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ANNUAL REPORT
2024-25

अखिल भारतीय समन्वित कृषि प्रणाली अनुसंधान परियोजना
AICRP on Integrated Farming Systems

भाकृअनुप
ICAR

ICAR-Indian Institute of Farming Systems Research
Modipuram, Meerut-250110 (UP)

ICAR-IIFSR

ICAR Indian Institute of Farming Systems Research (IIFSR) formerly Project Directorate for Farming Systems Research (PDFSR) was established by Indian Council of Agricultural Research New Delhi in April 1989 at Modipuram Meerut Uttar Pradesh.

Vision

Management of natural source of holistic improvement of small and marginal farmers through Integrated Farming Systems

Mission

Improve food, nutrition, livelihood and financial security 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.
- Co-ordinate and monitor integrated farming system research in the country

All India Coordinating Coordinated Research Project on Integrated Farming System (AICRP on IFS) is an integral part of ICAR-IIFSR with 74 centres to undertake on-station main (25 no's.) on-station sub (11 no's.) on-station voluntary (6 no's) and on-farm research (32 no's) spread across length and breadth of the country. The institute is also leading an All India Network Programme on Organic Farming (AI-NPOF) with 20 centres in 16 states.

ANNUAL REPORT 2024-25

ALL INDIA CO-ORDINATED RESEARCH PROJECT ON INTEGRATED FARMING SYSTEMS

ICAR-Indian Institute of Farming Systems Research

Modipuram, Meerut – 250 110, India

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Important Notes:

- This compilation is a joint contribution of all the associated scientists and technical staff of 74 AICRP-IFS centers (data generation), ICAR-IASRI New Delhi (statistical analysis) and ICAR-IIFSR, Modipuram (report writing, compilation, editing and printing).
- The report is based on experimental data generated during, kharif, rabi and summer seasons of 2023-24 (period ending June 2024), under 'on-station' and 'on-farm' research programmes of AICRP on Integrated Farming Systems. The other details are relevant to 31st March 2025.
- The report includes both processed and semi-processed data, generated in different sub-projects under AICRP on Integrated Farming Systems, and as such no material / data should be reproduced in any form without prior written permission of the Project Coordinator, AICRP on Integrated Farming Systems and due credit to the concerned scientists.

ACKNOWLEDGEMENT

AICRP on Integrated Farming Systems initiated during 2010-11 having mandate to develop integrated farming system models and cropping systems is currently operating with 74 co-operating centres (25 main, 11 sub, 32 OFR and 6 ICAR-institute-based centres) covering 25 States. Results of the study, experiments and demonstrations conducted during 2023-24 at all the locations are processed, compiled, and published as Annual Report 2024-25. I take this opportunity to record my sincere thanks to **Dr Himanshu Pathak**, Former Secretary, Department of Agricultural Research and Education and Director General, Indian Council of Agricultural Research, New Delhi for the support being extended to the scheme. I also take this opportunity to thank **Dr M.L. Jat**, Secretary, Department of Agricultural Research and Education and Director General, Indian Council of Agricultural Research, New Delhi for the support. I also extend my gratitude to **Dr. S.K. Chaudhari**, Former Deputy Director General (Natural Resource Management) for his constant guidance and mentoring the scheme to develop organic farming packages. I extend my gratitude to **Dr. A.K. Nayak**, Deputy Director General (Natural Resource Management) for his technical guidance in organizing the activities and research programmes. Inputs and support received from **Dr Rajbir Singh**, Former Assistant Director General (Agronomy, Agroforestry and Climate Change), **Dr A. Velmurugan**, Assistant Director General (SWM) and **Dr Rakesh Kumar**, Assistant Director General-Acting (AAF&CC) for improving the output of the scheme is duly acknowledged. The guidance and support received from **Dr Sunil Kumar**, Director, ICAR-Indian Institute of Farming Systems Research, Modipuram are duly acknowledged. Scientific inputs received from **Quinquennial Review Team (QRT), Research Advisory Committee (RAC)** and **Institute Management Committee (IMC)** is thankfully acknowledged.

I am highly thankful to each one of the scientists and research fellows involved in the scheme at 74 centres for setting the painstaking effort to conduct the field experiments, lab analysis and generating data. The sincere efforts put forth by all the Scientists and staff of Project Coordination Unit for preparing the report are appreciated. I extend my gratitude and appreciation to **Dr A.K. Prusty**, Principal Scientist & Principal Investigator (On-station IFS), **Dr M. Shamim**, Senior Scientist & Principal Investigator (On-station-Cropping systems), **Dr Raghuveer Singh**, Senior Scientist & Principal Investigator (On-Farm Research) and **Dr Raghavendra, KJ**, Scientist & Principal Investigator (Impact study) for analyzing the data and preparing the technical reports. The efforts put forth by **Mrs Himanshu Chauhan**, Senior Technical Officer (on-station) and **Dr Vipin Kumar**, Chief Technical Officer (on-farm research), **Dr P.V.N. Sindhuja**, Research Associate and **Ms Priyanshu**, Young Professional-II and all others who have helped to shape the report by compiling the data, its statistical analysis, report drafting and proof correction. Administrative assistance to the scheme given by **Mrs. Jailata Sharma**, Ex-Private Secretary and **Mrs Sheela Devi**, AAO, Project Coordination Unit is also duly acknowledged.

The contributions of all the other scientific, technical, administrative, and skilled supporting staff either directly or indirectly at various levels during preparation of this report are duly acknowledged. Findings from the scheme particularly integrated farming system models and alternate cropping systems for the various regions will pave way for promoting sustainable farming in the country.

(Project Coordinator, AICRP-IFS)

CONTENTS

1. INTRODUCTION

The Genesis of the" All India Coordinated Research Project on Integrated Farming Systems" may be traced back to all visit of Dr. A.B Stewart of Macaulay Institute of Soil Research, Aberdeen U.K., somewhere in mid-forties. He was invited by to the then Imperial Council of Agricultural Research' to (i) review the position in respect of soil fertility investigations, in general and manuring in particular, and (ii) suggest steps which might be taken in order to obtain, in shortest possible time, adequate information under different conditions of soil and climate to enable agricultural departments to give some advice to cultivators for increasing crop yield. His review reports, published in 1947, significantly affected philosophy and practices of fertilizers experimentation in the country, He stressed upon the need of conducting simple fertilizer trials on cultivators' fields and complex experiments at selected research centres. Prompted by these suggestions, a "Simple Fertilizer Trails at cultivators' fields" scheme was initiated in 1953 under the Indo American Technology Cooperation Agreement under "Soil Fertility and Fertilizer Use Project" with the following objectives.

i. To study crop responses to nitrogen, phosphorus and potassium when applied separately and in different combinations under the cultivators field conditions.

ii. To investigate the relative response of different fertilizers in various broad soil groups and to work out the optimum fertilizer combinations for different Agro climatic regions.

iii. To study the relative performance of different nitrogen and phosphatic fertilizers for indigenous production.

iv. To demonstrate to the farmers the value of fertilizers use for the production of crops.

Subsequently in 1956 experiments on carefully selected centres called 'Model Agronomic Experiments 'were added to the project and started as All India Coordinated Agronomic Experiment Scheme(AICAES). The objectives of Model Agronomic Experiments were;

i. To study the interaction of amounts of fertilizer application with intensity and frequency of irrigation, sowing date and plant density.

ii. To work out the manure requirement of important crop rotations, and their effect on soil fertility.

iii. To evaluate the relative efficiency of various sources of nitrogen and phosphorus for different crops and areas, and of different methods of application of nitrogenous and phosphatic fertilizers.

As knowledge progressed, new technology developed and the rate of growth in agriculture increased, the scheme went through various stages of evolution during which its scope expanded and its focus sharpened in accordance with newly required scientific knowledge. The scope of experimentation was, therefore, expanded to include agronomic research embracing cultural practices, irrigation and nutritional requirements, chemical weed control and multiple cropping But the emphasis continued on soil fertility and fertilizer use as influenced by soil and climatic factors and management.

In 1968 to 1969, the scheme was sanctioned as All India Coordinated Agronomic Research Project (AICARP) with two components, viz.; Model Agronomic Experiments' and Simple Fertilizer Trials, The main objectives of the experiments conducted at the research centres under the scheme were

i. To obtain information of the response of high yielding varieties of cereal to different economic factors such as fertilizers (including micronutrients), irrigation, weed control, liming etc.

ii. To study the menu requirements of important crop rotation and their effect on soil fertility.

iii. To evaluate various sources of Nitrogen and phosphorus for different crops and areas.

iv. To work out the production potential per unit area per unit time for different Agro climatic condition of the country and.

v. To determine the most suitable cropping patterns and fertilizer responses under rainfed condition.

Under the revised scheme with the main objectives of the simple fertilizer trial were.

i. To study the responsiveness of introduced high yielding and local Delhi improved varieties to nitrogen and phosphorus applied alone in the combination and to potassium in the presence of nitrogen and phosphorus and educated as well as dry and land location.

ii. To compare different methods of application of Nitrogen on series under dry farming conditions.

iii. To study the contribution of package of soil and moisture conservation practices to increase crop production in dry farming areas.

iv. To study the relationship between crop response to Fertilizer and soil test values and.

v. To formulate fertilizer recommendations for different soil and Agro climatic regions of the country.

But, during 1979 aforementioned objectives were further reviewed and redefined as under:

i. To develop, continuously update and test on cultivators' fields the technology for various crop based farming systems. For this patterns best suited for different agro-climatic zones may be identified, evolved for various emerging farming situations and package of practices developed to realize their production potential.

ii. To define/delineate all aspects of the use of fertilizers (recognizing that fertilizer is an important component of modern agricultural technology), including choice of materials maximize its use through recycling of agricultural wastes or employment of microbial aids,

iii. To provide facilities for testing new varieties at their pre-release stage, In mid-eighties, the policy planners duly recognized the importance of cropping systems approach of research to enhance resource use efficiencies for improved and sustainable crop productivity. Therefore, to strengthen all aspects of cropping systems research the 'Project Directorate for Cropping Systems Research' was established at Modipuram (Meerut) with effect from March 1989, with 'AICRP on Cropping Systems' as one of the constituent schemes of the Directorate with both the components, namely; 'On- Station Research' and 'On intact. However, within two decades of existence of PDCSR, the mandate of the Directorate Farm Research' remaining was broadened during 2009-10 to undertake research in integrated farming system mode andthe Directorate was renamed as 'Project Directorate for Farming Systems Research (PDFSR)' and mandate redefined as:

    i. To characterize existing farming systems to know the productivity, viability and constraints.

    ii. To develop resource efficient, economically viable and sustainable integrated farming system modules and models for different farming situations.

iii. To undertake basic and strategic research on production technologies for improving agricultural resource use efficiencies in farming system mode.

iv. To develop and standardize package of production practices for emerging cropping/ farming concepts and evaluate their long-term sustainability.

v. To act as repository of information on all aspects of farming systems by creating appropriate databases.

vi. To develop on-farm agro-processing and value addition techniques to enhance farm income and quality of finished products.

vii. To undertake on-farm production technologies.

viii. To develop capacity building of stakeholders in integrated Farming Systems through training.

The name and mandate of AICRP on Cropping Systems were also changed accordingly, with major emphasis on farming systems research and objectives modified as hereunder. The Project Directorate for Farming Systems Research was renamed as ICAR-Indian Institute of Farming Systems Research (IIFSR) during November 2014 and the mandate was redefined further as given below.

- 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.

All India Coordinated Research project on Integrated Farming Systems (AICRP on IFS) is an integral part of IIFSR with 74 centres to undertake on-station and on-farm research across length and breadth of the country. The institute is also leading a Network Project on Organic Farming (NPOF) with 20 centres.

2. OBJECTIVES

On-Station Research

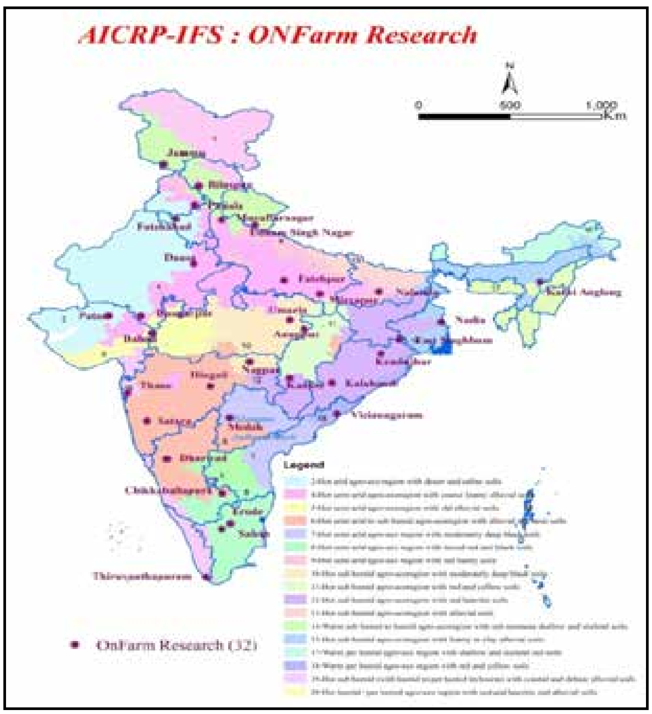
- To undertake applied and adaptive research in integrated farming systems (IFS), especially on production technologies for improving system productivity and resource use efficiencies.
- To develop efficient, economically viable and environmentally sustainable IFS models for different zones.
- To undertake capacity building and human resource development in IFS.

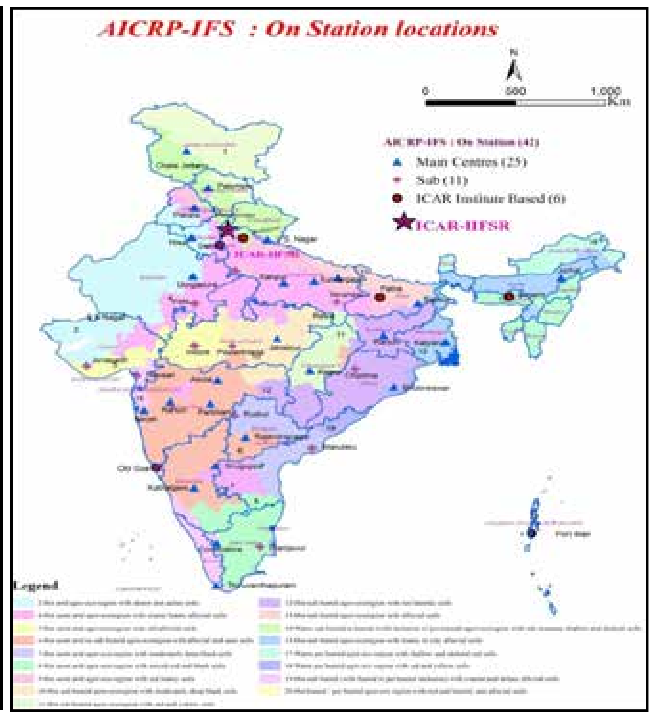
On-Farm Research

- To undertake characterization of existing farming systems for identification of production constraints and problem prioritization.
- To undertake on-farm testing and refinement of system-based farm production technologies.
- To optimize on-farm integration of farm enterprises for enhanced farm incomes, resource/ input use efficiencies, and employment opportunities.

3. LOCATIONS

Under the aegis of AICRP -IFS there are 25 main centers, 11 sub centers, 32 on-farm research centres and 6 voluntary centres. All main and sub centres are engaged in basic and applied research and are necessarily located at SAU"s or their Regional Research Stations or Agricultural colleges of those general universities, where strong agricultural research base is available. Whereas, on-farm research centres (earlier known as Experiments on Cultivators' Field / ECF agro climatic centres) are engaged in farmers participatory research and are located in different zones. These OFR centres remain shifted from one zone /farming situation to another, every 4-5 years. The voluntary centres are situated in ICAR institutes and are taking up only IFS model development activity. The location of different AICRP-IFS centres during the year under report (2024-25) is depicted in Map - 1 & 2, and details are given in table 3.





Map of AICRP-IFS centre

Table 1. Location of Different AICRP-IFS centres during the year under report (2023-24)

S. No.	State	Centre/district	Status	Ecosystem	Agro-climatic Regions/ Sub-Region of Planning	NARP Zone
1.	A&N	CIARI,, Portblair	Voluntary	Island	Island region	Northern Zone AN-1
2	Assam	Jorhat	Main Centre	Humid	Eastern Himalayan Region/Upper Brahmaputra Valley Sub-Region	Upper Brahmaputra Valley Zone (AS-2)
3.		Golaghat	OFR Centre	Humid	Eastern Himalayan Region	Central Brahmaputra Valley (AS-3)
4.	Andhra Pradesh	Maruteru (Dist. W. Godavari)	Sub Centre	Coastal	East Coast Plains and Hills Region/ South Coastal Andhra Sub-Region	Krishna Godavari Delta Zone (AP-1)
5.		Vizianagaram	OFR Centre	Sub-Humid	East Coast Plains and Hills Region	Andhra Pradesh- (AP-7)
6.	Bihar	Sabour (Dist. Bhagalpur)	Main Centre	Sub-Humid	Middle Gangetic Plains Region/ South Bihar Plains Sub-Region	South Bihar Alluvial Plain Zone (B1-3)
7.		Saharsa	OFR Centre	Sub-Humid	Middle Gangetic Plains Region	South Bihar Alluvial Plain Zone (BI-3)
8.		Patna	Vol. Centre	Sub-Humid	Middle Gangetic Plains Region	South Bihar Alluvial Plain Zone (B1-3)
9.	Chhattisgarh	Raipur	Main Centre	Sub-Humid	Eastern Plateau & Hills Region/ Wainganga Sub-Region	Chhattisgarh Plain Zone (CG-1)
10.		Bastar	OFR Centre	Sub-Humid	Eastern Plateau & Hills Region	Chhattisgarh Plain Zone (CG-1)
11.	Delhi	New Delhi	Vol. Centre	Semi-Arid	Trans Gangetic Plains region	Western Semi Arid (ND1)
12	Goa	Old Goa	Vol. Centre	Coastal	West Coast Plains &Hills Region	South Konkan Coastal
13.	Gujarat	S.K. Nagar (Dist. Banaskantha	Main Centre	Arid	Gujarat Plains and Hills Region/North Gujarat Sub-Region	North Gujarat Zone (GJ-4)
14.		Junagadh	Sub-Centre	Semi-Arid	Gujarat Plains and Hills Region/ South Saurashtra Sub-Region	South Saurashtra Zone (GJ-7)
15.		Navsari	Sub-Centre	Coastal	Gujarat Plains and Hills Region/ Southern Hills Sub-Region	South Gujarat Heavy Rainfall Zone (GJ-1)
16.		Dahod, Devgadh	OFR Centre	Semi-Arid	Gujarat Plains and Hills Region/ North Gujarat Sub-Region	Middle Gujarat Zone (GJ-3)
17.		Sabarkantha	OFR Centre	Arid	Gujarat Plains and Hills Region/North west Sub-Region	North West Agroclimatic zone (GJ-5)

S. No.	State	Centre/district	Status	Ecosystem	Agro-climatic Regions/ Sub-Region of Planning	NARP Zone
18.	Haryana	Hisar	Main Centre	Arid	Trans –Gangetic Plains Region/ Arid Sub-Region	Western Zone (HR-2)
19.		Rewari	OFR Centre	Semi-Arid	Trans –Gangetic Plains Region	Western (HR-2)
20.	Himachal Pradesh	Palampur (Dist. Kangra)	Main Centre	Humid	Western Himalayan Region/ High Altitude Temperature Sub-Region	Mid-Hill Sub-Humid Zone (HP-2)
21.		Kullu	OFR Centre	Humid	Western Himalayan Region	Sub-Montane and Low Hills Sub-Tropical (HP-1)
22.	J & K	Chatha (Jammu)	Main Centre	Humid	Western Himalayan Region/High Altitude Temperature Sub-Region	Mid to High Altitude Plain Zone
23.		Udhampur	OFR Centre	Humid	Western Himalayan Region/High Altitude Temperature Sub-Region	Mid to High Altitude Plain Zone
24.	Jharkhand	Kanke (Ranchi)	Main Centre	Sub-Humid	Eastern Plateau & Hills Region/Chhota Nagpur, South and West Bengal Hills & Plateau Sub-Region	Western Plateau Zone (B1-5)
25.		Sarai Kela Kharswan	OFR Centre	Sub-Humid	Eastern Plateau & Hills Region	South-eastern Plateau Zone
26.	Karnataka	Kathalgere (Dist. Davangere)	Main Centre	Semi-Arid	Southern Plateau and Hills Region	Southern Transition Zone (KA-7)
27.		Chikkaballapura	OFR Centre	Semi-Arid	Southern Plateau and Hills Region	Central Dry Zone (KA-4)
28.		Siruguppa (Dist. Bellary)	Main Centre	Arid	Southern Plateau and Hills Region/Northern Dry Region of Karnataka	Northern Dry Zone (KA-3)
29.		Uttrak-Kannada	OFR Centre	Semi-arid & arid	Southern Plateau and Hills Region	Northern Transition Zone -KA-8
30.	Kerala	Karamana (Dist. Thiruvanthapuram)	Main Centre	Coastal	West Coast Plains and Ghats / Mid land Sub-Region	Coastal Southern Zone (KE-2)
31.		Alappuzha	OFR Centre	Coastal	West Coast Plains and Ghats / Mid land Sub-Region	Coastal Southern Zone (KE-2)
32.	Madhya Pradesh	Jabalpur	Main Centre	Sub-Humid	Central Plateau & Hills Region/ Kymore Plateau and Satpura Hills Sub-Region	Kymore Plateau and Satpura Hills Zone (MP-4)
33.		Indore	Sub-Centre	Semi-Arid	Western Plateau &Hills Region/ Central Plateau Sub-Region	Malwa Plateau Zone (MP-10)

S. No.	State	Centre/district	Status	Ecosystem	Agro-climatic Regions/ Sub-Region of Planning	NARP Zone
34.		Powarkheda (Dist. Hoshangabad)	Sub-Centre	Sub-Humid	Central Plateau & Hills Region/Central Narmada Valley Sub-Region	Central Narmada Valley Zone (MP-6)
35.		Rewa	Sub-Centre	Sub-Humid	Central Plateau & Hills Region/ Kymore Plateau and Satpura Hills Sub-Region	Kymore Plateau and Satpura Hills Zone (MP-4)
36.		Mandla	OFR Centre	Semi-Arid	Eastern Plateau and Hills	Northern hill zone of Chattisgarh (CG-3)
37.		Jabalpur	OFR Centre	Semi-Arid	Central Plateau & Hills Region	Kymore Plateau and Satpura Hills (MP-1)
38.	Maharashtra	Akola	Main Centre	Semi-Arid	Western Plateau &Hills Region/ Central Plateau Sub-Region	Western Vidarbha Zone(MH-8)
39.		Solapur	OFR Centre	Semi-Arid	Western Plateau and Hills	Central Vidarbha Zone
40.		Karjat (Dist. Raigad)	Main Centre	Coastal	Western Plains & Ghat Regions/ Coastal Hilly Sub-Region	North Konkan Coastal Zone (MH-2)
41.		Thane	OFR Centre	Coastal	West Coast Plains and Ghats	North Konkan Coastal Zone (MH-2)
42.		Parbhani	Main Centre	Semi-Arid	Western Plateau &Hills Region/ Central Plateau Sub-Region	Central Maharashtra Plateau Zone (MH-7)
43.		Nanded	OFR Centre	Semi-Arid	Western Plateau &Hills Region	Central Vidarbha Zone
44.		Rahuri (Dist. Ahemadnagar)	Main Centre	Semi-Arid	Western Plateau & Hills Region/ Scarcity Sub-Region	Scarcity Zone (MH-6)
45.		Palghar	OFR Centre	Semi-Arid	Western Plateau & Hills Region	Western Maharashtra Plain Zone
46	Meghlaya	Umiam	Vol. Centre	Sub-humid To Humid	Eastern Himalayan Region	Sub-Tropical Hill Zone
47.	Odisha	Bhubaneswar	Main Centre	Sub-Humid	East Coast Plains and Hills Region/ Orissa Coastal Sub-Region	East and South –Eastern Coastal Plain Zone (OR-4)
48.		Chiplima (Dist. Sambalpur)	Sub-Centre	Sub-Humid	Eastern Plateau & Hills Region/ Wainganga Sub-Region	West-Central Table Land Zone (OR-9)
49.		Kendujhar	OFR Centre	Sub-Humid	Eastern Plateau & Hills Region	North-central Plateau Zone
50.		Khordha	OFR Centre	Coastal	East Coast Plains and Hills Region/ Orissa Coastal Sub-Region	Western Undulating Zone

S. No.	State	Centre/district	Status	Ecosystem	Agro-climatic Regions/ Sub-Region of Planning	NARP Zone
51.	Punjab	Ludhiana	Main Centre	Semi-Arid	Trans-Gangetic Plains Region/ Plains Sub-Region	Central Plain Zone (PB-3)
52.		Patiala	OFR Centre	Semi-Arid	Trans-Gangetic Plains Region/ Plains Sub-Region	Western Plain Zone
53.	Rajasthan	Durgapura (Jaipur)	Main Centre	Semi-Arid	Central Plateau & Hills Region/ Eastern Plains of Rajasthan	Semi-Arid Eastern Plain Zone (RJ-5)
54.		Bharatpur	OFR Centre	Semi-Arid	Western Dry Region	Eastern Plain Zone
55.		Kota	Sub Centre	Semi-Arid	Central Plateau & Hills Region/ Eastern Plains of Rajasthan	Humid South –Eastern Plain Zone (South-Eastern Humid Plain Zone (RJ-9)
56.		Dungarpur	OFR centre	Semi-Arid	Central Plateau & Hills Region/ Southern Plains of Rajasthan	Sub-Humid Southern Plain & Aravali Hills Zone (RJ-7)
57.	Tamil Nadu	Coimbatore	Main Centre	Semi-Arid	Southern Plateau and Hills Region/ Central Plateau of Tamil Nadu Sub-Region	Western Zone (TN-3)
58.		Thanjavur	Sub Centre	Coastal	East Coast Plains and Hills Region/ Thanjavur Sub-Region	Cauvery Delta Zone (TN-4)
59.		Yethapur Salem	OFR Centre	Semi-Arid	Southern Plateau and Hills Region	North western Zone (TN-2)
60.		Dindigul	OFR Centre	Semi-Arid	East Coast Plains and Hills Region	Sothern Zone (TN-5)
61	Telangana	Rajendranagar	Main centre	Semi-Arid	Southern Plateau and Hills Region/ South Telangana Sub-Region	Southern Telangana Zone (AP-5)
62		Rudrur +(Dist. Nizamabad)	Sub Centre	Semi-Arid	Southern Plateau and Hills Region/ North Telangana Sub-Region	Northern Telangana Zone (AP-4)
63		Rangareddy	OFR Centre	Semi-Arid	Southern Plateau and Hills Region	Southern Telangana (AP-5)
64.	Uttar Pradesh	Kanpur	Main Centre	Semi-Arid	Upper Gangetic Plains Region/South Western Plains Sub-Region	Central Plain Zone (UP-6)
65.		Unnao	OFR Centre	Semi-Arid	Upper Gangetic Plains Region/ South Western Plains Sub-Region	Central Plain Zone (UP-4)
66.		Faizabad	Main Centre	Sub-Humid	Middle Gangetic Plains Region/ Eastern Plains Sub-Region	Eastern Plain Zone (UP-9)

S. No.	State	Centre/district	Status	Ecosystem	Agro-climatic Regions/ Sub-Region of Planning	NARP Zone
67.		Mau	OFR Centre	Sub-Humid	Middle Gangetic Plains Region/ Eastern Plains Sub-Region	Eastern Plain Zone (UP-7)
68.		Varanasi	Sub Centre	Sub-Humid	Middle Gangetic Plains Region/ Eastern Plains	Eastern Plain Zone (UP-9)
69.		Modipuram	Vol. Centre	Sub-Humid	Upper Gangetic Plains Region	Western Plain Zoan(UP-3)
70.		Meerut	OFR Centre	Sub-Humid	Upper Gangetic Plains Region	Western Plain Zoan Dry sub-humid to semi-arid / (UP-3)
71.	Uttarakhand	Pantnagar (Dist. US Nagar)	Main Centre	Sub-Humid	Western Himalayan Region/ Valley Temperate Sub-Region	Bhawar and Tarai Zone (UP-2)
72.		Almora	OFR Centre	Sub-Humid	Western Himalayan Region/High hill Temperate Sub-Region	Hill Zone (UK-1)
73.	West Bengal	Kalyani (Dist. Nadia)	Main Centre	Humid	Lower Gangetic Plains Region/ Central Alluvial Plains Sub-Region	New Alluvial Zone (WB-3)
74.		Bankura	OFR Centre	Humid	Lower Gangetic Plains Region/ Central Alluvial Plains Sub-Region	New Alluvial Zone (WB-3)

4. SOIL AND CLIMATE

The major group of soil (centre-wise) on which on- station experiment of CSR/FSR were conducted during the year 2023-24 and geographical coordinates (latitude and longitude) of the different research location are given in table 4/1.The general climatic conditions for the experimental location are described below in brief.

Table – 4.1: Soils type of geographical coordinates of different on – station FSR Centres.

Centre	Soil Type	Latitude	Longitude
Rajendranagar	Udic Ustochrepts, black soils	18˚ 59’ N	78˚ 55’ E
Maruteru	Chromusterts clayey, medium black soils	16˚ 38’ N	81˚ 44’ E
Rudrur	Chromusterts clayey, deep (90 cm depth), deep black soils	18˚ 30’ N	77˚ 51’ E
Jorhat	Fluaquents/ Udicaquents association, very deep (90 cm depth), alluvial sandy clay loam soils	26˚ 47’ N	94˚ 12’ E
Sabour	Eutrocherpts (Very deep), low and clay soils	25˚ 23’ N	87˚ 07’ E
Raipur	Ochraquals association, deep black soils	21˚ 16’ N	81˚ 36’ E
S K Nagar	Haplaquals, deep medium black soils	24˚ 90’ N	72˚ 19’ E
junagadh	Ustochrepts, deep medium black soils	21˚ 30’ N	70˚ 30’ E
Hisar	Vertic Ustochrepts deep medium black soils	20˚ 57’ N	72˚ 54’ E
Palampur	Ustochrepts, very deep silty alluvial soils	29˚ 08’ 55” N	74˚ 41’ 16” E
Navsari	Udic Haplustalfs, red soils	32˚ 06’ N	76˚ 03’ E
Chatha (Jammu)	Eutrochrepts very deep clay soils	32˚ 05’ N	74˚ 04’ E
Ranchi	Ultic Palustaifs very deep (90 cm) red soils	23˚ 79’ N	85˚ 19’ E
Kathalagere	Aificols, dark reddish brown sandy clay loam	13˚ 02’ N	76˚ 15’ E
Siruguppa	Type Chromusterts, very deep (90 cm) black soils	15˚ 38’ N	76˚ 54’ E
Karamana	Typic Tropoflivents, very deep (90 cm depth)	11˚ N	77˚ E
Jabalpur	Chromusterts, very deep (90 cm depth), medium to deep black	23˚ 10’ N	79˚ 57’ E
Indore	Vertisols, medium and dark deep black soil	22˚ 04’ N	79˚ 57’ E
Powarkheda	Deep black soil,clay to sandy loam	23˚ 25’ N	73˚ 98’ E
Rewa	Ustochrepts-Vertic Ustochrepts association, fine loamy soils	24˚ 41’ N	81˚ 15’ E
Akola	Medium deep black clayey soil	20˚ 42’ N	77˚ 02’ E
Karjat	Haplustults Udic-Fluvents, red soils	18˚ 33’ N	75˚ 03’ E
Parbhani	Chromusterts,deep (90 cm depts.), deep black soils	19˚ 08’ N	76˚ 05’ E
Rahuri	Chromusterts, fine clayey soils	19˚ 47’ N	74˚ 18’ E
Bhubaneshwar	Haplustaifs very deep (90 cm depth), mediumtextured lateritic soils	20˚ 15’ N	85˚ 52’ E
Chiplima	Haplaquents, very deep (90 cm depth) clay, ill-drained soils	20˚ 21’ N	80˚ 55’ E
Ludhiana	Ustochrepts-Ustic Psamments Assciation, very deep (90 cm depth), alluvial sandy and sandy-loam soils	30˚ 56’ N	75˚ 52’ E
Durgapura (Jaipur)	Torrid-Psamments/ Torrid-Fluvents Association, sandy loam soils	26˚ 55’ N	75˚ 49’ E

Centre	Soil Type	Latitude	Longitude
Kota	Chromsterts-Paleusterts association, very deep (90 cm depth) clay loam soils	25˚ 26’ N	75˚ 30’ E
Coimbatore	Udic Rhodustalts, fine loamy red sandy soils	11˚ 59’ N	78˚ 55’ E
Thanjavur	Typic Pellusterts, clayey very deep (90 cm depth)/ deep black soils of deltaic origin	10˚ 47’ N	79˚ 10’ E
Kanpur	Udic Ustochrepts, alluvial soils	26˚ 28’ N	80˚ 21’ E
Faizabad	Udic fluvents-Fluaquents Association, loqland clayey soils	26˚ 47’ N	82˚ 12’ E
Varanasi	Aeric Chroquals very deep (90 cm depth) alluvial clayey soils	25˚ 18’ N	83˚ 03’ E
Pantnagar	Hapludolls, very deep (90 cm depth) alluvium coarse loam soils	29˚ 08’ N	79˚ 05’ E
Kalyani	Fluventic Eutrochrepts, very deep (90 cm depth) alluvial soils	23˚ 40’ N	88˚ 52’ E
PDFSR, Modipuram	Ustochrept	29.4’ N	77.46’ E
ICAR-RC, Patna	Alluvial soil	25˚ 50’ N	84˚ 45’ E
ICAR-RC, Umiam	Slfisols, Entisols, Inceptisols	25˚ 59’ N	85˚ 08’ E
ICAR-RC, Goa	Lithic dystropepts karmali soils series	15˚ 13’ N	75˚ 55’ E
ICAR-RC, Port Blair	Costal alluvial soil	11˚ 38’ N	92˚ 39’ E

Prevailing Weather at various AICRP centers of IFS for the reporting period of 2023-24

Introduction

The prevailing weather conditions during 2023-24 were assessed across the AICRP-IFS centres, focusing on key parameters such as rainfall and air temperature. Rainfall was categorized into four distinct seasons: Winter (January–February), Pre-monsoon (March–May), Southwest Monsoon (June–September), and Post-monsoon (October–December). The contribution of the Southwest Monsoon to the total annual rainfall was estimated for each centre, along with the percentage deviation of annual rainfall from the long-term normal values provided by the India Meteorological Department (IMD).

Spatial and temporal variability in rainfall patterns is illustrated through seasonal rainfall indices (Fig. 1) and deviations from normal annual rainfall (Fig. 2). Likewise, annual maximum and minimum air temperatures (Fig. 3) and their monthly fluctuations (Figs. 4 and 5) highlight the thermal regimes prevailing at different centres. Together, these datasets provide valuable insights into the climatic heterogeneity influencing farming system research across regions.

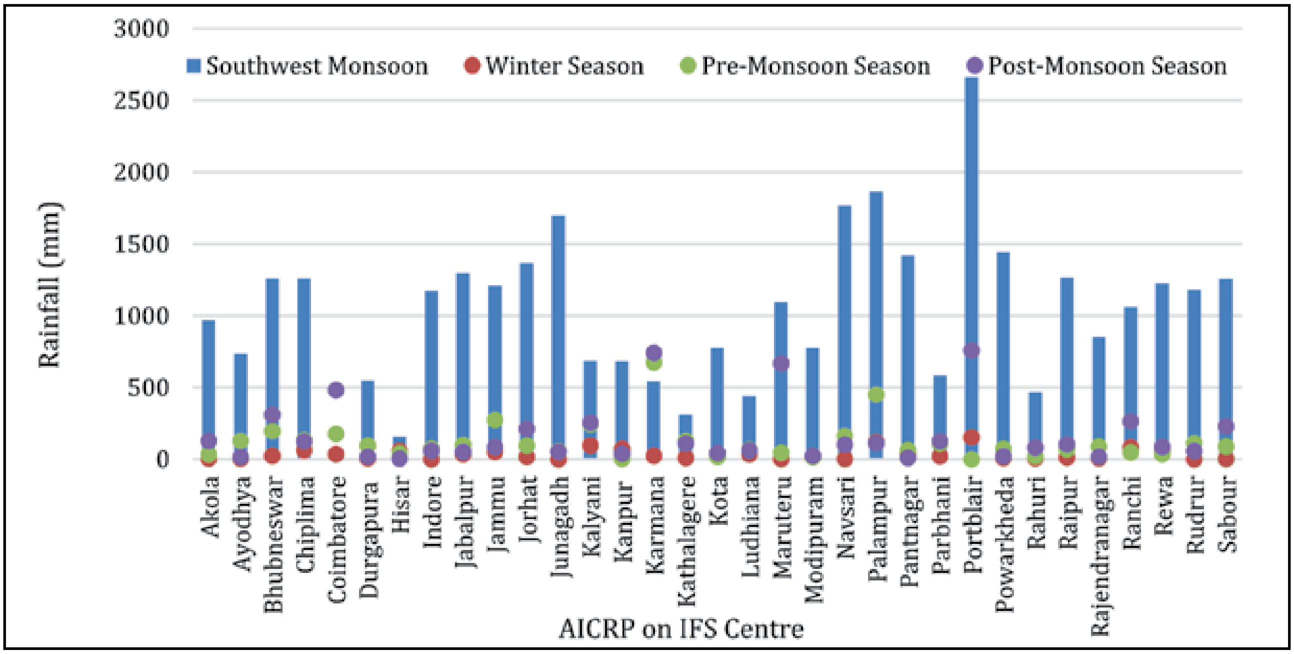


Fig. 1: Seasonal rainfall indices (mm) at various AICRP centers of IFS for the reporting period

Across the AICRP-IFS centres, maximum air temperatures exhibited wide variability during 2024–25. The hottest conditions were observed at Kota, where values peaked at 44.0 °C, followed closely by Kanpur and Rewa with summer maxima above 41 °C. Coastal and island stations such as Port Blair and Palampur remained comparatively mild, with highest temperatures around 32 °C and 31 °C, respectively. The annual mean maximum temperatures ranged between 24.0 °C at Palampur and over 36.8 °C at Powarkheda, highlighting the strong regional contrasts in heat regimes.

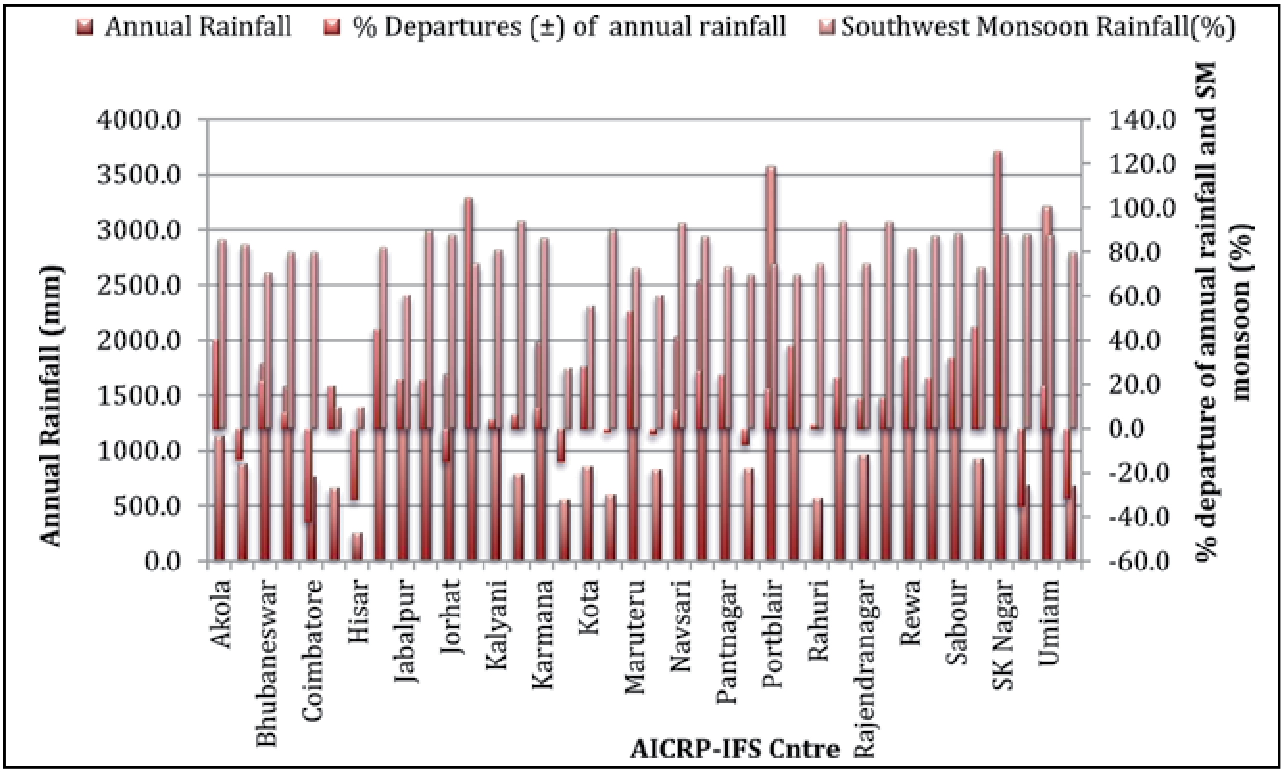


Fig. 2: Total annual rainfall, along with % deviation, contribution of South West Monsoon (%) to the annual rainfall for the reporting period

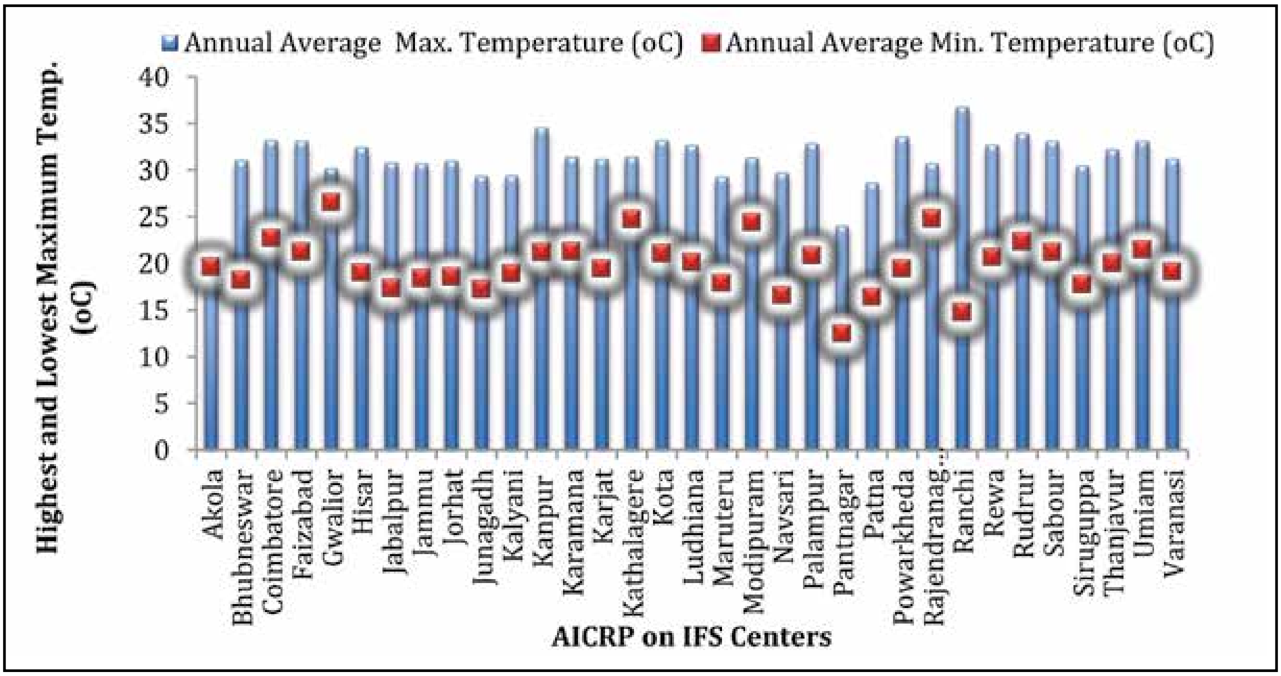


Fig. 3: Annual maximum and minimum air temperatures (in °C) various AICRP centers of IFS for the reporting period

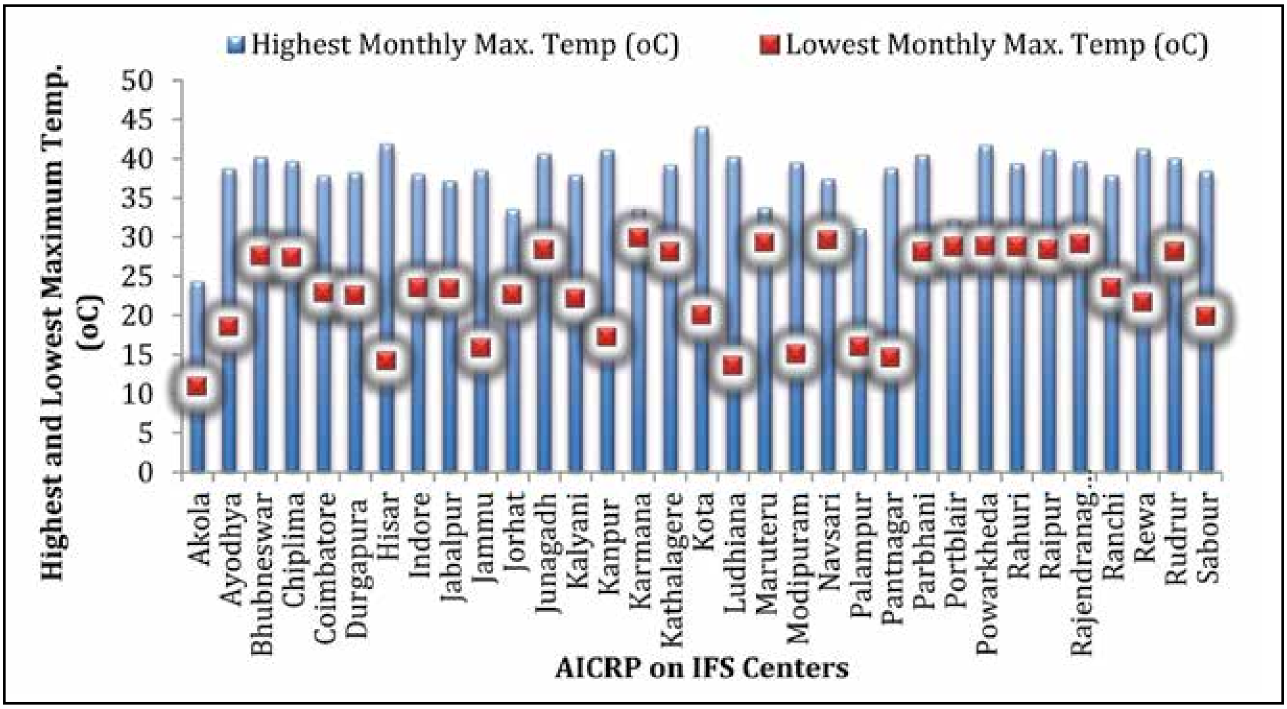


Fig. 4: Monthly maximum temperature range at IFS AICRP centers for the reporting period

Minimum air temperatures also displayed marked contrasts across centres. The coldest winter nights were recorded at Palampur, where values dropped to 4.3 °C, and at Jammu and Pantnagar with minima near 5–7 °C. In contrast, relatively warm winter conditions prevailed at coastal and southern centres such as Port Blair, Karmana, and Coimbatore, where minima rarely fell below 20 °C. The mean annual minimum temperatures varied from 12.6 °C at Palampur to nearly 26.6 °C at Coimbatore, underlining the diversity of thermal environments across the AICRP-IFS network.

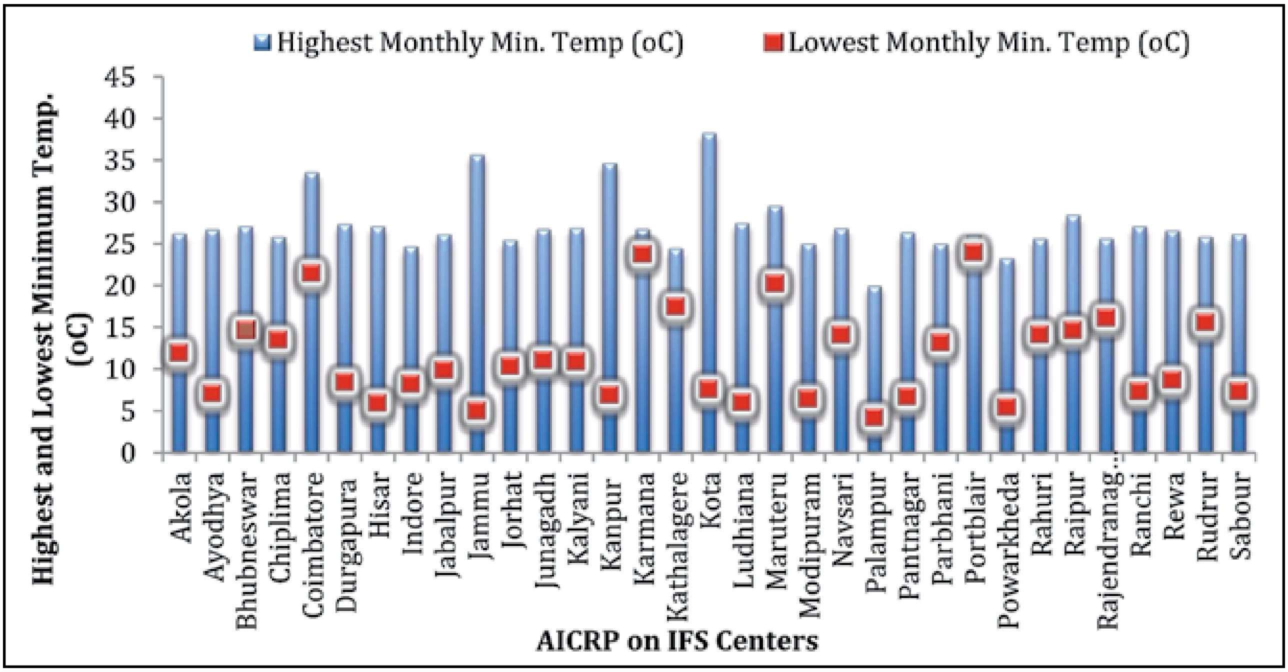


Fig. 5: Monthly minimum temperature range at IFS AICRP centers for the reporting period

Centre-wise Weather Reports

Akola: Akola recorded 1133.6 mm of rainfall, considerably above the normal of 807.0 mm, representing a 40.5% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 85.4% (968 mm) of the annual total 1134 mm. Temperature extremes ranged from 24.3 °C to 12.0 °C, while the mean annual maximum and minimum values stood at 17.9 °C and 19.7 °C, respectively.

Ayodhya: At Ayodhya, rainfall remained close to the long-term normal, with 884.4 mm compared to 1028.9 mm, a variation of -14.0%. The Southwest Monsoon dominated the rainfall pattern, contributing 83.2% (735 mm) of the annual total 884 mm. Temperature extremes ranged from 38.7 °C to 7.1 °C, while the mean annual maximum and minimum values stood at 31.0 °C and 18.3 °C, respectively.

Chiplima: At Chiplima, rainfall remained close to the long-term normal, with 1581.0 mm compared to 1470.0 mm, a variation of 7.6%. The Southwest Monsoon dominated the rainfall pattern, contributing 79.6% (1259 mm) of the annual total 1581 mm. Temperature extremes ranged from 39.7 °C to 13.6 °C, while the mean annual maximum and minimum values stood at 33.1 °C and 21.3 °C, respectively.

Coimbatore: In Coimbatore, rainfall was much lower than expected, with 768.6 mm against the normal of 1325.3 mm, showing a -42.0% deficit. The Southwest Monsoon dominated the rainfall pattern, contributing 79.6% (75 mm) of the annual total 769 mm. Temperature extremes ranged from 37.8 °C to 21.5 °C, while the mean annual maximum and minimum values stood at 30.1 °C and 26.6 °C, respectively.

Durgapura: At Durgapura, rainfall remained close to the long-term normal, with 668.4 mm compared to 560.0 mm, a variation of 19.4%. The Southwest Monsoon dominated the rainfall pattern, contributing 9.8% (548 mm) of the annual total 668 mm. Temperature extremes ranged from 38.2 °C to 8.5 °C, while the mean annual maximum and minimum values stood at 32.4 °C and 19.1 °C, respectively.

Hisar: In Hisar, rainfall was much lower than expected, with 259.7 mm against the normal of 381.9 mm, showing a -32.0% deficit. The Southwest Monsoon dominated the rainfall pattern, contributing 9.8% (157 mm) of the annual total 260 mm. Temperature extremes ranged from 41.8 °C to 6.0 °C, while the mean annual maximum and minimum values stood at 30.8 °C and 17.4 °C, respectively.

Jabalpur: Jabalpur recorded 1481.4 mm of rainfall, considerably above the normal of 1211.2 mm, representing a 22.3% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 60.6% (1297 mm) of the annual total 1481 mm. Temperature extremes ranged from 37.1 °C to 9.9 °C, while the mean annual maximum and minimum values stood at 31.0 °C and 18.6 °C, respectively.

Jammu: Jammu recorded 1618.4 mm of rainfall, considerably above the normal of 1325.6 mm, representing a 22.1% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 89.6% (1208 mm) of the annual total 1618 mm. Temperature extremes ranged from 38.5 °C to 5.1 °C, while the mean annual maximum and minimum values stood at 29.3 °C and 17.3 °C, respectively.

Jorhat: At Jorhat, rainfall remained close to the long-term normal, with 1691.5 mm compared to 1985.5 mm, a variation of -14.8%. The Southwest Monsoon dominated the rainfall pattern, contributing 87.5% (1367 mm) of the annual total 1692 mm. Temperature extremes ranged from 33.5 °C to 10.4 °C, while the mean annual maximum and minimum values stood at 29.4 °C and 19.0 °C, respectively.

Junagadh: Junagadh recorded 1805.0 mm of rainfall, considerably above the normal of 883.2 mm, representing a 104.4% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 74.7% (1695 mm) of the annual total 1805 mm. Temperature extremes ranged from 40.6 °C to 11.1 °C, while the mean annual maximum and minimum values stood at 34.5 °C and 21.3 °C, respectively.

Kalyani: At Kalyani, rainfall remained close to the long-term normal, with 1280.0 mm compared to 1226.7 mm, a variation of 4.3%. The Southwest Monsoon dominated the rainfall pattern, contributing 80.8% (685 mm) of the annual total 1280 mm. Temperature extremes ranged from 37.9 °C to 10.9 °C, while the mean annual maximum and minimum values stood at 31.4 °C and 21.3 °C, respectively.

Kanpur: At Kanpur, rainfall remained close to the long-term normal, with 791.6 mm compared to 744.4 mm, a variation of 6.3%. The Southwest Monsoon dominated the rainfall pattern, contributing 93.9% (681 mm) of the annual total 792 mm. Temperature extremes ranged from 41.1 °C to 7.0 °C, while the mean annual maximum and minimum values stood at 31.1 °C and 19.5 °C, respectively.

Karmana: At Karmana, rainfall remained close to the long-term normal, with 1985.5 mm compared to 1812.6 mm, a variation of 9.5%. The Southwest Monsoon dominated the rainfall pattern, contributing 86.1% (545 mm) of the annual total 1985 mm. Temperature extremes ranged from 33.5 °C to 23.8 °C, while the mean annual maximum and minimum values stood at 31.4 °C and 24.8 °C, respectively.

Kathalagere: At Kathalagere, rainfall remained close to the long-term normal, with 559.4 mm compared to 656.9 mm, a variation of -14.8%. The Southwest Monsoon dominated the rainfall pattern, contributing 27.4% (311 mm) of the annual total 559 mm. Temperature extremes ranged from 39.2 °C to 17.6 °C, while the mean annual maximum and minimum values stood at 33.2 °C and 21.1 °C, respectively.

Kota: Kota recorded 861.0 mm of rainfall, considerably above the normal of 672.0 mm, representing a 28.1% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 55.6% (775 mm) of the annual total 861 mm. Temperature extremes ranged from 44.0 °C to 7.6 °C, while the mean annual maximum and minimum values stood at 32.6 °C and 20.2 °C, respectively.

Ludhiana: At Ludhiana, rainfall remained close to the long-term normal, with 605.1 mm compared to 615.4 mm, a variation of -1.7%. The Southwest Monsoon dominated the rainfall pattern, contributing 90.0% (439 mm) of the annual total 605 mm. Temperature extremes ranged from 40.2 °C to 6.1 °C, while the mean annual maximum and minimum values stood at 29.3 °C and 18.0 °C, respectively.

Maruteru: Maruteru recorded 1809.0 mm of rainfall, considerably above the normal of 1180.2 mm, representing a 53.3% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 72.5% (1095 mm) of the annual total 1809 mm. Temperature extremes ranged from 33.7 °C to 20.3 °C, while the mean annual maximum and minimum values stood at 31.2 °C and 24.5 °C, respectively.

Modipuram: At Modipuram, rainfall remained close to the long-term normal, with 832.6 mm compared to 854.3 mm, a variation of -2.5%. The Southwest Monsoon dominated the rainfall pattern, contributing 60.5% (775 mm) of the annual total 833 mm. Temperature extremes ranged from 39.5 °C to 6.5 °C, while the mean annual maximum and minimum values stood at 29.7 °C and 16.6 °C, respectively.

Navsari: At Navsari, rainfall remained close to the long-term normal, with 2032.7 mm compared to 1876.8 mm, a variation of 8.3%. The Southwest Monsoon dominated the rainfall pattern, contributing 93.0% (1766 mm) of the annual total 2033 mm. Temperature extremes ranged from 37.3 °C to 14.1 °C, while the mean annual maximum and minimum values stood at 32.8 °C and 20.9 °C, respectively.

Palampur: Palampur recorded 2543.1 mm of rainfall, considerably above the normal of 2015.7 mm, representing a 26.2% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 86.9% (1861 mm) of the annual total 2543 mm. Temperature extremes ranged from 31.0 °C to 4.3 °C, while the mean annual maximum and minimum values stood at 24.0 °C and 12.6 °C, respectively.

Pantnagar: Pantnagar recorded 1532.4 mm of rainfall, considerably above the normal of 1230.0 mm, representing a 24.6% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 73.2% (1420 mm) of the annual total 1532 mm. Temperature extremes ranged from 38.7 °C to 6.8 °C, while the mean annual maximum and minimum values stood at 28.6 °C and 16.4 °C, respectively.

Parbhani: At Parbhani, rainfall remained close to the long-term normal, with 840.2 mm compared to 905.0 mm, a variation of -7.2%. The Southwest Monsoon dominated the rainfall pattern, contributing 69.4% (583 mm) of the annual total 840 mm. Temperature extremes ranged from 40.5 °C to 13.3 °C, while the mean annual maximum and minimum values stood at 33.5 °C and 19.5 °C, respectively.

Portblair: At Portblair, rainfall remained close to the long-term normal, with 3571.1 mm compared to 3027.0 mm, a variation of 18.0%. The Southwest Monsoon dominated the rainfall pattern, contributing 74.5% (2659 mm) of the annual total 3571 mm. Temperature extremes ranged from 32.1 °C to 24.0 °C, while the mean annual maximum and minimum values stood at 30.7 °C and 24.9 °C, respectively.

Powarkheda: Powarkheda recorded 1543.1 mm of rainfall, considerably above the normal of 1120.9 mm, representing a 37.7% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 69.4% (1442 mm) of the annual total 1543 mm. Temperature extremes ranged from 41.7 °C to 5.5 °C, while the mean annual maximum and minimum values stood at 36.8 °C and 14.9 °C, respectively.

Rahuri: At Rahuri, rainfall remained close to the long-term normal, with 573.8 mm compared to 562.7 mm, a variation of 2.0%. The Southwest Monsoon dominated the rainfall pattern, contributing 74.5% (468 mm) of the annual total 574 mm. Temperature extremes ranged from 39.3 °C to 14.2 °C, while the mean annual maximum and minimum values stood at 32.7 °C and 20.7 °C, respectively.

Raipur: Raipur recorded 1453.8 mm of rainfall, considerably above the normal of 1180.0 mm, representing a 23.2% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 93.5% (1266 mm) of the annual total 1454 mm. Temperature extremes ranged from 41.1 °C to 14.8 °C, while the mean annual maximum and minimum values stood at 33.9 °C and 22.4 °C, respectively.

Rajendranagar: At Rajendranagar, rainfall remained close to the long-term normal, with 963.9 mm compared to 846.3 mm, a variation of 13.9%. The Southwest Monsoon dominated the rainfall pattern, contributing 74.5% (850 mm) of the annual total 964 mm. Temperature extremes ranged from 39.6 °C to 16.2 °C, while the mean annual maximum and minimum values stood at 33.1 °C and 21.3 °C, respectively.

Ranchi: At Ranchi, rainfall remained close to the long-term normal, with 1453.5 mm compared to 1273.0 mm, a variation of 14.2%. The Southwest Monsoon dominated the rainfall pattern, contributing 93.5% (1060 mm) of the annual total 1454 mm. Temperature extremes ranged from 37.9 °C to 7.4 °C, while the mean annual maximum and minimum values stood at 30.5 °C and 17.8 °C, respectively.

Rewa: Rewa recorded 1393.1 mm of rainfall, considerably above the normal of 1049.4 mm, representing a 32.8% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 81.6% (1225 mm) of the annual total 1393 mm. Temperature extremes ranged from 41.2 °C to 8.8 °C, while the mean annual maximum and minimum values stood at 32.2 °C and 20.1 °C, respectively.

Rudrur: Rudrur recorded 1349.4 mm of rainfall, considerably above the normal of 1096.0 mm, representing a 23.1% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 87.1% (1181 mm) of the annual total 1349 mm. Temperature extremes ranged from 40.0 °C to 18.0 °C, while the mean annual maximum and minimum values stood at 33.1 °C and 21.5 °C, respectively.

Sabour: Sabour recorded 1576.4 mm of rainfall, considerably above the normal of 1192.2 mm, representing a 32.2%

surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 88.2% (1256 mm) of the annual total 1576 mm. Temperature extremes ranged from 38.4 °C to 7.4 °C, while the mean annual maximum and minimum values stood at 31.2 °C and 19.2 °C, respectively.

Siruguppa: Siruguppa recorded 926.0 mm of rainfall, considerably above the normal of 633.1 mm, representing a 46.3% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 72.9% (672 mm) of the annual total 926 mm. Temperature extremes ranged from 40.6 °C to 16.2 °C, while the mean annual maximum and minimum values stood at 35.1 °C and 22.4 °C, respectively.

SK Nagar: SK Nagar recorded 1339.4 mm of rainfall, considerably above the normal of 594.0 mm, representing a 125.5% surplus. The Southwest Monsoon dominated the rainfall pattern, contributing 87.9% (1268 mm) of the annual total 1339 mm. Temperature extremes ranged from 40.9 °C to 8.5 °C, while the mean annual maximum and minimum values stood at 35.2 °C and 19.0 °C, respectively.

Thanjavur: In Thanjavur, rainfall was much lower than expected, with 687.7 mm against the normal of 1058.8 mm, showing a -35.0% deficit. The Southwest Monsoon dominated the rainfall pattern, contributing 87.9% (338 mm) of the annual total 688 mm. Temperature extremes ranged from 36.5 °C to 14.7 °C, while the mean annual maximum and minimum values stood at 33.6 °C and 21.6 °C, respectively.

Umiam: At Umiam, rainfall remained close to the long-term normal, with 3207.0 mm compared to 2682.7 mm, a variation of 19.5%. The Southwest Monsoon dominated the rainfall pattern, contributing 87.5% (2201 mm) of the annual total 3207 mm. Temperature extremes ranged from 29.8 °C to 7.5 °C, while the mean annual maximum and minimum values stood at 25.8 °C and 15.4 °C, respectively.

Varanasi: In Varanasi, rainfall was much lower than expected, with 682.4 mm against the normal of 997.0 mm, showing a -31.6% deficit. The Southwest Monsoon dominated the rainfall pattern, contributing 79.7% (482 mm) of the annual total 682 mm. Temperature extremes ranged from 40.7 °C to 9.3 °C, while the mean annual maximum and minimum values stood at 31.9 °C and 19.6 °C, respectively.

Conclusion

In conclusion, the climatic assessment across AICRP-IFS centres during 2024–25 revealed pronounced regional disparities in rainfall and temperature. While several centres recorded surplus rainfall relative to the normal, others experienced considerable deficits, underlining uneven monsoon distribution. The Southwest Monsoon remained the principal contributor to annual rainfall at most centres. Thermal regimes also varied widely, with certain locations experiencing extreme summer heat and others reporting markedly low winter minima. These observations reaffirm the climatic diversity across the IFS centres and emphasize the need for location-specific adaptive farming strategies to enhance resilience and sustainability.h

5. STAFF POSITION

Table 5: Staff position under AICRP-IFS(University-wise) as on 31.3.2024

S.N.	Name of the University	Scientific		Technical	
		Sanctioned	Filled	Sanctioned	Filled
1	ANGRAU, Guntur	2	2	6	5
2	PJTSAU, Rajendranagar	6	6	7	3
3	AAU, Jorhat	5	5	6	3
4	BAU, Sabour	5	5	6	0
5	BAU, Ranchi	4	1	6	5
6	IGKV Raipur	4	4	6	1
7	HPKVV, Palampur	4	3	6	3
8	CSA, Kanpur	4	2	6	4
9	NDUAT, Faizabad	4	2	6	2
10	BHU,Varanasi	1	0	1	0
11	GBPUAT, Pantnagar	5	4	6	0
12	PAU, Ludhiana	4	2	6	1
13	HAU Hisar	5	5	6	0
14	SKNAU,Jobner	4	4	6	2
15	SDAU, S.K.Nagar	5	2	6	3
16	NAU, Navsari	1	1	1	1
17	JAU, Junagarh	1	1	1	1
18	AAU, Anand	1	1	5	5
19	JNKVV, Jabalpur	9	6	13	5
20	RVSKVV, Gwalior	1	1	1	0
21	BCKV, Kalyani	6	3	6	1
22	OUAT, Bhubaneswar	7	5	12	4
23	PDKV, Akola	4	3	6	3
24	VNMKV, Parbhani	4	3	6	4
25	MPKV, Rahuri	3	2	6	1
26	DBSKV, Dapoli	4	4	6	6
27	UAS, Raichur	3	3	1	1
28	USAD, Dharwad	1	1	5	5
29	UAS, Bangalore	2	2	5	5
30	UAHS, Shivamogga	3	3	1	1
31	TNAU, Coimbatore	6	6	12	12
32	SKAUST, Jammu	4	4	6	3
33	KAU, Trissur	5	5	6	5
34	MPUAT, Udaipur	2	1	5	4
35	AU, Kota	1	1	1	1
36	ICAR-IIFSR, Modipuram	1	0	5	2
	Total	131	103	196	102

6. BUDGET

AICRP on Integrated Farming Systems:Re- Revised Estimate (2024-25), ICAR share Rs. in Lakhs

Sl. No.	Name of University/ Institute	A. Other than STC (TSP)/SCSP/NEH														B. STC (TSP)								
		Grant-in-Aid 'Salaries'	Grant-in-Aid 'General'				Grant-in -Aid 'Capital'#							Total (Other than STC (TSP)/SCSP/ NEH)	Grant-in-Aid 'General'			Grant-in -Aid 'Capital'#					Total STC (TSP)
			Domestic T.A.	Operational Charges	Research Expenses	Sub Total	Equip-ments (1)	Works (2)	Information Technology (3)	Livestock (4)	Furniture & Fixture (5)	Vehicle (6)	Sub Total		Operational Charges	Research Expenses	Sub Total	Equipment (7)	Livestock (8)	Works (9)	Information Technology (10)	Sub Total	
1	ANGRAU, Guntur	70.54000	1.00000	2.03000	0.75000	3.78000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	74.32000	4.25	1.25	5.50	4.98	0.00	0.00	0.00	4.98	10.48
2	"PJTSAU, Hyderabad"	141.66000	1.40000	8.01000	2.94000	12.35000	0.50	0.00	0.00	0.00	0.00	0.00	0.50	154.51000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	"HPKVV,Palampur"	80.09000	0.15000	5.58000	10.76000	16.49000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.58000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	"GBPUA&T, Pantnagar"	91.00000	0.40000	4.97000	0.19000	5.56000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.56000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	CSAU&T, Kanpur	95.40000	0.40000	4.02000	3.28000	7.70000	0.45	0.00	0.00	0.00	0.00	0.00	0.45	103.55000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6	"NDUA&T, Faizabad"	92.00000	0.55000	2.27000	0.98000	3.80000	0.45	0.00	0.00	0.00	0.00	0.00	0.45	96.25000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	BHU, Varanasi	0.00000	0.25000	4.77000	1.23000	6.25000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	BAU, Ranchi	50.36000	0.75000	5.00000	7.78000	13.53000	0.45	0.00	0.00	0.00	0.00	0.00	0.45	64.34000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	BAU, Sabour	70.89573	1.25000	2.00000	0.50000	3.75000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	74.64573	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	BCKVV, Kalyani	52.79000	0.80000	4.25000	2.75000	7.80000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.59000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
11	AAU, Jorhat	113.73000	0.00000	0.00000	0.00000	0.00000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	113.73000	0.00	0.00	0.00	7.24	0.00	0.00	0.00	7.24	7.24
12	PAU, Ludhiana	82.68000	0.10000	8.00000	12.40000	20.50000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	103.18000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	HAU, Hisar	114.29509	0.68000	4.50000	5.93000	11.11000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	125.40509	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	SKNAU, Jobner	75.96000	1.00000	4.00000	7.06000	12.06000	0.00	1.00	0.00	0.00	0.00	0.00	1.00	89.02000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15	SDAU, S.K. Nagar	53.84212	0.60000	6.00000	3.25000	9.85000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	63.69212	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16	NAU, Navsari	29.41216	0.43000	3.90000	1.37000	5.70000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.11216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	JAU, Junagadh	26.99999	0.14000	1.66000	1.58000	3.38000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.37999	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18	AAU, Anand	45.56000	0.50000	0.00000	0.00000	0.50000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.06000	4.24	10.36	14.60	4.00	0.00	0.00	0.00	4.00	18.60
19	JNKVV,Jabalpur	199.18000	1.14000	10.00000	4.25000	15.39000	0.00	3.00	0.00	0.00	0.00	0.00	3.00	217.57000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20	RVSKVV, Gwalior	12.00000	0.34000	4.00000	1.18000	5.52000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.52000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
21	IGKV, Raipur	76.27000	0.65000	3.50000	3.36000	7.51000	3.70	0.00	0.00	0.00	0.00	0.00	3.70	87.48000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
22	"OUAT, Bhubaneswar"	107.21000	1.50000	6.44000	1.59000	9.53000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	116.74000	2.25	0.75	3.00	0.00	0.00	0.00	0.00	0.00	3.00
23	PDKV, Akola	73.10000	0.75000	4.02000	5.08000	9.85000	3.50	0.00	0.00	0.00	0.00	0.00	3.50	86.45000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
24	MAU, Parbhani	70.00000	0.75000	5.20000	4.97000	10.92000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80.92000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25	MPKV, Rahuri	67.94000	1.50000	6.25000	1.71000	9.46000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	77.40000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
26	KKV, Dapoli	67.10000	0.47000	3.70000	3.40000	7.57000	0.45	1.00	1.10	0.00	0.50	0.00	3.05	77.72000	2.25	0.75	3.00	1.78	0.00	0.00	0.00	1.78	4.78
27	UAS, Raichur	51.91000	1.22000	2.20000	0.97000	4.39000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56.30000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28	UAS, Dharwad	46.61000	0.80000	4.00000	3.00000	7.80000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.41000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29	UAS, Bangalore	50.00000	0.80000	2.50000	1.00000	4.30000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.30000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	UAHS, Shimoga	45.77000	1.10000	2.00000	1.64000	4.74000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.51000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	TNAU, Coimbator	216.87000	3.61000	12.73000	7.75000	24.09000	4.45	0.00	0.00	0.50	0.00	0.00	4.95	245.91000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	SKUAST, Jammu	118.21000	0.28000	7.17000	5.49000	12.94000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	131.15000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33	KAU, Thrissur	80.16000	1.63000	5.03000	1.25000	7.91000	3.50	0.00	0.00	0.00	0.00	0.00	3.50	91.57000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34	MPUAT, Udaipur	47.36491	0.80000	2.70000	2.25000	5.75000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.11491	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	AU, Kota	41.09000	0.30000	4.65000	2.00000	6.95000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48.04000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36	"ICAR-IIFSR, Modipuram"	0.00000	0.24753	7.85326	3.40321	11.50400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.50400	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37	"P.C.Unit,IIFSR, Modipuram"	0.00000	3.24870	5.52321	0.54409	9.31600	0.45	0.00	0.00	0.00	0.00	0.00	0.45	9.76600	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38	"ICAR Res. Comp., Patna"	0.00000	0.25000	6.75000	0.75000	7.75000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.75000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39	"ICAR Res. Comp., Umiam"	0.00000	0.00000	0.00000	0.00000	0.00000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40	"ICAR -CCARI, Old Goa"	0.00000	0.40000	4.48000	6.00000	10.88000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.88000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41	"ICAR-CIARI- Port Blair"	0.00000	1.23000	5.33000	2.21000	8.77000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.77000	0.90	3.00	3.90	0.90	0.00	0.00	0.00	0.90	4.80
42	"ICAR-IASRI, New Delhi"	0.00000	0.30000	2.75000	0.00000	3.05000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.05000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	2658.00	33.71623	189.73647			17.90	5.00	1.10	0.50	0.50	0.00	25.00	3033.00000	13.89	16.11	30.00	18.90	0.00	0.00	0.00	18.90	48.90

AICRP on Integrated Farming Systems:Re- Revised Estimate (2024-25), ICAR share Rs. in Lakhs

Sl. No.	Name of University/ Institute	C. SCSP									D. NEH												GRAND TOTAL (A+B+ C+D)
		Grant-in-Aid 'General'			Grant-in -Aid 'Capital'#					Total (SCSP)	Grant-in-Aid 'Salaries'	Grant-in-Aid General				Grant-in-Aid 'Capital'#						Total NEH	
		Research Expenses	Operatonal Charges	Sub Total	Equipment (11)	Livestock (12)	Works (13)	Information Technology (14)	Sub Total			Domestic T.A.	Operational Charges	Research Expenses	Sub Total	Equipments (15)	Works (16)	Livestock (17)	Furniture& Fixtures (18)	Information Technology (19)	Sub Total		
1	ANGRAU, Guntur	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	84.80000
2	"PJTSAU, Hyderabad"	4.15	4.75	8.90	3.50	0.00	0.00	0.00	3.50	12.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	166.91000
3	"HPKVV,Palampur"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.58000
4	"GBPUA&T, Pantnagar"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.56000
5	CSAU&T, Kanpur	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	103.55000
6	"NDUA&T, Faizabad"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	96.25000
7	BHU, Varanasi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25000
8	BAU, Ranchi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64.34000
9	BAU, Sabour	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	74.64573
10	BCKVV, Kalyani	1.20	2.50	3.70	0.00	0.00	0.00	0.00	0.00	3.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64.29000
11	AAU, Jorhat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.23	71.96	51.04	126.23	23.53	0.00	0.00	0.00	0.00	23.53	149.76	270.73000
12	PAU, Ludhiana	3.00	0.67	3.67	0.00	0.00	0.00	0.00	0.00	3.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	106.85000
13	HAU, Hisar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	125.40509
14	SKNAU, Jobner	0.64	0.38	1.02	0.00	0.00	0.00	0.00	0.00	1.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.04000
15	SDAU, S.K. Nagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	63.69212
16	NAU, Navsari	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	35.11216
17	JAU, Junagadh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.37999
18	AAU, Anand	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	64.66000
19	JNKVV,Jabalpur	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	217.57000
20	RVSKVV, Gwalior	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.52000
21	IGKV, Raipur	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	87.48000
22	"OUAT, Bhubaneswar"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	119.74000
23	PDKV, Akola	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	86.45000
24	MAU, Parbhani	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80.92000
25	MPKV, Rahuri	0.00	0.00	0.00	3.00	0.00	0.00	0.00	3.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80.40000
26	KKV, Dapoli	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	82.50000
27	UAS, Raichur	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56.30000
28	UAS, Dharwad	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.41000
29	UAS, Bangalore	3.00	3.10	6.10	0.00	0.00	0.00	0.00	0.00	6.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.40000
30	UAHS, Shimoga	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.51000
31	TNAU, Coimbator	6.96	4.83	11.79	0.00	0.00	0.00	0.00	0.00	11.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	257.70000
32	SKUAST, Jammu	1.02	4.00	5.02	3.50	0.00	0.00	0.00	3.50	8.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	139.67000
33	KAU, Thrissur	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	91.57000
34	MPUAT, Udaipur	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	53.11491
35	AU, Kota	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48.04000
36	"ICAR-IIFSR, Modipuram"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.50400
37	"P.C.Unit,IIFSR, Modipuram"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.76600
38	"ICAR Res. Comp., Patna"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.75000
39	"ICAR Res. Comp., Umiam"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	9.50	1.50	11.55	0.00	0.00	0.00	0.00	0.00	0.00	11.55	11.55000
40	"ICAR -CCARI, Old Goa"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.88000
41	"ICAR-CIARI- Port Blair"	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.57000
42	"ICAR-IASRI, New Delhi"	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	19.97	20.23	40.20	10.00	0.00	0.00	0.00	10.00	50.20	0.00	3.78	81.46	52.54	137.78	23.53	0.00	0.00	0.00	0.00	23.53	161.31	3293.41000

(1) Rs 0.50 lakhs to Rajendranagar, Rs 0.45 lakhs each to Kanpur, Faizabad, Ranchi, Dapoli and Coimbatore for Need based equipments (Feed mill), Rs 1.00 lakh for Coimbatore for need based equipments for lab, Rs 3.70 lakhs each to Raipur, Akola, Karamana & Rs 3 lakhs to Coimbatore for Need based equipment/IT/ other items each costing< 2.5 lakhs for developing display units and other facilities for facilitating visitors to IFS model and Rs 0.45 lakhs to PC Unit for Need based equipments/IT items; (2) Rs 1 lakh each to Dapoli and Jobner and Rs 3 lakhs to Jabalpur for modification/improvement/Strengthening IFS Units; (3) Rs 1.10 lakh to Dapoli for Need based IT items including computer/laptops; (4) Rs 0.50 lakhs for livestock (new/replacement); (5) Rs 0.50 lakhs to Dapoli for Furniture and fixtures; (7) Rs 4.98 lakhs to Vizianagaram, Rs 7.24 lakhs to Jorhat, Rs 4 lakhs to Dahod, Rs 1.78 lakhs to Palghar and Rs 0.90 lakhs to Port Blair for need based equipments/IT items; (11) Rs 3.50 lakhs each to Rajendranagar & Jammu Rs 3 lakhs to Rahuri Need based equipment/IT/other items each costing< 2.5 lakhs for developing display units and other facilities for facilitating visitors to IFS model; (15) Atomic Absorption Spectro Photometer with accessories and other need based equipments for AAU, Jorhat

7. RESEARCH RESULTS

7. INTEGRATED FARMING SYSTEMS

7.1 Sustainable resource management for climate smart IFS

Under All Indian Coordinated Research Project (AICRP) on Integrated Farming Systems (IFS) on station experimentation Sustainable resource management for climate smart IFS were implemented starting from 2017-18 with revised objectives, across different agro-climatic zones, and continued through reporting period of 2023-24 which are as follows:

- To identify ecologically and economically viable enterprises for different regions under climate change scenario.
- To undertake resource budgeting in systems perspective with special reference to soil, water, nutrients and energy.
- To evaluate the low carbon production modules in the system.
- To identify and evaluate secondary agriculture avenues in farming systems perspective for attracting rural youth.

Location of IFS models in different agro-climatic zones:

Agro-climatic region	Locations (State)	Number of IFS models
Western Himalaya	Jammu(JK), Palampur (HP), Pantnagar (UK)	3
Eastern Himalaya	Jorhat (AS), Umiam (ML)	2
Lower Gangetic Plains	Kalyani (WB)	1
Middle Gangetic Plains	Ayodhya, Varanasi (UP); Patna (2 nos), Sabour (BR)	5
Upper Gangetic Plains	Kanpur, Modipuram (UP)	2
Trans Gangetic Plains	Hisar (HR), Ludhiana (PB)	2
Eastern Plateau and Hills	Raipur(CG), Ranchi (JH), Chipilima (OD)	3
Central Plateau and Hills	Jabalpur, Rewa, Indore (MP); Kota, Durgapura (RJ)	5
Western Plateau and Hills	Akola, Parbhani, Rahuri (MH)	3
Southern Plateau and Hills	Coimbatore (TN), Kathalgere (2 nos) (KA), Siruguppa (KA), Rajendranagar (TS), Maruteru (2 nos) (AP), Rudrur (AP)	8
East Coast Plains and Hills	Bhubaneswar (OD), Thanjabhur (TN)	2
West Coast Plains and Hills	Goa(2 nos); Karamana (4 nos) (KL), Karjat (MH)	7
Gujarat Plains and Hills	Junagadh, SK Nagar (GJ), Navsari (GJ)	3
Islands	Port Blair (A&N)	1
Total		47

1. WESTERN HIMALAYAN REGION (WHR)

In this Agro Climatic Region three on-station Integrated Farming Systems (IFS) models namely Jammu (J&K), Palampur (Himachal Pradesh) and Pantnagar (Uttarakhand) with objectives of climate smart IFS initiated during

2017-18. The results obtained from these IFS models during the reporting period of 2023-24 revealed that mean gross income of Rs. 661611 while the mean net return with family labour employed was found to be Rs.4, 38,143. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 4, 02,969 from IFS models from area of 1.0 ha. Details of IFS model components and cost is presented in Table 7.1.1 which indicated mean total cost for the IFS models of Rs. 3,57,813 while it varied from Rs 3,29,366 at Pantnagar to Rs 4,01,408 at Jammu.

Table 7.1.3 Details of IFS model along with total cost of model in WHR

Location	IFS model	Area (ha)	Total cost (Rs)
Jammu	Cropping Systems +Fodder+ Horticulture + Livestock (3 nos)+ Vermicompost+ Biogas+ Fish cum poultry (0.1 ha) + Mushroom + Boundary plantation	1.0	401408
Palampur	Cropping system (0.65 ha) + Horticulture (0.175 ha) + Fodder (0.1 ha) + Dairy (2 nos) +Poultry (200 in two batches) Vermi-compost + Boundary Plantations + Kitchen Gardening+ Mushroom	1.0	342664
Pantnagar	Crops (0.47 ha) + Dairy (I Sahiwal + 1 HF) + Horticulture (0.22 ha) + Agroforestry as boundary plantation+ Fisheries (0.06 ha) + Biogas	1.0	329366
Mean		**1.0**	**357812.7**

The models could generate mean employment generation of 419 man days through different modules while the IFS models were also found to be carbon negative in terms of GHG emission at -8616.00 CO2 equivalents. Further, study of different fractions of cost revealed about 28% share of recycled inputs in total cost of the IFS whereas cost of outside purchase was to the tune of 33 % of the cost. The cost incurred towards hired labour was 29 %. These models revealed mean REY of 33.47 tonnes besides soil health improvement to the tune of 33.2 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 2.74.

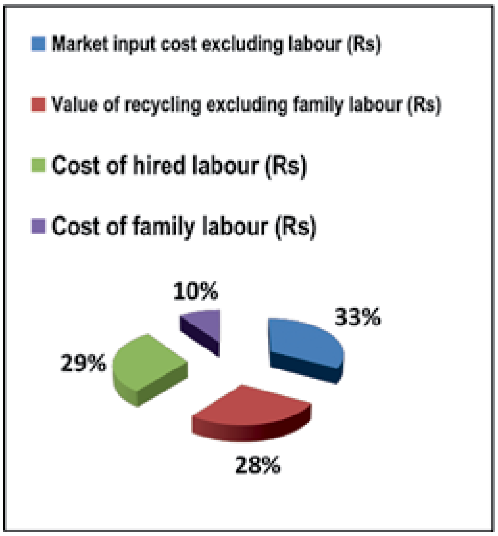


Fig 1. Different fraction of total cost in IFS models of WHR

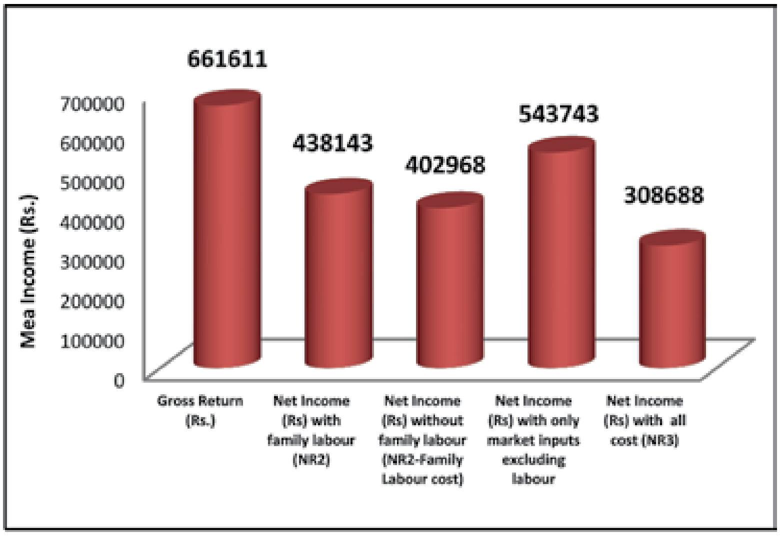


Fig 1. Economics of IFS models of WHR

2. EASTERN HIMALAYAN REGION (EHR)

In this Agro Climatic Region two AICRP-IFS centers Umiam (Meghalaya) and Jorhat (Assam) are located and climate smart IFS model studies initiated during 2017-18. The results obtained from these IFS models during the reporting period of 2023-24 revealed that mean gross income of Rs. 522029 while the mean net return excluding family labour cost was found to be Rs.412696. However, when family labour was accounted for in the cost, the mean net return was found to be Rs.317202. Details of IFS model components and cost is presented in Table 7.1.2 which indicated mean total cost for the IFS models was Rs. 252885 while it varied from Rs 186858 at Umiam to Rs 318912 at Jorhat for 1.0 ha IFS models.

Table 7.1.2: Details of IFS model along with total cost of model in EHR

Location	IFS model	Area (ha)	Total cost (Rs)
Jorhat	Crops (0.43 ha)+ Dairy (3 jersy) + Horticulture (0.17 ha)+ Fishery (0.092 ha)+ Poultry (5 batches of 25)+ Duckery (55 Layers) + Goatery (7 M+10 F) + Apiary (5 boxes) + Vermi-compost + Biogas + Liquid Manure + FYM production	**1.0**	318912
Umiam	Cropping systems (0.70 ha)+ Livestock (pig 3 nos) + Poultry (broiler + layers) + Horticulture + Fishery (0.05 ha)	**1.0**	186858
Mean		**1.0**	**252885.0**

The models could generate mean employment generation of 341 man-days through different modules. Further, study of different fractions of cost revealed about 20% share of recycled inputs in total cost of the IFS which could be further enhanced whereas cost of outside purchase was to the tune of 37% of the cost. The cost incurred towards hired labour was 6%. These models revealed mean REY of 23.70 tonnes besides soil health improvement to the tune of 32 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 3.81. The mean sustainable value index (SVI) for these models was found to be 0.8.

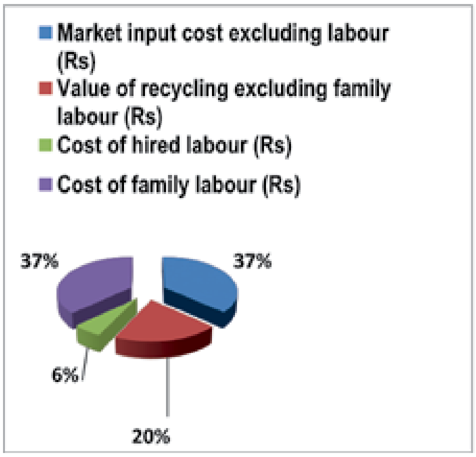


Fig 2. Different fraction of total cost in IFS models of EHR

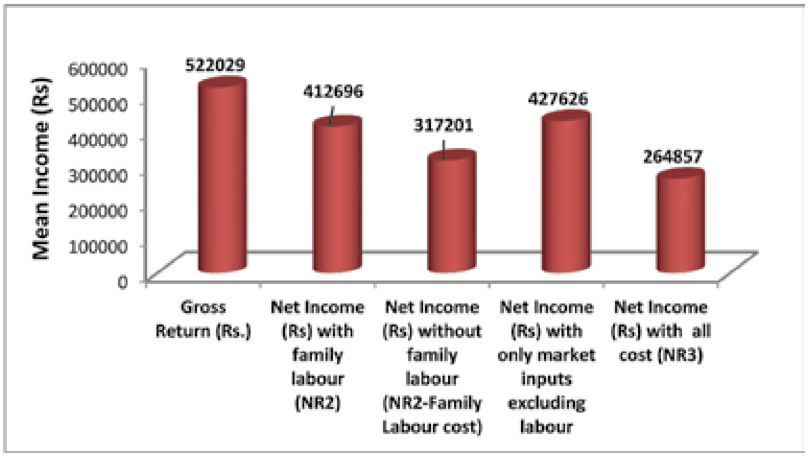


Fig 2. Economics of IFS models of EHR

3. LOWER GANGETIC PLAINS REGION (LGP)

To demonstrate the benefits of diversified climate smart farming a climate smart IFS Model was initiated in 2017-18 in order cater to the needs of six-member farm family so as to sustain their livelihood under irrigated ecosystem of New Alluvial zone of West Bengal. In order to meet the requirements of the farm families and livestock, the IFS Model has been developed for 0.66 ha land holding to support a family of small and marginal farmer having six family members. The model encompasses components 0.2 ha converted into five pairs of raised and sunken beds alternately, each bed measuring 200 m2 for paddy cum fish cultivation in the sunken beds and for cultivation of vegetables and arable field crops in the raised beds. Slope in the junction of raised and sunken beds has been utilized for fodder cultivation (hybrid napier). Some vegetable creepers (dolichos bean, bottle gourd etc.) are also grown above the sunken beds on netted scaffolds. The results of study during 2023-24 revealed gross income of only Rs. 355977 while the mean net return excluding family labour cost was found to be Rs.308263. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 247963. Details of IFS model cost components presented in Table 7.1.3 indicated total cost for the IFS models to be Rs. 189977.

Table 7.1.3: Details of IFS model along with total cost of model in LGP

Location	IFS model	Area (ha)	Total cost (Rs)
Kalyani	Cropping systems (0.18 ha) + Raised and sunken bed (0.2 ha)+ Dairy + Horticulture (0.12 ha) + Vermi-compost + Biogas + fishery (0.09 ha)	0.66	189977
Mean		**0.66**	**189977**

The models could generate employment generation of 337 man-days through different modules while the IFS model was found to be carbon negative in terms of mean GHG emission at - **-3310.12** CO2 equivalents. Further, study of different fractions of cost revealed about 43% share of recycled inputs excluding family labour in total cost of the IFS whereas cost of outside purchase excluding labour was 12%. These models revealed mean REY of 16.16 tonnes as compared to benchmark with net returns per rupee invested being 6.46 with mean SVI of 0.46.

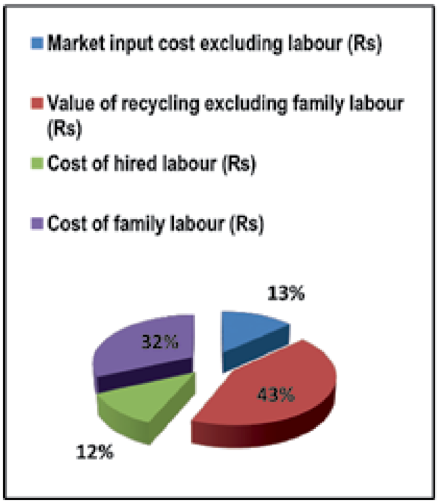


Fig 3. Different fraction of total cost in IFS models of LGP

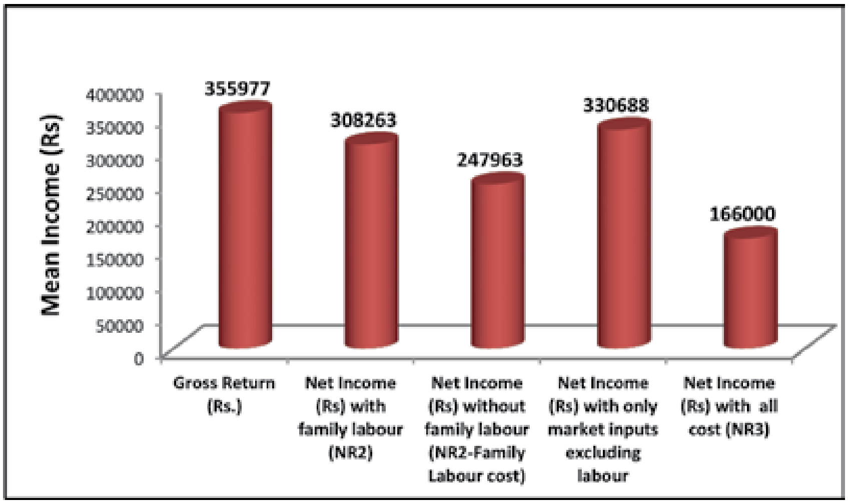


Fig 3. Economics of IFS models of LGP

4. MIDDLE GANGETIC PLAINS REGION (MGP)

Four AICRP –IFS Centers, two in eastern part of Uttar Pradesh namely i) IAS,BHU, Varanasi and NDUA&T, Kumarganj –Ayodhya and two in Bihar i) ICAR Research Complex for eastern region, Patna., and BAU, Sabour-Bhagalpur (Bihar) are given responsibilities of developing climate smart IFS Models with revised objectives for respective states since 2017-18. Significance of IFS approach towards production, profitability and livelihood of small land holders in the regions as reflected form the results of study during 2023-24. Details of different components of IFS are presented in Table 7.1.4. The results revealed mean gross income of Rs. 587062 while the mean net return excluding family labour cost was found to be Rs.390869. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 363244. Details of IFS model cost components presented in Table 7.1.4 indicated mean total cost for the IFS models to be Rs. 313277 while it varied from Rs 92492 at Patna (0.4 ha model) to Rs 473862 at Varanasi for 1.0 ha IFS model.

Table 7.1.4: Details of IFS model along with total cost per model in MGP

Location	IFS model	Area (ha)	Total cost (Rs)
Ayodhya	Cropping systems (0.7 ha) + Dairy (3 buffalo with heifer) + Horticulture (0.2 ha) + Fishery (0.1 ha) with 15 ducks + Vermi-compost + boundary plantation	**1.01**	343461
Patna Cropping systems (0.27 ha)+ Horticulture (0.09 ha) + Goatery (20+1)+ Poultry (7 batches of 100 birds)+ Mushroom, vermicomposting and boundary plantation		**0.4**	92492
Patna	Cropping systems (0.55 ha) + Dairy (2cow + 1 Buffalo)+ Horticulture (0.1 ha) +Fish cum duckery (0.12 ha) with 40 ducks+ Biogas, vermi-compost and boundary plantation	**0.8**	197890
Sabour	Cropping systems (0.78 ha) + Dairy (2 HF)+ Goatery (black Bengal 10 nos) +Fish cum duckery (20 nos)+ fruits (0.14 ha)+ vermi-compost+ boundary plantation	**1.0**	458681
Varanasi	Cropping systems (0.8 ha) + Dairy (4 cow+ 3 calves) + Horticulture (0.06ha) + Poultry (6 batches of 200 birds) + Fishery (0.1 ha) + Boundary plantation, mushroom and vermicomposting	**1.0**	473862
Mean			**313277.1**

The models could generate mean employment generation of 389 man-days through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at **-3554.56** CO2 equivalents. Further, study of different fractions of cost revealed about 28% share of recycled inputs excluding family labour in total cost of the IFS whereas cost of outside purchase excluding labour was 30%. The cost incurred towards hired labour was 34% while cost of family labour was 8% of the cost. These models revealed mean REY of 26.65 tonnes besides soil health improvement to the tune of 9.93% in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 2.30 with mean SVI of 0.8.

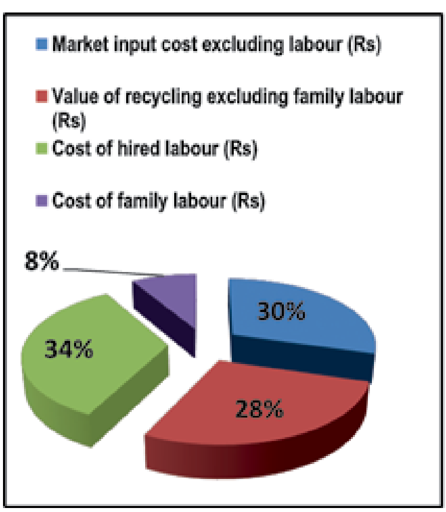


Fig 4. Different fraction of total cost in IFS models of MGP

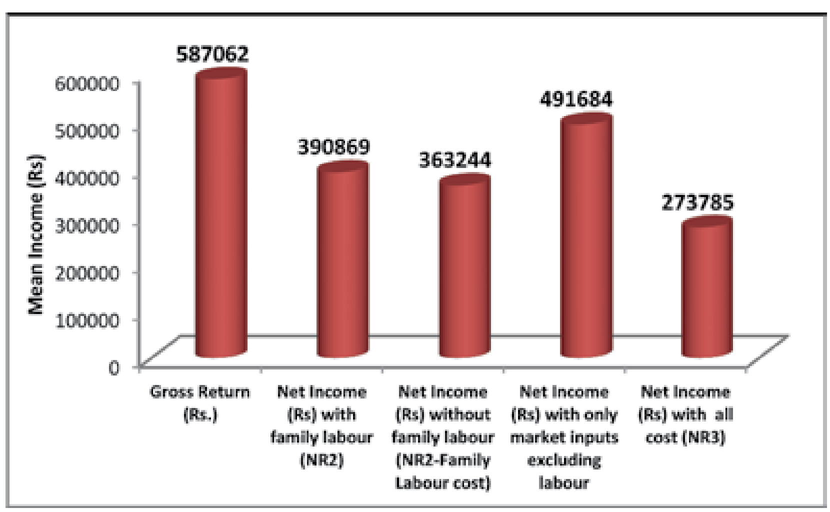


Fig 4. Economics of IFS models of MGP

5. UPPER GANGETIC PLAINS REGION (UGP)

In this Agro Climatic Region two AICRP-IFS centers namely ICAR-IIFSR, Modipuram, Meerut a voluntary ICAR institute and ii) CSAUA&T, Kanpur, both in Uttar Pradesh are working on the aspect of "Development of Climate smart IFS Models". The IFS model at IIFSR, Modipuram was spread over 0.72 ha while the IFS model at Kanpur was having 1.0 ha area. The findings of IFS models from these centres during the reporting period of 2023-24 revealed that mean gross income of Rs. 419281 while the mean net return excluding family labour cost was found to be Rs.228204 However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 175944. Details of IFS model components and cost is presented in Table 7.1.5. Which indicated mean total cost for the IFS models was Rs. 364872 while it varied from Rs. 259824 at Modipuram for 0.72 ha model to Rs 469920 at Kanpur for 1.0 ha IFS model.

Table 7.1.5: Details of IFS model along with total cost per model in UGP

Location	IFS model	Area (ha)	Total cost (Rs)
Kanpur	Cropping systems (0.72 ha) + Dairy (2 Cows + heifer) + Horticulture (0.192 ha)+ Vermicomposting + Boundary Plantations	1.0	469920
Modipuram	Cropping systems (0.38 ha) + multilayer farming (0.18 ha)+agri-horti system (0.12 ha)+ Dairy (1B+1C) + Boundary Plantations +farm pond (0.02ha)+ value addition	0.72	259824
Mean		**0.86**	**364872.0**

The models could generate mean employment generation of 664 man-days through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at - **-2688.15** CO2 equivalents. Further, study of different fractions of cost revealed about 33% share of recycled inputs excluding family labour in total cost of the IFS which could be further enhanced whereas cost of outside purchase was to the tune of 29% of the cost excluding labour. These models revealed mean REY of 19.03 tonnes besides soil health improvement to the tune of 21 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 1.18. The mean sustainable value index (SVI) for these models was found to be 0.67.

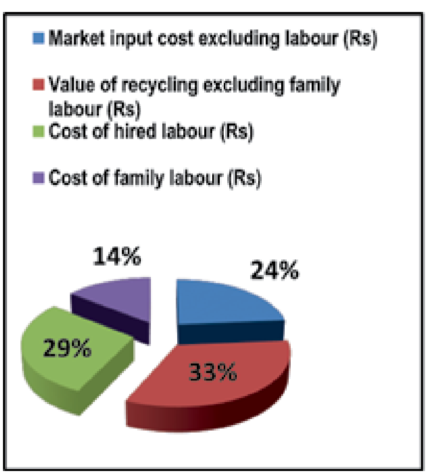


Fig 5. Different fraction of total cost in IFS models of UPG

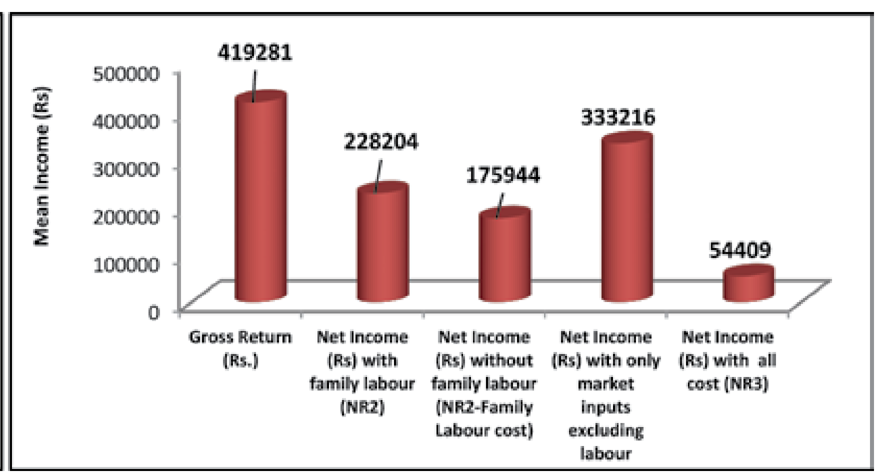


Fig 5. Economics of IFS models of UPG

6. TRANS GANGETIC PLAINS REGION (TGP)

Trans Gangetic Plains Region is represented by the states of Punjab and Haryana. Under AICRP-IFS, two independent centers one at PAU, Ludhiana (Punjab) and another one in CCHAU, Hisar are given the responsibility of development of "Climate smart IFS models" at respective centers. The results obtained from these IFS models during the reporting period of 2023-24 revealed that mean gross income of Rs. 961201 while the mean net return excluding family labour cost was found to be Rs.663956. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 627056. Details of IFS model components and cost is presented in Table 7.1.6. Which indicated mean total cost for the IFS models was Rs. 414586 while it varied from Rs 212237 at Hisar to Rs 616935 at Ludhiana for 1.0 ha IFS models.

Table 7.1.6: Details of IFS model along with total cost per model in TGP

Location	IFS model	Area (ha)	Total cost (Rs)
Hisar	Cropping systems (0.81 ha) + Horticulture (0.15 ha) + Dairy (1Buffalo +1Cow) +Vermicompost+ Boundary Plantations (Bael + karonda) + Mushroom+ Biogas	**1.0**	212237
Ludhiana	Cropping systems (0.64 ha) +Dairy (2 C+ 1 B) + Goatery (9 +1) + Horticulture (0.19 ha)+ Fishery (0.1 ha) + Agroforestry (Poplar with Turmeric – wheat) + Kitchen Gardening	**1.0**	616935
Mean		**1.0**	**414586.0**

The models could generate mean employment generation of 380 man-days through different modules while the IFS models were found to be carbon negative in terms of GHG emission at **-3501.25** CO2 equivalents. Further, study of different fractions of cost revealed about 19% share of recycled inputs in total cost of the IFS which could be further enhanced whereas cost of outside purchase was to the tune of 49% of the cost. The cost incurred towards hired labour was 23%. These models revealed mean REY of **43.63** tonnes besides net returns per rupee invested being **3.49**. The mean sustainable value index (SVI) for these models was found to be 0.51.

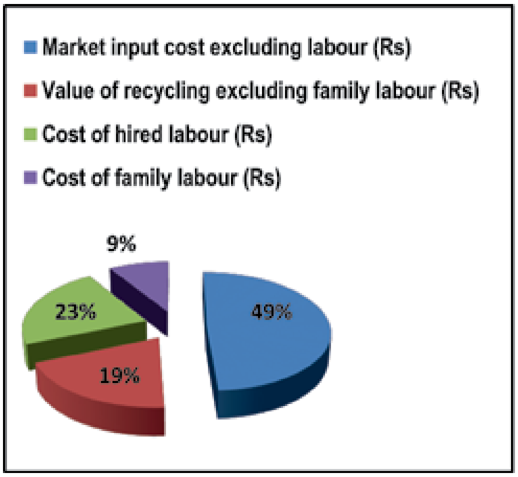


Fig 6. Different fraction of total cost in IFS models of TGP

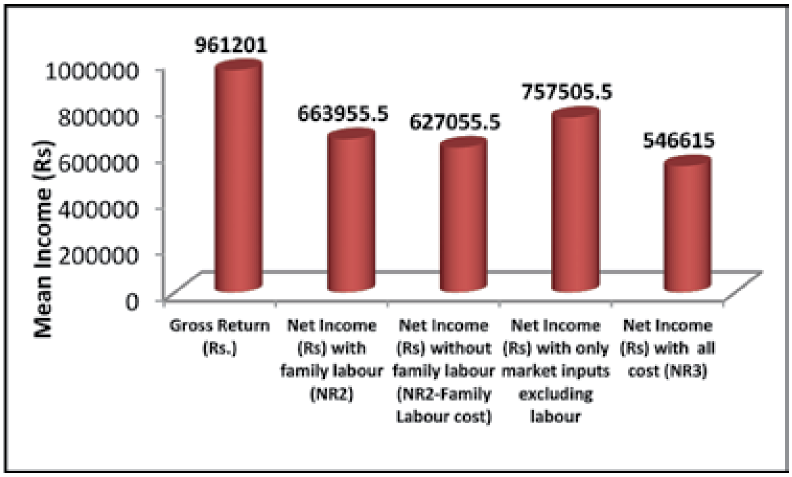


Fig 6. Economics of IFS models of TGP

7. EASTERN PLATEAU AND HILLS (EPH)

IGKV, Raipur (Chhatisgarh), BAU, Kanke Ranchi (Jharkhand) and OUAT, Chiplima (Odisha) all the three AICRP-IFS centers representing Eastern Plateau and Hills Region were evaluated for development of climate smart IFS models for livelihood improvement of small and marginal farmers of the region. The IFS model of all the locations were spread over 1.0 ha area to 0.4 ha. The findings of IFS models from these centres during the reporting period of

2023-24 revealed that mean gross income of Rs.334683 while the mean net return excluding family labour cost was found to be Rs.196326. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 146144. Details of IFS model components and cost is presented in Table 7.1.7 which indicated mean total cost for the IFS models was Rs. 238005 for IFS models.

Table 7.1.7: Details of IFS model along with total cost per model in EPH

Location	IFS model	Area (ha)	Total cost (Rs)
Raipur	Cropping systems (0.63) + Dairy (2 Sahiwal + 1 calf) Vermicompost + Boundary Plantations + Kitchen Gardening (revised technical programme new model) + Goatery proposed	1.0	101054
Ranchi	Cropping systems (0.8 ha) + Dairy (2 HF) + Vermi-compost + Mushroom + Apiary (6 boxes) + Fishery (0.1 ha) + Goatery (4 F+1M since 2022)+ boundary plantation (Drumstick, Papaya)	1.0	288747
Chipilima	Cropping systems (0.1 ha)+ Dairy (Red Sindhi 3 nos) + Horticulture (0.1 ha)+ poultry/duckery (60+30)+ fishery (0.1 ha)+ Composting, boundary plantation	0.4	324216
Mean		**1.0**	**238005.7**

The models could generate mean employment generation of 312 man-days through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at -1782.69 CO2 equivalents. Further, study of different fractions of cost revealed about 21% share of recycled inputs in total cost of the IFS which could be further enhanced whereas cost of outside purchase was to the tune of 33% of the cost. The cost incurred towards hired labour was 25% while 21% of cost saved due to family labour. These models revealed mean REY of 15.19 tonnes besides soil health improvement to the tune of 15.40 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.87 with mean SVI of 0.82.

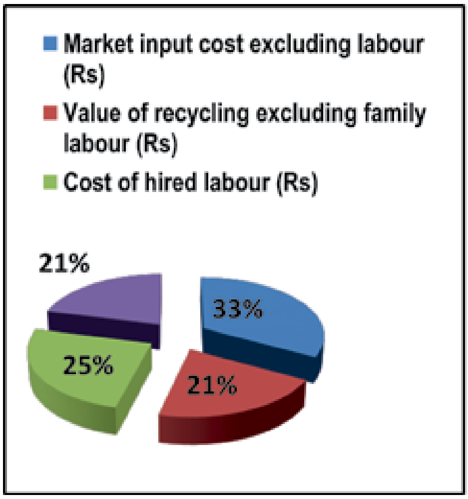


Fig 7. Different fraction of total cost in IFS models of EPH

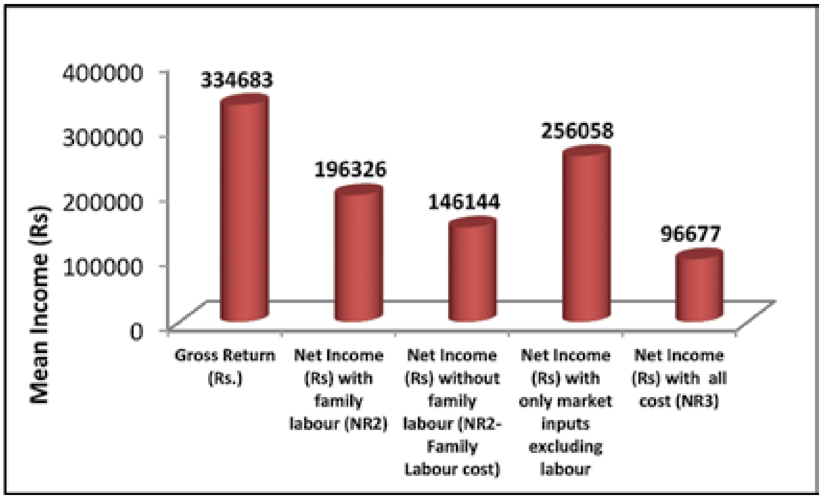


Fig 7. Economics of IFS models of EPH

8. CENTRAL PLATEAU AND HILLS (CPH)

AICRP-IFS Centre Jabalpur (MP), Durgapura (Rajasthan), Rewa (MP) and Kota (Rajasthan) falls under Central Plateau and hills region of the country. The average family size of the region is 5 members (3 male + 2 female) with the holding size of 0.70 ha for marginal and 1.20 ha for the small farmers. IFS model of 1.0 ha was initiated at Jabalpur for climate smart farming systems study during 2017. In the IFS model cropping component covers 0.64 ha, dairy component covers 0.007 ha with 3 cow + 1 calf, fisheries component 0.06 ha, poultry component and mandatory other enterprises like kitchen garden, boundary plantation etc. The IFS model at Durgapura consisted of crops, diary, horticulture, goatary, poultry as well as other complementary and supplementary modules in 1.45 ha area. The results of study during 2023-24 revealed gross income of Rs. 5495037 while the return excluding family labour cost was found to be Rs.335684. However, when family labour was accounted for in the cost, the net return was found to be Rs 282378. Details of IFS model cost components presented in Table 7.1.8 indicated mean total cost for the IFS models to be Rs. 353244.

Table 7.1.8: Details of IFS model along with total cost per model in CPH

Location	IFS model	Area (ha)	Total cost (Rs)
Jabalpur	Cropping systems (0.64 ha) + Dairy (3 Cow+ 1 calf)+ Poultry (10 nos) + Fishery (0.06 ha)+ Horticulture (0.18 ha)	**1.0**	210154
Durgapura	Cropping systems (1.0 ha)+ Dairy (2 Gir cow)+ Horticulture (0.12 ha) + Goatery (5+1 Sirohi)+ Poultry (RIR 100 birds)+ Vermicom-posting, Azolla, boundary plantation	**1.45**	525295
Rewa	Cropping systems (0.36 ha)+Dairy (2 Cross bred cow)+Boundary plantation +Compost	**0.4**	231975
Kota	Crops +Dairy Horticulture+ Compost +Boundary plantation +Azolla unit	**1.0**	445550
Mean		**1.22**	**353243.5**

The models could generate employment generation of 548 man-days through different modules while the IFS model was found to be carbon emissive in terms of mean GHG emission at - 5864.38 CO2 equivalents. Further, study of different fractions of cost revealed about 25% share of recycled inputs in total cost of the IFS whereas cost of outside purchase was 34%. The cost incurred towards hired labour was to the tune of 26%. These models revealed mean REY of 24.94 tonnes besides soil health improvement of 15 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.99 with mean SVI of 0.74.

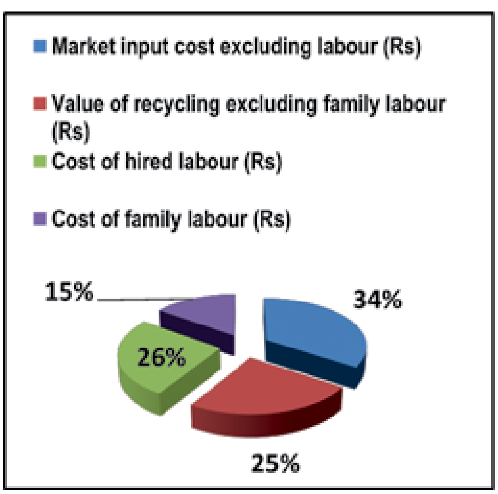


Fig 8. Different fraction of total cost in IFS models of CPH

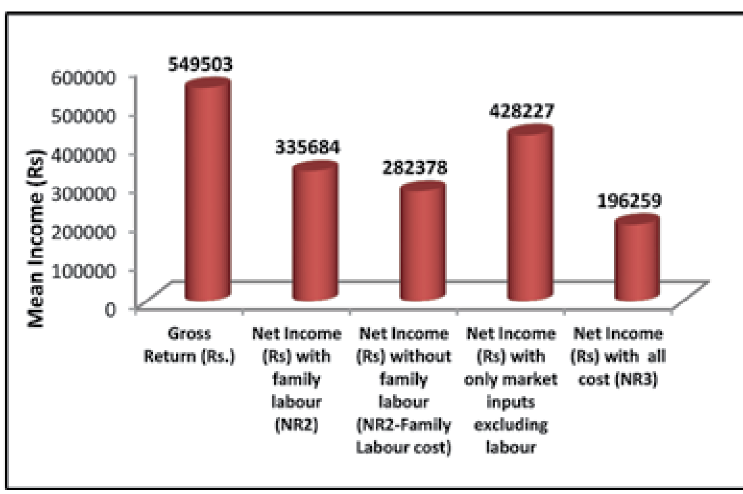


Fig 8. Economics of IFS models of CPH

9. WESTERN PLATEAU AND HILLS (WPH)

AICRP-IFS programme running in three representative districts of Western Plateau and Hill Region include i) AICRP-IFS Centre- Parbhani, ii) AICRP-IFS Centre – Akola and iii) AICRP-IFS center at Rahuri. Climate smart

IFS models are being developed at all the three respective centers. The results of study during 2023-24 at 3 centres along with components of IFS are presented in Table 7.1.9 which revealed mean gross income of Rs. 909793 while the mean net return excluding family labour cost was found to be Rs.583583. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 572283. Details of IFS model cost components presented in Table 7.1.9 indicated mean total cost for the IFS models to be Rs. 418007 while it varied from Rs 467602 at Parbhani model to Rs 430684 at Rahuri for 1.0 ha IFS model.

Table 7.1.9: Details of IFS model along with total cost per model in WPH

Location	IFS model	Area (ha)	Total cost (Rs)
Akola	Cropping systems (0.70 ha) + Fruit & Vegetables (0.25 ha) + Goat (Berari 20 nos)+ Cow (1 Gir) + Poultry (Vanraja/Giriraj 200 nos)+ Compost + Kitchen Garden + Boundary plantations	1.0	355735
Parbhani	Cropping systems (0.46 ha)+ Fodder (0.15 ha)+ Dairy (2cow)+ Goat (10+1) Horticulture (0.30 ha)+ Vermicompost + Boundary Plantation	1.0	467602
Rahuri	Cropping systems (0.75 ha) + Dairy (2 cow Phule Triveni)+ Horticulture (0.20 ha)+ Poultry (4 batches of 100 birds each)+ Goat (Sangamneri 10+1)+ Vermicompost	1.0	430684
Mean		**1.0**	**418007.0**

The models could generate mean employment generation of 498 man-days through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at - -8267.77 CO2 equivalents. Further, study of different fractions of cost revealed about 19% share of recycled inputs in total cost of the IFS whereas cost of outside purchase was to the tune of 42%. The cost incurred towards hiring labour was 36%. These models revealed mean REY of 41.30 tonnes besides soil health improvement to the tune of 5.60 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 1.39 with mean SVI of 0.70.

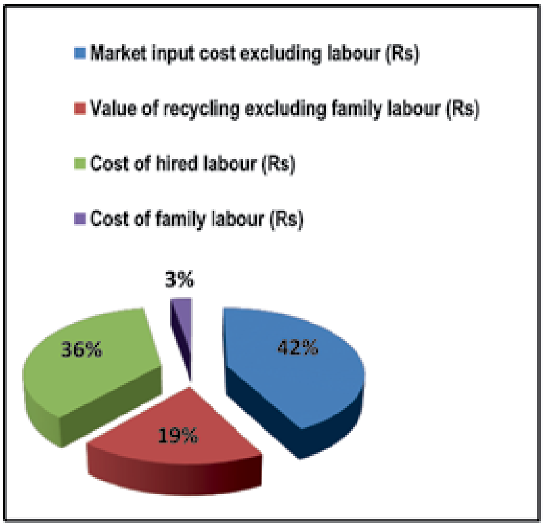


Fig 9. Different fraction of total cost in IFS models of WPH

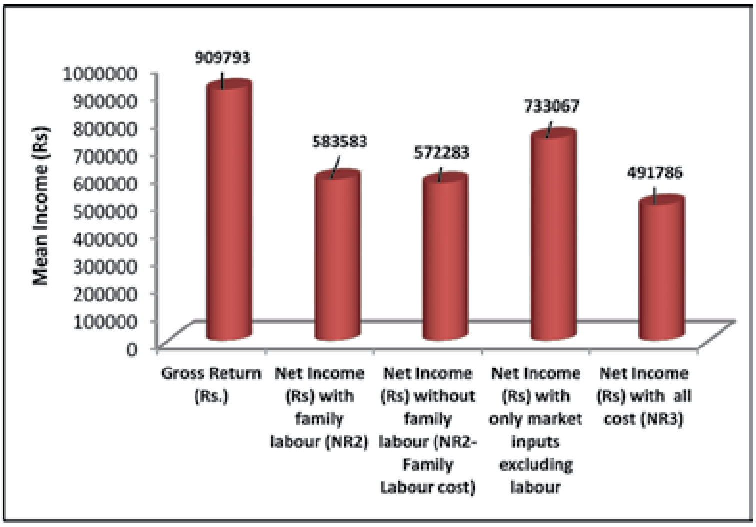


Fig 9. Economics of IFS models of WPH

10. SOUTHERN PLATEAU AND HILLS (SPH)

Six AICRP-IFS centers namely, TNAU, Coimbatore (Tamil Nadu), ARS, Kathalgere (Karnataka), ANGRAU, Rajendra Nagar, Hyderabad (A.P.), ARS, Sirriguppa (Karnataka) and PJTSAU, Hyderabad (Telangana) are located in different NARP zones of Southern Plateau and Hill ACZ of the country. A new sub centre is also being established at Maruteru, A.P. The results of study during 2023-24 at these centres along with components of IFS is presented in Table 7.1.10 which revealed mean gross income of Rs. 625584 while the mean net return excluding family labour cost was found to be Rs.469787. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 368873. Details of IFS model cost components presented in Table 7.1.10 indicated mean total cost for the IFS models to be Rs. 368026 while it varied from Rs 188181 at Kathalgere model(1.0 ha) to Rs 754039 at Coimbatore for 1.0 ha IFS model.

Table 7.1.10: Details of IFS model along with total cost per model in SPH

Location	IFS model	Area (ha)	Total cost (Rs)
Coimbatore	Cropping systems (0.85 ha) + Horticulture (0.10 ha) + Dairy (2 cow+ 2 calf) + Goat (Salem black 10+1) + Poultry (Aseel- 3 batches of 50 birds) + Vermicompost unit + Compost yard + Kitchen garden & Border planting	1.0	754039
Kathalgere	Cropping systems (0.53 ha) + Horticulture and plantation crops (0.30 ha)+ Dairy (HF-2+ 1 calf)+ Sheep (7+1) + Fishery(0.02) + Apiary (3 boxes)+ Mushroom+ Vermicompost + Azolla+ Boundary plantation	1.0	188181
Siruguppa	Cropping systems (0.74 ha) + Dairy (HF-3+ 3 calves)+ Horticulture (0.17 ha) + Goatery (27+3)+ Vermicompost Boundary Plantations + Kitchen Gardening	1.0	361135
Rajendranagar	Cropping systems (0.7 ha) + Dairy (Gir-2 nos)+ Horticulture with Pasture intercrop (0.2 ha) + Nellore Sheep (20+1)+ Poultry(Rajashri-200 birds)+ Compost + Boundary Plantations	1.0	356237
Maruteru_sub	Cropping systems(0.28 ha) + Dairy (2 Desi cows) + Fishery (0.12 ha) + Poultry (15 units) + Horticulture (0.165 ha)+ Compost /others	0.5	297164
Rudrur_sub	Cropping systems (0.70 ha)+Dairy (Murrah 1 + 2 Calves) +Horticulture (0.24 ha)+Poultry (110 birds)+vermicomposting	1.0	251399
Mean			**368025.8**

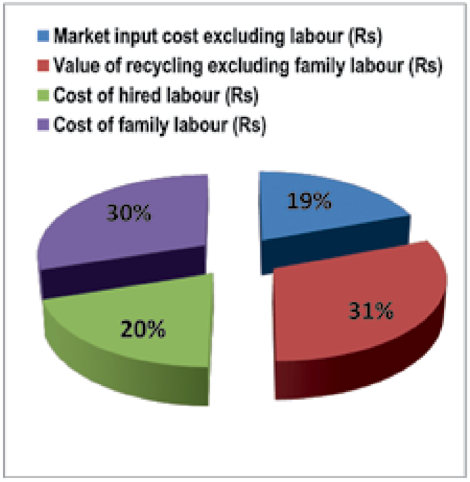


Fig 10. Different fraction of total cost in IFS models of WPH

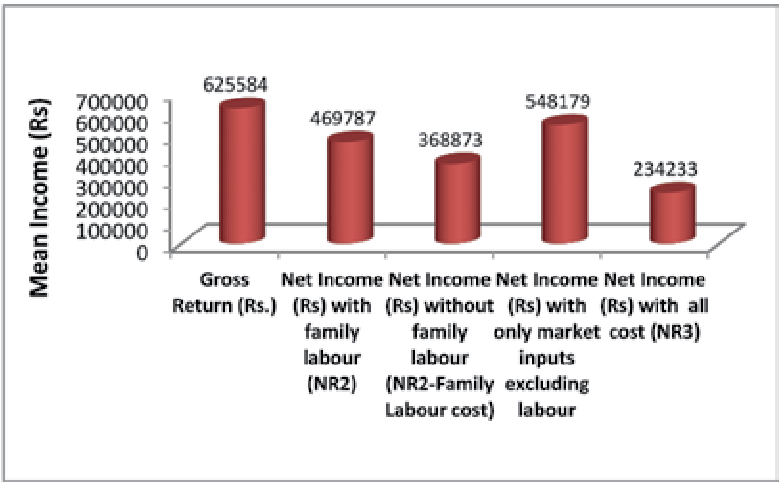


Fig 10. Economics of IFS models of WPH

The models could generate mean employment generation of 506 man-days through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at - -12230.15 CO2 equivalents. Further, study of different fractions of cost revealed about 31% share of recycled inputs in total cost of the IFS whereas cost of outside purchase was to the tune of 19%. The cost incurred towards hiring labour was 20%. These models revealed mean REY of 28.08 tonnes besides soil health improvement to the tune of 22.84 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being1.43 with mean SVI of 0.63.

11. EAST COAST PLAIN & HILLS (ECPH)

Two climate smart IFS models namely one at Bhubaneswar (Odisha) and another at Thanjavur (Tamil Nadu) represented the east coast plains and hills region. The IFS model at AICRP-IFS center at Bhubaneshwar (Odisha) representing East Coast Plain & Hill region is developed for small farming household with 1.20 ha area under irrigated ecosystem. The present system consists of cropping system, horticultural system, dairy, poultry, fishery, boundary plantation, kitchen garden and apiary. The IFS model at Thanjavur consisted of crops, dairy, poultry, horticulture and other supplementary enterprises in 0.8 ha. The results obtained from these IFS models during the reporting period of 2023-24 revealed that mean gross income of Rs. 677217 while the mean net return excluding family labour cost was found to be Rs.441105. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 387105. Details of IFS model components and cost is presented in Table 7.1.11 which indicated mean total cost for the IFS models was Rs. 373173 while it varied from Rs 348929 at Thanjavur for 0.8 ha model to Rs 397417 at Bhubaneswar for 1.25 ha IFS models.

Table 7.1.11: Details of IFS model along with total cost per model in ECPH

Location	IFS model	Area (ha)	Total cost (Rs)
Bhubaneswar	Cropping systems (0.32 ha) + Dairy + Horticulture (0.31 ha) +Fishery (0.46 ha)+ Poultry	**1.25**	397417
Thanjavur	Crops + Dairy + Poultry +Horticulture + Fishery + Vermicompost + Boundary Plantations	**0.8**	348929
Mean		**1.0**	**373173.0**

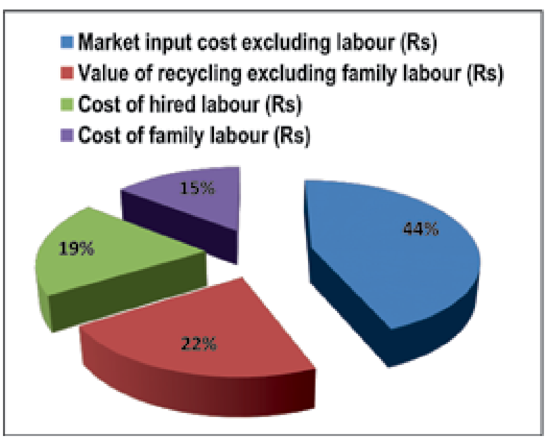


Fig 11. Different fraction of total cost in IFS models of ECPH

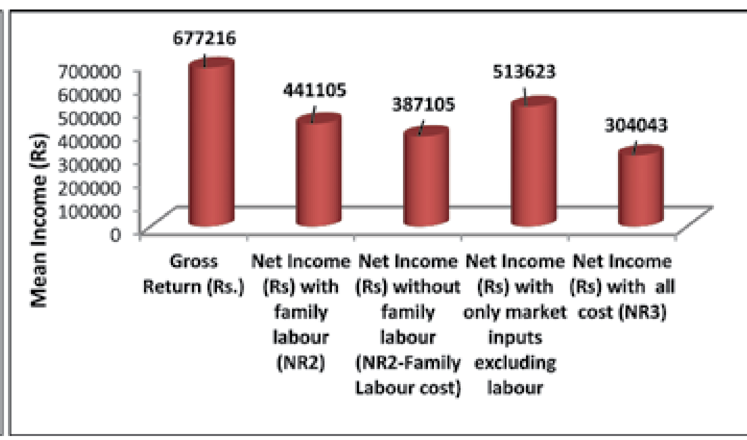


Fig 11. Economics of IFS models of ECPH

The models could generate mean employment generation of 391 man-days through different modules while the IFS models were found to be carbon negative in terms of GHG emission at -4359.95 CO2 equivalents. Further, study of different fractions of cost revealed about 22% share of recycled inputs in total cost of the IFS which could be further enhanced whereas cost of outside purchase was to the tune of 44% of the cost. The cost incurred towards hired labour was 19%. These models revealed mean REY of 30.74 tonnes besides soil health improvement to the tune of 18.40% in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 1.18 with mean SVI of 0.63.

12. WEST COAST PLAINS & HILLS (WCPH)

In this Agro Climatic Region three AICRP-IFS centers in the states of Goa (ICAR- Central Coastal Agricultural Research Institute, Goa), Maharashtra (Karjat) and Kerala (Karamana) represented the climate smart IFS Models for respective states. The results of study during 2023-24 at these centres revealed mean gross income to be Rs. 402759 while the mean net return excluding family labour cost was found to be Rs.201888. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 156827. Details of IFS model cost components presented in Table 7.1.12 indicated mean total cost for the IFS models to be Rs. 314223.

Table 7.1.12: Details of IFS model along with total cost per model in WCPH

Location	IFS model	Area (ha)	Total cost (Rs)
Goa	Rice based lowland: Cropping systems (0.40 ha) + Rice cum fish – Moong (0.07 ha)+ Dairy (1 Croos bred + 1 Calf) + Goat (7 nos) + Kitchen Gardening	**0.4**	210390
	Plantation crop based: (Casheu+ Pineapple- 0.25 ha)+ (Coconut+ Pineapple+Tapioca+Elephnat foot yam- 0.23 ha) + (Arecanut+Banana+ Turmeric- 0.22 ha)+ Goat + Compost + Catch pit with duckery	**0.72**	198400
Karjat	Cropping systems (0.50 ha) + Horticulture (Fruit crops + Nursery) (0.40 ha)+ Livestock (Dairy- 3 cows + Goat (10+2)+ Poultry (3 batches of 150 birds) + Vermicompost + Boundary Plantations + Kitchen garden	**1.0**	798221
Karmana	Homestead based- Cropping systems including vegetables and plantation (0.1455 ha)+ Dairy (Crossbred 1+ 1 calf) + Poultry (60 nos) + Fishery (0.002 ha) +Biogas+ Vermicomposting+ Azolla	**0.2**	199890
	Coconut based- Cropping systems including vegetables (0.147 ha)+ Dairy (Crossbred 1+ 1 calf) + Fishery (0.002 ha) +Apiary (1 box)+Boundary plantation+ Azolla	**0.2**	232460
	Rice based-- Cropping systems including vegetables (0.166 ha)+ Dairy (Crossbred 1+ 1 calf) + Fishery (0.002 ha) + Ducks (80 birds)	**0.2**	252695
	Banana based- Cropping systems including tubers,vegetables and fodder (0.1825 ha)+ Dairy (Crossbred 1+ 1 calf) + Fishery (0.002 ha) (500 GIFT Tilapia) + Vermicomposting	**0.2**	237298
Mean			**304193.4**

The models could generate mean employment generation of 266 man-days through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at -15278.11 CO_2 equivalents. Further, study of different fractions of cost revealed about 22% share of recycled inputs in total cost of the IFS which could be further improved whereas cost of outside purchase was 44% of the model cost. The cost incurred towards hired labour was 29%. These models revealed mean REY of 20.41 tonnes besides soil health improvement to the tune of 55.79 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.76 with mean SVI of 0.73.

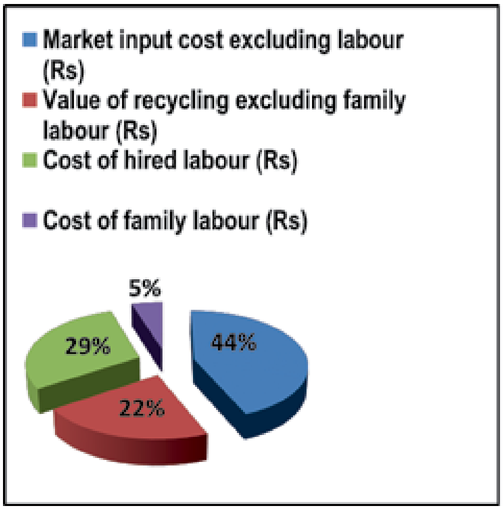


Fig 12. Different fraction of total cost in IFS models of WCPH

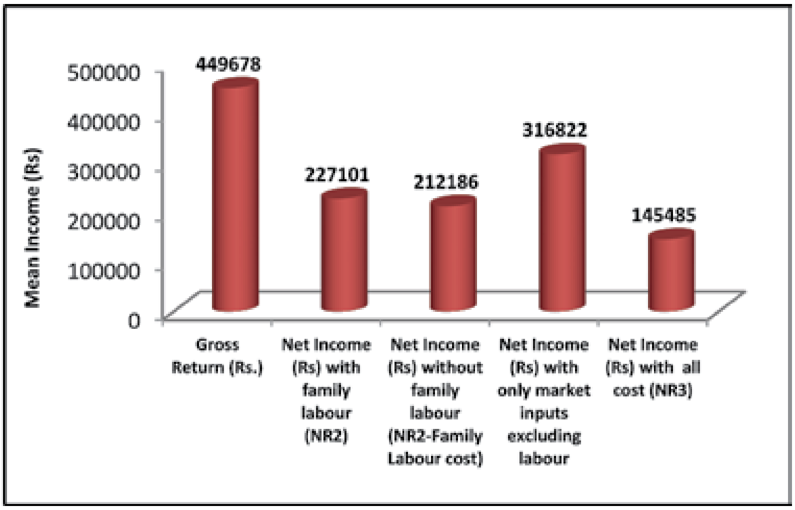


Fig 12. Economics of IFS models of WCPH

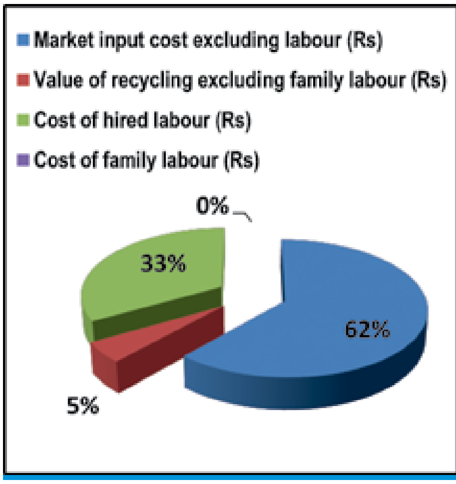
13. GUJARAT PLAINS AND HILLS (GPH)

This agro climatic region was represented by climate smart IFS model established at Junagadh where a climate smart IFS model with crops, horticulture, dairy, fishery and supplementary component like boundary plantation in 1.0 ha area. Another IFS model having 1.0 ha area was established in SK Nagar, Gujarat. The results obtained during reporting period of 2023-24 from these models revealed the mean gross return to be Rs. 504399 while the net return excluding family labour cost was found to be Rs.280257 Details of IFS model cost components presented in Table 7.1.13 indicated total cost for the IFS models to be Rs. 2624541 for 1.0 ha IFS model.

Table 7.1.13: Details of IFS model along with total cost of model in GPH

Location	IFS model	Area (ha)	Total cost (Rs)
Junagadh	Cropping systems (0.50 ha) +Multi storied horticulture (0.0.34 ha) +Dairy (2 Buffalo Mehsani breed)+ Fish pond (0.02 ha)+ Boundary plantations + NADEP Compost	**1.0**	241824
SK Nagar	Cropping systems (0.70 ha) +Multi storied horticulture (0.25 ha) +Dairy (2 Buffalo Mehsani breed)+ Farm pond (0.015 ha)+ Boundary plantations + Vermicompost	**1.0**	271865
Navsari	Cropping systems (0.18 ha) +horticulture (0.55 ha) +Dairy (1 Cow HF)+ Boundary plantations + Kitchen Gardening+ Compost pit	**1.0**	273673
Mean		**1.0**	**262453.8**

The models could generate employment generation of 214 man-days through different modules. Further, study of different fractions of cost revealed about 5% share of recycled inputs in total cost of the IFS whereas cost of outside purchase was 62% of the model cost. The cost incurred towards hired labour was 33%. These models revealed mean REY of 22.90 tonnes besides soil health improvement to the tune of 24 % in terms of organic carbon improvement. As compared to benchmark with net returns per rupee invested being 1.10 with mean SVI of 0.47.



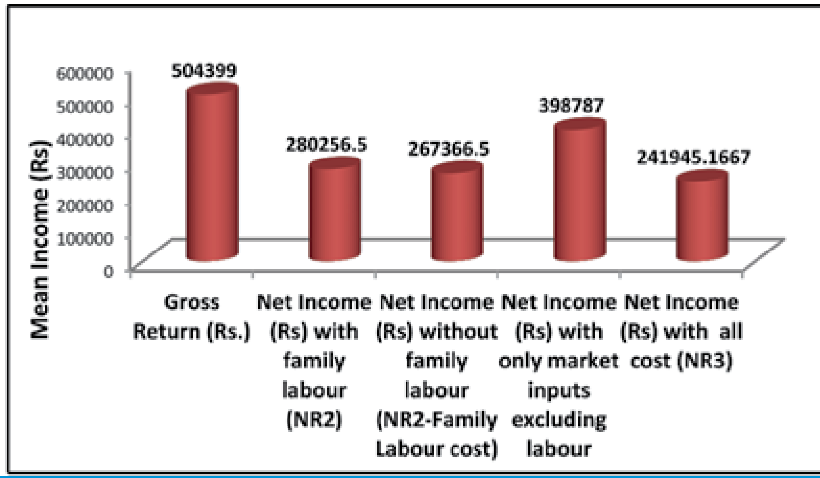


Fig 13. Different fraction of total cost in IFS models of GPH

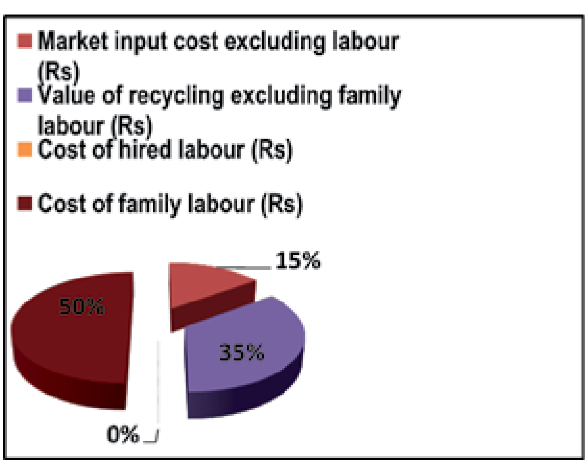
Fig 13. Economics of IFS models of GPH

14. ISLAND

The Andaman and Nicobar group of Islands lie in the Bay of Bengal 1200 km east of main land India between 6-140 N latitude and 92-940 E longitude. The holding size ranged in between 0.39ha (marginal farmer) to 1.38 (small farmer) with an average of 7 members in a family. The results obtained during reporting period of 2023-24 from horticulture + fishery+ Poultry+ Goatery for upland areas started in 2022 revealed the gross return to be Rs. 352272 while the net return excluding family labour was found to be Rs.327482. Details of IFS model cost components presented in Table 7.1.14 indicated total cost for the IFS models to be Rs. 189280 for 0.9 ha IFS model.

Table 7.1.14: Details of IFS model along with total cost of model in Island ecosystem

Location	IFS model	Area (ha)	Total cost (Rs)
Port Blair	Cropping systems: Coconut with intercrops (0.9 ha)+ Horticulture (Banana) + Poultry (3 batches of 50 birds) + Goat (15+1) + Fishery (0.06 ha) + Vermicomposting	**0.9**	**189280**
Mean		**0.9**	**189280**



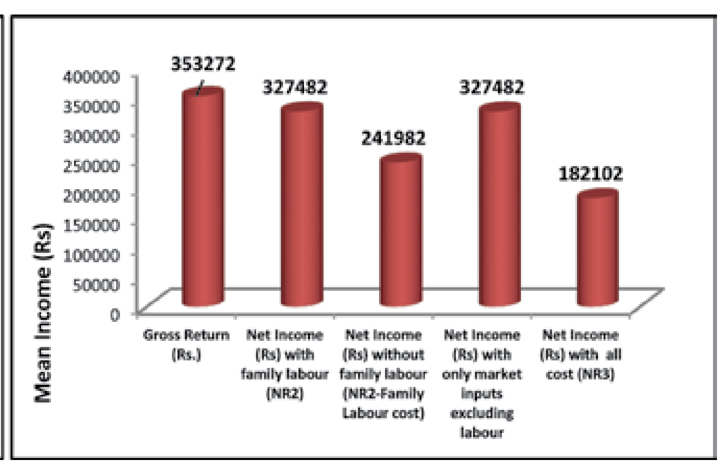


Fig 14. Different fraction of total cost in IFS models of Island

Fig 14. Economics of IFS models of Island

The model could generate mean employment generation of 190 man-days through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at -5855.30 CO2 equivalents. Further, study of different fractions of cost revealed about 35% share of recycled inputs in total cost of the IFS whereas cost of outside purchase was15% of the model cost. The cost incurred towards labour was 0% which needs further reduction. These model revealed mean REY of 16 tonnes besides soil health improvement to the tune of 51 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 1.91.with mean SVI of 0.60.

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 1). Maximum REY was found to be 43.6 tonnes at TGP (Trans Gangetic Plains Region) two models (Hisar & Ludhiana, 1 ha), followed by (41.3) tonnes at WPH (Western Plateau and Hills) three models (Akola, Parbhani, Rahuri (MH), 1 ha), whereas, minimum REY was found to be 15.2 tonnes at EPH (Eastern Plateau and Hills).

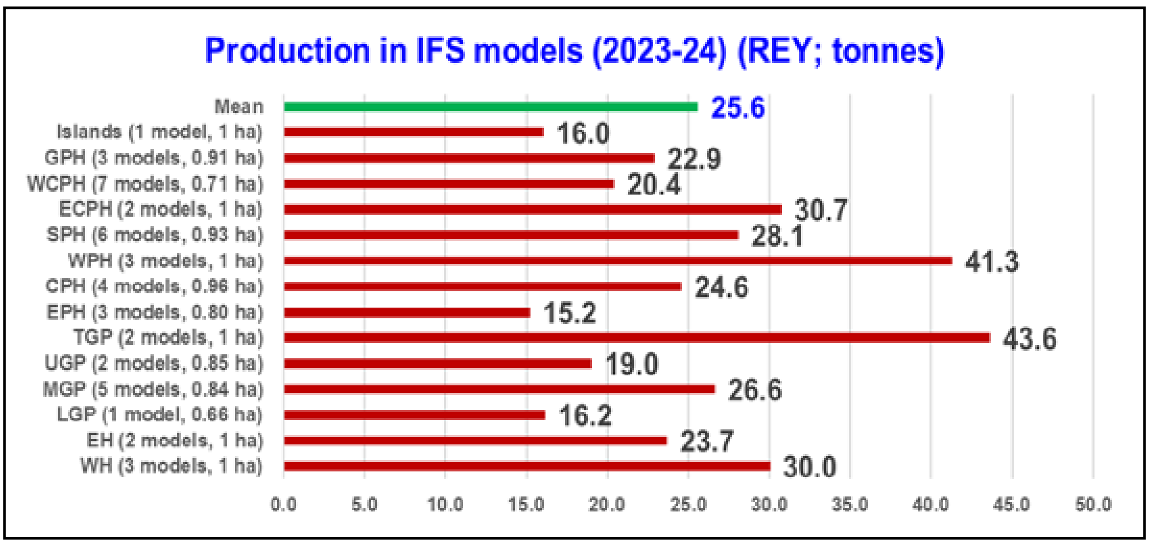


Fig 1. System productivity (REY in tonnes) from IFS models of different agro-climatic zones

Similarly, Mean Net return per rupee invested from IFS models of different ACZ was found to be (2.1). Maximum Net return per rupee invested was found to be (6.5) at LGP (Lower Gangetic Plains) one models (Kalyani(WB) 0.66 ha) followed by (3.8) at EH (Eastern Himalaya) two models Jorhat(AS), Umiam (ML) 1 ha, whereas, minimum Net return per rupee invested was found to be (0.9) at EPH (Eastern Plateau and Hills) (Fig. 2)

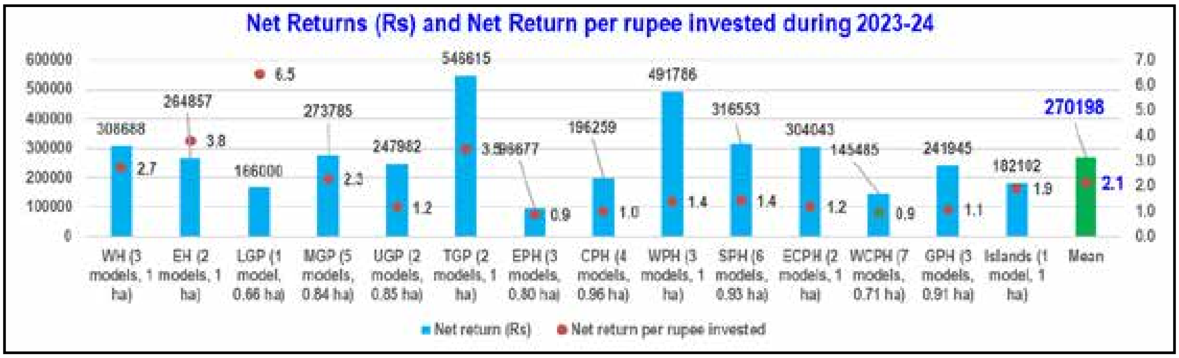


Fig 2. Mean net return per rupee invested from IFS models of different agro-climatic zones

Similarly, mean other key performance indicators like recycling values within IFS models of different ACZ was found to be Rs 78721. Maximum recycling values was found to be Rs.121535 at UGP (Upper Gangetic Plains) two models (Kanpur, Modipuram (UP), 0.85 ha) followed by Rs. 113326 at SPH (Southern Plateau and Hills) Six models Coimbatore (TN), Kathalgere (2 nos) (KA), Siruguppa (KA), Rajendranagar (TS), Maruteru (2 nos) (AP), Rudrur (AP) 0.93 ha), whereas, minimum recycling values was found to be Rs. 38132 at GPH (Fig. 3).

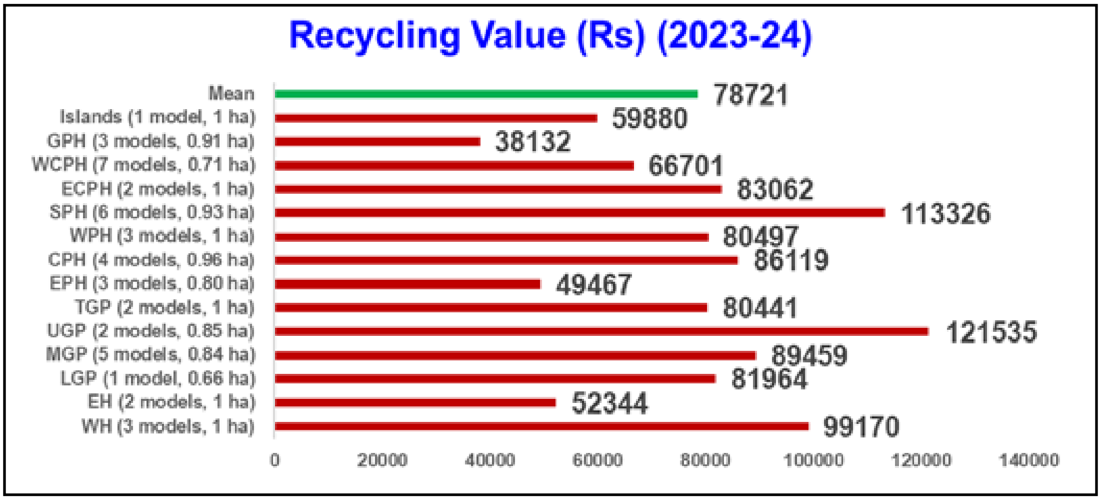


Fig 3. Mean value of recycling (Rs.) in IFS models of different ACZ

Similarly, other performance indicators like mean Soil organic carbon values within IFS models across different ACZ was found to be 25.08 (%). Maximum Soil organic carbon values were found to be 55.94 (%) at WCPH (West Coast Plains and Hills) seven models (Goa (2 nos); Karamana (4 nos) (KL), Karjat (MH), 0.71 ha) followed by 43.40 (%) at Islands (One models, 1. ha), whereas, minimum Soil organic carbon values were found to be 6.23 (%) at EPH (Eastern Plateau and Hills) (Fig. 4.).

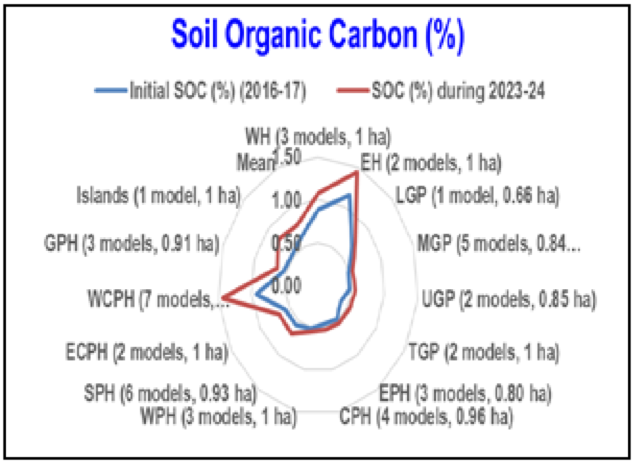


Fig 4. Improvement in SOC (%)

Similarly, other key performance indicators like mean number of employment generation within IFS models of different ACZ was found to be 389. Maximum number of employment generation was found to be 664 at UGP (Upper Gangetic Plains) two models Kanpur, Modipuram (UP) with average area of model being 0.85 ha followed by 548 at CPH (Central Plateau and Hills) with four models (Jabalpur, Rewa, Indore (MP) as well as Kota and Durgapura in Rajasthan with average IFS model area being 0.96 ha, whereas, minimum number of employment generation were found to be 190 at Islands (A&N Islands) (Fig. 5.)

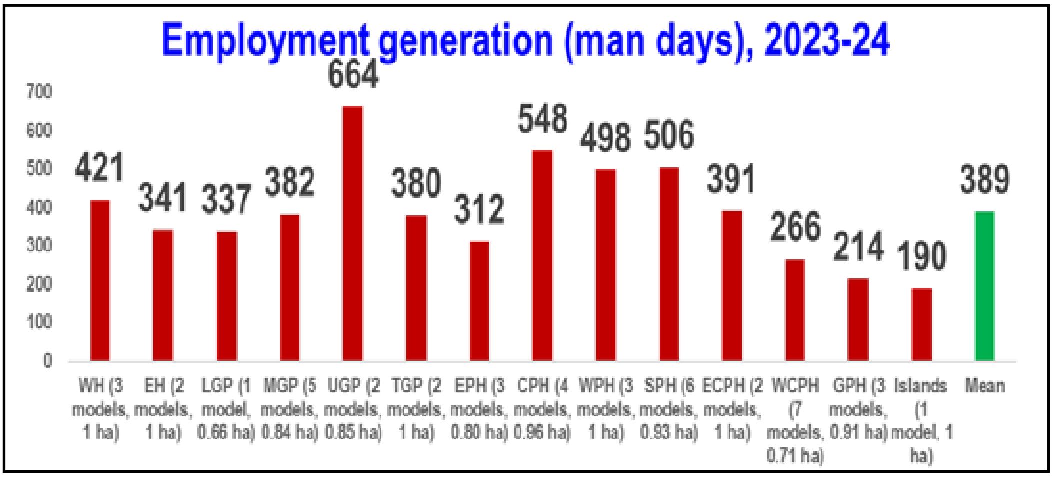


Fig 5. Employment generation from IFS models (Man-days);

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. (Fig. 6.)

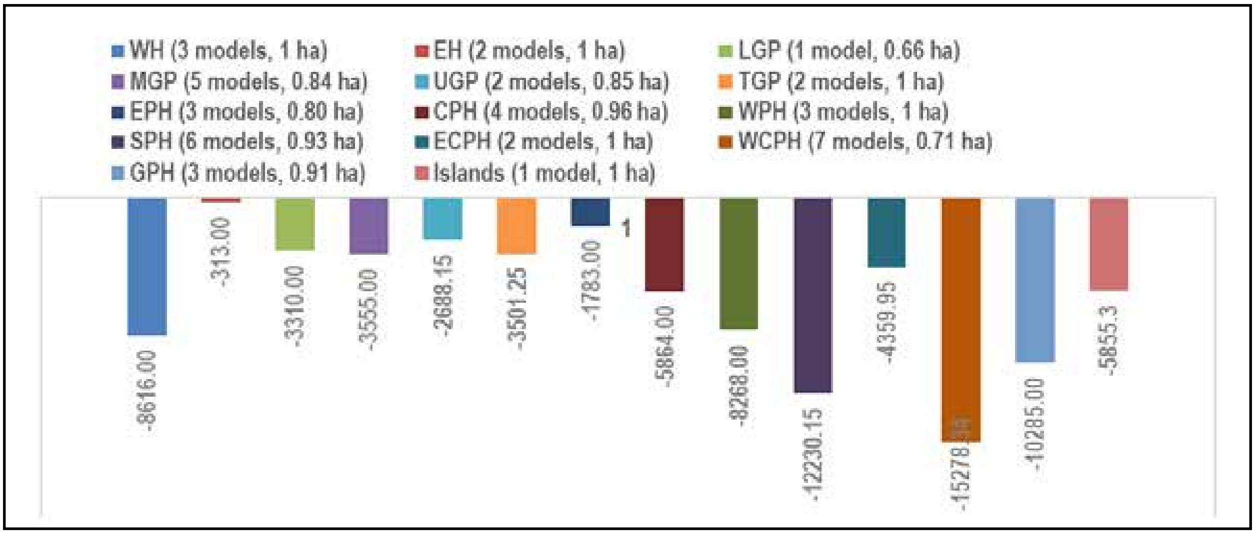


Fig 6. Net GHG emission from IFS models

Similarly, other key performance indicators like Sustainable Value Index (SVI) across IFS models of different ACZ was found to be 0.64. Maximum Sustainable Value Index was found to be 0.82 at EPH (Eastern Plateau and Hills) with three model (Raipur (CG), Ranchi (JH), Chipilima (OD) having area of 0.80 ha followed by 0.79 at MGP (Middle Gangetic Plains) with five models (Ayodhya, Varanasi (UP); Patna (2 nos), Sabour (BR) having mean area of 0.84 ha, whereas, minimum Sustainable Value Index were found to be 0.42 at Islands (Fig. 7.)

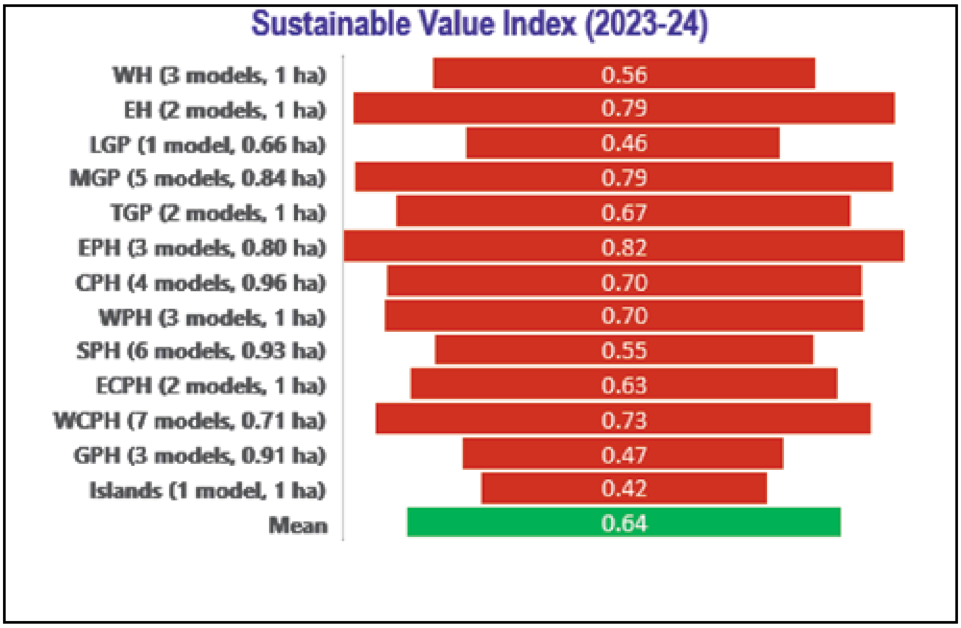


Fig 7. Sustainable Value Index (SVI) from IFS models

7.2 CROPPING SYSTEM MANAGEMENT

Title of the Experiment: Identification of cropping systems module for different farming systems

Objectives

- To evaluate the cropping systems in ecological, nutritional, feed and economic perspective
- To identify the cropping system module for specific farming systems
- To assess the resource dynamics of identified cropping system module

Year of start: 2017-18

During reporting period i.e., 2023-24, several cropping systems encompassing 4 crop modules for meeting the various purposes of farming systems such as family nutrition, soil health improvement, livestock nutrition as well as income enhancement with check were evaluated across 13 Agroclimatic regions of the country. The locations and the respective agroclimatic regions are described in Table 1 and treatment details are given in Table 2.

Table 1: Location of experiments conducted during 2023-24

Sl No.	Agro-Climatic Region	States	AICRP on IFS Centres
1	Western Himalayan region	Jammu	Jammu
		Himachal Pradesh	Palampur
		Uttarakhand (Hill region)	Pantnagar
2	Eastern Himalayan region	Assam	Jorhat
3	Lower Gangetic plain region	West Bengal (except the hilly areas)	Kalyani
4	Middle Gangetic Plain Region	Uttar Pradesh	Ayodhya
			Varanasi
		Bihar	Sabour
5	Upper Gangetic Plains Region	Uttar Pradesh (Central and western parts)	Kanpur
6	Trans-Ganga Plains Region	Punjab	Ludhiana
		Haryana	Hissar
7	Eastern Plateau and Hills	Jharkhand	Ranchi
		Chhattisgarh	Raipur
8	Central plateau and hill region	Madhya Pradesh	Jabalpur
			Indore
			Powarkheda
			Riwa
		Rajasthan	Durgapura
			Kota
9	Western plateau and hill region	Maharashtra	Akola
			Karjat
			Parbhani
			Rahuri

Sl No.	Agro-Climatic Region	States	AICRP on IFS Centres
10	Southern Plateau and Hills	Telangana	Rajendranagar
			Rudrur
		Andhra Pradesh	Maruteru
		Tamil Nadu	Coimbatore
			Thanjavur
		Karnataka	Kathalgere
			Siruguppa
		Odisha	Chiplima
11	Eastern Coastal Plains and Hills	Orissa	Bhubaneshwar
12	Western Coastal Plains and Ghats	Kerala	Karmana
13	Gujarat plain and hill region	Gujarat	SK Nagar
			Junagarh
			Navsari

Table 1: Treatments details with crop modules undertaken during 2023-24

Treatment notations	Cropping Systems	Remarks
T1	Predominant cropping system of the region	Check
T2		
T3	Ecological Cropping system involving pulses/ green manures and other crops	For soil health improvement
T4		
T5	Cropping system involving cereals, pulses and oilseeds	To meet household nutritional security
T6		
T7	Cropping systems for round the year green and dry fodder production	To meet fodder requirement for livestock
T8		
T9	Cropping systems involving vegetables and others high value crops	For income enhancement
T10		

Agroclimatic-wise data of various cropping systems was collected and analyzed for inferring the best cropping systems for a particular agroclimatic regions which are described below.

Western Himalayan region: In Western Himalayan, total 29 cropping systems were evaluated with the objective to select the best cropping systems for different purposes such as soil health (SH) management (Rice-wheat-sesbania, Rice-mustard-greengram, Rice-vegetable pea-blackgram, Sesbania-early cabbage–french beans and Blackgram-wheat-vegetable cowpea + sesbania and Sesbania-vegetable pea-frenchbean), households food and nutritional (FN) requirements (Rice-pea-okra, Maize + soybean - chickpea + linseed, Rice - yellow sarson - grain cowpea, Rice-gobi sarson-mash, Maize-yellow sarson-blackgram and Maize + soybean-chickpea + linseed), livestock nutrition (LN) (Sorghum– berseem , Rice-oats-seed, Multicut sorghum-berseem + oat + mustard – Maize + cowpea, Hybrid napier/ Cowpea-hybrid napier/berseem-Hybrid napier/cowpea, Hybrid sorghum + hybrid bajra-oats + sarson, Hybrid sorghum + hybrid bajra-ryegrass + berseem) and households income (IE) enhancement (Rice-brocolli-okra, Rice-potato-blackgram, Basmati rice-potato-maize, Maize-broccoli-okra, Babycorn-broccoli-frenchbean and okra-turnip-tomato) in Jammu, Himachal Pradesh and Uttarakhand. The cropping systems are evaluated with respect to Cost of Cultivation (COC), Net Returns (NR), and Soil Organic Carbon (SOC), and are categorized based on their primary objectives were Income Enhancement (IE), Family Nutrition (FN), Livestock Nutrition (LN), and Soil Health (SH).

In Pantnagar, the SH system comprising Sesbania, vegetable pea, and frenchpea has a high cost of cultivation at Rs.175,425 and provides a net return of Rs.174,115, while also registering the highest SOC among all systems at 1.254%. The LN system featuring Okra, turnip, and tomato demonstrates exceptional profitability with a net return of Rs.498,038, despite a relatively high COC of Rs.164,138. The FN system involving Hybrid Sorghum and Hybrid Bajra with oats and mustard has a COC of Rs.116,561 and yields Rs.292,804, indicating a strong balance between input cost and profitability. Meanwhile, the IE system consisting of maize, soybean, chickpea, and linseed is the most cost-effective in Pantnagar with a COC of Rs.87,889 and a modest return of Rs.165,510.

Palampur's SH system using blackgram, chickpea, and sesbania incurs the lowest COC at Rs.73,281 and provides a modest net return of Rs.168,084, while also recording a respectable SOC level of 0.99%. The IE module involving maize (cob), broccoli, and okra, although the most expensive at Rs.366,545, offers a high net return of Rs.318,665. The LN system in Palampur, comprising Multicut Sorghum, berseem, oat, maize, and cowpea, is relatively moderate in terms of cost (Rs.109,926) and highly profitable with returns reaching Rs.366,006, making it the most lucrative system in this region.

In Jammu, the FN system that includes rice, lentil, and vegetable cowpea has a cost of Rs.105,078 and provides a net return of Rs.287,819. The LN system using rice and wheat with sesbania shows a COC of Rs.91,320 and yields Rs.193,900, with an SOC of 0.72%, indicating moderate soil benefits. The IE system involving rice, broccoli, and okra costs Rs.125,352 and returns Rs.265,533. The SH system using rice and oat seed is one of the least expensive at Rs.76,455, offering a net return of Rs.169,233. Another FN-based combination in Jammu using rice, pea, and okra incurs a COC of Rs.116,271 and provides a return of Rs.234,000, showcasing its potential as a moderately profitable model.

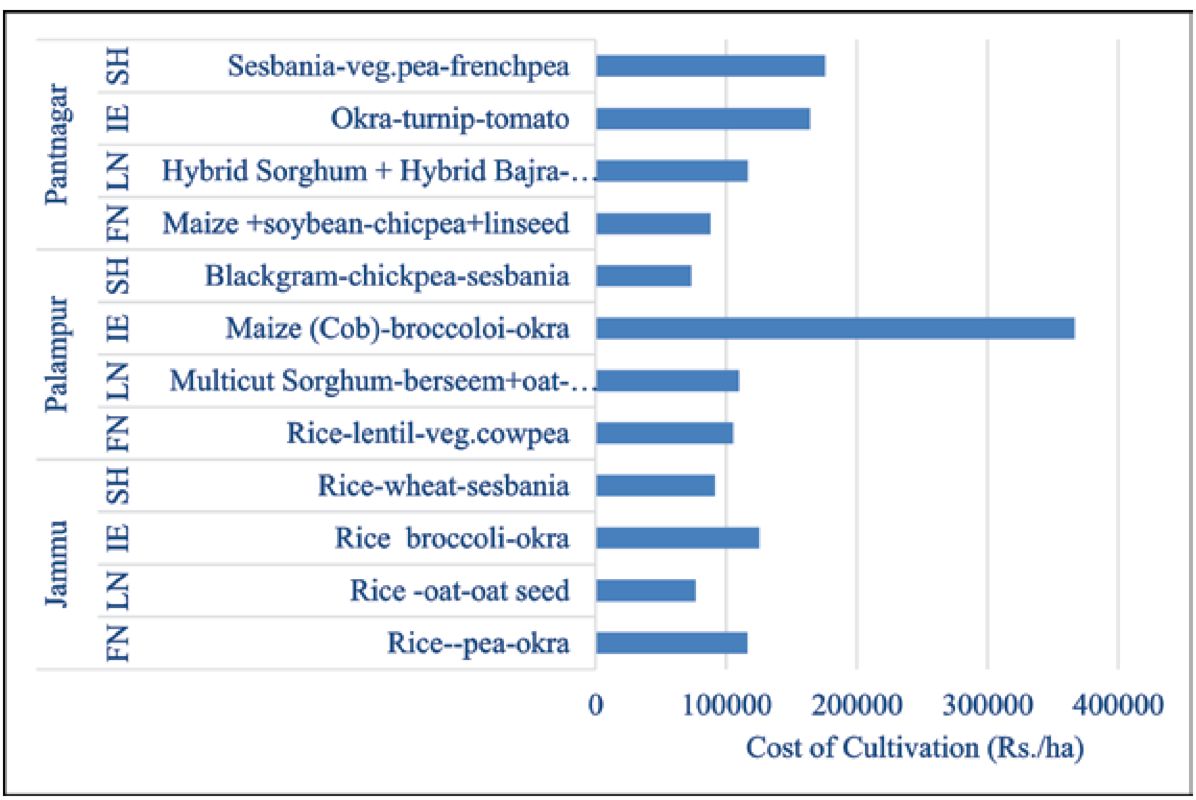


Fig 1. Cost of cultivation (Rs. /ha) of cropping systems module in Western Himalayan regions during 2023-24

Overall, Income Enhancement systems are the most resource-intensive but can be highly profitable when managed efficiently, as seen in Palampur and Jammu. Family Nutrition systems provide balanced economic performance and are particularly effective in Pantnagar. Livestock Nutrition systems show variability in profitability, with Palampur's LN model being highly lucrative, unlike Pant Nagar's LN system which incurs high costs. Soil Health modules consistently demonstrate lower input costs and moderate returns, with significant contributions to improving soil organic carbon. This makes SH systems ideal for sustainable and resource-conserving agricultural practices in the Western Himalayan Region.

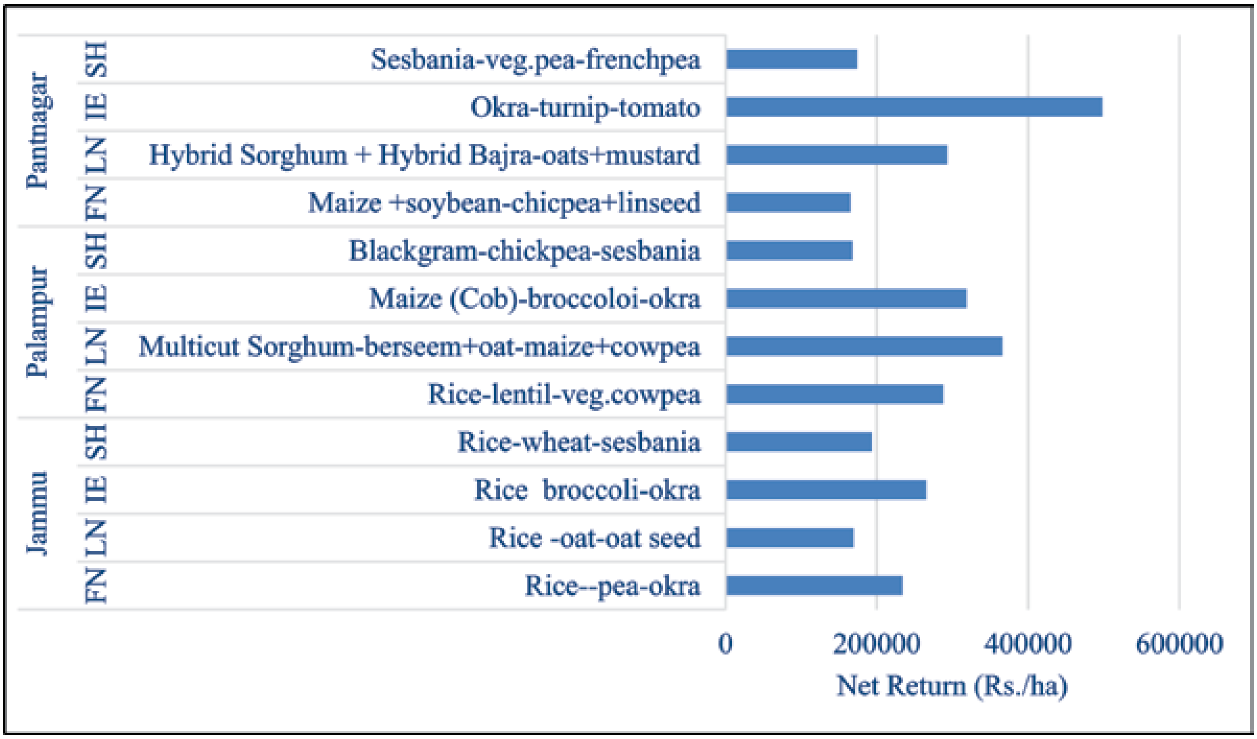


Fig 2. Net return (Rs. /ha) of cropping systems module in Western Himalayan regions during 2023-24

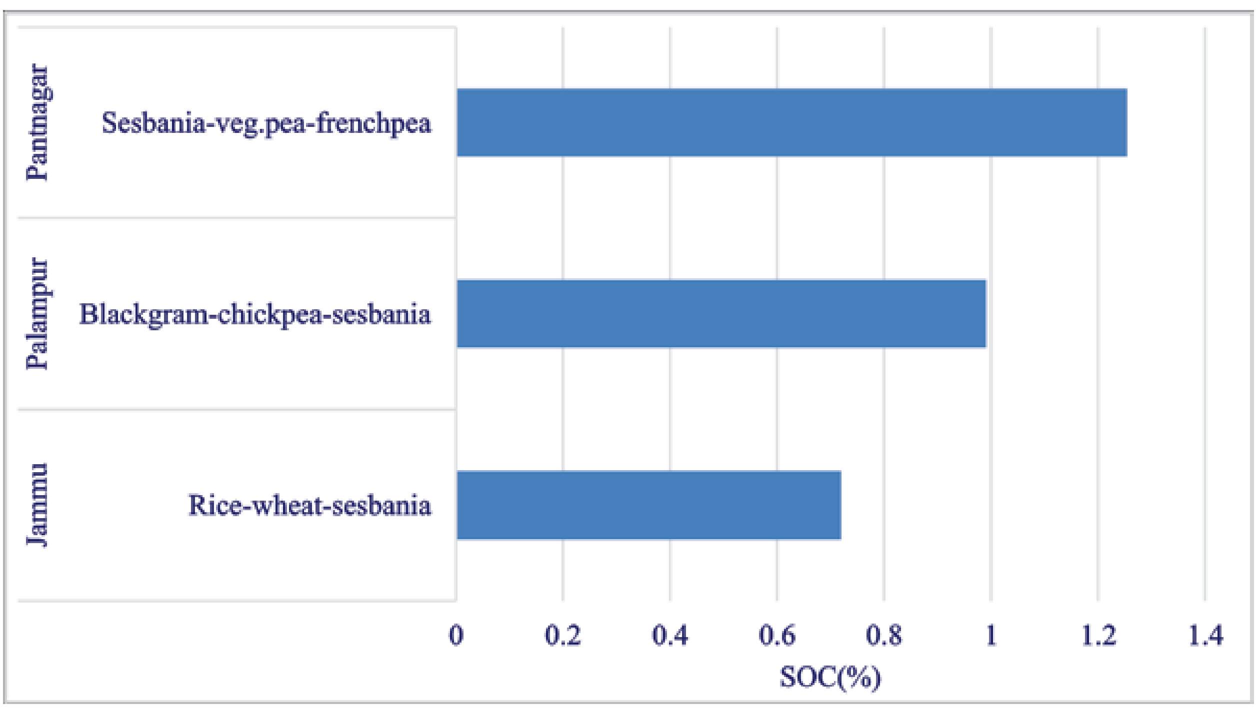


Fig 3. Soil organic carbon (%) of cropping systems module in Western Himalayan regions during 2023-24

Eastern Himalayan Region: This report explores the cropping systems of the Eastern Himalayan Region, specifically in the locations of Jorhat and Umiam. The focus of the evaluation is on four major categories of cropping systems—Income Enhancement (IE), Family Nutrition (FN), Livestock Nutrition (LN), and Soil Health (SH). These systems are assessed using economic indicators such as Cost of Cultivation (COC), Net Returns (NR), and agronomic sustainability represented by Soil Organic Carbon (SOC). In Jorhat, the Soil Health (SH) module comprised of blackgram, chickpea, and sesbania records the lowest cost of cultivation at Rs.73,281. However, this economic advantage is offset by the lowest net return among all systems at Rs.168,084. Despite its low profitability, the system yields a relatively good SOC level of 0.99%, suggesting its merit from a soil sustainability standpoint. The Income Enhancement (IE) system in Jorhat, structured around maize (cob), broccoli, and okra, exhibits the highest cost of cultivation at Rs.366,545. Despite this significant investment, its net return stands at Rs.318,665, which indicates a lack of proportional profitability, rendering it less efficient compared to the LN system.

The Livestock Nutrition (LN) cropping system in Jorhat, which includes multicut sorghum, berseem, oat, maize, and cowpea, provides the highest net return of Rs.366,006. With a moderate cultivation cost of Rs.109,926, it stands out as a cost-effective and profitable system. This affirms the economic value of diversified fodder-based modules in the region. The Family Nutrition (FN) system in Jorhat, based on rice, lentil, and vegetable cowpea, incurs a cost of cultivation of Rs.105,078 and generates a respectable net return of Rs.287,819. This system strikes a balance between investment and output, making it a suitable option for ensuring nutritional and financial security for smallholder families.

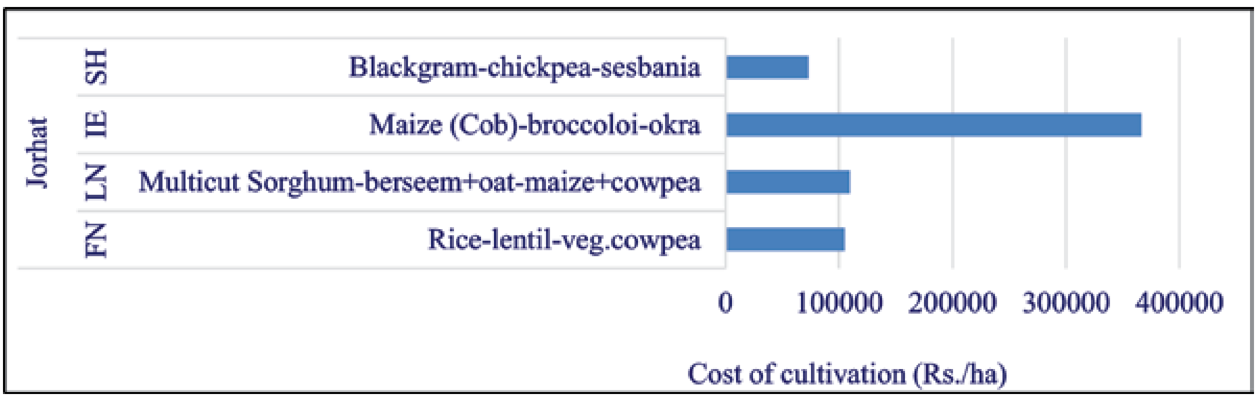


Fig 4. Cost of cultivation (Rs. /ha) of cropping systems module in Eastern Himalayan regions during 2023-24

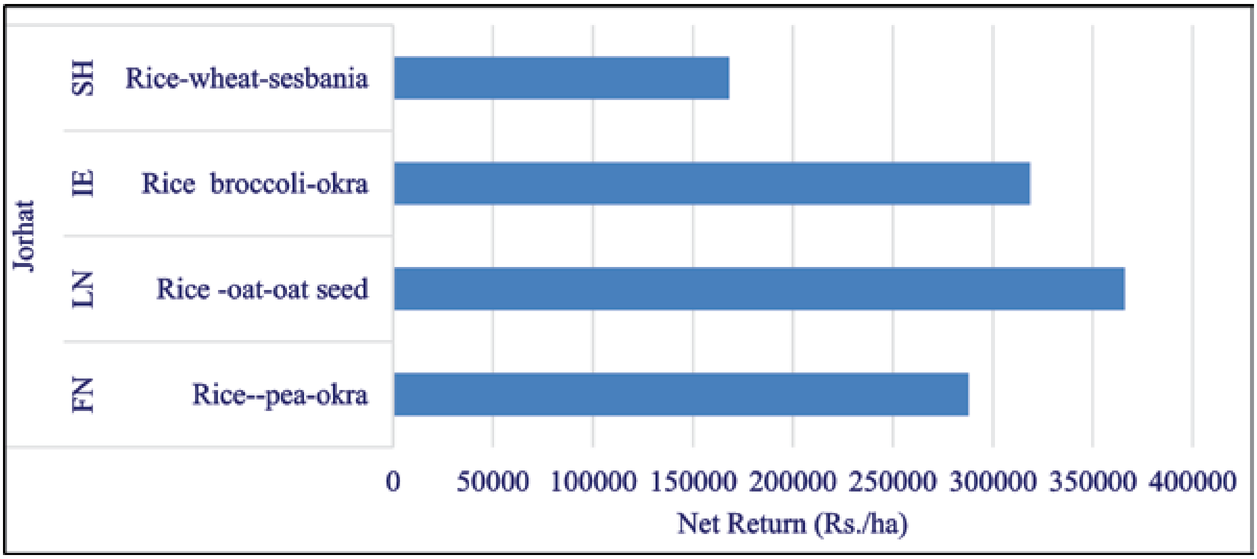


Fig 5. Net return (Rs. /ha) of cropping systems module in eastern Himalayan regions during 2023-24

Lower Gangetic Plain Region: Under this region at Kalyani centre the Soil Health module, which consists of the cropping sequence Rice-frenchbean-cowpea, stands out as the most efficient system. It provides the highest net return of Rs. 340,554 while maintaining a moderate cost of cultivation at Rs. 147,000. The system also supports soil sustainability with an SOC value of 0.98%, making it an ideal choice for both economic and environmental goals.

In contrast, the Income Enhancement system comprising E. foot yam, brinjal, coriander (l), and E. foot yam again, reflects the highest investment requirement with a cultivation cost of Rs. 330,000. However, it delivers the lowest net return of only Rs. 99,699. This disparity indicates that the IE module is the least efficient in terms of investment-to-return ratio within this region. The Livestock Nutrition module built around rice, oat, and maize (f) demonstrates the lowest cost of cultivation at Rs. 83,000, but its corresponding net return is relatively low at Rs. 88,777. While affordable, this system does not yield significant profits and may only be suitable for resource-constrained farmers prioritizing fodder needs. The Family Nutrition cropping model, consisting of rice, sunflower, and blackgram, presents a balanced approach. It requires Rs. 128,000 for cultivation and yields a net return of Rs. 195,206. This makes it a viable and moderately profitable system for households focusing on both nutrition and financial viability.

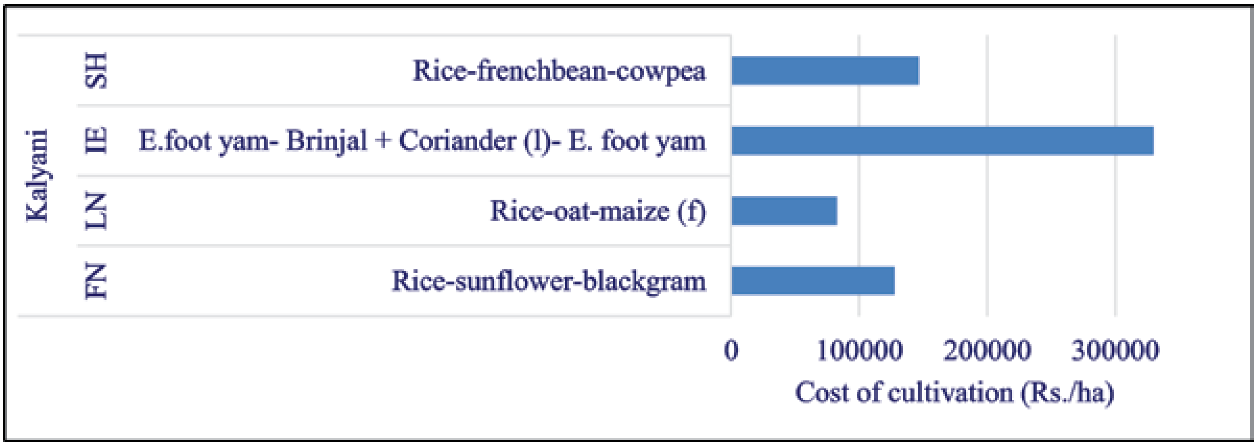


Fig 6. Cost of cultivation (Rs. /ha) of cropping systems module in Lower Gangetic Plain Region during 2023-24

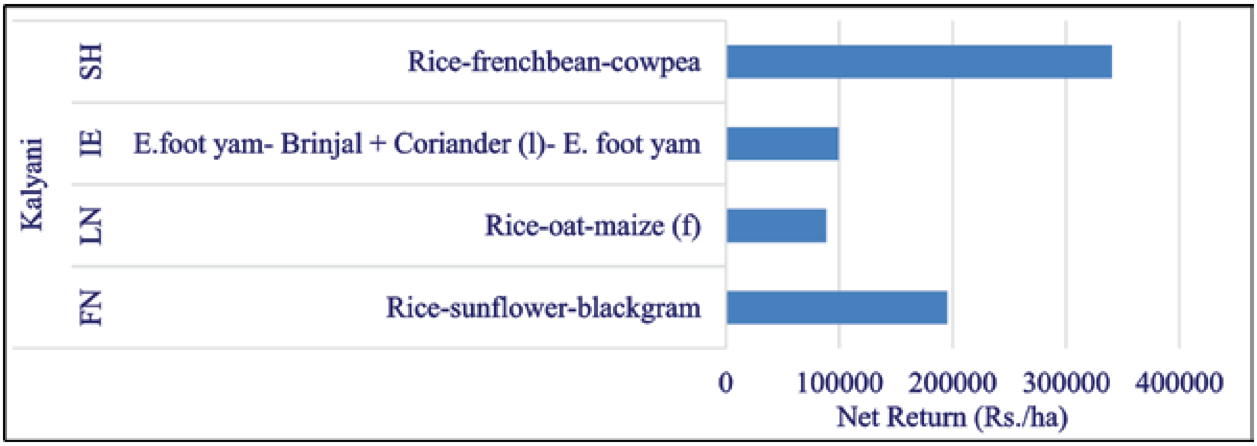


Fig 7. Net return (Rs. /ha) of cropping systems module in Lower Gangetic Plain Region during 2023-24

Middle Gangetic Plain Region: This report outlines the cropping systems in the Middle Gangetic Plain Region, with specific analysis from Ayodhya, Sabour, and Varanasi. In Varanasi, the most resource-intensive cropping module is the IE system which includes basmati rice, potato, and lady's finger. It records the highest COC at Rs. 186,340. Meanwhile, both the SH system (rice-lentil-blackgram) and the FN system (rice-mustard-greengram) have identical COC values of Rs. 124,266, while the LN system involving Sudan-berseem-cowpea (f) comes slightly lower at Rs. 123,989. These figures indicate relatively uniform costs among non-IE modules, with IE being the most expensive by a significant margin. In Sabour, the cropping system costs are more balanced. The IE system based on rice, cabbage, and lady's finger again stands out with the highest cultivation cost of Rs. 155,178. On the other hand, the SH system combining rice, vegetable pea, and greengram is the most economical with a cost of only Rs. 87,006. The LN system (rice-berseem-sorghum) and FN system (rice-mustard-maize) also maintain low COC values at Rs. 93,176 and Rs. 92,076 respectively, making Sabour an example of efficient input management across multiple cropping goals. In Ayodhya, the IE system using rice, vegetable pea, and okra emerges as the most expensive, requiring an input cost of Rs. 157,200. However, other modules such as the SH system (rice-field pea-vegetable cowpea) cost Rs. 95,200, while the FN system (rice-mustard-greengram) is the most economical at Rs. 98,700. The LN system, involving rice, oat, maize, and cowpea, also maintains a moderate cost of Rs. 110,200, positioning Ayodhya's non-IE modules as reasonably efficient in terms of cultivation expenses.

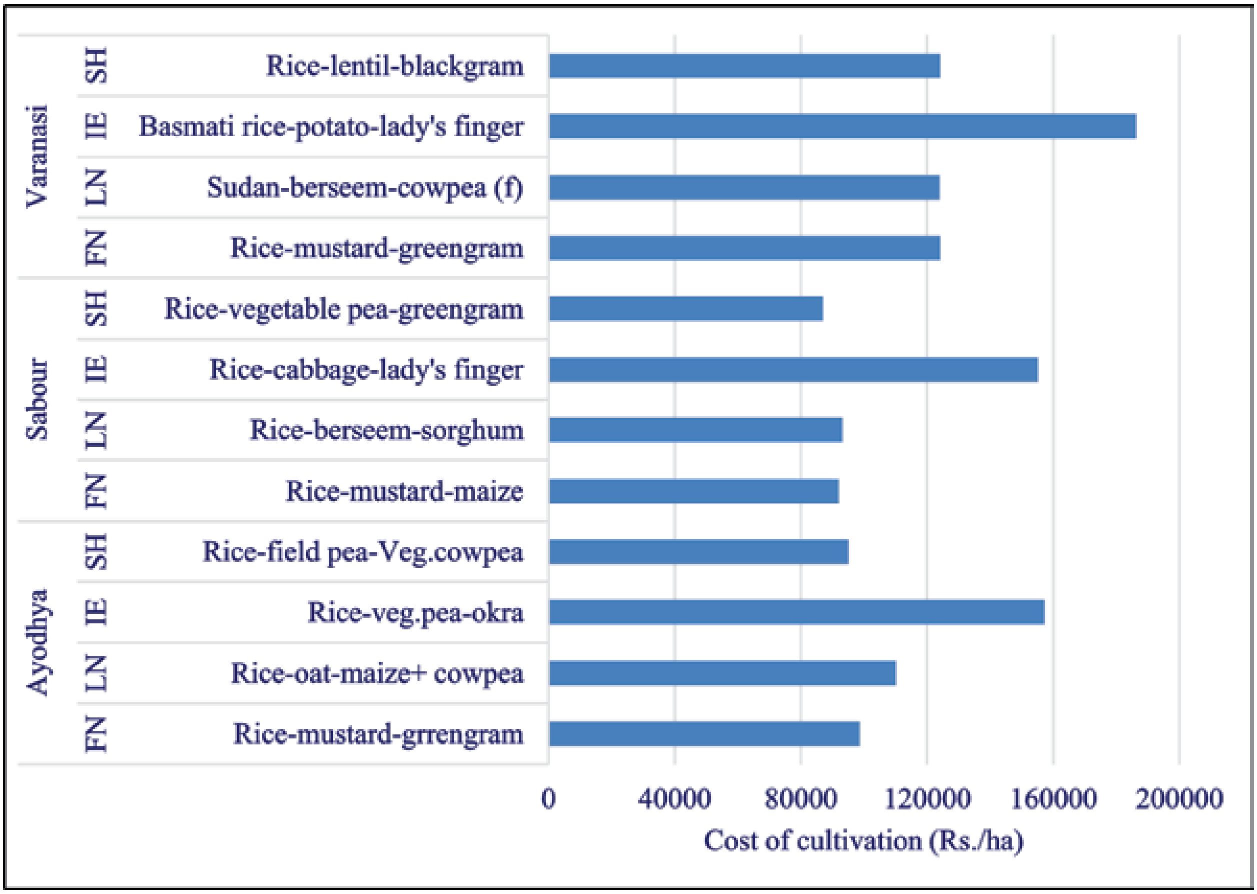


Fig 8. Cost of cultivation (Rs. /ha) of cropping systems module in Middle Lower Gangetic Plain Region during 2023-24

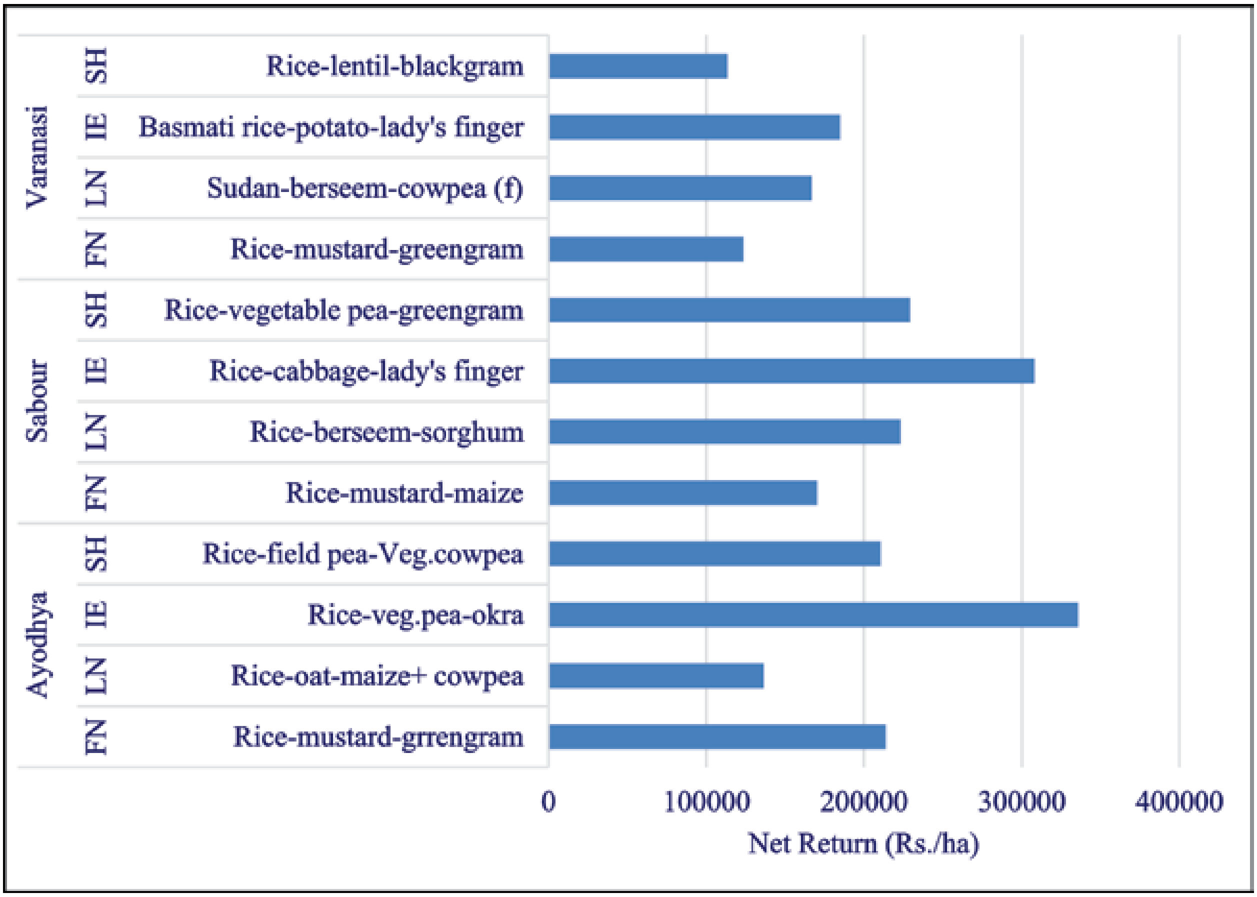


Fig 9. Net return (Rs. /ha) of cropping systems module in Middle Gangetic Plain Region during 2023-24

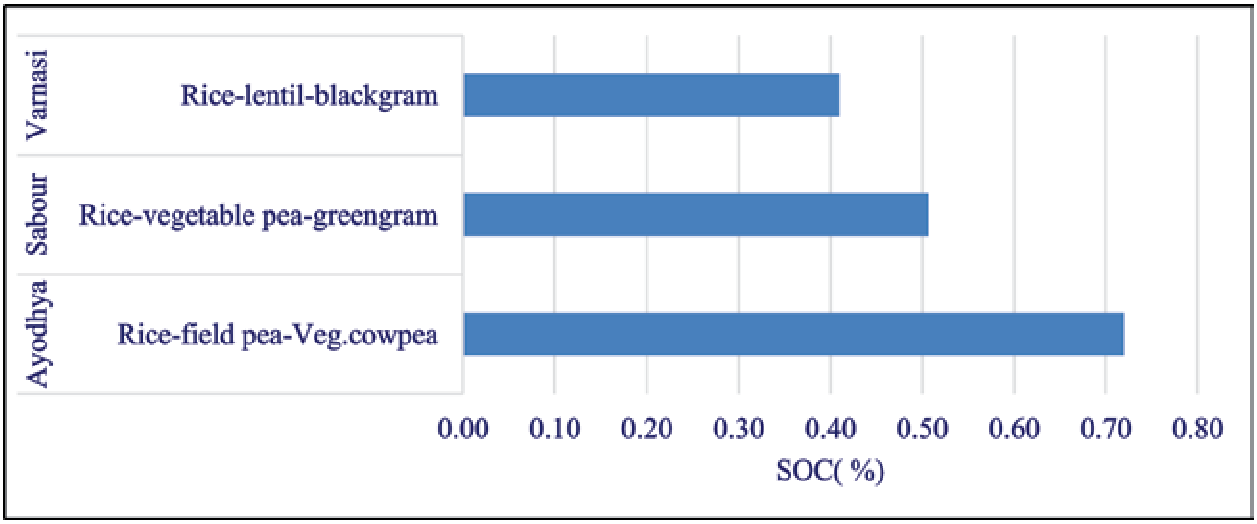


Fig 10. Soil organic carbon (%) of cropping systems module in Middle Gangetic Plain Region during 2023-24

Upper Gangetic Plains Region: Under the reporting period, 5 cropping systems such as Hybrid Rice-wheat, Black gram-Bengal gram+ Mustard-Green gram, Hyb. Rice- veg. pea + mustard-black gram, Maize+ Cow pea (fodder)-berseem+ Gobhi sarson/Velvet grass-Sweet Sorghum (multi cut) and Maize (cob)-Potato+Mustard-Okra were evaluated in Upper Gangatic plain region. The Soil Health (SH) module, which includes blackgram, chickpea, mustard, and greengram, has a relatively high COC at Rs. 136,027. However, it yields the highest net return among all systems at Rs. 273,018, making it the most profitable overall. This system also records a Soil Organic Carbon (SOC) value of 0.52%, reflecting its positive impact on soil sustainability. The Income Enhancement (IE) module, comprising maize (cob), potato, mustard, and okra, has the lowest COC at Rs. 39,447. Despite the low investment, it delivers a solid net return of Rs. 186,736, making it the most cost-effective system among all modules in the region. Its performance highlights the value of optimizing input costs without sacrificing profitability. The Livestock Nutrition (LN) system consists of a complex crop combination: maize and cowpea (for fodder), barseem, gobhisarso, velvet grass, and sweet sorghum in a multi-cut strategy. The cost of cultivation is Rs. 121,683, which matches its net return, also Rs. 121,683, implying a breakeven outcome. This system may be justified in contexts prioritizing feed production over financial gain. The Family Nutrition (FN) module incorporates hybrid rice, vegetable pea, mustard, and blackgram. It requires the highest input cost of Rs. 149,834 among all systems but delivers a respectable return of Rs. 192,236. While not the most profitable, it achieves moderate profitability, offering a suitable balance between nutrition and income.

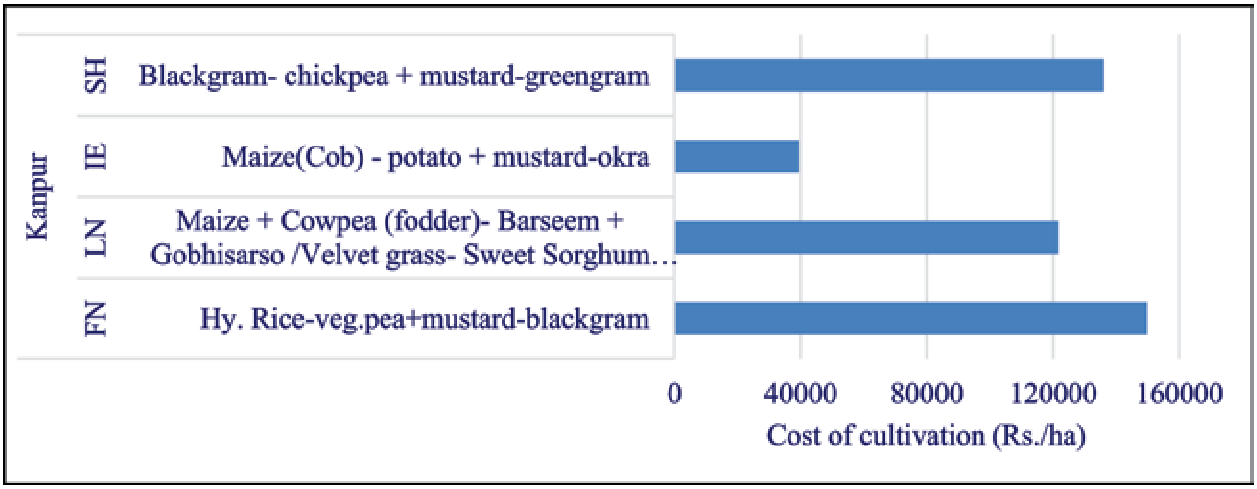


Fig 11. Cost of cultivation (Rs. /ha) of cropping systems module in Upper Gangetic Plain Region during 2023-24

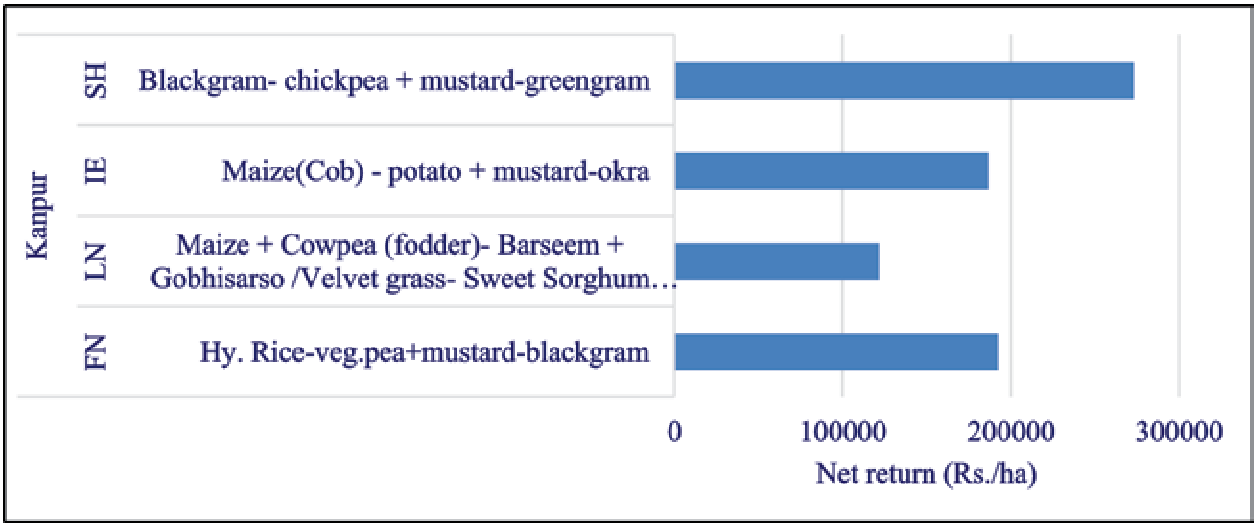


Fig 12. Net return (Rs. /ha) of cropping systems module in Upper Gangetic Plain Region during 2023-24

Trans-Gangetic Plains Region: This region presents an evaluation of cropping systems implemented in Ludhiana and Hisar. In Hisar, the SH system consisting of green gram, mustard, and green gram is the most cost-efficient with a COC of Rs. 74,999. It delivers moderate profitability with a net return of Rs. 177,983 and an SOC value of 0.52%, reflecting good sustainability. The IE system, which includes okra, cauliflower, and onion, incurs the highest input cost in Hisar at Rs. 210,145 but yields a high net return of Rs. 406,770. The LN system made up of maize, cowpea, oat, and sweet crops has a COC of Rs. 108,118 and delivers comparatively low returns of Rs. 75,385, indicating a less favorable return on investment. The FN module involving greengram, wheat, and mustard shows a balanced performance with a COC of Rs. 98,816 and net returns of Rs. 146,578. In Ludhiana, the cropping systems exhibit greater profitability across all categories. The IE system combining maize (cobs/f), potato, and onion shows the highest net return across both regions at Rs. 501,376, despite a high COC of Rs. 402,356. This highlights the strong economic potential of vegetable-based systems. The SH system comprising maize, GM/mustard, and cowpea (vegetables/GM) maintains a COC of Rs. 113,221 and achieves a healthy return of Rs. 285,733. It also provides the highest SOC among the two regions at 0.57%, showcasing its environmental benefit. The LN system in Ludhiana featuring multiple rotations of maize and cowpea incurs a cultivation cost of Rs. 132,500 and yields net returns of Rs. 260,542, making it one of the more efficient livestock systems. The FN module using maize, potato, and spring

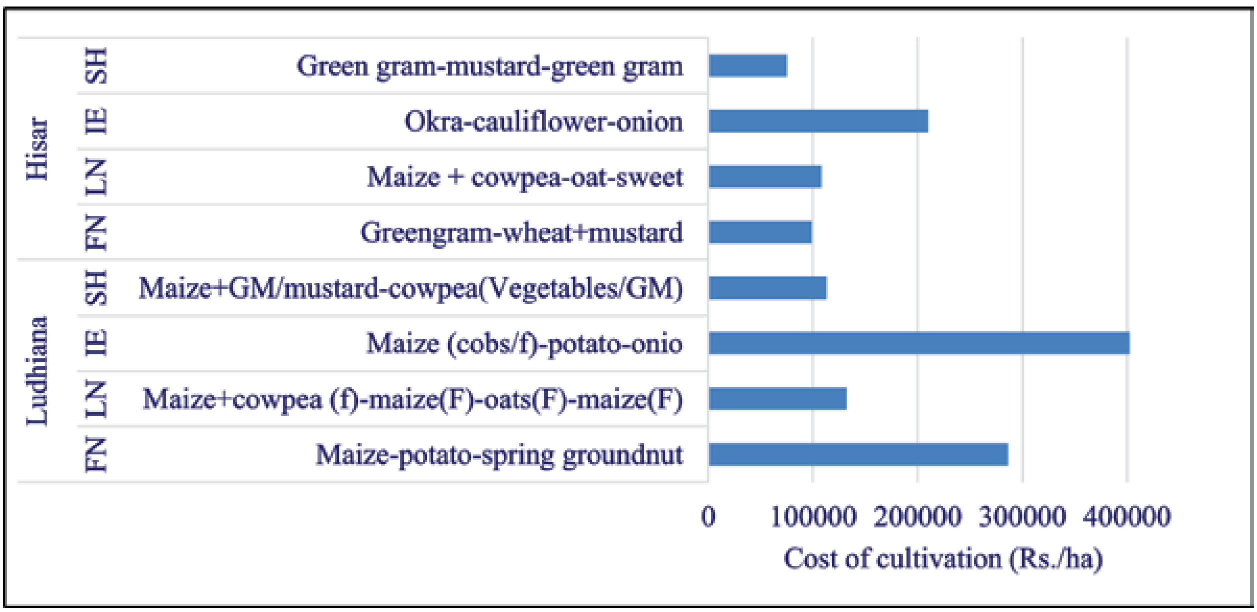


Fig 13. Cost of cultivation (Rs. /ha) of cropping systems module in Trans Gangetic Plain Region during 2023-24

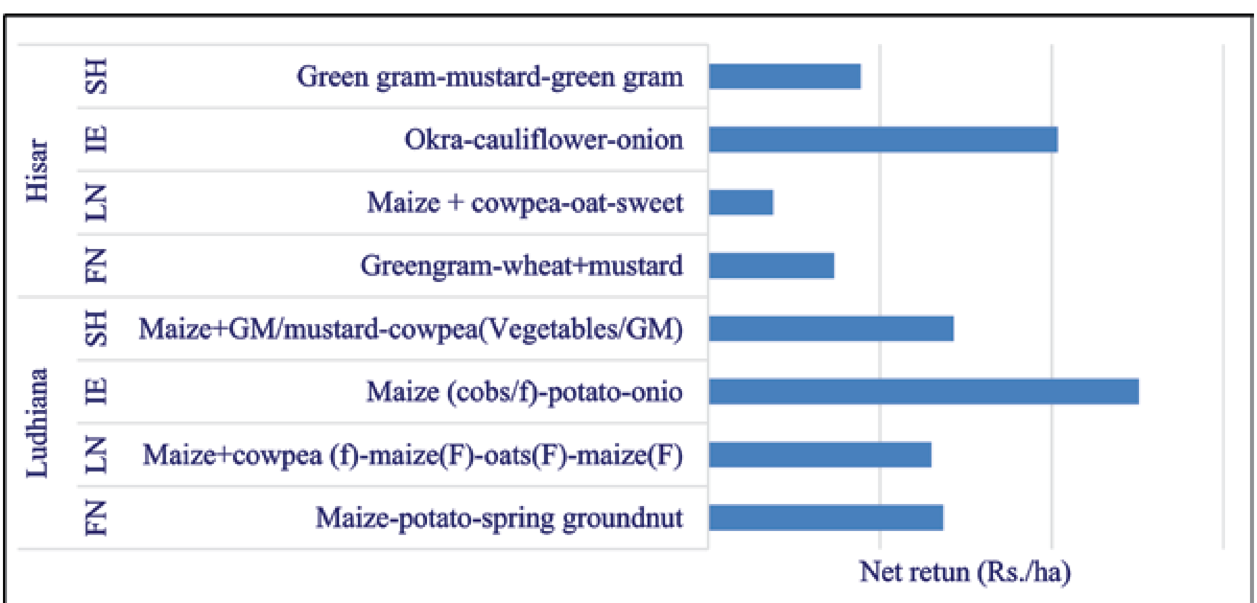


Fig 14. Net return (Rs. /ha) of cropping systems module in Trans Gangetic Plain Region during 2023-24

groundnut has the highest input cost among FN systems at Rs. 286,258 and returns Rs. 273,930, indicating modest profitability.

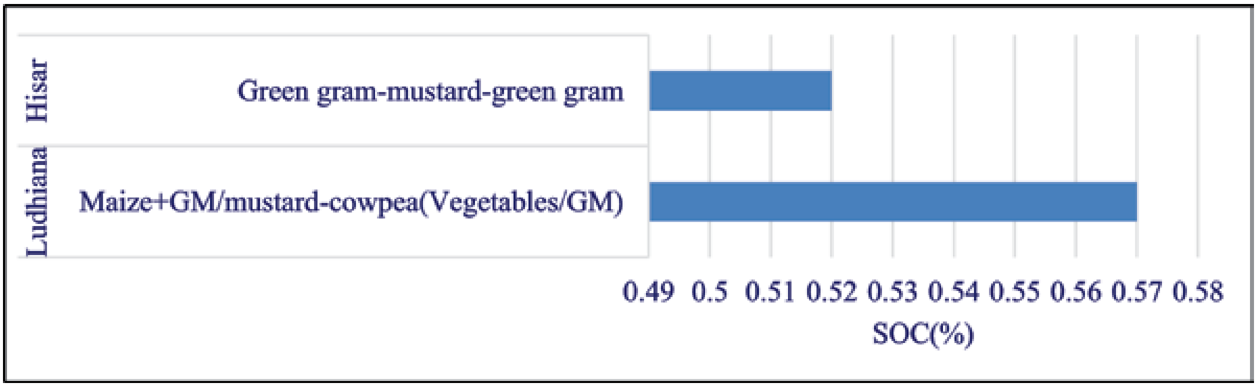


Fig 15. Soil organic carbon (%) of cropping systems module in Trans Gangetic Plain Region during 2023-24

Eastern Plateau and Hills: The comparative analysis of cropping systems in the Eastern Plateau and Hills region, specifically Raipur and Ranchi, reveals significant variations in cost of cultivation (COC), net returns (NR), and soil organic carbon (SOC). In Raipur, the Integrated Efficient (IE) system comprising Rice-sweet corn-tomato+coriander incurs the highest cultivation cost of Rs. 85214 but yields net returns equal to its COC, indicating balanced profitability. Other systems in Raipur show varying degrees of performance: the Rice-garden pea-cowpea (SH) system, with a COC of Rs. 48233, yields Rs. 73323 in NR, while the Rice-berseem-sorghum (LN) and Rice-frenchbean-groundnut (FN) systems show lower NR of Rs. 16524 and Rs. 23313 respectively. The SH system Rice + sesbania-lentil-greengram exhibits the lowest profitability with NR of only Rs. 11007 despite a moderate COC of Rs. 33712. In Ranchi, the IE system (Basmati rice-potato-okra) stands out as the most profitable cropping model, yielding the highest net returns of Rs. 203760 against a COC of Rs. 45315. This highlights the high productivity and market value of this system. Conversely, the LN system (Rice-maize(f)-cowpea(f)) and SH system (Rice + sesbania-lentil-greengram) result in low returns of Rs. 12608 and Rs. 11007, suggesting inefficiencies or limited market demand. The FN system (Rice-greengram-cowpea) demonstrates moderate profitability with a COC of Rs. 37142 and NR of Rs. 87102. Regarding SOC, the system Rice-garden pea-cowpea implemented in both Ranchi and Raipur demonstrates a higher SOC percentage of 0.79 compared to the Rice + sesbania-lentil-greengram system at 0.606, indicating a better impact on soil health.

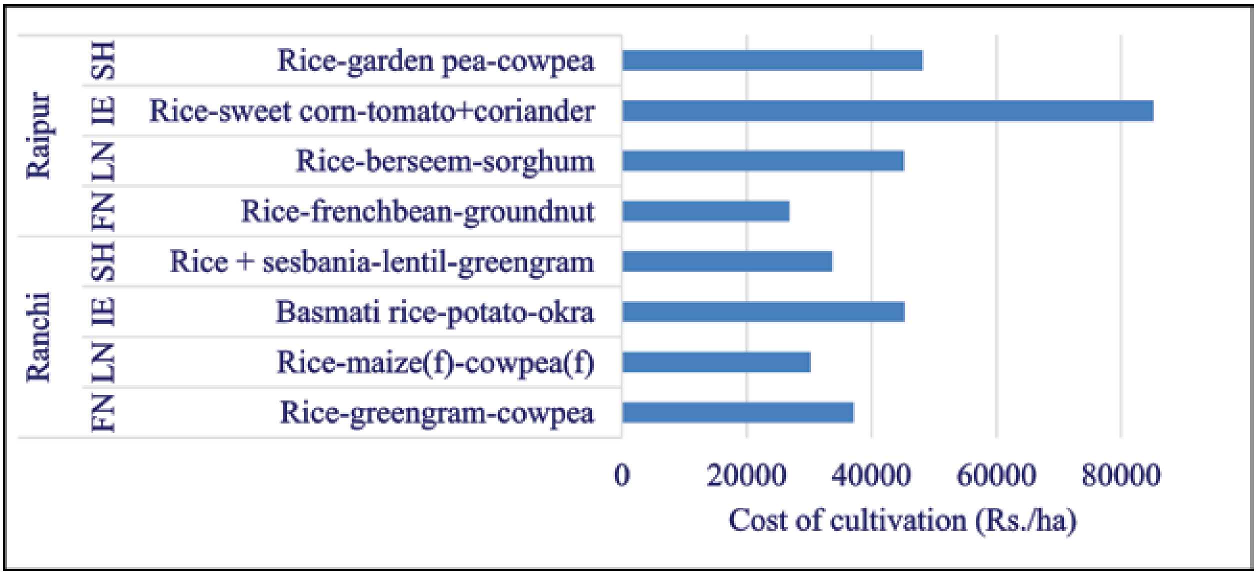


Fig 16. Cost of cultivation (Rs. /ha) of cropping systems module in Eastern Plateau and Hills Region during 2023-24

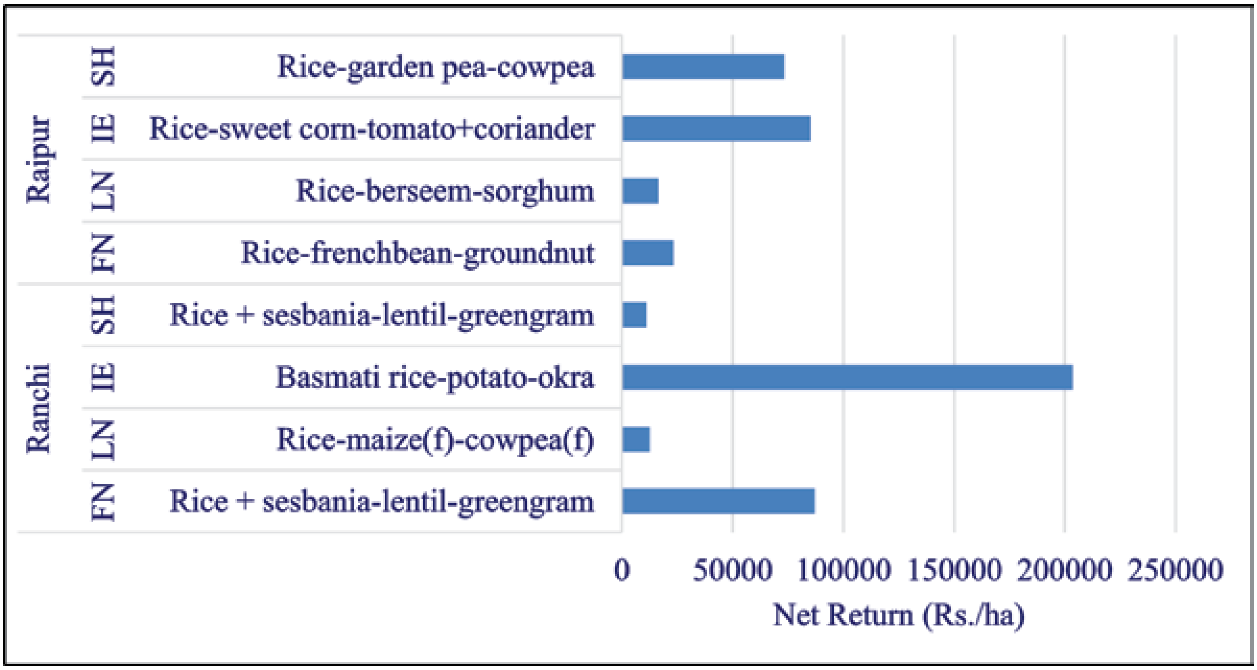


Fig 17. Net return (Rs. /ha) of cropping systems module in Eastern Plateau and Hills Region during 2023-24

Central plateau and Hill Region: The Central Plateau and Hill Region, encompassing Indore, Jabalpur, Powerkheda, Rewa, Durgapura, and Kota, showcases a wide array of cropping systems with diverse levels of cost of cultivation (COC) and net returns (NR). The Rewa region's FN system (Rice-pea + mustard-sesbania) demonstrates the highest profitability with net returns of Rs. 273771, indicating optimal performance both in productivity and market returns. Other notable systems include Rewa's Rice-potato-greengram (Rs. 259296) and Kota. In Kota, the IE system (Hybrid Maize-veg.pea-onion) achieves net returns of Rs. 308298 against a COC of Rs. 107900, highlighting its superior value. Similarly, systems like Sorghum+cowpea and Groundnut-wheat-blackgram also yield high net returns of Rs. 274181 and Rs. 281337 respectively. In contrast, Cowpea-lentil in Durgapura and Maize-berseem-sorghum in Powerkheda provide relatively lower returns of Rs. 140322 and Rs. 44636 respectively, suggesting potential limitations in profitability or efficiency. In Jabalpur, the system Rice-cabbage-greengram demonstrates a balanced return of Rs. 144404 against modest cultivation costs. However, some systems like Soybean-chickpea-greengram and Cowpea (vegetable)-cabbage-okra offer lower net returns, Rs. 66743 and Rs. 82804 respectively, compared to the more profitable models.

The soil organic carbon (SOC) levels recorded across selected cropping systems in the Central Plateau and Hill Region indicate significant variations in soil health enhancement. Among the regions analyzed, Indore's cropping system involving Soybean, Sesbania, Wheat, Chickpea, and Greengram recorded the highest SOC at 0.79 percent. This indicates a strong potential for soil fertility improvement and organic matter retention in this diverse and integrated crop rotation. Jabalpur, with its Soybean-Chickpea-Greengram system, followed with an SOC of 0.606 percent This result also reflects effective crop management practices that contribute positively to soil health. In contrast, Durgapura's Cowpea-Lentil system registered a lower SOC value of 0.32 percent, suggesting limited organic matter buildup or the need for improved agronomic practices.

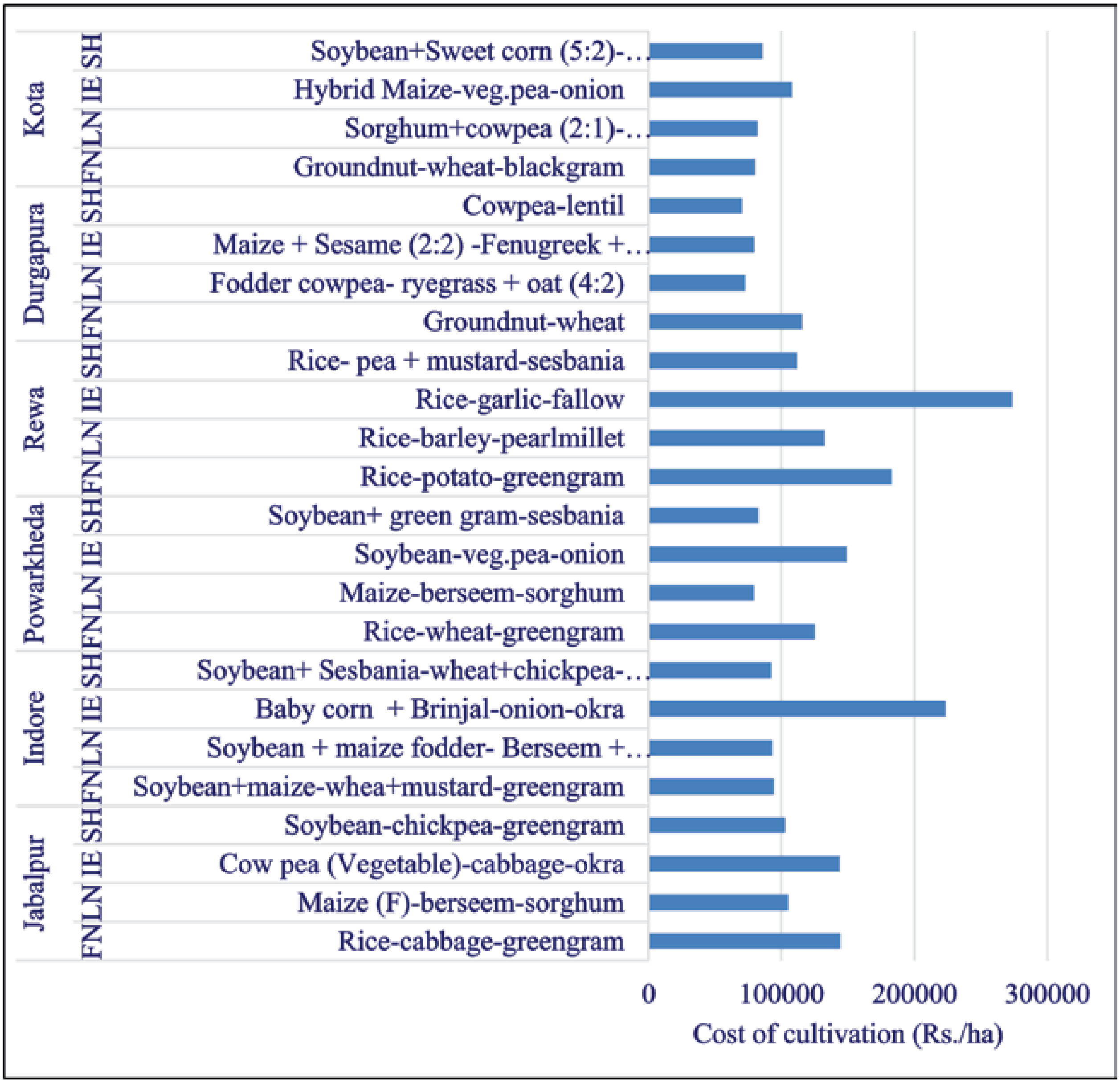


Fig 18. Cost of cultivation (Rs. /ha) of cropping systems module in Central plateau and Hill Region during 2023-24

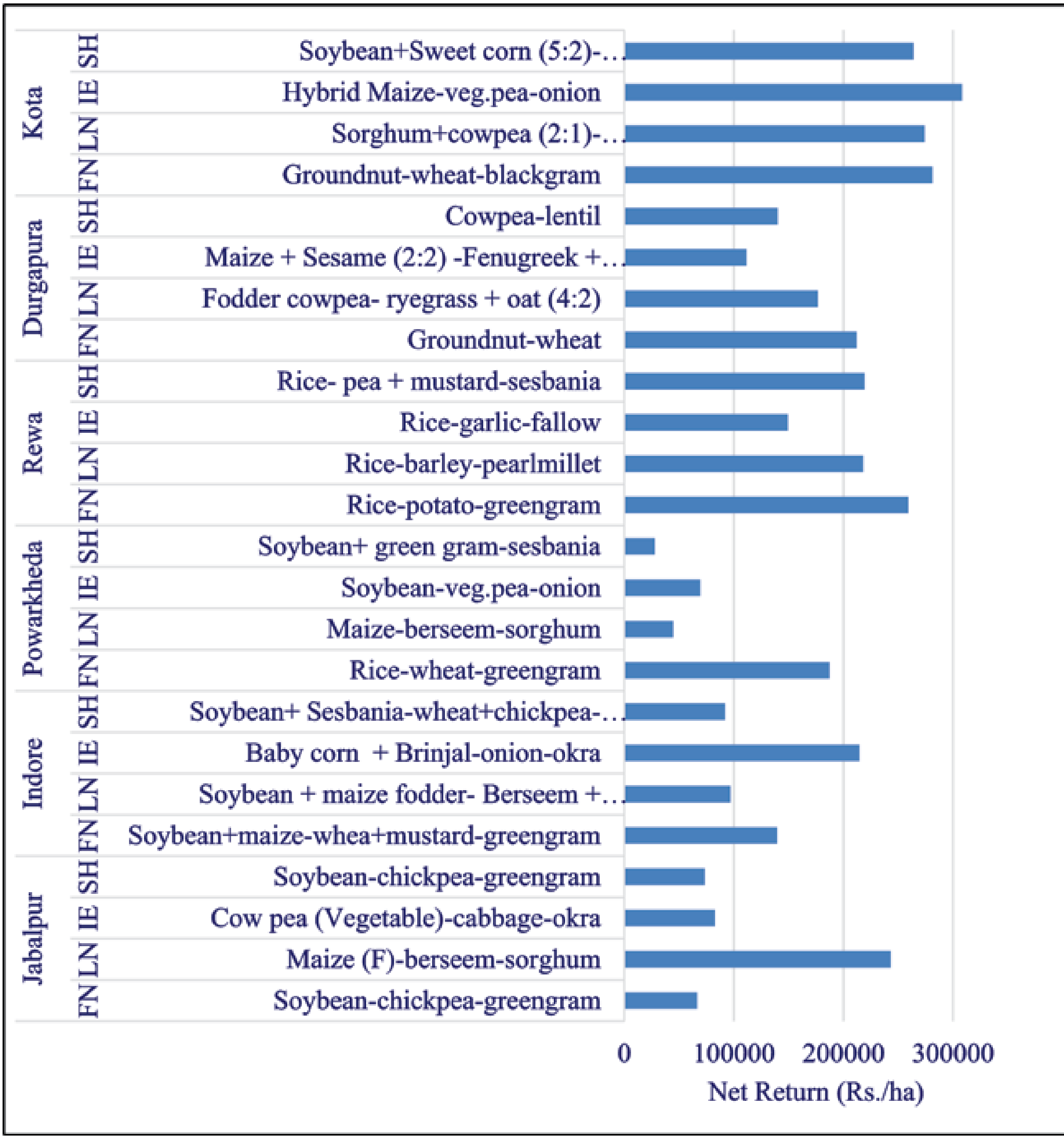


Fig 19. Net return (Rs. /ha) of cropping systems module in Central plateau and Hill Region during 2023-24

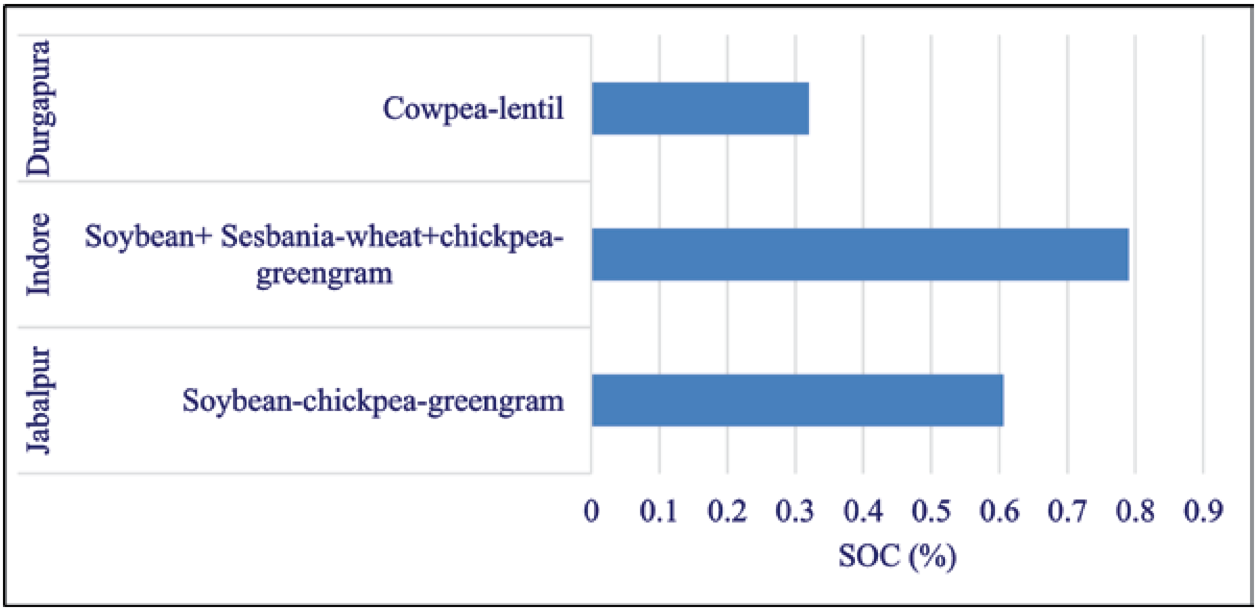


Fig 20. Soil organic carbon (%) of cropping systems module in Central plateau and Hill Region during 2023-24

Western Plateau and Hill Region: The Western Plateau and Hill Region, comprising Akola, Karjat, Parbhani, and Rahuri, demonstrates a wide variation in cropping systems, cultivation costs, and net returns. The analysis highlights the economic viability of diverse cropping patterns practiced across these districts. In Rahuri, the cropping system of soybean-onion emerged as the most economically beneficial, yielding a net return of Rs. 2,96,422 per hectare with a cost of cultivation (COC) of Rs. 1,41,250. This indicates a strong return on investment despite the relatively high input cost. Another notable system is soybean-chickpea, with a moderate cost of Rs. 80,740/ha and a substantial return of Rs. 1,42,633/ha. On the lower end, cowpea-rabi sorghum has the least cultivation cost at Rs. 60,824/ha, but also one of the lowest net returns at Rs. 73,276/ha, suggesting limited profitability. Similarly, pearl millet-chickpea yields marginally better returns (Rs. 75,166/ha) with a cost of Rs. 73,540/ha. Moving to Parbhani, the sweetcorn-potato-bitter gourd system stands out with high profitability, generating Rs. 2,60,501/ha net return against a high input cost of Rs. 1,94,700/ha. This makes it a viable option for farmers willing to invest more for higher gains. In contrast, the maize-berseem-berseem system, despite a mid-range COC of Rs. 1,23,040/ha, delivers a lower return of Rs. 1,18,275/ha, which may not be economically sustainable. The soybean-linseed-greengram system offers a good balance, with a cost of Rs. 1,03,660/ha and a net return of Rs. 1,69,350/ha. Another promising option is the pigeon pea + greengram-sunflower rotation, which gives a decent return of Rs. 1,20,233/ha on an investment of Rs. 1,14,660/ha. In Karjat, rice-cucumber proves to be the most profitable system, with a net return of Rs. 3,02,455/ha despite having the highest COC in the region at Rs. 2,70,321/ha. This system showcases high output relative to its investment. On the other hand, rice-groundnut is less favorable, incurring a cost of Rs. 1,73,760/ha but producing a modest return of Rs. 1,19,369/ha. Rice-rice bean offers a slightly better balance with a COC of Rs. 1,23,993/ha and net return of Rs. 1,14,877/ha. The rice-cowpea system results in a return of Rs. 1,00,815/ha, lower than its COC of Rs. 1,29,933/ha, indicating a potential loss or marginal viability. In Akola, the sweetcorn-carrot-okra system stands out prominently, delivering the highest net return of Rs. 7,67,508/ha with a cost of Rs. 1,63,236/ha, making it the most lucrative option across all regions. Other profitable systems include sorghum-chickpea-greengram, with a return of Rs. 2,51,621/ha and a cost of Rs. 1,28,016/ha, and sorghum-berseem-groundnut, which provides a return of Rs. 2,46,141/ha on a cost of Rs. 1,50,557/ha. The blackgram-chickpea-sunnhemp system also performs well with a return of Rs. 1,56,060/ha against a COC of Rs. 1,00,013/ha, offering a solid return-to-cost ratio.

The soil organic carbon (SOC) status across selected cropping systems in the Western Plateau and Hill Region indicates varying levels of soil health enhancement. Among the observed districts, Karjat's rice-cowpea cropping system recorded the highest SOC at 1.2%, reflecting a significant improvement in soil organic matter content, which is crucial for long-term soil fertility and sustainability. Parbhani's soybean-linseed-greengram system showed a moderate SOC level of 0.59%, suggesting better carbon retention compared to Rahuri, where the soybean-chickpea system registered the lowest SOC at 0.51%. These results highlight the superior soil-building capacity of legume-integrated and diversified cropping patterns, with Karjat demonstrating a particularly positive impact on soil quality.

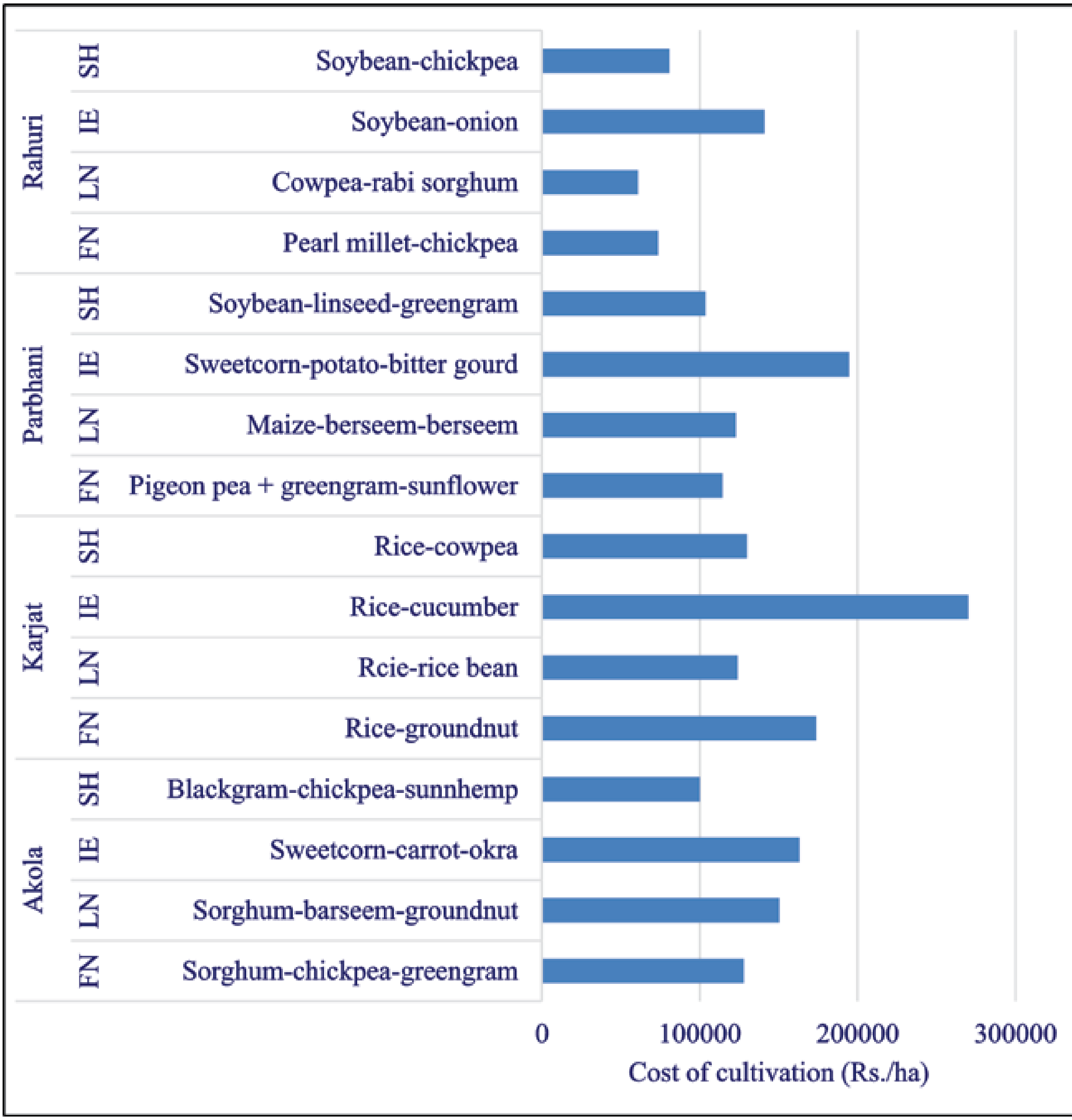


Fig 21. Cost of cultivation (Rs./ha) of cropping systems module in Western Plateau and Hill Region during 2023-24

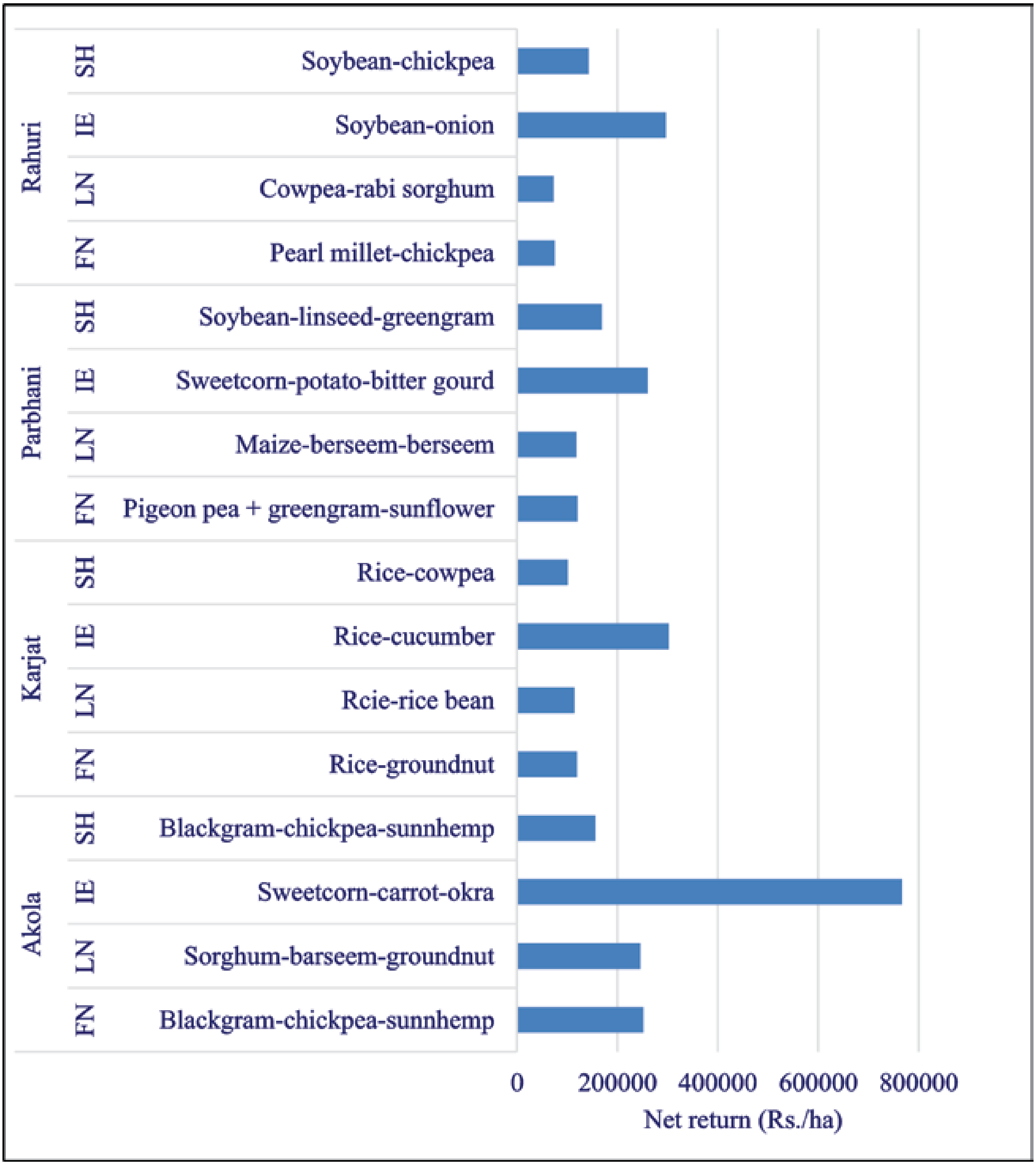


Fig 22. Net return (Rs./ha) of cropping systems module in Western Plateau and Hill Region during 2023-24

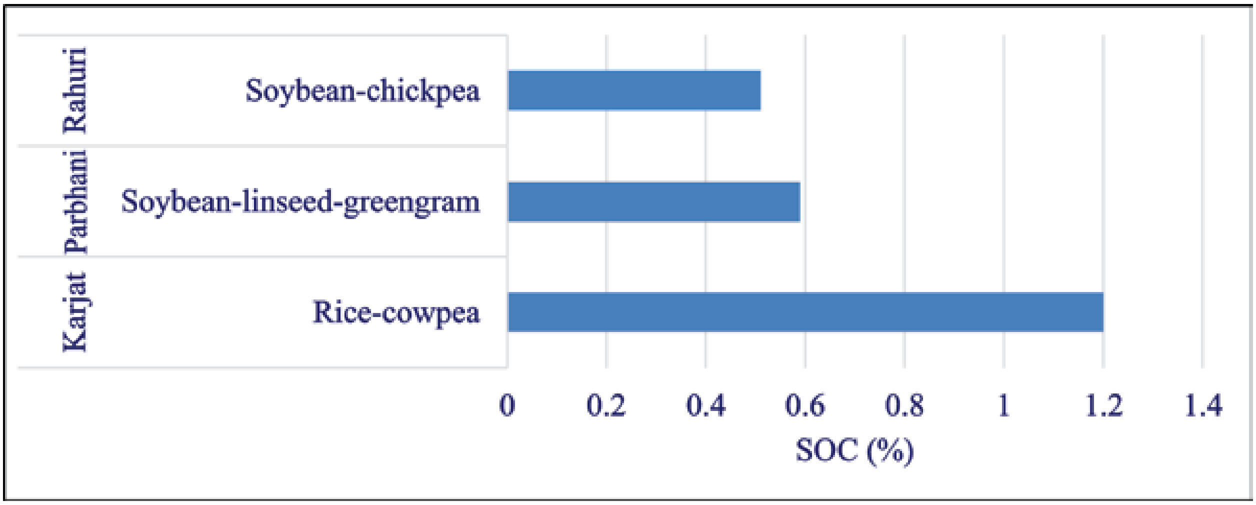


Fig 23. Soil organic carbon (%) of cropping systems module in Western Plateau and Hill Region during 2023-24

South Plateau and Hills: In the Southern Plateau and Hills region, encompassing districts such as Coimbatore, Kathalgere, Maruteru, Rajendranagar, Rudur, Siruguppa, and Thanjavur, the performance of cropping systems was analyzed based on Cost of Cultivation (COC) and Net Returns (NR) per hectare. Among the systems studied, the "sweet corn-marigold-bhendi" combination from Siruguppa stood out with the highest net returns of Rs. 554004/ha, despite a moderate cultivation cost of Rs. 102125/ha. Similarly, the "maize + bhendi-cotton+onion-brinjal" system from Coimbatore also demonstrated excellent economic performance with net returns of Rs. 398766/ha and a cultivation cost of Rs. 196629/ha. Another high-performing system was "maize-rice-seeraga samba-blackgram" from Thanjavur, which provided net returns of Rs. 418642/ha with a cultivation cost of Rs. 202723/ha. In contrast, systems such as "rice-bhendi-cluster bean" and "rice-safflower-cluster bean" yielded relatively lower net returns, ranging between Rs. 14504/ha and Rs. 33468/ha. Notably, the "sweetcorn-broccoli-okra" system from Rajendranagar offered a good balance with net returns of Rs. 302329/ha and a moderate cost of cultivation at Rs. 182639/ha. These findings suggest that diversified and vegetable-integrated systems, particularly those including sweet corn, bhendi, and marigold, provide better profitability in this region, while more traditional cereal-legume combinations may yield lower economic returns.

The soil organic carbon (SOC) levels under various cropping systems in the Southern Plateau and Hills region show notable variation across different locations. The highest SOC was observed in Maruteru under the "rice-pillipesara-greengram" system, with a value of 1.18%, indicating a significant improvement in soil health. This was followed by the "green gram-cowpea-beans" system in Siruguppa with an SOC of 0.71%, and the "sunnhemp-rice + daincha-greengram" and "cowpea + fenugreek-clusterbean-sunnhemp" systems in Thanjavur and Coimbatore respectively, both registering SOC levels of 0.59%. The "maize + green gram-sunnhemp" system in Kathalgere also showed a moderate SOC of 0.53%, while Rudur's "rice-blackgram" system recorded a slightly lower value of 0.5%. The lowest SOC was observed in Rajendranagar under the "Bt. cotton + greengram-sesame" system, with a value of 0.4%. These findings highlight the potential of legume-based and green manure-integrated cropping systems in enhancing soil organic carbon content, contributing to improved soil fertility and sustainability.

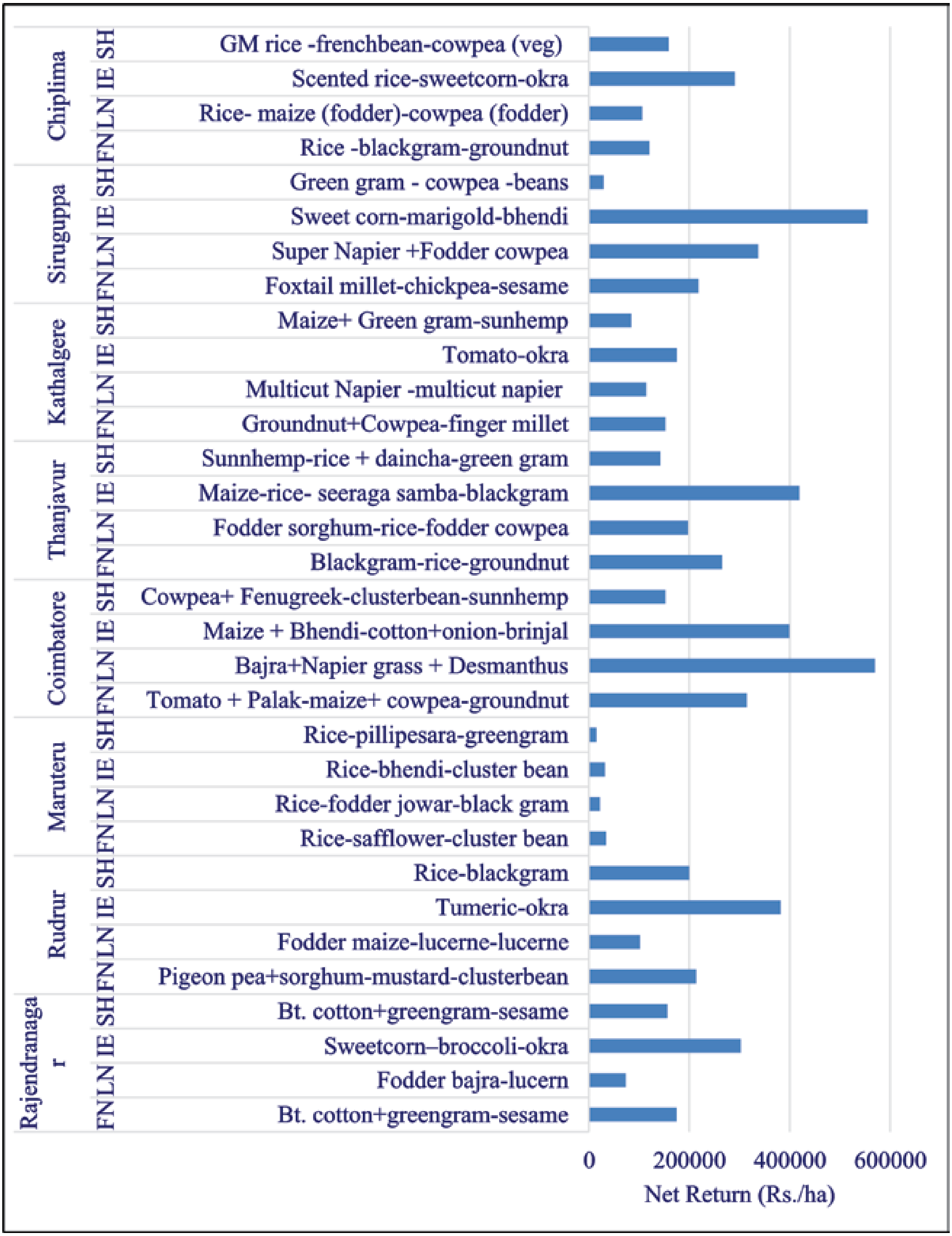


Fig 24. Cost of cultivation (Rs. /ha) of cropping systems module in South Plateau and Hills Region during 2023-24

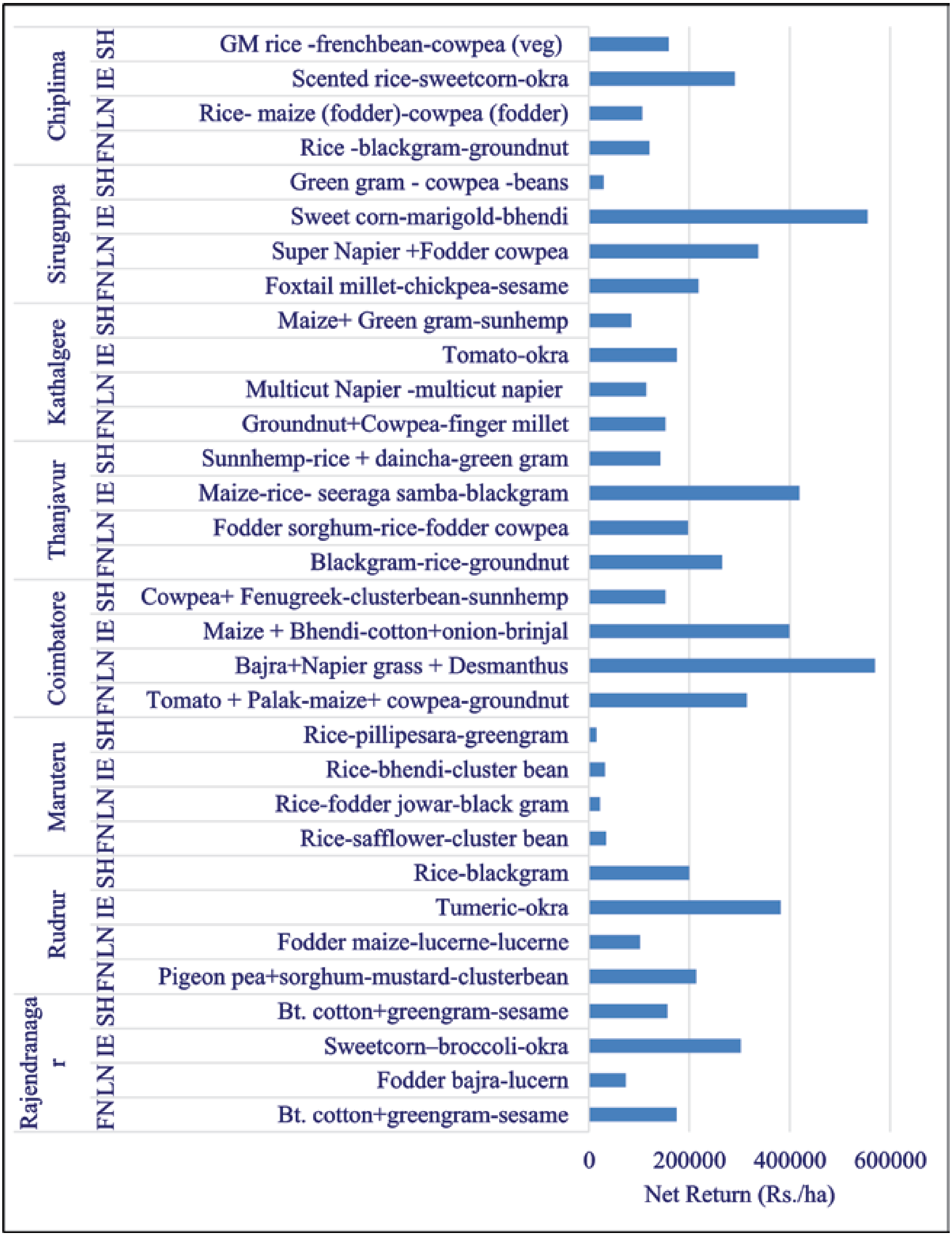


Fig 25. Net return (Rs. /ha) of cropping systems module in South Plateau and Hills Region during 2023-24

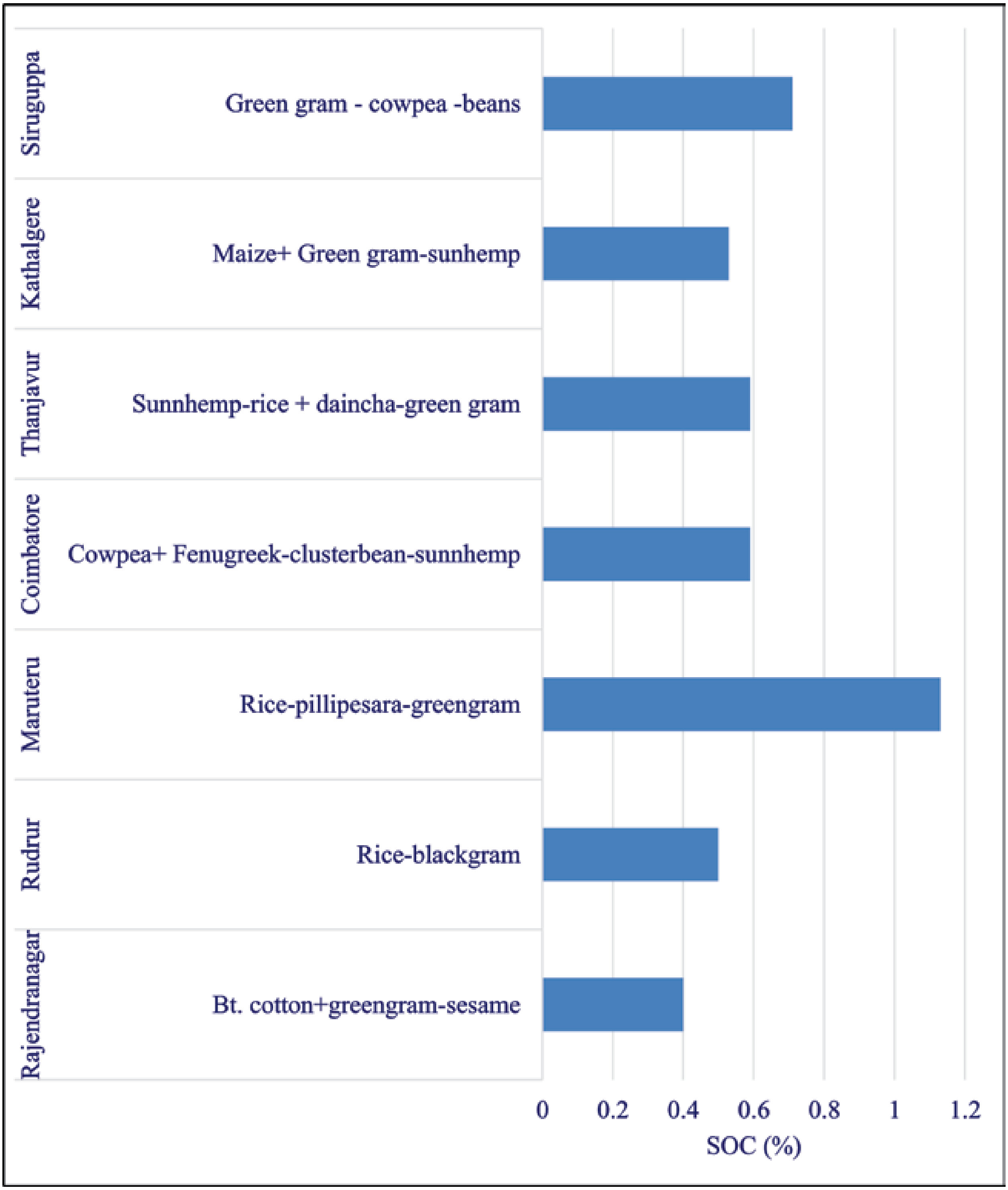


Fig. 26. Soil organic carbon (%) of cropping systems module in South Plateau and Hills Region during 2023-24

Eastern Coastal Plains and Hills: The cropping systems analyzed in the Eastern Coastal Plains and Hills region of Bhubaneswar show varied performance in terms of profitability and input-output efficiency. Among the systems, the IE system, which follows the pattern of scented rice, sweet corn, and cowpea (vegetable), records the highest net returns of Rs.173,338 per hectare. Although it has the highest cost of cultivation at Rs.219,418 per hectare, its high profitability demonstrates its superior performance among the cropping systems analyzed. In contrast, the LN system, which involves rice (used as dry fodder), oat (green fodder), and cowpea (green fodder), yields the lowest net returns of Rs.94,434 per hectare. Despite having a relatively lower cost of cultivation at Rs.148,023 per hectare, this system offers limited economic benefit, suggesting that the returns may not sufficiently compensate for the investment. The FN system, comprising rice, sunflower, and blackgram, and the SH system, which includes rice, cowpea (vegetable), and greengram, have somewhat similar costs of cultivation at Rs.163,139 per hectare and Rs.189,676 per hectare respectively. However, the SH system shows better performance in terms of returns, yielding Rs.145,703 per hectare as compared to Rs.103,378 per hectare from the FN system. This indicates higher input-output efficiency in the SH cropping system. The soil organic carbon (SOC) percentage for the region is recorded at 0.73 percent, which reflects a moderate level of soil fertility and is conducive to sustainable agricultural practices.

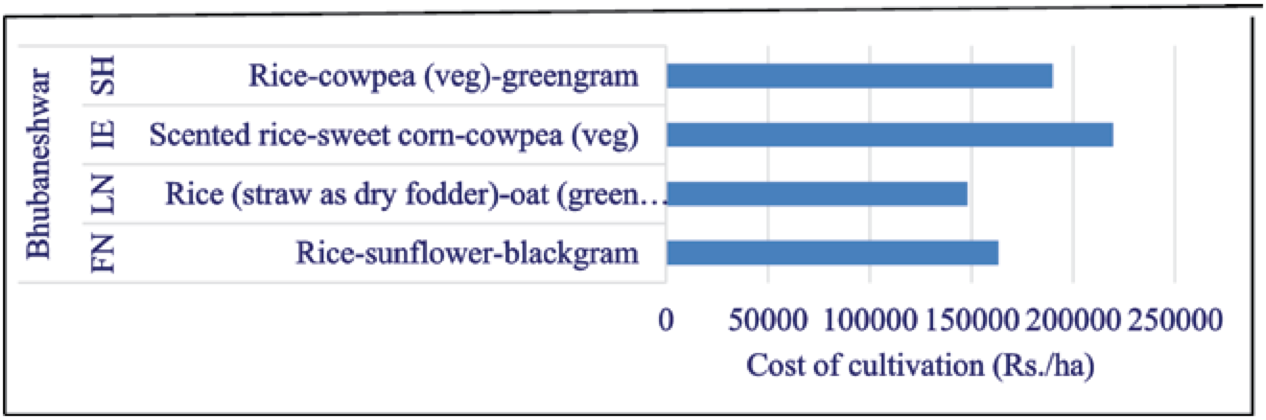


Fig 27. Cost of cultivation (Rs. /ha) of cropping systems module in Eastern plateau and Hills Region during 2023-24

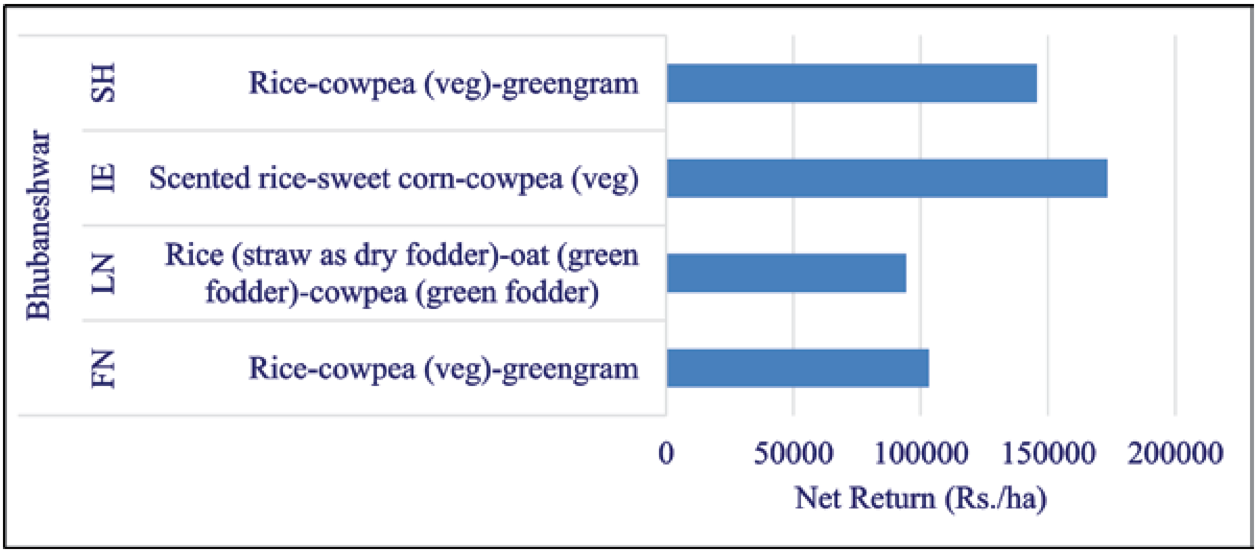


Fig 28. Net Return (Rs. /ha) of cropping systems module in Eastern plateau and Hills Region during 2023-24

Western Coastal Plains and Ghats: In the Western Coastal Plains and Ghats region of Karmana, various cropping systems were evaluated for their economic performance and impact on soil organic carbon (SOC). Among these, the Integrated Enterprise (IE) system comprising rice, sweet potato, and cucumber was found to be the most profitable, yielding the highest net returns of 678,523 Rs./ha despite its relatively high cost of cultivation of 339,400 Rs./ha. This highlights the economic advantage of crop diversification within this system. In contrast, the System of High Inputs (SH), which includes rice, daincha-rice, daincha-red gram, and groundnut, showed the lowest net returns of 102,901 Rs./ha, even though its cultivation cost was moderate at 207,250 Rs./ha, indicating limited profitability compared to other cropping modules.

Other systems such as the LN system (rice-guinea, fodder cowpea-guinea, and fodder cowpea) and the FN system (rice, bush cowpea, and sweet potato) demonstrated moderate returns. The LN system recorded net returns of 163,798 Rs./ha with a cultivation cost of 190,800 Rs./ha, while the FN system achieved net returns of 389,432 Rs./ha with a cost of 339,000 Rs./ha. Additionally, the SH system maintained a notable SOC percentage of 1.44%, suggesting a positive effect on soil fertility and long-term sustainability. Overall, this evaluation underscores the economic benefits and soil health advantages of integrated cropping systems in this region, with the rice-sweet potato-cucumber combination standing out as the most economically viable option.

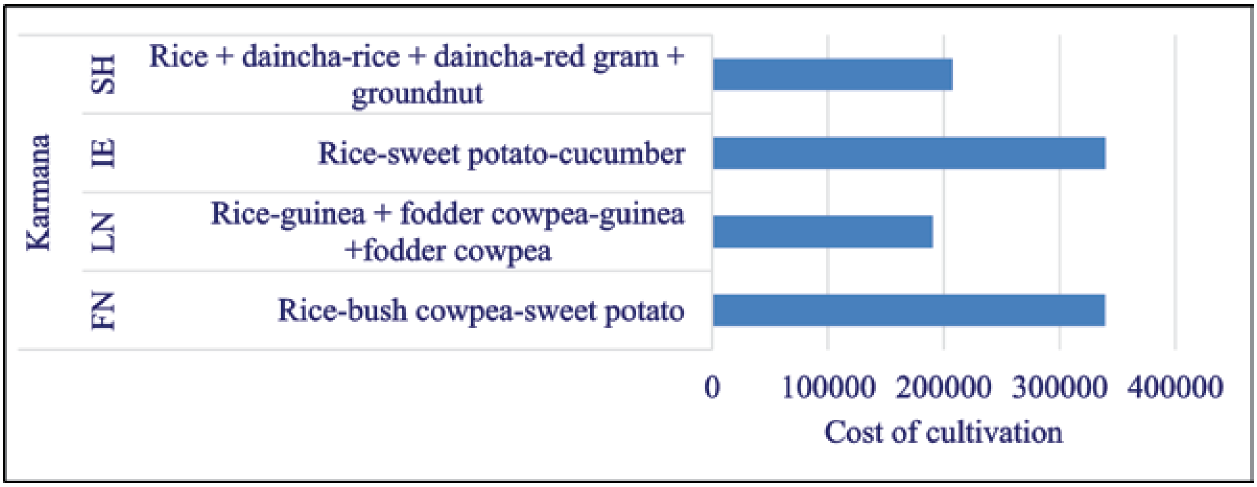


Fig 29. Cost of cultivation (Rs. /ha) of cropping systems module in Western Coastal Plains and Ghats Region during 2023-24

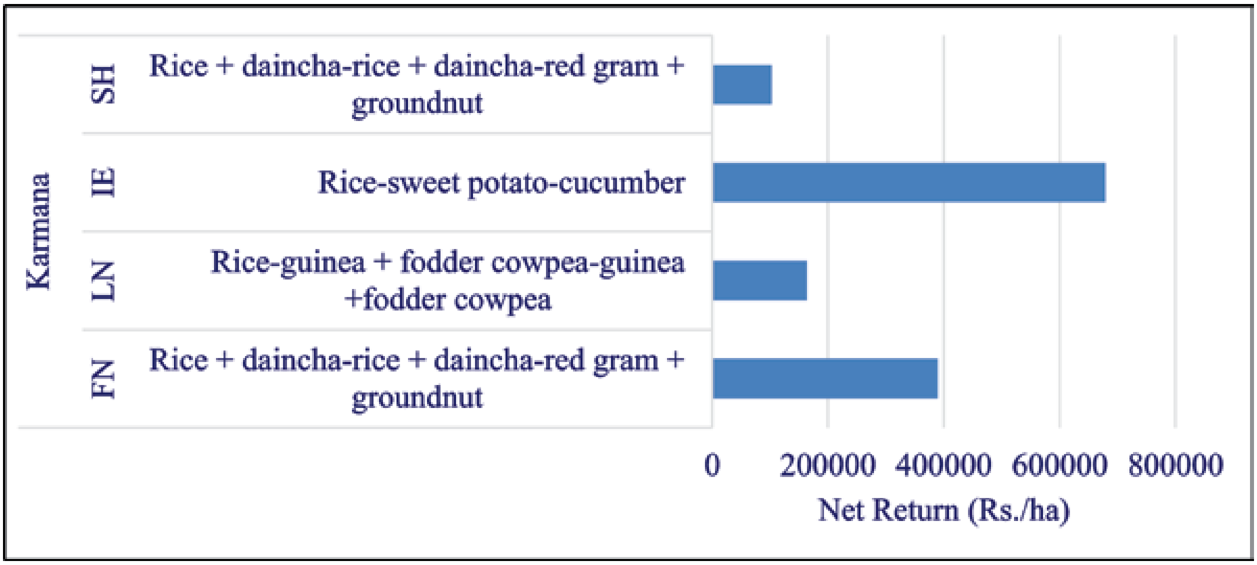


Fig 30. Net return (Rs. /ha) of cropping systems module in Western Coastal Plains and Ghats Region during 2023-24

Gujarat Plain and Hill Region: In the Gujarat plain and hill region encompassing Junagadh, Navsari, and SK Nagar, various cropping systems were assessed for their cost of cultivation (COC), net returns (NR), and soil organic carbon (SOC) content. Among the regions, SK Nagar demonstrated remarkable economic performance, particularly with the "Greengram-fenugreek-groundnut" cropping system, which achieved the highest net returns of Rs. 415,287 per hectare. This indicates the potential profitability of legume-based cropping sequences in this area. Meanwhile, Navsari led the overall region with the cropping system "Rice-brinjal+spinach-brinjal continue," delivering the highest net returns of Rs. 503,469 per hectare, despite its relatively higher cost of cultivation of Rs. 217,484 per hectare.

In terms of cost, cropping systems varied significantly across the centers, with systems like "Rice-sunhemp-okra" in Navsari costing Rs. 164,897 per hectare and "Groundnut-chickpea-sunhemp" in Junagadh having a lower cost of Rs. 84,037 per hectare. Net returns followed a similar pattern, with Junagadh's "Groundnut-castor-brinjal" system also performing well, generating Rs. 243,916 per hectare. Soil organic carbon percentages showed variation as well, with Junagadh exhibiting the highest SOC at 0.90% in the "Groundnut-chickpea-sunhemp" system, followed by Navsari at 0.85% with the "Rice-sunhemp-okra" system, while SK Nagar had a lower SOC of 0.37% in the "Greengram-fenugreek-groundnut" system. Overall, these results highlight the economic and soil health benefits of specific cropping systems tailored to each center, underscoring the importance of site-specific crop planning to maximize profitability and sustainability in the Gujarat plain and hill region.

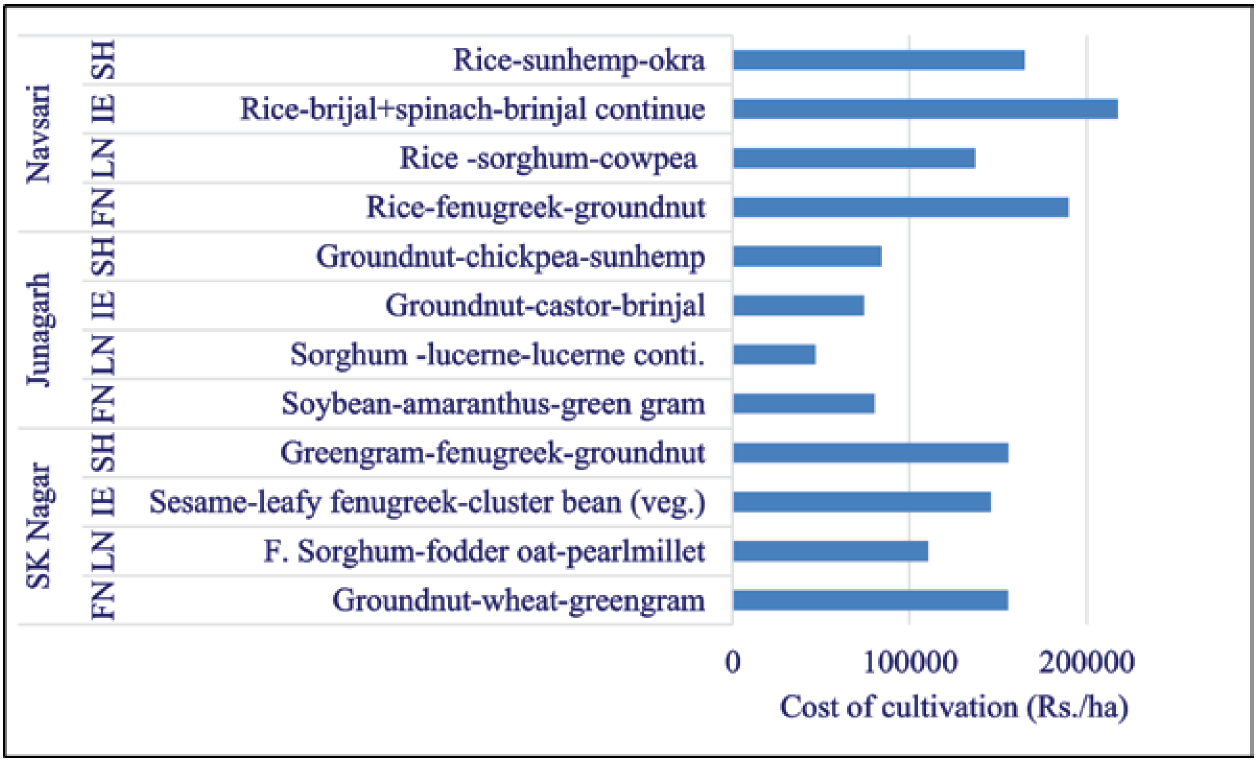


Fig 31. Cost of cultivation (Rs. /ha) of cropping systems module in Gujarat Plain and Hill Region during 2023-24

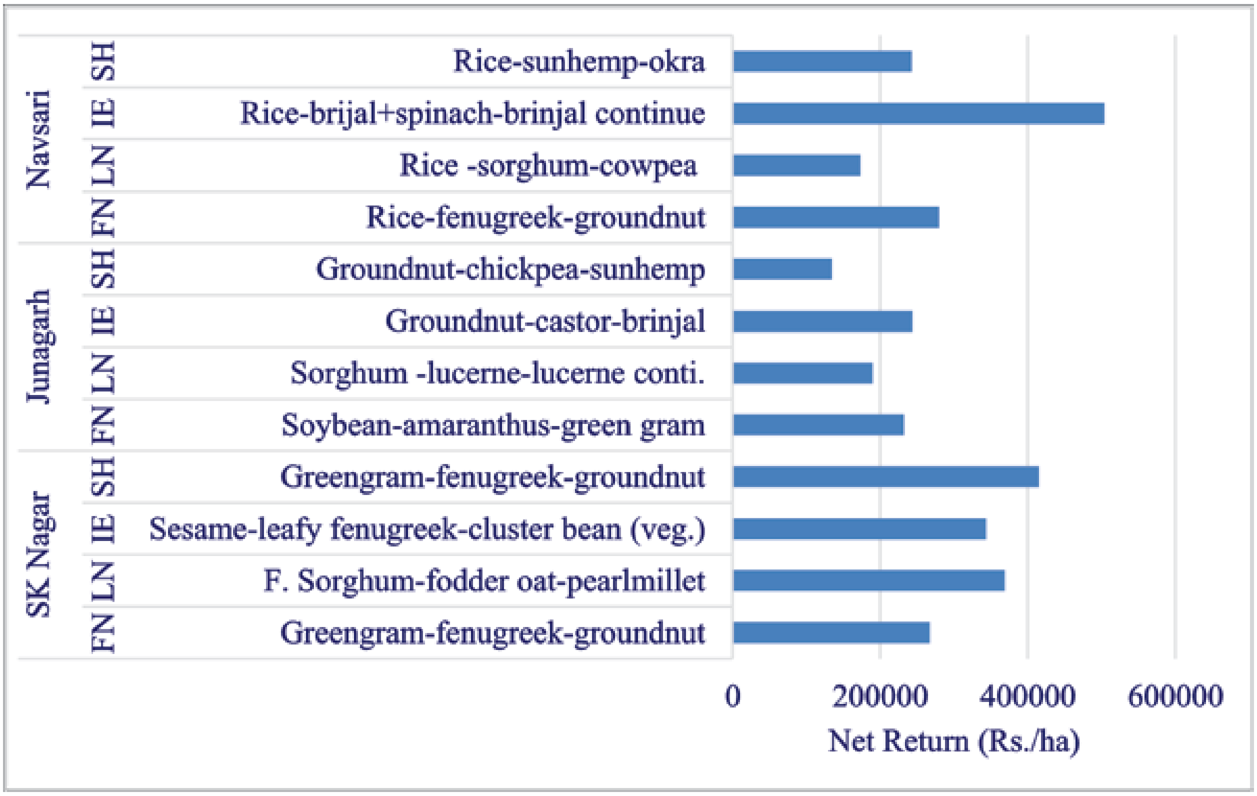


Fig. 32: Net return (Rs. /ha) of cropping systems module in Gujarat Plain and Hill Region during 2023-24

7.3 ON-FARM RESEARCH

7.3.1 On-Farm Research Experiments

7.3.1.1 On-farm crop response to application of nutrient

Title of the experiment: On-Farm evaluation of different management practices in pre-dominant cropping systems

Objective: To assess the response of major cropping system to different management practices.

Year of start: 1999-2000, Treatments are modified in 2010-211 and further in 2022-23.

Treatments: there are five common treatments at various locations (Farmer's Practice, RDF, ICM, Organic farming, Natural farming and 75% Organic + Natural farming concoction).

Locations:

Table: Detail about the ACZ wise experiment conducted

ACZ	Cropping System	Number of cropping systems	Number of districts
WH	Maize-wheat/barley, Fingermillet-wheat	2	3
EH	Rice-toria	1	1
LGP	Rice-mustard	1	1
MGP	Rice-wheat	1	2
UGP	Rice-wheat	1	2
TGP	Pearlmillet-mustard	1	1
EPH	Rice-wheat	1	2
CPH	Rice-wheat	1	1
WPH	Blackgram-sorghum, soybean-chickpea, Cotton-pigeonpea	3	3
SPH	Maize-maize, Groundnut-sorghum, rice-maize	3	2
ECPH	Rice-groundnut	1	1
WCPH	Rice-soybean, maize-soybean, rice-rice	3	2
WD	Maize-chickpea	1	1
GPH	Soybean-wheat	1	1
Total		21	23

Results: During 2023-24, a total of 276 trials were conducted across 12 cropping systems in 9 agro-climatic regions. The breakdown includes: 60 in the rice–wheat system, and 18 in the soybean-chickpea system.

Rice-wheat: A total of 60 on-farm trials were conducted across five locations (Jabalpur, Saraikela-Kharsawan, Mandla, Saharsa, and Mau) with 12 trials per site. The objective was to evaluate the performance of various crop management practices in the rice–wheat cropping system. Six treatments were tested: Farmer's Practice, Recommended Dose of Fertilizers (RDF), Integrated Crop Management (ICM), Organic Farming, Natural Farming, and a 75% Organic + Natural Farming concoction. RDF recorded the highest yields, with 4190 kg/ha in Kharif (rice) and 3737 kg/ha in Rabi (wheat), leading to a system yield of 7828 kg/ha, the highest among all treatments. ICM came next with a system yield of 7287 kg/ha, showing its potential to optimize production through integration of good agronomic practices. Farmer's Practice and Organic Farming had comparable system yields of 6162 kg/ha and 6224 kg/ha, respectively. Natural Farming recorded the lowest yields: 5370 kg/ha system yield, which was further marginally improved by the 75% Organic + Natural Farming mix (5858 kg/ha), though still below RDF and ICM. In terms of net returns, RDF emerged as the most profitable (₹1,30,687/ha), followed by ICM (₹1,01,408/ha). Farmer's Practice provided a decent return (₹93,709/ha) with a favorable B:C ratio of 1.94. Organic Farming and Natural Farming yielded lower net returns (₹59,944/ha and ₹59,639/ha, respectively) despite higher costs of cultivation, especially in the case of Organic (₹81,862/ha). The 75% Organic + Natural mix resulted in the lowest net return (₹52,138/ha) and a modest B:C ratio of 1.24, indicating limited profitability under current conditions. The findings show that RDF is currently the most effective practice in terms of both productivity and profitability in the rice–wheat system. ICM also shows promise, balancing good yields and economic returns. While organic and natural farming approaches are environmentally sustainable, they currently lag in productivity and profitability, highlighting the need for further refinement and support to make them viable alternatives for farmers.

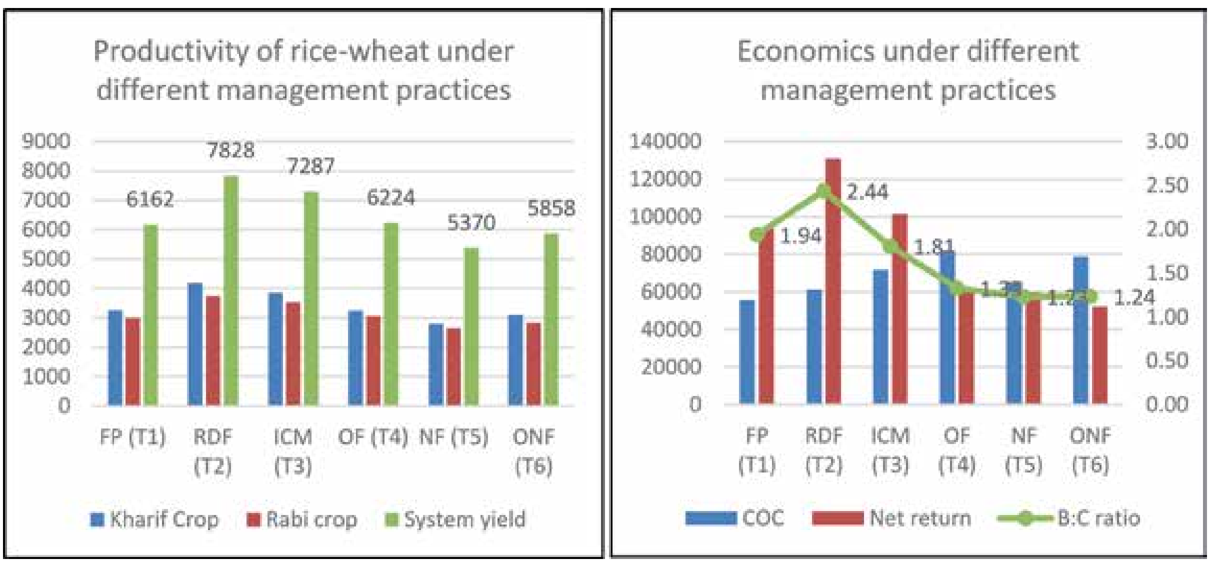


Fig 1. Performance of Rice-wheat system under different management practices

Soybean-chickpea: A total of 18 trials were conducted at two locations in Maharashtra—Nanded and Wardha—to assess the performance of different management practices in the soybean–chickpea system. Six treatments were tested

RDF gave the highest system yield (4079 kg/ha), followed closely by ICM (4032 kg/ha). Farmer's Practice yielded a modest 3496 kg/ha. Yields under Organic Farming (2829 kg/ha) and Natural Farming (2026 kg/ha) were significantly lower, indicating possible nutrient or management constraints. The 75% Organic + Natural mix showed slight improvement over Natural Farming, but still remained below conventional practices. Farmer's Practice, Recommended Dose of Fertilizers (RDF), Integrated Crop Management (ICM), Organic Farming, Natural Farming, and a 75% Organic + Natural Farming concoction. ICM recorded the highest B:C ratio (2.85), indicating the best economic efficiency, despite similar cost to RDF. RDF also performed well economically with the highest net return (₹65,776/ha) and a B:C ratio of 2.84. Organic Farming, though lower in yield, achieved decent profitability (₹62,328/ha) due to lower costs, with a respectable B:C ratio of 2.07. Natural Farming and the 75% Organic + Natural mix had lower net returns and B:C ratios, reflecting challenges in profitability despite minimal input use.

RDF and ICM emerged as the top performers in terms of both yield and net returns in the soybean–chickpea system. Organic Farming, while giving lower yields, managed to provide competitive returns due to reduced costs. Natural and integrated organic-natural approaches, though cost-effective, require further refinement to improve yields and profitability.

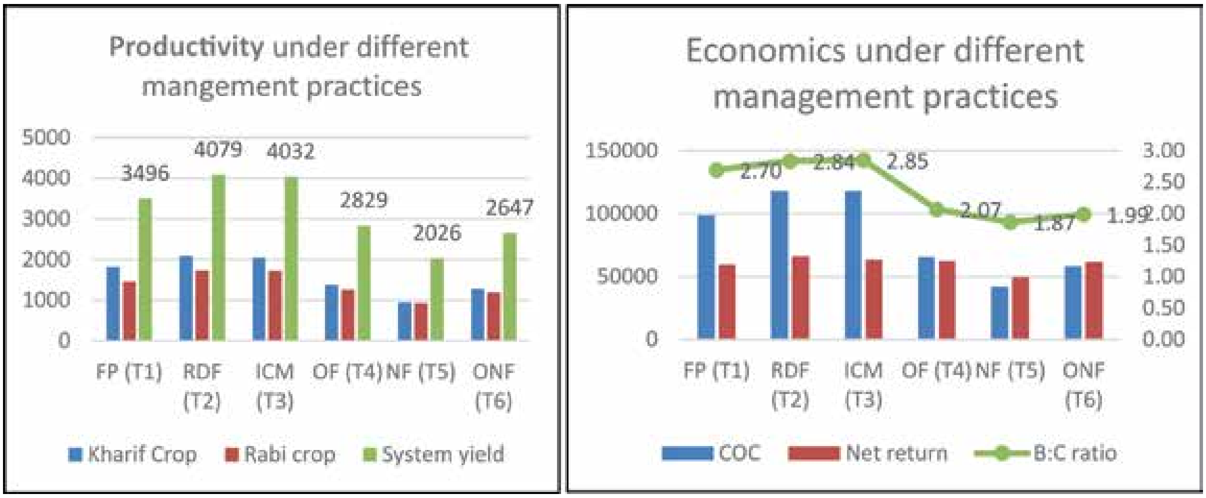


Fig 2. Performance of Soybean-chickpea system under different management practices

Rice-mustard: A total of 24 trials were conducted across two NARP zones. In the New Alluvial Zone (Bankura, West Bengal and the Lower Brahmaputra Valley Zone (Golaghat, Assam). ICM recorded the highest system yield (7120 kg/ha), showing its effectiveness in maximizing productivity. RDF followed closely (6631 kg/ha), confirming the benefits of balanced fertilizer use. Farmer's Practice and Organic Farming yielded 5634 kg/ha and 5892 kg/ha, respectively. Natural Farming (5145 kg/ha) and the 75% Organic + Natural mix (5355 kg/ha) showed the lowest system productivity. RDF recorded the highest B:C ratio (2.01) and net return (₹77,355/ha), indicating a favorable cost–benefit performance. ICM, despite having the highest yield, had a slightly lower net return (₹74,617/ha) and B:C ratio (1.91) due to the higher cost of cultivation. Farmer's Practice yielded moderate returns with a B:C ratio of 1.80. Organic and Natural Farming, though environmentally sound, recorded low economic returns due to high input costs and reduced yield. The 75% Organic + Natural mix had the lowest profitability, with a B:C ratio of 1.10 and net return of ₹29,703/ha. ICM showed the highest productivity, while RDF gave the best economic return in the rice–mustard system. Farmer's Practice is moderate in both yield and return.

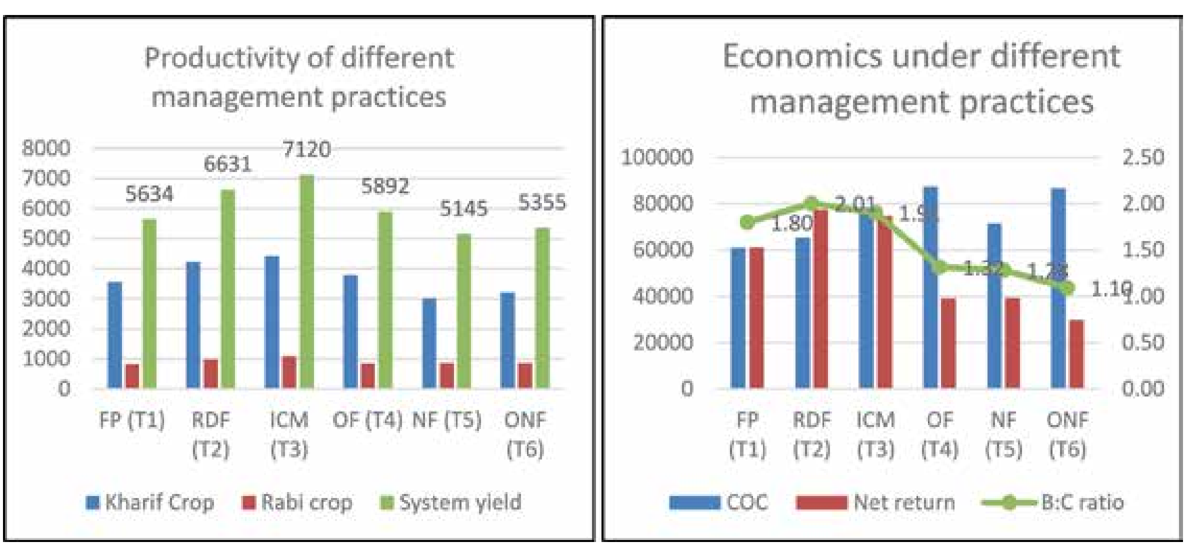
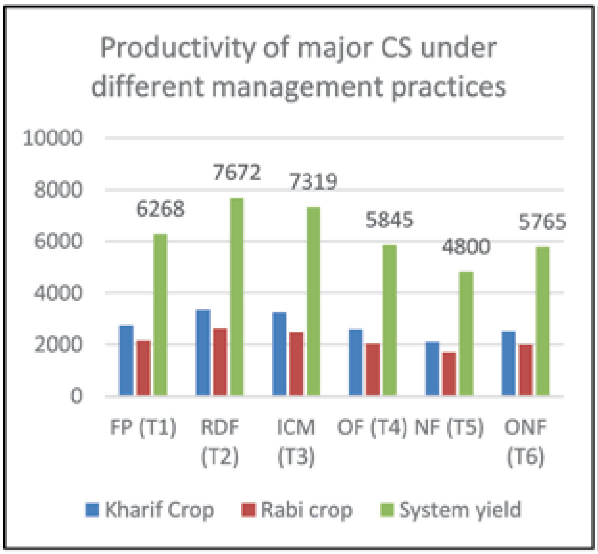


Fig 3. Performance of Rice-mustard system under different management practices

Performance of Major Cropping System under Different Management Practices

RDF recorded the highest system yield (7672 kg/ha), followed by ICM (7319 kg/ha). Farmer's Practice (6268 kg/ha) yielded moderately, while Organic Farming showed a 7% yield gap compared to FP. RDF gave the highest net return (₹88,816/ha) and best B:C ratio (2.37). ICM, though slightly costlier, also performed well with net return of ₹70,784/ha and B:C of 2.05. Farmer's Practice offered moderate profitability. Organic and Natural Farming systems had lower profitability, mainly due to reduced yields and higher costs of cultivation.



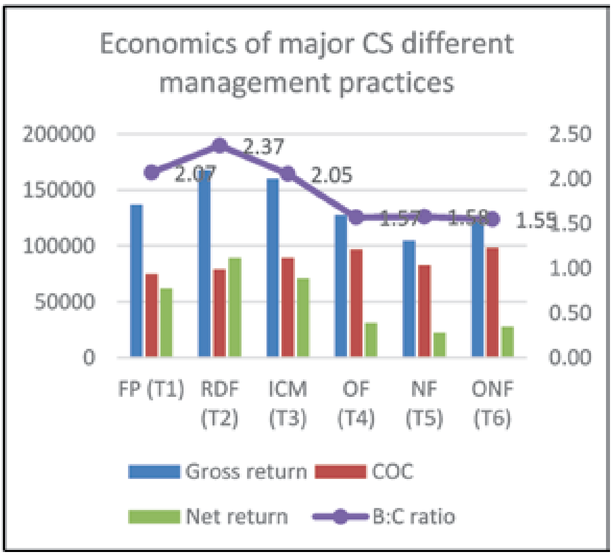


Fig 4. Performance of major cropping systems under different management practices

If we consider 25% premium price, organic farming is better than farmers' practice and ICM which indicates that in case of organic farming 25% premium price is desired to compensate the increased cost of cultivation.

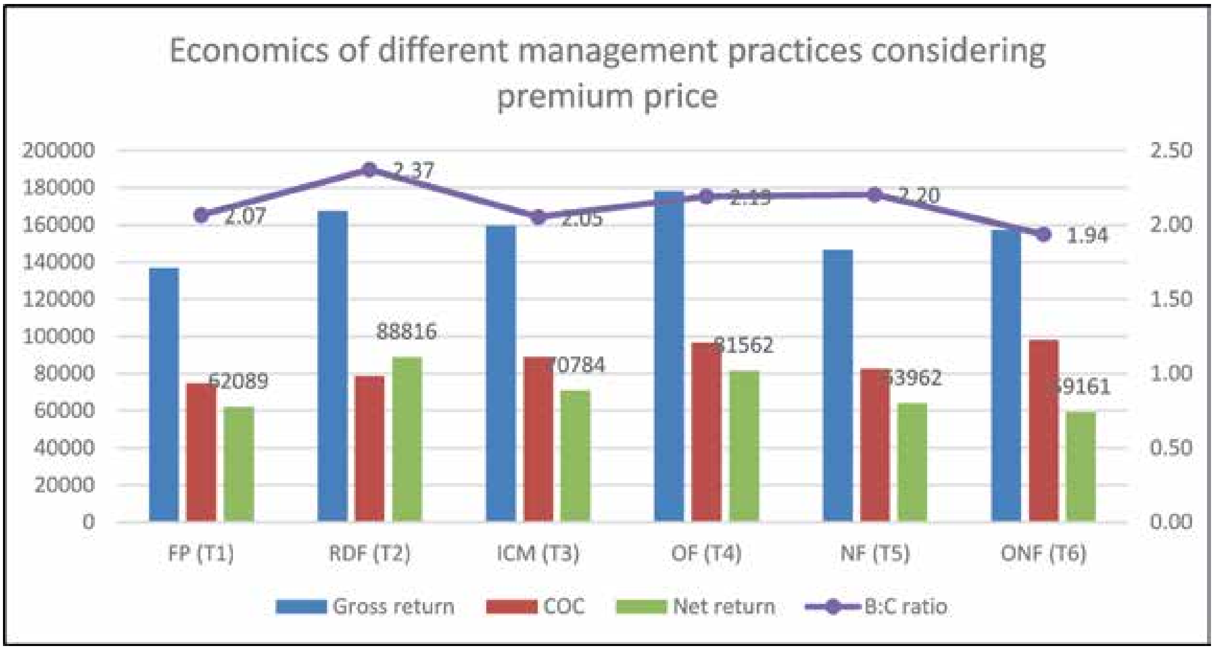


Fig 5. Economics of major cropping systems under different management practices considering a premium price (25%) for organic and natural products

Farmer practices Vs Nature Positive Farming

Indepth analysis reflects that 9 cropping systems in 6 ACZ responded positively to NPF practices

Table 1: Comparative yield under nature positive farming in comparison to organic farming

Agro-climatic zone	Location	Cropping System	Farmer's Practice and	Organic farming	Natural farming	75% Organic + Natural farming concoction
WH	Kullu	Maize-wheat/ barley	3300	4300	3300	4100
	Almora	Fingermillet-wheat	2171	2505	3405	3572
MGP	Saharsa	Rice-wheat	7885	8081	8208	7693
EHP	Saraikela	Rice-wheat	4870	7170	6440	7023
WPH	Solapur	BG-Soybean	2575	2509	2336	2506
SPH	Dindigul	Maize-maize	8750	8160	7318	9397
		Gnut-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

Nature Positive Farming

- NPF practices are agronomically viable and yield-competitive in most regions tested.
- 75% Organic + Natural Concoction (ONC) often gave the best or near-best yield, suggesting a practical middle path for transitioning farmers.
- A zone-specific and crop-specific approach is critical to scale NPF effectively.
- Supportive market mechanisms (e.g., premium pricing for organic produce) and capacity building will further boost NPF adoption.

Significant findings

➢ A zone-specific and crop-specific approach is essential to successfully scale Nature Positive Farming (NPF), considering the variability in performance across agro-climatic zones and cropping systems.

➢ In the first year of transition, yield comparisons show: ~30% yield gap between RDF and Organic Farming ~60% yield gap between RDF and Natural Farming

➢ These gaps are expected to narrow over time as the system stabilizes during the transition period (typically 2–3 years), with improvements in soil health and biological activity.

➢ Organic Farming shows promising results even in the first year, often producing yields comparable to Farmer's Practice, especially in rainfed and low-input systems.

➢ However, a major constraint in organic farming is the higher Cost of Cultivation (COC) due to increased labor, certification, and organic input costs.

- Therefore, to make Organic Farming economically viable and attractive, a minimum 25% premium price for organic produce is essential. This pricing support can offset initial yield loss and higher input costs.

7.3.2 Diversification of existing farming systems

Title of the experiment: Diversification and improvement of existing farming systems under small and marginal household conditions

Objectives

- To enhance the productivity and profitability of small and marginal farmers households through IFS approach
- To improve the livelihood and nutritional security through a diversification approach
- To estimate the impact of capacity building on the diversification of crop + livestock systems

Year of start: 2013-14 (Implemented in new districts from 2022-23)

The ever-increasing global population has intensified the pressure on agriculture, driving a shift toward smallholder farming systems. Historically, agricultural technologies have primarily catered to large, mechanized farms, exacerbating the disparity between large and small landholders. While strides have been made in achieving food security, livelihood security for farmers remains elusive, especially for smallholders and marginal farmers, who constitute over 80% of the global farming population. In India, these farmers account for nearly one-fourth of the world's small and marginal farms, cultivating less than 2 hectares of land. Raising the income of these smallholders poses a significant challenge to researchers, policymakers, and governments. Given the constancy of land resources, horizontal intensification is not possible. The solution lies in vertical intensification through diversification, exemplified by the Integrated Farming System (IFS). IFS integrates various farming enterprises, allowing the by-products of one enterprise to serve as inputs for another, enabling resource recycling, efficient use of labor and space, and reduced market dependency. However, implementing on-station IFS models directly at farmers' fields is impractical due to high initial costs. Interventions targeting critical inputs within existing farming systems, as demonstrated by the AICRP-IFS-OFR (All India Coordinated Research Project on Integrated Farming Systems–On-Farm Research), offer a promising alternative.

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 five key modules to enhance food security, nutrition, environmental sustainability, and income for small and marginal farmers.

The five modules include: details given in Table 1. These interventions, implemented in a participatory manner from 2022-23, 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 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.

Table 1: Modules-wise intervention for improvement in existing farming systems

Farming System	Notation	Module name	Details
Existing	M0	Bench mark	Recording of benchmark data on crops, livestock, other components, and household as a whole
Improved	M1	Cropping system Diversification/ improvement	Most efficient cropping systems were introduced keeping in view the farmers' resources, perception, willingness, market, and requirement of other components in the system besides improving the practices of existing systems
	M2	Livestock diversification/ improvement	Mineral mixture + deworming+ round year fodder production + introduction of location-specific low-cost livestock components viz., Backyard poultry, duckery, piggery & goat
	M3	Product diversification	Preparation of mineral mixture/value addition of market surplus products/kitchen /roof gardens
	M4	Capacity building	Training of farm households on farming systems especially on newly added practices & components and assessing its impact

Existing Farming System Characterization

Across the country, a total of 25 types of farming systems were recorded based on the permutation and combination of different farming components. It was observed that two-component farming systems are followed by 50% of households, three-component systems by 34% of farmers, four-component systems by 10% and five-component systems by 5%. Interestingly, about 1% of farmers incorporate six components into their systems. In terms of mean holding size and net return, there appears to be no direct relationship with the number of components followed. Among the various farming components, crops are the foundational element and occur in nearly all farming systems. Dairy emerges as the second most critical component, featuring in 83% of farming systems. Seven major farming systems were identified, with the following prevalence: Crop + Dairy with 42% in leading position, Crop + Dairy + Horticulture (11%), Crop + Dairy + Goatry (7%), Crop + Dairy + Goatry + Poultry (5%), Crop + Goatry (4.3%), Crop + Dairy + Goatry + Poultry (4.1%) and Crop + Dairy + Vegetable (2.8%). Together, these seven major farming systems represent 76% of the farming systems existing at the field level in the country.

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 (Fig 1). Conversely, the inclusion of goatry and poultry components tended to reduce net returns. 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 is typically avoided 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 contribute to lower returns from goatry (Leith 2016).

Table 2: Agro-climatic zone-wise farming system with the mean area and benchmark net income

ACR (Planning commission)	Name of centre	Number of Farming Systems	Number of farmer	Farming System Description	Mean Area (ha)	Benchmark Net income (Rs)
Western Himalayan Region	Udhampur (J&K)	3	24	Field crops + Dairy	0.49	60291
			6	Crop+ Dairy+ Goat	0.4	96974
			6	Crop+ Dairy+ Poultry	0.37	62475
	Kullu (HP)	3	18	Crop+ Dairy	0.16	81825
			14	Crop + Dairy + Horticulture	0.2	60125
			6	Crop + Dairy + Goat/ Sheep + Hort.	0.16	17600
	Almora (UK)	2	7	Crop + Vegetables+ Cattle + Goat	1.09	84905
			29	Crop + Veg.+ Cattle + Goat +Poultry	0.82	120281
Eastern Himlayan Region	Golaghat (Assam)	4	9	Crop+dairy+goatry+ poultry	1.35	91000
			9	Crop +dairy +goatry+ piggery+ poultry	1.39	95857
			11	Crop + dairy + goatry + piggery+ poultry+ fishery	1.29	91250
			7	Crop + dairy + poultry + fishery	1.26	76667
Lower Gangetic Plain	Bankura (WB)	4	18	Crop+dairy+goatery	0.9	19022
			5	Crop+dairy+poultry	0.81	19022
			7	Crop+goatery+poultry	0.55	19022
			6	Crop+dairy+goatery+fishery	0.98	19022
Middle Gangetic Plain	Saharsa (Bihar)	4	6	Crop + Vegetables	0.79	107218
			18	Crop + Livestock	0.75	154204
			8	Crop + Livestock + vegetables	0.83	173029
			4	Crop + Fisheries	1.08	133477
	Mau (UP)	1	36	Crop + dairy	0.52	60279
Upper Gangetic Plain	Unnao (UP)	5	17	Crop + Dairy + Horticulture	0.757	104796
			8	Crop + Dairy + Horticulture + Goatery	0.469	68885
			8	Crop + Dairy	0.875	59269
			2	Crop + Horticulture	0.688	95035
			1	Crop + Dairy + Goatry	0.375	47925
	Modi Puram (UP)	2	22	Crop+ Dairy	1.62	201805
			14	Crop+ Dairy+Horticulture	1.97	242800

ACR (Planning commission)	Name of centre	Number of Farming Systems	Number of farmer	Farming System Description	Mean Area (ha)	Benchmark Net income (Rs)
Trans gangetic Plain	Rewari (Haryana)	1	36	Crop + Dairy (Buffalo/cow)	0.99	238148
Eastern Plateau and Hills	Saraikela-Kharsawan (Jharkhan)	2	18	Crop+ Goat	1.2	34951
			18	Crop+ Goat + Poultry	1.24	37420
	Mandla (MP)	5	15	Crop + Dairy	1.11	123071
			6	Crop + Dairy + Vegetable	0.97	170980
			4	Crop + Dairy + Poultry	0.86	124460
			5	Crop + Dairy + Goatary	1	118190
			6	Crop + Goatry+ Poultry	1.28	130518
Central Plateau and Hills	Jabalpur (MP)	4	19	Crop + Dairy	1.02	114038
			8	Crop + Dairy + Vegetable	0.94	95811
			9	Crop + Dairy + Poultry	1.04	68667
			4	Crop + Dairy + Goatery	1.05	85311
Western Plateau and Hills	Solapur	4	9	Crop+ Dairy+Goatery+poultary	0.87	134798
			13	Crop + Dairy+Goatery	0.81	118067
			6	Crop + Dairy+poultary	0.81	118550
			8	Crop + Dairy	0.8	113920
	Nanded (MH)	4	10	Crop + Dairy	0.81	78236
			14	Crop + Goat	0.89	75481
			4	Crop + Horticulture	0.82	59370
			8	Crop + Sericulture	0.98	72984
	Wardha (MH)	2	15	Crop+Horti+Dairy	1.1	188133
			21	Crop+ Dairy	0.96	117108
Southern Plateau and Hills	Dindigul (TN)	2	19	Crop+Dairy+poultry	0.74	68934
			17	Crop+Dairy+ Goat/sheep+ poultry	0.91	60594
	Rangareddy (Telangan)	6	14	Crop + Dairy	0.93	75581
			7	Crop + Dairy + Sheep	0.94	99530
			8	Crop+ Dairy+ poultry	0.84	69223
			3	Crop+ Goatery	0.65	63925
			2	Crop + Dairy + Sheep + vegetables	1.3	84750
			2	Crop+dairy+poultry+vegetable	0.8	70088
East coast plains and hills	Khordha (Odisha)	5	18	Crop + dairy	2.9	1,26,488
			5	Crop + poultry	0.9	25,160
			5	Crop + dairy + poultry	1.2	1,52,680
			2	Crop+goatery+poultry	0.8	1,06,425
			6	Crop + dairy + poultry + goatary	2.3	1,56,540

ACR (Planning commission)	Name of centre	Number of Farming Systems	Number of farmer	Farming System Description	Mean Area (ha)	Benchmark Net income (Rs)
West Coast Plains and Hills	Uttara Kannada (KA)	2	16	Crop + Dairy	0.88	281375
			20	Crop + Dairy + Horticulture	0.77	320690
	Alappuzha (Kerala)	4	9	Coconut based IFS	0.66	102334
			9	Rice based IFS	1.03	68484
			9	Dairy-based FS	0.61	223651
			9	Aquaculture-based FS	0.62	186514
Western dry region	Rajasmand (RJ)	3	14	crop + dairy	0.77	72068
			8	Crop + Dairy + Horticulture	0.87	59697
			14	Crop + Dairy + Poultry	0.79	78445
Gujarat Plains and Hills	Sabarkantha (GJ)	1	36	Crop+Dairy	0.2	73064

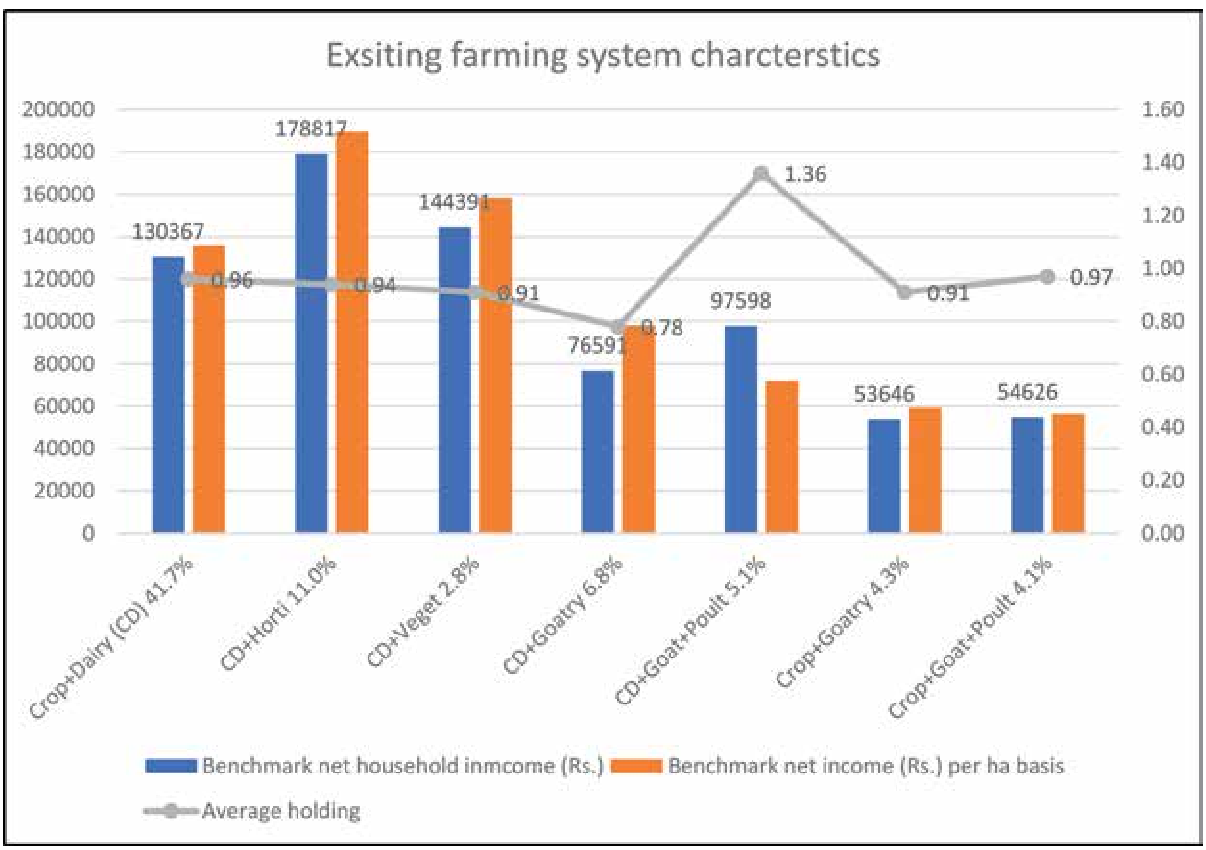


Fig 1. Existing major farming systems across the country have mean holding size and benchmark net household income along with benchmark net income per hectare basis.

Improvement in Existing Farming Systems

Across the country, a total of 73 farming systems were refined through farmer-participatory approaches. These refinements were achieved by intervening in critical inputs, with an average cost of ₹7,889 spent on these inputs per system. There was considerable variation in net returns across locations, ranging from ₹4,786 at Mandla (Madhya Pradesh) to ₹1,87,994 at Alappuzha (Kerala). This intervention resulted in an increase in average net returns to ₹55,573 per system, representing an 86% increase in average net returns within the second year of intervention (Table 2 and Fig 2). This significant improvement was attributed to module-based interventions targeting critical inputs that were scientifically derived from on-station research results. These findings highlight the potential of module-based interventions in IFS to double farm incomes within two years when implemented in a participatory mode. Different studies show that IFS have the potential to increase the overall productivity of farms (Panwar *et al*. 2021; Paramesh *et al*. 2022; Raghavendra *et al*. 2024).

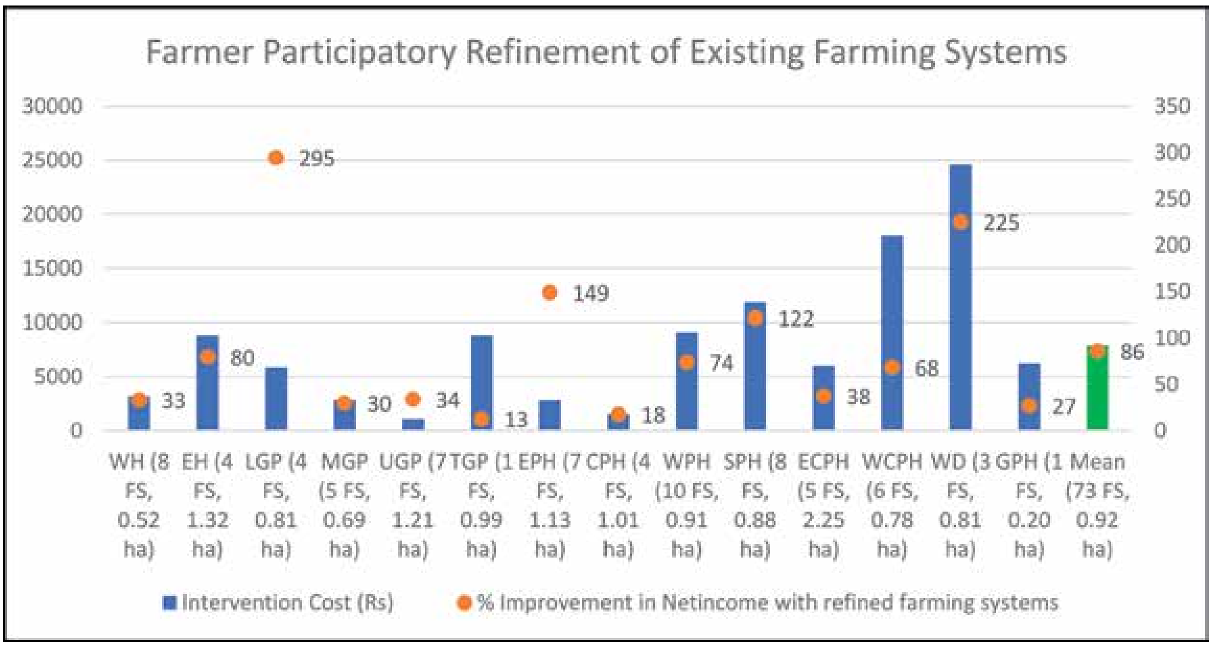


Fig 2. ACZ wise percent increase in net return along with intervention cost (abbreviation of zone given in next table)

Table 3: Agroclimatic Zone wise refined farming system with intervention cost and improvement in net income

Agroclimatic Zone	OFR centre	Number of Farming Systems Refined	Mean Area (ha)	Intervention cost (Rs)	Improvement in net income over benchmark	Percent improvement in net income over benchmark
Western Himalayan (WH)	Udhampur	3	0.42	6029	42721	56.3
	Kullu	3	0.17	639	11203	36.0
	Almora	2	0.96	2871	7786	7.9
	Total	8	0.52	3180	20570	33.4
Eastern Himlayan (EH)	Golaghat	4	1.32	8770	70620	79.8
	Total	4	1.32	8770	70620	79.8

Agroclimatic Zone	OFR centre	Number of Farming Systems Refined	Mean Area (ha)	Intervention cost (Rs)	Improvement in net income over benchmark	Percent improvement in net income over benchmark
Lower Gangetic Plain (LGP)	Bankura	4	0.81	5838	56046	294.6
	Total	4	0.81	5838	56046	294.6
Middle Gangetic Plain (MGP)	Saharsa	4	0.86	1800	8519	6.0
	Mau	1	0.52	3798	32406	53.8
	Total	5	0.69	2799	20462	29.9
Upper Gangetic Plain (UGP)	Unnao	5	0.63	1096	24459	33.9
	Total	5	1.21	1096	24459	33.9
Transgangetic Plain (TGP)	Rewari	1	0.99	8766	30552	12.8
	Total	1	0.99	8766	30552	12.8
Eastern Plateau and Hills (EPH)	Saraikela-Kharsawan	2	1.22	4045	103896	293.9
	Mandla	5	1.04	1500	4786	3.9
	Total	7	1.13	2773	54341	148.9
Central Plateau and Hills (CPH)	Jabalpur	4	1.01	1525	15399	18.0
	Bharatpur				0	
	Total	4	1.01	1525	15399	18.0
Western Plateau and Hills (WPH)	Solapur	4	0.82	970	14557	11.9
	Nanded	4	0.88	10818	85780	118.2
	Wardha	2	1.03	15366	133089	92.0
	Total	10	0.91	9051	77808	74.1
Southern Plateau and Hills (SPH)	Dindigul	2	0.83	11351	84116	132.6
	Rangareddy	6	0.93	12420	86094	110.5
	Total	8	0.88	11885	85105	121.6
East coast plains and hills (ECPH)	Khordha	5	2.25	6000	36985	37.5
	Total	5	2.25	6000	36985	37.5
West Coast Plains and Hills (WCPH)	Uttara Kannada	2	0.83	6700	40754	13.5
	Alappuzha	4	0.73	29268	187994	123.3
	Total	6	0.78	17984	111060	68.4
Western dry region (WD)	Rajasmand	3	0.81	24569	154787	225.2
	Total	3	0.81	24569	154787	225.2
Gujarat Plains and Hills (GPH)	Sabarkantha	1	0.20	6217	19833	27.1
	Total	1	0.20	6217	19833	27.1
	Grand Total	71	0.92	7889	55573	86.1

Promising Interventions Based on Agro-Climatic Zones (ACZs)

Drawing from the experiences of the AICRP-IFS-OFR and other studies, various Agro-Climatic Zone (ACZ)-specific interventions can be recommended. These interventions aim to optimize resource use and enhance farmers' livelihoods through integrated approaches. Different extension agencies can implement these interventions effectively at the field level detail given in (Table 3)

Promising Interventions at Farmers' Fields in Western Uttar Pradesh

a. **Late sown wheat varieties (DBW-173, HD-3298, HD-3271):-** Suitable for late sowing after sugarcane harvest and is less affected by terminal heat stress

b. **Gobhi Sarson (GSC-7) intercropped with sugarcane**: Serves as a winter fodder alternative to sugarcane tops, ensuring sustainable livestock feeding practices.

c. **Bajra Napier Hybrid (BNH Co-5)**: A perennial fodder crop providing round-the-year fodder availability for livestock, contributing to enhanced animal productivity.

Fig 3. Promising interventions at farmer's field in Western Uttar Pradesh (A) Sugarcane+Gobhi sarso GSC-7 (B)

Bajra Napier Hybrid (BNH Co-5) (C) mustard RH-725 (D) Animal rubber mat

d. **Mustard (RH-725) cultivation**: Integrated into sugarcane ratoon cropping systems to ensure timely sowing of sugarcane and improved crop rotation benefits.

e. **Animal rubber mat usage**: Ensures animal comfort, leading to increased productivity by reducing stress and enhancing overall welfare.

f. **Pest and disease-resistant sugarcane varieties (Co-0118, Co-15235, Co-14201, Co-98014):** Minimize damage as large area under single variety Co-0238.

Table 4: Agro-Climatic Zone (ACZ)-Wise Promising Interventions for Implementation by Extension Agencies based on AICRP-IFS-OFR and other studies submitted to Rainfed Area Development (RAD) Programme to include in operational guideline

Agro Climatic Zone	Existing predominant farming system	Farming modules	Module wise suggested intervention*
Himalayan Region			
Western Himalaya	Crop+Dairy/ Goatary/ Poultry, or Horticulture	Crop diversification/ Crop Improvement (CD/CI)	High-yielding variety /Fortified seed (Maize var.- Kanchan, Wheat var.- JAUW-672), micronutrient, Improved variety (Finger millet: VL 352, Wheat VL 967) and RDF in Finger millet
		Livestock Diversification/ Livestock Improvement (LD/ LI)	Perennial grass (Hybrid Napier BNH Co-5) Cereal mixed with legume, De-worming drug (Albendazole Bolus, Suprazole), Calcium supplement, AI for breed improvement, Mineral mixture, bypass fat, and cow mat Azolla cultivation, Goatary-feeding management &Vaccination in goatry, Poultry - Rearing of poultry birds.
		Horticulture Diversification/ Horticulture Improvement (HD/ HI)	Plantation of high-value horticulture plants (Kiwi, Plum, Apricot, Apple), IPM in Tomato and capsicum, Small Harvesting and pruning tools, Multi micronutrients
		Product Diversification (PD)	Ginger bread, ginger ale, ginger oil, ginger powder, and ginger candy, Vermicompost unit (vermibed), Preparation of kaladi for value addition, Value-added product of finger millet, Organic French bean packaging
		Capacity building (CB)	Mushroom cultivation, Waste recycling, NKG (Nutritional Kitchen Gardening)
Eastern Himalaya	Crop+ dairy+ Goatry+ poultry+ Fishery/ Piggery	CD/CI	Introduction of HYV Ranjit, Introduction of toria after winter rice (TS-67), Rice-fallow utilization by (mustard, potato, maize, and lentil)
		LD/LI	Same as Western Himalaya for livestock Improve, poultry/ duck Breeds (Banrajas & Chara Chambeli)
		Goatry	Improve breeds of Goats (Sirohi), Plantation of the tree-like drumstick (*Moringa oleifera* Lam) and Jack fruit (*Artocarpus heterophyllus*) on farm boundaries

Agro Climatic Zone	Existing predominant farming system	Farming modules	Module wise suggested intervention*
		Fishery/ Piggery	**Fisheries-** Lime application to maintain pH, Local ingredients to reduce feed costs like rice, bran, mustard cake, or any other oilseed cake, chopped material of leguminous fodder crops **Piggery-** Feeding management (Kitchen and farm waste, rice bran and rice polish, wild Colocasia (stem/ leaves/rhizomes), Tea waste, banana spadix, unripe banana, tapioca Jubili, Vaccination, iron supplements and monitoring for endo parasites
		PD	Making of Supari, Making of vermicompost
		CB	Vaccination of Goat and poultry
Gangetic Plain Region			
Lower Gangetic	Crop + Dairy + Goatary + Poultry/ Fishery	CD/CI	Improved rice varieties (CR Dhan 407, CR Dhan 508, CR dhan 518, CR Sugandh Dhan 908), Improved mustard varieties (TBM-204, NRCYS 05- 02, YSH 0401, 44 S 01), Sulphur application in mustard
		LD/LI	Same as Western Himalaya for livestock
		Goatary + Poultry	**Goatary-** Improve breeds of Goats, Plantation of the tree-like as Eastern Himalaya **Poultry-** Improve breeds of poultry,
		Fishery	Same as Eastern Himalaya
		PD	Oil extraction and mustard cake feeding
		CB	Training on Vaccination in Goat and poultry
Middle Gangetic	Crop + Dairy + Vegetables	CD/CI	Short-duration rice variety (Sabour Harshit, Sabour Shree for paddy), to avoid delayed sowing of wheat/ Improved rice Variety, (NDR-3112), Improved wheat varieties DBW-187 / DBW- 222/DBW-327/DBW-371/HD-3386, Improved mustard varieties RH-725/ RH-761, Pulses for summer (green/black gram), Timely sown wheat variety Sabour Nirjal, Zero-till wheat cultivation, Balance use of fertilizers
		LD/LI	Same as Western Himalaya for livestock
		Vegetables	Zero-till potato cultivation, Nursery raising in tunnel
		PD	Puffed rice, chana dal badi, pop- corn, carrot and pea pickles
		CB	Grading of vegetables, Training on IFS, natural farming & zero-till wheat and potato, Seed treatment,
Upper Gangetic	Crop + Dairy +Horticulture	CD/CI	Improved rice Variety NDR-3112, Pusa 1847, Pusa 1885, Pusa 1886, Improved wheat varieties DBW-187/ DBW- 222/ DBW-327/ DBW-371/ HD-3386, Improved mustard RH-725/RH-7621, Red rot and top borer resistant sugarcane variety Co-0118, C0-15235, Co-98014, Co-14201 Pulses for summer (green/black gram), Balanced fertilizers

Agro Climatic Zone	Existing predominant farming system	Farming modules	Module wise suggested intervention*
		LD/LI	Same as Western Himalaya for livestock and Gobhi sarso (GSC-7) as an intercrop with sugarcane
		HD/HI	Multi-nutrient mineral mixture, Application of oil cake per plant basis, Harvesting and pruning tools
		PD	Organic jaggery, Organic Sugar, Organic basmati rice, Puffed rice, chana dal badi, pop-corn, carrot, and pea pickles
		CB	Training on zero-till wheat, training on intercropping in trench method sugarcane sowing
Trans Gangetic	Crop + Dairy	CD/CI	Improved disease resistance rice variety PB1847, PB1885, PB1886, Herbicide-tolerant variety Pusa Basmati 1979 and Pusa Basmati 1985, Improved wheat/ varieties DBW-187/DBW- 222/DBW-327/ DBW-371/HD-3386 Improved mustard varieties RH-725/RH-761, Diversification by maize-mustard-moong/spring groundnut, Pulses for summer (green/black gram), Balanced fertilizers
		LD/LI	Same as Western Himalaya for livestock
		PD	Basmati rice, puffed rice, chana dal badi, pop-corn, carrot and pea pickles
		CB	Training on zero-till wheat, Crop residue management, Importance of herbicide rotation, and right spray in delaying herbicide resistance
3. Plateau Region and Hills			
Eastern Plateau	Crop + Dairy/ Goatary/ Poultry	CD/CI	Improved disease resistance rice variety JR-206, PB1847, PB1885, PB1886, Herbicide-tolerant variety Pusa Basmati 1979 and Pusa Basmati 1985, Improved wheat varieties JW-3288/ DBW-187/ DBW-222/ DBW-327/ DBW-371/ HD-3386, Improved mustard varieties RH-725/RH-7621 and Balanced fertilizers
		LD/LI	Same as Western Himalaya for livestock
		PD	Basamti rice, puffed rice, dal making, chana dal badi, pop- corn, carrot and pea pickles
		CB	Training on zero-till wheat, Crop residue management, Importance of herbicide rotation and right spray in delaying the herbicide resistance
Central Plateau	Crop+Dairy/ Poultry	CD/CI	Improved varieties of Paddy - JR-206, JR-81, Wheat - Raj 4238, JW-3288, JW-3382, Arhar – Rajeshwari, Kodo – JK-137 and Kutki – JK-4, Maize- DHM 177, Papaya- Red leady 786, Improved mustard RH-725/ RH-761, Hybrid pearl millet, Orobanche root parasite management through low dose of Glyphosate

Agro Climatic Zone	Existing predominant farming system	Farming modules	Module wise suggested intervention*
			and diversification by barley, Sulphur application in mustard
		LD/LI	Same as Western Himalaya for livestock **Poultry** -Introduce improved dual-purpose birds (Pratap Dhan)
		PD	Dal making, chana dal badi, pop- corn, carrot and pea pickles, Millets biscuits, laddu and barfi, Mustard oil extraction and use of mustard cake in animal feeding
		CB	Training on zero-till wheat & Orobanche root parasite management, CRM, Nutrient management in mustard
Western Plateau	Crop+ Dairy/ Goatery/ poultry + Horticulture	CD/CI	Improved variety seed, Green gram – P Chetak , Chick pea – P. Vikram, Crop diversification (Linseed & Mustard), Vegetable crop as intercrop (Onion, Spinach, Chili etc) New variety (MAUS 158 / MAUS 162 / MAUS 612), Sorghum – Parbhani Moti, Pbn Shakti; Wheat – Phule Samadhan, Chick pea – BDNG 797, JAKI 9218; KNO3 spray, Rhizobium, PSB and KMB, IPM (NSKE, pheromone traps, trichoderma).
		LD/LI	Same as Western Himalaya for livestock **Goatary**- Improved breeds of Goats, **Poultry**-Improved poultry breed Azolla feeding, Plantation of the tree-like as Eastern Himalaya
		HD/HI	Fruit drop control (KNO3@1% +GA/NAA @ 15 ppm), Supply of Sweet Orange seedlings of Katol Gold variety, Vegetable crop as intercrop in orchard
		PD	Bio decomposer for composting and Kitchen garden kit, Dal making, dal badi, Millets biscuits, laddu and barfi
		CB	Trainings on improved package of practices, value addition, seed treatment and IPM, Vaccination and deworming
Southern Plateau	Crop+ Dairy/ Sheep + Horticulture	CD/CI	Improved varieties of paddy- KNM-1638/ RNR-15048, Pramod and DKC, Improved Soybean –Dsb-34, Rabi/summer groundnut as crop diversification in rice fallow or maize fallow
		LD/LI	Same as Western Himalaya for livestock Improved poultry breed- Swarnadhara **Sheep**- Improved breeds of sheep, Azolla feeding, Plantation of the tree-like as Eastern Himalaya, Vaccination and deworming table

Agro Climatic Zone	Existing predominant farming system	Farming modules	Module wise suggested intervention*
		HD/HI	Multi nutrient mineral mixture and PGR spraying, Application of oil cake per plant basis, Harvesting and pruning tools, Fruit drop control (KNO3@1% +GA/NAA @ 15 ppm)
		PD	Millets biscuits, laddu and barfi
		CB	Training on seed treatment, vaccination in sheep and IPM
4. Coastal Region			
East coast plains and hills	Crop + Dairy Goat/ Sheep/ Poultry	CD/CI	Improved variety Hasanta, Kalinga Dhan 1401, RDF & micronutrients; IPM. Application of Boron (borax @ 10 kg/ha), IWM, Seed treatment (Mo @ 3 g/10 kg seed), Groundnut rich crop boosters, NKG
		LD/LI	Same as Western Himalaya for livestock and multicut fodder sorghum CO FS 32, Agathi, TANUVAS salt lick and velimasal **Poultry-** Improved poultry breed Swarnadhara **Goatry-** Mineral mixture Azolla for goat feeding, Drumstick plantation for goat feeding, Use of Hepatoprotective syrup, Deworming tablets
		PD	Millets biscuits, laddu and barfi, puffed rice, popcorn, different millet product
		CB	Training on seed treatment and IPM, vaccination and deworming
West Coast Plains and Hills	Crop+Dairy+ Horticulture+ Fishery	CD/CI	Short duration paddy Manu ratna' (100 day), Cowpea, Sesame in summer fallows Clean seed, Rouging, Stale Seed bed
		LD/LI	Same as Western Himalaya for livestock and bajra napier hybrid (var. Suguna), Establishment of Azolla bed
		HD/HI	IC cowpea var. Kanakamony 100 g per coconut basin, *Metarrhizium anisopliae* application to breeding site; neem cake and sand application to leaf axil; naphthalene balls and sand application to leaf axil; tuber: cassava (var. Vellayani Hraswa), elephant foot yam (var. Gajendra); spice: turmeric (IISR-Pragati); fruit: banana (var. Kanakamony), papaya (var. Red lady).
		Fishery	Fingerlings of Strains: GIFT,Chitralada, Big Nin, Nam Sai Feed for fingerlings
		PD	Puffed rice, Solar drying of copra, black pepper, nut meg
		CB	Training on plantation crop/livestock management

Agro Climatic Zone	Existing predominant farming system	Farming modules	Module wise suggested intervention*
5. Other Region			
Gujarat Plains and Hills	Crop+Dairy	CD/CI	Improved varieties of soybean (NRC 37, JS 335), Need of crop diversification from sorghum to soyabean, Improved varieties of wheat (GW-451/ GW-513), weedicide application, Seed treatment for termite control
		LD/LI	Same as Western Himalaya for livestock
		PD	Millets biscuit, laddu and barfi
		CB	Training on nutrient management in soybean and termite control in crops

*All listed interventions cannot be universally implemented. Their applicability should be assessed based on local agro-ecological conditions, community needs, and funding availability for the implementing agency. Extension agencies should prioritize interventions that align with the locality's specific challenges and resource constraints to ensure sustainable outcomes.

Policy Implications:

- The government should prioritize designing schemes that provide **improved critical inputs in a scientific manner**, which can significantly boost farmers' income nationwide.
- Instead of providing blanket subsidies, a portion of the **PM Kisan Samman Nidhi** could be allocated to incentivize farmers to invest in critical inputs. This approach ensures the money is spent on impactful interventions that enhance farm productivity and sustainability.

Such scientifically designed, need-based interventions have the potential to transform Indian agriculture, improving both income levels and the overall livelihood of farming communities.

Significant finding

- ➢ The study clearly indicates that module-wise, targeted interventions on critical inputs in Integrated Farming Systems (IFS), implemented in a farmers' participatory mode, have the potential to double farmers' incomes within the second year of intervention. Even a relatively small investment in critical inputs can yield substantial improvements in net returns.
- ➢ Replicating on-station IFS models directly at farmers' fields is challenging due to local variations and constraints. Therefore, module-wise interventions tailored to address specific constraints are essential for maximizing impact.
- ➢ To achieve a country-wide transformation, the government should reconsider its policies and promote schemes that encourage farmers to allocate resources toward critical inputs.
- ➢ This can be facilitated by redirecting funds from existing schemes or reallocating a portion of the PM Kisan Samman Nidhi toward scientifically designed interventions. Such an approach would enhance the reach and impact of the IFS participatory model, driving sustainable growth and improving the livelihoods of farmers across the nation.

7.3.3 Model Value Chain Development in IFS

Title: Model Value Chain Development in Integrated Farming Systems

Year of start: 2021-22

Integrated Farming System (IFS) is a holistic approach to agriculture that synergistically combines crops, livestock, aquaculture, agroforestry, and other complementary enterprises to enhance productivity, sustainability, and income security for farmers. While the adoption of IFS contributes significantly to resource optimization and ecological balance, the true potential of this system can be realized only when it is supported by a robust and well-structured value chain. **Model Value Chain Development in IFS** focuses on establishing efficient linkages from input supply to production, processing, storage, marketing, and consumption. It ensures that each component of the farming system contributes to and benefits from the economic cycle, creating added value at every stage. A well-developed value chain not only increases profitability for farmers but also reduces post-harvest losses, improves product quality, enhances market access, and encourages agro-entrepreneurship.

This model approach emphasizes capacity building, collective action through farmer-producer organizations (FPOs), the use of technology, and strong institutional support. By aligning production with market demand and integrating service delivery, value chain development within IFS creates a resilient, diversified, and market-responsive farming ecosystem—especially critical for small and marginal farmers in India and other developing regions. Keeping the above thing in mind MVCD in IFS implemented by IIFSR, Modipuram, Meerut trough AICRP-IFS-OFR in 7 districts.

Steps in Model Value Chain Development in Integrated Farming Systems

The Model Value Chain Development in IFS follows a participatory and systematic approach, where a group of farmers sharing a common farming system is mobilized to work collectively. The process is designed to optimize both the main enterprise (e.g., crop production) and the supplementary components (e.g., dairy, poultry, etc.) based on the group's potential and available resources. The steps involved are as follows:

- Farmer Group Formation Farmers practicing a similar Integrated Farming System are organized into a group. Each group focuses on a specific primary product (e.g., finger millet) and an associated supplementary enterprise (e.g., dairy). This grouping enables coordinated planning, resource sharing, and collective decision-making.
- Assessment of Marketable Potential The production capacity of both the main and supplementary components is assessed based on land, livestock, resources, and market demand. The quantity of produce that can be marketed profitably is estimated to guide planning.
- Input Supply and Capacity Building Improved varieties of crops (e.g., high-yielding finger millet) and essential inputs like seeds, fertilizers, and bio-agents are supplied to the group. Farmers are trained on improved cultivation practices, sustainable resource use, and integrated system management.
- Scientific Guidance and Monitoring At every stage—from land preparation and sowing to harvesting—scientific support is provided by experts to ensure optimal production and quality. This results in high-quality raw material suitable for value addition.
- Post-Harvest Management and Value Addition Harvested products undergo proper post-harvest operations, including cleaning, grading, storage, and primary processing. Value addition is carried out at the group level, enabling the creation of market-ready products such as finger millet flour, health mixes, etc.
- Branding and Marketing The group markets their value-added products under a common brand name, either independently or through linkages with Farmer Producer Organizations (FPOs). This enhances visibility, consumer trust, and market reach.
- Integration of By-products Crop residues like finger millet straw are utilized efficiently—fed to livestock within the group—thus strengthening the dairy component. This cyclical use of resources ensures better in-

put-output efficiency and sustainability.

- Holistic Support and Handholding Throughout the process, scientists and extension personnel provide continuous technical support, ensuring best practices are followed and challenges are addressed promptly.

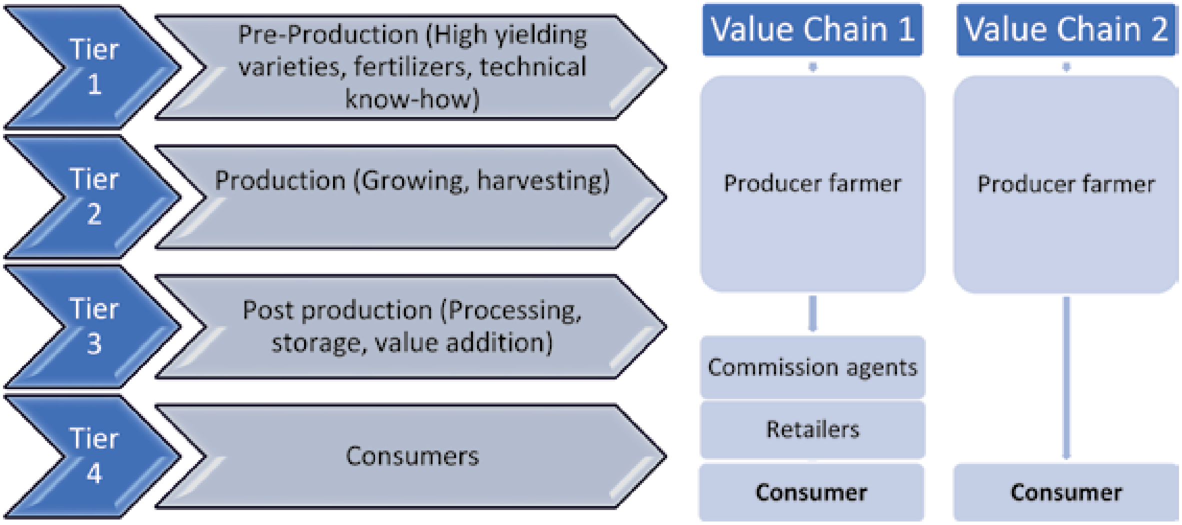


Fig 1. Steps in MVCD in IFS

This model creates a win-win situation, where the integration of primary and supplementary enterprises enhances income, resource use efficiency, and market value. It encourages group-based entrepreneurship, ensures better price realization, and promotes the development of resilient farming communities. The targeted group, working in unison with scientific guidance, becomes a successful example of Model Value Chain Development in IFS.

Results: Implementation of Model Value Chain Development in IFS

The Model Value Chain Development in Integrated Farming Systems (MVCD-IFS) was successfully implemented across seven districts in seven states of India. The initiative aimed to build resilient and market-oriented farming communities by strengthening primary and supplementary farm components through value chain interventions. The program emphasized collective farming, value addition, branding, and market linkages, leading to increased income and livelihood security among small and marginal farmers. Table 1 summarizes the coverage and outcomes achieved under MVCD-IFS across the selected locations:

Table 1: Coverage under Model Value Chain Development in IFS

Name of State	Name of District	Number of households covered	Total area (ha)	Total livestock population (Numbers)	Number of SHGs formed
Andhra Pradesh	Vizianagaram	391	154	1528	20 SHG + 58 JLG 2 FPO (Deeksha & Arogya Millets)
Gujarat	Dahod	300	234	2803	2 SHG (Masala Producer group-Ambali & Vadva)
Maharashtra	Thane	300	158	1981	12 SHG, 1 FPO (Ekatmic Sheti Gat, Vanai)
Orissa	Kendujhar	120	57	726	1 FPO (Bidu Chandra FPC Ltd)

Name of State	Name of District	Number of households covered	Total area (ha)	Total livestock population (Numbers)	Number of SHGs formed
Karnataka	Chikkaballapur	612	440	8465(Poultry 4350)	5 SHG 2 FPO (Sri Ambaji Durga FPO & Sri Chennakesahav FPC)
Punjab	Patiala	300	1485	1232	2 FIG
Tamil Nadu	Salem	400	362	2098	5 SHG +2 FPO (Thiruvalluvar & Vasista FPC)
Total		2222	2890	18833	44 SHG + 58 JLG + 2 FIG + 8 FPO

10 SHGs and 5 FPOs added during 2023-24

Fig 2. Training and SHG creation at Dahod Gujarat

Fig 3. Training on finger millet and soybean based value added product preparation

Fig 3. Intervention in MVCD at Thane, Maharashtra

Outcomes:

A total of 2,422 households were mobilized under the MVCD-IFS initiative. The program covered approximately 2,890 hectares of agricultural land. More than 18,833 livestock, including poultry, were integrated into the value chain system. Multiple community institutions were formed and strengthened: 44 Self-Help Groups (SHGs), 58 Joint Liability Groups (JLGs), 2 Farmer Interest Groups (FIGs) and 8 Farmer Producer Organizations (FPOs) Specific branding efforts were initiated through FPOs such as Deeksha, Argyo Millet, and Thiruvalluvar to market value-added products like millet-based foods and dairy items. This broad-based implementation demonstrates the scalability and effectiveness of MVCD in IFS across agro-climatic zones, with tangible impacts on livelihood improvement, market access, and farming system resilience.

7.3.4 Frontline Demonstration on Cropping Systems Involving Oilseeds

India holds a prominent position globally in oilseed production, ranking fourth, with oilseeds covering 20% of the global cultivation area and contributing 10% of global production. In India, oilseed crops are cultivated over 25.3 million hectares, second only to food grains. Over the past three decades, oilseed cultivation has expanded significantly in both area and production. However, compared to staple cereals like rice and wheat, the pace of expansion and yield improvement in oilseeds has been relatively modest, with considerable variation across states. Farmers have consistently sought technological advancements and practices that enhance returns, often responding positively to economic incentives.

The major oilseed crops grown in India include groundnut, rapeseed-mustard, sunflower, safflower, soybean, sesame, and castor. While overall production and productivity in these crops have remained largely stagnant, select crops have shown moderate gains following the initiation of the Technology Mission on Oilseeds. The Indian Institute of Farming Systems Research (IIFSR), through its 32 on-farm centers nationwide, has implemented Frontline Demonstrations (FLDs) as part of a crop diversification strategy to boost farmers' income by introducing oilseed crops into existing systems. This report presents the results of FLDs conducted on farmers' fields by the On-Farm Research (OFR) units of AICRP-IFS during 2024–25.

Objectives

- To demonstrate the production potential and monetary advantages of well-identified cropping and intercropping systems under real farm conditions, involving oilseeds as one of the component crops in various agro-ecosystems.

Technical Programme

During 2024–25, a total of 595 Frontline Demonstrations (FLDs) on oilseed-based cropping systems were organized across 16 centres under the All India Coordinated Research Project on Integrated Farming Systems (AICRP on IFS). These demonstrations were designed to showcase the yield potential and profitability of improved oilseed production technologies over existing farmers' practices under real farm conditions in different agro-ecological regions of the country.

The programme covered a diverse range of oilseed crops, including soybean, groundnut, mustard, sesame, and toria, with location-specific cropping systems. The distribution of demonstrations across participating centres is presented in Table 1. Soybean-based systems were demonstrated extensively at Udaipur (25), Rahuri (25), Jabalpur (40), and Wardha (25), accounting for 115 demonstrations. Groundnut-based systems formed the largest share, with demonstrations at Thanjavur (20), Indore (50), Vizianagaram (70), Dindigul (50), Rangareddy (25), Chikkaballapura (50), and Modipuram (50, as intercrop in sugarcane), totaling 315 demonstrations. Mustard and toria demonstrations were conducted at Udaipur (30 mustard), Udhampur (mustard and toria, 10), Jobner (40 mustard), and Jorhat (40 toria), summing up to 120 demonstrations. Sesame-based systems were included at Vizianagaram (20) and Alappuzha (25), with 45 demonstrations.

Table 1: List of centres of Front Line Demonstrations (FLD) on oilseed-based cropping systems (2024-25)

Name of Centre (State)	Crop/cropping system (s)	Number of demonstrations
Udaipur	Soybean	25
	Mustard	30
Thanjavur	Groundnut	20
Indore	Groundnut	50
Rahuri	Soybean	25
Vizianagaram	Groundnut,	70
	Sesame	20
Udhampur	Mustard and Toria	10
Jabalpur	Soybean	40
Alappuzha	Sesame	25
Jorhat	Toria	40
Wardha	Soybean	25
Dindigul	Groundnut	50
Jobner	Mustard	40
Rangareddy	Groundnut	25
Chikkaballapura	Groundnut	50
Modipuram	Groundnut as I/C in Sugarcane	50
Total		595

The demonstrations revealed that **farmers largely depended on old/local varieties, untreated seeds, and imbalanced fertilizer use**, with sowing often done late or by broadcasting. In contrast, the **improved practices** promoted:

- **High-yielding varieties** (e.g., JS-2098 in soybean, RH-725 in mustard, P. Sangam in soybean, Vishista in groundnut, Tilak in sesame).
- **Seed treatment** with bio-fertilizers, fungicides, and insecticides (Rhizobium, PSB, Trichoderma, etc.).
- **Balanced nutrient management**, including NPK, S, Zn, gypsum, and foliar sprays of micronutrients, instead of only basal DAP.
- **Improved sowing methods** (line sowing, BBF, trench planting) and timely planting.
- **Integrated crop management (ICM)** practices such as weedicides, disease control (Trichoderma), and use of nano-urea.

Overall, improved practices offered **better crop establishment, higher yield potential, and profitability** compared to traditional farmers' practices.

Table 2: Details of management practices adopted in farmers and improved practices

Name of Centre (State)	Intervention	Farmer practices	Improved practices
Udaipur	Varieties	Soybean variety (JS) 335	Soybean variety JS 2098
		Mustard variety (Bio 902)	Mustard variety (RH 725)
Thanjavur	Varieties Seed rate	Groundnut variety GG5 & GG7	Groundnut variety VRI 10
	Seed treatment	Fertilizer Complex fertilizer as basal alone.	*Trichoderma viride*- 2.5 kg/ha. and other packages as per recommendation.
Indore	Varieties	Local seed	Kadiri Lepakshi (K1812)
	Seed treatment	Local varieties, no seed treatment, apply DAP	Improve seed, Insecticide, fungicide NPK (19:19:19), nano urea and sulphur
Rahuri	Varieties	JS-335, DS-228	P. Sangam (KDS 726)
	Seed treatment	Sowing without seed treatment	Bio-fertilizer, Thirum, Thiomithoxam
Vizianagaram	Varieties	Groundnut (K 6)	Groundnut (Vishista and Nityaharitha)
		Sesame (YLM 66)	Sesame (YLM-146)
	Seed treatment	Old variety use and erroneous agrotechniques	Improved variety with ICM
		Old variety use and erroneous agrotechniques	Improved variety with ICM
Udhampur	Varieties	Own seed	RH 725 & Uttra
	Seed treatment	Use of local or low-yielding seed varieties, unbalanced fertilization, late sowing etc.	Adoption of high-yielding varieties, scientifically recommended amounts of fertilizers (balanced nutrient management), timely planting and line sowing
Jabalpur	Varieties	Previous year soybean crop seed/old variety seed viz; JS 335 etc.	JS-2172
	Seed treatment	Broadcasting sowing, 1 bag DAP, No seed treatment, Previous crop seed/old variety seed	Improved variety, Seed treatment with Rhizobium and PSB, Fertilizer SSP, Urea and MOP, Line sowing and Weed management
Alappuzha	Varieties	Kayamkulam-I	Tilak
	Seed treatment	Sesame in farmers' practice is grown without fertilizer application, relying on available soil moisture and residual nutrients from the previous rice crop	High-yielding variety Tilak, along with application of farmyard manure (5 t/ha) and balanced fertilization ($N:P_2O_5:K_2O$ @ 30:15:30 kg ha^{-1})
Jorhat	Varieties Seed treatment	Local	TS-38

Name of Centre (State)	Intervention	Farmer practices	Improved practices
Wardha	Varieties	JS-9560, JS-335, JS-9305, Greengold-3344	PDKV-Amba
	Seed treatment	Imbalanced fertilizer dose, Weed management through hoeing & hand weeding,	Balanced nutrition (NPK&S), Weed management through hoeing & weedicide application, Foliar application of
		No foliar micronutrient application.	micronutrients (Fe,Zn,B,Mn & Cu) and Sowing on BBF.
Jobner	Varieties	Pioneer hybrid	DRMR 1165-40
	Seed treatment	60:30:30 NPK kg/ha	Balance nutrition with S 40 kg/ha & Zn 15 kg/ha, disease management through oil application of *Tricodarma* sp. 2.5 kg/ha
Rangareddy	Varieties	K6 and K9	Kadhiri k-1618
Chikkaballapura	Groundnut		
Modipuram	Groundnut as I/C in Sugarcane	The farmer does not practice it	TG-37A Trench method
Dindigul	Varieties Seed rate	Local	GJG-32
	Seed treatment	Groundnut in farmers' practice is grown with local variety with unbalanced fertilizer application and without or less gypsum application	Application of balanced fertilization as Urea, SSP, and MOP (N: P_2O_5:K_2O @ 25:50:75 kg ha^{-1}) Groundnut Rich, Gypsum, Imidaclopride, and Acephate

Influence of Farmers' vs Improved Practices on Yield

The FLDs conducted during 2024–25 clearly demonstrated the yield advantage of improved practices over farmers' practices across locations and crops.

- **Soybean:** Yield improvements ranged from **20–33%**, with the highest gain at Jabalpur (33%), followed by Wardha (28%) and Udaipur (25.9%).
- **Mustard & Toria:** Mustard yields increased by **13.7–27.8%**, with Udaipur showing the maximum response (27.8%). Toria yields improved by **19.6–30.9%**, the highest being at Jorhat (30.9%).
- **Groundnut:** Significant yield gains were recorded at Indore (24.9%), Thanjavur (18.4%), Chikkaballapura (17.5%), and Vizianagaram (13.3%). At Rangareddy, a remarkable **37.6% increase** was observed.
- **Sesame:** Yield increased by **20–26%**, with Alappuzha showing the highest gain (26.1%).
- **Special system (Groundnut in sugarcane at Modipuram):** Farmers did not practice this system, but demonstrations showed an **additional 1051 kg/ha groundnut yield** along with sugarcane, proving the benefit of intercropping.

Overall, the adoption of improved practices led to **consistent yield gains across all crops**, demonstrating their effectiveness in enhancing productivity under real farm conditions.

Table 3: Influence of farmers and improved practices on grain or pod yield (kg/ha) of various crops under FLD (2024-25)

Name of Centre (State)	Crop/cropping system (s)	Number of demonstrations	Yield farmer practices	Yield improved practices	per cent increase
Udaipur	Soybean	25	628	791	25.95
	Mustard	30	855	1039	27.83
Thanjavur	Groundnut	20	2068	2447	18.41
Indore	Groundnut	50	9.8	12.3	24.9
Rahuri	Soybean	25	1626	1950	20.21
Vizianagaram	Groundnut,	70	2872	3254	13.3
	Sesame	20	872	1089	20
Udhampur	Mustard	10	959	1164	21.4
	Toria		938	1121	19.6
Jabalpur	Soybean	40	1491	1983	33
Alappuzha	Sesame	25	441	556	26.1
Jorhat	Toria	40	810	1060	30.9
Wardha	Soybean	25	1334	1854	28
Jobner	Mustard	40	1955	2203	13.7
OFR Centre, Rangareddy	Groundnut	25	2227	1618	37.6
Chikkaballapura	Groundnut	50	9577	11248	17.46
Modipuram	Groundnut as I/C in Sugarcane	50	-	1051*	-

*Additional yield received with sugarcane

The FLDs during 2024–25 showed that adoption of improved practices consistently enhanced gross returns (₹/ha) across crops and locations, highlighting their economic advantage.

- Soybean: Gross returns increased by 23–33%, with the highest gain at Jabalpur (33.5%), followed by Wardha (28%) and Udaipur (25.9%).
- Mustard & Toria: Mustard returns improved by 12.7–27.8%, with Udaipur showing the maximum response (27.8%). Toria also recorded strong gains (19.5–30.9%), the highest at Jorhat (30.9%).
- Groundnut: Significant increases were observed across centres—Indore (24.9%), Thanjavur (18.3%), Chikkaballapura and Vizianagaram (13.2%), while the highest was at Rangareddy with a remarkable 38.9% increase in gross returns.
- Sesame: Gross returns improved by 24.8–26%, with Alappuzha showing the highest response (26%).

Overall, improved practices resulted in higher profitability across all oilseed-based systems, with the highest economic gain in groundnut at Rangareddy (38.9%), and substantial benefits in soybean (up to 33.5%), mustard (27.8%), sesame (26%), and toria (30.9%).

Influence of Farmers' vs Improved Practices on Net Returns

The FLDs during 2024–25 highlighted that improved practices substantially enhanced net returns (₹/ha) compared to farmers' practices, showing the economic viability of adopting improved technologies.

- Soybean: Net returns increased by 42–47% at Udaipur (47.4%), Rahuri (43.2%), Jabalpur (42.1%), and Wardha (44%), demonstrating strong profitability from improved management.

- Mustard & Toria: Mustard net returns rose by 14.9–41.2%, the maximum at Udaipur (41.2%). Toria showed improvements of 25–52.8%, with Jorhat recording the highest (52.8%) among all centres.
- Groundnut: Substantial gains were observed across centres—Thanjavur (33.4%), Indore (31.9%), Vizianagaram (35.2%), with the highest at Rangareddy (56.7%).
- Sesame: Net returns improved by 21–25.8%, with maximum gain at Vizianagaram (25.8%).

Overall, improved practices led to consistent and significant increases in profitability, with the highest response recorded in groundnut at Rangareddy (56.7%) and toria at Jorhat (52.8%). Soybean centres also consistently showed over 40% gains in net returns, highlighting the economic strength of improved technologies.

Table 4: Influence of farmers and improved practices on gross returns (Rs/ha) of various crops under FLD (2024-25)

Name of Centre (State)	Crop/cropping system (s)	Number of demonstrations	gross returns farmer practices	gross returns improved practices	per cent increase
Udaipur	Soybean	25	30722	38696	25.95
	Mustard	30	50873	65034	27.83
Thanjavur	Groundnut	20	124080	146820	18.33
Indore	Groundnut	50	54116	67606	24.93
Rahuri	Soybean	25	79544	97968	23.1
Vizianagaram	Groundnut,	70	200900	227500	13.2
	Sesame	20	95920	119790	24.8
Udhampur	Mustard	10	57510	69820	21.45
	Toria		55342	66109	19.46
Jabalpur	Soybean	40	72938	97352	33.47
Alappuzha	Sesame	25	176400	222400	26
Jorhat	Toria	40	40486	52985	30.9
Wardha	Soybean	25	65259	90698	28
Jobner	Mustard	40	116341	131067	12.7
Rangareddy	Groundnut	25	155876	113288	38.9

Table 5: Influence of farmers and improved practices on net returns (Rs/ha) of various crops under FLD (2024-25)

Name of Centre (State)	Crop/cropping system (s)	Number of demonstrations	net returns farmer practices	net returns improved practices	per cent increase
Udaipur	Soybean	25	16571	24423	47.38
	Mustard	30	31423	44384	41.24
Thanjavur	Groundnut	20	61688	82302	33.4
Indore	Groundnut	50	30170	39793	31.89
Rahuri	Soybean	25	35369	50658	43.2
Vizianagaram	Groundnut,	70	108800	147100	35.2
	Sesame	20	75500	95040	25.8
Udhampur	Mustard	10	40010	49725	24.4
	Toria		38447	48164	25.28
Jabalpur	Soybean	40	46338	65252	42.09
Alappuzha	Sesame	25	143500	174180	21
Jorhat	Toria	40	27485	17986	52.8
Wardha	Soybean	25	27039	48213	44
Jobner	Mustard	40	82241	94467	14.9
Rangareddy	Groundnut	25	84216	35848	56.7
Chikkaballapura	Groundnut	50	60846	73327	20.51

Capacity Building through Training Programmes (2024–25)

To strengthen knowledge dissemination and promote adoption of improved oilseed-based farming practices, **training programmes were conducted for both extension personnel and farmers** during 2024–25.

1. **Training of Extension Officers/Workers/Input Dealers (Table 6):** A total of **five training programmes** were organized across different states, covering **100 participants**. Each programme trained around 20 participants, focusing on improved production technologies, integrated crop management, and dissemination strategies. These were held at Chikkaballapura (Karnataka), Kota (Rajasthan), Vizianagaram (Andhra Pradesh), Coimbatore (Tamil Nadu), and PAU Ludhiana (Punjab). Such trainings aimed at building the **capacity of frontline extension workers** to effectively transfer technologies to farming communities.

2. **Training of Farmers (Table 7):** In addition to extension personnel, **six farmer training programmes** were conducted across different centres, with **345 farmers trained in total**. The largest training was at IIFSR Modipuram (150 participants), followed by Uttar Kannada, Karnataka (60), Goalpara, Assam (50), and others at Rahuri, Udaipur, and Ludhiana. These trainings focused on **improved varieties, seed treatment, nutrient and pest management, and intercropping systems**, enabling farmers to adopt profitable oilseed-based cropping systems.

Table 6: Training of Extension Officers/workers/input dealers (2024-25)

Name of Centre	Date of training	Total participants
Chikkballapura (Karnataka)	10-11 February 2025	20
Kota (Rajasthan)	30-31 January 2025	20
Vizianagaram (Andhra Pradesh)	19-20 March 2025	20
Coimbatore (Tamil Nadu)	13-14 February 2025	20
PAU, Ludhiana	09 March 2025	20
Total		**100**

Table 7: Detail training of farmers (2024-25)

Name of Centre	Date	Number of participants
IIFSR, Modipuram	25-10-2024	150
Goalpara (Assam)	07-02-2025	50
Rahuri (Maharashtra)	12-06-2024	25
Uttar Kannada (Karnataka)	05-03-2025	60
Udaipur (Rajasthan)	29-01-2025	30
PAU, Ludhiana	04-03-2024	30
Total		**345**

Fig 1. Introduction of groundnut as an intercrop in sugarcane in western Uttar Pradesh

Fig 2. Glimpse of intervention in groundnut and sesamum in 2024-2025

Fig 3. Input distribution in FLD during 2024-25

Fig 4. Glimpse of intervention in mustard in 2024-2025

Fig 5. Glimpse of training conducted under FLD in 2024-25

7.4 Scaling and impact assessment of Integrated Farming Systems

The integrated farming system integrates natural resources and regulation mechanism activities to achieve maximum efficiency of inputs, secures sustainable production of high-quality food, and generates sufficient income for better livelihood of farmers. Indian Institute of Farming Systems Research, Modipuram through All India Coordinated Research Project on Integrated Farming Systems (AICRP-IFS) has developed 74 prototype IFS models (including 8 integrated organic farming system models) involving ICAR Institutes and SAUs suitable to 26 States and Union Territories. These tailor-made prototype models established at 30 State Agricultural Universities, 9 ICAR institutes and 1 Central University have the potential to increase the income by 3 to 5 times than existing systems/practices of farmers in a period of 3 to 4 years in different regions. IFS models notified by DA&FW vide F.No. 2-1/2018-RFS-III dated 29 August 2019 for implementation under Rainfed Area Development/Rainfed Farming Systems schemes by States. Interface meeting on IFS with all the States was organized in 2020. A total of about 1.7 million ha is covered under the scheme till now with targeted beneficiaries of 2.70 lakh.

The scheme was implemented in 16 major states, of which we selected three states, VIZ. Kerala, Tamil Nadu and Telangana, for studying the status and impact of IFS adoption. The samples from the beneficiary and non-beneficiary were selected randomly from each district. The sample farmers were chosen through the Simple Random Sampling (SRS) method at the multistage level. The first stage is the district level and the second stage is the mandal/taluk level. The beneficiaries listed under the scheme were collected from the respective district administration, and later, the representative samples were selected from them randomly. The nonbeneficiaries in the same locality who did not receive benefits from this scheme were selected randomly to compare the outcomes under study. A total of 1168 samples were collected from the identified three states, covering the 19 districts. These districts cover both irrigated and rainfed regions of the state. Five districts from Kerala, covering 708 farmers; 12 districts from Tamil Nadu, covering approximately 332 farmers; and two districts from Telangana, covering 128 farmers. A total of 1168 farmers from 19 districts in 3 states were covered under the study.

Analytical methods used:

Dietary Diversity Score (DDS)

Dietary diversity is a qualitative measure of food consumption reflecting household access to a variety of foods. The Dietary Diversity Score (DDS) was estimated using food frequency questionnaire data for each person based on thirteen food groups (ICMR 2012). We have modified and included the 10 food groups, which include cereals, meat, fruits, roots and tubers, fish/seafoods, oils/fats, pulses/legumes/nuts, eggs, milk & milk products, and vegetables, leaving the nut and oil seeds, condiments and spices, sugars and jaggery. The variable DDS10 was calculated by summing the number of food groups consumed by the household in the reference period, with the scores ranging from 1 to 10 (FAO 2011).

Coarsened Exact Matching (CEM)

To study the impact on treated and control groups, there are several matching methods available. Here, we use the Coarsened Exact Matching method to improve the balance of the data. This forces the distribution of observed explanatory variables between the treated and control groups to be similar. For our analysis, we coarsen a number of explanatory variables, including farm experience, male family labour, intercropping practice dummy, number of cows, and state as a region dummy. We then match the treatment group, i.e., participation in IFS schemes, with nonparticipants. Following the method given below.

Results:

Table 1 summarizes year-wise implementation of a program based on beneficiaries, targeted and achieved area, and financial expenditure from 2014–15 to 2022–23. A total of 2,70,340 beneficiaries were covered over the years. The targeted area increased significantly over time, peaking at over 43 lakh hectares in 2020–21. However, the achieved area was consistently lower than the target each year, totalling about 16.98 lakh hectares. The highest financial expenditure was in 2018–19 at ₹ 204.89 crore, while the lowest was in 2022–23 at ₹ 67.35 crore. The program saw the highest beneficiary count in 2018–19 (70,904), indicating peak outreach. Overall, the scheme spent a total of ₹ 1,236.16 crore across nine years.

Table 1: Coverage under Rainfed Area Development (RAD) Scheme for IFS promotion

Year	Beneficiaries (No.)	Area targeted (ha)	Area achieved (ha)	Financial expenditure (Crore Rs.)
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**

Cost of cultivation across all modules was provided in Fig.1, indicating IFS farmers consistently incur lower cultivation costs compared to control farmers. This indicates that IFS practices help reduce input costs through resource recycling, integration of enterprises, and better resource utilization. Highest cultivation costs for control farmers are observed in modules like V+O+D+G+P and V+O+D+P, exceeding Rs. 60,000/ha, whereas IFS farmers manage the same modules at significantly lower costs (~ Rs. 35,000–45,000/ha). Modules with vegetable-based systems (V) combined with other components (O: orchard, D: dairy, G: goat, P: poultry, C: crop) show a much larger cost difference between control and IFS farmers. Models like V+O+D+G+P cost more than Rs. 60,000/ha for control but less than Rs. 40,000/ha for IFS farmers. This graph demonstrates that adopting Integrated Farming Systems (IFS) helps farmers significantly reduce cultivation costs while maintaining diversified enterprise combinations. The savings come from better recycling of farm resources (e.g., dung, crop residues), reduced dependence on external inputs (fertilizers, pesticides, feed), and improved synergy among enterprises.

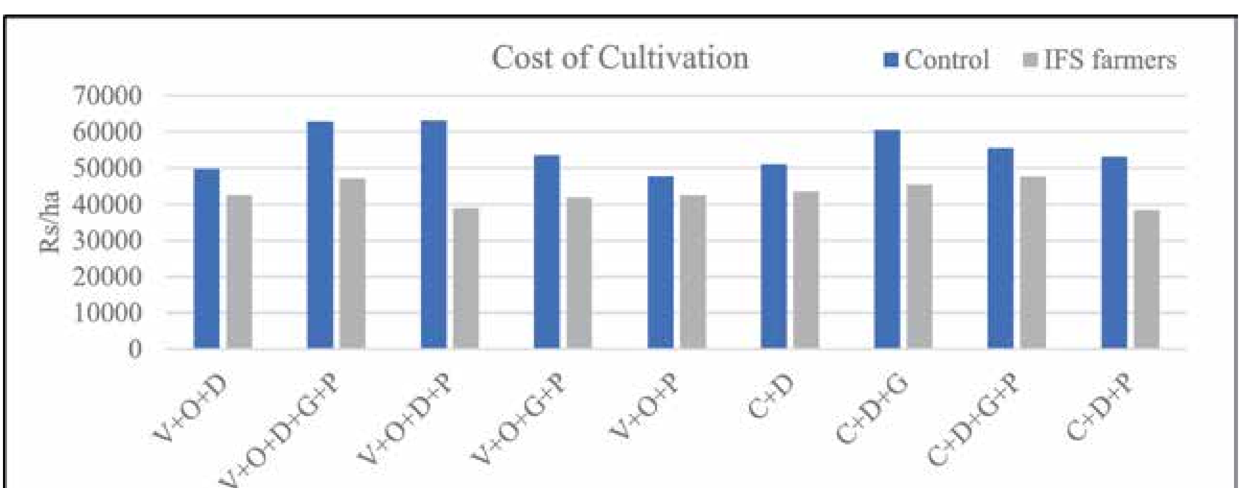


Fig 1. Cost of cultivation across different IFS models in Kerala, Tamil Nadu and Telangana

The net income of the farmers among different IFS models was provided in Fig. 2. IFS farmers consistently achieve higher net incomes across all modules compared to control farmers. This reflects the efficiency of enterprise integration, resource recycling, and better input-output linkages in IFS. The highest net income for IFS farmers is seen in V+O+D+G+P (Rs. ~1,20,000/ha), compared to control farmers at Rs. ~95,000/ha. This indicates that diversified and integrated modules bring higher profitability. Modules with vegetable (V) integration, such as V+O+D, V+O+P, and V+O+D+G+P, show the most significant net income gains for IFS farmers compared to the control. Models like V+O+D+G+P of IFS farmers achieve Rs. ~1,20,000/ha vs Control Rs. ~95,000/ha. Simpler models (like C+D, C+D+P) also show higher net income under IFS, though the margin is comparatively smaller. IFS model of C+D achieves Rs. ~95,000/ha vs Control of Rs. ~60,000/ha. On average, IFS farmers earn Rs. 20,000–40,000/ha more than control farmers across most modules.

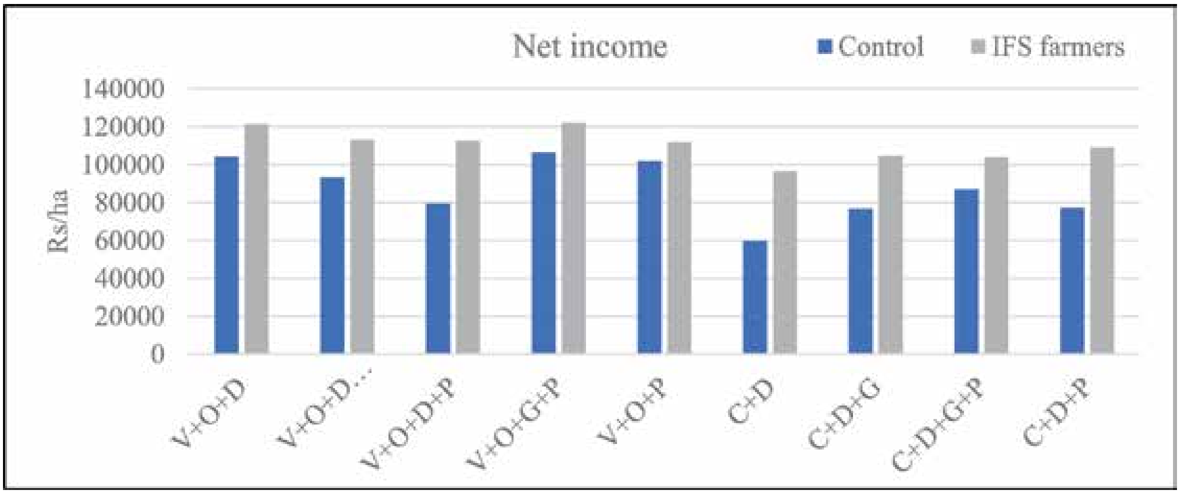


Fig 2. Net returns across different IFS models in Kerala, Tamil Nadu and Telangana

The graph 3 depicts the amount of residue recycling (in tonnes per year) in various farming systems, comparing IFS with Non-IFS. Across all systems, Integrated Farming Systems (IFS) demonstrate significantly higher residue recycling compared to Non-IFS. For example, in the C+D+P system, residue recycling is 18.2 tonnes/year in IFS, compared to just 12.5 tonnes/year in Non-IFS. Systems with more diversified components, such as crops, orchards, dairy, goats, and poultry (e.g., V+O+D+G+P), show the highest recycling potential. The maximum residue recycling is observed in the IFS system with V+O+G+P (28.9 tonnes/year), while the corresponding Non-IFS system recycles 24.1 tonnes/year.

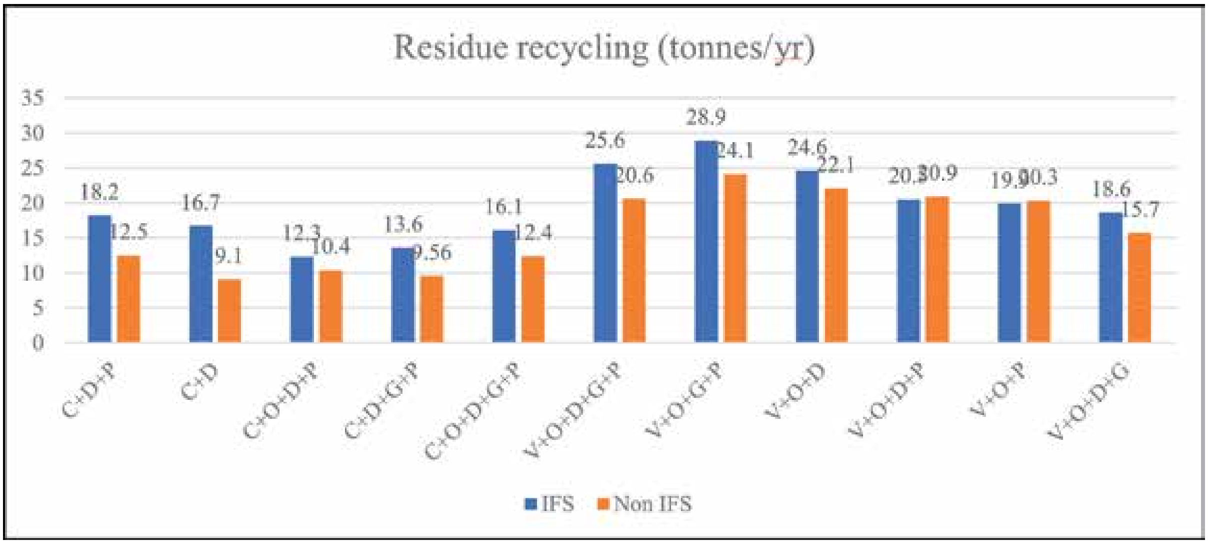


Fig 3. Residue recycling of the farm waste and manures across different IFS

Fig. 4 provide the information on dietary diversity of the farm households in the study area. The families under practice of IFS had clearly higher diversity of the food group compared to non-IFS groups. Higher diversity was observed in IFS farmers of C+O+D+P, C+O+D+P and V+O+D+G systems than the non-IFS farmers.

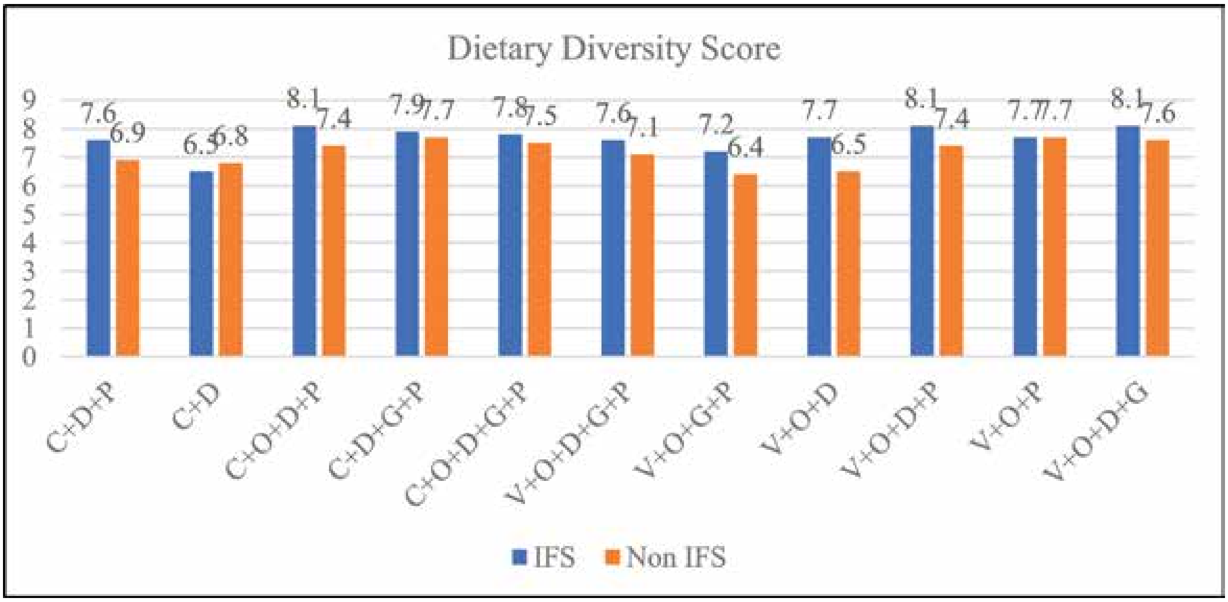


Fig 4. Dietary diversity score of the households across different FS

The Fig. 5 compares the employment generation of two groups (IFS and Non-IFS) across different predominant systems. In general, IFS farmers tend to generate more man-days of employment compared to Non-IFS farmers. The highest employment was created under V+O+P system (688) followed by V+O+D system with 645 man-days per year. Indicating almost round-the-year employment for two human labours.

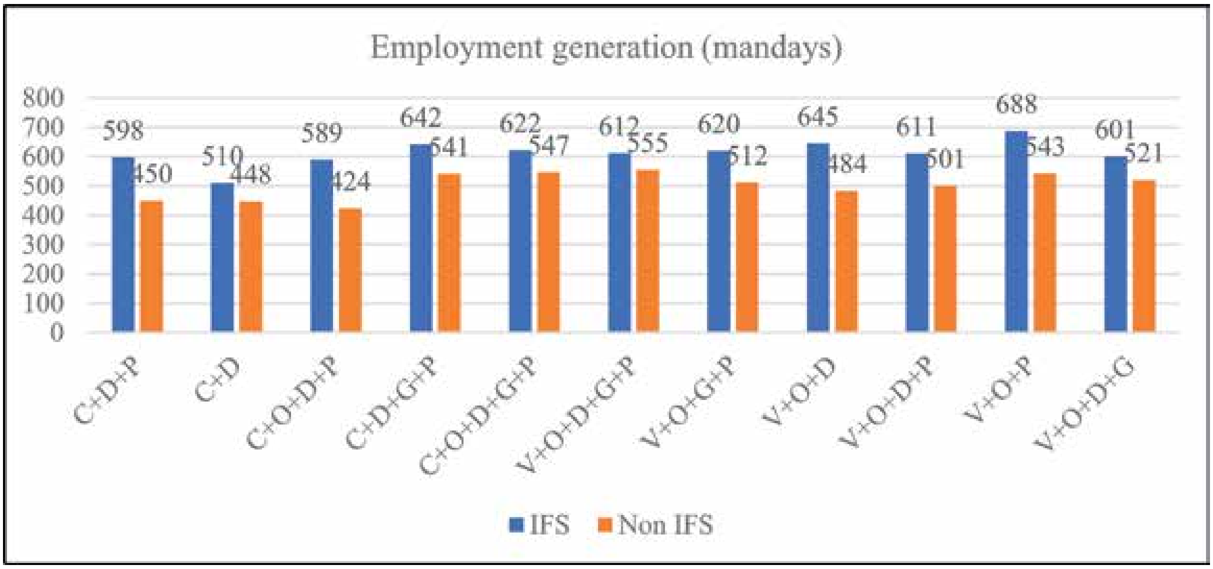


Fig 5. Employment generation by different IFS

Figure 6 compares the average values for household dietary diversity under various farming systems (Crop-based, Vegetable-based, Livestock-based, and Fish-based) across two states, Tamil Nadu and Kerala. A higher DD score was achieved under livestock-based system (6.16) in Tamil Nadu compared to Kerala (5.96) (Sekaran et al, 2021).

Vegetable-based system contribute second highest DDS for Kerala. On average, most of the systems diversity score is more than 6 indicating moderate DD among sampled farmers.

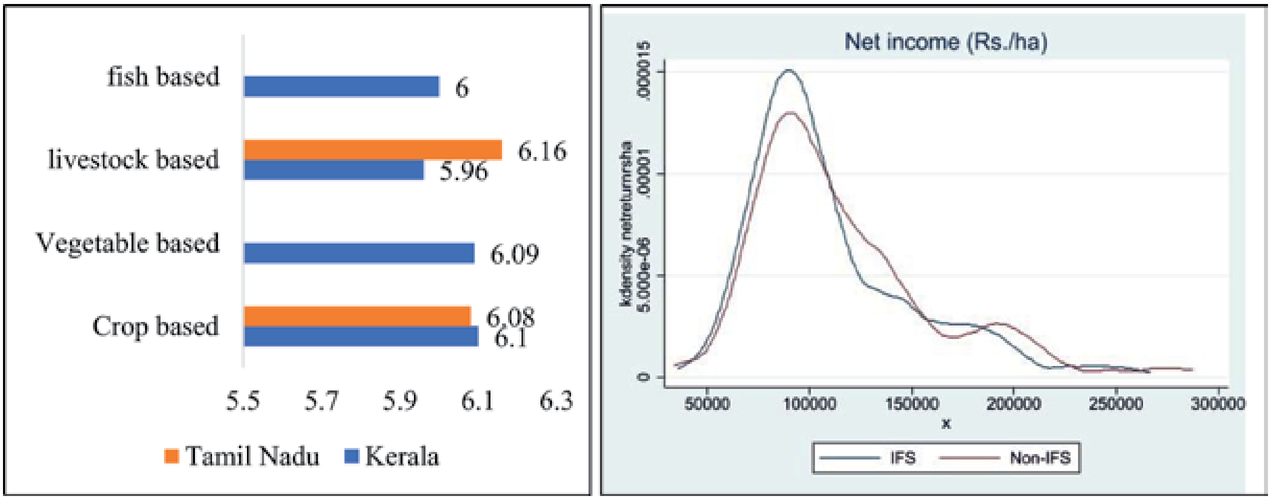


Figure 6. Dietary Diversity Score of Different Farming system; K-density plot for net income from IFS beneficiaries and non-beneficiaries

The density plot (Fig 6) compares net income per hectare between IFS (Integrated Farming System) and Non-IFS farmers. IFS farmers show a higher peak around Rs. 1,00,000/ha, indicating more consistency and concentration in income levels. Non-IFS farmers have a wider spread, with more variability and a slightly flatter distribution. Overall, IFS appears to yield higher and more stable net incomes compared to Non-IFS systems.

Impact of IFS using the Coarsened Exact Matching

Table 2 shows the results obtained from CEM for four outcome variables: gross income, net income, cost of cultivation, and HDDS. The imbalance in the data has reduced from 0.66 to 0.62 after matching. A total of 367 control and 390 observations were treated as matched, totalling 757 observations for analysis. ATT estimates indicate that the gross income of farmers who adopted integrated farming increased by Rs 18838 per hectare compared to the control group. Similarly, the cost of cultivation of adopters increased by Rs 3097 per ha in comparison to non-adopters. The net income for adopted farmers is increased, but not statistically significant. We also measured the impact of adopter households on dietary diversity scores. The measure of household dietary diversity score has increased by 0.48 units in comparison to control farm households. Outcome variables indicate that in selected states, the adopters had higher gross income and also an increased cost marginally, along with higher HDDS, compared to non-adopters.

Table 2. Average treatment effect of IFS on outcome variables

Outcome variable	ATT	Constant	P value
Cost of cultivation (Rs/ha)	**3097.148 **** (1366.224)	43807.48 (978.37)	0.024
Gross return (Rs/ha)	**18838.25 **** (5051.92)	155681.7 (3617.75)	0.033
Net returns (Rs/ha)	7741.204 [NS] (4956.18)	111874.2 (3549.19)	0.119
Household Dietary Diversity Score	**0.48***	0.25	8.64 %
Observations	280		

Note: *, **, *** indicate significance at the 10%, 5%, and 1% level, respectively; [NS] non-significant, ATT-Average Treatment Effects

Salient findings and recommendations:

Economic well-being and dietary diversity: The study revealed that integrated farming significantly enhances farmers' economic stability by generating multiple income sources from diverse farm enterprises. Additionally, it improves household dietary diversity by ensuring access to a variety of food items thereby improving nutrition security in rural communities.

Factors influencing adoption: Socio-economic factors such as age, education, social class, access to credit, and the presence of plantation crops were found to play a key role in farmers' decisions to adopt integrated farming systems. Educated and credit-accessible farmers were more likely to diversify their enterprises due to better awareness and risk management capacity.

Scope for income and well-being: Integrated farming provides small and marginal farmers with an opportunity to increase farm income by efficiently utilizing available resources and reducing dependency on external inputs. The system also enhances farmers' overall well-being by creating employment, stabilizing income, and building resilience against climate and market fluctuations.

Policy recommendation for promotion: The study emphasizes the need for strong policy and institutional support to promote integrated farming systems across states as a sustainable alternative to monocropping. Such initiatives would strengthen food production systems while simultaneously improving household nutrition and rural livelihoods.

Infrastructure and linkage support: For successful implementation, integrated farming schemes must be supported by robust infrastructure such as storage, processing, and marketing facilities. Strengthening both backward linkages (input supply, training) and forward linkages (value addition, market access) will ensure the long-term viability and profitability of integrated farming systems.

8. GENERAL/MISCELLANEOUS

8.1 Review/ Research Papers in NAAS rated Journals (Published during 2023-24)

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
1	Andhra Pradesh	Vizianagaram (OFR)	Srinivasa Rao M.M.V., Tejeswara Rao K., Rajendra B. and Patro T.S.S.K.	2024	Intensification of Agriculture + Horticulture + Poultry Farming Systems under Small and Marginal Tribal House holds for Higher Profitability	Frontiers in Crop Improvement	11: 1987-1993	4.20	-
2	Bihar	Patna	Sanjeev Kumar, Abhishek Kumar, Shivani, Santosh Kumar, Rakesh Kumar, Rachana Dubey, Kumari Shubha, Kirti Saurabh, Manibhushan and Anup Das	2025	Enhancing farm productivity, profitability, sustainability and livelihood of small farm holders through Integrated Farming System.	Indian Journal of Agricultural Sciences	95 (3): 272–279	6.30	-
			Rachana Dubey, J S Mishra, Anup Das, G K Dinesh, N Jain, B P Bhatt, S P Poonia, A Ajay, S Mondal, Sanjeev Kumar, A K Choudhary, Rakesh Kumar, A Upadhyaya and Andrew J. McDonald	2024	Enhancing ecosystem services through direct seeded rice in middle IndoGangetic Plains: a comparative study of different rice establishment practices	Agronomy for Sustainable Development	A113: 44 -57	12.40	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			Santosh Kumar, Sahana Basu, A.K. Choudhary, Shashi Shekhar, J.S.	2024	Sequential submergence and drought induce yield loss in rice by affecting	Field Crop Research	310-109362	11.60	
			Mishra, Sanjeev Kumar, Kumari Shubha, Rachana Dubey, Surajit Mondal, S.K. Dwivedi, N. Bhakta, Rakesh		redox homeostasis and source-to-sink sugar transport				
			K K Rao, S K Samal, Sanjeev Kumar, N Raju Singh, Rakesh Kumar, Surajit Mondal, Santosh Kumar, J S Mishra, B P Bhatt, N. Ravisankar, Sunil Kumar, P K Upadhyay, Swapnaja K. Jadhav and A K Choubey		Decade-long effects of integrated farming systems on soil aggregation and carbon dynamics in sub-tropical Eastern Indo-Gangetic plains	Frontiers in sustainable Food Systems	1384082	9.70	
			Sanjeev Kumar, Shivani, Kamal Sarma, Ujjwal Kumar, A. Dey, Manibhushan Santosh Kumar	2024	Fish-based intensive integrated farming system for resource recycling, enhanced productivity and livelihood improvement in the lowlands of the middle Indo-Gangetic plains	Indian Journal of Fisheries	71(4): 63-69	6.40	

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			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
3	Jammu & Kashmir	Jammu	Kour, Manpreet, Khan, Nazam, Thakur, N.P., Amrutkar, Suraj, Khandi, S.A., Kumar, Pranav and Mahajan, Vikas	2024	Influence of Different seasons and techniques on the yield and quality of vermicompost using under subtropical conditions of India	Annals of Forest Research	67(2): 21-35	7.70	
			Naik, Chanchal, Sharma, Rakesh, Sharma, L.K., Kumar, Jai, Sharma, M.K. and Thakur, N.P.	2025	Agriculture diversification in Jammu region: Status and determinants	Plant Science Today	Vol x(x): 1-9	6.70	
			Vijay Kumar, S. K. Sharma, Rakesh Kumar, Manoj Kimar, Neeraj Kotwal, Sanjay Khajuria, Neerja Sharma, Saurav Gupta, A. K. Sinha, A.P. Rai, Balbir Dhotra, Vijay Khajuria & Vishal Raina	2024	Nutrient availability and fruit production of Aonla (Emblica officinalis Gaertn.) as affected by trickle irrigation and superabsorbent polymer	WULFENIA Journal	Vol 31, No. 6; Jun 2024		
		Udhampur (OFR)	Naveena, Gupta, A.K., Thakur, N.P., Gupta Meenakshi, Khar Sanjay, Sharma Manish, Kumar, Parshotam & Nahwal Anu	Naveena, Gupta, A.K., Thakur, N.P., Gupta Meenakshi, Khar Sanjay, Sharma Manish, Kumar, Parshotam & Nahwal Anu	Performance of Rice-Wheat Cropping system under different production systems in Irrigated Subtropics of Jammu	Journal of Advances in Biology & Biotechnology	Vol. 28: 1011-1017		

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
4	Karnataka	Siruguppa	Ashok Kumar gaddi, Kalibavi C M, Srinivasa D K and Prabhuling Tevari	2025	Influence of cropping systems on yield and nutrient uptake by different crops in deep black soils of Kalyana Karnataka region				
5	Kerala	Karamana	Sajeena A., Berin Pathrose, Jacob John, Deepu Mathew, Visakh N. U., Sheila B., Sri. P. T., Meera A. V., Shanas S., and Bindhu J. S.	2024	Emerging trends in the management of soil borne diseases of yard long bean	Journal of Mycology and Plant Pathology	54 (4): 341-349	5.08	
			Ambili, S., Meera, A. V., Rani, B., Leno, N., and Bindhu, J. S.	2024	Characterization of organic fertlizers produced from aquatic weed, Limnocharis flava (L) Buchenau	International Journal of Advanced Biochemistry Research	8(10): 1026-1031	5.29	
			Krishna, N., Jacob, D., Bindhu, J.S., and Meera, A.V.	2024	Enhancing growth and zinc boavailability in rice (Oryza sativa L.) cultivars through agronomic biofortification strategies	Journal of Advances in Biology and Biotechnology	27(11): 1204-1213	5.30	
			Hasanath, T., Bindhu J. S., Shalini Pillai P., John J., Meera A. V., and Archana B	2024	Weed Dynamics and Soil Health As Influenced by Tillage Method and Establishment Method in Small Millets	Journal of Experimental Agriculture International	46 (11): 244-54	5.14	
			Jayapal, A., Jacob, D., Bindhu, J.S., Meera, A.V., Sudha, B., and Innazent, A.	2024	Sustainability of farming systems through integration of processing and value addition in	Journal of Farming Systems Research and Development	9(2):1-7		

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
					Southern Coastal Plains of Kerala.				
			Thomas, S.L., Bindhu, J.S., Pillai, S.P., Beena, R., Biju, J. and Sarada, S.	2024	Nutrient Dynamics and Moisture Distribution under Drip Irrigation System	Journal of Experimental Agriculture International	46(10): 485-493	5.14	1
			Hemnad, J., John,., Shalini, P.S., Bindhu, J.S., and Meera, A.V.,	2024	On-farm Productivity and Profitability of Paired-Row-Rice Diversified Cropping System in West Coast Plains and Ghat Region of India	International Journal of Plant and Soil Science	36(12): 244 253	5.07	
		Alappuzha (OFR)	Unnikrishnan, D., Raj, S. K., Jacob, D., Pillai, S. P., Ameena, M. and Chauhan, B.S.	2025	Phenological Patterns and the Impact of Seed Burial Depth and Scarification on the Emergence and Growth of Redweed (Melochia corchorifolia)	Weed Technology	39 (e21): 1-9.	7.30	
			Jacob, D., Paramesha, V., Bindhu, J. S., Meera, A. V., and Innazent, A.	2025	Enhancing productivity of rice (Oryza sativa)-rice-fallow system through balanced fertilization: A farmer participatory approach in Kerala's southern coastal plains	The Indian Journal of Agricultural Sciences	95(3): 298–303	6.30	
			Sowmya K., Bindhu J.S., Shalini Pillai P., Jacob D. and Gladis R.	2025	Productivity and Profitability of Green Gram [Vigna radiata (L.) Wilczek] under System of Crop Intensification.	Agricultural Science Digest	45(1): 70-73	5.52	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			Innazent, A., Anitha, S., and Jacob, D.	2024	Yield potential and economics of chilli + amaranth intercropping system as influenced by plant geometry and fertigation	Agricultural Science Digest	pp. 1-5	5.52	
			Sneha, S.R., Sheeja K. Raj., Jacob, D., Kavitha, G.V., Radhakrishnan, N.V., and Shalini Pillai, P.	2024	Influence of integrated weed management practices on weeds, physiology, quality, and yield of direct sown ragi (Eleusine coracana L. Gaertn)	Indian Journal of Weed Science	56: 208-213.	5.42	
			Krishna, N., Jacob, D., Bindhu, J.S., and Meera, A.V.	2024	Enhancing growth and zinc bioavailability in rice (Oryza sativa L.) cultivars through agronomic biofortification strategies	Journal of Advances in Biology & Biotechnology	27 (11): 1204-13	5.30	
			Alex, V., Jacob D., Shalini Pillai P., Sheeja K Raj, Joby Bastian, and Navya M.V.	2024	Optimizing cereal crop performance with nutrient priming	Journal of Advances in Biology & Biotechnology	27(10): 1307-19	5.30	
6	Madhya Pradesh	Jabalpur	Kumbhare Rahul, Mishra PK, Sahu RP, Gupta Vikas, Patel R and Singh K.	2025	Effect of different management practices on yield attributes and productivity of Wheat +Mustard intercropping system	International Journal of Plant and Soil Science	37(1) 550-563	5.07	
			Kumbhare Rahul, Mishra PK, Gupta Vikas Patel R., Singh	2025	Impact of different management practices on the physico-chemical	International Journal of Research in	8(1) 505-509	5.20	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			K., Anjana GL and Prajapati SS		properties of soil in wheat+mustard in intercropping system	Agronomy			
		Rewa	Yadav K, Rahangdale M and Maurya B.M.	2025	Assessment of rice based multiple cropping at Bansagar area of Kymore Satpura region	International Journal of Research in agronomy	8(1):497-500		
		Indore			Effect of micronutrients and npk consortia on nodulation, yields and economics of chickpea (Cicer arietinum L.) in Vertisols.	Journal of AgriSearch	11(4): 242-246.	4.95	
7	Maharash-tra	Akola	Subash Sharma, A. N. Paslawar, J. P. Deshmukh, N. M. konde, Raghvendra K.J., N. Ravisankar, and S. K. Chaudhari	2024	Innovative resource management technologies for nature positive farming	Journal of the Indian Society of Soil Science	SP-72,2024 and 106-111	5.34	
			Vinayak Yadav,J. P. Deshmukh,A. N. Paslawar and B. S. Morwal	2024	Integrated farming systems for resource recycling, sustainability and employment generation among the small and marginal farmers in Vidarbha region of Maharashtra	International Journal of Research in Agronomy	SP-7(11), 2024 and 28-32	5.20	
			A. M. Barekar,S. N. Potkile,J. P. Deshmukh, A. N. Paslawar and B. S. Morwal	2024	Development of integrated farming systems model under rainfed condition	International Journal of Research in Agronomy	SP-7(6), 51-55	5.20	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			A. M. Barekar,S. N. Potkile,J. P. Deshmukh, A. N. Paslawar, D. S. Kankal and B. S. Morwal	2024	Integrated farming systems model for resource management and rural employment in Vidarbha region under rainfed conditions	International Journal of Advanced Biochemistry	SP-8(6), 2024 and 179-183	5.29	
		Wardha (OFR)	A.M. Barekar,S. N. Potkile,J. P. Deshmukh, A. N. Paslawar and B. S. Morwal	2024	Development of integrated farming systems model under rainfed condition	International Journal of Research in Agronomy	SP-7(6), 51-55	5.20	
			Ekta D, Bagade, P.N. Dawane, S.N. Potkile, A.R.Veer, Hemlata, M. Khobragade, Y.B. Dharmik and S.P.Patinge	2024	Effect of different bio agents, chemicals and nutrients for the management of gummosis in Nagpur mandarin	International Journal of Advanced Biochemistry Research	8(9)176-180	5.29	
			N.A. Daware, S.N. Potkile. S.R.Potkile, S.R.Sarak, K.Y.Deshmukh, and R.V.Chavan	2024	Effect of application of nano urea and nano DAP on growth characters of soybean	International Journal of Research in Agronomy	7 (11)330-334	5.20	
			S.V.Kakade, P.V. Mahatale, B.C. Nandeshwar, G.D. Chandankar, S.N. Potkile, M.D.Yenpreddiwar, D.K.Nemade, S.G.Parshuramkar and M.M. Raut	2025	Comparing the dibbling and drilling techniques in wheat based on the plants reproductive and vegetative growth	Journal of Advances in Biology & Biotechnology	28(2) 253-264		
			S.V.Kakade, P.V.Mahatale,	2025	Comparative analysis of drilling and dibbling	Journal of Advances in	28(3) 502-514		

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			B.C.Nandeshwar, G.D.Chandankar, S.N.Potkile, G.B.Ganvir, M.D.Yenpreddiwar, D.K.Nemade, S.G.Parshuramkar, K.S.Pagire and M.M.Raut		techniques for wheat varieties for yield components in semi-arid conditions	Biology & Biotechnology			
		Palghar (OFR)	DK Borse, SS Pinjari, NV Mhaskar, MR Wahane and PS Bodake	2024	Performance of different leafy vegetables under coastal saline soil of Konkan Region of Maharashtra State of India	International Journal of Research in Agronomy	7(10): 773-775	5.20	
			L.K. Gabhale, S. S. Sayyad, A. V. Dahiphale and V.V. Sagvekar	2024	Studies of Heterosis in Tomato-A Review	Indian Journal of Agriculture and Allied Sciences	Page No: 85-94	3.99	
			L.K. Gabhale, S. S. Sayyad, P. S. Gudadhe and S. N. Sawant	2024	Studies of Combining Ability in Tomato- A Review	Indian Journal of Agriculture and Allied Sciences	Page. No. 85-91	3.99	
			DK Borse, SS Pinjari, NV Mhaskar, PS Bodake, MR Vahane and SB Dodake	2025	Effect of different rice establishment techniques on yield, economics and agronomic indices of panvel-1 rice variety under coastal saline soil condition of north Konkan region	International Journal of Agriculture and Food Science	7(2): 23-26	4.97	
		Rahuri	M.M. Godase, S.C. Patil, K.D. Varnekar, A.V. Solunke, U.S. Surve	2025	Effect of organic sources and organic formulations on system productivity, production	International Journal of research in Agronomy	SP-8(3):281-285	5.20	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
					efficiency and economic efficiency of soybean-wheat cropping sequence.				
			M.E. Bahiram, U.S. Surve, S.R. Shelke, M.R. Patil	2025	Impact of climate resilient technologies on growth performance of soybean-wheat cropping systems	International Journal of research in Agronomy	SP-8(3):575-581	5.20	
			V.V. Dadmal, R.M. Gethe, U.S. Surve, A.G. Durgude, M.R. Patil, P.S. Bodake, N.J. Danawale	2025	Response of foliar application of urea and nano urea on growth, yield and quality of wheat under irrigated conditions.	International Journal of research in Agronomy	SP-8(2):25-29	5.20	
			N.S. Ghule, U.S. Surve, V.S. Patil	2025	Effect of different intercrops on quality and nutrient uptake of organically grown pigeonpea	International Journal of research in Agronomy	SP-9(1):856-862	5.20	
			V.M. Chandrikpure, U.S. Surve, S.S. Ilhe, M.D. Gurav	2024	Influence of conservation agriculture and organic nutrient management on growth and yield of soybean-frenchbean cropping systems	International Journal of research in Agronomy	SP-7(8):779-783	5.20	
			S.M. Shende, U.S. Surve, S.S. Ilhe, M.D. Gurav	2024	Influence of shade management and agronomic factors such as soil types, fertigation levels and intervals on ginger growth characters	International Journal of research in Agronomy	SP-7 (12): 854-861	5.20	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
8	Rajasthan	Rajsamand (OFR)	Hari Singh, Gopal Nai, Narendra Yadav and H.K. Lamba,	2025	Enhancing Sustainability, Profatibility, and Energy Efficiency through Input Interventions in Existingn FRarming System in Sothern Planin Zone of Rajasthan	Journal of Scientific Research and Reports	3(02): 186-204	5.17	
9	Tamil Nadu	Coimbatore	P.M.Shanmugam, S. P. Sangeetha, P. C. Prabu ,S.V.Varshini, A. Renukadevi, N. Ravisankar, P. Parasuraman, T. Parthipan, N.Satheeshkumar, S. K. Natarajan and Marappan Gopi	2024	Crop-Livestock-Integrated Farming System: a strategy to achieve synergy between Agricultural Production, Nutritional security and environmental sustainability	Frontiers in Sustainable Food Systems	Vol. 8 (1-14)	9.70	
			Arivukkumar, N., Shanmugam, P. M., Balaji, K., Sumathi, C. S., Prahadeeshwaran, M.,Sangeetha, S. P	2024	Typology analysis of marginal and small households practicing integrated farming system in western parts of Tamil Nadu, India	Applied Ecology and Environmental Research	22(4) 3603-3627	6.70	
			N Arivukkumar, PM Shanmugam, Balaji Kannan, CS Sumathi, M Prahadeeshwaran, SP Sangeetha & G Raghavi	2024	Assessing the carbon footprint of marginal and smallholders	Plant Science Today	Vol 11(sp4): 01–07	6.70	
			Senthilnathan, S., Benson, D., Prasanna, V., Mallick, T.,	2024	Impact of Climate Variability on Maize Yield Under Different	Earth	6(1), 16	impact factor 2.10	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			Thiyagarajan, A., Ramasamy, M., &		Climate				
			Saranya, M., Sangeetha, S. P., Shanmugam, P. M., Dhananchezhiyan, P., Vanitha K. and Thirukumaran, K.	2024	Assessment of mechanized sown cotton-based intercropping systems: Impact on yield, efficiency and profitability	Plant Science Today	11(sp4): 01–12	6.70	
		Thanjavur	K.Subrahmaniyan, M Rajavel, P Veeramani and T Parthipan* (*Corresponding author)	2024	Tillage practices on soil penetration resistance, soil infiltration, percolation and yield of rice (Oryza sativa) in rice-based cropping system	Indian Journal of Agricultural Sciences	94 (8) 811-816	6.40	
			T. Parthipan, K. Subrahmaniyan, P.M. Shanmugam, S.P. Sangeetha and C. Vijayaraghavan	2024	Climate Resilient Integrated Farming System – A Way Forward to Food Security	Progressive Research: An International Journal.	Vol. 19 (Special) : 335-338	4.32	
			K Subrahmaniyan, T Parthipan, P Veeramani and M Rajavel	2024	Farming systems: A typology driven approach	Bangladesh J. Bot.	53(3): 519-525	6.30	
			Sundaram, S.	2024	Change Scenarios in Southern India: A Panel Data Approach.	Progressive Research : An International Journal	Vol 19 (2) : 96-98	4.32	
			A. Sangeetha, K. Subrahmaniyan, A. Mahalingam,	2024	Sesame Stalk Compost in Soil Revitalization and Long-term	Communications in Soil Science and Plant Analysis	56 (4), 567-591	7.80	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			P. Veeramani, M. Rajavel, C. Harisudan, T. Parthipan, M. Dhandapani & R. Baskaran		Sustainable Crop Productivity in Organic Sesame (Sesamum indicum L.)				
		Dindigul (OFR)	Selvakumar Thambiyannan, Senthivelu M, Sathya Sheela, KRV, Lakshmi Narayanan S, Satheeshkumar N*, Radhajayalakshmi R. and Karthikeyan Ramasamy (*Corresponding author)	2025	Production technology and optimization of inputs for soil- less maize green fodder production	Plant Science Today	12 (1) 01-08	6.70	
			R.Nageswari, T. Sanjaykumar, R. Anitha,V. Dhanushkodi, K.R. Sujatha,N. Satheeshkumar*, R. Rajarathinam, S. Somasundaram, S. Rathika and T. Ramesh (*Corresponding author)	2025	Impact of weed management practices on weed control efficiency and fiber quality in cotton under the high-density planting system	Plant Science Today	12(Sp1): 1-8	6.70	
			Alaesan A, Thukkaiyannan P, Satheeshkumar N, Thiruvarasan S, Ganesan K and Ayyadurai P	2025	Soil temperature prediction based on ensemble tree bagger machine learning algorithm for agricultural decision making	Plant Science Today	12(2): 1-11	6.70	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			Rathika S, Ramesh T, P.Janaki, S.M. Vinodhini,M. Baskar,A. Selvarani, K. Venkatalakshmi, N. Satheeshkumar, P. Ayyadurai, R. Jagadeesan, G. K. Dinesh, S. Kokilavani and R. Vinoth	2025	Response of finger millet under organic nutrient management in sodic soil	Plant science today	Vol 12(1) : 1-8	6.70	
			S Rathika, T Ramesh,MP Kavitha, K Vanitha, S,K Natarajan, D Rajkumar, J Bhuvaneswari , N Satheeshkumar, Jagadeesan, V Dhanushkodi, GK Dinesh and R. Vinoth	2025	Effect of aqueous extract of horse purslane (Trianthemaportulacas-trum L.,) on germination and seedling growth of selected field crops	Plant Science Today	Vol.12 (Sp 1) : 01-06	6.70	
		Yethapur (OFR)	R. Rithiga, S.K. Natarajan, S. Rathika, R. Sivakumar S.R. Venkatachalam and T. Ramesh.	2024	Allelopathy prospective of oil seed crops for sustainable weed management-A review.	Plant Science Today	11(sp4): 01-10	6.90	
			R.Gowsalya, S.K.Natarajan, T.Ragavan, S.R.Venkatachalam and S.Thambidurai.	2025	A review on way towards mechanized castor cultivation.	Plant Science Today	12(1): 1-11	6.90	
			S.K.Natarajan, N.Maragatham, N.Sakthivel,	2025	Accelerated vermicompost production through	Applied ecology and environment research	23(2): 3457-3466	6.70	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			R. Karthikeyan, N.Thavaprakash, R.Gowsalya, S.Jaya prabhavathi, P. Kathirvelan, V. Geethalakshmi, S.R. Venkatachalam and M.K.Kalarani		mechanization- ways to handle the crop residues and enhance the soil health				
			Rathika S, Ramesh T, P.Janaki, S.M. Vinodhini,M. Baskar,A. Selvarani, K. Venkatalakshmi, N. Satheeshkumar, P. Ayyadurai, R. Jagadeesan,G. K. Dinesh, S. Kokilavani and R. Vinoth	2025	Response of finger millet under organic nutrient management in sodic soil	Plant science today	Vol 12(1) : 1-8	6.70	
			S Rathika, T Ramesh,MP Kavitha, K Vanitha, S,K Natarajan, D Rajkumar, J Bhuvaneswari , N Satheeshkumar, Jagadeesan, V Dhanushkodi, GK Dinesh and R. Vinoth	2025	Effect of aqueous extract of horse purslane (Trianthemaportulacas-trum L.,) on germination and seedling growth of selected field crops	Plant Science Today	Vol.12 (Sp 1) : 01-06	6.70	
10	Telangana	Rajendra-nagar	Ramana, M.V., Pragathi Kumari, Ch., Goverdhan, M., Sridevi, S., Reddy, GK., Suresh, K.,	2024	Crop + horticulture + livestock IFS model for ensuring food and livelihood security with improving profitability,	Environ Dev Sustain.	Pp 1-29	10.90	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			Sharath Chandra, M., Karthik, R., Santhosh Kumar, M. · Ravi Shankar		employment, and climate resilience: a long term study in Telangana, India				
			Pragathi Kumari, Ch., Goverdhan, M., Venkata Ramana, M., Kiran reddy, G., Nthebere, K., Sharath Chandra, M., Santhosh Kumar, M., Karthik, R., Vinay, G and Ravi sankar, N	2024	Assessment of Carbon Sequestration Rate and System Productivity under Complementary Bio-Intensive Cropping Systems in an Inceptisol of Southern Telangana Zone	AATCC Review	pp: 303-311	6.00	
			Karthik, R., Ramana, M.V., Kumari, C.P., Ram Prakash, T., Goverdhan, M., Saida Naik, D., Sharath Chandra, M., Santhosh Kumar, M., Vinod Kumar, N., Peace Raising, L., Kirttiranjan Baral, Rajan Bhatt, Nadhir Al-Ansari, Khalid M. Elhindi and Mohamed A. Mattar	2024	Designing a productive, profitable integrated farming system model with low water footprints for small and marginal farmers of Telangana.	Scientific Reports	14, 17066	10.60	
			Gagandeep Kaur., Rajan Bhatt., Mandepalli Sharath Chandra., Pragathi Kumari, Ch., Shipra Yadav and Pradeep Kumar	2024	Artificial neural networks and adaptive neuro-fuzzy inference system networks application in crop production	AATCC Review	12 (3) 87-95	6.00	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			Reddy, G.K., Jayasree, G., Sharma, S.H.K., Neelima, T.L., Hussain, S.A and Triveni, M.	2024	Assessing and Mapping of Salt Affected and Waterlogged Soils in Nagarjuna Sagar Left Bank Canal Command Area of Deccan Plateau Using the AVIRIS NG Hyperspectral Data.	AATCC Review	12 (3): 227-235	6.00	
			Karthik, R., Ramana, M.V., Kumari, C.P., Prakash, T.R., Goverdhan, M., Naik, D.S., Kumar, N.V., Chandra, M.S., Bhatt, R., Elhindi, K.M.	2024	Suitable Integrated Farming System Models in Terms of Energetics, Greenhouse Gas Emissions and Employment Generation for the Small and Marginal Farmers	Sustainability.	16(23), 10189;	9.30	
			Ramana, M.V., Pragathi Kumari, Ch., Karthik, R., Alibaba, Md., Kiran Reddy, G., Chiranjeevi, K., Santhosh Kumar, M., Sharath Chandra, M., Ravisankar, N., Bhatt, R., Gaber, A and Hossain, A.	2025	Integrated Farming Systems Improve the Income of Small Farm Holdings—An Overview of Earlier Findings in the Indian Context	Food and Energy Security	14(2):e 70064	10.00	
11	Uttara-khand	Pantnagar	Abinash Das Tapan Jyoti Purakayastha, Nayan Ahmed, Sunanda Biswas, Debashis Chakraborty, Md Yeasin, Ranabir Chakraborty,	2024	Soil Organic Carbon Accrual Under Integrated Organic Management: Evidence From 33Years of Long-Term Field Experiments	Soil Use and Management	2025; 41:e 70111	11.00	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
			Sohan Singh Walia, Rohitashav Singh, Madan Singh Yadava, Natesan Ravisankar and Khushboo Rani						
		Almora (OFR)	Anjali Rawat1,Dinesh Kumar Singh, Subhash Chandra, Hem Ch. Joshi and Manoj Kumar Bhatt.	2024	Influence of establishment techniques and foliar nutrient spray timing on growth, yield parameters, crop productivity, quality, and economic viability of soybean (glycine max l.) in the tarai region of uttarakhand.	Envis Bulletin Himalayan Ecology.	Vol. 31. Pages 157-165		
			Amit bhatnagar*, sailesh deb karjee, gurvinder singh and dinesh kumar singh.	2024	Productivity, nutrient uptake and economics of sweet corn (Zea mays L. var. saccharata) under different planting geometry and NPK levels	Pantnagar Journal of Research	Vol. 22(1) January-April 2024. 1-7	4.86	
12	West Bengal	Kalyani	S Mohanty, S Saha, BN Saha, SM Asif, R Poddar,M Ray, SK Mukhopadhyay, GC Hazra	2024	Substitution of fertilizer-N with biogas slurry in diversified rice-based cropping systems: Effect on productivity, carbon footprints, nutrients and energy balance	Field Crops Research	307,1-14	11.60	11
			M.Ray et. al.	2024	Farming system interventions for improving farm	Journal of Crop and Weed	20, 85-91	5.27	

S. No.	State	Name of the centre	Research paper/Review Paper						
			Authors	Year	Title of paper	Journal name	Volume, pages	NAAS Rating (as per 2025 score)	Number of citations
					production of marginal tribal farmers in coastal west bengal				
			M Ray et al.	2025	Productivity, profitability, and energy dynamics of different cropping systems on broad-bed and furrows in the Gangetic flood plain of West Bengal	Indian Journal of Agronomy (1st International Farming Systems Conference 2025, Special Issue)	70, S97-S103	5.21	
13	Port Blair	Port Blair	TP Swarnam, A Velmurugan, SK Pandey, Zachariah George	2025	Integrated Farming System for Women empowerment in an island ecosystem	The Indian Journal of Agricultural Sciences	95(3): 249-254	6.40	
			T P Swarnam, A Velmurugan, T Subramani, N Ravisankar, N Subash, AS Panwar, P Perumal, I Jaisankar and S Dam Roy	2024	Climate smart crop livestock integrated farming as a sustainable agricultural strategy for humid tropical Islands	International journal of Agricultural Sustainability	22(1) 2298189	9.40	
			T P Swarnam, I Jaisankar, Sanjay Kumar Pandey, AS Panwar, N Ravisankar	2024	The role of Traditional Knowledge in Climate change adaptation among the nicobarese of Central Nicobar Islands, India	Indian journal of Traditional Knowledge	23(1) 6-15	6.80	

LIST OF PAPERS PUBLISHED IN SEMINAR/SYMPOSIA FROM APRIL 2024 TO MARCH 2025

S. No.	State	Name of the centre	Paper presented in seminar or symposia				
			Authors	Year	Title of paper	Name of Seminar/Symposia	Volume, pages
1	Bihar	Patna	Sanjeev Kumar, Ghous Ali, Abhishek Kumar, Shivani, Kumari Subha, Kirti Saurabh and Anup Das	2025	Sustainable Agriculture through Integrated Farming Systems: A Pathway to Economic and Environmental Stability in Eastern India	1st International Farming Systems Conference (IFSC 2025)	100
			Sanjeev Kumar, Shivani, Amitava Dey, Kirti Saurabh, Kumari Shubha, Abhishek Kumar, and Anup Das	2025	Integrated Farming Systems: A Pathway to Resource Efficiency and Sustainability in the Indo-Gangetic Plains	1st National Seminar Agri-Diversification and Eco-Regional Farming 4-5 March 2025 | ICAR-MGIFRI, Motihari (Bihar)	57-58
2	Karnataka	Kathalgere	Sharanappa Kuri, Sannathimmappa H. G., Raghavendra K. J. and Ravishankar N.	2025	Key Performance Indicators of Crop–Livestock based Irrigated Integrated Farming System for the Southern Transition Zone of Karnataka	1st International Farming Systems Conference (IFSC 2025)	24
			Sannathimmappa H. G., Sharanappa Kuri, and Ravishankar N.	2025	Integrated Farming System for Livelihood Security of Small Farmers in Bhadra Command Area of Karnataka	1st International Farming Systems Conference (IFSC 2025)	405
3	Kerala	Karamana	Anjali, S., Sudha, B., Shalini Pillai P.and Jacob John.	2025	Recycling aquatic weeds as composts: A sustainable option for crop nutrition and weed control in rice based integrated farming.	1st International Farming Systems Conference (IFSC 2025)	pp.116
			Rohith A. K., Meera A. V., Jacob John, Bindhu, J. S. and Sajeena. A.	2025	Impact of carbon farming in rice-based cropping systems for climate stabilization in west coast plains.	1st International Farming Systems Conference (IFSC 2025)	pp.113
			Bindhu. J S., John J., Meera A. V., Sudha B., and Sajeena A.	2025	Small- scale irrigation systems for diversified homesteads	1st International Farming Systems Conference (IFSC 2025)	p.246
			Greeshma, U., Bindhu, J.S., Ashish Koshy	2025	Green yields in tight spaces: The power of wicking beds and	1st International Farming Systems Conference (IFSC 2025)	pp.184

S. No.	State	Name of the centre	Paper presented in seminar or symposia				
			Authors	Year	Title of paper	Name of Seminar/Symposia	Volume, pages
			George3., Shalini Pillai, P.. and Sarada, S.		organic inputs.		
			Boddu Archana, Bindhu J.S, Shalini Pillai P., Jacob John, Meera A.V.	2025	Effect of zinc nutrition on productivity and profitability of diversified rice based cropping systems in high phosphorus soils of double cropped wetlands	1st International Farming Systems Conference (IFSC 2025)	p.181
		Alappuzha (OFR)	Namitha V.V., Raj, S.K., Pillai, P.S., Jacob, D., and Radhakrishnan, N.V.	2024	Sustainable spice production in plantations: Improving ecological regulation and climate change adaptation	In Sreekala, G.S., Anith, K.N., and Stephen, R. (Eds.), International Seminar on Spices. Sustainable Agricultural Practices.	p. 79
			Namitha, K and Jacob, D.	2024	Role of agronomic biofortification in improving Zn bioavailability of rice cultivars.	National Seminar on Innovative Strategy for Global Nutrition Security: Focus on Fortification. Technological Innovations and Methodologies in Food Fortification.	
			Anitrosa Innazent and Jacob, D.	2024	Greenhouse Gas Emission from Four Integrated Farming Systems (IFS): A Comparative Analysis	31st Swadeshi Science Congress. Towards Net Zero Emission: Approaches and Strategies	p. 140
			Namitha, V.V., Raj, S.K., Jacob, D., and Pillai, S.P.	2025	Agroecological intensification through crop diversification in coconut-based systems	Swarnam, T.P., Meena, A.L., Nirmal, Ghasal, P.C., Choudhary, J., Singh, R., Shamim, M., Kumar, K., Bhanu, C., Kashyap, P., Arif, M., Jat, P.C., Kumar, S., Raghavendra, K.J., Singh, R., Chaubey, C., and Rathi, S. (eds.),	p. 69
						Abstracts of the 1st International Farming Systems Conference: Transforming Food, Land and Water Systems under Global Climate Change, 07-09 March 2025, ICAR-IIFSR, Modipuram, Uttar Pradesh	

S. No.	State	Name of the centre	Paper presented in seminar or symposia				
			Authors	Year	Title of paper	Name of Seminar/Symposia	Volume, pages
			Anitrosa Innazent and Jacob, D.	2025	Integrated farming systems for climate Action: Mitigating greenhouse gas emissions and enhancing carbon credits	In: Swarnam, T.P., Meena, A.L., Nirmal, Ghasal, P.C., Choudhary, J., Singh, R., Shamim, M., Kumar, K., Bhanu, C., Kashyap, P., Arif, M., Jat, P.C., Kumar, S., Raghavendra, K.J., Singh, R., Chaubey, C., and Rathi, S. (eds.), Abstracts of the 1st International Farming Systems Conference: Transforming Food, Land and Water Systems under Global Climate Change, 07-09 March 2025, ICAR-IIFSR, Modipuram, Uttar Pradesh	p. 122
4	Maharashtra	Akola	J. P. Deshmukh, B.S. Morwal, D. A. Nagargoje and R. A. Datey	2025	Integrated farming Systems for higher profitability, livelihood security and employment generation	Shri Vasantrao Naik Memorial National Seminar on "Interventions of climate resilient technologies for regeneration of farming systems	
5	Tamil Nadu	Coimbatore	Sangeetha S.P., Shanmugam P.M, Sivasubramanian K. Senthilnathan S. Parthiban T, Satheeskumar N . and S.K.Natarajan	2025	Identification of cropping systems modules for irrigated upland based integrated farming system of Tamil Nadu	Global Agri business skill development in the Era of digital transformation	112
		Dindigul (OFR)	N.Satheeshkumar,N.K. Sathyamoorthy,P. Thukkaiyannan,T. Selvakumar,K.R.V. Sathya Sheela and R. RadhaJeyalakshsmi	2024	Influence of agronomic practices on growth and yield of groundnut under groundnut – redgram intercropping system	International Conference on Current innovations and Technological advances in Agriculture and allied sciences	414
			N.Satheeshkumar,S. Rani,S. Shri Rangasamy, T. Selvakumar,K.R.V. Sathya Sheela,	2024	Effect of nano urea application on growth and yield of fodder maize	International conference on current innovations and technological advances in agriculture and allied sciences	415

S. No.	State	Name of the centre	Paper presented in seminar or symposia				
			Authors	Year	Title of paper	Name of Seminar/Symposia	Volume, pages
			P. Thukkaiyannann and R. RadhaJeyalakshsmi				
			N. Satheeshkumar,P.M. Shanmugam,S.P. Sangeetha,K. Sivasubramanian,S.K. Natarajan,T. Parthipan,S. Senthinathan and T. Selvakumar	2024	Doubling of farmers income through integrated farming systems	International Conference on Recent trends in advancement of Agriculture, Horticulture, Livestock and Allied Sciences	268
		Yethapur (OFR)	Natarajan S K, R.Nageswari, M.Velmurugan, P.S.Kavitha and S.R.Venkatachalam	2024	Effect of Integrated Weed Management practices on Growth and Yield of tapioca	International conference on Precision Horticulture (ICPH2024) –Advancing technologies for sustainable production, Food and environment 22-24.08.2024	107
			S K Natarajan, P.Kathirvelan, P. Veeramani, S.R.Venkatachalam, M. Raju,and S. Pazhanivelan	2024	Impact of Alternate Wetting and Drying Irrigation (AWDI) on Water Saving and Yield of Transplanted Rice Through Field Water Tube	International conference on current innovations and technological advances in agriculture and allied sciences (CITAAS - 2024) 29-31.08.2024	101
			S.K.Natarajan, N.Maragatham, C.R.Chinnamuthu, N.Sakthivel, P.Kathirvelan, N. Thavaprakaash, R. Karthikeyan, S.R.Venkatachalam, V.Geethalakshmi and M.K.Kalarani	2024	A smart technique to dispose of crop waste through accelerated vermicompost production by automation	International Conference on Agrovoltaics and Sustainability in Farming is being organized by the Agricultural Engineering College and Research Institute of Tamil Nadu Agricultural University (TNAU), Coimbatore, on 19th September 2024	68
			S K Natarajan, P.Kathirvelan, P. Veeramani, S.R.Venkatachalam, M. Raju,and S. Pazhanivelan	2024	On farm assessment of precision farming in tapioca to enhance the tuber productivity and water use efficiency	International conference on water and agricultural sustainability under changing climate (WASCC - 2024)	87

S. No.	State	Name of the centre	Paper presented in seminar or symposia				
			Authors	Year	Title of paper	Name of Seminar/Symposia	Volume, pages
			S K Natarajan, P.Kathirvelan, P. Veeramani, S.R.Venkatachalam, M. Raju,and S. Pazhanivelan	2024	Area Expansion and Productivity EnhancementOf Castor Under Precision Farming Mode	International conference on water and agricultural sustainability under changing climate (WASCC - 2024)	93
			S K Natarajan, G.Sridevi, P.Veeramani S.R.Venkatachalam, S.Jaya Prabhavathi P.Kathirvelan, and M.K.Kalarani	2024	Influence of nutriseed pack placement on growth, nutrient use efficiency and yield of castor hybrids	international conference on innovative technologies for research and development for sustainable production of cotton, oilseeds and fibre crops	165 ISBN: 978-81-946148-4-5
6	Telangana	Rajendra-nagar	Srinivasnaik, S., Vijaya Lakshmi, K., Omprakash, S., Balram, N and Reddy, G.K	2024	Taxonomic characterization of invasive thrips species, Thrips parvispinus and its host range in Telangana,	6th International conference on Holistic Innovation and Technological Advances for Sustainable Agriculture at SR University, Warangal	174-175.
7	Uttarakhand	Almora (OFR)	Dinesh Kumar Singh, Subhash Chandra, Rohitashav Singh, Sumit Chaturvedi, Ajeet Pratap Singh.	2025	Performance of Integrated Farming Systems Demonstrations in Western Himalayan Region. Sub-Theme: Next Frontiers for Climate Change Science. Frontier Sciences And Technologies In Agriculture For A Developed India	XVII Agricultural Science Congress 2025	P142
			Ajeet Pratap Singh, Rohitashav Singh, Subhash Chandra, Dinesh Kumar Singh, Dushyant Kumar, N.S. Dhaka.	2024	Integrated Farming Systems: A viable option for small farmers.	National Conference on "Quality Seed Production: Backbone to the National Food Security" March 04-06, 2024 at GBPUA&T, Pantnagar.	P200
			P. Santha Kumar, Dinesh Kumar Singh, Subhash Chandra, Rohitashav	2024	Diversification and Intensification in Rice - Wheat System for Enhancing	National Conference on "Quality Seed Production: Backbone to the National Food Security" March	P187

S. No.	State	Name of the centre	Paper presented in seminar or symposia				
			Authors	Year	Title of paper	Name of Seminar/Symposia	Volume, pages
			Singh, A.P. Singh, Ajay Kumar and Amit Bhatnagar.		Productivity.	04-06, 2024 at GBPUA&T, Pantnagar. P 187.	
			Ajay Kumar, Pragya Nainthani and Dinesh Kumar Singh.	2024	Augmenting Soybean Productivity through Auxin Supplement Application.	National Conference on "Quality Seed Production: Backbone to the National Food Security" March 04-06, 2024 at GBPUA&T, Pantnagar. P 73	73

LIST OF BULLETINS/PAMPHLETS/POPULAR ARTICLES PUBLISHED FROM APRIL 2024 TO MARCH 2025

S. No.	State	Name of the centre	Bulletin/Pamphlet/Popular Article					
			Authors	Year	Title of the Bulletin/ Pamphlet/Popular Article	Publisher name	ISBN Number	Volume and Pages
1	Bihar	Patna	Sanjeev Kumar, Shivani, Abhishek Kumar and Anup Das	2024	Behtar lav Prapti ke liye ekikrit Krishi pranali avum fasal -cum- Pashudhan kheti	Directorate of Extension Education, Bihar Animal Sciences University, Patna-14.		80-92
			Sanjeev Kumar, Shivani, Kumari Shubha, Rachana Dubey and Anup Das	2024	Samekit Krishi pranali dwara laghu evum simant kisanon ki aay mein vridhi evum paryavaran ka sarankshan	Directorate of Extension Education, Bihar Animal Sciences University, Patna-14.		120-127
			Manisha Tamta, Shivani, Madhu Chaudhary, Kumari Shubha, Abhishek Kumar Dubey, Ujjwal Kumar, Abhay Kumar and Sanjeev Kumar	2024	Understanding Carbon Terminologies	Agri Articles		04(0 4): 82-85
			Rakesh Kumar, Anup Das, J S Mishra, A K Biswas, S. Mondal, B K Jha, S K Naik, S S Mali,	2025	Greening Rice Fallow areas of eastern India: Package of practices for Bihar, Jharkhand and Chhatisgarh	ICAR Research Complex for EasternRegion, Patna	Tech Bulletins: R-84/ Patna-50	71

S. No.	State	Name of the centre	Bulletin/Pamphlet/Popular Article					
			Authors	Year	Title of the Bulletin/ Pamphlet/Popular Article	Publisher name	ISBN Number	Volume and Pages
			J S Chodhary, Sanjeev Kumar, B P Bhatt, Rachana Dubey and S K Chaudhari					
			Rakesh Kumar, Anup Das, Ghous Ali, D Mondal, Ashish Kumar biswas and Sanjeev Kumar	2025	Dhan- Parati bhoomi mein rabi fasal ka utpadan	ICAR Research Complex for Eastern Region, Patna	Prasr Pustika no. E-259/ Patna-142	4
			Manisha tamata, Shivani, Himani Bisht, Santosh Kumar. A K dubey, Ved Prakash, Sanjeev Kumar, Abhay Kumar and Anup Das	2024	Jalvau anukool Krishi mausam sevayen	ICAR Research Complex for Eastern Region, Patna		4
2	Jammu and Kashmir	Udhampur (OFR)	A.K. Gupta, N.P. Thakur, Sunil Kumar, Vijay Khajuria, Dheeraj Rajwal, A.W. Katoch, P.Kumar, Ritika Gupta, Mahesh Shingare	2025	Bulletin on Kaladi making in English and Hindi	OFR, Jammu		
3	Kerala	Karamana	Jisha, A., Meera, A. V., Midhun, M., Bindhu, J. S., Sajeena, A., and Shanas, S.	2024	Green manures for enriching soil health (Mannu pariposhanathinu pachilavalangal)	Kerala Karshakan, FIB		pp.55-58
			Meera, A.V., Midhun, M., Bindhu, J. S., Sajeena, A., Shruthy, O. N., and Shuaib, A. N	2024	Grafting technique for vegetable seedlings (grafting sankethika Vidhya pachakkari thaikalil)	Kerala Karshakan, FIB		pp.42-44
			John, J., Shanas, S., Sajeena, A., Meera, A. V., and Bindhu, J. S.	2024	A Centre of Academic and Skill Excellence. Kerala Agricultural University	KAU		20p.

S. No.	State	Name of the centre	Bulletin/Pamphlet/Popular Article					
			Authors	Year	Title of the Bulletin/ Pamphlet/Popular Article	Publisher name	ISBN Number	Volume and Pages
			Meera, A. V., John, J., Bindhu, J. S., Sajeena, A., Shanas, S., and Rohith, A. K	2024	Integrated farming for carbon neutrality (Samyojitha Krishi carbon thulanavasthakku: In Malayalam).	KAU		2p.
			Bindhu, J. S.,John, J.,Meera, A. V., Sajeena, A., Shanas, S., and Haznath, T.	2024	Role of millets in integrated farming (Samyojitha krishiyil cherudhanyangalude pradhanyam	KAU		2p.
			Sajeena, A., John, J., Meera, A. V., Bindhu, J. S., and Shanas, S.	2024	Pest-disease management in terrace farming (Roga-keeda niyantranam mattuppavu krishiyil : In Malayalam)	KAU		2p.
			Shanas, S., John, J., Sajeena, A., Meera, A. V., Bindhu, J. S., and Anjukrishnan, G.	2024	Diversity in honeybee (Theneechakalile vaividhyam : In Malayalam)	KAU		2p.
		Alappuzha (OFR)	Sheeja K. Raj., Jacob D., Shalini Pillai, P., Unnikrishnan, D., Innazent, A., Krishnasree, R., and Chacko, S.R.	2024	Crop Protective Herbicide Applicator - News Letter -	Indian Society of Weed Science, ICAR-DWR, Jabalpur		p. 2
4	Madhya Pradesh	Indore	सिंहबी., भगत डी.वी. जादव एम एल एवं कुमावत एन. (2025). जनवरी 2025: 53-56.	2025	जलवायु परिवर्तन परिदृश्य में शुष्क भूमि कृषि	ICAR	9001-15	2025: 53-56
			कुमावत नरेन्द्र एवं चौरे दीपिका (2025).	2025	ग्रीष्मकालीन मुंग उत्पादन की उन्नत तकनीक	कृषक दूत		फ़रवरी 4-10 : पेज 5
			कुमावत नरेन्द्र एवं चौरे दीपिका	2025	ग्रीष्मकालीन मूंगफली से पैदावार एवं आय में बढ़ोतरी	कृषक वंदना मार्च		पेज :2025 7-12
5	Maharash-tra	Akola	डॉ. जे. पी. देशमुख, डॉ. एस, एन पोतकिले, बी. एस	अक्टूबर, 2024	गहू पिकाचे लागवड तंत्रज्ञान	शेतकरी मासिक		पान क्र०१-९ .
			डॉ. जे. पी. देशमुख, डॉ. एस, एन पोतकिले, बी. एस. मोरवाल	नवम्बर, 2024	अन्नद्रव्य कमतरतेचे लक्षणे, कार्य व व्यवस्थापन	शेतीविश्व मासिक		पान क्र. १८-२१

S. No.	State	Name of the centre	Bulletin/Pamphlet/Popular Article					
			Authors	Year	Title of the Bulletin/ Pamphlet/Popular Article	Publisher name	ISBN Number	Volume and Pages
			डॉ. जे. पी. देशमुख, डॉ. एस, एन पोतकिले, बी. एस. मोरवाल	दिसम्बर, 2024	अन्नद्रव्य कमतरतेचे लक्षणे, कार्य व व्यवस्थापन	शेतीविश्व मासिक		पान क्र. २८-३०
			डॉ. जे. पी. देशमुख,डॉ. एस, एन पोतकिले,बी. एस. मोरवाल	जनवरी, २०२५	जमिनीची सुपीकता व सेंद्रिय कर्ब	शेतीविश्व मासिक		पान क्र१२-८१ .
		Wardha (OFR)	डॉ. जे. पी. देशमुख, डॉ. एस, एन पोतकिले, बी. एस. मोरवाल	नवम्बर, 2024	सेंद्रिय कर्ब व जमिनीची सुपीकता	शेतकरी मासिक		पान क्र७३-६३ .
			डॉ. जे. पी. देशमुख,डॉ. एस, एन पोतकिले, बी. एस. मोरवाल	नवम्बर, 2024	हरभरा पिकाचे लागवड तंत्र	शेतीविश्व मासिक		पान क्र४२-१२ .
			डॉ.एकता बागडे, डॉ. मोहन तोटावार, डॉ. एस. एन पोतकिले, डॉ. मेघ डहाळे व श्री. अमान वीर	मार्च २०२५	लिंबूवर्गीय फळ पिकांमधील मंदऱ्हास रोगाचे एकात्मिक व्यवस्थापन	शेतीविश्व मासिक		पान क्र. १९-२०
			डॉ. जे. पी. देशमुख,डॉ. एस, एन पोतकिले,बी. एस. मोरवाल	दिसम्बर, 2024	अन्नद्रव्य कमतरतेचे लक्षणे, कार्य व व्यवस्थापन	शेतीविश्व मासिक		पान क्र. २८-३०
			डॉ. जे. पी. देशमुख, डॉ. एस, एन पोतकिले, बी. एस. मोरवाल	अक्टूबर, 2024	गहू पिकाचे लागवड तंत्रज्ञान	शेतकरी मासिक		पान क्र०१-९ .
			डॉ. जे. पी. देशमुख,डॉ. एस, एन पोतकिले, बी. एस. मोरवाल	नवम्बर, 2024	गहू उत्पादन तंत्रज्ञान	शेतीविश्व मासिक		पान क्र१२-८१ .
			डॉ. जे. पी. देशमुख,डॉ. एस, एन पोतकिले, बी. एस. मोरवाल	दिसम्बर, 2024	अन्नद्रव्य कमतरतेचे लक्षणे, कार्य व व्यवस्थापन	शेतीविश्व मासिक		पान क्र०३-८२ .
		Rahuri	U.S. Surve, A.S. Takate, N.S. Ugale, D.D. Patil, O.S Garad, P.P. Kamble, B.D. Chavan	2024	Progress report 2023-25 Pilot Project for Crop Diversification	AICRP on IFS, Main Center, MPKV, Rahuri		
6	Tamil Nadu	Thanjavur	T.Parthipan, M.P.Manonmani and A.Ramanathan	2024	Technology of Sunnhemp seed production	Valarum Velanmai		
			T.Parthipan, A.Ramanathan	2024	Magimai Miguntha Manpulu uram	Uzhavarin Valarum Velanmai		23-26
		Dindigul (OFR)	N.Satheeshkumar, P.M.Shanmugam,K. Sivasubramanian, S.P. Sangeetha,	2024	Enhancement of farm income through integrated farming systems under farmers holdings in Dindigul District	AICRP on IFS, OFR Dindigul centre, Maize Research Station, Vagarai		

S. No.	State	Name of the centre	Bulletin/Pamphlet/Popular Article					
			Authors	Year	Title of the Bulletin/ Pamphlet/Popular Article	Publisher name	ISBN Number	Volume and Pages
			S. Senthilnathan, S.K. Natarajan, T.Parthiban and T. Selvakumar					
			P.Thukkaiyannan and N. Satheeshkumar	2024	Mechanical weed management replaces chemical weed managementin maize	AgriGate Magazine- An International Multidisciplinary e-magazine	SBN : 978-81 - 965582 - 9-1	July 4 (7} :618-624
		Yethapur (OFR)	செ.க. நடராஜன், சா.ரா. வெங்கடாசலம் மற்றும் சு. இளங்கவி	2024	கொட்டில் முறை ஆடு வளர்ப்பில் விவசாயி பச்சமுத்து அனுபவம்	கால்நடை வேளாண்மை		lஅக்-டோபர் : 44
			செ.க. நடராஜன், சா.ரா. வெங்கடாசலம் மற்றும் பூ.மு. சண்முகம்	2024	பாக்குச் சாகுபடியில் நிழல் பயிர்களின் பங்கு	உழவரின் வளரும் வேளாண்மை		ஜீன் 15(2): 14
			S.K Natarajan., R Gowsalya, S.R.Venkatachalam, P.M Shanmugam and R.Rithiga	2024	Cultivating Success: How Mushroom Farming Transformed a Rural Woman Entrepreneur's Life?	AgriGate- An International Multidisciplinary e-Magazine	ISBN : 978 - 81 - 965582 - 9-1	November 04(11): 192-198
			செ.க.நடராஜன், சா.ரா. வெங்கடாசலம் மற்றும் பூ.மு. சண்முகம்	2024	கேக் தொழிலில் கலக்கும் திவ்ய தர்ஷினி	உழவரின் வளரும் வேளாண்மை		நவம்பர் 16(5): 33-34
			S.K. Natarajan, R. Gowsalya, S.R. Venkatachalam and S. Jaya Prabhavathi	2025	Empowering Farmers Through Fisheries as an unit in Integrated Farming Systems: A Success Story from Thumbal Village	AgriGate- An International Multidisciplinary e-Magazine	ISBN : 978 - 81 - 965582 - 9-1	January 5(1): 520-524

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			Authors	Year	Title of the Bulletin/ Pamphlet/Popular Article	Publisher name	ISBN Number	Volume and Pages
			S.K. Natarajan, R. Gowsalya,R. Rithiga,V. Abirami, S. Elankavi, S.Jaya Prabhavathi, S.R. Venkatachalam and S.Rathika.	2025	A case study on the effectiveness of mulching for cassava farming in Salem District	AgriGate- An International Multidisciplinary e-Magazine	ISBN : 978 - 81 - 965582 - 9-1	January 5 (1): 550-555
			செ.க.நடராஜன், சா. ரா. வெங்கடா-சலம்மற்றும் சா. ஜெயபிரபாவதி	2025	காளான் வளர்ப்பு மூலம் கூடுதல் வருமானம் : விவசாயியின் அனுபவம்.	உழவரின் வளரும் வேளாண்மை		ஜனவரி 15(07): 27-29
7	Telangana	Rajendranagar	Reddy, G.K., Vinay, G., Govardhan, M., Kumari, Ch. P and Chandra, M.S	2024	Popular article Problematic soils and their management-Vyavasaya padipantalu	Department of Agriculture, Govt. of Telangana		June; 45-46
			Vinay, G., Reddy, G. K., Goverdhan, M, Pragathi Kumari, Ch and Chandra, M.S.	2024	Fertigation. Vyavasaya padipantalu	Department of Agriculture, Govt. of Telangana		July; 40-41
			Vinay, G., Reddy, G. K., Goverdhan, M, Pragathi Kumari, Ch and Chandra, M.S.	2024	Backyard Poultry. Vyavaya Padipanthalu	Department of Agriculture, Govt. of Telangana		November 44-45
8	Uttara-khand	Almora (OFR)	Bhatnagar, A., Kumar, A. and Singh, D.K.	2024	Makka me sukshma poshak tatvon ki kami ke lakshon ki pahchan evam nidan	Kisan Bharti. Year 56, Serial 2. November 2024.		
			Amit Bhatnagar, Ajay Kumar, Dinesh Kumar Singh and Pragya Naithani.	2025	Functions, Deficiency Symptoms and Management of 16 Micro Nutrients in Maize.	Indian Farmers' Digest. Volume: 58, No. 03. March 2025. P 16-18.		16-18
			Bhatnagar, A., Kumar, A. and Singh, D.K.	2024	Makka me sukshma poshak tatvon ki kami ke lakshon ki pahchan evam nidan.	Kisan Bharti. Year 56, Serial 2. November 2024.		
			Amit Bhatnagar, Ajay Kumar and Dinesh Kumar Singh	2025	Functions, Causes of Deficiency, Symptoms and Management of Nitrogen in Maize.	Indian Farmers' Digest. Volume: 58, No. 05. May 2025. P 4-6.		

S. No.	State	Name of the centre	Bulletin/Pamphlet/Popular Article					
			Authors	Year	Title of the Bulletin/ Pamphlet/Popular Article	Publisher name	ISBN Number	Volume and Pages
9	West Bengal	Kalyani	Sushanta Saha, M. Ray, S. Chatterjee and S.K. Mukhopadhyay	2024	Integrated Farming System (IFS model) for enhancing Farm income and Family nutrition for small and marginal farmers of the Lower Gangetic Plains of West Bengal	AICRP on IFS, Kalyani Centre	ISBN: 978-93-341-6799-3	1-4

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			Authors	Year	Title of the Book/Book Chapter	Publisher name	ISBN Number	Volume and Pages
1	Bihar	Patna	Sanjeev Kumar, Santosh Kumar, Rakesh kuma, Kirti Saurabh, Sonaka Ghosh, Anup Das and Abhay Kumar	2025	Book- Crop Production in Changing Climate: Package of Practices for Eastern India	ICAR Research Complex for Eastern Region, Patna	978-81-954348-2-4	190
			Sanjeev Kumar, Md. Monobrullah, Shivani, Rakesh Kumar, Santosh Kumar and Arti Kumari	2025	Book Chapter: Crop Production in Changing Climate: Package of Practices for Eastern India	ICAR Research Complex for Eastern Region, Patna	978-81-954348-2-4	30-41
			Sanjeev Kumar, Shivani, Kumari Shubha, Abhishek Kumar, Rakesh Kumar, Anup Das and A K Dubey	2025	Book Chapter: Integrated Farming System Models	ICAR Research Complex for Eastern Region, Patna	978-81-954348-2-4	156-170
2	Jammu and Kashmir	Jammu	Dr. Vijay Khajuria	2025	Smart Agriculture Practices for future Food Security	Daya Publishing House		
3	Kerala	Karamana	Chief Editor: Dr. Jacob John	2024	Package of Practices Recommendations: Crops. 16th edition.	Publisher: Kerala Agricultural University, Thrissur-	SBN-10. 8196912161	434 P.
			Jacob John	2024	Rice scientific cultivation. - Book Chapter -In. Meera	IFSRS, Karamana, KAU		pp7-9

S. No.	State	Name of the centre	Book/Book Chapters					
			Authors	Year	Title of the Book/Book Chapter	Publisher name	ISBN Number	Volume and Pages
					A.V., Jacob John, Sajeena A., Bindhu J.S., ShanaS, S. (Eds.) Diploma in Agricultural Extension Service for Input Dealers (DAESI) Training Manual.			
			Meera A V	2024	Soil formation and properties(Malayalam). In: DAESI-A Training Manual. Meera, A. V., John, J., Sajeena, A., Bindhu, J. S., and Shanas, S. (eds)	IFSRS, Karamana, KAU		PP:20-22
			Bindhu, J. S.	2024	Scientific banana cultivation (Malayalam). In: DAESI-A Training Manual. Meera, A. V., John, J., Sajeena, A., Bindhu, J. S., and Shanas, S. (eds)	IFSRS, Karamana, KAU		pp-54-58
			Bindhu, J. S.	2024	Scientific cultivation of oil seeds (Malayalam). In: DAESI-A Training Manual. Meera, A. V., John, J., Sajeena, A., Bindhu, J. S., and Shanas, S. (eds)	IFSRS, Karamana, KAU		PP 81-83
		Alappuzha (OFR)	Ameena, M., Pillai, P.S., Jacob, D., Shanavas, S., Preethy, S. and Sahoo, C.	2024	Weed flora in rice fields. - Book-	Crown Publishing, Chhattisgarh	ISBN: 978-93-6426-910-0	254p
			Jacob D.	2024	Rice scientific cultivation. - Book Chapter -In. Meera A.V., Jacob John, Sajeena A., Bindhu J.S., ShanaS, S. (Eds.) Diploma in Agricultural Extension Service for Input Dealers (DAESI) Training Manual.	IFSRS, Karamana, KAU		pp. 46-49

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4	Maharash-tra	Rahuri	U.S. Surve, S.D. Gorantiwar, M.G. Shinde, R.C. Agrawal, Prabhat Kumar, S.D. Thorat, R.K. Sonawane, M.A. Tamboli and Shubhangi N. Ghadge	2024	Organic Farming For Sustainable Agriculture	Satish Serial Publishing House, Delhi 110033	IISBN 9789390 660582	1 - 402
			B.D. Bhakare, U.S. Surve, A.G. Durgude, S.D. Gorantiwar, Prabhat Kumar, R.C. Agrawal, M.G. Shinde, Nilima B. Kondvilkar, R.K. Sonawane, S.D. Thorat, Mohasin Tamboli, D.K. Jayswal and S. N. Ghadge	2024	Natural Resources Management in Climate Smart Agriculture	Satish Serial Publishing House, Delhi 110033	ISBN 9789395 700702	1-170
5	Tamil Nadu	Coimbatore	P.M.Shanmugam, S.P.Sangeetha, K.Sivasubramanian, S.V.Varshini and P.Parasuraman	2024	IFS- A path way for food and sustainable income	TNAU, DPM, Coimbatore	ISBN - 9789360 134310	1-96
			P.M.Shanmugam, S.V.Varshini, S.P.Sangeetha, K. Sivasubramanian and P.Parasuraman	2024	Organic farming- Benefits	Department of Agronomy, TNAU, Coimbatore	ISBN 978-93-340-8375-0	1-191
		Dindigul (OFR)	N. Satheeshumar,P. Thukkaiyannan,A. Alagesan, R. Jeyasrinivas,R. Nageswari, R. Radhajeyalakshm and S. K. Natarajan	2024	Book- Manavari sagupadi uthigal	Pachai boomi, Guduvanchery, Chengalpattu	978-81-965425-9-7	1-162

S. No.	State	Name of the centre	Book/Book Chapters					
			Authors	Year	Title of the Book/Book Chapter	Publisher name	ISBN Number	Volume and Pages
		Yethapur (OFR)	S.K. Natarajan, P. M. Shanmugam, N. Ravisankar, S. R. Venkatachalam, R. Gowsalya, N. Satheesh Kumar, K. Sivasubramanian, T. Parthipan, S.P.Sangeetha, S. Sethilnathan, M.K. Kalarani,P. Parasuraman,R. Rithiga,S. Elankavi.	2024	Value chain management in Integrated Farming system	Tapioca and Castor Research Station, Yethapur	978-81-981359-9-5	1-168
			S.R. Venkatachalam,M. Velmurugan,S. K. Natarajan,P. Arutchenthil,R. Vijayan,P. Veeramani,S.	2024	Contemporary Techniques for profitable cassava cultivation	Tapioca and Castor Research Station, Yethapur	978-81-981359-6-4	1-123
			Elankavi,S. Jaya Prabhavathi,A. Sangeetha,S. Ranjith Raja Ram,S. Mullaimaran,M.K. Kalarani.					
			S.R. Venkatachalam,S. K. Natarajan,P. Arutchenthil,P. Veeramani,R. Vijayan,M. Velmurugan,S. Elankavi,S. Jaya Prabhavathi,A. Sangeetha,S. Ranjith Raja Ram,S. Mullaimaran,M.K. Kalarani.	2024	Modern Techniques for Profitable Castor Cultivation	Tamil Nadu Agricultural University, Tapioca and Castor Research Station, Yethapur	978-81-981359-0-2	1-123

S. No.	State	Name of the centre	Book/Book Chapters					
			Authors	Year	Title of the Book/Book Chapter	Publisher name	ISBN Number	Volume and Pages
			சா. ரா. வெங்கடாசலம்,மு. வேல்முருகன், செ.க.நடராஜன், ப. அருட்செந்தில்,பெ. வீரமணி,இரா. விஜயன்,சு. இளங்கவி,சு. முல்லைமாறன், சா. ஜெயபிரபாவதி,அ. சங்கீதா,	2024	இலாபகரமான மரவள்ளி சாகுபடி தொழில் நுட்பங்கள்	தமிழ்நாடு வேளாண்மை பல்கலைக் கழகம், மரவள்ளி மற்றும் ஆமணக்கு ஆராய்ச்சி நிலையம், ஏத்தாப்பூர்	978-81-981359-1-9	1-136
			ச. ரஞ்சித் ராஜா ராம்,எம். கே. கலாராணி	2024	வளம் தரும் ஆமணக்கு சாகுபடிக்கான நவீன தொழில் நுட்பங்கள்	தமிழ்நாடு வேளாண்மை பல்கலைக் கழகம், மரவள்ளி மற்றும் ஆமணக்கு ஆராய்ச்சி நிலையம், ஏத்தாப்பூர்	978-81-981359-2-6	1-130
6	Uttara-khand	Almora (OFR)	Singh, D.K.	2025	Integrated Farming Systems :An Approach for Sustaining Farming in Hills.	In Proc. of CAFT on “Natural Farming for Food and Nutritional Security”. (January 16 - February 05,2025). Pantnagar		p 71-77.
			Verma, N., Chaudhary, V.P., Malik, S., Bhanu, C., Kumar, A., Nath, A., Verma, A. Kumar, Dinesh, Ravisankar, N., Prusty, A K., Nirmal, Jat, P. C., Kumar, Sunil.	2024	Augmenting nutritional and livelihood security of tribal farmers in Uttarakhand	Published by ICAR-Indian Institute of Farming Systems Research, Modipuram, Meerut, Uttar Pradesh - 250 110. IIFSR Bulletin No.04/2024, pp. 1-30		1-30

8.2 VIII (XXXVI of project) BIENNIAL WORKSHOP of AICRP on Integrated Farming Systems

The 8th (XXXVI of project) biennial workshop of ICAR-AICRP on Integrated Farming Systems was organized during 2-5 December 2024 at PAU Ludhiana in which review of on-going research programmes of on-station and on-farm centres including Tribal Sub Plan (STC), Scheduled Caste Sub Plan (SCSP), administrative and financial issues were undertaken besides discussion on modifications in the existing programmes, review of Pilot Project for Crop diversification and special lectures. All the Scientists working in the AICRP-IFS from on-station, on-farm centres and ICAR Institute centres participated. A total 123 scientists from 34 universities, 8 ICAR institutes and 1 Central University from 25 states and union territories participated.

The 8th (XXXVI of project) biennial workshop of ICAR-AICRP on Integrated Farming Systems was inaugurated by Dr S.K. Chaudhari, DDG (NRM) as Chairman and Dr Satbir Singh Gosal, Vice Chancellor, PAU as Chief Guest in the Dr B.P. Pal Auditorium of PAU, Ludhiana. The workshop focused on evaluating the current multi-location on-station and on-farm research on IFS, fostering innovation, and advancing integrated farming systems (IFS) as a solution to environmental and economic challenges. The inaugural session was Chaired by Dr S.K. Chaudhari, DDG (NRM) with the presence of Dr. Satbir Singh Gosal, Vice-Chancellor of PAU as the Chief Guest. Dr. Rishipal Singh, IAS, Registrar, PAU, Dr. Parvinder Sheron Director, ICAR-ATARI, Dr. Hanuman Sahay Jat, Director ICAR-Indian Institute of Maize Research; Dr. Sunil Kumar, Director, ICAR-IIFSR, Dr. Ajmer Singh Dhatt, Director (Research), PAU and Dr. N. Ravisankar, Project Coordinator also graced the inaugural session as Guest of Honour and Special Invitees. In his inaugural address, Dr. Satbir Singh Gosal, Vice Chancellor, PAU underscored the importance of sustainable practices through IFS in tackling environmental challenges and enhancing agricultural profitability. He highlighted PAU's adoption of integrated farming models benefiting 300 farmers, promoting environmental health and economic resilience. Dr. Gosal also stressed the need for crop diversification and innovation to ensure self-reliance in agriculture. Dr. S.K. Chaudhari, DDG (NRM) in his keynote speech, referred to the workshop as a landmark event, emphasizing the shift from mere productivity to nutritional security and sustainability. He commended project centers for developing sustainable farming solutions and emphasized the importance of natural resource conservation and urged researchers to focus on market-driven, resource-efficient farming solutions to transform Indian agriculture. Dr. Sunil Kumar, Director, ICAR-IIFSR highlighted the significance of balancing food production, nutritional security, and environmental conservation through innovative farming systems. During the workshop, Dr. N. Ravisankar, Project Coordinator, AICRP-IFS presented the progress report for 2023-24, outlining achievements and plans for advancing IFS research in the country. Dr. Ajmer Singh Dhatt, Director of Research, PAU in his welcome address, stressed the importance of collaboration between research institutions and farming communities to develop sustainable, community-focused farming models, particularly for small and medium-scale farmers. Dr. Hanuman Sahay Jat, Director, ICAR-IIMR, urged agricultural scientists to devise innovative strategies to combat climate change impacts in farming. Dr. Parvinder Sheron Director, ICAR-ATARI emphasize on need for collaboration with KVKs in refining the IFS models and validation of management packages developed under the scheme. Chairman and Chief Guest released the annual report of the project, newly published literature, and video documentaries showcasing work done by centres of AICRP-IFS. The session concluded with a vote of thanks by Dr. Sohan Singh Walia, Chief Agronomist, PAU and event coordination by Dr (Mrs). Hina Goyal, Teaching Assistant (English), PAU. Review of on-going activities of AICRP-IFS and Pilot Project for Crop Diversification was held during the workshop apart from discussion on modifications in the on-going activities. The salient recommendations emerged are given below which was approved by ICAR for implementation vide letter F.No. NRM/7-10/2020-AFC (Comp.91301) dated 1 January 2025.

1. Climate Resilience Indicators (CRI) for integrated farming systems must be defined and quantified. A Focused Group Discussion (FGD) should be organized in collaboration with NICRA (National Initiative on Climate Resilient Agriculture), ICAR-CRIDA, Hyderabad, to finalize these indicators.

2. The GHG estimator tool developed for IFS should be calibrated using actual measurements from the IFS model at Ludhiana, Coimbatore, Rajendranagar, Jorhat, and Raipur.

3. The Self-Reliance Status (SRS) of Integrated Farming System (IFS) models, particularly concerning mineral fertilizer savings through recycling, should be evaluated using organic composts instead of raw materials based nutrient composition.

4. Potential for off-season employment generation through IFS models should be analyzed on a gender-specific basis across all agro-climatic zones.

5. Upgrading the skill and knowledge of marginal and small farmers is crucial for adopting customized prototype IFS models developed by the centers. Therefore, skill development modules, training programs, and learning resources on IFS models should be created in collaboration with the Agricultural Skill Council of India (ASCI).

6. State-specific policy briefs on Integrated Farming Systems and crop diversification should be developed, emphasizing benefits beyond yield and income. These briefs should be shared with state authorities for effective dissemination.

7. State-specific documents should be prepared, detailing district profiles, major constraints in existing farming systems, and alternative efficient cropping and farming systems along with logistical requirements. These documents should be shared during ICAR Regional Committee meetings and other state-level consultations.

8. Centers should be encouraged to publish research findings in Impact Factor (IF) journals to showcase their work on an international platform. Providing technical and financial support to these centers is essential to facilitate this effort.

9. Each center (main, sub-centers, OFR, and ICAR institutes) should be linked with a KVK within their jurisdiction to facilitate the transfer of IFS and cropping systems recommendations for inclusion in OFTs/ FLDs and related initiatives.

9. APPENDIX

APPENDIX I

APPENDIX IA : WEATHER PARAMETERS (MONTHELY AVERAGES RAINFALL) AT DIFFERENT FARMING SYSTEM CENTERS DURING 2023-24

AICRP on IFS Centres	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Akola	23.20	381.6	404.8	158.1	33	94	1	3.5	0	7.6	25.8	1.0
Ayodhya	81.6	189	242.8	222	11	2.4	2	4.4	0	16.4	44.6	68.2
Bhubneswar	144.8	212.5	489.2	413.8	269.3	19.5	21.3	0.0	22.6	11.7	68.9	114.7
Chiplima	338	331.8	347.4	242	86.6	0	37.2	37.2	27.8	50	9.6	73.4
Coimbatore	14.6	47.5	1.3	11.8	34.5	391.7	56.5	34.9	0	0	0	175.8
Durgapura	22.9	32.8	422.0	70.0	2.0	14.7	0.0	8.0	0.0	6.0	0.0	90.0
Hisar	107.3	16.6	14.2	19.2	0.0	5.5	0.0	13.1	43.2	6.8	0	33.8
Indore	187.9	362.51	65.8	554	0	60.4	0	0	0	2.6	6.2	66
Jabalpur	297.4	258.6	494.7	246.1	0.6	0.0	50.0	14.9	20.1	17.5	16.5	65
Jammu	70	460.4	339	339	48.2	24.8	9.6	51.8	0.4	65.4	71.4	138.4
Jorhat	350.0	405.9	350.7	260.0	190.0	17.5	4.2	15.3	2.4	30.5	5.0	60.0
Junagadh	290.0	450.0	802.0	152.9	50.8	0.0	2.4	0.0	0.0	0.0	1.5	55.4
Kalyani	142.7	172.6	203.1	166.7	175.5	3.1	77.1	72	23.3	50.9	5	188
Kanpur	81.2	267.9	182.4	149.8	19.1	6.6	11.8	11.2	59.6	0	2	0
Karmana	0.3	140.0	20.1	384.5	504.4	179.6	57.1	6.9	17.8	52.6	74.4	547.9
Kathalagere	37.3	199.40	26.50	47.70	0.00	110.80	0.00	9.00	0.00	0.00	0.00	128.70
Kota	95.8	505	48.2	125.7	0.0	25.4	16.3	27.0	1.5	4.5	7.8	3.8
Ludhiana	94.0	212.4	77.6	55.0	34.0	28.6	0.0	16.4	20.0	62.1	5.0	0.0
Maruteru	102.4	450.8	180.9	360.4	406.5	260.0	1.0	2.0	0.0	0.0	8.5	36.5
Navsari	397.00	1010.70	69.00	289.00	9.00	42.00	52.00	2.00	1.00	0.00	8.40	152.60
Palampur	70	635.4	912.8	243.2	38.6	17.2	56	83.6	36	133.2	181.7	135.4
Pantnagar	125.6	619.8	373	301.8	7.4	0	1	25	14.2	60.8	3	0.8
Parbhani	42.0	297.6	141.0	102.5	0.0	123	3.0	1.0	20.4	4.2	59.3	46.2
Portblair	653.5	622.1	443.7	940.1	307.5	360.2	91.1	150	2.9	0	67	378
Powarkheda	304	160.5	905.3	72.4	11.2	0	8.6	2.7	6.4	2.0	0.0	70.0
Rahuri	77.2	160	24	207	15.4	60.8	3.8	6.2	1.2	0	7.6	10.6
Raipur	226.4	395	405	240	78.5	14.8	11.4	10.4	2.5	1.5	16	52.3
Rajendranagar	159	379	41.4	270.8	3	10.6	3.8	5.4	2.3	0	25	63.6

AICRP on IFS Centres	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Ranchi	91.6	276.8	193.8	497.8	223.7	2	38.8	35	46	31	4	13
Rewa	88.0	333.0	333.0	470.7	68.4	10.6	5.6	1.8	45.6	15.0	2.3	19.0
Rudrur	132	616.6	128	304.2	1	54.4	1	0.00	0	3.4	24.80	84.00
Sabour	253.8	198.6	358.2	445.6	222.0	0.0	8.0	0.0	1.8	6.5	0.0	81.9
Siruguppa	103	253.1	125.1	191.0	152.0	35.0	1.2	3.4	6.7	0.0	9.6	45.9
SK Nagar	85.0	205.0	806.0	172.0	52.0	2.0	1.0	0.0	0.0	4.1	0.0	12.3
Thanjavur	99.5	54.4	54.4	129.5	35.8	104.7	69.1	80.6	1.2	0	3.1	55.4
Umiam	501	704.6	200	795	486	82.3	26.4	0	29.5	36.4	72.4	273.4
Varanasi	103.2	155.4	139.6	83.3	130.8	4.4	7.5	7.6	39.6	11	0.00	0.00

APPENDIX II

Maximum and minimum temperature(^{0}C) (June 2023 to May 2024)

	June		July		August		September		October		November		December		January		February		March		April		May	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Akola	24.30	23.20	21.20	23.50	22.75	22.70	20.38	22.00	16.93	19.60	13.34	13.60	11.30	12.00	10.98	16.20	12.73	14.60	16.52	19.30	21.25	23.50	23.42	26.20
Ayodhya	38.68	26.04	33.97	26.66	33.24	25.97	33.22	24.93	31.73	18.98	28.30	14.07	23.65	9.65	18.58	7.15	27.46	9.71	30.65	14.98	36.18	19.23	36.68	22.26
Bhubneswar	40.16	27.04	33.20	26.78	32.78	26.23	33.07	25.41	33.52	24.67	31.66	21.30	28.77	18.24	27.60	14.77	28.75	17.90	33.62	21.37	35.36	24.25	39.57	25.47
Chiplima	39.66	25.72	32.80	25.79	31.59	25.40	33.10	25.24	33.42	21.80	32.03	18.19	27.58	13.55	27.42	14.70	31.24	18.27	33.59	20.29	36.26	21.85	38.26	24.58
Coimbatore	33.78	24.03	31.16	23.36	23.51	33.52	23.81	32.51	23.61	32.90	22.93	29.97	32.74	25.66	29.16	21.50	32.90	21.99	35.55	23.59	37.80	25.73	34.40	24.62
Durgapura	38.20	26.20	36.50	27.30	32.40	24.10	34.40	24.00	34.30	18.60	28.40	14.50	25.00	9.70	22.60	8.50	28.50	12.60	34.10	17.60	37.10	21.60	37.50	24.50
Hisar	34.95	27.06	35.85	26.68	35.80	25.01	33.39	17.74	27.19	12.79	22.52	7.14	14.23	6.01	22.27	7.50	28.06	12.08	35.57	17.78	41.84	24.23	37.60	24.60
Indore	35.27	24.63	28.97	24.00	27.54	23.14	28.82	22.72	32.50	18.32	28.37	14.20	23.64	11.25	23.56	8.29	31.39	11.18	32.10	17.19	37.84	22.61	38.00	23.96
Jabalpur	33.82	26.06	32.55	25.59	29.99	24.07	31.66	24.14	31.94	18.36	30.21	13.24	24.71	10.98	23.42	9.94	26.83	12.13	32.46	14.70	36.87	20.79	37.10	23.40
Jammu	38.50	35.60	33.51	25.84	34.08	25.98	34.08	25.98	31.20	17.31	25.80	10.03	20.96	5.68	15.89	5.07	24.54	8.04	27.12	12.61	32.22	15.97	34.13	19.09
Jorhat	31.40	25.30	32.00	25.00	33.50	25.40	32.60	24.90	32.40	23.40	22.70	15.90	24.00	10.90	23.40	10.40	27.80	11.90	29.60	16.80	31.40	18.70	31.70	19.00
Junagadh	39.40	26.50	32.60	26.70	30.40	25.60	33.20	25.80	35.40	23.40	33.00	17.80	30.80	14.50	28.40	11.10	33.60	14.60	38.00	19.70	40.60	23.50	38.90	25.90
Kalyani	35.11	26.83	34.19	26.44	33.20	26.06	32.47	25.87	31.82	23.07	30.10	18.00	25.46	13.89	22.17	10.93	27.33	15.08	31.35	19.37	37.90	24.94	35.50	25.62
Kanpur	35.40	34.60	34.30	26.90	33.42	26.10	33.58	24.65	33.05	18.60	28.28	13.36	22.85	9.38	17.30	6.98	24.88	11.13	30.75	14.53	38.83	21.43	41.10	26.14
Karamana	29.92	24.29	30.43	24.77	31.59	25.35	29.96	24.45	30.16	24.38	31.04	23.81	31.94	24.50	31.44	23.82	31.97	24.27	32.84	25.07	33.49	26.70	31.99	26.06
Kathalagere	32.57	22.73	28.12	21.86	30.09	21.27	29.10	21.37	32.35	21.01	31.04	20.31	32.09	18.31	32.04	17.56	36.20	18.85	38.77	21.99	39.20	23.87	36.65	24.36
Kota	39.00	38.20	35.04	22.39	33.44	25.39	33.78	25.51	35.12	21.10	29.83	16.11	23.73	11.48	20.07	7.65	25.48	9.43	32.82	13.91	39.17	22.55	44.04	28.36
Ludhiana	36.83	26.28	33.09	27.42	34.63	27.41	33.21	25.03	30.77	17.81	26.25	13.15	20.69	7.84	13.61	6.07	21.24	8.36	26.61	13.02	34.05	18.87	40.21	24.21
Maruteru	33.50	22.50	31.50	26.60	30.50	25.30	31.20	27.60	30.20	26.10	30.80	23.10	29.90	21.60	29.50	20.30	29.30	21.40	31.40	29.50	33.70	25.30	33.40	24.40
Navsari	33.15	26.78	29.65	24.83	30.70	25.13	31.65	24.28	35.15	21.41	33.11	19.27	31.08	16.99	30.39	14.15	32.85	15.31	34.31	16.58	37.33	22.13	34.48	23.96

	June		July		August		September		October		November		December		January		February		March		April		May	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
Palampur	31.00	19.23	27.92	19.90	27.10	19.22	26.20	16.90	25.20	12.73	21.70	8.85	19.16	5.32	16.03	4.28	20.44	7.90	21.30	9.23	24.46	12.14	27.25	14.98
Pantnagar	36.60	23.96	32.48	26.34	32.30	25.73	32.70	24.73	31.62	17.58	27.70	12.70	23.55	7.80	14.65	6.75	23.00	7.75	26.70	10.80	15.00	16.65	38.74	24.06
Parbhani	37.30	24.95	30.75	23.00	31.64	22.16	31.00	22.15	33.24	17.20	30.68	16.90	28.13	13.25	29.96	13.30	33.65	15.30	37.00	18.45	38.75	22.75	40.48	24.64
Port Blair	30.90	25.30	30.30	25.00	30.40	25.40	28.80	24.00	30.70	24.80	31.00	25.40	31.00	26.00	30.70	24.60	30.90	24.20	32.10	24.20	32.5	23.4	31.1	24.1
Powarkheda	39.60	19.60	38.80	22.30	37.40	21.50	36.50	23.20	35.80	14.60	34.60	12.90	31.60	8.60	28.90	5.60	34.40	5.50	40.10	11.30	41.70	12.50	41.60	20.60
Rahuri	35.77	25.57	29.56	24.08	29.93	23.50	30.73	23.63	32.91	21.32	31.00	18.61	28.82	16.00	29.17	14.19	31.42	14.98	35.03	19.73	38.65	22.57	39.33	24.30
Raipur	39.24	26.50	35.60	26.30	33.40	25.10	32.10	24.40	30.70	22.80	30.40	18.50	28.90	14.70	28.40	14.80	31.70	19.50	35.10	22.40	39.70	25.10	41.10	28.40
Rajendranagar	36.76	25.56	29.16	23.32	31.48	23.18	29.57	22.23	32.13	19.78	30.30	19.78	29.75	16.88	30.12	16.20	33.83	17.75	36.58	21.63	39.58	24.58	37.83	24.50
Ranchi	37.87	27.06	32.91	23.24	31.52	22.52	31.35	22.01	29.13	18.87	25.98	14.45	23.53	7.90	26.50	7.40	26.15	11.22	27.21	14.52	36.62	19.53	36.65	25.07
Rewa	39.53	26.53	34.58	26.46	34.58	26.46	32.37	25.22	31.40	23.50	29.95	22.20	24.55	11.26	21.70	8.76	25.73	11.62	31.56	14.46	39.01	19.97	41.21	24.31
Rudrur	37.89	25.76	30.12	23.39	31.07	23.17	30.03	23.24	32.30	19.44	30.96	19.14	28.21	15.66	29.29	18.04	32.17	18.69	35.53	21.83	39.27	24.57	40.03	25.35
Sabour	38.38	25.37	33.76	26.12	33.30	25.52	33.24	25.17	32.13	21.01	30.00	15.59	25.04	10.98	19.91	7.41	25.14	11.08	29.40	15.62	37.97	21.32	35.72	24.63
Sirruguppa	35.60	24.60	34.70	16.20	32.40	21.50	31.60	22.00	31.00	19.30	32.50	21.50	39.50	17.40	31.70	19.50	33.80	29.50	38.00	24.70	40.60	26.30	39.40	26.40
S.K Nagar	39.40	26.40	38.40	26.90	34.10	25.50	34.00	24.30	35.60	19.70	33.80	14.80	27.60	8.60	24.80	8.50	35.80	11.30	37.40	16.40	40.50	21.30	40.90	24.80
Thanjavur	36.54	25.00	35.17	24.39	35.63	23.91	34.39	23.40	33.35	22.74	29.82	21.83	29.31	14.65	29.51	19.08	32.73	20.65	34.64	21.15	36.45	24.41	35.48	17.74
Umiam	27.00	21.60	25.00	20.60	28.70	21.80	27.90	20.40	26.70	18.60	24.30	10.90	21.60	8.90	21.20	7.50	23.40	9.40	27.90	12.80	29.80	15.20	26.40	17.40
Varanasi	39.83	24.43	35.74	26.44	32.95	23.95	33.86	25.90	32.71	21.13	29.49	16.52	23.97	13.09	18.79	9.35	25.11	13.54	30.81	14.66	39.10	22.53	40.70	23.65

APPENDIX III

CENTRE-WISE STAFF POSITION

1. AAU JORHAT (ASSAM)	
Main Centre, Jorhat	
Chief Agronomist	Dr.Debasish Borah
Junior Agronomist	Ms. Lipika Talukdar
Jr. Soil Scientist	Mr. Bhabesh Gogoi
SRF,Veterinary	Dr. Jahnabi Jyoti Kalita
On-Farm Centre, Golaghat	
Jr. Agronomist	Mr. Ajoy Sankar Bora
Jr.Economist	Mrs. Monisha Borah
Field assistant	Mr. R. Borah
Field assistant	Mr. P.Dutta
Field assistant	Mr. A.K.Borthakur
Driver	Sri Suresh Boro
LDA	Mrs. D.J.Saikia
Messenger	Sri Bubul Borsaikia
2.ANGRAU, Guntur (A.P.)	
Sub Centre, Maruteru	
Agronomist	Dr. B.Sahadeva
Technical Asstt.	A. S. Saibaba Reddy
On-Farm Centre, Vizianagaram	
Agronomist	Dr. Tejeswara Rao
Field assistant	Mr.N.Murali Mohan Rao
Field assistant	Mr. B.V.A. Satyanarayana
Field assistant	Mr. A.V.Ramana
Field assistant	Mr. K.Gopi
Driver	Vacant
3. BAU, Sabour (BIHAR)	
Main Centre, Sabour	
Chief Agronomist	Dr. Sanjay Kumar
Jr. Soil Scientist	Sri Anupam Das
Jr. Agronomist	Dr. Sushant
Technical Asstt.	Vacant
S.R.F.	Dr. Satyaveer Singh
On-Farm Centre, Saharsa	
Agronomist	Dr.(Mrs.) Sneha Kumari
Jr. Economist	Mrs Ashwini Choudhary
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Driver	Vacant
4. IGKVV, RAIPUR (CHHATISSGARH)	
Main Centre, Raipur	
Chief Agronomist	Dr. Adikant Pradhan
Jr. Soil Scientist	Shri Vinod Nayak
Jr. Agronomist	Shri Sunil Kumar Agrawal,
Technical Asstt.	Mr. B.K.Chandrakar
On-Farm Centre, Bastar	
Agronomist	Dr. P. K.Salam
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Driver	Vacant
5. SDAU, S.K.NAGAR (GUJRAT)	
Main Centre, S K Nagar	
Chief Agronomist	Dr.L. J. Desai
Jr. Soil Scientist	Mr. P.K.Patel
Jr. Agronomist	Dr. K. M. Patel
Technical Assistant	Vacant
Junior Agronomist	Vacant
Senior Research Fellow	Vidhi K Patel
Senior Research Fellow	Neha G. Chaudhary
Agriculture Officer	Mr.J.K.Gami
Senior Clerk	Vacant
OFR- Khedbrahma	
Agronomist	Vacant(Additional Charge hold by Dr. M.S Dabhi)
Jr. Economist	Vacant(Additional Charge hold by Dr. M.S Dabhi)
Field Assistant	Mr.A.K.Goswami
Field Assistant	Mr. P.M.Kalotara
Field Assistant	Mr.R.M.Patel
Field Assistant	Charge hold by Mr. D. P. Parekh

Driver	Mr. D.A.Chauhan
On-Farm Centre, Dantiwada	
Agronomist	DrJ.J.Mistri
Jr. Ag Economist	Dr. R.R.Patel
Field assistant	Mr.A.K Goswami
Field Assistant	Mr. M.N.Prajapati
Field Assistant	Mr. D.P. Parekh
Field Assistant	Mr. S.S.Patel
Driver	Vacant
6. JAU,JUNAGADH (GUJARAT)	
Sub Centre, Junagadh	
Agronomist	Dr. R. M. Solanki
Technical Asstt.	Shri K. K. Sarvaiya
7. NAU, Navsari (GUJRAT)	
Sub Centre, Navsari	
Agronomist	Dr. L.K. Arvadiya
Technical Asstt.	K.M. Patel
8. AAU, ANAND (GUJRAT)	
On-Farm Centre, Dahod, Devgadh	
Agronomist	.Dr. Y.B. Chauhan
Field assistant	Mr. D.J. Gohil
Field assistant	Mr.V.H. Rathva
Field assistant	Mr. P.G. Solanki
Field assistant	Mrs. R.S. Thakor
Driver	Mr. B.S.Patel
9. CCS HAU, HISAR (HARYANA)	
Main Centre, Hisar	
Chief Agronomist	Dr. R.S.Dadarwal
Assistant Scientist (Agronomy)	R. D. Jat
Jr. Soil Scientist	Dr. Ritambhara
Technical Asstt.	Vacant
OFR Centre, Rewari	
Agronomist	Dr. Anil Mehta
Jr. Economist	Dr.(Mrs.) Kavita Yadav
Field Assistant	Mr.Mahinder Singh
Agril. Inspectors	Sh. Sadi Lal
Agril. Inspectors	Sh. Mahinder Singh
Agril. Inspectors	Sh. Sat Narain
Agril. Inspectors	Sh. Gaya Lal
Driver	Jitender

10. CSK HPKVV, PALAMPUR (H.P.)	
Main Centre, Palampur	
Chief Agronomist	Dr. Dhanbir Singh
Jr. Soil Scientist	Dr. Sanjay K Sharma
Jr. Agronomist	Dr. G.D.Sharma
Technical Asstt.	Sh. Manohar Lal
On-Farm Centre, Kullu	
Agronomist	Dr.Vinod Kumar Sharma
Field assistant	Sh. Ramesh Chand
Field assistant	Sh. Gurmeet Singh
Field assistant	Mr.Saran Das
Field assistant	Mani Raj
Driver	Mr. Ashok Kumar
11. SKUAST, Jammu (J&K)	
Main Centre, Chatta, Jammu	
Chief Agronomist	Dr. N.P. Thakur
Jr. Soil Scientist	Dr.N. P.Thakur
Jr. Agronomist	Dr. Vijay Khajuria,
Technical Asstt.	Vacant
SRF Animal Science	Vacant
SRF Horticulture	Vacant
OFR Centre, Udhampur Jammu	
Agronomist	Dr. A.K.Gupta
Field assistant	Kuldeep Sharma
Field assistant	Dheeraj Rajwal
Field assistant	Vikas Koul
Driver	Mohd.Saleem
12. BAU, Ranchi (JHARKHAND)	
Main Centre,Ranchi	
Chief Agronomist	Dr. S. Karmakar
Jr. Soil Scientist	Mr. A. N. Puran
Jr. Agronomist	Mr.R.P.Manjhi
Technical Assistant	Sri R. B. Singh
SRF	Dr. Piyush Kumar Bhargaw
SRF	Dr. Rahul Kumar
Junior Steno	Mr. Pawan Kumar Mahto
Supporting staff	Vacant
On-Farm Centre, East Singhbhum	
Agronomist	Dr.Shambhu Saran Kumar
Field assistant	Rajesh Kujur
Field assistant	Sri Parwej Alam

Field assistant	Anant Kumar Mandal
Field assistant	Tulsi Baitha
Young Professional -1	Vacant
Junior steno	Vacant
Supporting staff	Vacant
Driver	Md. Sarif Ansari
13. UAHS, Shivamoga	
Main Centre, Kathalagera	
Chief Agronomist	Dr.H.G.Sannathimmappa
Jr. Soil Scientist	Dr Ramya H S
Jr. Agronomist	Dr Sharanappa Kuri
Technical Asstt.	Dr. Chandru Patil
14. UAS, Banglore (KARNATAKA)	
On-Farm Centre, Chikkaballapura	
Agronomist	Dr.M.T.Sanjay
Jr.Scientist	Dr. Mahin Sharif/Dr.Anjan kumar M J
Field assistant	Mr.Sunil Kumar
Field assistant	Mr. Narayanaswamy
Field assistant	Mr. Basavaraja
Field assistant	Mr. ALN Gowda
Driver	Jagadeesh, M. K.
15. UAS, Raichur	
Main Centre, Siruguppa	
Principal Scientist (Agronomy)	Dr. C.M.Kalibavi,
Jr. Soil Scientist	Dr. Ashok Kumar Gaddi
Jr. Economist	Dr.Prabhuling Tewari
Technical Asstt.	Mr.Erappa Yankannvar
16. UAS, Dharwad (KARNATAKA)	
On-Farm Centre, Dharwad (KARNATAKA)	
Agronomist	Dr R.B.Neglur
Field assistant	Mr. V.D. Kalwad
Field assistant	Mr. R.S. Hiremath
Field assistant	Mr.V.D.Kalawad
Field assistant	Mr. V.G. Chickmath
Driver	Mr. U.S. Athanimath
17. KAU, THRISSUR (KERALA)	
Main Centre, Karmana (Thiruvandrum)	
Chief Agronomist	Dr.Jacob John
Jr. Soil Scientist	Dr.Meera.A.V.
Jr. Agronomist	Dr.(Mrs.)Bindhu J.S.
Technical Asstt.	Ms Revathy M R/ Aswani K Vinod/ Veena Raj S S/ Sree Lekshmi M Pillai
Senior Research Fellow	Smt. Sheeba U.
Junior Steno/Typist	Vacant
Supporting (Skilled)	Vacant
On-Farm Centre, Thiruvananthapuram/ Kayamkulam	
Agronomist	Dr. D. Jacob
Jr. Ag. Economist	Miss Sreena K.S./Dr Atul Jayapal
Field assistant	Smt. Bindu V S
Field assistant	Mrs. Smitha P.
Field assistant	Mrs Melany Treesa Jose
Field assistant	Mr Mohammed Faisal K L
Driver	Vacant
Young Professional	Mr Sreerag
Administrative	Vacant
Supporting	Vacant
18. JNKVV, Jabalpur (M.P.)	
Main Centre,Jabalpur	
Chief Agronomist	Dr. P. K. Mishra
Chief Agronomist	Dr. P.B. Sharma
Jr. Soil Scientist	Vacant
Scientist (Agronomy)	Dr. R.P.Sahu
Jr. Agronomist	Dr. Vikas Gupta
Technical Asstt.	Dr. Abhijeet Dubey
Sub Centre, Rewa	
Agronomist	Dr.B.M.Mourya
Tech.Assistant	Vacant
Sub Centre, Powerkheda	
Agronomist	Dr. Vinod Kumar
Tech.Assistant	Shri. Sudhir Dubey
On Farm Centre, Mandla	
Agronomist	Dr. Manisha Shyam
Field assistant	Shri Sunil kumar Malviya
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant

Driver	Vacant
On Farm Centre, Umaria	
Agronomist	Dr. Namrata Jain
Field assistant	Shri Deepak Singh Marko
Field assistant	Shri Rakesh Mobia
Field assistant	Vacant
Field assistant	Vacant
Driver	Vacant
19. RMVRSUA&T GWALIAR, (M.P.)	
Sub Centre, Indore	
Agronomist	Dr Narendra Kumawat
Technical Asstt.	Shri N.K. Sinha
20. MPKV, RAHURI (MAHARASHTRA)	
Main Centre, Rahuri	
Chief Agronomist	Dr U S Surve
Jr. Agronomist	Dr.N.S.Ugale
Jr.Soil Scientist	Dr. A. S. Takate
Field Assistant	Mr.B.K.Jadhay
On Farm Centre, Padegaon, Palghar	
Agronomist	Dr. S.S. Pinigari
Jr.Economist	Dr Yashawant C Sali
Field Assistant	Shri R. K. Chaudhari
Field Assistant	Shri A. G. Nikrad
Field Assistant	Shri B. K. Pisal
Field Assistant	Vacant
Driver	Vacant
21. PDKV, AKOLA (MAHARASHTRA)	
Main Centre, Akola	
Chief Agronomist	Dr. J. P. Deshmukh
Jr. Agronomist	Shri B.S.Morval
Jr.Soil Scientist	Dr. D.S. Kankal,
Technical Assistant	Mrs. P. N. Kalane
On-Farm Centre, Katol, Nagpur	
Agronomist	Dr. S.N. Potkile
Field Assistant	Mr.S.D.Kadam
Field Assistant	Mr. R. S. Ghorpade
Field Assistant	Miss Sharda G. Bunde
Field Assistant	Vacant
Driver	Vacant

22. MAU, Parbhani (MAHARASHTRA)	
Main Centre, Parbhani	
Chief Agronomist	Dr.Anand K. Gore
Jr.Agronomist	Dr. S.P. Chenalwad,
Jr.Soil Scientist	Dr.S.T. Shirale
Tech. Assistant	Shri. D. Y. Chavan
On Farm Centre, Nanded	
Agronomist	Dr. A.D. Pandagale,
Field Assistant	Shaikh Ilahi Shaikh Lal
Field Assistant	Mr.A.U.Dukre/Mr.A.U.Dukre
Field Assistant	N.V.Kadam
Field Assistant	Vacant
Driver	Vacant
23. DBSKKV, Dapoli (MAHARASHTRA)	
Main Centre, Karjat	
Chief Agronomist	Dr. V.V. Sagvekar
Jr. Soil Scientist	Dr.D.G.Jondhale
Jr. Agronomist	Dr. N.V. Mhaskar
Technical Asstt.	Shri. D. J. Shet
On Farm Centre, Thane	
Agronomist	Dr M.N. Waghmare
Field Assistant	Shri. S.V. Kamble
Field Assistant	Shri. V.S. Daphal
Field Assistant	Shri. V. N. Patil
Field Assistant	Shri. G. N. Totkar
Driver	Mr.Vaibhav R Salunke
24. OUAT, Bhubaneswar (ODISSA)	
Main Centre, Bhubaneswar	
Chief Agronomist	Dr. Alok Kumar Patra
Jr. Agronomist	Vacant
Jr. Soil Scientist	Mr.B.B.Behera
Tech. Assistant	Mr.Dilip Kumar Rout
Sub Centre, Chiplima	
Agronomist	Dr. Sanjukta Mohapatra
Tech. Assistant	Mr. S. K. Pradhan
On Farm Centre, Kendujhar	
Agronomist	Dr. Kishore Chandra Sahoo
Jr.Economist	Vacant
Field Assistant	Mr.Kasinath Mallick
Field Assistant	Vacant

Field Assistant	Vacant
Field Assistant	Vacant
Driver	Vacant
On Farm Centre, Kalahandi	
Agronomist	Dr. Bhabani Shankar Nayak
Field Assistant	Mr. Ananda Chandra Sahu
Field Assistant	Vacant
Field Assistant	Vacant
Field Assistant	Vacant
Driver	Vacant
OFR, Khordha	
Agronomist	Dr. Alok Kumar Patra
Field Assistant	Mr. Prakash Chandra Khuntia
Field Assistant	Vacant
Field Assistant	Vacant
Field Assistant	Vacant
Driver	Vacant
25. PAU, Ludhiana (PUNJAB)	
Main Centre, Ludhiana	
Chief Agronomist	Dr.Sohan Singh Walia
Chief Agronomist	Dr.C.S.Aulakh
Jr.Soil Scientist	Dr (Mrs). Neeraj Rani
Tech. Assistant	Manpreet Singh
Junior Typing Assistant	Mr. Aman Atwal
SRF	Tamanpreet Kaur
SRF	Karamjeet Kaur
Supporting	Vacant
Supporting	Vacant
On Farm Centre, Patiala	
Agronomist	Dr. Vijinder Pal Kalra
Field Assistant	Lakhwinder Singh
Field assistant	Varinder Singh
Field assistant	Gurwinder Singh
Field assistant	Harpreet Singh
Young Professional-II	Harpreet Singh
Young Professional-II	Harjivan Singh
Driver	Avtar Singh

26. AU, Kota (RAJASTHAN)	
Sub Centre, Kota	
Agronomist	Dr. J. P. Tetarwal
Tech. Assistant	Vacant
27. MPUAT, Udaipur (RAJASTHAN)	
On Farm Centre, Dungarpur	
Agronomist	Dr. Harpool Singh
Jr.Economist	Dr.Hari Singh
Field Assistant	Mr.N.S.Jhala
Field Assistant	Mr.Ramji Lal
Field Assistant	Mr.Madan Lal
Field Assistant	Mr.A.S.Rathore
Driver	Sh. Neeraj Kumhar
28. SKNAU, Jobner, (RAJASTHAN)	
Main Centre, Durgapura, Jaipur	
Chief Agronomist	Dr. R. Sammauria
Jr. Agronomist	Dr. O.P.Meena
Jr. Soil Scientist	Dr Pratibha
Technical Asstt.	Shri Ram Lal Nehra
On-Farm Centre, Dausa	
Agronomist	Dr. Ramphool Puniya
Field Assistant	Sri. Ramesh Gaotm
Field Assistant	Vacant
Field Assistant	Vacant
Field Assistant	Vacant
Driver	Vacant
29. PJTSAU, Rajendernagar, Hyderabad	
Main Centre, Rajendranagar	
Chief Agronomist	Dr. Mohammad Lateef Pasha
Jr. Agronomist	Dr.Ch.Pragathi Kumari
Jr. Soil Scientist	Sri G.Kiran Reddy
Technical Asstt.	C.Madhusudhan
Sub Centre, Rudrur	
Agronomist	Smt.Firdoz Shahana
Technical Asstt.	M.Praveen
On-Farm Centre, Medak	
Agronomist	Dr. Kodam Chiranjeevi
Jr.Economist	Dr. Md. Ali Baba
Field assistant	Md Munaweruddin

Field assistant	Sri. P.Yadagiri
Field assistant	S.Aziz Hasan
Field assistant	Vacant
Driver	Sri. Shaik Shabbir
30 .TNAU, Coimbatore (TAMILNADU)	
Main Centre, Coimbatore	
Chief Agronomist	Dr. P.M. Shanmugam
Jr. Agronomist	Dr. S.P.Sangeetha
Junior Scientist (Env. sci.)	Dr. P.C. Prabu
Junior Scientist (Env. sci.)	Dr. K. Sivasubramanian
Junior Agricultural Officer	P. Kasthuri
Assistant Agricultural Officer	M.Raja
Senior Resreach Fellow	Dr. S.V. Varshini
Skilled worker	D. Pushparaj
Skilled worker	R. Sri Vidhya
Skilled worker	S. Parimaladevi
Contractual labour	P. Jothiammal
Sub Centre, Thanjavur	
Agronomist	Dr. T.Parthipan
Tech. Assistant	Tmt. D. Ramya
On farm ,OFR Centre Erode, Bhavanisagar / Vagarai	
Agronomist	Dr. N.Sathish Kumar
Field Assistant	Th. A. Amuthakrishnan
Field Assistant	Mrs. K. Sumathi
Field Assistant	Mrs. A. Muthulakshmi
Field Assistant	Th. A. Padaleeswaran
Driver	Th. D. Ganesan
Vacant	Young professional 1
Vacant	Steno/LDC
Vacant	Skilled worker
On farm, OFR Centre, Salem, Yethapur,	
Agronomist	Dr. S.K. Natarajan
Jr. Ag economist	Dr.T .Rajendran
Agricultural Supervisor	K. Murugan
Agricultural Supervisor	M.P. Raja

Assistant Agricultural Officer	P. Nallathambi
Assistant Agricultural Officer	T. Jayasankar
Driver	S. Radhakrishnan
Technical Assistant	R.Vijay
Skilled Worker	M. Mani
31 .CSAUA&T, Kanpur (UTTAR PRADESH)	
Main Centre, Kanpur	
Chief Agronomist	Dr M Z Siddiqui
Jr. Soil Scientist	Vacant
Jr. Agronomist	Dr Naushad Khan
Technical Asstt.	Mr. Suhail Ahmed
Jr. Clerk	Sri Sunil Gautam
Fourth class staff	Mohd Taufeeq
Young Professional - I	Sri Praveen Kumar
On Farm Centre, Fatehpur	
Agronomist	Vacant
Field Assistant	Mr. Sudhir Pratap Singh
Field Assistant	Mr. Rajesh Saxena
Field Assistant	Mr. Yogesh Mishra
Driver	Mr. Mahendra Pal Singh
32.ANDUAT, Ayodhya (UTTAR PRADESH)	
Main Centre, Ayodhya	
Chief Agronomist	Dr. A K Singh
Jr. Soil Scientist	Vacant
Jr. Agronomist	Vacant
Technical Asstt.	Mr. A. P. Singh
On Farm Centre, Ambedkar Nagar	
Agronomist	Vacant
Field Assistant	Mr. A.N.Pandey
Field Assistant	Mr. Ashutosh Singh
Field Assistant	Mr. V.B.Singh
Field Assistant	Vacant
Driver	Vacant
33. OFR Centre, ICAR-IIFSR, Modipuram, Meerut,(UTTAR PRADESH)	
Agronomist	Vacant
Field Assistant	Vacant
Field Assistant	Vacant
Field Assistant	Vacant

Field Assistant	Vacant
Field Assistant	Vacant
Driver	Vacant
34.BHU, Varanasi (UP)	
Sub Centre, Varanasi	
Agronomist	Dr.U P Singh
Tech. Assistant	Vacant
35. GBPUAT, Pantnagar (UTTARAKHAND)	
Main Centre, Pantnagar	
Chief Agronomist	Dr. Rohitashav Singh
Jr.Soil Scientist	Dr. Ajeet Pratap Singh
Jr. Agronomist	Dr. Dinesh kumar Singh
Tech. Assistant	Mr. Y.S. Khokar
On- Farm Centre, Udham Singh Nagar	
Agronomist	Dr. D K Singh I/C
Jr. Scientist(Economics)	Vacant
Field Assistant	M P Singh

Field Assistant	Mahendra Singh
Field Assistant	Ashok Kumar
Field Assistant	Vacant
Driver	R B Yadav
36. BCKV, Kalyani (WEST BENGAL)	
Main Centre, Kalyani	
Chief Agronomist	Dr.Manabendra Ray
Jr. Soil Scientist	Dr. Sushanta Saha
Jr. Agronomist	Vacant
Technical Asstt.	Vacant
On-Farm Centre, Nadia	
Agronomist	Dr. Manabendra Ray
Jr. Economist	Dr. Soumitra Chatterjee
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Driver	Vacant

APPENDIX IV

SOIL FERTILITY STATUS AND NUTRIENT UPTAKE 2023-24

Table A : Soil fertility status-Organic carbon (%) and available N,P and K (Kg/ha) after kharif/rabi/summer season in Exp No. 1(a)

Name of centre	Season	Nut/ treat	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
ANGRAU, Guntur	**Kharif**	OC%	1.18	1.19	1.18	1.16	1.17	1.17	1.17	1.17	1.16	1.16	1.17	1.17
		N	0.97	1.05	1.08	1.14	1.14	1.10	1.06	1.06	1.13	1.11	1.10	1.06
		P	0.44	0.50	0.48	0.45	0.48	0.47	0.47	0.47	0.49	0.49	0.47	0.47
		K	3.29	2.24	3.29	2.39	2.52	2.31	2.49	2.40	2.74	2.81	2.31	2.49
	Rabi	OC%	1.16	1.16	1.16	1.17	1.16	1.16	1.14	1.16	1.16	1.14	1.16	1.14
		N	2.29	2.89	3.46	2.50	3.41	2.91	0.34	0.21	0.21	7.33	2.91	0.34
		P	1.08	1.46	1.73	1.23	1.66	1.41	0.17	0.10	0.11	3.58	1.41	0.17
		K	6.68	8.32	10.06	7.19	9.89	8.37	0.96	0.60	0.63	21.38	8.37	0.96
PJTSAU, Hyderabad	**Kharif**	OC%	0.4	0.39	0.43	0.43	0.44	0.43	0.44	0.44	0.4	0.4	0.80	0.70
		N	200	175	225	213	225	183	213	211.5	182.6	176.5	156.00	175.00
		P	30.1	28.9	38.6	40.6	42.6	36.9	36.5	40.3	30.5	29.3	45.00	36.50
		K	201.6	187	192.2	196.2	192.3	192.7	185.2	195.3	175.6	174.5	145.00	156.30
	Rabi	OC%	0.4	0.39	0.43	0.44	0.45	0.43	0.43	0.44	0.4	0.4	0.53	0.25
		N	183	175	212.3	225	225	187	200	212.3	181.5	175.3	179.00	180.00
		P	29.9	28.9	38.5	40.7	42	37.5	37.8	40.5	30.5	29.4	23.20	35.20
		K	203.3	187	191.2	195.5	191.2	193.2	192.5	196.3	177.4	175.6	178.20	168.20
	Summer	OC%	0.52	0.42	0.36	0.23	0.45	0.36	0.44	0.31	0.41	0.38	0.37	0.51
		N	178	183	182	170	221	211	216.7	213.5	183.7	189.2	179.20	176.20
		P	23.2	28.1	35.2	36.2	42.4	45.2	36.9	40.5	30.8	38.2	36.10	29.80
		K	189.2	186.2	193.2	186.2	193.7	177.8	186.6	190.3	178.5	168.2	176.50	185.20
BAU, Sabour	**Kharif**	OC g/kg	4.86	4.89	4.85	4.95	4.86	4.94	4.88	4.86	4.97	4.86	4.56	4.89
		N	241.5	253.1	258.6	263.1	236.4	248.9	234.4	228.7	222.4	220.7	223.20	245.30
		P	30.4	34.2	37	38.3	32	34.5	32.5	33.8	32.3	33.4	32.40	31.50
		K	186.5	189.4	197.4	185.1	174.1	192.4	184.7	177	179.6	176.9	176.50	184.30
	Rabi	OC g/kg	4.82	4.88	4.84	4.94	4.85	4.93	4.87	4.85	4.96	4.85	5.21	4.93
		N	239.7	252.6	258.1	262.5	236	248.4	234	228.2	221.9	220.3	198.20	201.20
		P	30.1	34.1	36.9	38.2	31.9	34.4	32.4	33.7	32.2	33.3	31.20	32.50
		K	185.1	189	197	184.7	173.8	192	184.3	176.7	179.3	176.6	176.30	180.50
	Summer	OC g/kg	4.84	4.9	4.86	4.96	4.87	4.95	4.89	4.87	4.98	4.87	5.21	4.92
		N	240.9	253.9	259.5	263.9	237.2	249.7	235.2	229.4	223.1	221.5	215.30	220.30
		P	30.3	34.3	37.1	38.4	32.1	34.6	32.6	33.9	32.4	33.5	38.90	34.50
		K	186.1	190	198.1	185.7	174.7	193	185.3	177.6	180.2	177.5	182.20	179.20

Name of centre	Season	Nut/ treat	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
JAU, Junagadh	**Kharif**	OC%	5.21	4.9	4.68	4.78	4.13	4.25	4.86	4.23	4.13	4.72	4.52	4.28
		N	245	253	221	235	243	215	240	235	219	228	245.00	241.00
		P	31.2	36.2	35.1	30.45	32.5	38.2	30.4	32.1	31.6	32.6	31.80	34.20
		K	178	189	188	145	162	178	192	189	179	196	170.00	176.00
	Rabi	OC%	3.21	4.2	4.5	4.6	4.3	4.1	4.2	4.9	4.2	4.3	4.40	4.20
		N	199	187	177	196	176	179	180	191	202	210	230.00	213.00
		P	32.1	35.2	32.9	34.2	31.5	30.8	32.4	33.5	36.5	30.1	29.10	31.20
		K	180	181	179	168	170	175	168	189	179	185	182.00	187.00
	Summer	OC%	8.4	8.43	8.42	8.52	8.18	8.47	8.35	7.78	8.26	8.09	7.9	7.92
		N	234	232	240	243	240	236	238	240	236	238	231	222
		P	26.51	27.07	29.49	29.87	23.15	25.76	26.41	25.48	26.79	26.23	29.2	26.1
		K	252	240	251	246	223	222	214	229	245	228	254	226
SKUAST, Jammu	**Kharif**	OC%	4.2	4.3	5.2	5.6	4.3	4.2	4.8	4.1	4.7	4.2	4.5	4.1
		N	213	222	225	241	235	223	236	242	215	220	231	227
		P	23.1	22.5	28.6	29.3	30.5	31.2	24.5	25.6	28.2	24.3	26.5	28.5
		K	218	223	243	226	237	220	218	235	230	226	225	221
	Rabi	OC%	5.3	5.4	5.2	5.8	5.3	5.1	5.7	5.2	4.9	4.8	4.5	5.1
		N	203	205	213	210	208	209	211	214	216	218	220	224
		P	25.4	20.3	21.6	24.5	22.3	23.6	28.2	24.6	27.3	22.5	26.3	24.5
		K	198	186	201	205	214	210	212	215	217	220	225	213
	Summer	OC%	5.8	6.6	6.8	6.6	6.5	6.3	6.5	6.5	6.4	6.2	6.3	6.5
		N	220	238	245	225	232	230	235	232	220	215	211	213
		P	19.1	23.2	22.12	21.7	21.85	22.1	23.8	22.65	23.1	23.1	25.4	23.4
		K	122	130	135	128	126	132	131	128	122	118	112	130
KAU, Thrissur	**Kharif**	OC%	2.26	2.1	1.9	1.87	2.5	2.13	3.2	3.5	2.9	2.7	2.8	2.4
		N	188	175	198	176	185	182	189	176	196	186	182	190
		P	18.2	18.5	19.2	17.5	17.6	19.3	17.8	18.8	19.8	20.1	21.3	23.2
		K	113	145	121	135	111	112	120	125	128	130	128	127
	Rabi	OC%	4.3	2.8	3.5	3.6	3.1	2.9	2.8	2.7	2.6	3.1	3.5	3.8
		N	198	197	201	213	207	189	176	185	192	190	197	193
		P	20.1	19.8	21.5	21.9	21.7	20.3	20.9	20.7	21.2	19.8	19.5	19.2
		K	112	103	115	120	123	128	127	123	131	120	124	123
	Summer	OC%	1.26	1.31	1.64	1.58	1.37	1.52	1.68	1.54	1.82	1.63	1.56	1.74
		N	311	307	339	351	322	327	296	287	318	317	298	276
		P	39.5	38.7	48.61	52.05	42.2	47.22	42.34	41.8	47.3	46.8	44.3	41.5
		K	153	154	172	181	169	165	151	158	161	164	176	168

Name of centre	Season	Nut/ treat	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
DBSKKV, Karjat	**Kharif**	OC%	1.21	1.12	1.13	1.42	1.07	1.08	1.33	1.22	1.23	1.14	1.18	1.17
		N	223.91	220.77	237.08	236.45	234.57	227.05	218.89	220.77	218.27	219.52	221.3	225.1
		P	11.2	11.4	11.91	11.71	11.61	11.51	10.59	10.69	10.69	10.89	9.87	9.23
		K	185.92	202.16	208.88	206.36	204.12	196	181.16	190.96	184.52	196.84	198.35	187.53
	Rabi	OC%	1.1	1.13	1.17	1.16	1.11	1.12	1.02	1.04	1.06	1.05	1.12	1.15
		N	228.93	231.44	245.86	244.61	242.73	237.71	224.54	226.42	220.15	222.66	223.54	221.63
		P	12.12	12.32	12.63	12.32	12.52	12.42	11.51	11.61	10.79	11.3	12.3	11.5
		K	197.4	195.16	192.36	191.52	186.88	190.68	189	186.76	209.44	207.48	198.6	202.5
	Summer	OC%	1.5	1.9	1.6	2.5	2.8	1.6	1.8	1.9	2.2	2.1	1.9	1.7
		N	281	288	285	283	315	310	281	235	225	238	225	286
		P	16.12	18.54	16.12	17.92	17.92	18.12	21.5	20.5	16.33	16.12	17.2	175.2
		K	237	262	213	202	202	251	236	226	217	292	285	278
Ayodhya	**Kharif**	OC%	0.417	0.5	0.505	0.467	0.493	0.494	0.45	0.434	0.461	0.463	0.52	0.45
		N	213.5	230	233.2	235	224	229.4	219	215.75	223.12	233	245	236
		P	21	25.1	25	27.9	24.86	24.1	24.6	23.9	25.1	24	23.5	23.9
		K	270.1	269.1	271.6	270.2	270.8	267.3	251.9	252	269.9	265.7	245.6	256.2
	Rabi	OC%	0.418	0.501	0.503	0.465	0.491	0.493	0.448	0.43	0.458	0.461	0.423	0.453
		N	214.6	229	231.9	235.9	223.8	230.5	220.05	213	221.8	233.1	216	243.5
		P	21.9	25	25.87	27	24.1	24.18	23.96	22.1	24.6	23.75	25.2	24.92
		K	268.1	270.8	270.9	272	268.4	266.2	249.86	253.1	267	265	223.5	225.8
	Summer	OC%	0.419	0.502	0.504	0.466	0.492	0.493	0.449	0.432	0.46	0.462	0.452	0.453
		N	213.9	229.68	232.1	235.06	223.6	229.1	219.96	214.9	222.22	234.9	225.4	236.2
		P	21.87	25.12	25.36	27.66	24.96	24	24.5	23	24.96	24.98	22.5	25.6
		K	269.9	270.6	272.68	271.1	269.8	266.9	250.1	252.1	268.4	266.9	253.6	264.5
TNAU, Coimbatore	**Kharif**	OC%	0.56	0.55	0.59	0.56	0.55	0.55	0.66	0.65	0.57	0.58	0.86	0.54
		N	244	274	231	257	244	225	322	330	296	233	287	245
		P	19.9	20.9	20	20.7	17.8	20.5	21.9	21.7	20.9	19.5	21.3	23.2
		K	627	644	666	619	662	643	680	667	628	659	655	675
	Rabi	OC%	1.23	1.12	1.1	1.15	1.14	1.18	1.23	1.19	1.18	1.25	1.24	1.32
		N	189	196	220	212	210	209	208	213	214	218	211	213
		P	18.9	16.5	19.5	18.5	19.6	20.6	21.6	20.7	20.8	21.5	203.5	202.1
		K	524	532	555	524	498	528	502	504	542	536	584	521
	Summer	OC%	0.89	0.78	0.85	0.76	0.82	0.74	0.83	0.81	0.57	0.92	0.83	0.84
		N	199	187	201	206	210	189	205	207	206	200	198	186
		P	19.2	17.8	18.2	19.7	19.6	18.6	22.5	21.9	20.8	20.9	22.4	23.5
		K	221	218	216	205	217	209	210	203	208	204	199	200

Name of centre	Season	Nut/ treat	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
RSVKVV, Gwalior	**Kharif**	OC%	0.38	0.42	0.64	0.50	0.42	0.40	0.46	0.48	0.44	0.38	0.58	0.56
		N	172	184	246	200	184	180	192	196	188	172	169	187
		P	10.40	9.20	10.40	8.80	10.40	10.00	10.40	8.80	10.4	8.2	11.2	9.8
		K	525	531	531	563	538	494	469	494	513	513	498	502
	Rabi	OC%	0.38	0.42	0.62	0.52	0.40	0.38	0.50	0.50	0.46	0.36	0.86	0.79
		N	172	184	241	207	180	172	200	200	192	165	187	198
		P	10.80	10.40	10.80	9.20	10.80	10.00	10.80	9.20	9.6	8.1	11.2	13.8
		K	500	485	520	535	430	445	460	530	520	500	489	465
	Summer	OC%	0.40	0.41	0.64	0.56	0.42	0.40	0.46	0.48	0.46	0.38	0.54	0.58
		N	180	185	246	221	184	180	192	196	192	172	201	213
		P	11.00	8.20	10.40	8.80	10.40	10.80	9.60	8.40	10	9.2	11.5	10.9
		K	495	500	500	545	425	460	445	490	495	485	498	487
CSHAU, Hissar	**Kharif**	OC%	0.45	0.27	0.56	0.43	0.51	0.41	0.45	0.43	0.47	0.48	0.41	0.42
		N	185	189	176	182	190	192	177	186	189	178	179	184
		P	10.45	8.91	9.56	7.53	8.88	8.67	10.23	7.96	8.23	7.98	8.12	8.31
		K	221	231	198	201	212	215	214	208	204	206	209	200
	Rabi	OC%	0.43	0.28	0.51	0.41	0.57	0.42	0.44	0.42	0.46	0.49	0.42	0.44
		N	176	180	221	204	189	179	198	189	195	182	186	192
		P	10.23	9.25	10.14	8.98	10.65	10.23	10.40	9.80	10.4	8.9	11.2	9.8
		K	445	325	241	325	333	321	302	256	278	298	279	267
	Summer	OC%	0.40	0.36	0.62	0.70	0.46	0.45	0.56	0.49	0.58	0.49	0.51	0.42
		N	125.50	127.00	135.00	148.00	130.50	129.50	142.00	135.00	131.33	128.67	124.6	125.36
		P	14.35	14.50	25.90	23.00	20.35	23.35	24.00	19.67	22.00	21.00	19	21.32
		K	311.50	302.50	333.33	284.00	313.50	295.00	327.50	258.00	324.33	338.67	247.23	289.23
AAU, Jorhat	**Kharif**	OC%	6.64	6.62	6.7	6.72	6.67	6.69	6.69	6.67	6.65	6.68	6.53	6.87
		N	221.5	222.8	231.5	235	234	230.5	229.5	232	227.8	233	213	230
		P	7.7	7.9	8.6	8.8	8.7	8.6	8.4	8.5	8.6	8.3	8.2	7.9
		K	83.5	85	90	91.8	90	87.8	87.3	85.8	87.5	90	96	89
	Rabi	OC%	6.61	6.66	6.5	6.8	6.2	6.72	6.68	6.08	6.24	6.34	5.79	7.01
		N	220	215	228	231	236	225	227	235	223	235	213	222
		P	7.02	6.98	8.4	8.2	8.45	8.23	7.98	8.2	8.4	8.23	7.25	8.12
		K	82	7.9	7.12	8.67	90	82	98	79	92	88	87	86
	Summer	OC%	6.08	6.12	6.71	6.45	6.56	6.51	6.78	6.77	6.12	6.34	8.21	7.21
		N	218	221	226	228	232	231	226	231	224	233	213	210
		P	7.5	7.01	8.12	8.34	8.6	8.11	8	7.82	8.02	7.98	7.23	8.12
		K	77	82	89	91	89	83	87	89	92	95	98	94

Name of centre	Season	Nut/ treat	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
BCKV, Kalyani	**Kharif**	OC%	0.92	0.90	1.02	1.06	1.06	1.04	0.88	0.92	0.84	0.87	0.76	1.02
		N	232.20	210.80	262.20	258.70	238.40	234.10	222.40	214.80	210.80	224.70	214.21	213.55
		P	55.40	57.80	68.70	69.20	67.20	64.80	62.80	58.40	68.70	78.20	72.5	76.23
		K	170.20	160.10	195.40	192.70	178.20	165.80	168.40	168.20	174.20	200.80	198.21	176.32
	Rabi	OC%	0.84	0.82	0.88	0.89	0.90	0.88	0.82	0.78	0.76	0.78	0.89	0.79
		N	222.80	210.40	245.80	240.80	217.90	219.40	200.80	190.70	198.40	190.20	189.2	190.21
		P	48.20	46.80	55.80	52.10	50.80	49.70	45.20	42.80	60.80	70.00	49.21	52.13
		K	162.20	148.80	169.40	172.80	158.20	148.20	143.70	149.50	162.80	172.90	153.2	153.45
	Summer	OC%	0.85	0.89	0.97	0.98	1.03	1.01	0.86	0.88	0.81	0.83	0.92	0.91
		N	220.2	197.6	254.2	244.7	223.9	227.4	204.5	195.7	203.0	195.5	200.23	198.63
		P	49.4	47.1	60.7	57.7	52.3	54.2	50.0	45.8	64.7	71.0	60.21	64.23
		K	163.1	152.1	192.1	196.2	165.1	151.4	158.6	161.4	164.7	194.6	198.23	191.12
CSAU&T, Kanpur	**Kharif**	OC%	0.53	0.51	0.5	0.46	0.49	0.44	0.45	0.42	0.45	0.41	0.52	0.45
		N	215	225	231	235	220	228	219	217	220	233	241	236
		P	20	24	25	26	24	22	28	27	25.1	24	23	23
		K	270.1	269.1	271.6	270.2	270.8	267.3	251.9	252	269.9	265.7	245.6	256.2
	Rabi	OC%	0.41	0.58	0.49	0.46	0.49	0.49	0.44	0.43	0.45	0.46	0.42	0.45
		N	212.6	229	230.9	225.9	223.8	230.5	210.05	213	221.8	231.1	216	243.5
		P	21.9	25	25.87	27	24.1	24.18	23.96	22.1	24.6	23.75	25.2	24.92
		K	268.1	270.8	240.9	272	218.4	266.2	259.86	253.1	287	265	223.5	275.8
	Summer	OC%	0.452	0.468	0.505	0.490	0.455	0.488	0.460	0.455	0.478	0.445	0.482	0.465
		N	203.40	210.60	227.25	220.50	204.75	219.60	207.00	204.75	215.10	200.25	204.3	202.31
		P	13.43	13.58	13.70	13.60	13.48	13.60	13.55	13.45	13.52	13.44	14.1	13.96
		K	201.20	206.50	224.80	218.10	200.40	214.25	204.40	199.60	210.80	197.20	192.3	194.5
HPKVV, Palampur	**Kharif**	OC%	11.5	11.9	12.6	12.9	12.1	12.6	11.3	11.1	11	11.5	11.7	12.18
		N	360.4	373.2	421.1	417.1	404.5	366.7	399.7	400.2	385.4	385.9	350.21	350
		P	52.2	51.6	60.2	62.4	55.2	58.4	57.8	58.8	57.5	55.8	50.1	52.3
		K	156.9	160.8	143.5	147.5	160.7	139.2	178.8	152.5	175.8	196.4	175.2	185.2
	Rabi	OC%	11.9	12.2	13	13	12.8	12.9	12.4	12.1	11.8	11.7	11.5	12.3
		N	370.7	383.2	435.4	425.2	415.6	378.2	412.3	410.4	396.7	397.2	345.6	378.2
		P	45.5	54.2	60.8	64.2	58.4	60.5	58.6	60.5	59.8	57.4	56.3	58.2
		K	172.5	179.7	154.2	158.5	172.8	149.5	179.8	169.5	184.8	208.5	198.2	182.2
	Summer	OC%	10.200	11.230	12.320	13.000	11.200	11.230	11.450	11.360	11.235	10.120	12.32	11.23
		N	302.40	305.60	317.25	321.50	305.75	309.60	307.00	304.75	305.10	300.25	304.3	302.31
		P	13.43	13.58	13.70	13.60	13.48	13.60	13.55	13.45	13.52	13.44	14.1	13.96
		K	171.20	176.50	154.80	168.10	160.40	154.25	164.40	199.60	166.80	197.20	182.3	164.5

Name of centre	Season	Nut/ treat	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12
UAS, Raichur	**Kharif**	OC%	0.45	0.52	0.48	0.42	0.44	0.42	0.41	0.42	0.43	0.42	0.42	0.47
		N	202.6	209	210.9	205.9	213.8	220.5	210.05	213	211.8	221.1	216	223.5
		P	21.9	25	25.87	27	24.1	24.18	23.96	22.1	24.6	23.75	25.2	24.92
		K	208.1	200.8	240.9	272	208.4	266.2	209.86	253.1	257	265	203.5	245.8
	Rabi	OC%	0.452	0.468	0.505	0.490	0.455	0.488	0.460	0.455	0.478	0.445	0.482	0.465
		N	203.40	210.60	227.25	220.50	204.75	219.60	207.00	204.75	215.10	200.25	204.3	202.31
		P	13.43	13.58	13.70	13.60	13.48	13.60	13.55	13.45	13.52	13.44	14.1	13.96
		K	201.20	206.50	224.80	218.10	200.40	214.25	204.40	199.60	210.80	197.20	192.3	194.5
	Summer	OC%	5.8	6.3	7.1	7.1	6.8	6.8	5.9	6.3	6.7	6.9	7.2	7.1
		N	194	176	198	194	186	191	173	184	188	186	182	184
		P	9.9	13	14.1	16.1	14.9	14.3	15.2	15.4	15.0	12.5	13.2	12.5
		K	365	357	367	354	374	362	343	365	364	370	325	342
BHU, Varanasi	**Kharif**	OC%	0.41	0.48	0.45	0.53	0.46	0.50	0.51	0.54	0.52	0.57	0.45	0.51
		N	186.8	186.7	185.0	186.9	196.7	205.9	198.7	211.3	227.9	227.7	189.5	196.2
		P	11.4	12.2	12.7	13.9	14.1	13.2	14.0	16.0	15.0	18.1	15.3	16.2
		K	183.6	174.5	180.8	178.0	171.4	186.0	192.0	188.1	196.2	199.7	189.6	186.2
	Rabi	OC%	0.38	0.42	0.40	0.47	0.41	0.44	0.45	0.48	0.46	0.51	0.51	0.45
		N	174.3	165.6	164.0	165.7	174.4	182.6	176.2	187.4	202.1	201.9	178.2	185.2
		P	10.7	11.4	11.9	12.9	13.1	12.3	13.0	14.9	14.0	16.9	12.3	12.3
		K	171.4	162.9	168.8	166.1	159.9	173.6	179.2	175.5	183.2	186.4	178.2	185.3
	Summer	OC%	0.39	0.43	0.41	0.48	0.42	0.45	0.46	0.49	0.47	0.52	0.58	0.46
		N	177.9	168.9	167.4	169.1	178.0	186.4	179.8	191.2	206.3	206.0	189.32	186.2
		P	10.9	11.6	12..1	13.2	13.4	12.6	13.3	15.2	14.3	17.2	12.3	14.2
		K	174.9	166.2	172.2	169.5	163.2	177.16	182.81	179.12	186.9	190.2	186.3	175.2

10. ANNEXURE

ANNEXURE-I

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ANNEXURE-II

Price (Rs./q) & Calorie per 100gm for (2024-25)

Crops	Price (Rs./q) 2023-24	Price (Rs./q) 2024-25	Cal./ 100 gm	Crops	Price (Rs./q) 2023-24	Price (Rs./q) 2024-25	Cal./ 100 gm
All Fodders**	233	255	16	Knolkhol**	610	685	43
All green manuring**	345	385	16	Ladyfinger**	1800	1950	35
Amaranthus grain**	6000	6500	49	Lentil /Masur*	6100	6250	343
Arhar/Pigeonpea/* Redgram	7200	7850	335	Linseed**	4750	4850	530
Baby Corn**	3650	3950	125	Maize(Grain)*	2100	2210	342
Barley*	1800	1950	336	Maize (green cobs)**	1.85/cob or 510/q	1.95/cob or 545/q	125
Beetroot**	650	710	25	Maize Sweet Corn**	2150	2215	342
Berseem (seed)**	12100	13000	344	Marigold**	2350	2500	4
Bitter Gourd**	1210	1280	25	Rapeseed& Mustard*	4950	5025	541
Blackgram/Urad*	7250	7580	347	Gobi sarson/ Hayola**	3250	3365	541
Bottle gourd (Lauki)**	2450	2568	12	Niger Seed*	7450	7510	515
Brinjal**	1350	1480	24	Oat**	1750	1885	374
Broccoli**	3300	3550	45	Onion (big)**	1800	1950	50
Buck Wheat**	1250	1350	346	Pea*	7650	7810	315
Cabbage**	610	665	27	Pea (veg.)**	2450	2558	93
				Pearlmillet/ Bajra**	2500	2658	361
Carrot**	1220	1310	48	Potato**	720	785	97
Cassava**	2050	2150	134	Pumpkin**	1875	1920	25
Castor**	5450	5658	440	Radish (White)**	615	657	17
Cauliflower**	610	700	66	Ragi/ Fingermillet**	3850	4000	328
Chillies(green)**	3050	3250	29	Rice(coarse)*	2150	2285	346
Clusterbean **	3950	4125	35	Ricebean fodder**	275	295	16

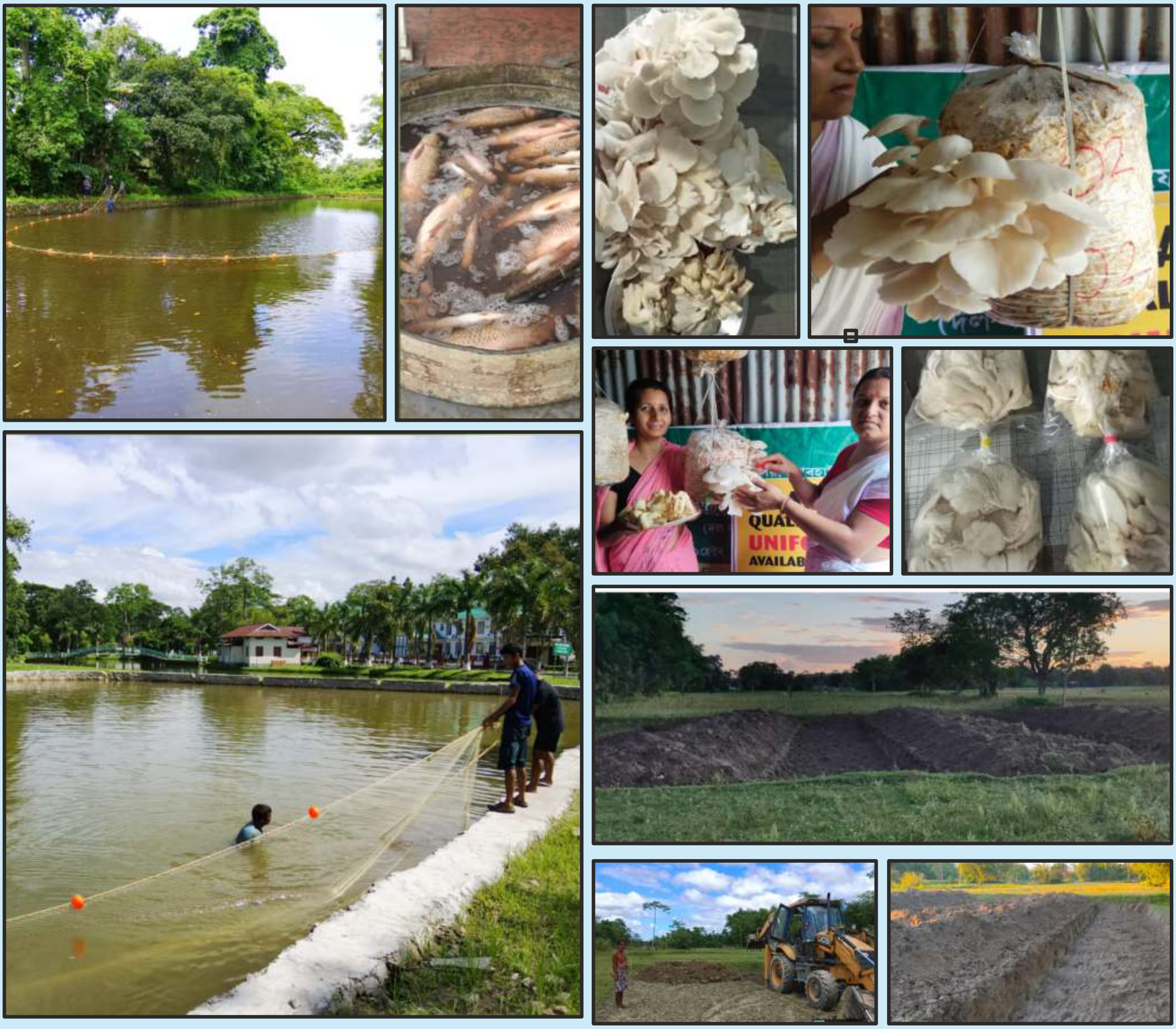
Crops	Price (Rs./q) 2023-24	Price (Rs./q) 2024-25	Cal./ 100 gm	Crops	Price (Rs./q) 2023-24	Price (Rs./q) 2024-25	Cal./ 100 gm
Coleus**	2550	2650	86	Ridge /Round gourd**	3550	3775	17
Coriander(S)**	6650	6885	288	Safflower**	5850	6210	356
Coriander(L)**	495	525	49	Sesamum/ Gingely/ Til**	8150	8500	563
Cotton(F-4/1180)*	6700	6950	332	Sorghum/Jowar*	3250	3365	349
Cotton (H-1380)*	7000	7250	332	Soyabean (b)*	3450	3620	432
Cowpea/ Lobia(S)**	3350	3450	323	Soyabean (y)*	4050	4200	432
Cowpea (Veg.) pod**	1950	2050	48	Sugar beet**	1175	1215	48
Cucumber**	890	925	13	Sugarcane*	385	400	34
Cumin/ SiyaZeera**	24500	25500	356	Summer Squash**	1750	1875	16
Fennel grain**	6000	6300	31	Sweet Potato**	1780	1865	120
Fennugreek (seed)**	6100	6350	333	Tomato (green)	900	985	23
Fennugreek leaves/ spinach**	1750	1900	49	Toria/Raya/*	4850	5050	541
Field bean**	2350	2450	48	Turmeric**	7350	7500	349
Fieldpeas/Veg. peas**	3550	3800	93	Wheat*	2150	2265	346
Frenchbeans**	2375	2510	26	White gingely**	8350	8458	563
Garlic**	5950	6050	145	Rajmash/ Rajmah**	6750	6950	346
Ginger**	2450	2658	67	Sunflower seed *	7000	7500	620
Gram/Chickpea/ Bengalgram*	5250	5585	360	Rice Basmati*	2085	2155	346
Greengram/ Moong*	8350	8465	334	Horse gram**	4250	4358	321
Groundnut*	6050	6175	567	Indian bean**	3950	4025	26

*** Minimum support price fixed by Government of India for 2024-25.**
****Farm gate price at OFR Centre.**

ANNEXURE III

S.N	COMMON NAME	Botanical name	Hindi Name
1	Ajwain/Ajowan Caraway	Trachyspermum copticum	Ajwain
2	Ashwagandha/India Ginseng	Withania somnifera(L.) Dunal	Ashwagandha
3	Barley	Hordeum vulgare L.	Jau
4	Black caraway /Fennel flower	Nigella sativa Sumac	Kalongi
5	Black gram	Phaseolus mungo L.	Urd/Urd bean
6	Bottle gourd	Lagenaria siceraria (Mol.)/L.vulgaris L.	Lauki
7	Brinjal/Egg plant	Solanum melongena L.	Baigen
8	Broccoli	Brassica oleracea (L.)var.italica	Hari Phool Gobhi
9	Cabbage	Brassica oleracea (L.)var.capitata	Band gobhi/Patta gobhi
10	Castor	Ricinus communis L.	Arandi
11	Cauliflower	Brassica oleracea L.var botrytis	Phool Gobhi
12	Chickpea	Cicer arietinum L.	Chana
13	Chickpea /Bengal gram	Cicer arietinum L.	Chana
14	Chicory	Cichorium intybus L.	Kasni
15	Chilli	Capsicum annum L.	Mirch
16	Cluster bean	Cyamopsis tetragonoloba L.Taub .	Guar/Guar bean
17	Coriander	Coriandrum sativum L.	Dhania
18	Cotton	Gossypium hirstum L.	Kapaas
19	Cowpea	Vigna unguiculata (L)Walp.	Lobia
20	Cumin	Cuminum cyminum L.	Jeera
21	Egyptian clover	Trifolium alexandrinum L.	Berseem
22	Fenugreek	Trigonella foenum -graecum L.	Methi
23	Finger millet	Eleusine coracana (L.)Gaertn.	Ragi/Mandua
24	Garden Cress/ Water Cress	Lepidium sativum L.	Chandrasur
25	Garlic	Allivum sativum L.	Lahsun
26	Garlic	Allium sativum L.	Lehsum
27	Green gram	Phaseolus radiatus (L,) Wilczek	Moong/Moong bean
28	Groundnut	Arachis hypogea L.	Moongfali
29	Hyacinth bean/indian bean	Dolichis lablab L./D.purpureus/ Lablab purpureus	Seim
30	Indian Mustard	Brassica juncea Coss.	Sarson /Raya
31	Indian rape	Brassica campestris L.var .Toria	Toria
32	Lady finger /Okra	Abelmoschus esculantus Moench .	Bhindi

33	Lentil	Lean culinaris Medikus	masoor
34	Linseed /Flax /Flax seed	Linum usitatissinum L.	Alsi
35	Maize /Com	Zea mays L.	Makka
36	Marigold	Calendula officinalis L.	Gainda
37	Mustard	Brassic campestris L.var .Yellow sarson/Brown sarson	Sarson
38	Oat	Avena sativa L.	Jaee
39	Onion	Allium cepa L.	Pyaz
40	Pearl millet	Pennisetum americanum L.	Bajra
41	Pea /Vegetable Pea	Pisum sativum L.	Mastar
42	Pigeon pea	Cajanus cajan (L) Milsp	Arhar /Tauar
43	Potato	Solonum tuberosum	Aloo
44	Psyllium	Plantago ovata Forssk	Isabgol
45	Pumpkin	Cucurbita pepo Duch .	Kaddu
46	Radish	Raphanus sativus L.	Mooli
47	Rape/Oilseed rape	Brassica napus var.napus	Gobhi sarson
48	Red /Purple Amaranth	Amaranthus cruentus L.	Chauiai/Ramdana / Rajgira
49	Rice /Paddy	Oryza sativa L.	Dhan
50	Ridge groud /Sponge groud	Lufa acutangula /L.aegyptica/L. Cylindrica	Torai
51	Sesame	Sesamum indicum L.	Till
52	Sorghum	Sorghum bicolor (L.)Moench .	Jowar
53	Soybean	Glycine max L.(Merr.)	Soybean
54	Spinach	Spinacia oleracea L.	Palak
55	Suger beet	Beta vulgaris L.	Chukander
56	Sugarcane	Saccharum officinarum L.	Ganna
57	Sunflower	Helianthus annus L.	Surajmukhi
58	Sunhemp	Crotolaria juncea L.	Sanai
59	Sweet potato	Ipomoea batatas (L.)Lam.	Sakarkand
60	Tomato	Solanum IycopersicumL./Lycoper-sicon esculantum/L.lycopersicum	Tamatar
61	Turmeric	Curcuma longa L.	Haldi
62	Wheat	Triticum aestivum L.emend .Fiori $ Paol.	Gehun



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