



ICAR-IFSR Newsletter



ICAR- INDIAN INSTITUTE OF FARMING SYSTEMS RESEARCH, MODIPURAM, MEERUT

VOLUME 31 | ISSUE 02 | July- December 2024

In This Issue

- 01 About the Institute
- 02 Research Highlights
- 03 Technology/Models/
Concepts/Methods/
Copyrights
- 04 New Appointments/
Promotions/
Superannuations
- 05 Meeting Organized/
HRD and Capacity
Building
- 06 Exhibitions/
Demonstrations
- 07 Celebration of Events
- 08 Visit of Dignitaries
- 09 Outreach/Extension
Activities
- 10 Awards and Honours/
MoU Signed

Published by:

Dr Sunil Kumar,
Director

ICAR-IIFSAR, Modipuram,
Meerut – 250 110 (U.P.)

From Director's Desk

Dear Readers,

Greetings!

With great pleasure, I present this edition of the ICAR-IIFSAR Newsletter, encapsulating key events, activities, and achievements from July to December 2024. Over the past six months, we have witnessed scientific advancements that hold the potential to redefine the future of our domain, underscoring our steadfast dedication to excellence. Through collaborative initiatives, the institute remains focused on promoting sustainable agricultural practices to enhance productivity, optimize resource utilization, and ensure the environmental sustainability of agri-food systems. ICAR-IIFSAR's research endeavours align with the imperative of transforming food, land, and water systems under global climate change, thereby bolstering farm profitability and resilience. The institute has been able to develop 9 novel technologies, concepts, and models duly recognized by ICAR. Additionally, 3 copyright certificates have been secured for scientific innovations developed by the institute. Our outreach and extension activities continue to bridge the gap between science and society, empowering different stakeholders viz. farmers, entrepreneurs, NGOs, institutions with knowledge and solutions to pressing challenges. We were also privileged to host many distinguished dignitaries whose visits to the institute enriched our collaborative efforts and strengthened our institutional ties.



As we continue our journey of scientific calibre and knowledge dissemination, I encourage each member of the institute to remain motivated and actively engaged in our collective mission. Let us foster an environment where innovation thrives, and achievements receive due recognition. I am confident through our concerted efforts, we have the potential to generate transformative outcomes and make a lasting impact on the farming community.



About the Institute

With a 70 years' history, the ICAR-Indian Institute of Farming Systems Research has played a pivotal role in advancing agronomic management practices and advocating for alternative cropping systems. Originally focused on fertilizer experimentations, it initiated the "Simple fertilizer trials on Cultivars Fields" in 1953 under the Indo-American Technology Cooperation Agreement. This initiative expanded into the 'All India Coordinated Agronomic Experiment Scheme (AICAES)' in 1956, emphasizing agronomic research encompassing cultural practices, irrigation, nutrition and multiple cropping. Recognizing the necessity for a holistic approach, the institute underwent a transformation during the 7th five-year plan in 1989, becoming the 'Project Directorate for Cropping Systems Research (PDCSR).' Subsequently during the 11th five-year plan, it was re-designated as the 'Project Directorate of Farming Systems Research (PDFSR).' In 2014, during the 12th five-year plan, PDFSR attained the status of a full-fledged institute and was renamed the "ICAR-Indian Institute of Farming Systems Research". The institute comprising the AICRP on IFS (74 centres) and AI-NP-OF (20 cooperating centres), covering 26 States/UTs and is organized into three research divisions (Integrated Farming Systems, Organic Agriculture Systems and Cropping Systems & Resource Management), on Project coordinating unit, and one section (Technology Transfer and Assessment) to comprehensively address its mandate.

Research Highlights

Evaluation of different cropping systems for crop intensification under conservation agriculture practices (CRP on CA Project)

(Amrit Lal Meena, Raghavendra Singh, Mohd Arif, Jairam Choudhary, P.C. Jat and Sunil Kumar)

Long-term adoption of CA based management practices in all the cropping systems recorded 43.6, 26.8% and 27.5% higher C stock, C-accumulation and C sequestration over the conventional practices. Over a period of 9 years; a positive linear relationship ($R^2 = 0.65$) b/w the amount of C sequestered and cumulative C input was recorded. Further, slope of the curve indicated that among the different cropping systems, a maximum of 22% of added C input ha^{-1} converted to SOC in maize-mustard-mungbean followed by the rice-wheat-mungbean system. Even after the nine years of CA based management practices the direct seeded rice recorded 18.6 and 21.7% less yield in R-W (CA) and R-W-GG (CA) over the conventional practices.



Plate 1: Field experiment view of CRP on CA Project.

Adaptation and mitigation potential through cropping systems/farming system (NICRA Project)

(Raghavendra Singh, Amrit Lal Meena, P.C. Ghasal, Mohd. Shamim, Mohd. Arif and M.A. Ansari)

Results showed that the methane emission varied from 4.03 to 99.12 mg m⁻² day⁻¹ and 4.13 to 193.8 mg m⁻² day⁻¹ in DSR and TPR crop establishment methods, respectively. Similarly, the N₂O emission ranged from 0.05 to 1.09 mg m⁻² day⁻¹ and 0.04 to 0.92 mg m⁻² day⁻¹ in DSR and TPR establishments. Among the nutrient management practices, the organic farming practices recorded 30-32% lower global warming potential (GWP) over the conventional practices. The GWP of DSR-ZTW crop establishment across the various nutrient management practices were 15.82% lower over the TPR-CTW method.



Plate 2: NICRA field experiment view and collection of GHG samples from field

Effect of rice straw retention, incorporation and residue decomposition on productivity, profitability, soil health and environment under RW system

(Amrit Lal Meena, Raghavendra Singh, Mohd. Arif, P.C. Jat, Jairam Choudhary and Lalit Kumar)

In-situ management of rice residue along with microbial consortia resulted in 8.69-18.71% higher number of tillers both in rice and wheat crops as compared to residue burning and sole residue management treatments. Further, combined application of rice residue and microbial consortia improved the soil organic carbon content to the tune of 23.3% over the crop residue burning.



Plate 3: Sowing of zero tilled wheat and field experiment view of microbial consortia experiment

Standardization of IFS modules and model for different farming situations of western plain zone of U.P.

(R.P. Mishra, P. Punia, Kamlesh Kumar, Lalit Kumar, S. Malik, P.P. Singh, Chandra Bhanu, A.K. Prusty, Nirmal and Sunil Kumar)

The IFS model designed for small and marginal

farmers of Western UP spanning in 1.38 ha, the model integrates crops, dairy, horticulture, aquaculture, mushroom cultivation, and boundary plantations, emphasizing resource recycling and economic viability. The IFS approach enhanced food and nutritional security by fulfilling household needs and producing marketable surpluses of cereals, fruits, milk, fish, and mushrooms with a marketable surpluses of cereals (92.8%), fruits (94.6%), and milk (93.7%). This comprehensive system offers a sustainable solution to monocropping issues, boosting income and resilience for farm households.



Plate 4: Integrated farming system model at ICAR-IIFSR, Modipuram

Modeling the effect of nitrogen options under conventional and conservation tillage on growth, yield and nitrogen dynamics in Maize and Wheat

(Kamlesh Kumar, A.L. Meena, P.C. Ghasal and Nirmal)

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. 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. 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.

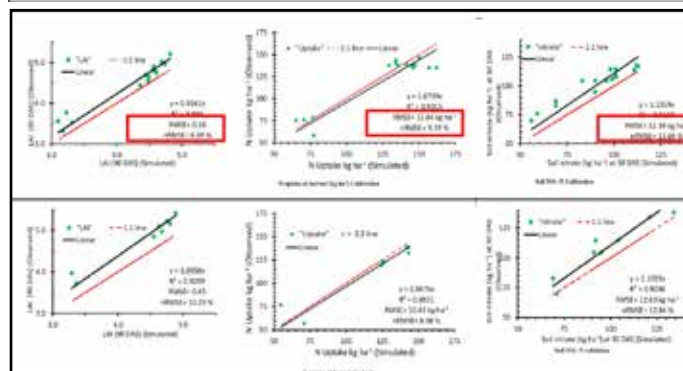
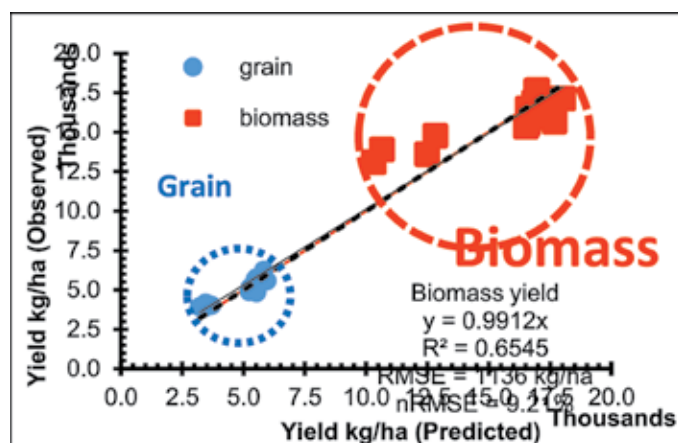


Plate 5: CERES Model calibration in maize and wheat

Development of regenerative Agroforestry based IFS model for sustainable production and livelihood.

(Nirmal, Sunil Kumar, Kamlesh Kumar and Raghavendra K.J.)

The results demonstrated that the Moringa-based agroforestry system significantly outperformed others, recording the highest yields of green gram (7.5 q/ha) and sorghum fodder (38 t/ha) during kharif, while in rabi, mustard yielded 22.5 q/ha under Moringa plantations, followed by Teak and Shisham-based systems. This study highlights the potential



of regenerative agroforestry in improving farm productivity, supporting smallholder farmers, and mitigating climate change through enhanced carbon capture and ecosystem restoration.

AICRP on Integrated Farming Systems- On farm research (National)

(Raghuveer Singh, Raghavendra K.J., M.A. Ansari, M. Shamim and Sunil Kumar)

With six treatments (Farmer's Practice, RDF, ICM, Organic farming, Natural farming and 75% Organic + Natural farming concoction) experiments were conducted during 2023-24 through farmer-participatory research covering the major food production systems in India. A total of 276 trials; 50 in rice-wheat, 24 in rice-mustard and 18 in soybean-chickpea. A total 23 district were covered from 14 agro-climatic zones. The Crop + Dairy system generates a net income of ₹1.35 lakh from an average landholding of 0.96 ha. When, horticulture

and vegetable components are integrated with the Crop + Dairy system, they provide additional returns. The highest net income per household and per unit of landholding was recorded in the Crop + Dairy + Horticulture system i.e. ₹1.78 lakh, followed closely by the Crop + Dairy + Vegetable system ₹1.44 lakh

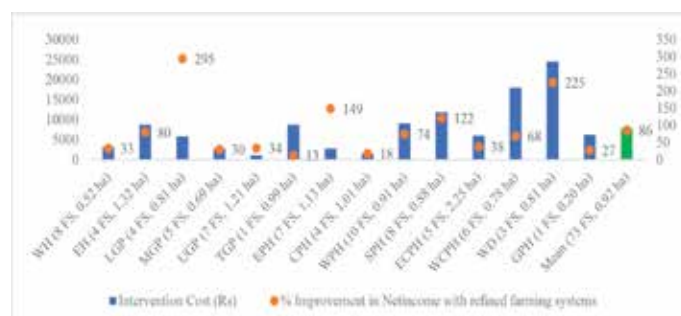


Plate. ACZ wise percent increase in net return along with intervention cost

Characterization of existing farming systems in Uttarakhand

(Nisha Verma, Vipin Kumar Chaudhary, Raghavendra K.J. and Nirmal)



Figure 1 a), 1b) Horticultural based farming system, c) root-stock development for entrepreneurship



Fig 2 (a) beekeeping

(b) Goatary production

A survey conducted in the high hills of Pauri Garhwal, Uttarakhand (1569–1933 m amsl), covered 60 households across Thailisain and Pabo blocks. It revealed that 96.66% were marginal farmers, with average landholdings of 0.35 ha in Thailisain and 0.10 ha in Pabo block. The dominant farming system included crop-horticulture-livestock integration, with the traditional *Sari* system (two-year crop rotation) widely practiced. Vegetable and horticulture-based intercropping were also common. Key challenges included water scarcity, wild animal attacks, and low productivity due to dry spells. To address these issues, awareness programs on crop intensification using HYVs, water management strategies, biological barriers, and value addition for employment generation were conducted through WhatsApp groups, promoting sustainable agricultural practices in the region.

Evaluation of improved mustard lines for organic production

(D. Kumar, L.R. Meena, K.H. Singh and Raghavendra K.J.)

Developing crop varieties suited for organic farming is a key focus for sustainable agriculture. In this effort, high-yielding mustard varieties were developed using F2 progenies from hybridized indigenous and exotic parental lines of *Brassica juncea* L. Transgressive segregants from F2 populations underwent continuous selfing and selection up to the F8 generation for homozygosity. Fifteen promising homozygous mustard lines were identified and tested against the

locally adapted variety RH-749. Two lines, MM16A 241 (29.47 q ha⁻¹) and MM16A 081 (29.11 q ha⁻¹), outperformed RH-749 (25.78 q ha⁻¹), yielding 11.64% higher with 45% oil content under organic conditions.

All India Network Programme on Organic Farming

(N. Ravisankar, M. Shamim, Raghuveer Singh, M.A. Ansari and Raghavendra K.J.)

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. 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



Plate 6: Integrated organic farming system model at ICAR-IIFSR, Modipuram

pepper) in natural farming due to lack of adoption of scientifically developed organic farming packages. Evaluated 351 existing varieties of 20 crops and identified 90 varieties for 20 cropping systems covering Traditional, HYV and Specialty purpose. Implemented the Model value chain development by collaborating with existing FPOs covering 13 villages in 5 districts of 5 States by involving 275 farmers. A total of 52 trainings in 12 States were organized

covering various aspects of organic and natural farming in which 2187 participants benefitted.

Pilot Project for Crop Diversification

(N. Ravisankar, M.A. Ansari, Raghuveer Singh, Raghavendra K.J., A.K. Prusty, Poonam Kashyap and Nisha Verma)

Field implementation of crop diversification has been initiated in twenty-four (24) districts (18 district in 2024-25 + 8 districts continuing from 2023-24) covering 1689.5 ha area. 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. Maps were developed in ESRI ArcMap for 10 districts in 5 States.



Plate 7: Programmes conducted under PPCD project

Transformational agro-ecology across food, land and water systems

(M. Shamim, Raghvendra K.J., M.A. Ansari, A.K. Prusty and Raghuveer Singh)

The findings from this study will contribute to developing integrated solutions for improving

agricultural resilience and sustainability in the region. The study water productivity and pesticide usage across different models. The results show that the IFS 3 model had the highest water productivity per cubic meter (Rs. 6.5), while IFS 2 had the lowest at Rs. 5.6. 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.



Plate 8: Programme conducted under IWMI Projects

Technologies/Models/Concepts/Methods/Copyrights developed by ICAR-IIFSR





Copyrights



New Appointments/Promotions/ Superannuation

New Appointments

Smt. Neha Saharawat joined as assistant on 31/12/2024

Promotions



Rajkumar Meena
promoted to T-4



Smt. Anju Verma
promoted to T-5

Superannuation



Sh. Uma Shankar Pandey,
T-5 on 31/08/2024



Smt. Alka Jain, AAO
on 30/09/2024



Dr. Suresh Malik,
Pr. Scientist on 31/10/2024



Sh. Brijesh Sharma,
SSS on 30/11/2024



Sh. Surykant Sharma,
Sr. PPS on 31/12/2024



Dr. Yogendra Singh,
CTO on 31/12/2024



Dr. L.R. Meena, Pr. Scientist on 31/12/2024

Meeting organized/HRD and Capacity building activities



Joint meeting of ICAR-IIFSR QRT and IMC during 23-24 Oct. 2024



19th Annual Group Meeting of All India Network Programme on Organic Farming during 8-9 at ICAR-NRC Spices, Ajmer Nov. 2024



Review meeting of NICRA-NRM partner institutes on 26 Nov. 2024 at ICAR-IIFSR, Modipuram



VIII (XXXVI of project) Biennial workshop of AICRP on Integrated Farming Systems organised at PAU, Ludhiana during 2-5 Dec. 2024



Entrepreneurship development in youth through training on round the year mushroom production technology 9-11 Dec 2024



First meeting of 10th Research Advisory Committee (RAC) during 17-18 Dec. 2024



International Workshop cum Interaction meeting with 13th Advance Course on CA and Regenerative Agriculture on 20 Dec. 2024 at ICAR-IIFSR

Exhibitions/Demonstrations



ICAR-IIFSR, Modipuram displayed IFS Technologies in Krishi Kumbh & Agro Expo at SVPUAT, Meerut during 16-18 Oct. 2024



ICAR-IIFSR, Modipuram displayed IFS technologies in Global Soils Conference 2024 during 19-22 Nov. 2024 at NASC, New Delhi

Celebration of Events



संस्थान द्वारा गाजरघास जागरूकता सप्ताह का आयोजन दिनांक 16 अगस्त 2024



संस्थान में 'एक पेड़ मां के नाम' कार्यक्रम का आयोजन दिनांक 21 अगस्त 2024



कृषि प्रणाली संस्थान द्वारा विश्व मृदा दिवस का आयोजन दिनांक 05 दिसंबर 2024



Celebration of Independence Day on 15 August 2024



Visit of Dignitaries



Dr. B.S. Dwivedi, Member, NRM, ASRB and Dr. (Mrs.) Vandana Dwivedi, Member, QRT visited ICAR-IIFSR on 02 July 2024



Dr. Salman Hussain, Head, TEN Unit, UNEP visited ICAR-IIFSR, Modipuram on 17 Oct. 2024 and interacted for second phase TEEB Agri Food initiative project



Dr. Himanshu Pathak, Secretary, DARE and DG, ICAR, New Delhi inaugurated ISORL and VIP Guest House and interacted with the scientists of Meerut based ICAR institutes ICAR-IIFSR, ICAR-CRIC and ICAR-CPRI-RS on 04 Nov. 2024



Outreach/Extension Activities



Demonstration of millet processing to women SHGs of Uncha, Karnal under ABI scheme, ICAR-IIFSR on 9th July 2024



Field Day on Improved IFS Technologies, Farmer Visit and Training on fisheries aspects 2th August, 2024 at ICAR-IIFSR, Modipuram



Farmer Scientist Interaction on Mixed Farming was conducted on 18-09-2024 in Mubarikpur village under Farmer FIRST project.



On campus training programme on "Technology demonstration of agro-processing tools and equipments for drudgery reduction" under Farmer FIRST project to women SHGs on 18th October 2024



Farmer Scientist Interaction with Nepal delegation at Satheri village on 19-10-2024 under Farmer FIRST project.



Farmer-Scientist Interaction & seed & input distribution in village Samoli-Salempur and Akhtyarpur on 23 Oct. 2024



Farmer-Scientist Interaction & seed & input distribution in village Pepla and Shekhpuri on 26 Oct. 2024



Kisan Goshthi cum Farmer Scientist Interaction programme organized on 18-12-2024 at Meerapur Dalpat village under Farmer FIRST project



Celebration of Kisan Diwas and Swachhta Diwas in Shahpur-Jainpur village on 23 Dec. 2024

MoUs signed



An MoU signed between ICAR-IIFSR, Modipuram and Agrinovate India Limited on 12 Dec. 2024 at NASC, New Delhi.

Awards and Honour

- ICAR-NAARM-49th Foundation Day Award for Best Policy Paper (Ramesh Naik, M., Umesh H, Gopinath, KA, Ramanjeneyulu AV, Ravisankar N, Srinivas Tavva, Ansari, MA, Singh VK, Venkateshwarlu G and Srinivasa Rao ch.2023. Organic farming in India: Production constraints and policy recommendations, ICAR-NAARM, Hyderabad) by Dr. N Ravisankar and Dr. MA Ansari

- Best stall award conferred to ICAR-IIFSR amongst ICAR group by All India Farmer's Fair and Agro-Industrial Exhibition" at SVP University of Agriculture and Technology, Meerut from 16-18 October, 2024 by Dr. PC Jat, Dr. AL Meena, Dr. PC Ghasal and Dr. Poonam Kashyap



Published by:

Dr. Sunil Kumar
Director

ICAR- Indian Institute of Farming Systems Research
Modipuram, Meerut 250 110 (UP)

Tel.: 0121-2973430

Mob.: +91-9415719637

Email: director.iifsr@icar.gov.in



Edited by:

Dr. Poonam Kashyap
Dr. A.L. Meena
Dr. P. C. Ghasal
Dr. Kamlesh Kumar
Dr. Nirmal



भाकृअनुप – भारतीय कृषि प्रणाली अनुसंधान संस्थान
मोदीपुरम, मेरठ-250 110 (उ०प्र०), भारत

