कुमार (सूचना प्रौद्योगिकी विभाग) द्वारा किया गया।

कार्यक्रम के पहले दिन का व्याख्यान डॉ. चंद्र भानु, प्रधान

वैज्ञानिक, IIFSA, मोदिपुरम, उत्तर प्रदेश ने दिया। उन्होंने जैविक और प्राकृतिक खेती में उभरती हुई विधियों की जानकारी दी। इसके बाद, डॉ. जयराम चौधरी, वैज्ञानिक, IIFSA ने रासायनिक-मुक्त उर्वरकों और फसल अवशेषों के अपघटनकारकों की तैयारी पर एक व्यावहारिक प्रदर्शन किया और टिकाऊ कृषि पद्धतियों

पर जोर दिया।

यह प्रशिक्षण कार्यक्रम प्रतिभागियों के लिए सिद्धांत और व्यावहारिक ज्ञान के बीच की खाई को पाटने का एक प्रभावी माध्यम साबित हुआ। कार्यक्रम ने प्रतिभागियों को जैविक खेती और कृषि अपशिष्ट प्रबंधन में व्यावहारिक अंतर्दृष्टि प्रदान की।

डॉ. बी.के. कनौजिया, निदेशक, एनआईटी जालंधर ने संदेश के माध्यम से कहा कि यह पहल कौशल विकास और उद्यमिता के प्रति एनआईटी जालंधर की अटूट प्रतिबद्धता को दर्शाती है, जो भारत सरकार के एमएसएमई कार्यक्रमों के माध्यम से नवाचार और आत्मनिर्भरता को बढ़ावा देने के दृष्टिकोण के अनुरूप है।

स्वच्छता ही सेवा अभियान के अंतर्गत कार्यक्रम का आयोजन



मोदीपुरम : भारतीय कृषि प्रणाली अनुसंधान संस्थान के तत्वावधान में खतौली ब्लॉक के टबीता गांव के प्राथमिक विद्यालय पर स्कूल के छात्रों के साथ स्वच्छता ही सेवा अभियान के अंतर्गत कार्यक्रम का आयोजन किया गया। कार्यक्रम में वरिष्ठ वैज्ञानिक डा. सुनील कुमार ने छात्रों और अध्यापकों के समक्ष दैनिक जीवन में स्वच्छता के महत्व व उसके उद्देश्यों को पूरा करने के लिए सभी की जिम्मेदारियों के बारे में बताया। वैज्ञानिक डा. विपिन चौधरी एवं तकनीकी अधिकारी डा. योगेंद्र सिंह ने प्राथमिक विद्यालय के कैंपस को स्वच्छ रखने के बारे में बताया। प्रभारी प्रधानाचार्य दीपा रावत ने स्वच्छता के प्रति छात्रों को जागरूक करने के लिए स्कूल द्वारा किए जा रहे प्रयासों के बारे में जानकारी दी। कार्यक्रम का संचालन डा. सुनील कुमार, वरिष्ठ वैज्ञानिक ने किया।

ICAR के महानिदेशक डॉ हिमांशु पाठक ने बताया भविष्य के फार्म की अवधारणा

📅 November 5, 2024 🧑 naveen chauhan



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न्यूज 127.

कृषि अनुसंधान एवं शिक्षा विभाग (DARE) के सचिव और भारतीय कृषि अनुसंधान परिषद (आईसीएआर) के महानिदेशक डॉ. हिमांशु पाठक और प्राकृतिक संसाधन प्रबंधन डिवीजन, आईसीएआर के उप महानिदेशक डॉ. एस.के. चौधरी ने मेरठ के मोदीपुरम स्थित भारतीय कृषि प्रणाली अनुसंधान संस्थान (IIFSR) का दौरा किया। संस्थान के निदेशक डॉ. सुनील कुमार, केंद्रीय पशु अनुसंधान संस्थान (CIRC) के निदेशक डॉ. ए.के. मोहंती और केंद्रीय आलू अनुसंधान संस्थान (CPRI) क्षेत्रीय स्टेशन के प्रमुख डॉ. आर.के. सिंह ने अतिथियों का स्वागत किया।



पौधरोपण किया



कृषि प्रणाली संस्थान ने मनाया पर्यावरण दिवस

मेरठ: भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम, मेरठ द्वारा आज दिनांक 5 जून 2024 को विश्व पर्यावरण दिवस का आयोजन किया गया। इस बार विश्व पर्यावरण दिवस का विषय हमारी भूमि हमारा भविष्य रखा गया है। इस दौरान, मेरठ जनपद के रोहटा ब्लॉक के पेपला गांव में लाइफ मिशन के अंतर्गत, सतत खाद्य प्रणाली पर एक किसान गोष्ठी एवं पौधरोपण कार्यक्रमों का आयोजन किया गया। कार्यक्रम के दौरान प्रधान वैज्ञानिक डॉक्टर फूलचंद जाट ने किसानों को पर्यावरण सुरक्षा हेतु टिकाऊ कृषि प्रणाली के गुर सिखाए। प्रधान वैज्ञानिक डॉ. चंद्रभानु ने किसानों को बताया कि मनुष्य की अधिकतर आवश्यकताएं हमारे पर्यावरण के माध्यम से ही पूरी होती हैं अतः हम सब की जिम्मेदारी बनती है कि, हम अपने पर्यावरण का ख्याल भी तन मन और धन से करें। हमें अपने प्राकृतिक संसाधनों जैसे भूमि, जल एवं वातावरण की सुरक्षा करनी चाहिए और उसे प्राकृतिक रूप में बनाए रखने का प्रयास करना चाहिए, ताकि हम अपनी आने वाली पीढ़ियों को एक सुरक्षित वातावरण दे सकें। डॉ. सुनील कुमार एवं डॉ. रघुवीर सिंह ने कृषि प्रणाली के विविधीकरण द्वारा पर्यावरण को संभालने के ऊपर अपने-अपने विचार रखे। कार्यक्रम का संचालन डॉ. निर्मल ने किया। कार्यक्रम के दौरान वातावरण को सुरक्षित रखने के उद्देश्य से, बहुउद्देशीय फल वृक्षों के 70 पौधों का वितरण भी किसानों को किया गया। कार्यक्रम में पेपला गांव के किसानों सहित कुल 100 लोगों ने भाग लिया।

स्वयं सहायता समूह की महिलाओं को समेकित कृषि प्रणाली के गुर सिखाए



धारा न्यूज, मोदीपुरम : भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम, मेरठ में दिनांक 9 जुलाई, 2024 को करनाल की मधुबन से आई हुई शिव गौरा स्वयं सहायता समूह की महिलाओं को समेकित कृषि प्रणाली के विभिन्न पहलुओं पर एग्री बिजनेस इनक्यूबेशन सेंटर के अंतर्गत प्रशिक्षण दिया गया। नाबार्ड द्वारा वित्त पोषित इस स्वयं सहायता समूह की 25 महिलाओं को दुग्ध एवं दुग्ध उत्पादों के मूल्यवर्धन, कृषि द्वारा उत्पादित खाद्यान्नों के मूल्य वर्धन व विभिन्न उत्पादों के बनाने, पैकिंग व विपणन संबंधी विस्तृत जानकारी दी गई, जिससे कि महिलाओं को अधिक लाभ कमाने के अवसर मिल सकें। कार्यक्रम का संचालन परियोजना अधिकारी डॉक्टर आर पी मिश्र, प्रधान वैज्ञानिक डॉक्टर पीयूष पुनिया, वैज्ञानिक डॉक्टर निशा वर्मा, डॉ. सुनील कुमार, डॉ. विपिन कुमार एवं यंग प्रोफेशनल शिवम राठी आदि ने किया।

स्वच्छता के प्रति किया जागरूक

मोदीपुरम। भारतीय कृषि प्रणाली अनुसंधान संस्थान मोदीपुरम की ओर से टबीता गांव के प्राथमिक विद्यालय में स्वच्छता ही सेवा कार्यक्रम किया गया। इसमें छात्रों को स्वच्छता के प्रति जागरूक किया गया। स्वच्छता पेंटिंग प्रतियोगिता हुई।

वरिष्ठ वैज्ञानिक डॉ. सुनील कुमार ने दैनिक जीवन में स्वच्छता का महत्व बताया और जिम्मेदारियों से अवगत कराया। वैज्ञानिक डॉ. विपिन कुमार चौधरी, तकनीकी अधिकारी डॉ. योगेंद्र सिंह ने विद्यालय कैपस को स्वच्छ रखने के ऊपर विचार रखे। प्रभारी प्रधानाचार्य दीपा रावत ने स्वच्छता के प्रति छात्रों को जागरूक किया। स्कूल कैपस को साफ रखने को लेकर खरपतवारनाशक का छिड़काव किया गया। पेंटिंग प्रतियोगिता में विजेता रहने वाले विद्यार्थियों को संस्थान के वैज्ञानिकों ने पुरस्कार देकर सम्मानित किया। कार्यक्रम का संचालन डॉ. सुनील कुमार ने किया। संवाद



भोपाल मंगलवार 18 से 24 जून 2024

आंचलिक

समन्वित कृषि प्रणाली मॉडल से बढ़ेगी कृषकों की आमदनी

कृषक वैज्ञानिक संगोष्ठी का आयोजन

मंडला। परिवर्तनशील कृषि पारिस्थितिकी परियोजना अंतर्गत कृषक वैज्ञानिक संगोष्ठी का आयोजन कृषि विज्ञान केन्द्र सभागार में किया गया। यह परियोजना भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम मेरठ द्वारा तहसील नारायणगंज के चिरई डोंगरी, चौकी, देवरी, मझगांव एवं कोडरामाल में चयनित कृषक प्रक्षेत्रों पर संचालित की जा रही है। भारतीय कृषि प्रणाली अनुसंधान संस्थान के वरिष्ठ वैज्ञानिक एवं परियोजना प्रमुख डॉ. मोहम्मद शमीम ने बताया कि परियोजना का मुख्य उद्देश्य समन्वित कृषि प्रणाली में नई तकनीकों के समावेशन द्वारा कृषकों की आय में वृद्धि करना तथा पारिस्थितिकी को संतुलित रखना है।

कार्यक्रम में ऑनलाइन माध्यम से जुड़े अंतर्राष्ट्रीय जल प्रबंधन संस्थान के वैज्ञानिक डॉ. गोपाल ने कहा कि इस परियोजना के अंतर्गत समन्वित कृषि प्रणाली मॉडल से प्रक्षेत्र की उत्पादकता, कृषकों की आमदनी बढ़ने के साथ-साथ मृदा एवं जल भी संरक्षित होगा। उक्त परिचर्चा में उपसंचालक कृषि, मंडला मधु



अली ने समन्वित कृषि प्रणाली की विभिन्न तकनीकों को कृषकों को अपनाने हेतु प्रेरित किया। कार्यक्रम में नारायणगंज जनपद के मुख्य कार्यपालन अधिकारी गौरीशंकर डहेरिया एवं कृषि विज्ञान केन्द्र के वरिष्ठ वैज्ञानिक एवं प्रमुख डॉ. के.व्ही. सहारे ने मंडला जिले में लाख उत्पादन की संभावनाओं पर विस्तार से चर्चा की। कार्यक्रम का संचालन वरिष्ठ सस्य वैज्ञानिक डॉ. नम्रता जैन ने किया। उक्त बैठक में जवाहरलाल नेहरू कृषि विश्वविद्यालय के प्रमुख वैज्ञानिक डॉ. प्रवीण कुमार मिश्रा, डॉ. विकास गुप्ता, कृषि विज्ञान केन्द्र के वैज्ञानिक एवं प्रदान एनजीओ के प्रतिनिधि श्री साहिब के साथ साथ नारायणगंज विकासखण्ड के 40 कृषकों ने भाग लिया।

कृषि गोष्ठी में किसानों को समेकित कृषि की जानकारी दी

दिव्य विश्वास प्रतिनिधि
बिनीली। भारतीय कृषि प्रणाली अनुसंधान संस्थान मोदीपुरम मेरठ की ओर से शुक्रवार को जौहड़ी के पंचायत सचिवालय पर कृषक गोष्ठी हुई। जिसमें किसानों को समेकित कृषि की जानकारी दी गयी साथ ही फसलों में कोई समस्या होने संबंधित किसानों से फार्म भी भरवाए।

आई एफ एस आर डायरेक्टर डॉ. सुनील कुमार व आईएफएस विभागध्यक्ष डॉ. आरपी मिश्रा के निदेशानुसार कृषि वैज्ञानिक डॉ. सुनील कुमार ने किसानों को बताया कि अनुसंधान ने बागपत के जौहड़ी व



छाया: दिव्य विश्वास

मवालीखेड़ा को चयनित किया गया। बैठक में उन्होंने किसानों को समेकित कृषि में कम खर्च करके अधिक लाभ लिया जा सकता है। उन्होंने किसानों

को फलदार पेड़, सब्जी की खेती, मधुमक्खी पालन, मछली पालन, मुर्गी पालन आदि करने विस्तार से जानकारी दी। इस दौरान कुशल सहायक सुभाष

सोहनपाल सिंह, सोमपाल सिंह, चरण सिंह, प्रकाश, यशपाल सिंह, कपिल, राजेश शर्मा, देवेन्द्र, राजवीर कश्यप, धीरज आदि किसान उपस्थित रहे।

चंद शर्मा, मृदुल त्यागी, विशाल शर्मा ने 20 किसानों को चयनित कर उनकी फसलों में किसी प्रकार की कोई समस्या बीमारी के संबंधित फार्म भी भरवाए ताकि अनुसंधान द्वारा कृषि कार्यशाला लगाकर किसानों को उत्तम फसल व रोगों से बचाव की जानकारी दी जाएगी। गोष्ठी में ग्राम प्रधान

Quniquennial Review Team' evaluates project work at Palampur Agri-versity

Palampur: A meeting of Quniquennial Review Team (QRT) to review the 'All India Coordinated Research Project on Integrated Farming system' and 'All India Network Programme on Organic Farming' is being organized at Farm Varsity, Palampur on 6-7 July, 2024 under the chairmanship of Dr. Arvind Kumar, Former DGO (ICAR) & Former Vice Chancellor of Rani Lakshmi Bai Central Agricultural University, Jhansi; wherein scientists from different states presented last five years research & extension activities of their respective centers. The meeting at Farm University, Palampur, under Dr. Arvind Kumar's chairmanship, saw discussions on advancing Integrated Farming System Models and enhancing nutritional security through productive farming practices and bio-fortification.



the development of Integrated Farming System Models to sustain the production and conserve the environment on long term basis. The chairman of the event specifically stressed upon the nutritional security

The scientists from different states presented last five years research & extension activities of their respective centers

of the large population of the country through highly productive farming system components coupled with adoption of bio-fortification approaches. The other dignitaries Dr. VS Thakur, Former Vice Chancellor, Solan University, Dr. AK

Singh, Former Vice Chancellor, Bihar Agril. University, Dr. Kusumakar Sharma, Former ADG, HRD (ICAR), Dr. Vandana Prasad, Former Additional Commissioner, INM Division, Deptt. of Agriculture & Farmers Welfare (GOI), Dr. Sunil Kumar, Director, ICAR-Indian Institute of Farming System Research, Dr. N. Ravikanth, PC (IFS) & NIP, AINP-OF, ICAR-IISR, Dr. Rajivendra Singh, Member Secretary, QRT also graced the occasion. They gave their valuable suggestions for the improvement of quality research under integrated farming system. The

Himachal Saver

The Saver Times

किसानों को समेकित कृषि की जानकारी दी

भारतीय कृषि प्रणाली अनुसंधान संस्थान की ओर से जौहड़ी में हुई कृषि गोष्ठी

● जनवाणी संवाददाता, बिनीली

भारतीय कृषि प्रणाली अनुसंधान संस्थान मोदीपुरम मेरठ की ओर से शुक्रवार को जौहड़ी के पंचायत सचिवालय पर कृषक गोष्ठी का आयोजन किया गया। जिसमें किसानों को समेकित कृषि की जानकारी दी गयी साथ ही फसलों में कोई समस्या होने संबंधित किसानों से फार्म भी भरवाए।

कृषि वैज्ञानिक डॉ. सुनील कुमार ने किसानों को बताया कि अनुसंधान ने बागपत के जौहड़ी व मवालीखेड़ा को चयनित किया गया। बैठक में उन्होंने किसानों को समेकित कृषि में कम खर्च करके अधिक लाभ लिया जा सकता है। उन्होंने किसानों को फलदार पेड़, सब्जी की खेती, मधुमक्खी पालन,



जौहड़ी में किसानों को समेकित कृषि की जानकारी दी

मछली पालन, मुर्गी पालन आदि करने विस्तार से जानकारी दी। इस दौरान कुशल सहायक सुभाष चंद शर्मा, मृदुल त्यागी, विशाल शर्मा ने 20 किसानों को चयनित किया। उनकी फसलों में किसी प्रकार की कोई समस्या या बीमारी होने से संबंधित फार्म भी भरवाए। जिससे कि अनुसंधान

द्वारा कृषि कार्यशाला लगाकर किसानों को उत्तम फसल व रोगों से बचाव की जानकारी दी जाएगी। गोष्ठी में ग्राम प्रधान सोहनपाल सिंह, सोमपाल सिंह, चरण सिंह, प्रकाश, यशपाल सिंह, कपिल, राजेश शर्मा, देवेन्द्र, राजवीर कश्यप, धीरज आदि किसान उपस्थित रहे।

कृषि प्रणाली संस्थान ने मनाया 35वां स्थापना दिवस

● प्राकृतिक संसाधनों के चरण जैसी चुनौतियों को ध्यान में रखते हुए अपने शोध कार्यों को परिष्कृत करने की दी सलाह

पंकज शर्मा

घारा न्यूज संवाददाता । मेरठ

भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम, मेरठ में दिनांक सोमवार को 35वें स्थापना दिवस का आयोजन किया गया। आज ही के दिन सन 1989 को संस्थान की नींव रखी गई थी।

कार्यक्रम का उद्घाटन भारतीय कृषि अनुसंधान परिषद नई दिल्ली के उप-महानिदेशक एवं कार्यक्रम अध्यक्ष डॉ सुरेश कुमार चौधरी ने किया। डॉक्टर के. के. सिंह कुलपति, सरदार वल्लभभाई पटेल कृषि एवं प्रौद्योगिकी विश्वविद्यालय, मेरठ कार्यक्रम के मुख्य अतिथि रहे। भारतीय कृषि अनुसंधान परिषद, नई दिल्ली के सहायक महानिदेशक डॉ राजवीर सिंह एवं



डॉक्टर ए. वेलमुरुगन; गोपशु अनुसंधान संस्थान, मेरठ के निदेशक डॉक्टर ए. के. मोहंती; एवं केंद्रीय आलू अनुसंधान संस्थान, क्षेत्रीय केंद्र, मोदीपुरम के अध्यक्ष डॉ आर. के. सिंह कार्यक्रम के विशिष्ट अतिथि रहे।

कार्यक्रम अध्यक्ष डॉ सुरेश कुमार चौधरी ने अपने संबोधन के दौरान देश की खाद्य, पोषण एवं आजीविका सुरक्षा के ऊपर किए गए उत्कृष्ट शोध कार्यों हेतु कृषि प्रणाली संस्थान की सराहना

करते हुए, संस्थान को इस स्तर तक पहुंचाने हेतु, पूर्व एवं वर्तमान निदेशकों की भूरि-भूरि प्रशंसा की। उन्होंने वैज्ञानिकों से बदलते हुए अंतर्राष्ट्रीय परिदृश्य, कम जल की उपलब्धता, बदलती जलवायु परिस्थितियों एवं प्राकृतिक संसाधनों के चरण जैसी चुनौतियों को ध्यान में रखते हुए अपने शोध कार्यों को परिष्कृत करने की सलाह दी। कार्यक्रम के मुख्य अतिथि एवं सरदार पटेल कृषि विश्वविद्यालय,

मेरठ के कुलपति डॉक्टर के. के. सिंह ने अपने संबोधन के दौरान कृषि प्रणाली संस्थान के निदेशक डॉ सुनील कुमार एवं उनकी टीम की प्रशंसा करते हुए संस्थान द्वारा विकसित की गई कृषि प्रणाली तकनीकों के प्रभाव का अध्ययन किसानों के प्रक्षेत्र पर करने की सलाह दी।

संस्थान के निदेशक डॉक्टर सुनील कुमार ने कार्यक्रम के प्रारंभ में सभी अतिथियों का स्वागत किया और संस्थान की पिछले 1 वर्ष के अवधि की प्रगति रिपोर्ट प्रस्तुत की। उन्होंने बताया कि कृषि प्रणाली संस्थान ने 63 से अधिक समेकित कृषि प्रणाली मॉडल विकसित किए हैं जिनमें किसानों की आय को तीन से लेकर 5 गुना तक बढ़ाने की क्षमता है। इन कृषि प्रणाली मॉडल को अपनाकर किसान बाजार से खरीदे जा रहे रासायनिक उर्वरकों की मात्रा 41 से लेकर 66 प्रतिशत तक घटा सकते हैं।

कृषि प्रणाली संस्थान में कृषि मंत्रालय, भारत सरकार के अतिरिक्त सचिव फ़ैज अहमद किदवाई का भ्रमण

का न्यूज (राजकोट, मेरठपुर)

भारतीय कृषि प्रणाली अनुसंधान संस्थान मोदीपुरम मेरठ में भूपद को भारत सरकार कृषि मंत्रालय के अतिरिक्त सचिव फ़ैज अहमद किदवाई ने भ्रमण किया। अपने भ्रमण के दौरान सचिव ने कृषि प्रणाली संस्थान में जैविक एवं प्राकृतिक खेती, पन्ने के फसल विविधकरण, जैविक कृषि प्रणाली मॉडल व समेकित कृषि प्रणाली के ऊपर चल रही विभिन्न परियोजनाओं के अंतर्गत लगे हुए प्रयोगों का अवलोकन किया। संस्थान में बहुउद्देशीय पृष्ठों के पौधारेण के परभाव अतिरिक्त सचिव महोदय ने संस्थान के वैज्ञानिकों के साथ यहां पर चल रही शोध परियोजनाओं के ऊपर गहन विचार विमर्श किया। अपने संबोधन में उन्होंने बताया कि कृषि प्रणाली संस्थान में, समेकित कृषि प्रणाली के ऊपर चल रही परियोजनाएँ



भारत सरकार द्वारा चिन्हित राष्ट्रीय चुनौतियों को ध्यान में रखकर परिष्कृत की जा रही हैं। संस्थान द्वारा विकसित समेकित कृषि प्रणाली मॉडल केवल किसानों की आय बढ़ाने में ही योगदान नहीं दे रहे, बल्कि पर्यावरण को संतुलित करने में भी अपनी महत्वपूर्ण भूमिका निभा रहे हैं। उन्होंने यह भी बताया कि पर्यावरण अनुकूल समेकित कृषि प्रणाली मॉडल

अपनाकर किसान सर्वाधिक कार्वन मांकेट में अपनी भागीदारी करके अतिरिक्त आय भी अर्जित कर सकते हैं। पूर्व में कृषि प्रणाली संस्थान के निदेशक डॉक्टर सुनील कुमार ने सभी अतिथियों का स्वागत किया और संस्थान की प्रगति के बारे में अपना व्याख्यान दिया। निदेशक महोदय ने कहा कि कृषि प्रणाली संस्थान भारत के 23 राज्यों व केंद्र शासित प्रदेशों के



लिए 74 तरह के समेकित कृषि प्रणाली मॉडल विकसित किए हैं जिनमें किसानों की आय को 3 से लेकर 5 गुना तक बढ़ाने की क्षमता है। इनके साथ ही साथ ये कृषि प्रणाली मॉडल जलवायु परिवर्तन की चुनौतियों को ध्यान में रखते हुए डिजाइन किए गए हैं जिससे, किसानों को इन चुनौतियों से निपटने में भी मदद मिलेगी। समेकित

कृषि प्रणाली पर अखिल भारतीय सर्वान्वित शोध परियोजना के समन्वयक डॉक्टर एन रविशंकर ने बताया कि, कृषि प्रणाली संस्थान ने 62 से अधिक फसल प्रणालियों के लिए जैविक उत्पादन पैकेज विकसित किए हैं एवं विभिन्न प्रसार माध्यमों से किसानों के उपयोग हेतु प्रेषित भी कर दिए गए हैं। कार्यक्रम के दौरान डॉक्टर

आर पी थिरु, डॉक्टर टी पी पौषू पुनिया, डॉक्टर पी सी चंद्रभानु, डॉ एल आर मोण, डॉक्टर देवेन्द्र कुमार, डॉक्टर मोहम्मद सलीम, डॉक्टर मेराज आलम अंसारी आदि उपस्थित रहे। संस्थान डॉक्टर वृत्तम कश्यप ने किया। डॉक्टर राधेवेंद्र सिंह ने धन्यवाद ज्ञापन दिया।

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भारतीय कृषि प्रणाली अनुसंधान संस्थान में शुरू हुआ गाजर घास जागरूकता सप्ताह

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मोदीपुरम स्थित भारतीय कृषि प्रणाली अनुसंधान संस्थान में गाजर घास जागरूकता सप्ताह का शुभारंभ किया गया। 16 अगस्त से शुरू हुए जागरूकता सप्ताह का शुभारंभ संस्थान के निदेशक डॉ सुनील कुमार ने किया।

इस दौरान अपने संबोधन में उन्होंने कहा कि कुछ वर्षों पहले तक यह घास सिर्फ अनुपयोगी भूमि, बंजर भूमि, रेलवे लाइन के किनारे या सड़क के किनारे खाली पड़ी जमीन में ही पायी जाती थी। परंतु आज इसने हमारी खेती योग्य भूमि में भी प्रवेश कर लिया है। यह घास हमारी फसलों को नुकसान पहुंचा रही है। गाजर घास से निकलने वाले एलिलो केमिकलस स्थानीय वनस्पतियों का अंकुरण कम कर धीरे धीरे उन्हें विस्थापित कर देते हैं। इसीलिए यह जैव विविधता के लिए खतरा है। उन्होंने इस हानिकारक गाजरघास को नियंत्रित करने एवं इसके उन्मूलन के लिए सदैव तत्पर रहने के लिए वैज्ञानिकों और किसानों को आगाह किया।

डॉ राघवेंद्र सिंह विभागध्यक्ष सीएसआरएम ने गाजरघास के दुष्प्रभावों के बारे में बताया। उन्होंने बताया कि गाजर घास के लगातार संपर्क में रहने से मनुष्यों में त्वचा सम्बंधी रोग (डर्माटाइटिस), एलर्जी, बुखार, दमा इत्यादि बीमारियां हो जाती हैं। इस कार्यक्रम के दौरान उपस्थित लोगों ने संस्थान के प्रक्षेत्र पर गाजर घास को उखाड़ा।

इस कार्यक्रम में डॉ आरपी मिश्रा, डॉ पीसी जाट, डॉ चन्द्रभानु, डॉ सुरेश मलिक, डॉ पुष्पेंद्र सिंह, डॉ सुनील कुमार, डॉ पीसी घासल, डॉ निर्मल, संस्थान के वरिष्ठ प्रशासनिक अधिकारी अशोक कुमार समेत अन्य अधिकारी और कर्मचारियों ने अपनी सहभागिता दी। कार्यक्रम के अंत में डॉ मोहम्मद आरिफ ने धन्यवाद ज्ञापन प्रस्तुत किया।

गाजरघास के लिए किया जागरूक

मोदीपुरम। भारतीय कृषि प्रणाली अनुसंधान संस्थान के वैज्ञानिकों ने गांव टबीटा में मंगलवार को किसानों एवं विद्यार्थियों को गाजरघास के दुष्प्रभावों के बारे में जागरूक किया।

गांव में आयोजित गोष्ठी को संबोधित करते हुए डॉ. चंद्रभानु प्रधान वैज्ञानिकों ने किसानों को बताया कि यह घास हमारी फसलों के साथ प्रतिस्पर्धा कर उनके उत्पादन को कम कर रही है। डॉ. मोहम्मद आरिफ ने बताया कि गाजर घास के लगातार संपर्क में रहने से मनुष्यों में त्वचा संबंधी रोग डर्माटाइटिस, एलर्जी, बुखार, दमा आदि बीमारियां हो जाती हैं। डॉ. रघुवीर वरिष्ठ वैज्ञानिक ने गाजर चारा नियंत्रण के उपाय बताए। डॉ. सुनील कुमार वरिष्ठ वैज्ञानिक एवं डॉ राघवेंद्र ने भी अपने विचार रखे। संवाद

दैनिक
परा प्रवाह
हरीद्वार, बुधवार, 21 अगस्त 2024

प्रादेशिक

कृषि प्रणाली संस्थान ने टबीटा गांव में चलाया गाजरघास उन्मूलन जागरूक अभियान



परा प्रवाह संवाददाता

उत्तर प्रदेश के जनपद मेरठ में मोदीपुरम स्थित भारतीय कृषि प्रणाली अनुसंधान संस्थान ने मंगलवार को खेती योग्य भूमि में भी प्रवेश कर लिया है। यह घास हमारी फसलों को नुकसान पहुंचा रही है। गाजर घास से निकलने वाले एलिलो केमिकलस स्थानीय वनस्पतियों का अंकुरण कम कर धीरे धीरे उन्हें विस्थापित कर देते हैं। इसीलिए यह जैव विविधता के लिए खतरा है। उन्होंने इस हानिकारक गाजरघास को नियंत्रित करने एवं इसके उन्मूलन के लिए सदैव तत्पर रहने के लिए वैज्ञानिकों और किसानों को आगाह किया।

जागरूकता अभियान चलाया।

डॉ. चंद्रभानु प्रधान वैज्ञानिक ने किसानों को गाजरघास से होने वाले दुष्प्रभावों के बारे में विस्तार से बताया कि यह घास हमारी फसलों के साथ प्रतिस्पर्धा कर उनके उत्पादन को कम कर रही है एवं यह हमारी स्थानीय क्षेत्र की जैव-विविधता के लिए खतरा बनती जा रही है। डॉ.

मेरठ, बुधवार, 21 अगस्त, 2024
कृषि कालावधि

दैनिक जनवाणी

किसानों और विद्यार्थियों को गाजर घास के लिए किया जागरूक



मोदीपुरम: भारतीय कृषि प्रणाली अनुसंधान संस्थान गांव टबीटा में किसानों एवं विद्यार्थियों को गाजर घास के दुष्प्रभावों के बारे में जागरूक करने एवं इसके नियंत्रण के लिए गाजर घास जागरूकता अभियान चलाया। डा. चन्द्रभानु प्रधान वैज्ञानिक ने किसानों को गाजर घास से होने वाले दुष्प्रभावों के बारे में विस्तार से बताया। डा. मोहम्मद आरिफ, वैज्ञानिक ने बताया कि गाजर घास के लगातार संपर्क में रहने से मनुष्यों में त्वचा सम्बंधी रोग (डर्माटाइटिस), एलर्जी, बुखार, दमा इत्यादि बीमारियां हो जाती हैं। डा. सुनील कुमार वरिष्ठ वैज्ञानिक एवं डा. राघवेंद्र केजे, वैज्ञानिक ने टबीटा गांव के प्राथमिक विद्यालय के विद्यार्थियों को गाजर घास के दुष्प्रभावों एवं इसके नियंत्रण के बारे में बताया।

DISTINGUISHED VISITORS



Visit of Sh. Manoj Ahuja, Secretary, DAFW, Ministry of Agriculture & Farmers Welfare, Government of India on 14 March, 2024



Visit of Smt. Shubha Thakur, Additional Secretary, Ministry of Agriculture & Farmers Welfare Government of India on 27 May, 2024



Shri Franklin Khobung, Joint Secretary (NRM), DA&FW visited and interacted with scientists of ICAR-IIFSR on May 09, 2024



Visit of Dr B S Dwivedi and Dr(Mrs) Vandana Dwivedi at ICAR-IIFSR during 2nd July 2024



Dr Salman Hussain, Head TEN Unit, UNEP visited ICAR-IIFSR, Modipuram visited on 17 Oct, 2024 and interacted for the Second phase TEEB Agri Food Initiative project in Uttar Pradesh and Uttarakhand



Inauguration of ISORL and VIP Guest House by Dr Himanshu Pathak, Secretary DARE and DG, ICAR and Dr S.K. Chaudhary, DDG, NRM on November 04, 2024 at ICAR-IIFSR



RESEARCH COORDINATION AND MANAGEMENT

10th Research Advisory Committee (RAC) Meeting



The 10th Research Advisory Committee (RAC) meeting of the ICAR–Indian Institute of Farming Systems Research (IIFSR), Modipuram, Meerut, was successfully held on December 17–18, 2024. The meeting was chaired by Dr. K. M. Bujarbaruah, former Deputy Director General (Animal Science), ICAR, New Delhi. In his inaugural address, Dr. Bujarbaruah commended the Institute's research achievements and emphasized the need to further refine future research with a focus on in-depth analysis of Integrated Farming Systems (IFS) data, enhancing soil organic carbon, reducing greenhouse gas emissions, minimizing chemical fertilizer use through initiatives like PM-PRANAM, promoting organic and nature-positive farming, integrating resource conservation technologies, adopting agrivoltaic systems for clean energy generation on farmland, and developing waste-to-wealth technologies. Dr. Rajveer Singh, ADG, ICAR, highlighted the importance of integrating precision and natural farming to lower input costs and safeguard environmental health in the face of climate change. The RAC members Dr. S. Rajan, Dr. R.K.

Awasthe, Dr. S.A. Faruqui, Dr. K.S. Ramachandran, and Dr. R.B. Singandhupe gave suggestions on the adoption of improved fruit varieties and crop technologies, integration of livestock into IFS models, emphasis on water and natural resource conservation, and promotion of secondary agriculture to engage rural youth in farming. Dr. Sunil Kumar, Director of the Institute, presented a detailed report on research progress over the past two years. He informed that over 74 IFS models have been developed, demonstrating the potential to increase farmers' income by 3–5 times, reduce fertilizer dependency by 40–50%, improve water conservation, and mitigate greenhouse gas emissions. Divisional heads also shared their respective progress updates. The meeting was effectively coordinated by Dr. Raghvendra Singh, Member Secretary, RAC

Quinquennial Review Team (QRT) Meeting



The final meeting of the Five-Year Review Team at ICAR–Indian Institute of Farming Systems Research (IIFSR), Modipuram, Meerut, was organized during October 23–24, 2024. The meeting was chaired by Dr. Arvind Kumar, Ex Vice Chancellor, RLBCAU, Jhansi and Chairman of QRT. In his address, he emphasized the urgent need to strengthen research in integrated farming systems to ensure food, nutrition, livelihood, and environmental security for the farmers of the country. He highlighted the necessity to redesign and reorient integrated farming systems research considering the changing national and international food demands, advancements in agricultural mechanization and digital revolution, along with challenges posed by climate change. Earlier Dr. Sunil Kumar,



Director, ICAR-IIFSR welcomed all the guests and presented an overview of the institute's achievements during 2018–2022, along with the strategic direction and focus of research for the upcoming five-year period. Committee members including Dr. V. S. Thakur, Dr. A. K. Singh, Dr. Vandana Dwivedi, and Dr. N. P. Singh, as well as heads of divisions, provided their valuable suggestions for steering research on integrated, organic, and natural farming systems in the right direction. Dr. Raghvendra Singh, Member Secretary, QRT presented the committee's recommendations to all participants.

36th Institute Research Committee Meeting

The 36th meeting of Institute Research Committee (IRC) meeting of ICAR-IIFSR, Modipuram, Meerut was held on 25th June 2024 to 2nd July 2024 to review the progress of on-going research projects, the follow up of action of 35th IRC meeting and technical programmes of new research proposals. The meeting was chaired by Dr Sunil Kumar, Director, ICAR-IIFSR. All the Heads/in charges and scientists attended and participated in the meeting.

Director particularly highlighted the role on the institute in many flagship programmes, like climate resilient agriculture, voluntary

carbon market, net zero emission, doubling farmers income, organic and natural farming. The state Governments, NGOs and other stakeholders are looking towards ICAR-IIFSR for its contribution as key knowledge partner and stakeholder as research institute, for which we need to reorient the mandated research matching the client requirement. He appreciated the efforts of the institute scientists which has brought the ICAR-IIFSR in much limelight through its Headquarters and AICRP centers/network partners in the area of IFS, organic farming and natural farming at the national and international level. He opined that institute is progressing well with the international projects under UNEP-TEEB, CIMMYT, IWMI and it needs further strengthening in view of new emerging challenges in agriculture and research needs. He particularly asked all HoDs/ ICs and scientists to achieve the 100 days targets and 5 years targets for timely reporting. The Chairman expressed satisfaction on technology certified by ICAR but also asked to prepare the documents for future technology in the required format of ICAR to enhance the possibility of clearance by the designated committee. Further, he desired that all the projects should be in line with the mandate of the institute and fulfilling QRT, RAC recommendations



36th Institute Research Committee Meeting during 19-26 June, 2023

PROJECT INFORMATION

(A) Institute Funded Projects

Name of Projects and code	Duration of project	PI/Co-PI/Associates
Standardization of IFS modules and model for different farming situations of western plain zone of U.P. NRMAIIFSRIL202305000298	2023-28	Dr. R. P. Mishra (PI) Dr. Peyush Punia Dr. Suresh Malik Dr. Lalit Kumar Dr. P. P. Singh Dr. Chandra Bhanu Dr. A. K. Prushty Dr. Sunil Kumar Dr. Nirmal Dr. Kamlesh Kumar
Development of regenerative Agro-forestry based IFS Model for Sustainable production and livelihood. NRMAIIFSRIL202005000251	2020-2025	Dr. Nirmal (PI) Dr. Sunil Kumar Dr. Suresh Malik Dr. Kamlesh Kumar Dr. Raghavendra KJ
Sustainable livelihood generation through IFS involving uneconomic cattle. NRMAIIFSRIL201910000254	2019- 2025	Dr. Raghuvveer Singh (PI) Dr. Nirmal Dr. S. K. Dabas Dr. A. S. Sirohi Dr. H. L. Singh
Development of fruit crop based integrated farming system for western plain zone of U.P. NRMAIIFSRIL202205000255	2022-2025	Dr. Pushpendra P. Singh (PI) Dr. Suresh Malik Dr. Chandra Bhanu Dr. Amrit Lal Meena Dr. Nirmal Dr. Raghavendra K.J.
Establishment of ornamental and biofloc fisheries modules for farm livelihood improvement. NRMAIIFSRIL202205000257	2022- 2025	Dr. Peyush Punia (PI) Dr. Lalit Kumar Dr. Sunil Kumar Dr. Jairam Choudhary
Modelling the effect of nitrogen options under conventional and conservation tillage on growth, yield and nitrogen dynamics in maize and wheat. NRMAIIFSRIL202306000299	2023- 2027	Dr. Kamlesh Kumar (PI) Dr. Amrit Lal Meena Dr. Prakash Ghasal Dr. Nirmal
Development of Integrated Organic Farming System model for Uttar Pradesh, Uttarakhand and Punjab NRMAIIFSRIL202310000307	2023- 2027	Dr. N. Ravisankar (PI) Dr. P. C. Jat Dr. Poonam Kashyap Dr. Meraj Alam Ansari Dr. Rakesh Kumar Singh Dr. Lalit Kumar Dr. Chandra Bhanu Dr. Jairam Choudhary CC-PI From AINPOF-OF Centres



Name of Projects and code	Duration of project	PI/Co-PI/Associates
Identification of Cropping Systems Module for Different Farming Systems (NRMAIIFSRIL202104000267)	2021-2026	Dr. M Shamim (PI) CC-PI from all the on station centres of AICRP-IFS
Assessing the role and contribution of Integrated Farming Systems for addressing One Health at household and landscape levels (NRMAIIFSRIL202111000275)	2021- 2026	Dr. M. Shamim (PI) Dr. N. Ravisankar Dr. M. A. Ansari Dr. A. K. Prusty Dr. R. P. Mishra
Updating of cropping system atlas of India and preparation of futuristic crop plan for 2030, 2040 and 2050. (NRMAIIFSRIL201910000273)	2019- 2024	Dr. Raghuveer Singh (PI) Dr. N. Ravisankar Dr. V. Ramamurthy Dr. C. A. Rama Rao Dr. B. M. K. Raju Dr. M. Shamim
Estimation and valuation of ecosystem services from organic and natural farming systems in different Agro-ecology (NRMAIIFSRIL202104000276)	2021- 2025	Dr. M. A. Ansari (PI) Dr. N. Ravisankar Dr. M. Shamim Dr. Jairam Choudhury Dr. P. C. Ghasal Dr. Raghavendra KJ CCPI of AINP-OF centres (Modipuram, Ludhiana, Pant Nagar, Coimbatore, Dharwad, Gangtok, Bajaura and Almora)
Multi-criteria assessment of IFS schemes design and its impact on farmer's livelihood	2021-2024	Dr. Raghavendra KJ (PI) Dr. A. K. Prusty Dr. M. Shamim Dr. M. A. Ansari Dr. Raghuveer Singh
Development of Vegetable Based Farming System Models for Food and Nutritional Security of Farmers of Western Uttar Pradesh (Phase 2) (NRMAIIFSRIL202201000262)	2022-2027	Dr. Poonam Kashyap (PI) Dr. A. K. Prusty Dr. Jayram Choudhary Dr. Amrit Lal Meena Dr. M. A. Ansari
Characterization of Existing Farming Systems of Uttarakhand (NRMAIIFSRIL201810000263)	2018-2024	Dr. Nisha Verma (PI) Mr. Vipin Kumar Chaudhary Dr. Raghavendra K.J. Dr. Nirmal
Crop improvement for organic production system (with Soybean as a New Crop) (Phase-II) (NRMAIIFSRIL202305000302)	2023-2028	Dr. D. Kumar (PI) Dr. K. H. Singh (DRMR Bharatpur) Dr. T. P. Swarnam Dr. L. R. Meena Dr. S. K. Gupta (IISR Indore) Dr. B. S. Gill (PAU)
Integration of concentrated manure for organic nutrient management in different cropping systems (NRMAIIFSRIL202305000303)	2023-2028	Dr. P. C. Ghasal (PI) Dr. Chandra Bhanu Dr. A. L. Meena Dr. Jairam Choudhary Dr. Kamlesh Kumar



Name of Projects and code	Duration of project	PI/Co-PI/Associates
Development of pest and disease management package for vegetables for organic production system (NRMAIFSRIL202305000304)	2023-2026	Dr. Chandra Bhanu (PI) Dr. A. L. Meena Dr. P. C. Ghasal Dr. Jairam Choudhary
Development and validation of microbial consortia for crop residue recycling under organic farming system (NRMAIFSRIL201805000293)	2018-2025	Dr. Jairam Chaudhary (PI) Dr. T. P. Swarnam Dr. Chandra Bhanu Dr. A. L. Meena Dr. P. C. Ghasal
Effect of rice straw retention, incorporation and residue decomposition on productivity, profitability, soil health and environment under rice wheat system (NRMAIFSRIL202104000287)	2021- 2025	Dr. A. L. Meena (PI) Dr. L. R. Meena Dr. P. C. Jat Dr. Jairam Choudhary Dr. Lalit Kumar Dr. Raghavendra Singh Dr. Mohd. Arif
Status of Agriculture in Jammu and Shimla Division of Western Himalayan Region (NRMAPDFSRIL201908000284)	2019- 2024	Dr. Sunil Kumar (PI) Dr. A. L. Meena Dr. L. R. Meena Dr. Nirmal
Development and evaluation of novel Nano matrix intercalated formulations for enhancing nitrogen use efficiency in crops (NRMAIFSRIL20235000301)	2023- 2028	Dr. Lalit Kumar (PI) Dr. T. P. Swarnam Dr. A. L. Meena Dr. Peyush Punia Dr. R. P. Mishra Dr. P. P. Singh Mr. V. K. Choudhary
Development of an Intelligent Model for Predicting Mango Yields using Artificial Neural Networks (NRMAIFSRIL202008000285)	2020- 2024	Mr. V. K. Choudhary (PI) Dr. P. P. Singh Dr. Dushyant Mishra
Evaluation and Identification of Farm Implements under Different Farming Systems (NRMAIFSRIL201805000256)	2018-2024	Dr. Nisha Verma (PI) Dr. V. P. Choudhary (Earlier PI)
Evaluation of extension methods for effective dissemination of integrated farming system interventions (NRMAIFSRIL202308000300)	2023-2028	Dr. Nisha Verma (PI) Dr. Chandra Bhanu Dr. Kamlesh Dr. P. P. Singh Dr. Nirmal Associates: Dr. P. C. Jat Dr. Poonam Kashyap Dr. M. Shamim Dr. Raghvendra KJ
On farm participatory research in farming system prespective under schedule caste sub plan (SCSP) in Meerut (UP) and Haridwar (Uttarakhand) districts	2023-2028	Dr. P. C. Jat (PI) Dr. Raghuveer Singh Dr. A. L. Meena Dr. Chandra Bhanu Dr. Kamlesh Kumar Dr. Raghavendra Singh Dr. Raghvendra K.J.

**(B) Externally funded projects**

Name of Projects and code	Duration of project	Budget & Funding Agency	PI/Co-PI/Associates
Sustainable resource management for climate smart IFS under AICRP on Integrated Farming Systems (NRMAIFSR SOL202104000269)	2023- 2028	₹ 28.20 Lakhs/year, ICAR-IIFSR, Modipuram	Dr. R. P. Mishra (PI) Dr. N. Ravisankar Dr. P. C. Ghasal Dr. Suresh Malik Dr. Poonam Kashyap Dr. M. Shamim
AICRP on Integrated Farming Systems (On-station National) (NRMAIFSR COL20214000266)	2021- 2026	Plan Scheme of ICAR, New Delhi	Dr. A. K. Prusty (PI) Dr. M. Shamim Dr. M. A. Ansari Dr. Raghuvveer Singh Dr. Raghvendra K.J.
AICRP on Integrated Farming Systems- On farm research (National) (Including FLD on Oilseeds) (NRMAIFSR COL202104000268)	2021- 2026	Plan Scheme of ICAR, New Delhi	Dr. Raghuvveer Singh (PI) Dr. Raghavendra K.J. Dr. M. A. Ansari Dr. Sunil Kumar Dr. M. Shamim
All India Network Programme on Organic Farming (National) (NRMAIFSR COL202104000265)	2021- 2026	Plan Scheme of ICAR, New Delhi	Dr. N. Ravisankar (PI) Dr. M. Shamim Dr. Raghuvveer Singh Dr. M. A. Ansari Dr. Raghavendra K.J.
Pilot Project for Crop Diversification (NRMAIFSR SOL20234000278)	2023-2028	DAF&W, Govt. of India	Dr. Sunil Kumar (Nodal Officer) Dr. N. Ravisankar (PI) Dr. M. A. Ansari Dr. Raghuvveer Singh Dr. Raghavendra K.J. Dr. M. Shamim Dr. A. K. Prusty Dr. Poonam Kashyap Dr. Nisha Verma
Co-creating sustainable water use in the Hindon sub-basin: A multiscale participatory approach (NRMAIFSR SOL202204000279)	2021-2026	₹ 78.58 Lakhs, DST, Govt. of India	Dr. A. K. Prusty (PI) Dr. N. Ravisankar (PI till Jan., 2023) Dr. M. Shamim Dr. Raghuvveer Singh Dr. Raghavendra K.J. Dr. M. A. Ansari Dr. Poonam Kashyap Consortia Lead: IISER, Kolkata (India), Consortia Partners: IIT, Roorkee, PSI, Dehradun, Dutch partners: WUR, The Netherlands, Utrecht University, The Netherlands
Agri-Drone Demonstration (NRMAIFSR SOL202208000281)	2022 -2025	₹ 35.50 Lakhs, ATARI, Kanpur	Dr. A. K. Prusty (PI) Dr. Raghuvveer Singh Dr. M. Shamim Dr. Poonam Kashyap Dr. Raghvendra K.J.



Name of Projects and code	Duration of project	Budget & Funding Agency	PI/Co-PI/Associates
Preparation of (DPR) Model Agro-Tourism Farm (MATF -4 nos) (NRMAIIFSRSCSL202203000280)	2022-2024	₹ 44.40 Lakhs, Ministry of Agriculture, Govt. of Odisha	Dr. A. K. Prusty (PI) Dr. N. Ravisankar Dr. Raghavendra K.J. Dr. M. A. Ansari Dr. Raghuvier Singh Dr. M. Shamim
AICRP on Integrated Farming Systems (On-Farm), Modipuram Centre (NRMAIIFSR SOP202004000259)	2021-2026	Plan Scheme of ICAR, New Delhi	Dr. P. C. Jat (PI) Dr. M. A. Ansari Dr. Poonam Kashyap Dr. Amrit Lal Meena Dr. Sumit Mahajan
Ensuring Food and Nutritional Security through Integrated Farming Systems in Western Plain Zone of Uttar Pradesh (Farmer FIRST) (NRMAIIFSR SOL201606000261)	2022-2027	ATARI, Kanpur	Dr P. C. Jat (PI) Dr. Poonam Kashyap Dr. A. K. Prusty Dr. M. Shamim Dr. Nisha Verma Dr. Sunil Kumar Dr. Raghuvier Singh Dr. Raghavendra K.J.
All India- Network Programme on Organic Farming, Modipuram Centre (NRMAIIFSR SOL200405000294)	2004-Contd.	₹10.60 Lakhs, ICAR, New Delhi	Dr. T. P. Swarnam (PI) Dr. Chandra Bhanu Dr. P. C. Ghasal Dr. Jairam Choudhary Dr. A. L. Meena
Impact assessment of certified Farm Advisors (CFA) Interventions on Organic and Natural Farming (NRMAIIFSR SOL202205000297)	2022-2024	₹ 5.54 Lakhs, MANAGE, Hyderabad	Dr. Chandra Bhanu (PI) Dr. P. C. Ghasal Dr. N. Ravisankar Dr. Raghvendra K.J.
Adaptation and mitigation potential through Cropping systems/farming systems approaches (NMRAIIFSR SOL202104000289)	2021- 2025	₹ 21.995 Lakhs, NICRA	Dr. Raghavendra Singh (PI) Dr. M. Shamim Dr. A. L. Meena Dr. P. C. Ghasal Dr. M. A. Ansari Dr. Mohd. Arif
Evaluation of different cropping systems for crop intensification under conservation agriculture practices (NRMAIIFSR SOL201505000286)	2015-2026	₹23.21 Lakhs, CRP on CA	Dr. A. L. Meena (PI) Dr. P. C. Jat Dr. L. R. Meena Dr. Sunil Kumar Dr. Jairam Choudhary Dr. Raghavendra Singh Dr. Mohd. Arif
Evaluation of Poly 4 application on productivity, quality and soil sustainability of basmati rice-potato under organic farming system. (NRMAIIFSR SCL202005000295)	2020-2024	₹ 40.00 Lakhs, Sirius Minerals India Pvt. Ltd. New Delhi	Dr. R. P. Mishra (PI) Dr. P. C. Ghasal Dr. N. Ravisankar
NAIF funded ABI Centre, ICAR-IIFSR, Modipuram, Meerut (NRMAIIFSR SOP202005000253)	2023- 2025	₹ 11.09 Lakhs/year, IPTM Unit, ICAR, New Delhi	Dr. R. P. Mishra (PI) Dr. P. P. Singh, Dr. Nirmal Dr. Chandra Bhanu Dr. Nisha Dr. Sunil Kumar



Name of Projects and code	Duration of project	Budget & Funding Agency	PI/Co-PI/Associates
Achieving Sustainable Development Goals through adoption of livestock-based natural farming system in bundelkhand region of Uttar Pradesh NRMAIFSRCOL202301000309	2023- 2027	UPCAR	Dr. Raghavendra Singh Dr. Chandra bhanu Dr. M. A. Ansari
Enrichment of FOM produced from CBG plants and development of package of practices (PoP) for major crops"	2024- 2026	DoF	Dr. Sunil Kumar (Nodal Officer) Dr. T. P. Swarnam (PI)
Pilot project on voluntary carbon Market (VCM)	2024-26	DAFW	Dr. Sunil Kumar (Nodal Officer) PI-Dr. Raghavendra Singh Dr. A. L. Meena Dr. Mohd. Arif Dr. M. A. Ansari Dr. Raghuvveer Singh Dr. P. C. Ghasal Dr. Jairam Chaudhary Dr. Kamlesh kumar Dr. P. C. Jat
Evaluation of Lentus organic NPK on productivity, quality and soil health of rice-wheat system under organic production system.	2024 -2026	Consultancy Prithvi Crop	Dr. Sunil Kumar (Nodal Officer) Dr. P. C. Ghasal (PI) Dr. Chandra Bhanu
Development and on farm validation of organic package for commercial Horticultural crops for WPZ of UP	2024-27	UPCST	Dr. Pushpendra Pratap Singh (PI)
Sustainable intensification of farming systems-food-value chain for ensuring food, nutritional and livelihood security of Buxa tribes".	2024-27	DST	Dr. Nisha Verma (PI)

(C) Foreign aided projects

Name of Projects and code	Duration of project	Funding Agency	PI/Co-PI/Associates
Consortium for Scaling-up Climate Smart Agriculture in South Asia (NRMAIFSR SOL202212000283)	2022 - 2024	SAC, IFAD, SDF	Dr. M. A. Ansari (PI) Dr. M. Shamim CC-PI- Dr. Dinesh Kumar Singh Dr. Rhoitashav Singh Dr. Subash Chandra
UNEP TEEB project on True Value Accounting: Making the Economics case for food systems Transformation in India and Kenya	2024-27	UNEP	Dr. Sunil Kumar (Nodal Officer) Dr. M. A. Ansari (PI) Dr. N. Ravisankar Dr. M. Shamim Dr. Raghavendra K.J. Dr. A. K. Prusty Dr. Raghuvveer Singh Dr. Raghavendra Singh
Atlas of Climate Adaptation in South Asian Agriculture (ACASA) (NRMAIFSR SOP202312000306)	2023 -2026	BISA-CIMMYT (Bill & Milinda Gates Foundation)	Dr. M. A. Ansari (PI)



Name of Projects and code	Duration of project	Funding Agency	PI/Co-PI/Associates
Transformational agroecology across food, land and water systems (NRMAIFSRCOL202301000308)	Nov. 2023 -Dec. 2024	IWMI	Dr. Sunil Kumar (Nodal Officer) Dr. M. Shamim (PI) Dr. M. A. Ansari Dr. A. K. Prusty Dr. Raghuv eer Singh Dr. Raghavendra K.J.
Additive Intercropping in wide row crops for resilient crop production in Bangladesh, Bhutan and India NRMAIFSR SOP202308000305	2023-2028	CIMMYT, Mexico	Dr. Sunil Kumar (Nodal Officer) Dr. P. C. Ghasal (PI) Dr. Raghuv eer Singh Dr. Poonam Kashyap Dr. Raghvendra K.J.



PERSONNEL

Scientific Staff

S. No.	Name of the employees	Designation
1.	Dr. Sunil Kumar	Director
Integrated Farming Systems Division		
2.	Dr. Rajendra Prasad Mishra	Head & Principal Scientist (Agronomy)
3.	Dr. Peyush Punia	Principal Scientist (Fisheries Resource Management)
4.	Dr. Pushpendra Pratap Singh	Principal Scientist (Vegetable Science)
5.	Dr. Nirmal	Scientist (Agroforestry)
6.	Dr. Kamlesh Kumar	Scientist (Agronomy)
Cropping Systems and Resource Management Division		
7.	Dr. Raghavendra Singh	Head & Principal Scientist (Agronomy)
8.	Dr. Lalit Kumar	Principal Scientist (Agricultural Chemicals)
9.	Dr. Sunil Kumar	Senior Scientist (Computer Applications & Agricultural Statistics)
10.	Dr. Amrit Lal Meena	Scientist (Soil Science)
11.	Dr. Mohd. Arif	Scientist (Agronomy)
12.	Sh. Vipin Kumar Choudhary	Scientist (Computer Applications & Information Technology)
Organic Agriculture Systems Division		
13.	Dr. T.P. Swarnam	Head & Principal Scientist (Soil Science)
14.	Dr. Devendra Kumar	Principal Scientist (Plant Breeding & Genetics)
15.	Dr. Chandra Bhunu	Principal Scientist (Plant Pathology)
16.	Dr. Prakash Chand Ghasal	Scientist (Agronomy)
17.	Dr. Jairam Choudhary	Scientist (Agricultural Microbiology)
Technology Transfer and Assessment Section		
18.	Dr. Phool Chand Jat	In-charge & Principal Scientist (Agronomy)
19.	Dr. Poonam Kashyap	Principal Scientist (Fruit Science)
20.	Dr. Nisha Verma	Scientist (Home Science)
Project Coordination Unit		
21.	Dr. N. Ravisankar	Project Coordinator, IFS & Principal Scientist (Agronomy)
22.	Dr. Ashish Kumar Prusty	Principal Scientist (Aquaculture)
23.	Dr. Mohammad Shamim	Senior Scientist (Agricultural Meteorology)
24.	Dr. Meraj Alam Ansari	Senior Scientist (Agronomy)
25.	Dr. Raghuveer Singh	Senior Scientist (Agronomy)
26.	Dr. Raghavendra K J	Scientist (Agricultural Economics)



Technical Staff

S. No.	Name of the employees	Designation
1.	Dr. Vipin Kumar	Chief Technical Officer
2.	Dr. S.P. Singh	Chief Technical Officer
3.	Sh. Krishan Kumar	ACTO
4.	Sh. Satish Kumar Duhoon	STO
5.	Smt. Deepsikha	STO
6.	Smt. Anju Verma	STA
7.	Sh. Ashok Kumar	Driver (T-5)
8.	Sh. Raj Kumar Meena	Driver (T 2-3)

Administrative & Accounts Staff

S. No.	Name of the employees	Designation
1.	Sh. Ashok Kumar Sharma	Senior Administrative Officer
2.	Sh. D.S. Verma	Senior Finance & Accounts Officer
3.	Sh. S.K. Gupta	Assistant Administrative Officer
4.	Smt. Sheela Devi	Assistant
5.	Sh. S.K. Bansal	Private Secretary
6.	Sh. Rajesh Kumar	Personal Assistant
7.	Sh. Ravi Kant Sharma	Assistant
8.	Sh. Rai Bahadur	UDC
9.	Sh. Prem Singh	Assistant
10.	Sh. Rajendra Kumar	UDC
11.	Sh. Parmanand	UDC
12.	Sh. Prasant Panwar	UDC
13.	Sh. Rakesh Tyagi	LDC
14.	Sh. Prem Kumar	LDC

Skilled Supporting Staff

S. No.	Name of the employees	Designation
1.	Sh. Ashok Kumar	Skilled Supporting Staff
2.	Sh. Vijay Shankar Pandey	Skilled Supporting Staff
3.	Sh. Kamal Singh	Skilled Supporting Staff
4.	Sh. Naresh Kumar Chauhan	Skilled Supporting Staff
5.	Sh. Narender Pal Singh	Skilled Supporting Staff
6.	Sh. Ram Gopal	Skilled Supporting Staff
7.	Sh. Rakesh Kumar	Skilled Supporting Staff



S. No.	Name of the employees	Designation
8.	Sh. Yogendra Kumar Tyagi	Skilled Supporting Staff
9.	Sh. Sunil Kumar Sharma	Skilled Supporting Staff
10.	Sh. Devendra Kumar	Skilled Supporting Staff
11.	Sh. Subodh Kumar Tyagi	Skilled Supporting Staff
12.	Sh. Subhash Chand Sharma	Skilled Supporting Staff
13.	Sh. Kripa Shankar Tewari	Skilled Supporting Staff
14.	Sh. Harsh Nath Singh	Skilled Supporting Staff
15.	Sh. Prem Shankar	Skilled Supporting Staff
16.	Sh. Mahaveer Singh	Skilled Supporting Staff
17.	Sh. Ayodhya Prasad Dubey	Skilled Supporting Staff
18.	Sh. Kirpa Shankar Pandey	Skilled Supporting Staff
19.	Sh. Siddh Kumar Yadav	Skilled Supporting Staff
20.	Sh. Sada Ram	Skilled Supporting Staff
21.	Sh. Gagendra Singh	Skilled Supporting Staff

New Joining

S. No.	Name	Designation	Date of Joining	Transfer/Joining
1.	Smt. Himanshu Chauhan	STO	31.05.2024	New Joining
2.	Smt. Neha Sharawat	Assistant	13.12.2024	New Joining

Promotions

S. No.	Name	Designation	Date of promotion
1.	Smt. Anju Verma	STA, Promoted to T-5	26.09.2024
2.	Sh. Raj Kumar Meena	Driver (T 2-3), Promoted to T-4	26.09.2024

Superannuation

S. No.	Name	Designation	Date of superannuation
1.	Dr. Suresh Malik	Principal Scientist	31.10.2024
2.	Dr. L R Meena	Principal Scientist	31.12.2024
3.	Dr. Om Kumar Tomar	Chief Technical Officer	30.06.2024
4.	Sh. R B Tewari	Chief Technical Officer	29.02.2024
5.	Sh. Dhanajay Tripathi	Chief Technical Officer	31.03.2024
6.	Dr. Yogendra Singh	Chief Technical Officer	31.12.2024
7.	Sh. Uma Shankar	Driver (T-5)	31.08.2024
8.	Sh. Surya Kant	Principal Private Secretary	31.12.2024
9.	Smt. Alka Jain	Assistant Administrative Officer	30.09.2024
10.	Sh. Brijash Sharma	Skilled Supporting Staff	30.11.2024
11.	Sh. Anand Singh	Skilled Supporting Staff	30.09.2024

INSTITUTE COMMITTEES

INSTITUTE MANAGEMENT COMMITTEE (2024)

1.	Dr. Sunil Kumar	Director, ICAR-IIFSR, Modipuram	Chairman
2.	Director (Agriculture)	Government of Uttar Pradesh	Member
3.	Director (Agriculture)	Government of Uttarakhand	Member
4.	Director (Research)	SVPUAT, Modipuram, Meerut	Member
5.	Sh. Mithlesh Kumar	Village Bharveelya, Nagar Panchayat- Bankatee, Distt. – Basti (UP)	Non-official Member
6.	Sh. Narendra Singh	Village Didvadee, Tehsil and Halka-Israna, Distt. Panipat (Haryana)	Non-official Member
7.	Dr. Shiv Dhar (Pr. Scientist)	Division of Agronomy, ICAR-IARI, New Delhi	Member
8.	Dr. S. K. Das (Pr. Scientist)	Division of Riverine and Estuarine Fisheries, ICAR-CIFRI, Barrackpore	Member
9.	Dr. Sanjib Kumar Behra (Pr. Scientist)	ICAR-IISS, Bhopal	Member
10.	Dr. Rajbir Singh, ADG (AAF&CC)	ICAR, New Delhi	Member
11.	Finance & Account Officer	ICAR-CSSRI, Karnal	Member
12.	Sr. AO/AO	ICAR-IIFSR, Modipuram	Member Secretary

RESEARCH ADVISORY COMMITTEE (2024)

1.	Dr. K.M. Bujarbaruah	Former DDG (AS), ICAR Hqrs. and Former Vice Chancellor, AAU, Jorhat	Chairman
2.	Dr. R.B. Singandhupe	Ex. Principal Scientist, ICAR-CICR, Nagpur	Member
3.	Dr. Ravikant Avasthe	Ex. Joint Director, ICAR RC for NEH Region, Gangtok, Sikkim	Member
4.	Dr. S. Rajan	Ex. Director, ICAR-CISH, Lucknow	Member
5.	Dr. S.A. Faruqi	Ex. PC AICRP-Forage Crops, ICAR-IGFRI, Jhansi	Member
6.	Dr. K.S. Ramachandran	Ex. Technical Expert (AH&F), National Rainfed Area, Govt of India	Member
7.	Dr. Rajbir Singh	ADG (AAF&CC), ICAR, New Delhi	ADG (AAF&CC)
8.	Dr. Raghavendra Singh	Head, Division of Cropping System and Resource Management, ICAR-IIFSR, Modipuram, Meerut	Member Secretary

**QUINQUENNIAL REVIEW TEAM (QRT -2024)**

1.	Dr. Arvind Kumar	Former Vice Chancellor, Rani Laxmi Bai Central Agricultural University, Jhansi, UP	Chairman
2.	Dr. V. S. Thakur	Former Vice Chancellor, Y S Parmar University of Horticulture & Forestry, Solan, HP	Member
3.	Dr. A.K. Singh	Former Vice Chancellor, Bihar Agricultural University, Sabour, Bhagalpur, Bihar	Member
4.	Dr. Kusumakar Sharma	Former Assistant Director General (Human Resource Development), ICAR, New Delhi	Member
5.	Dr. (Mrs.) Vandana Dwivedi	Former, Additional Commissioner, INM Division, Ministry of Agriculture and Farmers Welfare, GoI, New Delhi	Member
6.	Dr. N. P. Singh	Member, Commission for Agriculture Costs and Prices, Ministry of Agriculture and Farmers Welfare, GoI, New Delhi	Member
7.	Dr. Raghavendra Singh	Head, Cropping Systems and Resource Management Division, ICAR-IIFSR, Modipuram, Meerut, UP	Member Secretary



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