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AICRP ON INTEGRATED FARMING SYSTEMS

वार्षिक प्रतिवेदन
ANNUAL REPORT
2021-22

ICAR- Indian Institute of Farming System Research
Modipuram, Meerut – 250110, INDIA

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.

ALL INDIA CO-ORDINATED RESEARCH PROJECT ON INTEGRATED FARMING SYSTEMS

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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 2020-21 (period ending June 2021), under 'on-station' and 'on-farm' research programmes of AICRP on Integrated Farming Systems. The other details are relevant to 31st March 2022.
- 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 Director, ICAR- Indian Institute of Farming Systems Research and due credit to the concerned scientists.

ACKNOWLEDGEMENT

All India Coordinated Research Project on Integrated Farming Systems (AICRP-IFS) initiated in 2010-11 is operating with 25 main, 11 sub, 6 ICAR institute-based and 32 on-farm centres in 25 States/Union territory. The results of experiments conducted during 2020-21 by all the co-operating centres are processed and compiled in the Annual Report 2021-22. I take this opportunity to record my sincere thanks to **Dr. Trilochan Mohapatra**, Former Secretary, Department of Agricultural Research and Education and Director General, Indian Council of Agricultural Research, New Delhi and **Dr Himanshu Pathak**, Secretary (DARE) and Director General (ICAR) for their remarks and guidance during the review. I extend my gratitude to **Dr S K Chaudhari**, Deputy Director General (Natural Resource Management) for his constant support extended to the scheme. The time-to-time guidance received from **Dr. S. Bhaskar**, former Assistant Director General (Agronomy, Agroforestry and Climate Change) and Dr. Rajbir Singh, Assistant Director General (Agronomy, Agroforestry and Climate Change) for improving the performance and output of the scheme is duly acknowledged. Scientific inputs received from Quinquennial Review Team (QRT), Research Advisory Committee (RAC) and Institute Management Committee (IMC) are thankfully acknowledged as those inputs provided immense help in taking new initiatives, shaping and improvement of the programme for practical utility. I am highly thankful to each and every scientist and research fellows involved in the scheme at the all the centres for putting the meticulous effort to conduct a field experiment, lab analysis and generating data. Contribution and guidence given by **Dr. A.S. Panwar,** Former Director, ICAR-IIFSR and **Dr. Sunil Kumar**, Director, ICAR-IIFSR are duly acknowledged. The sincere efforts put forth by Dr. N. Ravisankar, Principal Scientist and Project Coordinator (Acting) during the period of report deserves appreciation for compilation of the report. I also extend my appreciation to Dr. A. K. Prusty, Senior Scientist, Dr. M. Shamim, Senior Scientist, Dr Meraj Alam Ansari, Senior Scientist, Dr. Raghuveer Singh, Scientist, Dr.Raghavendra K.J, Scientist Mr. Dhananjay Tripathi, Chief Technical Officer, Dr Vipin Kumar, Chief Technical Officer and Mrs. Jailata Sharma, Personal Assistant for their Cooperation in compilation of the data, its statistical analysis, drafting and proof corrections and administration of the scheme. 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 also acknowledged. Significant findings obtained from the experiments of cropping and farming systems and its validation in the farmers field including FLDs will serve as useful method for implementation of cropping systems and farming systems by State agencies.

(Project Coordinator)

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.

Location 3

Under the aegis of AICRP -IFS there are 25 main centers, 11 sub centers, 32 on-farm research centres and 5 voluntary centres. All main and sub centres are engaged in basic and applied research and are necessarily located at SAUS 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 (2020-21) is depicted in Map - 1 & 2, and details are given in table 3.

Map of AICRP-IFS centre

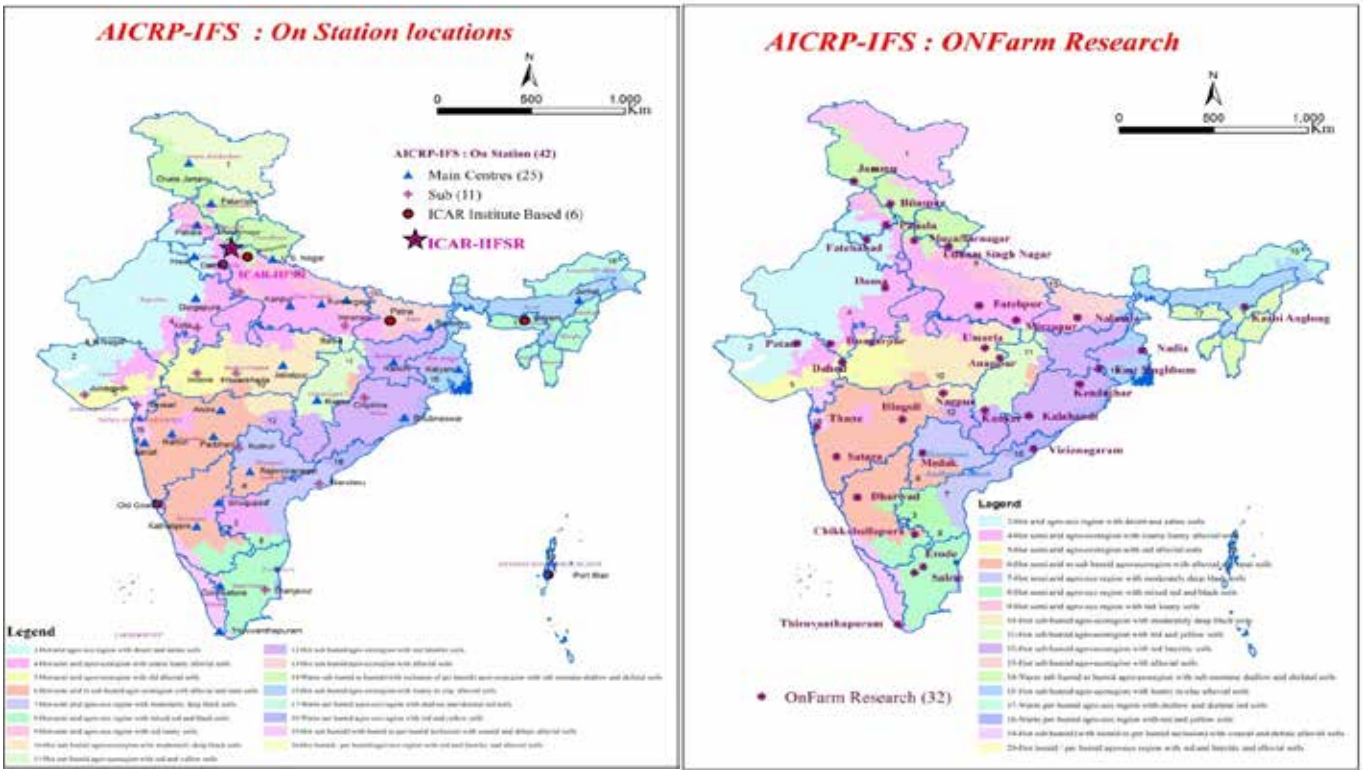


Table-3/1: Location of Different AICRP-IFS centres during the year under report (2020-21)

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.		Goalpara	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.		Nalanda	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.		Kanker	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.		Adiya, Patan	OFR Centre	Arid	Gujarat Plains and Hills Region/North west Sub-Region	North West Agroclimatic zone (GJ-5)
18.	Haryana	Hisar	Main Centre	Arid	Trans –Gangetic Plains Region/ Arid Sub-Region	Western Zone (HR-2)
19. .		Fatehabad	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.		Bilaspur	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.		Jammu	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.		East Singhbhum	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.		Dharwad	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.		Thiruvananthapuram	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)

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.		Anuppur	OFR Centre	Semi-Arid	Eastern Plateau and Hills	Northern hill zone of Chattisgarh (CG-3)
37.		Umaria	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.		Katol, Nagpur	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.		Hingoli	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.		Padegaon, Satara	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.		Kalahandi	OFR Centre	Coastal	East Coast Plains and Hills Region/ Orissa Coastal Sub-Region	Western Undulating 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.		Dausa	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	OFR Centre	Semi-Arid	Southern Plateau and Hills Region	North western Zone (TN-2)
60.		Bhavanisagar	OFR Centre	Semi-Arid	East Coast Plains and Hills Region	Sothern Zone (TN-5)
61	Telangana	Rajenderaanagar	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		Medak	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.		Fatehpur	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)
67.		Mirzapur	OFR Centre	Sub-Humid	Middle Gangetic Plains Region/ Eastern Plains Sub-Region	Eastern Plain Zone (UP-7)

4 Soil and Climate

The major group of soil (centre-wise) on which on- station experiment of CSR/FSR were conducted during the year 2020-21 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.

S.No.	Centre	Soil Type	Latitude	Longitude
1.	Rajendranagar	Udic Ustochrepts, black soils	18˚ 59' N	78˚ 55' E
2.	Maruteru	Chromusterts clayey, medium black soils	16˚ 38' N	81˚ 44' E
3.	Rudrur	Chromusterts clayey, deep (90 cm depth), deep black soils	18˚ 30' N	77˚ 51' E
4.	Jorhat	Fluaquents/ Udicaquents association, very deep (90 cm depth), alluvial sandy clay loam soils	26˚ 47' N	94˚ 12' E
5.	Sabour	Eutrocherpts (Very deep), low and clay soils	25˚ 23' N	87˚ 07' E
6.	Raipur	Ochraquals association, deep black soils	21˚ 16' N	81˚ 36' E
7.	S K Nagar	Haplaquals, deep medium black soils	24˚ 90' N	72˚ 19' E
8.	junagadh	Ustochrepts, deep medium black soils	21˚ 30' N	70˚ 30' E
9.	Hisar	Vertic Ustochrepts deep medium black soils	20˚ 57' N	72˚ 54' E
10.	Palampur	Ustochrepts, very deep silty alluvial soils	29˚ 08' 55" N	74˚ 41' 16" E
11.	Navsari	Udic Haplustalfs, red soils	32˚ 06' N	76˚ 03' E
12.	Chatha (Jammu)	Eutrochrepts very deep clay soils	32˚ 05' N	74˚ 04' E
13.	Ranchi	Ultic Palustaifs very deep (90 cm) red soils	23˚ 79' N	85˚ 19' E
14.	Kathalagere	Aificols, dark reddish brown sandy clay loam	13˚ 02' N	76˚ 15' E
15.	Siruguppa	Type Chromusterts, very deep (90 cm) black soils	15˚ 38' N	76˚ 54' E
16.	Karamana	Typic Tropoflivents, very deep (90 cm depth)	11˚ N	77˚ E
17.	Jabalpur	Chromusterts, very deep (90 cm depth), medium to deep black	23˚ 10' N	79˚ 57' E

18.	Indore	Vertisols, medium and dark deep black soil	22° 04' N	79° 57' E
19.	Powarkheda	Deep black soil,clay to sandy loam	23° 25' N	73° 98' E
20.	Rewa	Ustochrepts-Vertic Ustochrepts association, fine loamy soils	24° 41' N	81° 15' E
21.	Akola	Medium deep black clayey soil	20° 42' N	77° 02' E
22.	Karjat	Haplustults Udic-Fluvents, red soils	18° 33' N	75° 03' E
23.	Parbhani	Chromusterts,deep (90 cm depts.), deep black soils	19° 08' N	76° 05' E
24.	Rahuri	Chromusterts, fine clayey soils	19° 47' N	74° 18' E
25.	Bhubaneshwar	Haplustaifs very deep (90 cm depth), mediumtextured lateritic soils	20° 15' N	85° 52' E
26.	Chiplima	Haplaquents, very deep (90 cm depth) clay, ill-drained soils	20° 21' N	80° 55' E
27.	Ludhiana	Ustochrepts-Ustic Psamments Assciation, very deep (90 cm depth), alluvial sandy and sandy-loam soils	30° 56' N	75° 52' E
28.	Durgapura (Jaipur)	Torrid-Psamments/ Torrid-Fluvents Association, sandy loam soils	26° 55' N	75° 49' E
29.	Kota	Chromsterts-Paleusterts association, very deep (90 cm depth) clay loam soils	25° 26' N	75° 30' E
30.	Coimbatore	Udic Rhodustalts, fine loamy red sandy soils	11° 59' N	78° 55' E
31.	Thanjavur	Typic Pellusterts, clayey very deep (90 cm depth)/ deep black soils of deltaic origin	10° 47' N	79° 10' E
32.	Kanpur	Udic Ustochrepts, alluvial soils	26° 28' N	80° 21' E
33.	Faizabad	Udic fluvents-Fluaquents Association, loqland clayey soils	26° 47' N	82° 12' E
34.	Varanasi	Aeric Chroquals very deep (90 cm depth) alluvial clayey soils	25° 18' N	83° 03' E
35.	Pantnagar	Hapludolls, very deep (90 cm depth) alluvium coarse loam soils	29° 08' N	79° 05' E
36.	Kalyani	Fluventic Eutrochrepts, very deep (90 cm depth) alluvial soils	23° 40' N	88° 52' E
37.	PDFSR, Modipuram	Ustochrept	29.4' N	77.46' E
38.	ICAR-RC, Patna	Alluvial soil	25° 50' N	84° 45' E
39.	ICAR-RC, Umiam	Slfisols, Entisols, Inceptisols	25° 59' N	85° 08' E
40.	ICAR-RC, Goa	Lithic dystropepts karmali soils series	15° 13' N	75° 55' E
41.	ICAR-RC, Port Blair	Costal alluvial soil	11° 38' N	92° 39' E

Prevailing Weather Conditions at various centers of AICRP on IFS during 2020-21

The weather conditions including imperative parameters such as precipitation (rainfall), and air temperature (monthly minimum & maximum) prevailed for the reporting i.e., Jun 2020 to May 2021 at the various Integrated Farming Systems Research (IFS) Centers of the AICRP

were analyzed. The rainfall data was classified into four (04) seasons, namely, Winter (Jan-Feb), Pre-monsoon (Mar-May), Southwest monsoon (Jun-Sep), and Post-monsoon (Oct-Dec), respectively. Additionally, the contribution of the Southwest monsoon was described in percentage of the total annual rainfall for 2020-21 for each of the AICRP-IFS centers. Center-wise departure (in %) of the annual rainfall with respect to the IMD (India Meteorological Department) normal rainfall was also calculated. Fig 1 illustrates the seasonal rainfall indices, while Fig 2 represents the contribution from the Southwest monsoon (in %) in reference to the total annual rainfall along with percent deviation from the India Meteorological Department (IMD) normal rainfall. Fig. 3-5 illustrate the daily maximum & minimum temperatures during the months for the AIRCP centers.

Regarding the rainfall, the complied results suggested that eight (08) of the AICRP IFS centers, namely, Ayodhya, Bhubaneswar, Indore, Junagadh, Navsari, Reva, Sabour, and SK Nagar, received no rainfall during the winter season. The maximum annual rainfall was received at Port Blair (3447.9 mm), while the least was recorded at Hisar (400. 8 mm). In the context of the SW Monsoon, the highest was received at Navsari (2266.0 mm), while, the least was recorded at Meerut (204.5 mm), respectively. Percentwise, the SW Monsoon contributes maximum to the annual rainfall at SK Nagar (96.41 %) and least for Thanjavur (36.45 %). The highest positive deviation was observed for Kathalgere (+117.72 %), whereas the highest negative deviation was detected for Coimbatore (-49.38 %). The Rewa station (0.44 %) has the least deviation from the IMD normal rainfall over annual time scales. In relation to air temperatures, Powarkheda (41.3 °C) was the hottest AIRCP center, while Palampur (3.4 °C) was the coldest. Additionally, the Powarkheda station, with its maximum and minimum temperature of 41.3 °C & 5.5 °C also expressed the largest temperature range (35.8 °C), while the least was recorded for Port Blair (9.3 °C) in the 2020-21. The center wise brief of the prevailing weather conditions is described below.

Akola: The station received an annual rainfall of 832.3 mm, with a deviation of +3.14 % from the normal. The SW Monsoon contributed 88.14 % (733.6 mm) to the total annual rainfall. The Post-Monsoon, Winter, and Pre-Monsoon rainfalls were 38.0 mm, 2.5 mm, and 58.2 mm, respectively. The maximum monthly rainfall was received in July (264.9 mm). In the context of the air temperature, the daily maximum ranged from 40.5 °C and 29.6 °C in April & May and August, respectively. As for the daily minimum temperature, a range of 24.6 °C and 12.5 °C was observed in June and March & April, respectively.

Ayodhya: An annual precipitation of 795.2 mm was observed at Ayodhya for the reporting period with a -22.72 % deviation from the normal rainfall. Approximately, 81.14 % or 645.2 mm of the total precipitation was contributed by the SW Monsoon, while, Post-Monsoon, Winter, and Pre-Monsoon rainfalls accounted for 9.2 mm, 0.0 mm, and 140.8 mm of the rainfall,

respectively. August was observed to be the wettest month with a cumulative monthly rainfall of 273.4 mm. Concerning air temperature, the daily maximum temperature ranged from 38.6 °C and 19.9 °C in the months of April and January, respectively. Similarly, the daily minimum was in the range of 26.9 °C and 7.8 °C during the months of July and January, respectively.

Bhubaneswar: For the reporting period, a cumulative annual precipitation of 1519.5 mm was perceived at Bhubaneshwar station. A +3.50 % deviation was noticed from the normal amount with the SW Monsoon contributing to 1051.3 mm or 69.19 %. Additionally, 253.2 mm and 215.0 mm were received from Post-Monsoon and Pre-Monsoon, while no rainfall occurred during the winters. Monthly rainfall data suggested that August received the most rainfall for the observance duration which was 585.4 mm. In regard to the air temperature daily maximum ranged from 38.5 °C and 29.8 °C during the months of April and December, respectively. Correspondingly, the daily minimum varied from 26.7 °C and 14.3 °C during June and December, respectively.

Chiplima: The station's yearly precipitation was 1074.5 mm, deviating from -26.93 % with respect to the normal. Of the total yearly rainfall 88.77 %, corresponding to 953.8 mm, is due to the SW Monsoon. The precipitation amounts during the Post-Monsoon, Winter, and Pre-Monsoon are 26.4 mm, 4.2 mm, and 90.1 mm, respectively. August saw the highest monthly rainfall of 383.7 mm. Regarding the air temperature, the highest daily temperature was recorded in May which was 40.2 °C, while in December it was 26.9 °C. In terms of the daily lowest, variations of 25.8 °C to 11.5 °C were contemplated in July and January, respectively.

Coimbatore: At the Coimbatore station, cumulative yearly precipitation for the reporting period was recorded at 670.9 mm. There was a -49.38 % variation from the average, with the SW Monsoon accounting for 296.0 mm, or 44.12 %, of the total. In addition, the Pre-Monsoon, Winter, and Post-monsoon accounted for 171.0 mm, 144.4 mm, and 59.5 mm of the total annual rainfall. According to monthly rainfall data, January received the greatest amount of rain (141.5mm) at the time of the observance. Regarding the daily maximum air temperature, it varied between 35.2 °C and 27.8 °C in April and January, respectively. In June and February, respectively, the daily minimum fluctuated from 24 °C to 21 °C.

Durgapura: During the reported period, Durgapura had 610.8 mm of annual precipitation, which is a +9.09 % divergent from the long-term average. The SW Monsoon produced about 82.32 % or 502.8 mm of the total precipitation, with the Post-Monsoon, Winter, and Pre-Monsoon rainfalls contributing 15.2 mm, 6.8 mm, and 86 mm, respectively. Observations showed that August had the highest monthly rainfall, totaling 387 mm. Concerning air temperature, the highest daily temperature was recorded in the months of June and January with numerical values being 38.6 °C and 22 °C, respectively. In a similar vein, the daily minimum in June & July and in January was between 26.2 °C and 9.7 °C, respectively.

Hisar: Annual precipitation observed at Hisar for the recording period was 400.8 mm with the SW monsoon contributing to 80.64 % of the total. Further, a +4.95 % deviation of rainfall from normal is also observed. Contributions from the Post-Monsoon, Winter, and Pre-Monsoon rainfalls were 19.1 mm, 17.6 mm, and 40.1 mm, respectively. Month-wise July was considered as the wettest month with a monthly cumulative rain of 172.9 mm. In the context of the daily maximum air temperature, a range of 38.2 °C and 17.4 °C during the months of June and January, respectively. In addition, the daily minimum range of 26.9 °C and 5.0 °C was recorded in the months of July and December, respectively.

Indore: Indore experienced 1083.2 mm of annual precipitation over the recorded period, deviating by +20.48 % from the long-term average. About 95.57 %, or 1035.2 mm, of the total precipitation, was imparted by the SW Monsoon, with the remaining amounts being contributed from the Post-Monsoon and Pre-Monsoon rainfalls, which were 34.7 mm and 13.3, respectively. Further, winter rainfall was null for the Indore station in the reporting period. With a total of 572.2 mm, August had the greatest monthly rainfall. In terms of air temperature, April & December had the greatest daily readings, with numerical values of 38.7 °C and 24.9 °C, respectively. Parallel to this, the daily minimum was between 24.7 °C and 10.6 °C in July & December, respectively.

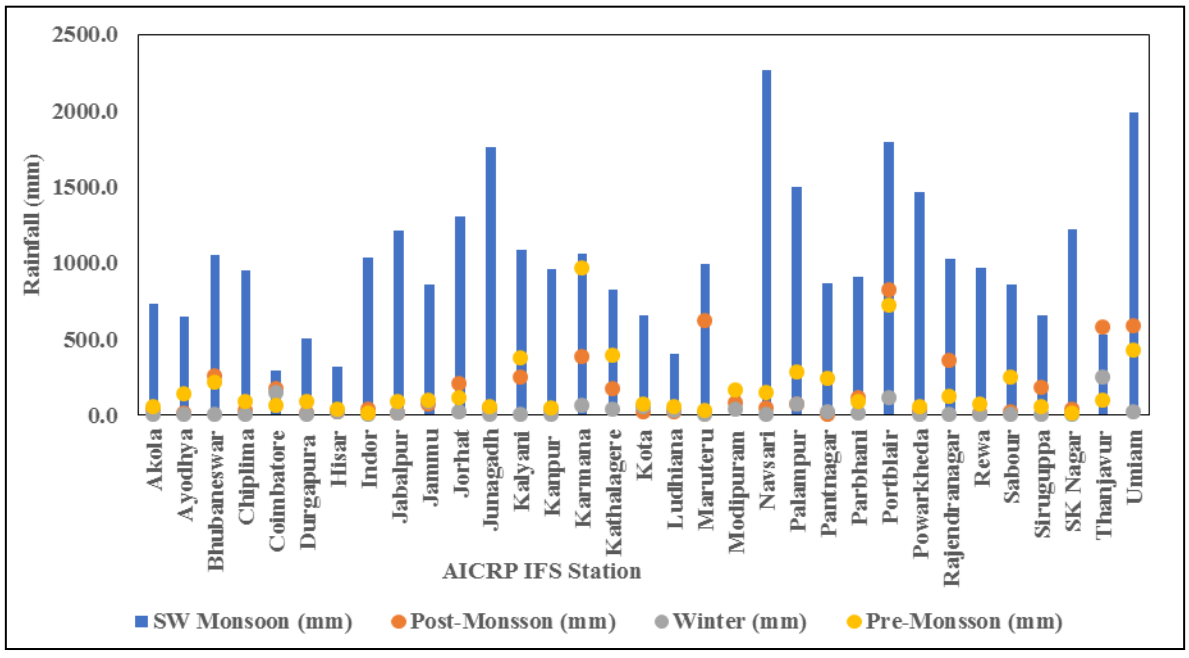


Fig. 1 Seasonal rainfall indices (mm) for IFS AICRP centers during 2020-21

Jabalpur: Throughout the recording period, Jabalpur received 1319.2 mm of annual precipitation, which is a deviation of +8.95 % from the long-term average. The SW Monsoon provisioned around 91.91 % of the total precipitation, with the remaining amounts accounted for from the Pre-Monsoon, Winter, and Post-Monsoon rainfalls, which were 8.9, 13.5, and 84.3

mm, respectively. The highest monthly rainfall totaling 698.4 mm was observed for the month of August. With the numerical values of 37.9 °C and 25.0 °C, respectively, April and January had the highest daily measurements of air temperature. In parallel with this, the daily minimum was observed for the months of July and December, which was found to be 24.7 °C and 10.6 °C, respectively.

Jammu: Jammu perceived 1319.2 mm of annual precipitation during the reporting period, which is 8.95 % more than the long-term average. 79.91 % of the total precipitation was supported by the SW Monsoon, with the remaining portion coming from the Pre-Monsoon, Winter, and Post-Monsoon rainfalls. These were 73.0 mm, 92.0 mm, and 93.0 mm, respectively. Further, the highest monthly cumulative was observed to be 594.2 mm in the month of August. The range of the daily maximum air temperature readings was recorded in June and January, reaching 38.7 °C and 17.5 °C, respectively. Simultaneously, in July and December daily minimum temperatures were recorded, and they turned out to be 24.7 °C and 10.6 °C, respectively.

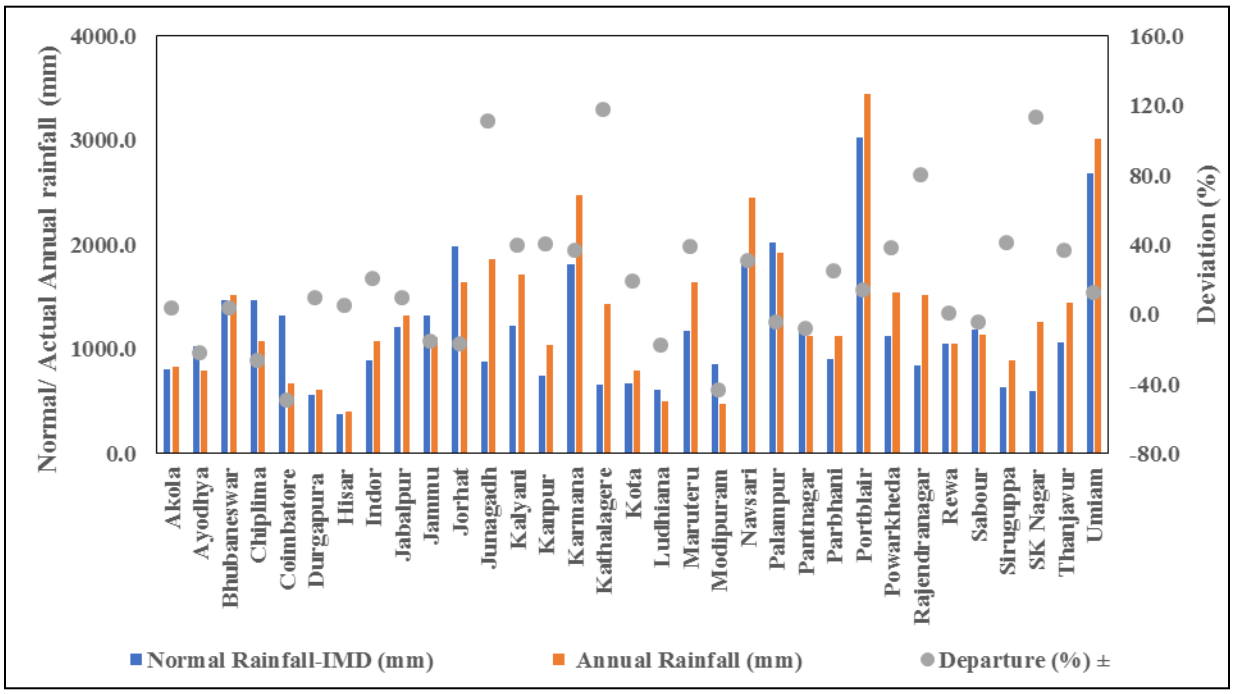


Fig. 2 Total annual rainfall for 2020-21, IMD normal rainfall along with % deviation

Jorhat: For the reported period, Jorhat experienced 1638.5 mm of annual precipitation, 17.48 % less than the long-term average. The SW Monsoon contributed 79.65 % of the total precipitation, with the Pre-Monsoon, Winter, and Post-Monsoon rainfalls accounting for the remaining amount, with the measured values of 204.1 mm, 16.9 mm, and 112.5 mm in that order. Furthermore, it was found that the month of June had the greatest monthly cumulative, measuring 410.3 mm. In August and November, the daily maximum air temperature readings ranged from 33.6 °C and 21.1 °C, respectively. The daily low temperatures were observed simultaneously in the month of August and January and were found to be 25.6 °C and 10.5

°C, respectively.

Junagarh: Annual precipitation observed at the station was 1861.2 mm with a positive deviation of 110.73 % from the normal. Approximately, 94.96 % of the annual was showered by the SW Monsoon. The rest amounts were provisioned by the Pre-Monsoon and Post-Monsoon precipitation, which contributed 50.1 mm and 53.1 mm, respectively. Whereas the no rai occurred during the Winters. With a total of 866 mm, August had the highest monthly rainfall recording period. The daily maximum air temperature readings were recorded in April and January, reaching 40.1 °C and 28.3 °C, respectively. Likewise, June and January have the daily minimum temperatures in the range of 26.3 °C and 14 °C, respectively.

Kalyani: Kalyani station experienced 1713.4 mm of annual precipitation, 39.67 % more than normal. The SW Monsoon contributed 63.42 % of the total precipitation, with the Pre-Monsoon and Post-Monsoon rainfalls accounting for the remaining amount. These rainfall measurements were 247.4 mm and 378.3 mm, respectively. In comparison to that the Winter rain was minuscule with a numeric value of 1.1 mm only. Furthermore, it was found that the month of August had the largest monthly cumulative rain, measuring 367 mm. In April and January, the daily maximum air temperature readings ranged from 37.0 °C and 24.8 °C, respectively. Similarly, the daily minimum temperatures stretch from 26.6 °C and 11.5 °C in August and December, respectively.

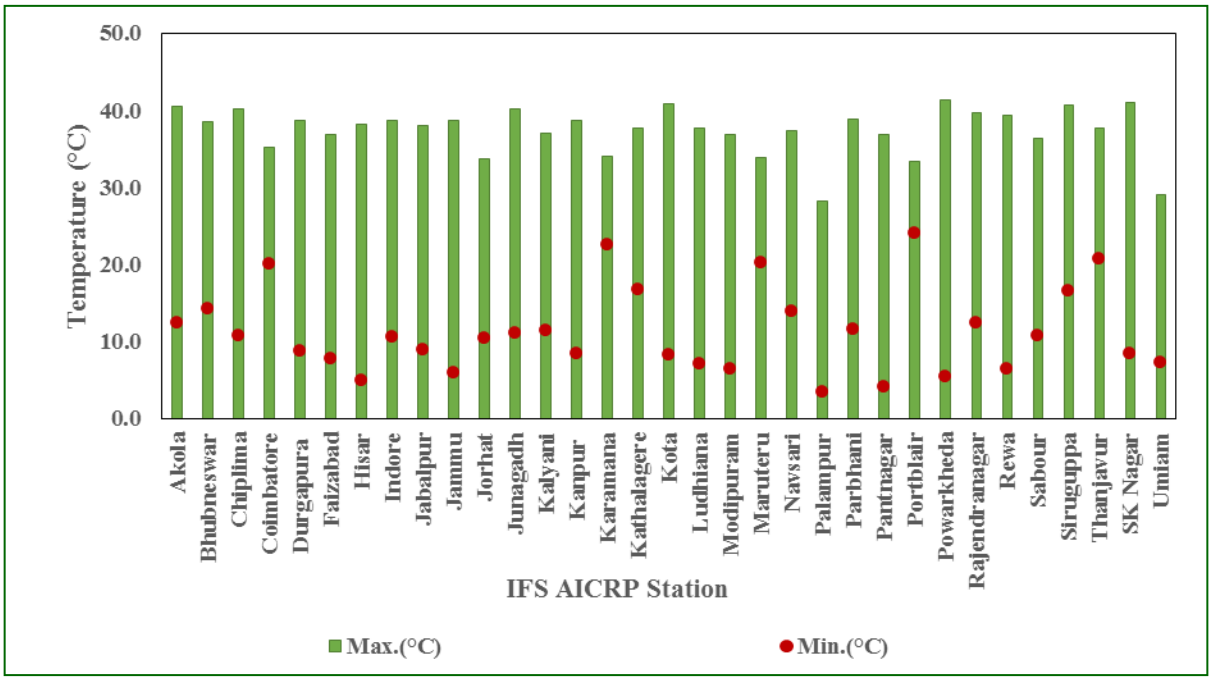


Fig 3 Annual maximum and minimum air temperatures (in °C) for IFS AICRP centers in 2020-21

Kanpur: An annual precipitation of 1046.1 mm was received at the station, with a positive deviation of 40.53 % from the normal. The SW Monsoon contributed 91.71 % to the total

annual rainfall. The Post-Monsoon, Winter, and Pre-Monsoon rainfalls were 38.4 mm, 5.1 mm, and 43.2 mm, respectively. The maximum monthly rainfall was received in July with a monthly cumulative value of 446.6 mm. In the context of the air temperature, among the months the daily maximum temperature ranged from 38.7 °C and 20.3 °C in April and January. Correspondingly, the daily minimum was in the range of 26.8 °C and 8.7 °C in July and January, respectively.

Karamana: Throughout the recording period, Karmana received 2468.9 mm of annual precipitation, which is a positive deviation of 36.21 % from the long-term average. The SW Monsoon provisioned around 42.87 % of the total precipitation, with the remaining amounts accounted for from the Pre-Monsoon, Winter, and Post-Monsoon rainfalls, which were 382.8 mm, 65 mm, and 962.8 mm, respectively. The highest monthly rainfall totaling 820.8 mm was observed for the month of September. With the numerical values of 34 °C and 30.9 °C, respectively, April and September had the highest daily measurements of air temperature. In parallel with this, the daily minimum was observed for the months of June and January, which was found to be 26 °C and 23.5 °C, respectively.

Kathalagere: The station received an annual rainfall of 1430.1 mm, with a deviation of +117.72 % from normal. The SW Monsoon contributed 57.44 % (823 mm) to the total annual rainfall. The Post-Monsoon, Winter, and Pre-Monsoon rainfalls were 175.5 mm, 36.8 mm, and 394.8 mm, respectively. The maximum monthly rainfall was received in September (474 mm). In the context of the air temperature, among the months the daily maximum temperature ranged from 37.7 °C and 27.8 °C in March and August, while, the daily minimum was in the range of 21.6°C and16.8 °C in June and December, respectively.

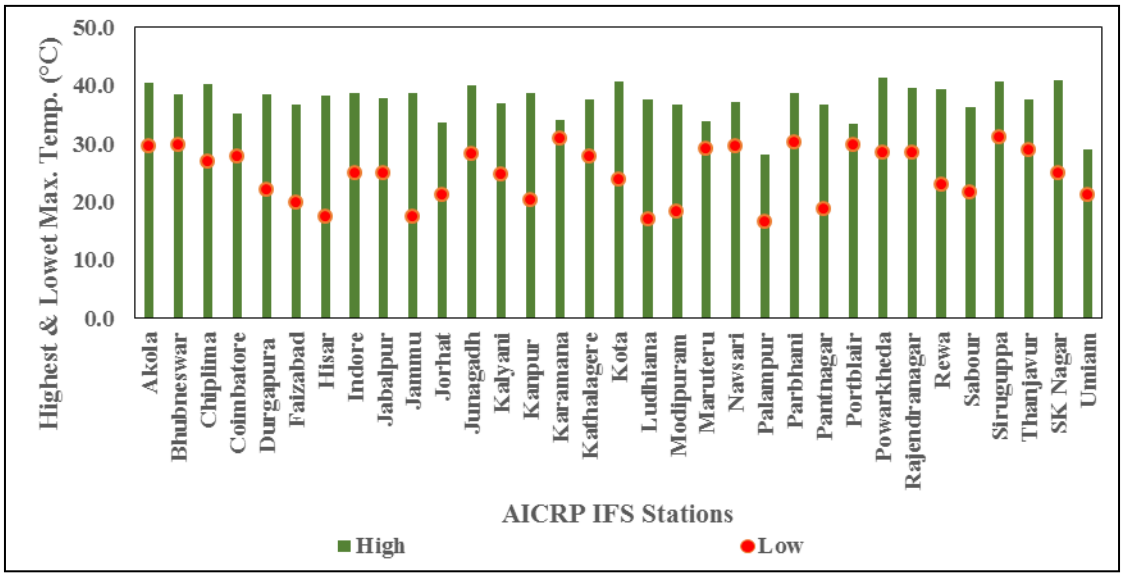


Fig 4 Daily maximum temperature range for IFS AICRP centers in 2020-21

Kota: In reference to the air temperature at the Kota station, the daily maximum ranged from

40.7 °C and 23.8 °C in May and January, respectively. On the contrary, the daily minimum is observed in the range of 23.6 °C and 10.2 °C in the months of July and January, respectively. Concerning the precipitation, a cumulative annual of 800.2 mm was recorded. This deviated by a positive 19.08 % from the normal trend for the region. 81.75 % of the same was contributed by the SW monsoon. The beneficence from the Post-Monsoon, Winter, and Pre-Monsoon rainfalls were relatively low, which are 17 mm, 57 mm, and 72 mm, respectively. Month-wise most of the precipitation was concentrated during the month of August with a cumulative value of 335.6 mm.

Ludhiana: An annual precipitation of 507 mm was observed at Ludhiana for the reporting period with a negative 17.62 % deviation from the normal rainfall. Approximately, 79.05 % of the total precipitation was contributed by the SW Monsoon, while, Post-Monsoon, Winter, and Pre-Monsoon rainfalls accounted for 21.6 mm, 28 mm, and 56.6 mm of the rainfall, respectively. July was observed to be the wettest month with a cumulative monthly rainfall of 232 mm. Concerning the air temperature, the daily maximum temperature ranged from 37.6 °C and 16.9 °C in the months of June and January, respectively. Consequently, the daily minimum was in the range of 26.9 °C and 7.1 °C during the months of December and January, respectively.

Modipuram: Concerning the air temperature indices, the daily maximum varied from 36.9 °C to 18.3 °C in the months of April & January, while the daily minimum ranged from 25.7 °C and 6.5 °C in July and December, respectively. In regard to the annual precipitation, 481.2 mm was recorded at the gauging site. The annual rainfall displayed a negative deviation of 43.67 % from the normal trend. Of the total rainfall received, 42.68 % was contributed from the SW Monsoon. The apportionments from Post-Monsoon, Winter, and Pre-Monsoon rainfalls were 81 mm, 34.5 mm, and 160.3 mm, respectively. Maximum monthly rainfall of 153.2 mm was recorded during the month of May.

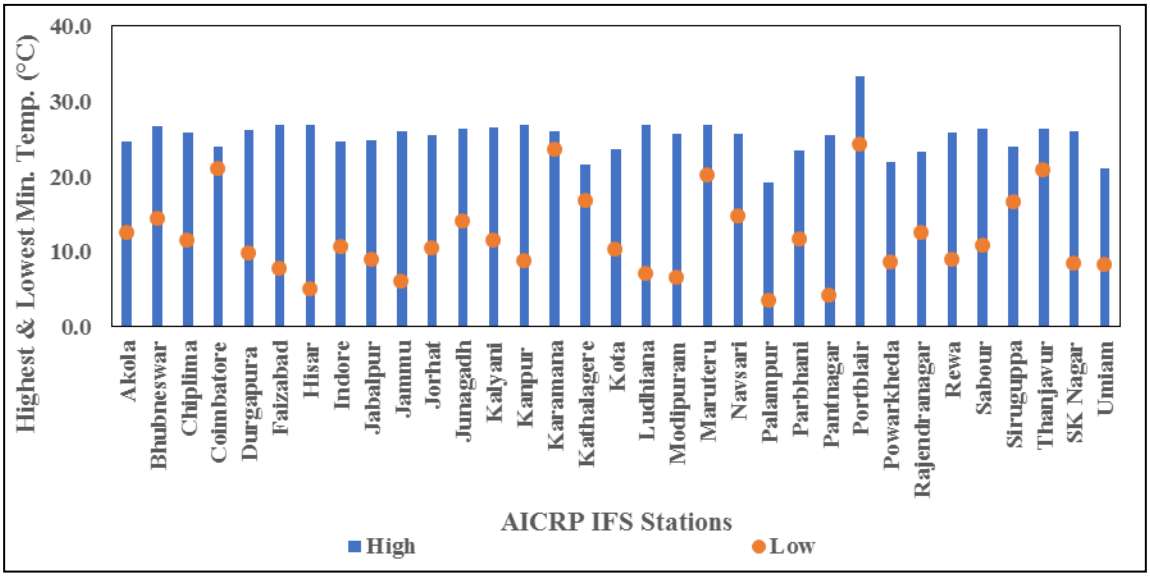


Fig 5 Daily minimum temperature range for IFS AICRP centers in 2020-21

Maruteru: Maruteru experienced 1637 mm of annual precipitation over the recorded period, deviating by a positive 38.70 % from the long-term average. About 60.52 % of the total precipitation was imparted by the SW Monsoon, with the remaining amounts being contributed from the Post-Monsoon and Pre-Monsoon rainfalls, which were 615.3 mm and 31 mm, respectively. Further, winter rainfall was null for the station during the reporting period. With a total of 427.2 mm, July had the largest monthly rainfall. In terms of air temperature, April & January had the greatest daily readings, with numerical values of 36.9 °C and 18.3 °C, respectively. Parallel to this, the daily minimum was between 25.7 °C and 6.5 °C in July & December, respectively.

Navsari: The total annual rainfall received during the reporting period was 2454 mm, which displayed a relatively large positive deviation (+30.75 %) from the normal rainfall trend. The Pre-Monsoon and Post-Monsoon contributed to 188 mm of rain, whereas the SW monsoon contemplated 2266 mm of rain corresponding to 92.34 % of the total annual. No rainfall was recorded during the winter season. Cumulatively maximum monthly rain was registered during the month of August which was 1265 mm. The highest monthly maximum air temperature was observed in March (37.3 °C), whereas the lowest minimum of 14.8 °C was recorded during January.

Palampur: Annual precipitation observed at Palampur for the recording period was 1922.8 mm with the SW monsoon contributing 78.07 % of the total. Further, a negative 4.61 % deviation of rainfall from the normal is also observed indicating a little less rain was recorded during the period of observance with respect to the long-term average. Contributions from the Post-Monsoon, Winter, and Pre-Monsoon rainfalls were 67.8 mm, 74 mm, and 279.8 mm, respectively. Month-wise August was contemplated as the wettest month with a monthly cumulative rain of 634.6 mm. In the context of the daily maximum air temperature, a range of 28.2 °C and 16.6 °C during the months of June and January, respectively. In addition, the daily minimum range of 19.2 °C and 3.4 °C was recorded in the months of August and December.

Parbhani: The center received a total annual precipitation of 1125.3 mm rainfall for the period of observance. During the Post-Monsoon, Winter, and Pre-Monsoon seasons rainfall amount of 117.0 mm, 16.3 mm, and 85.4 mm was recorded. Further, 80.57 % was contributed from the SW Monsoon. A 24.36 % positive deviation at the center suggests that the rainfall was relatively higher for the reporting period than the normal trend. The lowest minimum temperature was recorded during December (11.6 °C), while the highest monthly mean maximum temperature was observed during April (38.8 °C).

Pantnagar: The station received an annual rainfall of 1130.1 mm, with a deviation of -8.12 % from normal. The SW Monsoon contributed 76.41 % (863.5 mm) to the total annual rainfall. The Post-Monsoon, Winter, and Pre-Monsoon rainfalls were 2.5 mm, 23.2 mm, and 240.9 mm,

respectively. The maximum monthly rainfall was received in July (384.5 mm). In the context of the air temperature, among the months the daily maximum temperature ranged from 36.8 °C and 18.8 °C in April and January, while the daily minimum was in the range of 25.6 °C and 4.1 °C in July and December, respectively.

Port Blair: Concerning the air temperature indices, the daily maximum varied from 33.4 °C and 29.8 °C in the months of May and December, while the daily minimum ranged from 33.4 °C and 24.3 °C in April and February, respectively. Regarding the annual precipitation, 3447.9 mm was recorded at the gauging site. The annual rainfall displayed a negative deviation of 13.90 % from the normal trend. Of the total rainfall received, 52.07 % was contributed from the SW Monsoon. The apportionments from Post-Monsoon, Winter, and Pre-Monsoon rainfalls were 818 mm, 117.7 mm, and 717 mm, respectively. Maximum monthly rainfall of 657.1 mm was recorded during the month of June.

Powarkheda: Most of the annual rainfall at the Powarkheda center was concentrated in the SW Monsoon, which contributes to 94.86 % of the total. Additionally, a large positive deviation of 38.11 % was observed for the reporting period suggesting that the concerned tenure has received a greater rainfall than what is observed under the typical pattern. The Post-Monsoon, Winter, and Pre-Monsoon rainfalls aggregate 79.5 mm of rain, while calendar month-wise August receives the most, which is 1016 mm. In reference to air temperature, the daily minimum was in the range of 22 °C and 8.5 °C observed in the month of July & January, respectively. Parallely, the daily maximum temperature ranges from 41.3 °C and 28.5 °C during May & January.

Rajendranagar: For the reporting period, a cumulative annual precipitation of 1520.2 mm was perceived at the Rajendranagar center. A positive 79.64 % deviation was noticed from the normal amount with the SW Monsoon contributing 67.82 % of the total annual amount. Additionally, 359.8 mm, 4.6 mm, and 124.8 mm were received from Post-Monsoon, Winter, and Pre-Monsoon showers, respectively. Monthly rainfall data suggested that September received the most rainfall for the observance duration which was 383.8 mm. In regard to the air temperature daily maximum ranged from 39.6 °C and 28.5 °C during the months of July & December, respectively. Correspondingly, the daily minimum varied from 23.3 °C and 12.5 °C during June and December, respectively.

Rewa: Rewa experienced 1054 mm of annual precipitation over the recorded period, deviating by a minor positive of 0.44 % from the normal. About 91.94 % of the total precipitation was imparted by the SW Monsoon, with the remaining amounts being contributed from the Post-Monsoon and Pre-Monsoon rainfalls, which were 10.6 mm and 74.4 mm, respectively. Further, winter rainfall was null for the station during the reporting period. With a total of 304.8 mm, July had the largest cumulative monthly rainfall. In reference to the air temperatures, April &

January had the greatest daily maximum readings, with numerical values of 39.3 °C and 22.9 °C, respectively. Parallel to this, the daily minimum was between 25.9 °C and 9.0 °C in July & January, respectively.

Sabour: The total annual rainfall received during the reporting period was 1132.6 mm, which displayed a little negative deviation (-5.0 %) from the normal rainfall trend. The Pre-Monsoon and Post-Monsoon contributed 272.5 mm of rain, whereas the SW monsoon contemplated 860.1 mm of rain corresponding to 75.94 % of the total annual. No rainfall was recorded during the winter season. Cumulatively maximum monthly rain was registered during the month of July which was 353.5 mm. The highest monthly maximum air temperature was observed in April (36.4 °C), whereas the lowest minimum of 10.8 °C was recorded during December.

Siruguppa: Concerning the air temperature indices, the daily maximum varied from 40.6 °C and 31.2 °C in the months of April & October, while the daily minimum ranged from 24.0 °C and 16.5 °C in June and July, respectively. Regarding the annual precipitation, 893.8 mm was recorded at the gauging site. The annual rainfall displayed a positive deviation of 41.18 % from the normal trend. Of the total rainfall received, 73.45 % was contributed from the SW Monsoon. The apportionments from Post-Monsoon, Winter, and Pre-Monsoon rainfalls were 8177.6 mm, 8.0 mm, and 51.7 mm, respectively. Maximum monthly rainfall of 272.7 mm was recorded during the month of July.

Thanjavur: An annual precipitation of 1444.4 mm was observed at Thanjavur for the reporting period with a positive 36.42 % deviation from the normal. Approximately, 36.45 % of the total precipitation was contributed by the SW Monsoon, while, Post-Monsoon, Winter, and Pre-Monsoon rainfalls accounted for 577.0 mm, 245.8 mm, and 95.1 mm of the rainfall, respectively. December was observed to be the wettest month with a cumulative monthly rainfall of 320.1 mm. Concerning the air temperature, the daily maximum temperature ranged from 37.6 °C and 28.9 °C in the months of June and December, respectively. Consequently, the daily minimum was in the range of 26.4 °C and 20.8 °C, both during the month of July.

SK Nagar: In reference to the air temperature at the SK Nagar station, the daily maximum ranged from 40.9 °C and 24.9 °C in May and January, respectively. On the contrary, the daily minimum is observed in the range of 26 °C and 8.5 °C in the months of December and January, respectively. Concerning the precipitation, a cumulative annual of 1266 mm was recorded. This deviated by a large positive of 113.13 % from the normal trend for the region. 96.41 % of the same was contributed by the SW monsoon. The beneficence from the Post-Monsoon and Pre-Monsoon rainfalls were relatively low, at 35 mm and 10.5 mm, respectively. The winter season does not contribute to any rain during the gauging period. Month-wise most of the precipitation was concentrated during the month of August with a cumulative value of 785 mm.

Umiam: The station received an annual rainfall of 3015.6 mm, with a deviation of +12.41 % from the normal. The SW Monsoon contributed 65.79 % (1984 mm) to the total annual rainfall. The Post-Monsoon, Winter, and Pre-Monsoon rainfalls were 589.0 mm, 20.4 mm, and 422.2 mm, respectively. The maximum monthly rainfall was received in September (695.2 mm). In the context of the air temperature, among the months the daily maximum temperature ranged from 29.1 °C and 21.2 °C in April & December & January, while the daily minimum was in the range of 21.1 °C and 8.3 °C in August, September & October and January, respectively.

5 Staff Position

Out of 327 total staff sanctioned for different centres, 241 staff were actually in position as on 31st March 2022, suggesting that 26.3 percent total post were vacant. (Table 5.1 and Appendix-III)

Table -5:Staff position under AICRP-IFS (University-wise) as on 31.3.2021

S.No.	Name of the University	Scientific		Technical	
		Sanctioned	Filled	Sanctioned	Filled
	ANGRAU, Guntur	2	2	6	4
	PJTSAU, Hyderabad	6	6	7	6
	AAU, Jorhat	5	5	6	6
	BAU, Sabour	5	4	6	2
	BAU, Ranchi	4	4	6	4
	IGKV, Raipur	4	2	6	1
	CSKHPKVV, Palampur	4	4	6	6
	CSAUA & T, Kanpur	4	2	6	4
	NDUA & T, Ayodhya	4	3	6	2
	BHU, Varanasi	1	1	1	0
	GBPUA & T, Pantnagar	5	3	6	5
	PAU, Ludhiana	4	4	6	2
	CCSHAU, Hisar	5	3	6	4
	SKNAU, Jobner	4	4	6	2
	SDAU, S.K. Nagar	5	5	6	4
	NAU, Navsari	1	1	1	1
	JAU, Junagarh	1	1	1	1
	AAU, Anand	1	1	5	5

	JNKVV, Jabalpur	7	6	13	5
	RVSKVV, Gwalior	1	1	1	1
	BCKVV, Kalyani	5	4	6	4
	OUAT, Bhubaneswar	7	5	12	3
	PDKV, Akola	4	3	6	3
	MAU, Parbhani	4	3	6	4
	MPKU, Rahuri	5	5	6	6
	KKV, Dapoli	4	4	6	5
	UAS, Raichur	3	3	1	1
	UAS, Dharwad	1	1	5	4
	UAS, Banglore	2	2	5	5
	UAHS, Shimoga	3	3	1	1
	TNAU, Coimbtore	7	6	12	12
	SKUAST, Jammu	4	4	6	5
	KAU, Thrissur	5	5	6	4
	MPUAT, Udaipur	2	2	5	5
	AU, Kota	1	1	1	1
	ICAR-IIFSR, Modipuram	1	0	5	0
	Total	131	113	196	128

Budget 6

Revised (RE) for 2021-22 of AICRP on Integrated Farming Systems (ICAR share Rs. in Lakhs)

Sl. No.	Name of University/ Institute		A. Other than STC (TSP)/SCSP/NEH												B. STC (TSP)								C. SCSP								D. NEH									GRAND TOTAL (A+B+C+D)
			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)	Grant-in-Aid 'General'			Grant-in -Aid 'Capital'#				Total (SCSP)	Grant-in-Aid 'Salaries'	Grant-in-Aid General				Grant-in-Aid 'Capital'#						Total NEH	
		Grant-in-Aid 'Salaries'	Domestic T.A.	Operational Charges	Research Expenses	Sub Total	Equipments (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		Research Expenses	Operational Charges	Sub Total	Equipment(11)	Livestock (12)	Works (13)	Information Technology (14)	Sub Total		Grant-in-Aid 'Salaries'	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	44.04	0.13	5.91	1.83	7.87	0.00	2.00	0.00	0.00	0.00	0.00	2.00	53.91	4.62	4.02	8.64	2.50	0.00	0.00	0.00	2.50	11.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.05
2	PJTSAU, Hyderabad	103.05	0.50	18.02	4.75	23.27	2.00	0.00	0.00	0.00	0.00	0.00	2.00	128.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50	6.99	10.49	0.00	0.00	3.00	0.00	3.00	13.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	141.81
3	HPKVV, Palampur	61.56	0.35	5.66	2.53	8.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	70.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50	6.99	10.49	0.00	0.00	0.00	0.00	0.00	10.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	80.59
4	GBPUA&T, Pantnagar	56.67	0.10	8.65	6.09	14.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	71.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	71.51
5	CSAU&T, Kanpur	56.96	0.33	2.51	1.53	4.37	2.28	0.00	0.00	0.00	0.00	0.00	2.28	63.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	63.61
6	NDUA&T, Faizabad	96.82	0.33	1.64	1.53	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.32
7	BHU, Varanasi	50.60	0.33	7.18	2.65	10.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.76
8	BAU, Ranchi	30.00	0.13	6.78	5.32	12.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.23
9	BAU, Sabour	90.60	0.13	6.03	5.32	11.48	2.00	0.00	0.00	0.00	0.00	0.00	2.00	104.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	104.08
10	BCKVV, Kalyani	63.88	0.13	5.13	3.58	8.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50	5.45	8.95	0.00	0.00	2.96	0.00	2.96	11.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	84.63
11	AAU, Jorhat	54.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	54.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	8.41	3.72	12.32	18.59	0.00	0.00	0.00	0.00	18.59	30.91	84.91
12	PAU, Ludhiana	60.60	0.30	12.01	11.86	24.17	0.60	0.00	0.00	0.00	0.00	0.00	0.60	85.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	85.37
13	HAU, Hisar	45.52	0.13	5.13	2.18	7.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.96
14	SKNAU, Jobner	58.31	0.13	5.33	4.28	9.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	68.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50	6.99	10.49	0.00	0.00	1.12	0.00	1.12	11.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	79.66

15	SDAU, S.K. Nagar	64.00	0.13	7.09	2.53	9.75	2.00	0.00	0.00	0.00	0.00	0.00	2.00	75.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.75
16	NAU, Navsari	21.12	0.06	4.26	1.44	5.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.88
17	JAU, Junagadh	20.74	0.06	4.41	1.44	5.91	2.00	0.00	0.00	0.00	0.00	0.00	2.00	28.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.65
18	AAU, Anand	36.24	0.24	0.00	0.13	0.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.61	4.84	2.83	7.67	2.50	0.00	0.00	0.00	2.50	10.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.78
19	JNKVV,Jabalpur	132.00	0.19	12.45	7.12	19.76	0.00	2.72	0.00	0.00	0.00	0.00	2.72	154.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	154.48
20	RVSKVV, Gwalior	24.00	0.06	4.41	1.44	5.91	0.00	2.00	0.00	0.00	0.00	0.00	2.00	31.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.91
21	IGKV, Raipur	67.51	0.13	8.83	2.88	11.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	79.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	79.35
22	OUAT, Bhubaneswar	90.80	0.25	11.37	3.67	15.29	0.00	2.00	0.00	0.00	0.00	0.00	2.00	108.09	4.00	2.25	6.25	2.50	0.00	0.00	0.00	2.50	8.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	116.84
23	PDKV, Akola	47.16	0.13	5.33	3.23	8.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55.85
24	MAU, Parbhani	42.24	0.13	5.33	3.23	8.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.93
25	MPKV, Rahuri	48.96	0.13	6.38	2.53	9.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	58.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	58.00
26	KKV, Dapoli	47.16	0.13	5.33	3.23	8.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55.85	4.30	2.62	6.92	2.82	0.00	0.00	0.00	2.82	9.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.59
27	UAS, Raichur	33.00	0.13	5.33	2.53	7.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40.99
28	UAS, Dharwad	52.80	0.13	5.33	3.58	9.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	61.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	61.84
29	UAS, Bangalore	31.20	0.19	5.38	1.18	6.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	37.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.49	10.47	20.96	0.00	0.00	3.00	0.00	3.00	23.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	61.91
30	UAHS, Shimoga	30.96	0.13	4.46	3.58	8.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.13
31	TNAU, Coimbatore	152.95	0.50	15.07	9.04	24.61	2.50	2.00	0.00	0.00	0.00	0.00	4.50	182.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	182.06
32	SKUAST, Jammu	105.08	0.35	10.14	5.23	15.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	120.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50	6.99	10.49	0.00	0.00	3.00	0.00	3.00	13.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	134.29
33	KAU, Thrissur	132.20	0.50	12.66	5.41	18.57	0.00	2.00	0.00	0.00	0.00	0.00	2.00	152.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	152.77
34	MPUAT, Udaipur	36.40	0.13	5.33	2.71	8.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.57
35	AU, Kota (*)	42.00	0.06	5.28	3.54	8.88	2.00	0.00	0.00	0.00	0.00	0.00	2.00	52.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.88
37	ICAR-IIFSR, Modipuram	0.00	0.00	18.74	2.42	21.16	1.45	0.00	1.04	0.00	0.00	0.00	2.49	23.65	1.73	4.64	6.37	0.00	0.00	0.00	0.00	0.00	6.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.02
38	P.C.Unit,IIFSR, Modipuram	0.00	0.00	3.29	0.00	3.29	0.91	0.00	5.11	0.00	1.44	0.00	7.46	10.75	0.70	0.00	0.70	0.14	0.00	0.00	0.00	0.14	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.59
39	ICAR Res. Comp., Patna	0.00	0.06	6.60	3.54	10.20	2.00	0.00	0.00	0.00	0.00	0.00	2.00	12.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.20
40	ICAR Res. Comp., Umiam	0.00	0.13	0.04	0.08	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	8.34	4.71	13.24	25.76	0.00	0.00	0.00	0.00	25.76	39.00	39.25
41	ICAR -CCARI, Old Goa	0.00	0.06	8.42	4.64	13.12	2.50	0.00	0.00	0.00	0.00	0.00	2.50	15.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.62
42	ICAR-CIARI-Port Blair	0.00	0.00	6.83	4.82	11.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.65
43	ICAR-IASRI, New Delhi	0.00	0.30	4.93	0.00	5.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.23
Total			7.33	283.00	138.62	428.95	22.24	12.72	6.15	0.00	1.44	0.00	42.55		20.19	16.36	36.55	10.46	0.00	0.00	0.00	10.46	47.01	27.99	43.88	71.87	0.00	0.00	13.08	0.00	13.08	84.95	0.00	0.38	16.75	8.43	25.56	44.35	0.00	0.00	0.00	0.00	44.35	69.91	2804.50

Research Result 7

7.1 INTEGRATED FARMING SYSTEMS

Title of the experiment: 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 2021-22 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	Chatha (J&K), Palampur (HP). Pantnagar (UK)	3
Eastern Himalaya	Umiam (Meghalaya), Jorhat (Assam)	2
Trans Gangetic Plains	Hisar (Haryana), Ludhiana (Punjab)	2
Upper Gangetic Plains	Modipuram (UP), Kanpur (UP)	2
Middle Gangetic Plains	Varanasi (UP), Ayodhya (UP), Patna (Bihar), Sabour (Bihar)	5
Lower Gangetic Plains	Kalyani (WB)	1
Eastern Plateau and Hills	Raipur (Chhattisgarh) Ranchi (Jharkhand)	2

Central Plateau and Hills	Jabalpur (MP)	1
Western Plateau and Hills	Akola (MS), Parbhani (Maharashtra), Rahuri (Maharashtra)	3
Southern Plateau and Hills	Rajenderanagar (Telangana), Coimbatore (TN), Kathalgere (Karnataka), Sriguppa (Karnataka) Thanjavur (TN)	5
East Coast Plains and Hills	Bhubaneswar (Odisha)	1
West Coast Plains and Hills	Goa, Karjat (Maharashtra). Karamana (Kerala)	7
Western dry	Durgapura (Rajasthan), Kota (Rajasthan)	2
Gujarat Plains and Hills	SK Nagar (Gujarat)	1
Islands	Portblair (A&N)	2
Total		39

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. The results obtained from these IFS models during the reporting period of 2021-22 revealed that mean gross income of Rs. 565586 while the mean net return excluding family labour was found to be Rs.423174. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 246112 from IFS models with mean 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 was Rs. 357460 while it varied from Rs 291074 at Palampur to Rs 422298 at Jammu.

Table 7.1.1 Details of IFS model along with total cost per model in WHR

Location	IFS model	Area (ha)	Total cost (Rs)
Jammu	Cropping Systems +Fodder+Livestock+ Vermicompost+ Biogas+Horticulture + Fish cum poultry + Mushroom	1.0	422298
Palampur	Crops + Dairy + Horticulture + Fodder + Vermi-compost + Boundary Plantations + Kitchen Gardening	1.0	291074
Pantnagar	Crops + Dairy + Horticulture/Agroforestry + Fisheries	1.0	359010
Mean		1.0	284255

Jammu: Cropping Systems + Fodder+ Livestock+ Vermi-compost+ Biogas+ Horticulture + Fish cum poultry + Mushroom

Components IFS model at Palampur: Crops + Dairy + Horticulture + Fodder + Vermi-compost + Boundary Plantations + Kitchen Gardening

Components IFS model at Pantnagar: Crops + Dairy + Horticulture/Agroforestry + Fisheries

The models could generate mean employment generation of 392.5 mandays through different modules while the IFS models were also found to be carbon negative in terms of GHG emission at -7655.03 CO2 equivalent. Further, study of different fractions of cost revealed about 30% share of recycled inputs in total cost of the IFS whereas cost of outside purchase was to the tune of 40% of the cost. The cost incurred towards hired labour was 10%. These models revealed mean REY of 29.15 tonnes besides soil health improvement to the tune of 38.4 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.6.

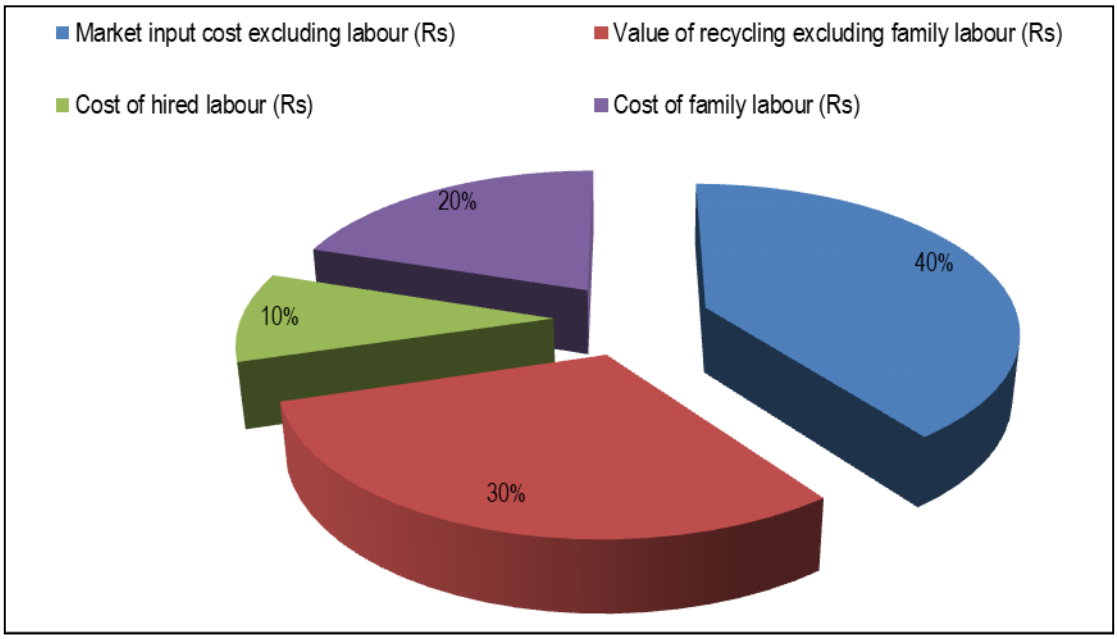


Fig 1. Different fraction of total cost

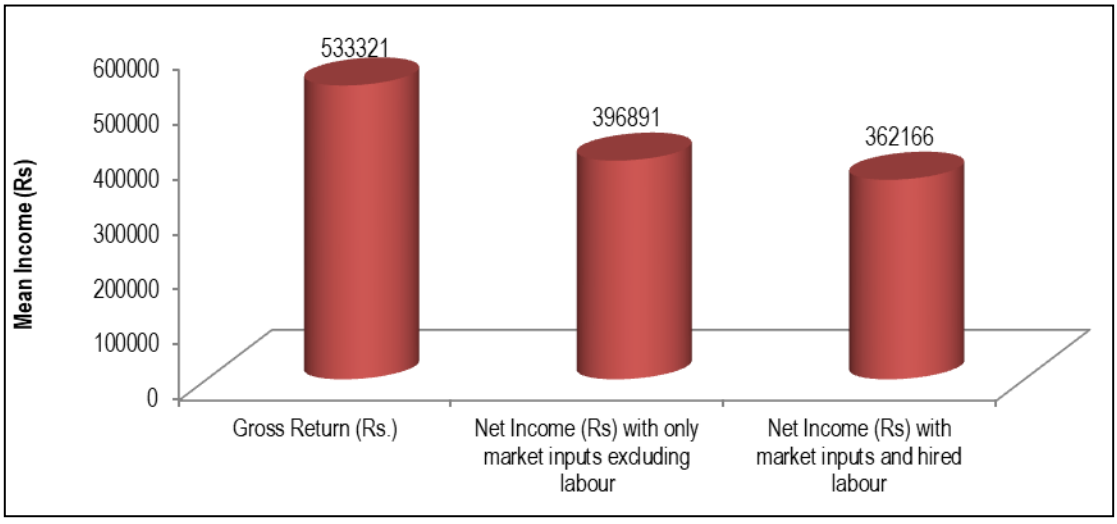


Fig 2. Economics of IFS models of WHR

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. The results obtained from these IFS models during the reporting period of 2021-22 revealed that mean gross income of Rs. 573711 while the mean net return excluding family labour was found to be Rs.479334.50. However, when family labour was accounted for in the cost, the mean net return was found to be Rs.381618. 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 per model in EHR

Location	IFS model	Area (ha)	Total cost (Rs)
Jorhat	Crops + Dairy + Horticulture + Fishery + Poultry + Duckery + Goatery + Apiary + Vermi-compost + Biogas + Liquid Manure + FYM production	1.0	318912
Umiam	Crops + Livestock + Horticulture + Fishery	1.0	186858
Mean		1.0	253812

The models could generate mean employment generation of 441.5 mandays through different modules. Further, study of different fractions of cost revealed about 23% 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 2%. These models revealed mean REY of 29.57 tonnes besides soil health improvement to the tune of 32.7 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 1.30. The mean sustainable value index (SVI) for these models was found to be 0.8.

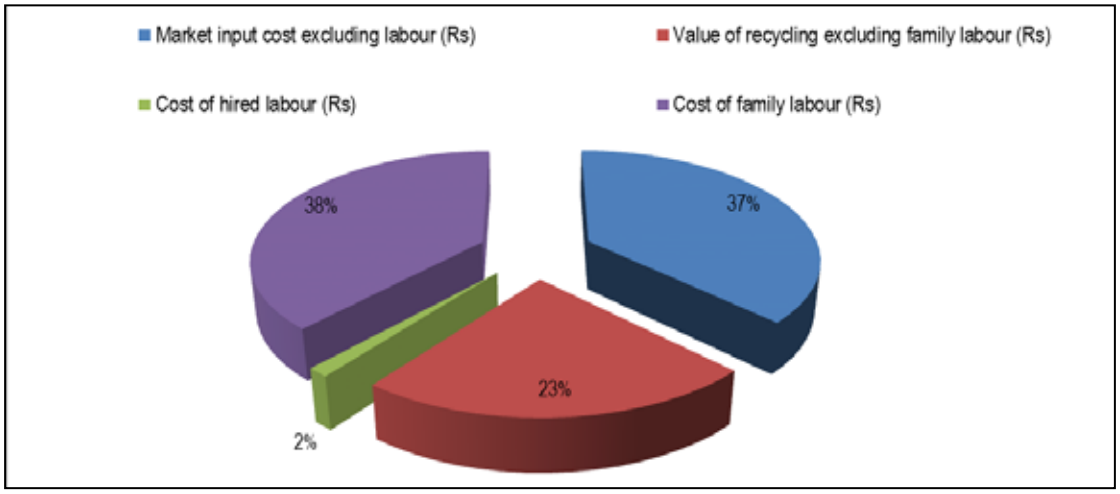


Fig 3. Different fraction of total cost

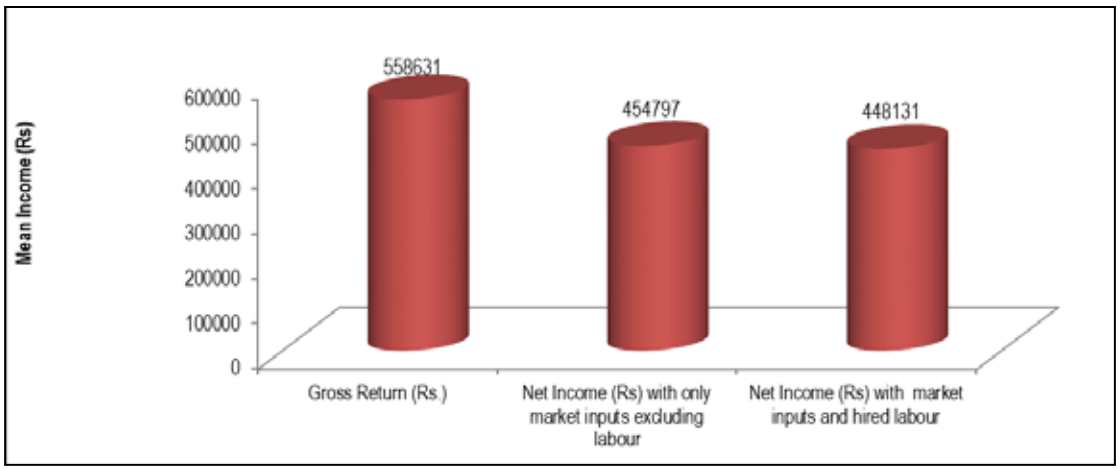
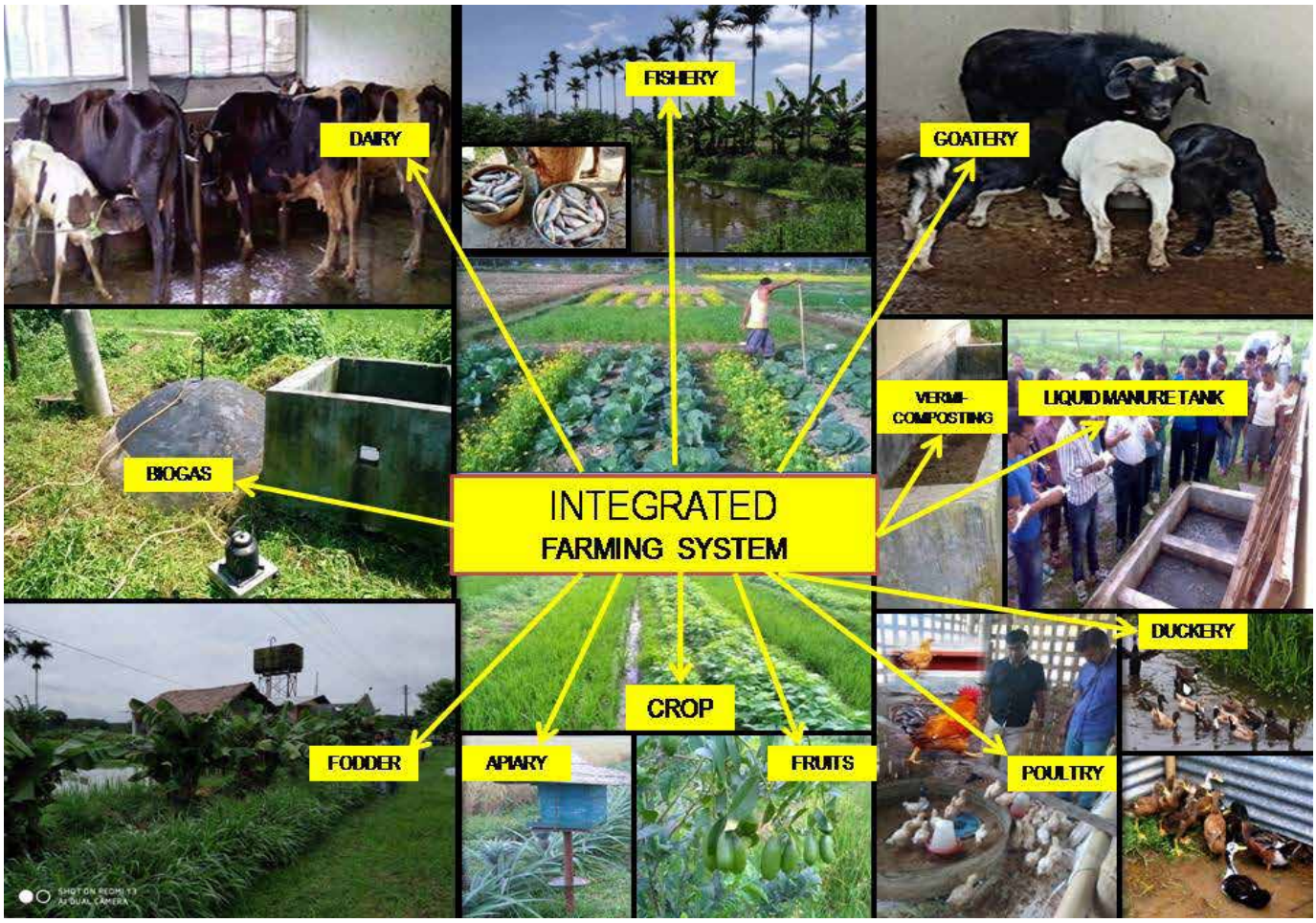


Fig 4. Economics of IFS models of HER



Components IFS model at Jorhat : Crops + Dairy + Horticulture + Fishery + Poultry + Duckery + Goatery + Apiary + Vermi-compost + Biogas + Liquid Manure + FYM production

3. 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 2021-22 revealed that mean gross income of Rs. 795485 while the mean net return excluding family labour was found to be Rs.5720205. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 317006. Details of IFS model components and cost is presented in Table 7.1.3. which indicated mean total cost for the IFS models was Rs. 442071 while it varied from Rs 310541 at Hisar to Rs 573601 at Ludhiana for 1.0 ha IFS models.

Table 7.1.3 Details of IFS model along with total cost per model in TGP

Location	IFS model	Area (ha)	Total cost (Rs)
Hisar	Crops+Dairy+Hort.+Vermicompost+Boundary Plantations + Mushroom+ Biogas	1.0	310541
Ludhiana	Crop +Dairy +Hortculture (fruits and vegetables)+fishery	1.0	573601
Mean		1.0	442071.0

Components IFS model at Hisar : Crops+Dairy+Hort.+Vermicompost+Boundary Plantations + Mushroom+ Biogas

Components IFS model at Ludhiana: Crop +Dairy +Horticulture (fruits and vegetables) + fishery

The models could generate mean employment generation of 332.5 mandays through different modules while the IFS models were found to be carbon negative in terms of GHG emission at -2173.9 CO_2 equivalent. Further, study of different fractions of cost revealed about 23% 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 50% of the cost. The cost incurred towards hired labour was 7%. These models revealed mean REY of 41.00 tonnes besides net returns per rupee invested being 0.8. The mean sustainable value index (SVI) for these models was found to be 0.4 with energy input – output ratio being 0.2.

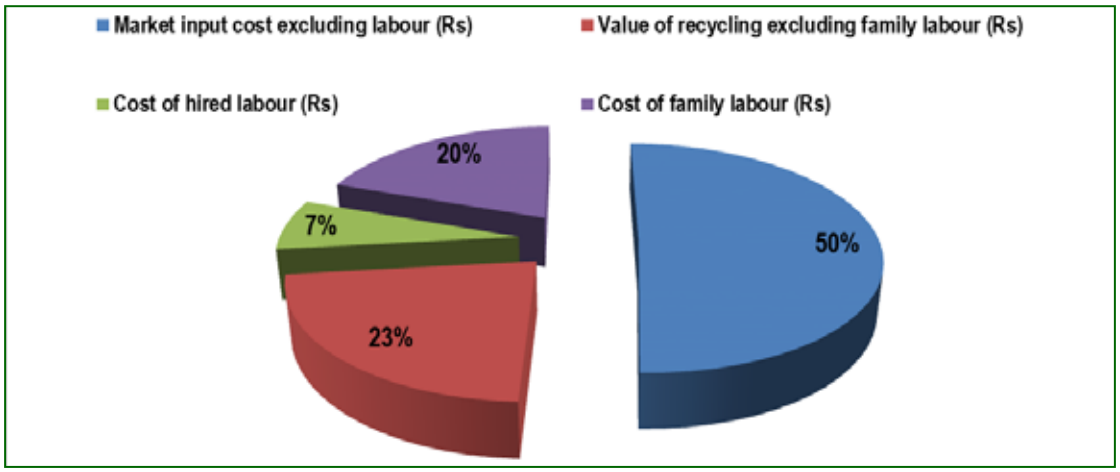


Fig 5. Different fraction of total cost

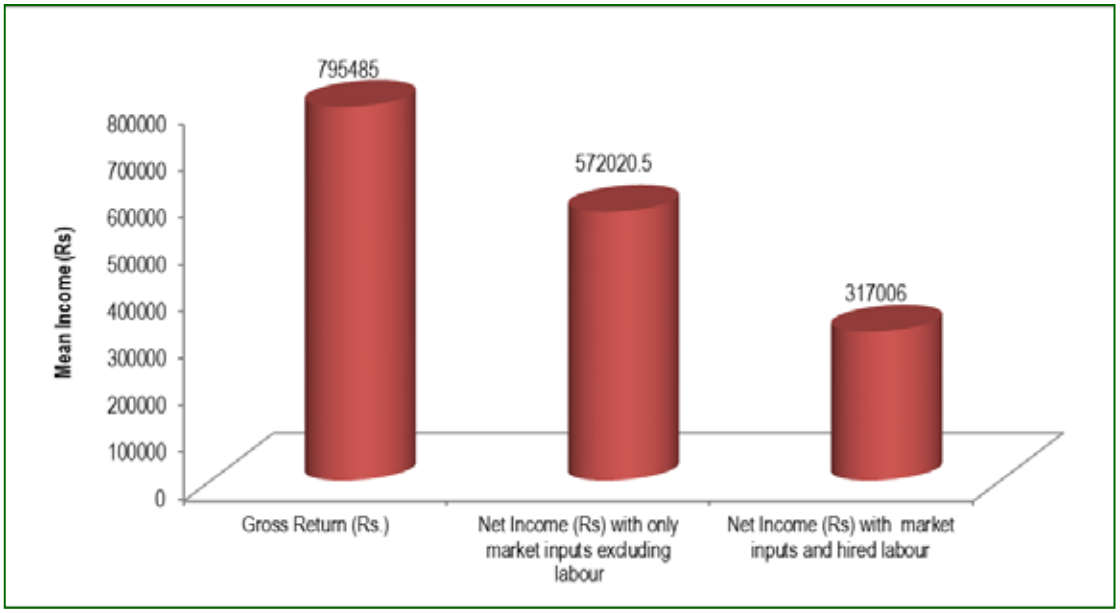


Fig 6. Economics of IFS models of TGP

4. 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 2021-22 revealed that mean gross income of Rs. 560557 while the mean net return excluding family labour was found to be Rs.4961205. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 340076. Details of IFS model components and cost is presented in Table 7.1.4. which indicated mean total cost for the IFS models was Rs. 328509 while it varied from Rs. 215025 at Modipuram for 0.72 ha model to Rs 441993 at Kanpur for 1.0 ha IFS model.

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

Location	IFS model	Area (ha)	Total cost (Rs)
Kanpur	Crops + Dairy + Horticulture + Boundary Plantations	1.0	441993
Modipuram	Crops + multilayer farming+agrihorti +Dairy+ Boundary Plantations +farmpond+ value addition	0.72	215025
Mean		0.86	328509

Components IFS model at Modipuram: Crops + multilayer farming+agrihorti +Dairy+ Boundary Plantations +farmpond+ value addition

The models could generate mean employment generation of 630 mandays through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at -33144.15 CO2 equivalent. Further, study of different fractions of cost revealed about 36% 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 20% of the cost excluding labour. These models revealed mean REY of 28.89 tonnes besides soil health improvement to the tune of 13.8 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.81.

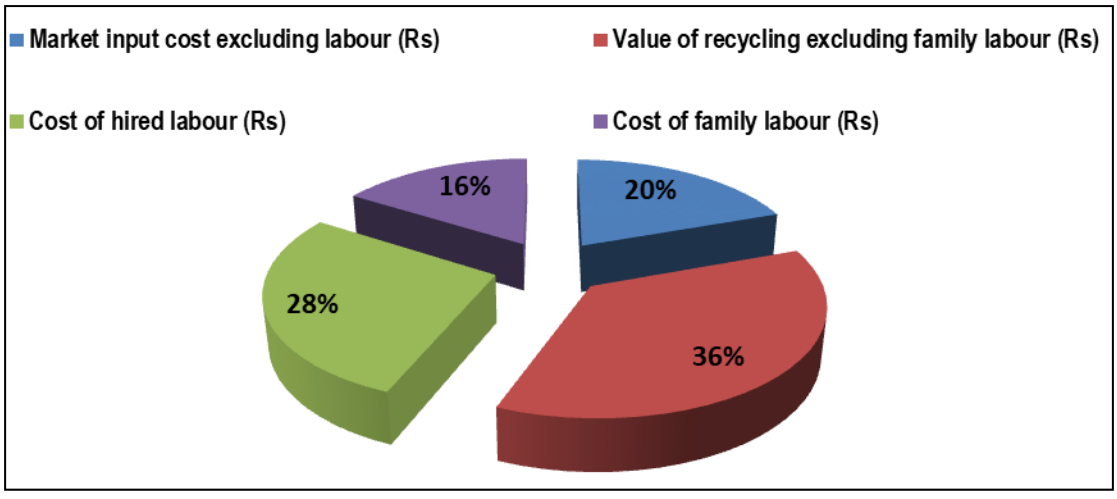


Fig 7. Different fraction of total cost

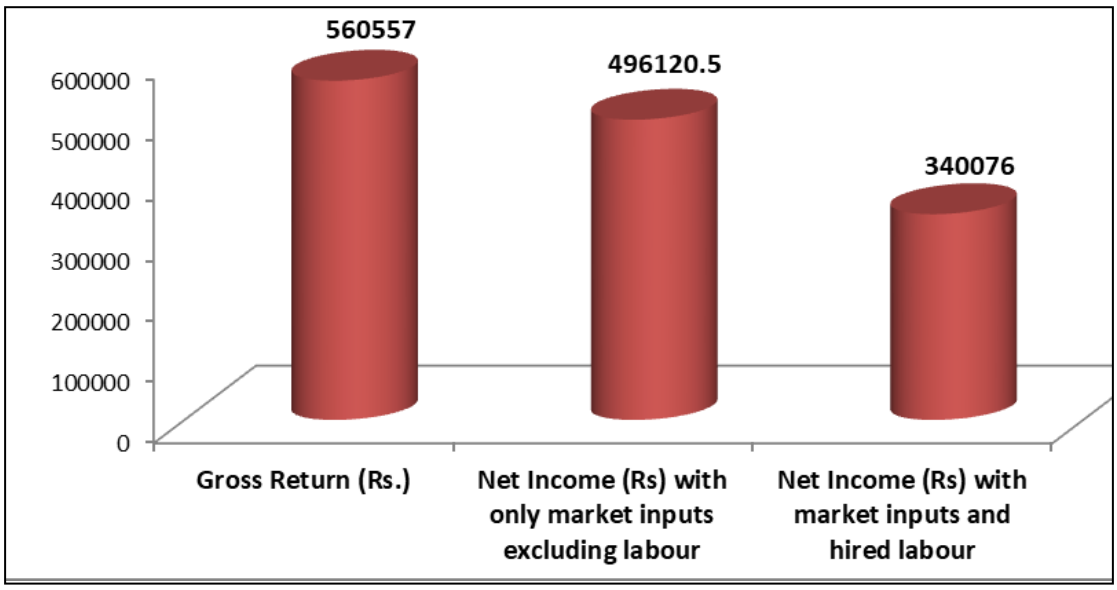


Fig 8. Economics of IFS models of UGP

5. 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 –Faizabad 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. Significance of IFS approach towards production, profitability and livelihood of small land holders in the regions as reflected form the results of study during 2021-22. Details of different components of IFS are presented in Table 7.1.5. The results revealed mean gross income of Rs. 549461 while the mean net return excluding family labour was found to be Rs.450468. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 284323. Details of IFS model cost components presented in Table 7.1.5 indicated mean total cost for the IFS models to be Rs. 305165.60 while it varied from Rs 134590 at Patna (0.4 ha model) to Rs 544883 at Varanasi for 1.0 ha IFS model.

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

Location	IFS model	Area (ha)	Total cost (Rs)
Ayodhya	Crop + Dairy + Horticulture + Fishery + Vermi-compost	1.01	252656
Patna	Main: Crop + Horticulture + Goatry + Poultry Allied: Mushroom /vermi-compost/B.P./ Agroforestry	0.4	134590
Patna	Main: Crop + Dairy+ Horticulture + Goatry + Poultry +Fish cum duckery, Allied: Mushroom /vermi-compost/ B.P.	0.8	186190

Sabour	Crop + Dairy + Goatry +Fish cum duckery+ vermi-compost+B.P.	1.0	407509
Varanasi	Crop + Dairy + Horticulture + Poultry + Fishery + Boundary plantation	1.0	544883
Mean		0.84	305165.6

Components of IFS model at Ayodhya: Crop + Dairy + Horticulture + Fishery + Vermi-compost

Components of IFS model at Patna: Crop + Dairy + Horticulture + Goatry + Poultry Mushroom /vermi-compost

Components of IFS model at Varanasi: Crop + Dairy + Horticulture + Poultry + Fishery + Boundary plantation

The models could generate mean employment generation of 442.5 mandays through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at -1321.3 CO2 equivalent. Further, study of different fractions of cost revealed about 26% share of recycled inputs excluding family labour in total cost of the IFS whereas cost of outside purchase excluding labour was 32%. The cost incurred towards hired labour was 22% while cost of family labour was 20 % of the cost. These models revealed mean REY of 28.32 tonnes besides soil health improvement to the tune of 6.9 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.9 with mean SVI of 0.8.

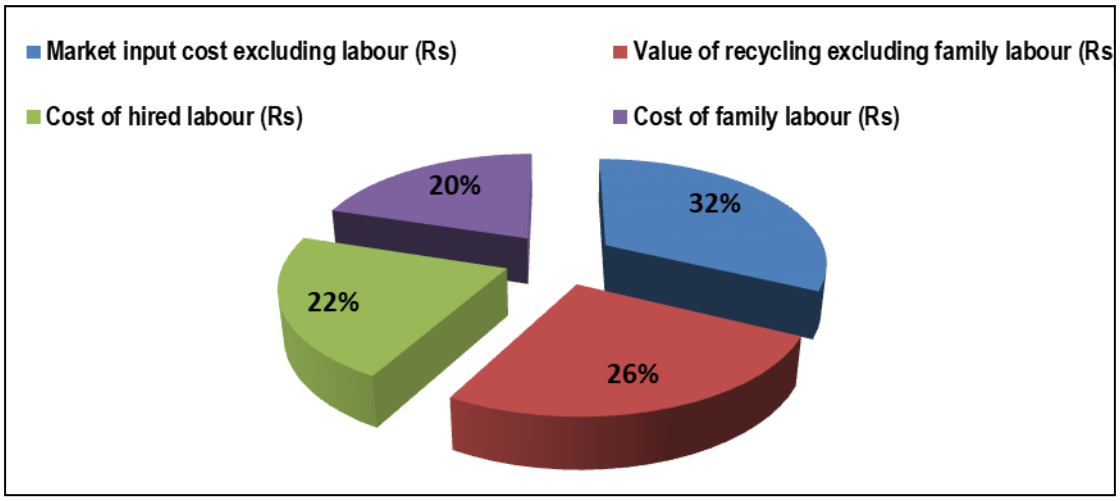


Fig 9. Different fraction of total cost

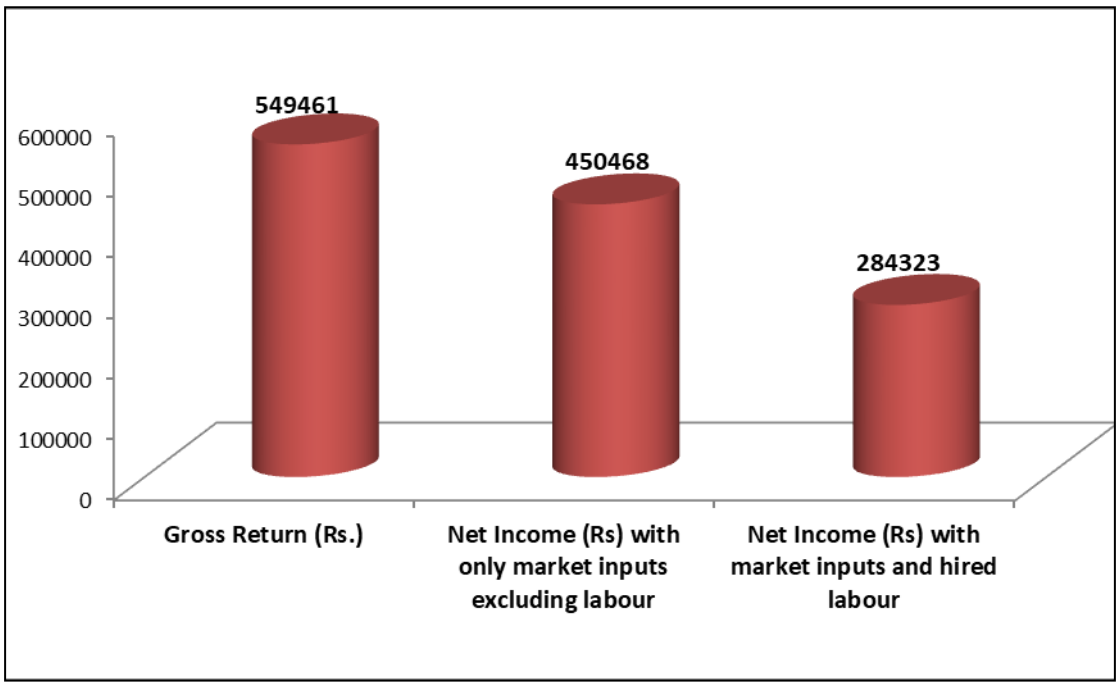


Fig 10. Economics of IFS models of MGP

6. LOWER GANGETIC PLAINS REGION (LGP)

To demonstrate the benefits of diversified climate smart farming a climate smart IFS Model was initiated in 2017 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 synthesized for 0.66 ha land holding to support a family of small and marginal farmer having six family members. The model encompasses components like crop (0.42 ha), horticulture (0.11 ha), dairy, vermicomposting and biogas unit (0.03 ha) and fishery (0.09 ha). Low lying area measuring 0.2 ha of the total crop area of 0.42 ha has been 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 2021-22 revealed gross income of only Rs. 198618 while the net return were found to be Rs. 152653 with only market inputs excluding labour and net return was Rs.106688 with market inputs and hired labour. Details of IFS model cost components presented in Table 7.1.6 indicated total cost for the IFS models to be Rs. 128274.

Table 7.1.6 Details of IFS model along with total cost of model in LGP

Location	IFS model	Area (ha)	Total cost (Rs)
Kalyani	Crops + Dairy + Horticulture + Vermi-compost + Biogas + fishery	0.66	128274
Mean		0.66	128274

Components of IFS model at Kalyani : Crops + Dairy + Horticulture + Vermi-compost + Biogas + fishery

The models could generate employment generation of 317 mandays through different modules while the IFS model was found to be carbon negative in terms of mean GHG emission at -3171.0 CO2 equivalent. 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 36%. These models revealed mean REY of 10.24 tonnes as compared to benchmark with net returns per rupee invested being 0.55 with mean SVI of 0.70.

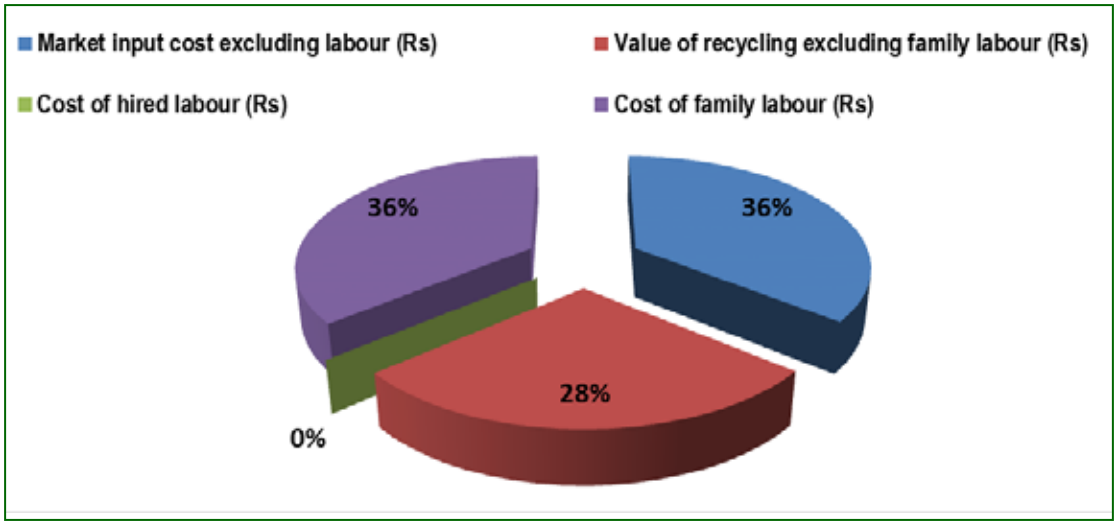


Fig 11. Different fraction of total cost

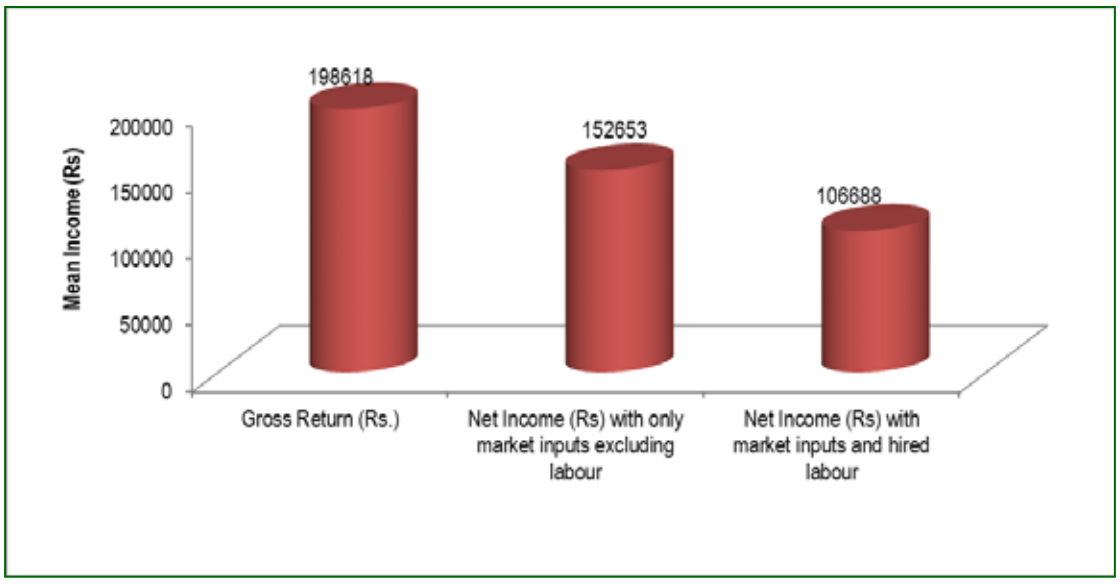


Fig 12. Economics of IFS model of LGP

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 2021-22 revealed that mean gross income of Rs.322105 while the mean net return excluding labour was found to be Rs.277373. 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. 209481 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	Crops + Dairy + Horticulture + poultry + fishery + Goatary + Mushroom + Vermicompost + Boundary Plantations + Kitchen Gardening	1.0	106972
Ranchi	Crops + Dairy + Vermi-compost + Mushroom + Apiary + Fishery	1.0	311991
Chiplima	Crop+dairy + horticulture+poultry/duckery+ fishery+ Composting	0.4	202584
Mean		1.0	209481

The models could generate mean employment generation of 308.7 mandays through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at -647.1 CO2 equivalent. Further, study of different fractions of cost revealed about

33% 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 21% of the cost. The cost incurred towards hired labour was 10% while 36% of cost saved due to family labour. These models revealed mean REY of 16.17 tonnes besides soil health improvement to the tune of 2.4 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.6 with mean SVI of 0.50.

Components of IFS model at Ranchi: Crops + Dairy + Vermi-compost + Mushroom + Apiary + Fishery

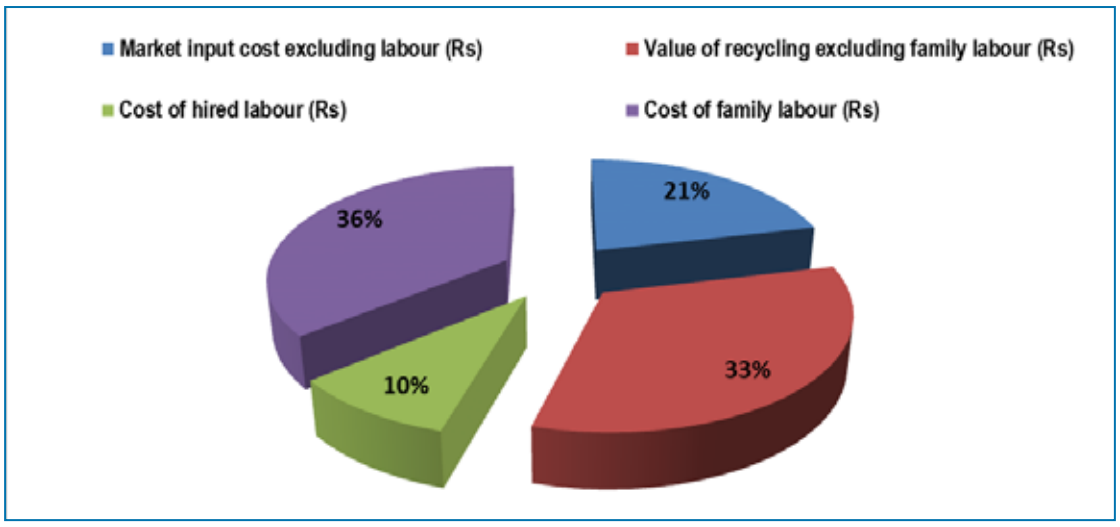


Fig 13. Different fraction of total cost

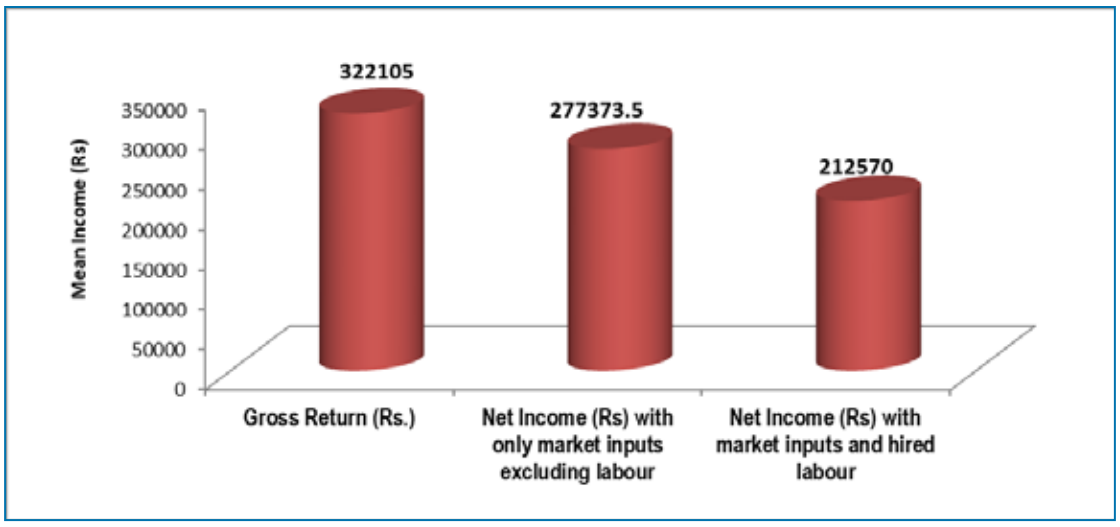


Fig 14. Economics of IFS models of EPH

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 (1800 m^3), poultry component 300 birds, vermicompost 0.0039 ha 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 2021-22 revealed gross income of Rs. 519408 while the return excluding family labour was found to be Rs.436924. However, when family labour was accounted for in the cost, the net return was found to be Rs 247969. Details of IFS model cost components presented in Table 7.1.8 indicated mean total cost for the IFS models to be Rs. 329615.

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	Crop + Dairy + Poultry + Fishery + Horticulture	1.0	195460
Durgapura	Crops+ Dairy+ Horticulture + Goatry+ Poultry + Biocompost	1.45	459105
Rewa	Crops+Dairy+Boundary plantation +Compost	0.4	252494
Kota	Crops +Dairy+Horticulture+ Compost +Boundary plantation +Azolla unit	1.0	395488
Mean		0.96	329615.3

Components of IFS model at Durgapura: Crops+ Dairy+ Horticulture + Goatry+ Poultry + Biocompost

Components of IFS model at Rewa : Crops+Dairy+Boundary plantation +Compost

The models could generate employment generation of 556 mandays through different modules while the IFS model was found to be carbon emissive in terms of mean GHG emission at -279.0

CO2 equivalent, which can be made carbon neutral with suitable management strategies. 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 25%. The cost incurred towards hired labour was to the tune of 32% requiring special attention for reduction of labour hiring cost. These models revealed mean REY of 23.02 tonnes besides soil health improvement of 3.6 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.5.

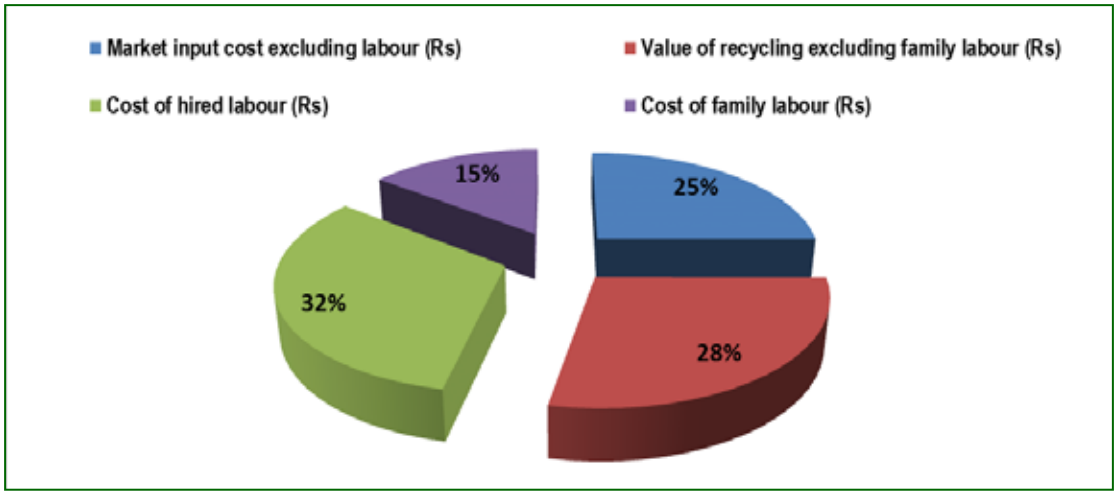


Fig 15. Different fraction of total cost

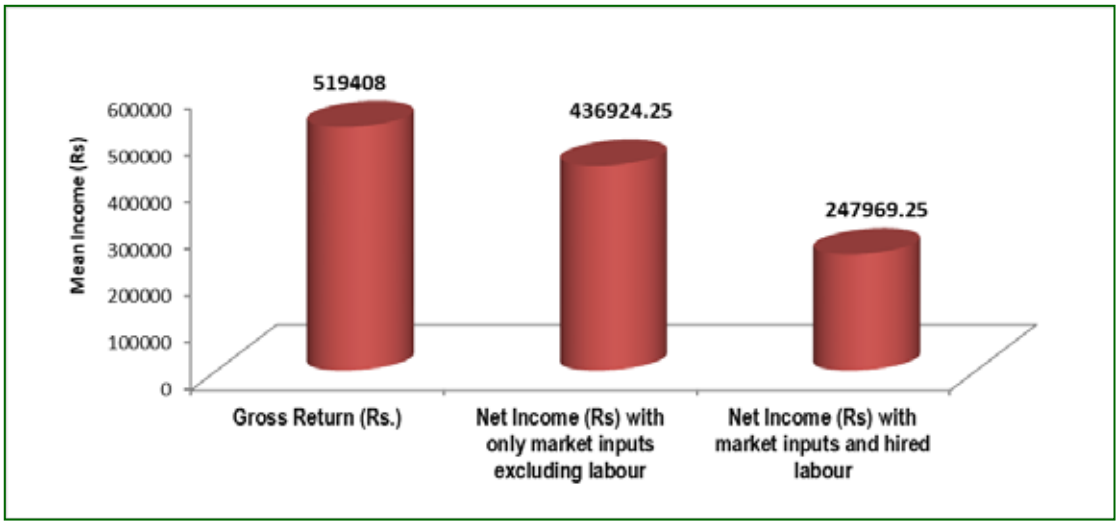


Fig 16. Economics of IFS models of CPH

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 2021-22 at 3 centres along with components of IFS are

presented in Table 7.1.9. which revealed mean gross income of Rs. 650104 while the mean net return excluding family labour was found to be Rs.514012. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 251944. Details of IFS model cost components presented in Table 7.1.9 indicated mean total cost for the IFS models to be Rs. 332085 while it varied from Rs 265205 at Parbhani model to Rs 462069 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	Crops + Fruit & Vegetables + Goat+ Cow + Poultry+ Compost + Kitchen Garden + Apiary + Boundary plantations+ farm pond	1.0	268982
Parbhani	Crops+ Dairy+ Horticulture + Vermicompost + Boundary Plantation	1.0	265205
Rahuri	Crops + Dairy + Horticulture + Poultry + Goat + Vermicompost	1.0	462069
Mean		1.0	332085.3

Components of IFS model at Akola: Crops + Fruit & Vegetables + Goat+ Cow + Poultry+ Compost + Kitchen Garden + Apiary + Boundary plantations+ farm pond

Components of IFS model at Parbhani: Crops+ Dairy+ Horticulture + Vermicompost + Boundary Plantation

Components of IFS model at Rahuri: Crops + Dairy + Horticulture + Poultry + Goat + Vermicompost

The models could generate mean employment generation of 471 mandays through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at -448.5 CO2 equivalent. Further, study of different fractions of cost revealed about 21% share of recycled inputs in total cost of the IFS whereas cost of outside purchase was to the tune of 41%. The cost incurred towards hiring labour was 38%. These models revealed mean REY of 33.51 tonnes besides soil health improvement to the tune of 14 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.8 with mean SVI of 0.4.

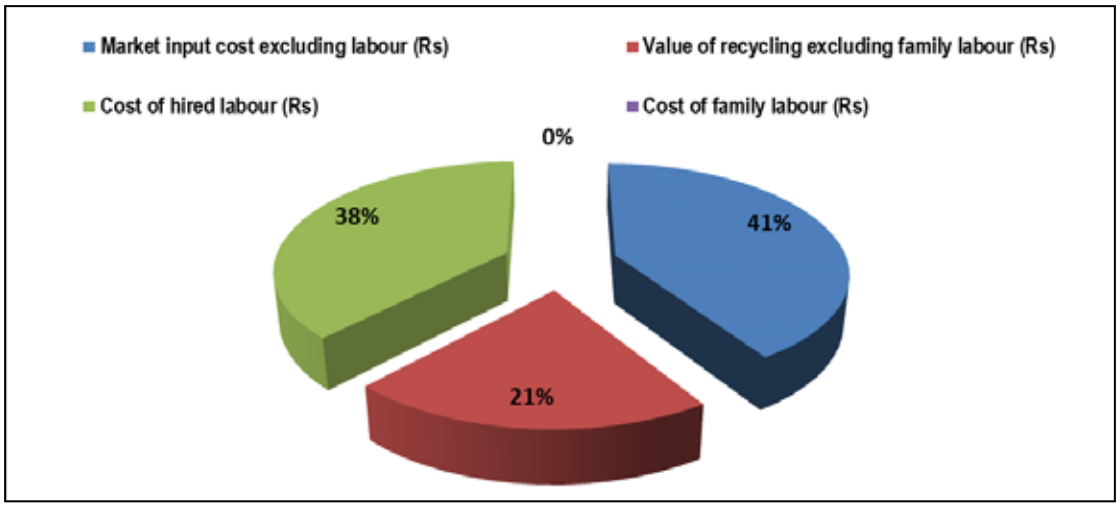


Fig 17. Different fraction of total cost

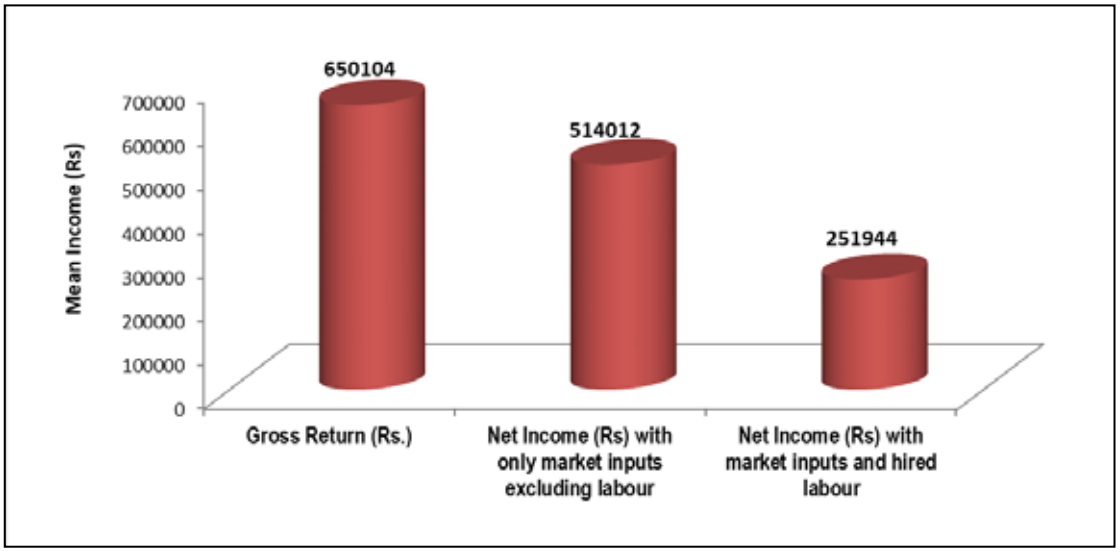


Fig 18. Economics of IFS models of WPH

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 2021-22 at these centres along with components of IFS is presented in Table 7.1.10 which revealed mean gross income of Rs. 503613 while the mean net return excluding family labour was found to be Rs.457192. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 369180. Details of IFS model cost components presented in Table 7.1.10 indicated mean total cost for the IFS models to be Rs. 278215 while it varied from Rs 143351 at Kathalgere model to Rs 459817 at Coimbatore for 0.92 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	Crop + Horticulture + Dairy+ Goat Rearing + Poultry + Vermicompost unit + Compost yard + Kitchen garden & Border planting	1.0	459817
Kathalgere	Crops + Horticulture +Plantation+ Dairy + Sheep + Vermicompost + Agroforestry + Boundary plantation	1.0	143351
Siruguppa	Crops + Dairy + Horticulture + Goatary + Vermicompost +Azolla +Boundary Plantations + Kitchen Gardening	1.0	221731
Rajendranagar	Crops + Dairy + Horticulture-Pasture + Compost + Boundary Plantations	1.0	299271
Maruteru_sub	Cropping systems + Dairy (2 Desi cows) + Fishery + Poultry + Horticulture + Compost /others	0.5	266906
Rudrur_sub	Crop+Dairy+Horticulture+Poultry (100)+Composting	1.0	301018
Mean		0.92	278215.2

Components of IFS model at Coimbatore: Crop + Horticulture + Dairy+ Goat Rearing + Poultry + Vermicompost unit + Compost yard + Kitchen garden & Border planting

Components of IFS model at Kathalgere: Crops + Horticulture +Plantation+ Dairy + Sheep + Vermicompost + Agroforestry + Boundary plantation

The models could generate mean employment generation of 738 mandays through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at -2112.9 CO_2 equivalent. Further, study of different fractions of cost revealed about 37% share of recycled inputs in total cost of the IFS whereas cost of outside purchase was to the tune of 17%. The cost incurred towards hiring labour was 15%. These models revealed mean REY of 25.96 tonnes besides soil health improvement to the tune of 19.9 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.8 with mean SVI of 0.6.

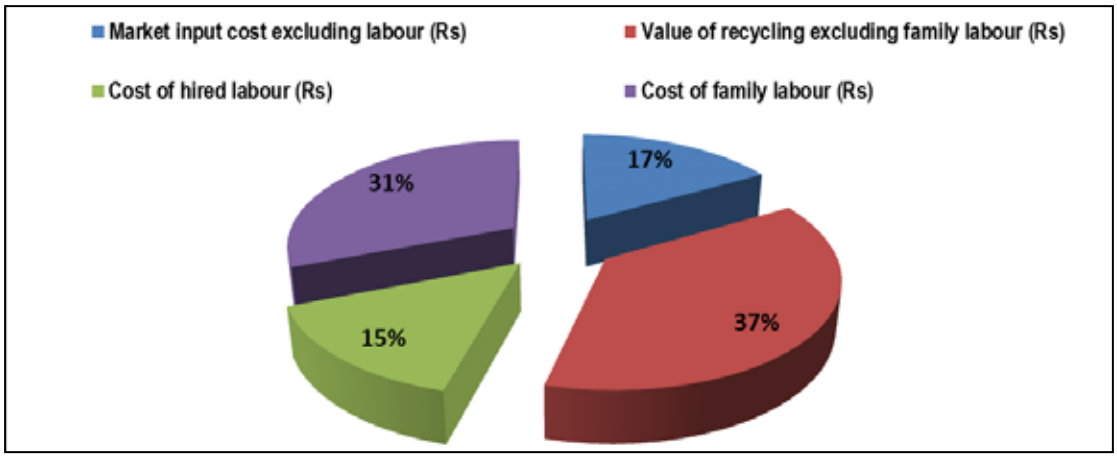


Fig 19. Different fraction of total cost

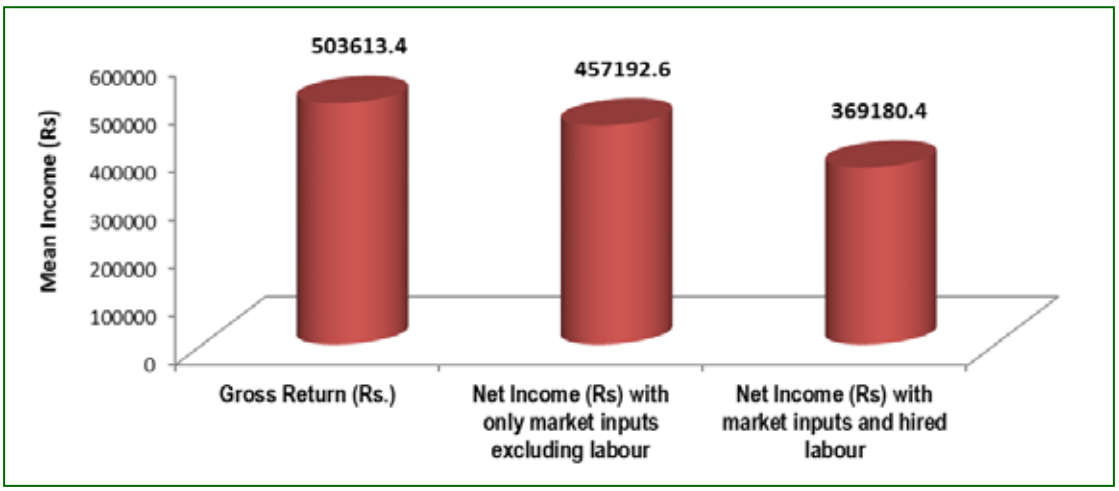


Fig 20. Economics of IFS models of SPH

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 1.25 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 2021-22 revealed that mean gross income of Rs. 607033 while the mean net return excluding family labour was found to be Rs.452829. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 215780. 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. 331211 while it varied from Rs 305946 at Thanjavur for 0.8 ha model to Rs 356476 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	Crops + Dairy + Horticulture +Fishery + Poultry	1.25	356476
Thanjavur	Crops + Dairy + Poultry +Horticulture + Fishery + Vermicompost + Boundary Plantations	0.8	305946
Mean		1.0	331211

Components of IFS model at Thanjavur : Crops + Dairy + Poultry +Horticulture + Fishery + Vermicompost + Boundary Plantations

The models could generate mean employment generation of 395 mandays through different modules while the IFS models were found to be carbon negative in terms of GHG emission at -889.6 CO2 equivalent. 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 47% of the cost. The cost incurred towards hired labour was 25%. These models revealed mean REY of 31.29 tonnes besides soil health improvement to the tune of 10.3 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.8with mean SVI of 0.8.

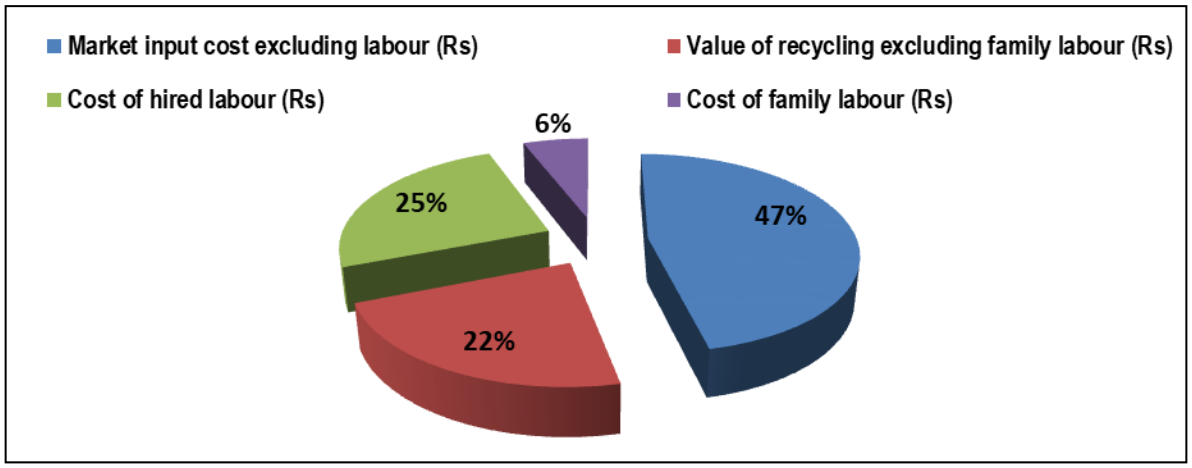


Fig 21. Different fraction of total cost

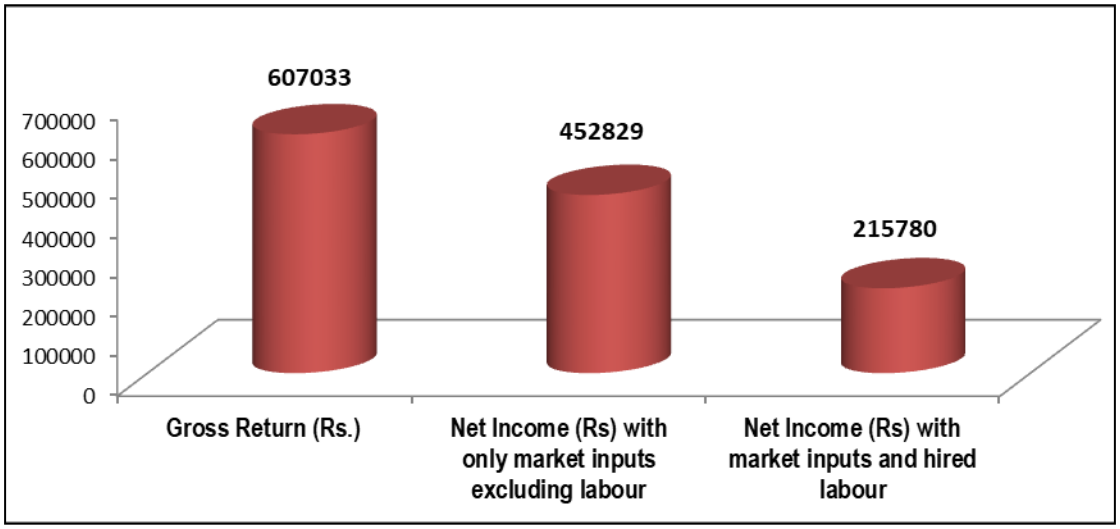


Fig 22. Economics of IFS model of ECPH

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 2021-22 at these centres revealed mean gross income to be Rs. 328163 while the mean net

return excluding family labour was found to be Rs.204029. However, when family labour was accounted for in the cost, the mean net return was found to be Rs. 28981. Details of IFS model cost components presented in Table 7.1.12 indicated mean total cost for the IFS models to be Rs. 279501.

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	0.4	193657
	Plantation crop based	0.72	177098
Karjat	Crops + Horticulture (Fruit crops + Nursery) + Livestock (Dairy + Goatary + Poultry) + Vermicompost + Boundary Plantations + Kitchen garden	1.0	669150
Karmana	Homestead based	0.2	247658
	Coconut based	0.2	181826
	Rice based	0.2	313232
	Banana based	0.2	173890
Mean			279501.5

Components of IFS model in Karjat and Karamana

The models could generate mean employment generation of 268 mandays through different modules while the IFS models were found to be carbon negative in terms of mean GHG emission at -7178.9 CO2 equivalent. Further, study of different fractions of cost revealed about 20% share of recycled inputs in total cost of the IFS which could be further improved whereas cost of outside purchase was 45% of the model cost. The cost incurred towards hired labour was 18%. These models revealed mean REY of 16.92 tonnes besides soil health improvement to the tune of 55.4 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.2 with mean SVI of 0.70.

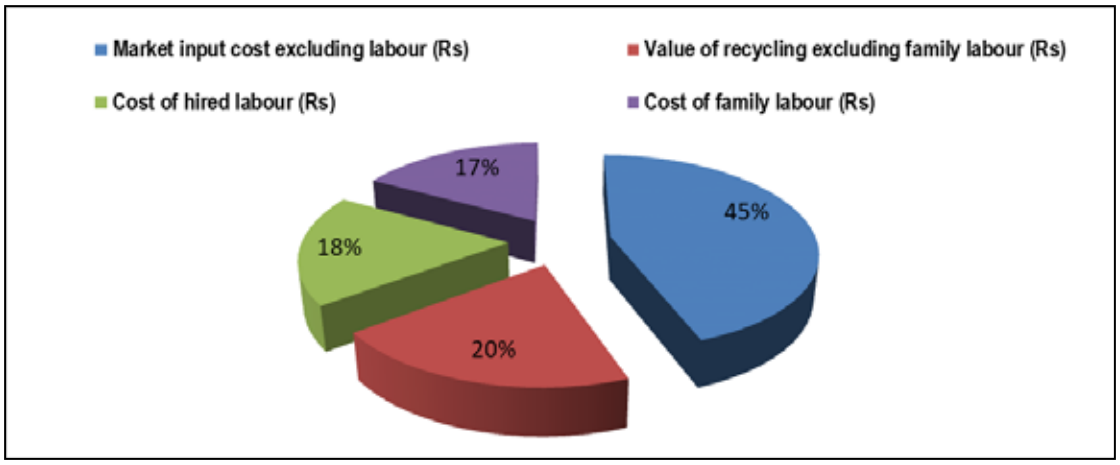


Fig 23. Different fraction of total cost

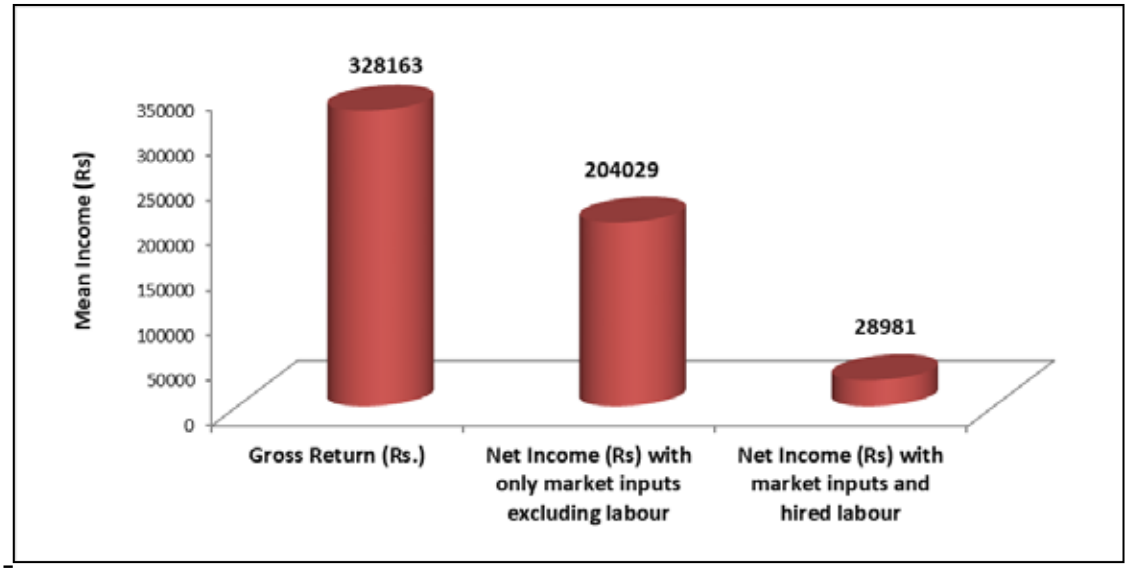


Fig 24. Economics of IFS models of WCPH

13. GUJARAT PLAINS AND HILLS (GPH)

This agroclimatic 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 2021-22 from these models revealed the mean gross return to be Rs. 436838 while the net return excluding family labour was found to be Rs.275394. However, when family labour was accounted for in the cost, the mean net return was found to be Rs 38499. Details of IFS model cost components presented in Table 7.1.13 indicated total cost for the IFS models to be Rs. 263557 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	Crops + Horticulture +Dairy+fish+ Boundary Plantations	1.0	279558
SK Nagar	Crops + Horticulture + Boundary plantation + Fisheries +Livestock+NADEP compost	1.0	247557
Mean		1.0	263557.5

Components of IFS model in Junagadh + SK Nagar

The models could generate employment generation of 256 mandays through different modules. Further, study of different fractions of cost revealed about 10% share of recycled inputs in total cost of the IFS whereas cost of outside purchase was 61% of the model cost. The cost incurred

towards hired labour was 29%. These models revealed mean REY of 22.52 tonnes besides soil health improvement to the tune of 15.4 % in terms of organic carbon improvement.

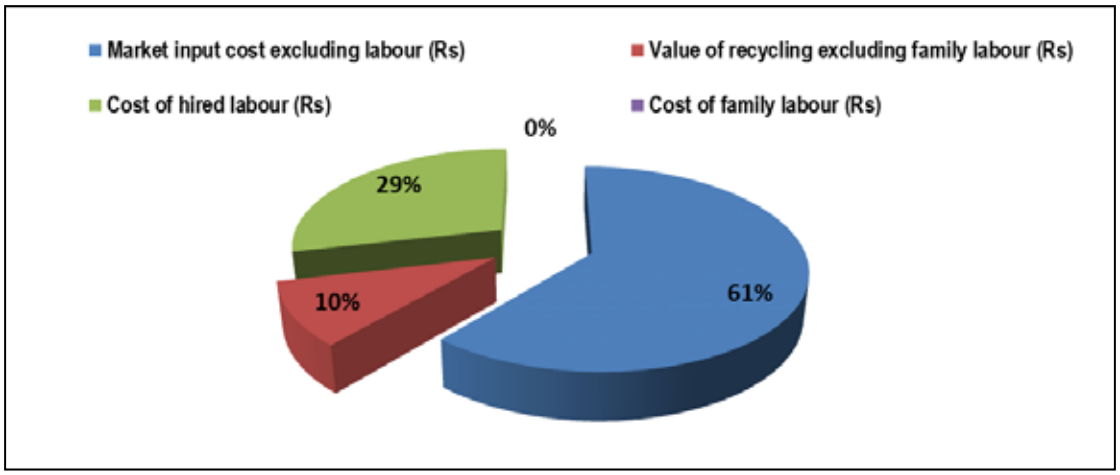


Fig 25. Different fraction of total cost

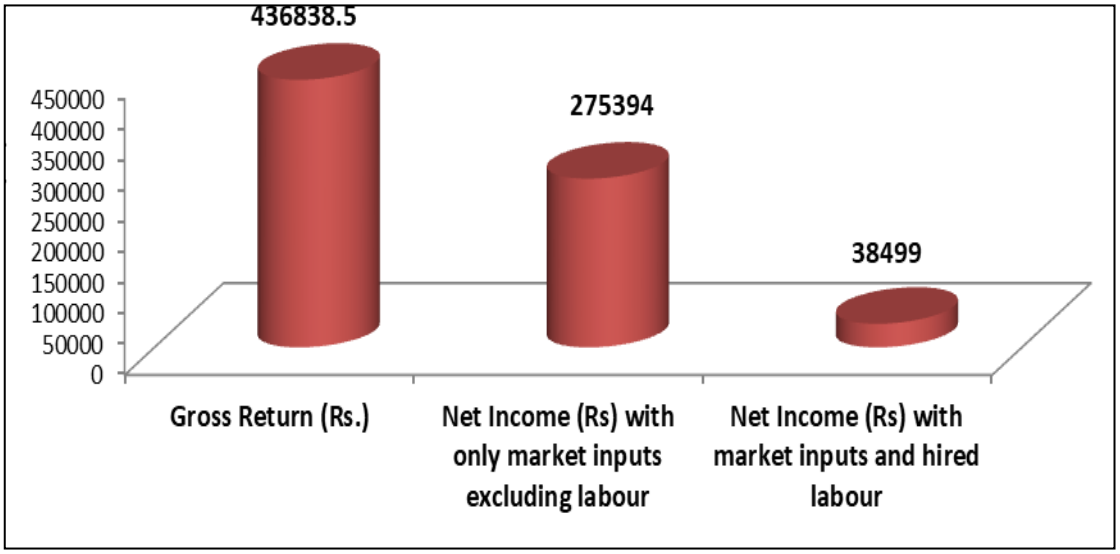


Fig 26. Economics of IFS models of GPH

15. 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. Plantation crops + Pig (50 %) followed by Crop + Dairy animal cows + Fish (45 %) are two equally important and prevalent farming systems of the region. Pigs are important animal of the region and symbol of social status too. 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 2021-22 from horticulture + pig + fishery for upland areas revealed the gross return to be Rs. 345775 while the net return excluding family labour was found to be Rs.297175. 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	Horticulture + Pig +Fishery for hilly upland	0.9	189280
Mean		0.9	189280

Components of IFS model in Port Blair

The model could generate mean employment generation of 210 mandays through different modules while the IFS models were found to be carbon negatve in terms of mean GHG emission at -5678.4 CO2 equivalent. 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 was 26% of the model cost. The cost incurred towards labour was 39% which needs further reduction through small scale farm mechanization. These models revealed mean REY of 17.82 tonnes besides soil health improvement to the tune of 69.7 % in terms of organic carbon improvement as compared to benchmark with net returns per rupee invested being 0.8.

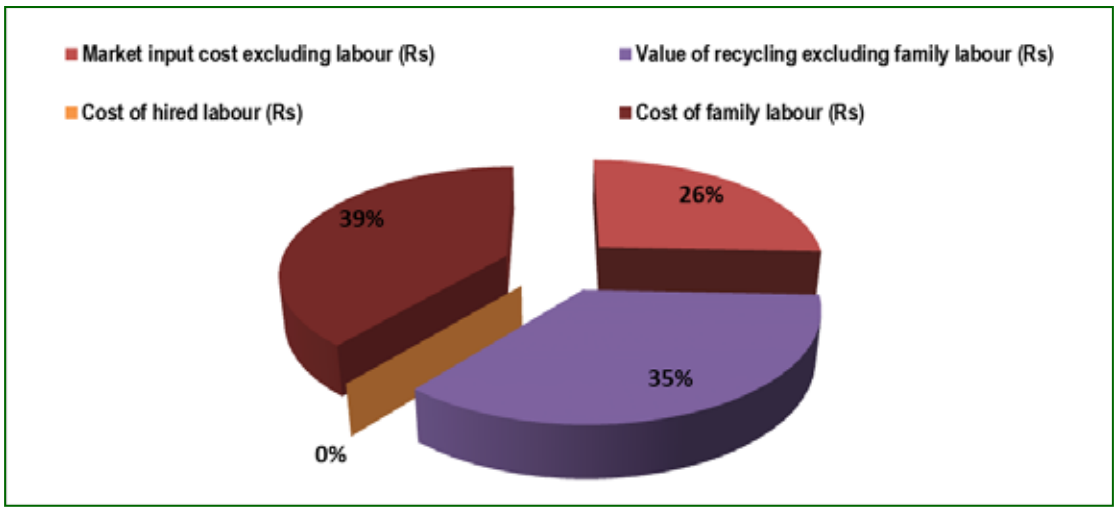


Fig 27. Different fraction of total cost

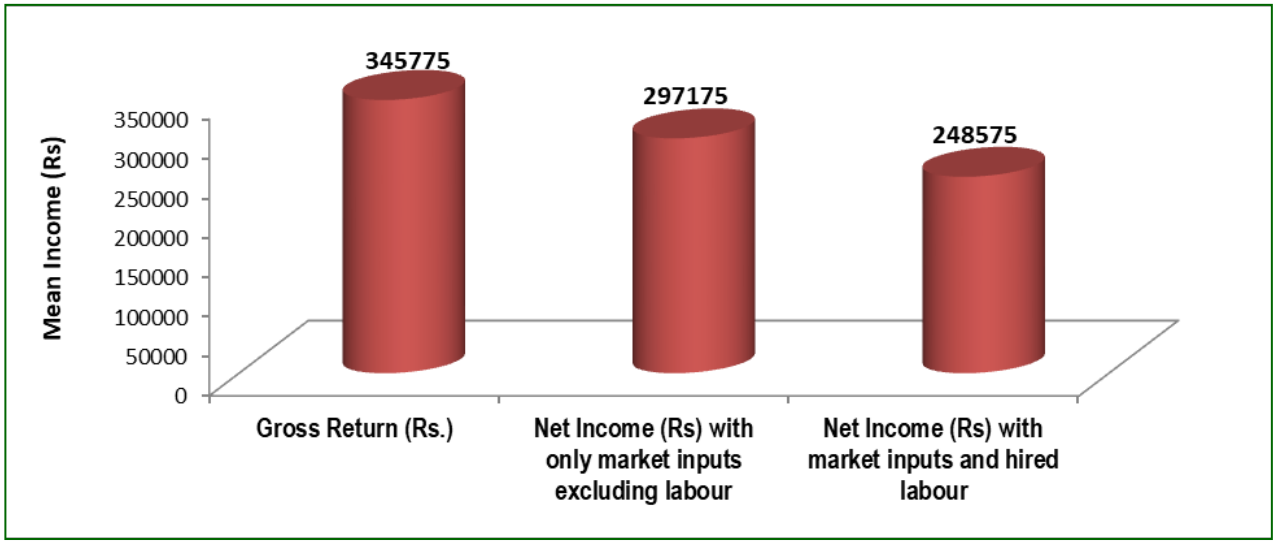


Fig 28. Economics of IFS model at Pot Blair (A & N)

The study of climate smart IFS across agroclimatic zones during 2020-21 depicted that;-

- Market input cost excluding labour (13.11 % in LGP to 66.43 % in TGP)
- Value of recycling excluding family labour (10.65 % in WCPH to 43.59 % WHP)
- Cost of hired labour (0 % in Islands to 40.2 % in CPH)
- Cost saving by family labour (49.83% in UGP being highest and lowest in TGP i.e. 0)
- Purchase of animal feed from market as share of market input excluding labour (18.2 % in GPH to 89.5 % in Islands)
- Net return per rupee invested varied from 0.38 in LGP to 1.7 in UGP
- SVI varied between 0.6 to 0.8

- Improvement in soil OC over initial status in range of 4.8 % (GPH) to 96.2 % (TGP)
- Water productivity (Rs/m3) was highest being in MGP (186) while lowest being in ECPH (14.9)

Details of Projects being executed under AICRP-IFS at National Level

Project title	Duration	Principal Investigator	Co-PIs	Source of fund	Budget
National Level					
All India Network Programme on Organic Farming (National)	April 2017-March 2026	N. Ravisankar	M. Shamim Raghuveer Singh M.A. Ansari Raghavendra K.J.	NRM Division, ICAR	251.42 Lakh/year (2021-22)
AICRP on Integrated Farming Systems (On-station National)	2020-2026	A.K. Prusty	R.P. Mishra M. Shamim Debashis Dutta N. Ravisankar Raghuveer Singh	NRM Division, ICAR	1682.70 Lakh/year (2021-22)
AICRP on Integrated Farming Systems: On-Farm Research (National)	2020-2026	Raghuveer Singh	N. Ravisankar M.A. Ansari Raghavendra K.J.	NRM Division, ICAR	1121.80 Lakh/year (2021-22)
Coordination Unit, Modipuram					
Sustainable resource management for climate smart IFS under AICRP on Integrated Farming Systems (Modipuram centre)	April 2017-March 2026	N. Ravisankar	P.C. Ghasal Debashis Dutta Suresh Malik Amit Nath A.K. Prusty Poonam Kashyap M. Shamim Chandra Bhanu	ICAR-IIFSR, Modipuram	18.01 Lakh/year (2021-22)
On-farm Participatory Research in Farming Systems Perspective under Tribal Sub Plan in Haridwar (TSP)	May 2018-March 2022	Chandra Bhanu	R.P. Mishra Debashis Dutta A.L. Meena Jairam Choudhary	ICAR-IIFSR, Modipuram	6.37 Lakh/ year (2021-22)
On Farm Research (OFR), AICRP-IFS, Modipuram Centre	2020- 2025	P.C. Jat	P.C. Ghasal	ICAR-IIFSR, Modipuram	12.01 Lakh/year (2021-22)
Cluster based on farm participatory research in farming systems perspective under tribal sub plan in Uttrakhand (TSP)	2017-2022	Nisha Verma	V.P. Chaudhary Amit Nath Vipin Kumar Chaudhary	ICAR-IIFSR, Modipuram	0.84 Lakh/ year (2021-22)

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., 2020-21, 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 2020-21

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
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 2020-21

Treatment notation	Cropping system	Remarks
T_1	Pre-dominant cropping system of the region	Check
T_2	Pre-dominant cropping system of the region	

T_3	Ecological cropping system involving pulses/green manures and other crops for improving soil health	Soil health
T_4	Ecological cropping system involving pulses/green manures and other crops for improving soil health	
T_5	Cropping system involving cereals/pulses/oilseeds to meet the household nutritional security	Family nutrition
T_6	Cropping system involving cereals/pulses/oilseeds to meet the household nutritional security	
T_7	Cropping system for round the year green/dry fodder production	Livestock nutrition
T_8	Cropping system for round the year green/dry fodder production	
T_9	Cropping systems involving vegetables and other high value crops for income enhancement	Income enhancement
T_{10}	Cropping systems involving vegetables and other high value crops for income enhancement	

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 12 cropping systems were evaluated with the objective to select the best cropping systems for different purposes such as soil health management (Rice-Wheat-Green manuring, Dhaincha-Early Cabbage – Frenchbean and Rice – Wheat – Sesbania), households food and nutritional requirements (Rice-Pea-Okra , Maize + Soybean - Chickpea + Linseed, Rice - Yellow sarson - Grain cowpea), livestock nutrition (Sorghum+ Cowpea – Berseem + Oats , Hybrid Sorghum + Hybrid Bajra-Oats + sarson and Multicut sorghum – Berseem+Oat – Maize+Cowpea) and households income enhancement (Rice-Brocolli-Okra , Babyorn – Broccoli – Frenchbean and Basmati Rice – Potato – Maize (cob)) in Jammu, Himachal Pradesh and Uttarakhand. On the basis of diversification of cropping systems under studied agroclimatic region, crop sequence like okra-turnip-tomato recorded maximum rice equivalent yield (308.1 q/ha) with net return of Rs. 4,26,960/ha. (Fig. 1). However, Rice-wheat and Rice-vegetable pea-

mentha were performed better in Jammu and Pantnagar respectively. Under household type 1 (HH1) having 1 acre of holding size, 5 number of family size and 2 number of dairy animals, cropping systems such as Rice - Yellow sarson - Grain cowpea should be taken in 1300 m^2, for household type 2 (HH2) having holding size of 2 acre land, family size of 5 numbers and dairy size of 2 numbers of dairy animal the same cropping system should be taken in 1300 m^2 however for household type 3 (HH3) having 3 acers of holding with family size of 7 numbers and dairy size of 4 dairy animal, the same cropping system should be taken in 2000 m^2 for providing food and nutritional security in terms of carbohydrate, fats and protein. To sustain the livestock fodder requirement trough out the year fodder crop module involving Hyb. Sorghum + Hyb. Pearl millet- Oats + Sarson should be taken in 1700 m^2, 1700 m^2 and 4000 m^2 for HH1, HH2 and HH3 respectively. Family income enhancement crop module such as Baby corn – Broccoli – French bean found suitable under the studied agroclimatic region and land area of 400 m^2, 3000 m^2 and 3000 m^2 may be allotted under HH1, HH2 and HH3 respectively. In the western Himalayan region cropping system such as Sesbania- Early Cabbage – French bean registered 1.25% of soil organic carbon at the end of second year of experimentation which should be taken in plots of above modules on rotation basis to maintain the soil health particularly in terms of soil organic carbon and available nitrogen content.

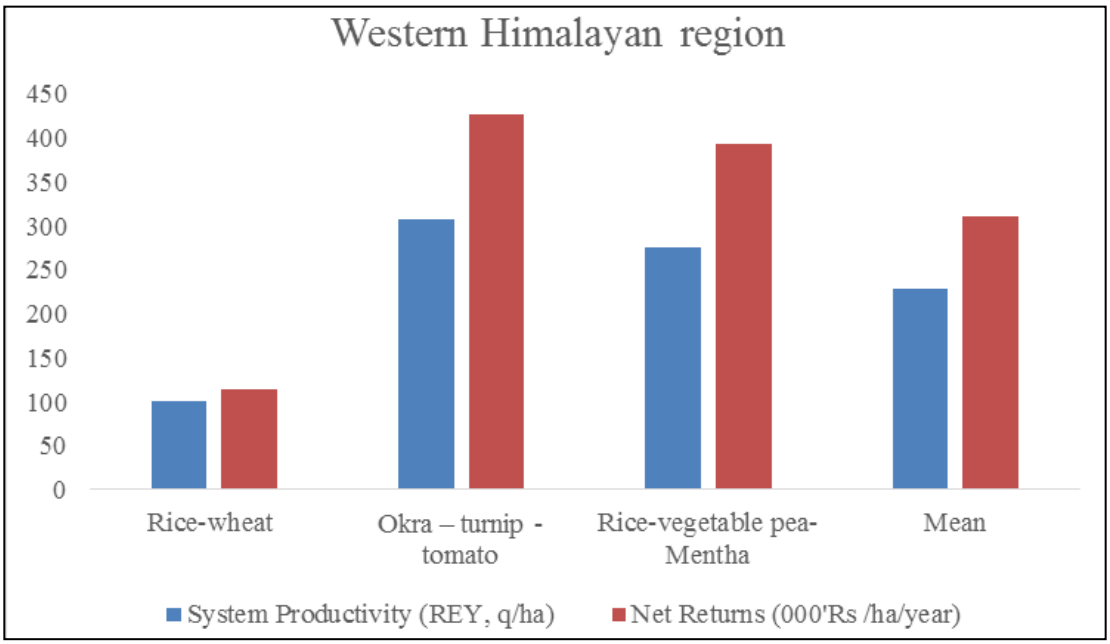
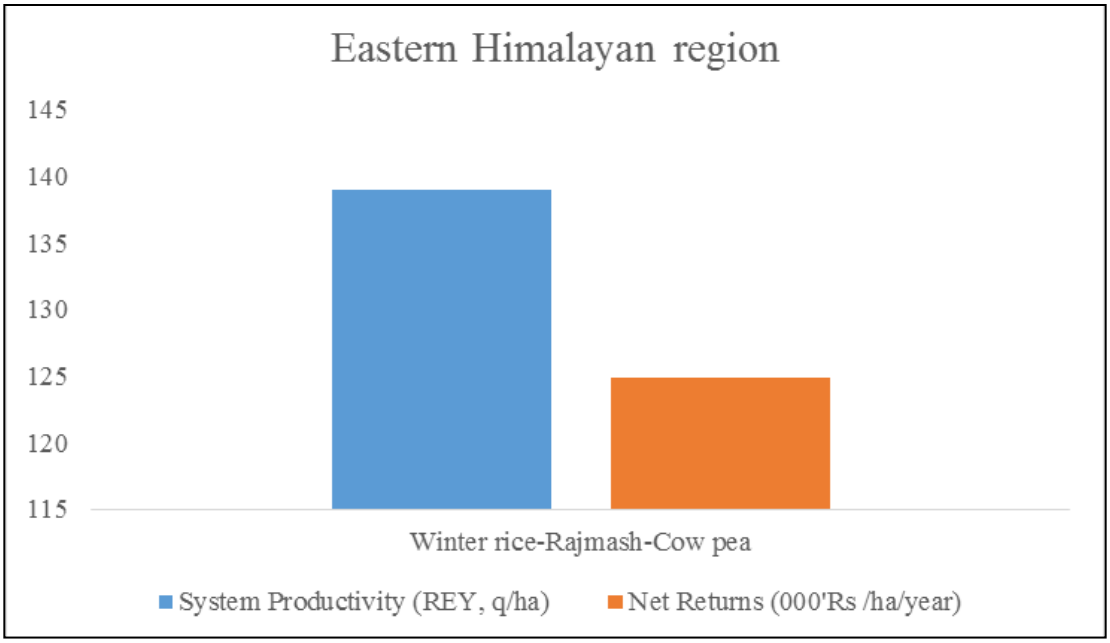


Fig. 1 System productivity and net returns from cropping systems module of Integarated farming systems in Western Himalayan regions

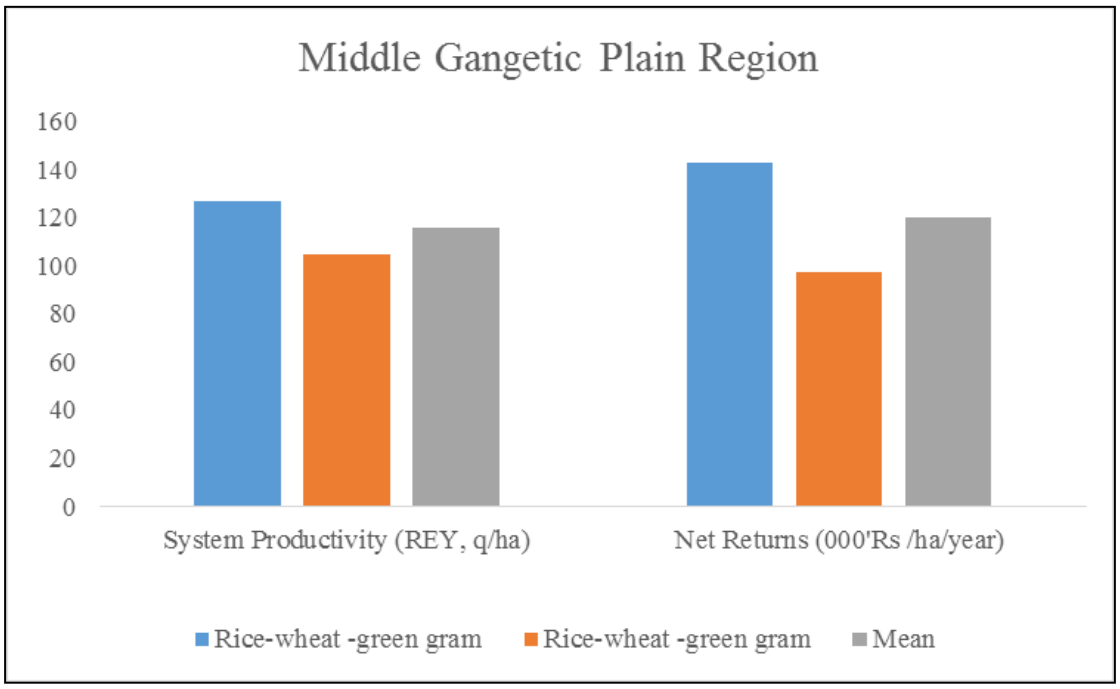
Eastern Himalayan region: Total 4 cropping system such as winter Rice – Toria –Blackgram, Teosinte – Oat – Rice bean, Ridge gourd – Broccoli – Lady's finger and Soyabean– Toria – Black gram for the purposes of family nutrition, livestock fodder requirement, household income enhancement and soil health building were under taken at Jorhat for the study. Investigation highlighted that cropping systems involving vegetables and other high value crops for income enhancement were found to be better in terms of REY. The Ridge gourd–Broccoli–Lady's finger system gave highest REY (446 q/ha) followed by Bitter gourd–Tomato–French bean system (356 q/ha) among all the systems. Teosinte-Oat-Cowpea (fodder) system was found to left highest available NPK nutrients in the post-harvest soils, whereas lowest was recorded in case of winter Rice- Autumn rice sequence which is the most predominant cropping system of Assam and cropping systems like winter Rice-Rajmash-Cowpea registered the highest net return of Rs. 1,24,866 /ha. This cropping system should be taken in 960 m^2, 1540 m^2, and 3000 m^2, under HH1, HH2 and HH3 respectively. However, Teosinte – Oat – Rice bean should be given area of 300 m^2, 500 m^2 and 1000 m^2, respectively. Ridge gourd – Broccoli – Lady's finger for enhancing income of household may be under taken in 400 m^2, 800 m^2 and 1400 m^2 for HH1, HH2 and HH3, respectively. The soil organic carbon was registered highest (0.75%) under Soyabean– Toria – Black gram cropping system hence, this system may be taken as soil health improvement crop modules on rotation basis.



Lower Gangetic Plain Region: Under this agroclimatic region 5 cropping systems such as Rice-Potato-Jute, Sesbania + Rice-French bean-Cowpea, Rice (bio fortified)-Sunflower-Black gram, Rice-berseem-fodder cowpea and Pointed gourd-Cauliflower/Onion were evaluated in Nadia district of West Bengal for the purpose to select the suitable cropping systems for integration in the integrated farming system. The maximum system yield with that you know 579 q/ha was recorded from Rice-berseem-fodder cowpea cropping system whereas, maximum soil organic carbon (0.84%) was recorded in the plot of Sesbania + Rice-French bean-Cowpea system. For fulfilling the requirement of food and nutrition of a household, Rice (bio fortified)-Sunflower-Black gram cropping system was capable enough which required to grow in 1512 m^2, 1512 m^2 and 2117 m^2 for HH1, HH2 and HH3 respectively. To provide the fodder and nutritional requirement of livestock in the studied region Rice-berseem-fodder cowpea may be grown in 2488 m^2, 6488 m^2 and 9883 m^2 for HH1, HH2 and HH3 respectively whereas Sesbania + Rice-French bean-Cowpea may be taken as soil health building cropping system on rotational basis.

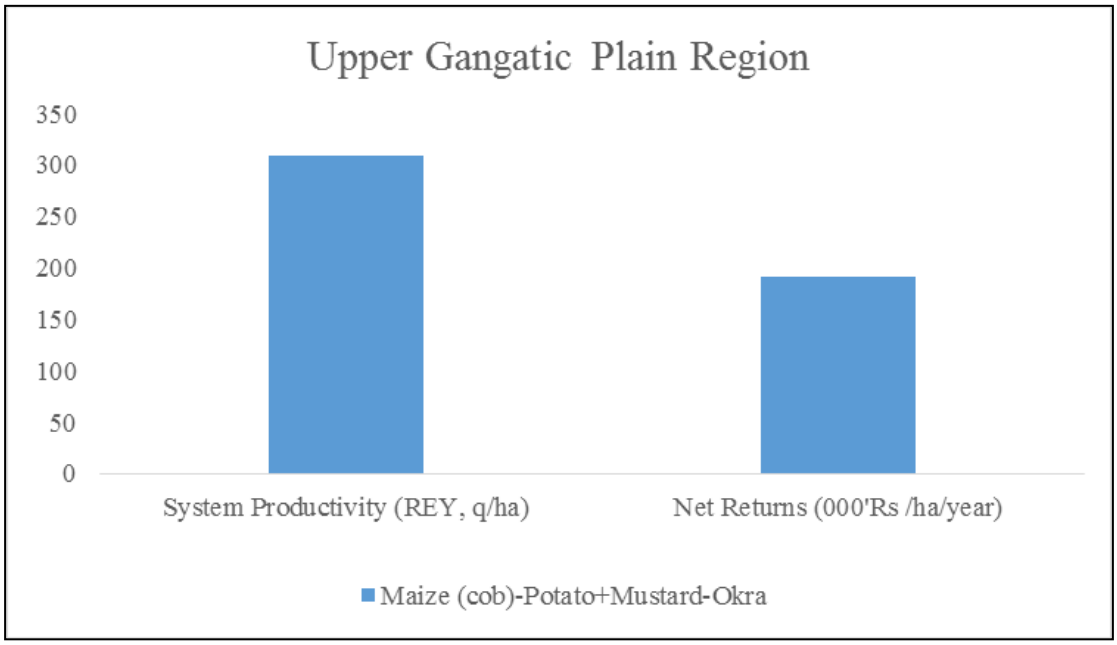
Middle Gangetic Plain Region: Total 10 cropping systems such as Rice-wheat -green gram, as check, Rice-French bean-green gram and Rice-vegetable pea-green gram for improving soil health, Rice-Linseed-Black Gram, Rice- Oat- Maize+cowpea, Rice-Mustard-Maize for maintaining household food and nutrition requirement, Rice-Berseem-Sorghum for providing fodder requirement of livestock component, Rice-Cabbage-Ladys finger and Rice-Cauliflower-Okra for enhancing the family income were taken under Middle Gangatic plain region during the reporting period. The highest system productivity in the tune of 127 q/ha and net return in the tune of Rs.1,42,950 /ha was registered with Rice-Wheat-green gram cropping system (fig.). Cropping systems like Rice-Linseed-Black Gram was

found to be most suitable for the middle gangatic plain region for providing family food and nutritional security. Therefore, this cropping system should be taken as integral part of integrated farming system for the regions. The area of 2527 m^2, 2527 m^2 and 3538 m^2 may be allotted for the above purpose for HH1, HH2 and HH3 respectively. Rice-Berseem-Sorghum was found to be suitable to provide the fodder and nutritional requirement of dairy animals and it should be taken in area of 1473 m^2, 5473 m^2 and 8462 m^2 under HH1, HH2 and HH3, respectively. The soil organic carbon was registered highest (0.52%) under Rice-vegetable pea-green gram cropping system therefore, this system may be taken as soil health improvement crop modules on rotation basis.

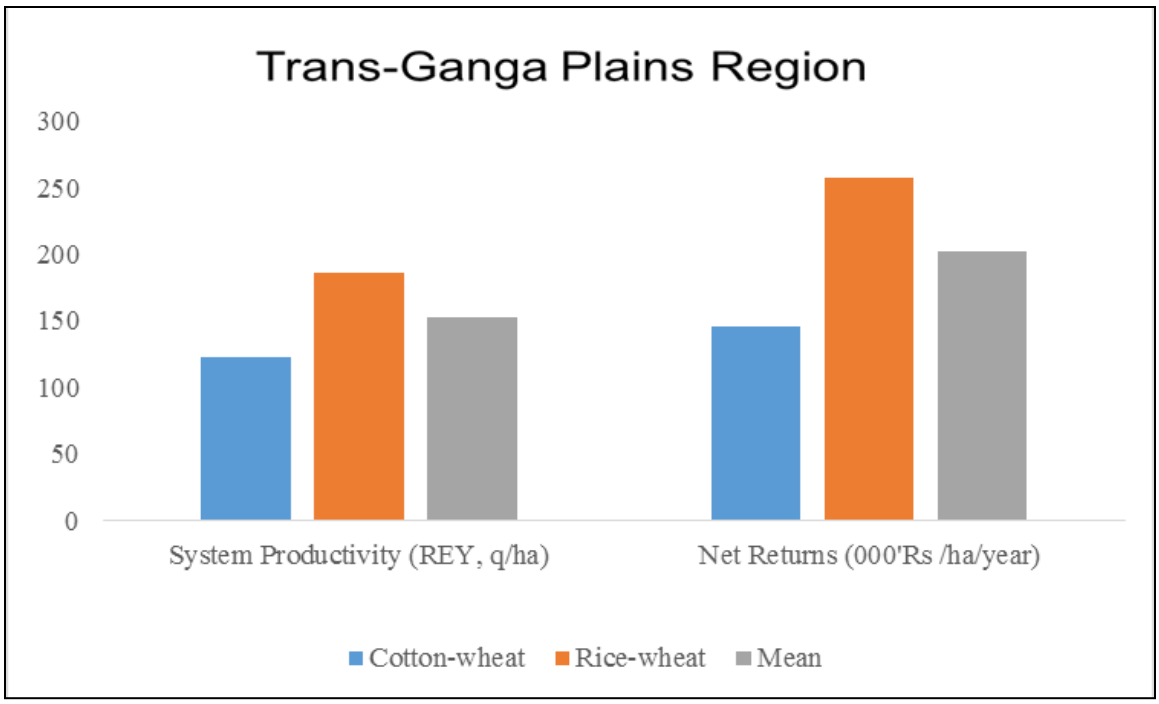


Upper Gangetic Plains Region: Under the reporting period, 5 cropping systems such as Hybrid Rice-wheat, Black gram-Bengal gram+ Mustard-Green gram, Hyb. Rice- veg. pea + mustard-black gram, Maize+ Cow pea (fodder)-berseem+ Gobhi sarson/Velvet grass-Sweet Sorghum (multi cut) and Maize (cob)-Potato+Mustard-Okra were evaluated in Upper Gangatic plain region. Maize (cob)-Potato + Mustard - Okra crop sequence excelled over all the cropping systems in respect of total system yield (309 q/ha) and Net monetary return (Rs 1,91,573.00 /ha). Cropping system Hyb. Rice- veg. pea + mustard-black gram was found to be most suitable for family food and nutrition, therefore, this cropping system should be taken in 2147 m^2, 2147 m^2, and 3006 m^2, under HH1, HH2 and HH3 respectively. While, Maize + Cowpea(fodder) - Barseem + Gobhisarso /Velvet grass - Sweet Sorghum (Multicut) cropping system should be given area of 1853 m^2, 5853 m^2 and 7247 m^2, respectively, for providing fodder requirement of dairy animals. For income enhancement of the household Maize (Cob) - Potato + Mustard-Okra can be taken in 1747

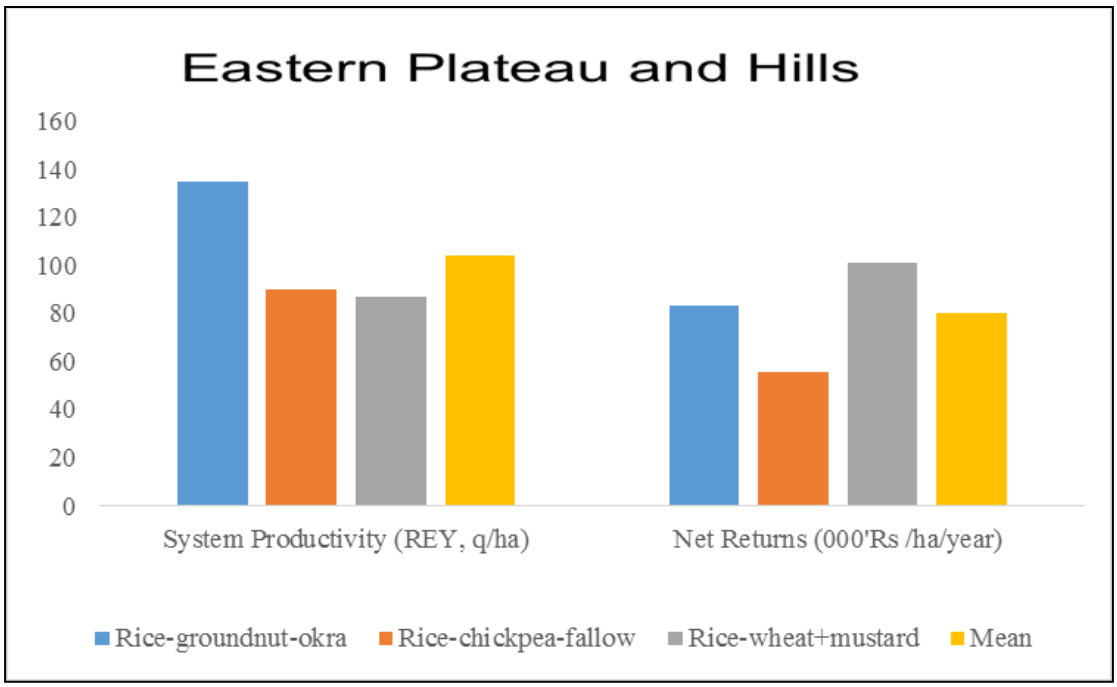
m^2 under HH3. The soil organic carbon was registered highest (0.49%) under Black gram-Bengal gram+ Mustard-Green gram cropping system hence, this system may be taken as soil health improvement crop modules on rotation basis.



Trans-Ganga Plains Region: Ten cropping systems with diverse purposes such as family nutrition (Maize-Potato/Pea-Groundnut and Green Gram-Wheat+Mustard) livestock nutrition (Maize+Cowpea/Sorghum-Oat/Berseem-Saathi maize and Sorghum-Barseem), maintaining soil health (B. Rice-wheat-cowpea and Green-Gram-Mustard-Green Gram) and income enhancement for family (Maize/Baby corn-Potato-Onion/Okra and Cowpea-Potato-Cucurbits) were compared with predominant cropping systems like Rice/Maize-wheat and Cotton-wheat. For income enhancement with Rice-Wheat registered significantly higher rice equivalent yield 186 q/ha with net return Rs. 2,57,752 /ha. thus, indicating their suitability over the existing systems. Cropping systems like Maize-Potato/Pea-Groundnut was found to be most suitable for the Trans-Ganga plain region for providing family food and nutritional security. Therefore, this cropping system should be taken as integral part of integrated farming system for the regions. The area of 1800 m^2, 5000 m^2 and 7000 m^2 may be allotted for the above purpose for HH1, HH2 and HH3 respectively. Maize+Cowpea/ Sorghum-Oat/Berseem-Saathi maize was found to be suitable to provide the fodder and nutritional requirement of dairy animals and it should be taken in area of 1480 m^2, 1480 m^2 and 2960 m^2 under HH1, HH2 and HH3, respectively. The soil organic carbon was registered highest (0.36%) under B. Rice-wheat-cowpea cropping system therefore, this system may be taken as soil health improvement crop modules on rotation basis.

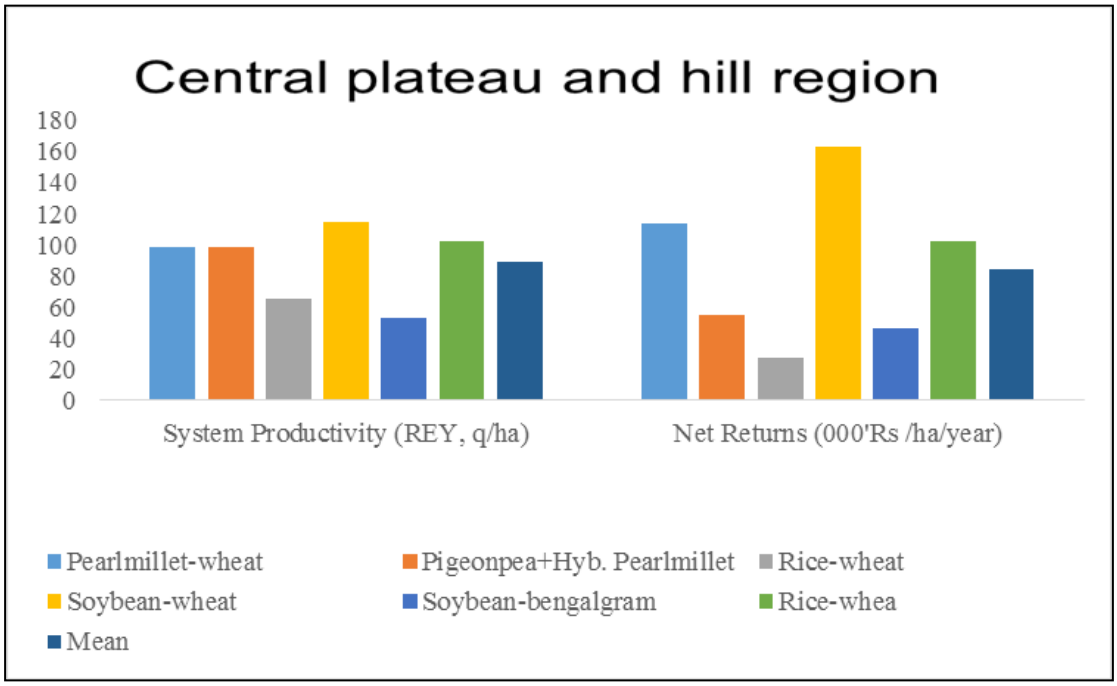


Eastern plateau and Hills: Under the reporting period, 15 cropping systems such as Rice-groundnut-okra, Rice-Chickpea-Fellow, Rice-Wheat+Mustard, Green manured rice-groundnut-cowpea, Rice-Gardon pea-Cowpea, Rice+Daincha-Lentil-Greengram, Rice -French bean-Groundnut, Rice-Groundnut-Greengram,Rice-Gram-Cowpea, Rice – Oat + Berseem-Cowpea, Rice-Fodder Maize-Fodder cowpea, Rice-Berseem-Sorghum, Rice – Sweet Corn – Tomato+ coriander, Rice-Sweet corn-Bitter gourd and Rice-Potato-Okra were evaluated in Eastern plateau and Hills. Rice-groundnut-okra crop sequence excelled over all the cropping systems in respect of total system yield (135 q/ha) and Rice-Wheat+Mustard cropping system recorded the highest annual net return Rs 1,01,187.00 / ha. Cropping systems like Rice -French bean-Groundnut was found to be most suitable for the Eastern plateau and Hills for providing family food and nutritional security. Therefore, this cropping system should be taken as integral part of integrated farming system for the regions. The area of 2200 m^2, 2200 m^2 and 3000 m^2 may be allotted for the above purpose for HH1, HH2 and HH3 respectively. Rice –Oat + Berseem-Cowpea was found to be suitable to provide the fodder and nutritional requirement of dairy animals and it should be taken in area of 1300 m^2, 1300 m^2 and 4550 m^2 under HH1, HH2 and HH3, respectively. The soil organic carbon was registered highest (0.70%) under Rice -French bean-Groundnut cropping system.



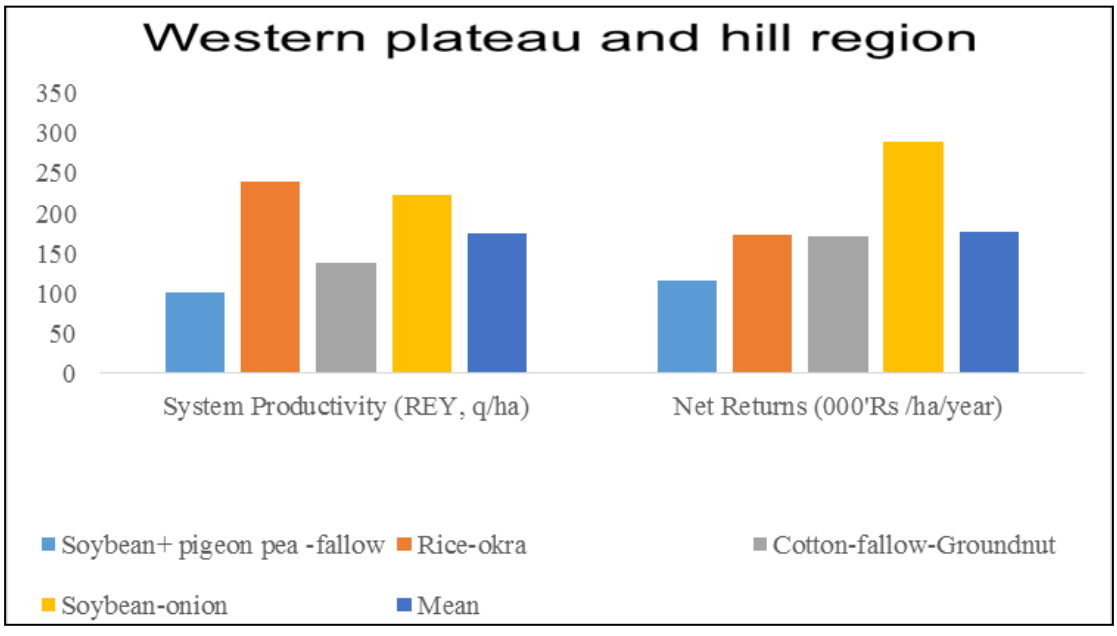
Central plateau and Hill Region: Twenty eight cropping systems with purposes like family nutrition (Rice-Potato-Maize, Groundnut-Wheat, Soyabean+Maize(4:2) Wheat+Mustard(2:2)-Moong, Groundnut-Wheat-Urdbean, Rice-Wheat-Greengram, Rice-Potato-Green gram), livestock nutrition (Sorghum+ cowpea (2:1)-Ryegrass+ Fodderbeet (FB/R)-Cowpea, Clusterbean-Dual barley, Arhar + Hyb. Bajra F (1:1)-Berseem-Sweet sorghum, Sorghum-Barseem, Maize (African tall)-Berseem-Sorghum, Rice-Barley-Bajra), maintaining soil health (Soybean + sweet corn (5:2)-lentil+linseed(5:2)-greengram(G+R), Clusterbean-Barley, Soyabean+Sesbania(1:1)-Wheat PI+Gram(2:4)-Moong, Soyabean-Chickpea-Greengram, Rice-Pea+Mustard-Green manure) and income enhancement for family (Okra+ Babycorn (FB/R)-Turnip + Beet root(FB/R)-Sponge gourd +Cluster bean (FB/R), Groundnut-Rabi onion, Maize-Veg. pea-Okra, Babycorn+Brinjal (1:1)- Onion-Okra, Maize cob-Potato-Okra, Rice-Garlic) were compared with

predominant cropping systems. The results indicated that Soyabean-Wheat system was found most productive, and it has recorded the REY of 115.0 q/ha with net return Rs. 1,62,779 /ha whereas, maximum soil organic carbon (0.75%) was recorded in the plot of Green gram-Bengal gram-Green gram system. For fulfilling the requirement of food and nutrition of a household, Rice-Potato-Maize cropping system was capable enough which required to grow in 1500 m2, 1500 m2 and 2100 m2 for HH1, HH2 and HH3 respectively. To provide the fodder and nutritional requirement of livestock in the studied region Sorghum+ cowpea (2:1)-Ryegrass+ Fodderbeet (FB/R)-Cowpea may be grown in 1600 m2, 1600 m2 and 3200 m2 for HH1, HH2 and HH3 respectively, For enhancement of income of household Okra+ Babycorn (FB/R)-Turnip + Beet root(FB/R)-Sponge gourd +Cluster bean (FB/R) cropping system was capable enough which required to grow in 900 m2, 4900 m2 and 6700 m2 for HH1, HH2 and HH3 respectively.



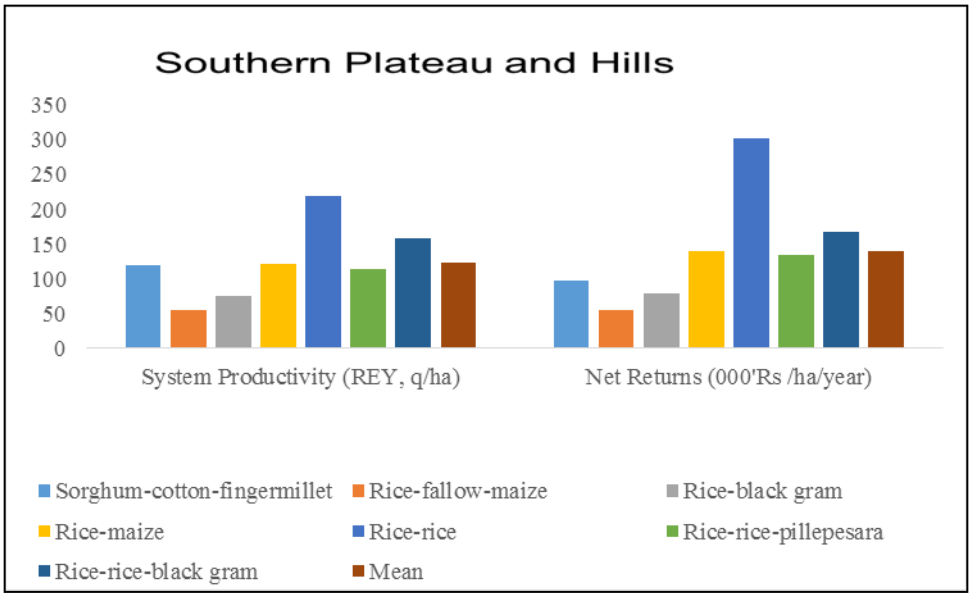
Western Plateau and Hill Region: Twenty two cropping systems having objectives like family nutrition requirement, cropping systems such as (Sorghum + Black gram (2:1)-Mustard Sorghum + Black gram (2:2)-Mustard Rice-Groundnut+Long yard bean, Sorghum-Chickpea-Seasamum, Pearlmillet-Chickpea), livestock nutrition (groundnut+sorghum-lucern-sweet corn, groundnut+maize-fennel-groundnut+sesame Maize + Greengram (2:2)- Cow pea, Rice-Oat, Sorghum-Cowpea-Pearlmillet, Cowpea-

Rabi sorghum), maintaining soil health (Soybean+ sesbania (1:1)- Bengal gram, Soyabean+Sunhemp(1:1)-Chickpea, Rice-Cowpea, Soyabean-Chickpea, Soybean + Green manure crop-Sorghum+ Green gram) and income enhancement for family (Clusterbean + Sweetcorn (2:2)-Ajwain, Rice-Cucumber , Clusterbean-Carrot-Coriandar, Soyabean-Onion) were compared with predominant cropping systems like Rice-okra, Soyabean+Pigeonpea, Cotton-Groundnut, Soyabean-Onion. Among different cropping systems, Rice-Okra recorded highest REY of 239.0 q/ha thus was found superior to other systems in terms of improvement in the productivity. Net return (Rs. 2,89,146 / ha) was recorded highest under Soyabean-Onion cropping system. Cropping systems like Sorghum + Black gram (2:1)-Mustard was found to be most suitable for the Western Plateau and Hill for providing family food and nutritional security. The area of 1500 m^2, 1500 m^2 and 2100 m^2 may be allotted for the above purpose for HH1, HH2 and HH3 respectively. Maize + Greengram (2:2)- Cow pea and Sorghum+Blackgram(2:2)-Mustard were found to be suitable to provide the fodder and nutritional requirement of dairy animals and it should be taken in area of 1000 m^2, 1000 m^2 and 2000 m^2 under HH1, HH2 and HH3, respectively. For enhancement of income of household cropping system Clusterbean + Sweetcorn (2:2)-Ajwain may be found suitable and it will take in area of 1500 m^2, 6500 m^2 and 2900 m^2 under HH1, HH2 and HH3, respectively. The soil organic carbon was registered highest (0.73%) under Rice -French bean-Groundnut cropping system therefore, this system may be taken as soil health improvement crop modules on rotation basis.

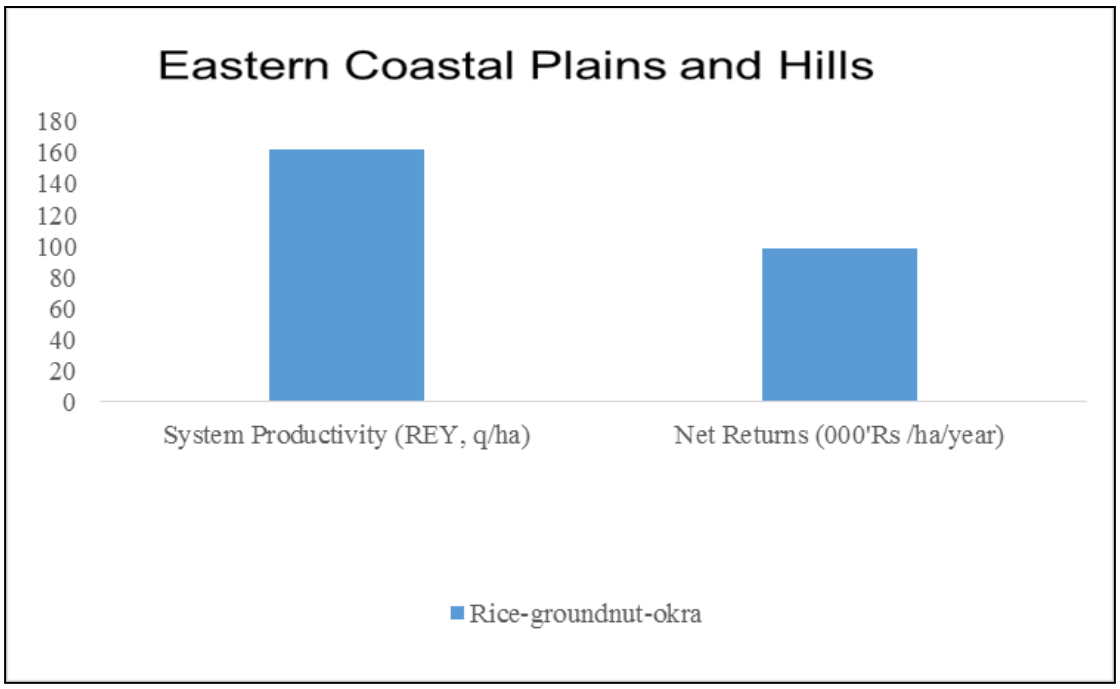


South Plateau and Hills: In this agroclimatic region 34 cropping systems have been evaluated at 7 centres such as Coimbatore, Kathalgere, Maruteru, Rajendranagar, Rudrur, Siruguppa and Thanjavur. The cropping systems tested as a check were Rice-rice, Sorghum-Cotton-Ragi, Paddy-Maize, Rice-Blackgram, Rice-Maize, Rice-Rice-Pillepesara, Rice-Rice-Blackgram. Under soil health crop modules Rice-Black gram-Sunhemp, Fodder maize-Fodder cowpea, Groundnut+Cowpea(4:1)-Sunhemp, Rice-Blackgram,Pigeonpea+ Greengram (1;6)-Sesame, Greengram-Cowpea-Dolchos, Dhaincha-Rice+Dhaincha-Blackgram cropping systems were evaluated. To identified the suitable crop modules for providing household food and nutritional security, cropping systems such as Maize+ Dolichos bean-Mustard-Cluster bean, Prosomillet-Cowpea-Sunflower, Groundnut+Cowpea-Fingermillet-Fellow-Finger millet/Maize+Castor-Sorghum-Fallow-Sorghum, Rice-Blackgram, Pigionpea+Maize(1:3)-Groundnut, Maize-Mustard-Blackgram, Blackgram – Rice – Groundnut were undertaken in the region. Total 6 cropping systems namely Bajra Napier grass + Desmanthus (perennial), Multicut hybrid Napier (CO-3), Rice-Fodder , Fodder Maize-Lucerne, Super Napier + fodder Cowpea, Fodder sorghum – Rice – Fodder cowpea were undertaken for evalution to secure the fodder requirement of the dairy animal round the year. Under family income enhancement crop modules, Okra-Marigold-Beetroot, Maize-Chillies-Radish, Tomato-Okra, Rice-Sweetcorn, Okra-Marigold-Beetrot, Bt. Cotton-Fallow-Sweetcorn, Sweetcorn-Marigold-Okra, Maize - Rice - Seeraga samba- Bhendi + blackgram (5:1) were taken for identifying most suitable cropping systems for the region. The results indicated that Rice-rice system was found most productive, and it has recorded the REY of 220.0 q/ha with net return Rs. 3,01,580 /ha. For fulfilling the requirement of food and nutrition of a household, Maize+ Dolichos bean-Mustard-Cluster bean cropping system was capable enough which required to grow in 560 m^2, 560 m^2 and 784 m^2 for HH1, HH2 and HH3 respectively. To provide the fodder and nutritional requirement of livestock in the studied region Bajra Napier grass + Desmanthus (perennial) may be grown in 2720 m^2, 5440 m^2 and 4800

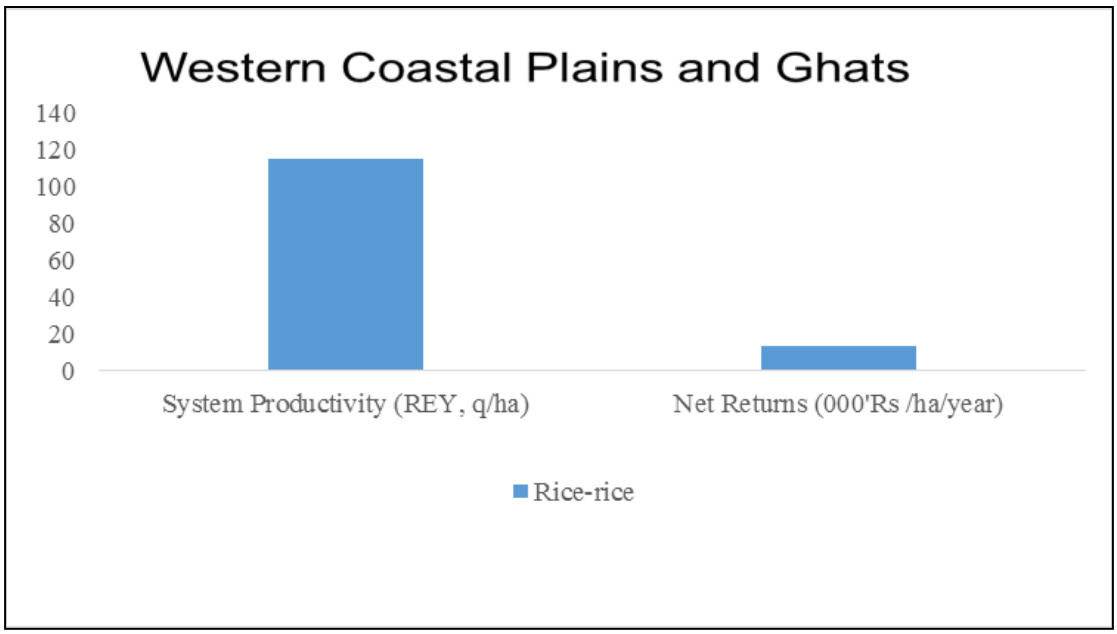
m^2 for HH1, HH2 and HH3 respectively. For enhancement of income of household Okra-Marigold-Beetroot cropping system was capable enough which required to grow in 720 m^2, 2000 m^2 and 6416 m^2 for HH1, HH2 and HH3 respectively.



Eastern Coastal Plains and Hills: Under the reporting period, Rice-Groundnut-Cowpea, Rice-Groundnut-Green gram, Rice-Maize (fodder)-Cowpea (fodder) and Scented rice-Sweet corn-Bitter gourd were evaluated in Eastern Coastal Plains and Hills. Rice-groundnut-okra crop sequence excelled over all the cropping systems in respect of total system yield (162 q/ha) and annual net return Rs 98,301.00 /ha. Cropping systems like Rice-Groundnut-Green gram was found to be most suitable for the Eastern Coastal plateau and Hills for providing family food and nutritional security. Therefore, this cropping system should be taken as integral part of integrated farming system for the regions. The area of 2000 m^2, 2000 m^2 and 2800 m^2 may be allotted for the above purpose for HH1, HH2 and HH3 respectively. Rice-Maize (fodder)-Cowpea (fodder) was found to be suitable to provide the fodder and nutritional requirement of dairy animals and it should be taken in area of 1500 m^2, 1500 m^2 and 3000 m^2 under HH1, HH2 and HH3, respectively. For enhancement of income of household cropping system Scented rice-Sweet corn-Bitter gourd may be found suitable and it will take in area of 500 m^2, 4500 m^2 and 6200 m^2 under HH1, HH2 and HH3, respectively The soil organic carbon was registered highest (0.78%) under Rice-Groundnut-Cowpea cropping system.

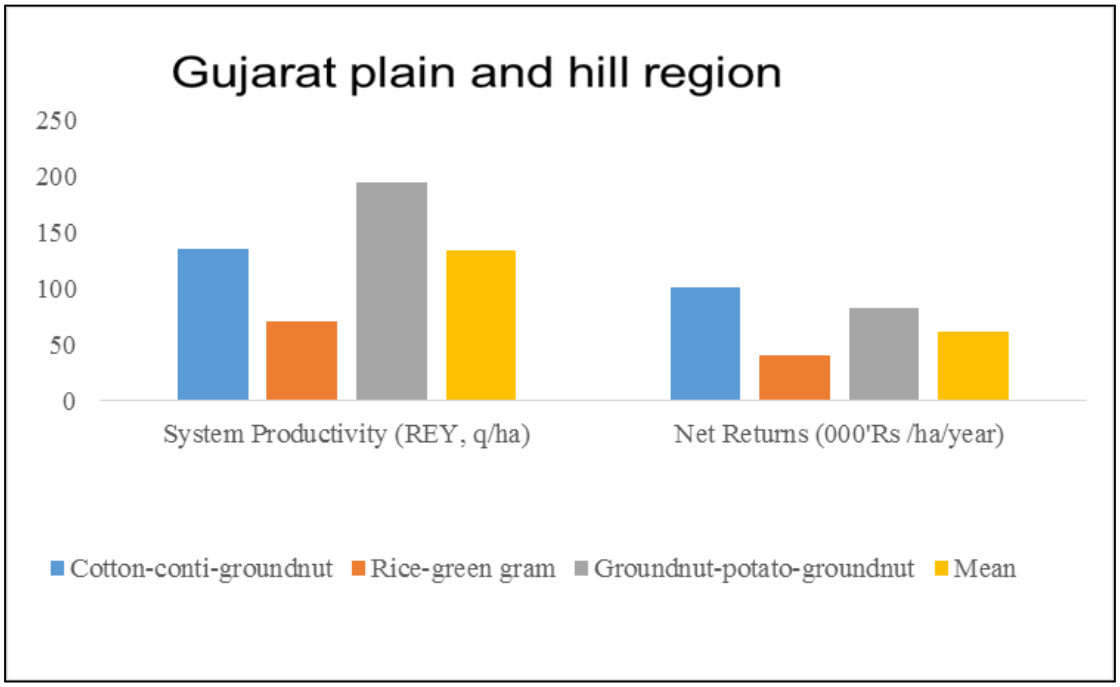


Western Coastal Plains and Ghats: Five cropping systems with diverse purposes such as family nutrition (Rice-Cassava-Amaranthus) livestock nutrition (Rice-Para grass-Fodder Cowpea), maintaining soil health (Rice-Sesbania- Bush Cowpea) and income enhancement for family (Rice-Okra-Cucumber) were compared with predominant cropping system like Rice-Okra-Cucumber. For income enhancement with Rice-Rice registered significantly higher rice equivalent yield 115 q/ha with net return Rs. 13,139 /ha. thus, indicating their suitability over the existing systems. Cropping systems like Rice-Cassava-Amaranthus was found to be most suitable for the Western Coastal Plains and Ghats for providing family food and nutritional security. Therefore, this cropping system should be taken as integral part of integrated farming system for the regions. The area of 1000 m^2, 1200 m^2 and 1600 m^2 may be allotted for the above purpose for HH1, HH2 and HH3 respectively. Rice-Para grass-Fodder Cowpea was found to be suitable to provide the fodder and nutritional requirement of dairy animals and it should be taken in area of 1800 m^2, 4000 m^2 and 3600 m^2 under HH1, HH2 and HH3, respectively. . For enhancement of income of household cropping system Scented rice-Sweet corn-Bitter gourd may be found suitable and it will take in area of 1200 m^2, 2800 m^2 and 6800 m^2 under HH1, HH2 and HH3, respectively The soil organic carbon was registered highest (1.8%) under Rice-Okra-Cucumber cropping system.



Gujarat Plain and Hill Region: Total 15 cropping systems such as Groundnut-potato-groundnut, Cotton-Cotton-Groundnut, Rice-Greengram-Fellow, Veg. Cow pea-Amaranthus-Groundnut, Groundnut-Coriander-Sesame,Rice-Sunhemp-Greengram, Maize-Leafy coriander-Pearl millet, Groundnut-Coriander-Sesame, Rice-Indianbean-Sesamum, Marvel grass , Rice-Lucerne-Conti.., Fodder sorghum-Lucerne-conti.., Rice-fenugreek-Cluster bean, Groundnut-Onion-Sorghum and Veg. clusterbean-Leafy fenugreek-Sesamum have been examined. The results revealed that Groundnut-potato-groundnut (REY 195.0 q/ha) and net return (Rs. 1,00,954 /ha) was recorded under Cotton-conti-groundnut cropping system. Cropping systems like Maize-Leafy coriander-Pearl millet was found to be most suitable for the Gujarat Plain and Hill for providing family food and nutritional security. The area of 1400 m^2, 1350 m^2 and 4500 m^2 may be allotted for the above purpose for HH1, HH2 and HH3 respectively. Marvel grass-Conti.. were found to be suitable to provide the fodder and nutritional requirement of dairy animals and it should be taken in area of 800

m^2, 800 m^2 and 1600 m^2 under HH1, HH2 and HH3, respectively. For enhancement of income of household cropping system Rice-fenugreek-Cluster bean may be found suitable and it will take in area of 2200 m^2, 3700 m^2 and 5900 m^2 under HH1, HH2 and HH3, respectively. The soil organic carbon was registered highest (0.93%) under Marvel grass-Conti.. cropping system therefore, this system may be taken as soil health improvement crop modules on rotation basis.



Summary

- ✓ Carrying capacity of land (CCL) varied from agroclimatic region to agroclimatic region.
- ✓ CCL was found to be the highest in Western Coastal Plains and Ghats (0.12 ha to 0.68 ha land may be spared for income generation crop modules).
- ✓ It was followed by Trans Gangetic plains regions (0.053 ha to 0.47 ha) and Lower & upper Gangetic plains agroclimatic regions.
- ✓ CCL was found to be the lowest under Southern Plateau and Hills (-) 1.2 ha to (-) 2.8 ha followed by Eastern Himalayan region (-) 1.02 ha to (-) 1.48 ha.
- ✓ विभिन्न जलवायु क्षेत्र में भूमि की वहन क्षमता (सीसीएल) भिन्न-भिन्न पाया गया।
- ✓ सीसीएल पश्चिमी तटीय मैदानों और घाटों में सबसे अधिक पाया गया (जहाँ 0.12 हेक्टेयर से 0.68 हेक्टेयर भूमि आय सृजन फसल मॉड्यूल के लिए छोड़ी जा सकती है) जबकि यह दक्षिणी पठार और पहाड़ियों जलवायु क्षेत्रों में सबसे कम पाया गया।

7.3 ON-FARM RESEARCH

7.3.1 On-farm crop response to application of nutrient.

Title of the experiment: On-farm crop response to application of major plant nutrients in predominant cropping system

Objective: To assess the response of major crops to application of N, P and K at recommended rates in predominat cropping systems in different agro-ecosystem under farmers field condition.

Year of start: 1999-2000, Treatments are modified in 2010-211.

Treatments: There are five common treatments at various locations. They are ($N_0P_0k_0$), N, N+P, N+K and N+P+K and all the nutrients are applied as per the recommended rates of crops/cropping systems evaluated at particular location. Two treatments namely, N+P+K+ Supplement of deficient micronutrient based on soil test and farmer's practice were added during 2010-2011.

Locations:

Cropping system	OFR Centre (State)	No. of trials
Rice-Rice	Vellyani (Kerala)	24
Rice-Wheat	Patiala (Punjab), Udham singh nagar (Uttarakhand), East singh bhum (Jharkhand), Fatehpur (U.P.), Udham Singh Nagar (J.K.), Fethabad (Haryana), Nalnda (Bihar) Umaria and Annupur (Madhy Pradesh)	216
Rice-Mustard	Nadia (W.B.), Golpara (Assam)	36
Rice-Maize	Vizianagaram (A.P.)	24
Rice-Okra	Karjat (Maharashtra)	24
Maize-Wheat	Dungarpur (Rajasthan), Bilashpur (H.P.)	48
Maize-Chikpea	Dahod (Gujarat)	12
Pearmillet-Mustard	Dausa (R. J.)	24
Pearmillet-Wheat	Satara (Maharashtra)	24
Soybean-Wheat	Hingoli (Maharashtra)	24
Total		456

Results: The centre-wise details of varities, nutrients used, crop yield and crop response to NPK application in terms yield difference, and are presented in table 7.3.1. Brief descriptions of centre-wise result are given below.

Rice rice: A total 24 trial conducted at Vellyani centre Kerala. Application of micronutrient show very positive response. However, application of recommended dose of fertilizer recorded higher yield over the control 208% but it lower by -11% than farmers practices in Kharif season as farmers already applying higher dose of fertilizers than RDF. Zinc application recorded good response and it helps in additional yield 2% over the RDF. Additional yield of 708 kg ha^{-1} is possible through application of required quantity of zinc to the system in addition to recommended level of NPK nutrient. Same trend like Kharif observed in Rabi rice.

Rice-wheat: A total 216 trial conducted at 9 locations compromising of 8 NARP zones. Under these total 8 states covered which are Punjab, Uttarakhand, Jharkhand, Madhya Pradesh, Uttar Pradesh, Jammu Kashmir, Bihar and Haryana.

Increase in yield was recorded by the application of micronutrient (Zn) in both crop and highest percentage increase in yield over Recommended Fertilizer (NPK only) were recorded at (Annupur) in rice it was 9.5% and in case of wheat 8.8% at Fethabad (Haryana) other centre also observed 2-9% increase in yield with the application of micronutrients. Similar trend was observed in case of recommended dose of fertilizer it recorded higher yield over the control at all the 9 locations within range of 36 to 187% in case of rice and 31 to 294% in case of wheat. Highest yield gap 3533 kg ha^{-1} in rice recorded Fatehpur of Uttar Pradesh and 3894 kg ha^{-1} in wheat were recorded at Fethabad of Haryana. Highest percentage increase in yield 187 in case of rice and 294% in case of wheat were recorded at East Singh Bhum and Fatehabad centre respectively. In rice-wheat system, across the NARP zones, it was found that mean yield gap of 1394 kg ha^{-1} exists between farmers and recommended nutrient practice. Additional yield of 585 kg ha^{-1} is possible through application of required quantity of zinc to the system in addition to recommended level of NPK nutrient.

Rice-mustard: A total 48 trials were conducted in 2 NARP zones. New Alluvial Zone (Nadia) of West Bengal, application of 25 kg Zinc ha^{-1} recorded additional yield of 519 and 502 kg ha-1 in rice and mustard. At Lower Brahmaputra Valley Zone (Golpara) of Assam application of 25 kg ha-1 of zinc in addition to recommended NPK in rice and mustard gave additional yield of 545 and 79 kg ha-1 which was 9.4 and 8.4% higher than NPK alone. It was observed that farmer's practices of nutrient management resulted in lower yield (2316 and 284 kg ha-1) of rice and mustard compared to application of recommended quantity of NPK and NPK+ Mn.

Rice-maize: Total 24 trials were conducted in North Coastal Zone - Anakapalle of Andhra Pradesh. There were huge yield gap in recommended NPK application and farmer practices under both crop, In case of rice application of 80:60:50 Kg NPK ha^{-1} gave additional yield of 1732 kg ha^{-1} and 628 kg ha^{-1} over the control and farmer practice respectively which were 57 and 13% higher over the control and farmer practice respectively. In case of maize application of 200:80:80 Kg NPK ha^{-1} gave additional yield of 3696 kg ha^{-1} and 1165 kg ha^{-1} over the control and farmer practice respectively which were 136 and 20% higher over the control and farmer practice respectively.

Rice-Okra: A total 24 trials were conducted in 1 NARP zones. In North Konkan Coastal Zone (Thane) of Maharashtra, yield difference of system between farmers and recommended NPK practices were found to be 860 kg ha^{-1} and 1413 kg ha^{-1} in rice and okra. Further with application of micronutrient gave additional yield of 1121 kg ha^{-1} and 2052 kg ha^{-1} in rice and okra.

Maize-wheat: A total 48 trials were conducted in 2 NARP zones. Sub-mountain and low hills sub-tropical zone (Bilaspur) of Himachal Pradesh, application of 25 kg Zinc ha^{-1} recorded additional yield of 314 and 267 kg ha^{-1} in maize and wheat. It was recorded that application of 90:45:30: Kg NPK + 25 kg zinc ha^{-1} in maize and 80:40:40: Kg NPK + 25 kg zinc ha^{-1} in wheat gave significantly higher yield than farmer practices and it was observed 50 and 58% higher than farmer practices in maize and wheat respectively. At Sub-Humid Southern Plain and Aravalli Hill Zone (Udaipur) of Rajasthan application of 25 kg ha^{-1} of zinc in addition to recommended NPK in maize and wheat gave additional yield of 90 and 204 kg ha^{-1} which was 6.7 and 5.9% higher than NPK alone. It was observed that farmer's practices of nutrient management resulted in lower yield (752 and 1219 kg ha^{-1}) of maize and wheat compared to application of recommended quantity of NPK and NPK+ Mn.

Maize-Chikpea: A total 12 trials were conducted in 1 NARP zones. In (Dahod) of Gujarat, yield difference of system between farmers and recommended NPK practices were found to be 333 kg ha^{-1} and 118 kg ha^{-1} in maize and Chickpea. Additional yield of 549 kg ha^{-1} and 223 kg ha^{-1} can be achieved by adding micronutrient in the system.

Pearl millet-wheat: In case of pearl millet-wheat system at Scarcity Zone CSRS Padegaon (Satara) Maharashtra there is huge improvement in yield was recorded with the application of RDF over the farmer practice in pear millet (25%) and mustard (29%) further application of micronutrient enhance the yield up to (37%) and (38%) respectively. It indicated the importance of balance application of nutrients in the field.

Pearl millet-mustard: In case of pearl millet-mustard system at Semi Arid Eastern Plain Zone (Dausa) Rajasthan there is huge improvement in yield was recorded with

the application of RDF over the farmer practice in pear millet (20%) and mustard (32%) further application of micronutrient enhance the yield up to (41%) and (42%) respectively. It indicated the importance of balance application of nutrients in the field. Arid system both pearl millet-wheat and pearl millet-mustard recorded very positive response to RDF and micronutrient which show the importance of fertilizer application in arid region which normally taken least priority.

Soybean-wheat: A total 24 trials were conducted in Vidharbha Zone (Hingoli) of Maharashtra, It was observed that there was minor yield gap between farmer's practices and recommended nutrient application along with micronutrient (278 and 149 kg ha^{-1}) in soybean and wheat respectively as compared to farmer practices. Which were 18.2 and 9.8% higher in soybean and wheat over the farmer practices.

Summary of results on response of prevalent cropping system to applied nutrient in various NARP zones are:

- On-farm nutrient response trials (456 no's) conducted in various NARP zones indicated, across the locations and systems, nutrient application gap of 25, 28, 55 and 88 % in N, P2O5, K2O and micro nutrient exists between farmers practice and recommended nutrient package. The same is also reflected in system yield of major cropping systems.
- Agronomic Efficiency (AE) of N can be enhanced to 36, 23, 16 and 28 kg (grain yield / kg of N) from 6.5, 10, 7, 7.2 (grain yield /kg of N) in rice-rice, rice-wheat, maize-wheat, and rice-mustrad systems respectively by application of recommended dose of N with P and K instead of N alone.
- Mean economic response of cropping systems to applied nutrients indicates a return of Rs 6, 3.0 and 7.0 per rupee invested on N, P2O5 and K2O respectively.
- On-farm system yield gap between recommended dose of N P2O5 K2O and farmer's package was found to be 1394, 1774 and 482 in rice- wheat, maize-wheat and rice-mustard which can enhanced up to 1979, 2242 and 1380 kg ha^{-1} with application of micronutrients. If we consider all system together than yield gap between recommended dose of N P2O5 K2O and farmer's package was found 1009 kg ha^{-1}, which can enhanced up to 1787 kg ha^{-1} with application of micronutrients.
- At Vellyani (Kerala) in rice-rice farmer practices recorded higher yield than RDF because farmers are applying high dose of fertilizers but in imbalance manner. Farmers should encourage applying balance dose of fertilizers along with micronutrient.

Table-7.3.1 : Yield potential of different cropping systems under researcher and farmer managed conditions - Year 2020-21

Report for Grain Yield - Year 2020-21																									
State	NARP Zone/ Center/ No. of Trials	Soil Type	Variety/ Recommended Fertilizer Dose/ Micro. Dose/	Initial Soil Status					Yield(kg/ha)												Yield gap 1(kg/ha)	Yield gap 2(kg/ha)	Yield gap 3(kg/ha)	Yieldgap 3(kg/ha) gap 4(kg/ha)
			FP(Fert. Dose)	pH	OC (%)	N (kg/ha)	P (kg/ha)	K (kg/ha)	Control	N	NP	NK	NPK	NPK + M.Nut.	F.Pract.	SE(d)	SE(M)	CD -5%	CV	RF vs Control	RF + Mic. Nut. vs RF	RF vs FP	RF + Mic.Nut. vs FP
Rice-rice																									
Kerala	Southern Zone - Vellayani/ Vellayani/ 24	Not Avail-able	Uma/ 90- 45 -45 / ZnSO4(20) 98-50-41	4.6	2	446	35	148	1570	1984	3201	3165	4848	5556	5448	--	--	--	--	3278	708	-600	108
Kerala	Southern Zone - Vellayani/ Vellayani/ 24	Not Avail-able	Uma/ 90- 45 -45 / 0 101-48-43	--	--	--	--	-	1488	2248	3318	3285	4790	5584	5443	--	--	--	--	3302	794	-652	142
Rice- Wheat																									
Punjab	Central Plain Zone III/ Patiala-PB/ 24	Not Avail-able	PR-126/ 120- 30 -30 / ZnSO4(25) 150-3.8-0	7.7	0.4	250	31	142	4444	5989	5998	6071	6029	6330	6151	--	--	--	--	1584	302	-122	179

Punjab	Central Plain Zone III/	Not Avail-able	PBW725	--	--	--	--	-	3834	4232	4980	4917	5018	5251	5139	--	--	--	--	1183.8	233.6	-121.4	112.2
	Patiala-PB/		120- 30 -30 /																				
	24		MnSo4(5)																				
			150-60-0																				
Uttarakhand	Bhabar and Tarai Zone - Pantnagar/	Alluvial	HKR 27	6.3	0.7	275	18	170	3740	4536	5408	5075	6298	6477	5767	--	--	--	--	2557	179	530	710
	Udham singh nagar/		150- 60-40/																				
	24																						
			148-50-25																				
Uttarakhand	Bhabar and Tarai Zone - Pantnagar/	Alluvial	HD 2967/	6.3	0.7	275	18	170	3394	3755	4603	4338	5707	6010	5580	--	--	--	--	2312.5	303.8	126.7	430.4
	Udham singh nagar/		150- 60-40/																				
	24																						
			127-43-33																				
Uttar Pradesh	Central Plain Zone - Kanpur/	Not Avail-able	PHB - 71	7.9	0.4	188	13	142	2930	4198	5438	5056	6463	7008	5418	--	--	--	--	3533	544	1045	1590
	Daleep Nagar (Kanpur Dehat)/		150- 60 -40 /																				
	24		ZnSO4(25)																				
			199- 64-0																				
Uttar Pradesh	Central Plain Zone - Kanpur/	Not Avail-able	HD 2967	7.9	0.4	188	13	142	2208	3204	4125	3829	4837	5228	4022	--	--	--	--	2629.3	391.0	814.9	1205.9
	Daleep Nagar (Kanpur Dehat)/		120- 60 -40 /																				
	24		ZnSO4(0)																				
			143- 61-0																				

Jharkhand	Central and North Eastern Plateau Zone	Not Avail-able	Naveen	--	--	--	--	-	1229	2319	2684	2566	3525	3709	2582	--	--	--	--	2296	185	943	1127
	East Singh-bhum		100- 50 -25 /																				
	24		ZnSO4(5)																				
			60- 30-0 (0)																				
Jharkhand	Central and North Eastern Plateau Zone	Not Avail-able	K-9107	--	--	--	--	-	1315	2255	2695	2315	3565	3655	2425	--	--	--	--	2250.0	90.0		1230.0
	East Singh-bhum																						
	24		ZnSO4(5)																				
			60- 30-0 (0)																				
Jammu & Kashmir	Subtropical low altitude	Not Avail-able	B-370	7.2	3.0	229.0	14.6	122.2	1374	1942	2488	2142	2923	2987	2392	--	--	--	--	1549	64	531	595
	Samba		30- 20 -10 /																				
	24		ZnSO4(10)																				
			24- 14-0 (0)																				
Jammu & Kashmir	Subtropical low altitude	Not Avail-able	WH1105	7.2	3.0	229.0	14.6	122.2	2851	3908	5123	4521	5942	6098	4441	--	--	--	--	3091.3	155.4		1656.7
	Samba		100- 50 -25 /																				
	24		ZnSO4(0)																				
			56- 26-0 (0)																				
Haryana		Not Avail-able	PB-1121						1994	4205	4497	4280	4715	5132	4725	--	--	--	--	2721	416	-10	407
	Fatehabad		150- 60 -60 /																				
	24		ZnSO4(5)																				
			150-60-0 (0)																				

Haryana		Not Available	WH-2967						1321	3698	4880	4630	5215	5672	5254	--	--	--	--	3894.2	456.3	-38.8	417.5
	Fatehabad		150- 60 -30/																				
	24		ZnSO4(0)																				
			150-0-0 (0)																				
Madhy Pradesh	Central High-land, Hot Sub humid	Not Available	JRH-19						2233	3850	4458	3952	5416	5690	4158	--	--	--	--	3183	275	1257	1532
	Umaria		120- 60 -40 /																				
	24		ZnSO4(25)																				
			80-30-0																				
Madhy Pradesh	Central High-land, Hot Sub humid	Not Available	JW3211						2049	3515	4247	3895	4794	5011	3914	--	--	--	--	2745.2	216.3	880.3	1096.6
	Umaria		120- 60 -40/																				
	24		ZnSO4(25)																				
			80-30-0																				
Madhy Pradesh	Central High-land, Hot Sub humid	Not Available	MTU1010						2058	2277	2887	2714	3821	4045	2747	--	--	--	--	1763	224	1074	1298
	Annupur		120- 60 -40 /																				
	24		ZnSO4(25)																				
			50-25-0																				
Madhy Pradesh	Central High-land, Hot Sub humid	Not Available	JW3211						2024	2591	3246	3031	3855	4221	3051	--	--	--	--	1830.8	365.9	803.5	1169.3
	Annupur		120- 60 -40/																				
	24		ZnSO4(25)																				
			60-25-0																				
Bihar	South Bihar Alluvial Plain Zone	Not Available	Super Moti						2200	3330	4014	3555	5008	5282	4189	--	--	--	--	2808	274	819	1093
	Nalnda		80-30-15																				
	24																						

	South Bihar Alluvial Plain Zone	Not Avail-able	100-50-20						1779	2789	3524	3427	4388	4531	3583	--	--	--	--	2609.2	142.4	805.2	947.7
	Nalnda																						
	24																						
Rice- Gram																							
Chhattisgarh	Chhattisgarh plain zone	Not Avail-able	IGKVR-1	7.3	0.6	251.9	12.5	306.5	2649	3566	4165	3960	4880	5040	4209	-	-	-	-	2231	160	671	831
	Kanker		100- 60-40/																				
	24		ZnSO4(20)																				
			60- 40-30																				
Chhattisgarh	Chhattisgarh plain zone	Not Avail-able	JAKI-9218	7.3	0.6	251.9	12.5	306.5	695	861	1073	971	1241	1315	1088	-	-	-	-	546.1	73.5	153.5	227.0
	Kanker		20- 50-20/																				
	24																						
Odisha	Odisha	Not Avail-able	Sahbhagi Dhan						2060	3120	3663	3572	4392	4617	3945	-	-	-	-	2332	225	446	672
	keonjhar		60-30-30/																				
	12		ZnSO4(25)																				
Odisha	Odisha	Not Avail-able	NBeG 3						531	751	855	820	1200	1292	899	-	-	-	-	668.3	92.1	300.4	392.5
	keonjhar		20- 40-20/																				
	12																						
Rice-Maize																							
Andhra Pradesh	North Coastal Zone - Anakapalle/	Red Sandy	MTU1001/	6.8	2.1	214	17	271	3111	3874	4319	4781	4843	5263	4635					1732	420	208	628
	Vizianagaram		80- 60-50/																				
	24		ZnSO4(25)																				
			70-44-37																				

Andhra Pradesh	North Coastal Zone - Anakapalle/ Vizianagaram 24	Red Sandy	NK 6607/ 200 - 80-80/ control 172-71-54	--	--	--	--	-	2728	4012	4748	5422	6424	7114	5949					3695.8	690.0	475.4	1165.4
Rice-Okra																							
Maharashtra	North Konkan Coastal Zone Thane 24	Not Available	Karjat-3 100- 50-50 ZnSO4(25) 80-25-0	0	0	0	0	0	2776	3190	3546	3394	4206	4466	3346	33	23	45	3.47	1430	261	860	1121
Maharashtra	North Konkan Coastal Zone Thane 24	Not Available	Phule Vimukti 100- 50-50 ZnSO4(25) 50-25-0	--	--	--	--	-	7573	8912	10152	9852	11921	12560	10508	5	4	8	3.65	4348	639	1413	2052
Rice-Mustard																							
West Bengal	New Alluvial Zone Nadia 24	Not Available	Ajit-IET-22083 80-40-40-25						4771	5469	6125	6829	6923	7442	7692	-	-	-	-	2152	519	-769	-250
West Bengal	New Alluvial Zone 24	Not Available	Pusa bold 80-40-40-30						3446	3692	4071	4300	4706	5208	5229	-	-	-	-	1260	502	-523	-21

Assam	Lower Brahmaputra Valley Zone	Not Available	Ranjit						3744	4348	4923	5275	5786	6331	4015	-	-	-	-	2042	545	1771	2316
	Golpara		40-20-20-5																				
	24																						
Assam	Lower Brahmaputra Valley Zone	Not Available	TS-67						691	720	868	859	941	1020	736	-	-	-	-	250	79	206	284
	Golpara		40-35-15-10																				
	24																						
Maize-wheat																							
Rajasthan	Humid Southern Plain /	Clay	DHM-117/	6.8	0.6	303	19	214	358	796	1058	954	1340	1429	677	0	0	0	0	981	90	663	752
	Dungarpur/		90- 35 -30 /																				
	24		ZnSO4(25)																				
			70- 20 -0																				
Rajasthan	Humid Southern Plain /	Clay	Raj-4079/	6.8	0.6	303	19	214	1402	2440	3179	2844	3485	3690	2471	0	0	0	0	2083	204	1015	1219
	Dungarpur/		120- 40-30 /																				
	24		control																				
			70- 15-0																				
Himachal Pradesh	Sub-mountain and low hills sub-tropical zone /	Sub montaneous	Hybrid;Kanchan/	0	0	0	0	0	1578	1995	2343	2276	2772	3086	2053	0	0	0	0	1194	314	719	1034
	Bilaspur (H.P.)/		90- 45 -30 /																				
	24		ZnSO4(25 Kg)																				
			76.7-0-0																				

Himachal Pradesh	Sub-mountain and low hills sub-tropical zone / Bilaspur (H.P.)/ 24	Sub-montaneous	HPW-368/ 80- 40-40/ ZnSO4(25 Kg) 72.6-5-2.5	--	--	--	--	-	1517	2074	2442	2295	2889	3156	1991	0	0	0	0	1372	267	898	1165
Maize-Maize																							
Tamil Nadu	NWZ 12		NK6240 250-75-75 ZnSO4(37.5 210-50-60	6.9	0.8	198	20	244	2879	3486	4265	4932	5122	5614	4869	0	0	0	0	2243	493	253	745
Tamil Nadu	NWZ 12		NK6240 250-75-75 ZnSO4(37.5 165-40-55	--	--	--	--	-	2822	3637	4559	4773	5155	5635	4686	0	0	0	0	2333	480	469	949
Maize-Toria																							
Odisha	Odisha	Not Available	OMH 14-27						1944	3164	4018	3800	5051	5328	3678	-	-	-	-	3107	277	1373	1650
	keonjhar 12		120-60-60 ZnSO4(25) 59-46-23																				
Odisha	Odisha	Not Available	Anuradha						456	688	794	784	986	1032	652	-	-	-	-	531	46	334	380
	keonjhar 12		30-15-15/ ZnSO4(40) 12-9.7-4																				
Maize-wheat																							
Gujarat	North West Agro climatic Zone/ Adiya/ 24	Alluvial	GAWMH 2 100- 50-50/ ZnSO4(20) 77-39-0	7.7	0.3	118	25	303	1238	1387	1538	1679	1904	2121	1572	0	0	0	0	667	216	333	549

Gujarat	North West Agro climatic Zone/	Alluvial	JG 14	--	--	--	--	-	808	891	974	963	1059	1164	941	90	64	125	10.59	251	105	118	223
	Adiya/		20-40-20 /																			
	24		Znso4(20)																			
			23.5-16-0																			
Pearlmillet-wheat																						
Maharashtra	Scarcity Zone CSRS Pade-gaon		Adishakti	0	0	0	0	0	1396	1770	2121	2385	2701	2946	2157	0	0	0	0	1305	246	544	789
	Satara		50-25-25																			
	24		ZnSO4(25)																			
			40-30-30																			
Maharashtra	Scarcity Zone CSRS Pade-gaon		NIAW-1994	--	--	--	--	-	1909	2745	2962	3122	3579	3825	2766	0	0	0	0	1670	245	813	1058
	Satara		70-40-30																			
	24																					
Pearlmillet-mustard																						
Rajasthan	Semi Arid Eastern Plain Zone	Alluvial	Rasi-1827	7.4	0.5	222.4	22.4	226.6	987	997	1120	1120	1134	1332	946	0	0	0	0	148	198	189	386
	Dausa, Rajas-than/		90-30-30/																			
	24		ZnSO4(25)																			
			54-17																			
Rajasthan	Semi Arid Eastern Plain Zone	Alluvial	DRMRIJ-31 (Giriraj)	7.4	0.5	222.4	22.4	226.6	1345	1341	1401	1502	1636	1762	1240	0	0	0	0	291	126	395	522
	Dausa, Rajas-than/		60-40-30/																			
	24		ZnSO4(30)																			
			61-15-0																			

Soybean-Wheat																																
	Maharashtra	Scarcity Zone CSRS Pade-gaon																														
		Hingoli	150-75-75	6.9	0.8	198	20	244	987	1183	1377	1247	1641	1806	1528	0	0	0	0	653	166	112	278									
		24	ZnSO4(10)																													
			66-52-52-0																													
	Maharashtra	Scarcity Zone CSRS Pade-gaon																														
		Hingoli	GPU 28	--	--	--	--	-	1010	1170	1367	1249	1573	1669	1520	0	0	0	0	563	96	53	149									
		24	60-30-30																													
			ZnSO4(12.5)																													
			23.2-48-0																													

7.3.2 Diversification of existing farming systems

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

Objectives

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

Year of start: 2013-14 (Implemented in new districts from 2017-18)

The experiment in farming systems perspective entitled “Diversification of existing farming systems under marginal households” was initiated with the background that 63 % households in India are in marginal category with average land holding size of 0.38 ha. Due to their size of holding, marginal farm households do not have sufficient marketable surplus for getting the decent livelihood and are most vulnerable to climate related risks. The assumptions made are marginal households are having family members of 5 with crop + livestock as the dominant farming systems and if these system is diversified, sufficient marketable surplus can be generated for sustainable livelihood.

Modules: The experiment was designed with innovative approach in which changes are made compulsorily in all components of farming systems by way of introducing new crops, livestock species and product or processing techniques in marginal households aiming to increase the marketable surplus and income of the family from a less land resource. The major strength of marginal household is having sufficient manpower (due to family size) for farm operations. After benchmarking, modules comprising of cropping system diversification (most efficient cropping systems was synthesized keeping in view of the farmers resources, perception, willingness, market and requirement other components in the system), livestock diversification [(Mineral mixture + deworming+ round the year fodder supply for existing components) + introduction of location specific low cost livestock components viz., BYP, duckery, piggery, goat etc)], product diversification (Preparation of mineral mixture/value addition of market surplus products/Kitchen /roof gardening) and capacity building (Training of farm households on farming systems including post- harvest and value addition and assessing its impact) were implemented in randomly selected 24 marginal farm households in each district. The general guidelines used for designing the modules are given below:

Farming System	Notation	Module name	Details
Existing	M0	Bench mark	Recording of bench mark data on crop, livestock, other components and household as a whole
Improved	M1	Cropping system diversification	Most efficient cropping systems was introduced keeping in view of the farmers resources, perception, willingness, market and requirement of other components in the system besides improving the practices of existing systems
	M2	Livestock diversification	Mineral mixture + deworming+ round the 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

Households: Twenty four marginal households were selected for experiment in all the locations. The average holding size of marginal households in the study locations ranged from 0.34 to 1.87 ha in various farming systems. During 2020-21, study involved 736 households with mean holding size of 0.93 ha. At very few locations and farming systems, the size of holding of farming system was higher than 1 ha due to non-availability of marginal households for diversification.

Locations: During 2020-21, 31 districts in 14 agro climatic implemented the modules in various farming systems. The details of locations, farming systems, size of holding, number of households in each farming system and module wise interventions made are given in Table 7.2.1.

Data analysis methodology: Based on the benchmark data, farming systems practiced by the households were identified and grouped in to different farming system categories such as field crops+ dairy, field crops + dairy+ goat etc as given in Table 7.2.1. Five parameters namely production (on equivalent basis of base pre-dominant crop), marketable surplus (calculated by deducting the family consumption for food, feed, seed etc from the total production), cost (total cost of the system including all components and diversification), returns (calculated by deducting the total cost from gross returns of the system) and profit (calculated by deducting the cost of the system from the gross income obtained from marketable surplus) were used for comparison of existing with improved (diversified)

system and also different farming systems. Farming system with more than one household was subjected to ANOVA and paired t-test analysis. Paired t-test has been carried out for comparing existing and diversified systems with respect to production, marketable surplus, cost, return and profit. Similarly, one-way ANOVA has been carried out to identify the best farming system with respect to production, marketable surplus, cost, return and profit for the district. Standard error of mean values is also presented in parenthesis in Table 7.2.2.

Results

The components of existing and diversified farming systems in marginal farm households are given in Table 7.2.1, while the production, marketable surplus and economics of different farming systems are given in 7.2.2. Location wise and summary of results is explained briefly below.

Western Himalayan

Udham Singh Nagar (Uttarkhand): Two farming systems viz; field crops + dairy, field crops were found, and both the farming systems were found dominant. Diversification of existing systems resulted in significantly higher return in both the system.

Bilaspur (Himachal Pradesh): In Bilaspur farmers having only one farming system that is crop+dairy. Here major issue of quality fodder production for that effort is put for round the year fodder production overall due to diversification and improved practices improve in the net return Rs 24777 recorded with average holding size 0.55 ha.

Eastern Himalaya

Goalpara (Assam): Five farming systems viz; field crops + poultry + fishery + piggery, field crop + goat + poultry, field crop + poultry + piggery, field crop + dairy + poultry + piggery and field crop + dairy + poultry were found among which field, crops + dairy + poultry + piggery was found dominant based on number of households (29 %) adopting the system. Diversification of cropping and livestock components resulted in significant improvement in profit from field crop + poultry + piggery and field crop + dairy + poultry + piggery farming systems. Among the systems, higher profit was obtained from field crops + poultry + piggery (Rs 1,74,302 from 0.77 ha). Dominant system field crop + dairy + poultry + piggery also recorded a profit of Rs 139145 from 0.79 ha trough module wise intervention.

Upper Gangetic Plain

Fathepur (Uttar Pradesh): Two farming systems viz; field crops + dairy, field crops + dairy + horticulture were found, and both the farming systems were found dominant. Diversification of existing systems resulted in significantly higher return in both the system but not profit because of increase in cost of cultivation or home consumption.

Baghpat (Uttar Pradesh): In the western Uttar Pradesh farmers having only one farming system that is crop+dairy here farmers grow sugarcane as main crop and in case dairy they maintain buffalo for the milk production. Here major issue of quality fodder production for that effort is put for round the year fodder production overall due to diversification and improved practices improve in the net return Rs 57800 recorded with average holding size 1.25 ha.

Middle Gangetic Plain

Nalanda (Bihar): Two farming systems viz; field crops + dairy, field crops + horticulture were found, among which field crop+dairy found dominating with 84% households practices it. Diversification of existing systems resulted in significantly higher return in both the system within the system field crop+horticulture perform slightly better than field crop+dairy.

Lower Gangetic Plain

Nadia (West Bengal): Four farming systems namely field crops + dairy + fishery, field crop +dairy, field crop + poultry +fishery and field crop + dairy + horticulture were found among which field crop + dairy + horticulture system was practiced pre-dominantly by 42% of households having mean area of 0.51 ha. In all the farming systems, significant improvement in production, marketable surplus and return was observed due to diversification. Highest profit over the existing resulted by diversification in field crop + dairy + horticulture (Rs 54,610 from 0.51 ha).

Central plateau and hills

Dungarpur (Rajasthan): Three farming systems namely field crop + dairy, field crop + dairy+ horticulture and field crop + dairy + poultry were found among which 50% households were having field crop + dairy + poultry with mean area 0.8 ha.

Dausa (Rajasthan): Three farming systems namely field crop + dairy, field crop + dairy+ horticulture and field crop + dairy + goat were found all three systems is found equally dominant.

Eastern plateau and hills

East Singhbhum (Jharkhand): In East Singhbhum farmers having only one farming system that is crop+sheep/goat+dairy. Significant improvement in production, marketable surplus return and profit was observed due to diversification. Improvement in net return over existing system is (Rs 20,439 from 0.76 ha).

Kalahandi (Odisha): Three farming systems namely field crop + dairy+goat, field crop + dairy and field crop + dairy+goat + poultry were found among which 62% households were

having field crop + dairy+goat with mean area 1.09 ha. Diversification resulted in higher return and profit in all the farming systems. Among the systems, higher profit was observed in of field crops + dairy system after diversification (Rs 35,050 from 1.75 ha).

Keonjhar (Odisha): Two farming systems namely field crop + horticulture + poultry +goat and field crop + horticulture + poultry were found among which first one with 80% households is dominating with 0.75 ha mean holding size. Diversification resulted in higher production, marketable surplus, return and profit in both farming systems. Among the systems, higher profit was observed in field crops + horticulture + poultry system after diversification (Rs 71,655 from 0.79 ha).

Annupur (Madhy Pradesh): Two farming systems namely field crop + goat + poultry and field crops + dairy was found with mean area of 0.92 and 0.86 ha respectively and field crop + dairy with 80% household were found dominant. Diversification made in field crop + goat+dairy resulted in significant improvement in profit (Rs 49,410 from 0.92 ha).

Central plateau and hill region

Umaria (Madhya Pradesh): Field crops + dairy farming systems were practiced by all the study households with mean area of 1.22 ha. Diversification resulted in higher production, marketable surplus, return and profit. Trough diversification increase in profit in Field crop+ dairy (Rs 75,702 from 1.22 ha) was recorded at the centre.

Western Plateau and hills

Hingoli (Maharashtra): Four farming systems namely field crops + sericulture, field crops + horticulture, field crops + goat and field crops + dairy were found among which 37.5 % households were having field crops + goat with mean area of 0.86 ha. Significantly higher production, marketable surplus and profit were recorded in field crops + horticulture field crop + dairy and field crops + goatry farming systems after diversification. Field crop + sericulture and field crop +dairy not performed well after diversification and reduction in returns observed. Among the systems, higher profit over the benchmark was observed in of field crops + goat system after diversification (Rs 45,117 from 0.86 ha).

Satara (Maharashtra): Four farming systems namely field crop + dairy + goat, field crop + dairy + goat + poultry, field crop + dairy + poultry and field crop + dairy was found among which field crop + dairy + horticulture and field crop + bullock was practiced by 29 % households each. Among the systems, higher profit over the benchmark was observed in of field crops + dairy system after diversification (Rs 1,03,877 from 0.55 ha).

Nagpur (Maharashtra): Four farming systems namely field crop + dairy +horticulture, field crop + horticulture + poultry, field crop + poultry and field crop + dairy was found

among which field crop + dairy + horticulture dominating by 42 % households. Due to high cost of cultivation farming system not performed well but field crop+poultry found most remunerative among the system.

Southern Plateau and hills

Salem (Tamil Nadu): Three farming systems namely field crops + dairy + goat + poultry, field crops + dairy + goat and field crop + dairy + poultry were found among which 50% households were having field crops + dairy + goat + poultry system with mean area of 0.86 ha. Among the farming systems, field crop + dairy +goat+ poultry recorded higher profit of Rs 2,74,017 from 0.86 ha after diversification.

Erode (Tamil Nadu): Two farming systems namely field crop + dairy + poultry and field crops + dairy + poultry + goat was found with mean area of 0.91 and 0.89 ha respectively and both the systems were found dominant. Diversification made in field crop + dairy + poultry + goat resulted in significant improvement in profit over the existing (Rs 2,13,443 from 0.90 ha) due to diversification.

Chikkaballapura (Karnatka): Five farming system namely field crops + dairy, field crop + dairy + poultry, field crop + dairy + horticulture, field crop + dairy + sheep and field crop + dairy + horticulture, sheep and poultry practiced all the farming system almost equally practiced. Diversification made in field crop + dairy + poultry resulted in significant improvement in profit over the existing (Rs 1,64,893 from 0.83 ha) due to diversification.

Dharwad (Karnatka): Two farming systems namely field crop + dairy and field crops + dairy + horticulture was found with mean area of 1.01 and 1.03 ha respectively and both the systems were found dominant. Increase in COC was recorded in both the system but thorough improved practices and diversification improvement in net return and profit was observed.

Medak (Telangana): Five farming system namely field crops + dairy, field crop + dairy + poultry, field crop + dairy + horticulture, field crop + dairy + sheep +horticulture and field crop + dairy + sheep all the farming system almost equally practiced. Diversification made in field crop + dairy + sheep +horticulture resulted in significant improvement in profit over the existing (Rs 1,22,051 from 2.0 ha) due to diversification.

West coast plains and ghats

Thiruvananthapuram (Kerala): Three farming systems namely field crops + dairy + horticulture, horticulture + poultry and horticulture + dairy was found among which 50% households were having horticulture + poultry. Diversification resulted in significant improvement in production, marketable surplus, return and profit of field crop + dairy +

horticulture and horticulture + dairy systems. Among the systems, horticulture + dairy farming system recorded higher profit of Rs 4,50,349 from 0.35 ha followed by Field crop + horticulture + dairy Rs 350586 from 0.49 ha.

Thane (Maharashtra): Two farming systems namely field crop + dairy and field crops + poultry was found with mean area of 0.21 and 0.23 ha respectively and both the systems were found equal dominant. Among the system field crop+poultry performa better and recorded improvement in profit up to Rs 24860 from 0.23 ha.

Gujarat plains and hills

Patan (Gujarat): Field crops + dairy farming systems were practiced by all the study households with mean area of 0.90 ha. Improvement in production, marketable surplus, return and profit was observed due to diversification. Profit over existing system Rs 94948 is observed in the system. Over the year cost of cultivation also get reduced.

The results across the locations are summarized below

- The number of farming systems in different districts varied from 1 to 5. Presence of maximum of 5 farming systems was observed in Goalpara (Assam), Medak (Telgana) and Chikkaballapura (Karnatka) followed by 4 systems in Kanker (Chhattisgarh), Hingoli, Satara and Nagpur (Maharashtra). Existence of single farming systems was observed in Bhagpat (Uttar Pradesh), Bilashpur (Himachal Pradesh), Patiala (Punjab), Fatehabad (Haryana), Jammu (J&K) Umaria (Madhya Pradesh) and Patan (Gujarat). It clearly indicates that paletu and hills area more diversified than plain area and having more number of farming component.
- Field crops + dairy was found to be the common farming system at all locations in marginal households and it is the dominant system practiced in 22 districts based on number of households practicing the system.
- Based on the statistical analysis, best performing farming system has been identified for each district which can be scaled along with all possible interventions and diversification approach for improving the livelihood of marginal farm households.

Table 7.3.2: Production (on equivalent basis of base crop), marketable surplus and economics of existing and improved farming systems in marginal households (For 2020-21)

Farming System	Area (ha)	No. of House-holds	Existing System					Improved (Diversified System)					P value Significance - Existing vs Improved				
			Production (kg)	Market-able Surplus (kg)	Cost (Rs)	Return (Rs)	Profit (Rs)	Production (kg)	Marketable Surplus (kg)	Cost (Rs)	Return (Rs)	Profit (Rs)	Production (kg)	Marketable Surplus (kg)	Cost (Rs)	Return (Rs)	Profit (Rs)
Udham Singh Nagar																	
FC	0.40	14	12135 (1313)	11162 (1256)	-	-	-	11036 (1270)	9290 (1137)	102909 (14496)	84711 (7284)	55015 (5227)	0.685	0.305	0.006***	0.002***	0.002***
FC+D	0.40	10	4632 (1427)	3817 (1366)	-	-	-	5288 (1380)	4182 (1236)	42380 (15759)	47517 (7919)	28706 (5683)	0.042**	0.054*	0.966	0.002***	<0.005***
Overall FS			P value Significance - Existing vs Improved										0.647	0.186	0.002***	0.002***	0.002***
CD [P = 0.05] FS1 vs FS2			4064	3890	-	-	-	3931	3521	44880	22551	16183					
Bilaspur																	
FC +D	0.55	24	5730 (1051)	4550 (858)	54400 (5701)	43005 (14277)	22947 (11643)	5220 (569)	2177 (322)	20958 (4832)	67782 (7378)	16060 (3639)	-	-	-	-	-
Overall FS			P value Significance - Existing vs Improved										0.648	0.013**	<0.0001***	0.141	0.603
Goalpara																	
FC+F+Pi+Po	0.895	4	1503 (296)	1462 (296)	22624 (4359)	2926 (3053)	2226 (3322)	6116 (851)	6746 (1030)	16513 (1408)	88651 (14369)	99376 (17317)	0.125	0.125	0.125	0.125	0.125
FC+G+Po	0.73	4	1379 (296)	1296 (296)	28109 (4359)	-4669 (3053)	-6069 (3322)	4119 (851)	4435 (1030)	18250 (1408)	51769 (14369)	57144 (17317)	0.125	0.125	0.250	0.125	0.125
FC+Pi+Po	0.77	4	1218 (296)	1218 (296)	12063 (4359)	8638 (3053)	8638 (3322)	10515 (851)	11566 (1030)	13688 (1408)	165065 (14369)	182940 (17317)	0.125	0.125	0.125	0.125	0.125
FC+D+Pi+Po	0.79	7	1758 (224)	1704 (224)	27171 (3295)	2709 (2308)	1795 (2511)	8394 (643)	9333 (778)	17714 (1064)	124990 (10862)	140940 (13090)	0.016**	0.016**	0.016**	0.016**	0.016**
FC+D+Po	0.81	5	1720 (265)	1668 (265)	32050 (3899)	-2818 (2731)	-3698 (2971)	2257 (761)	2177 (921)	13900 (1259)	24464 (12852)	23104 (15488)	0.313	0.313	0.063*	0.063*	0.063*
Overall FS			P value Significance - Existing vs Improved										<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
CD [P = 0.05] FS1 vs FS2			876	876	12902	9037	9832	2518	3047	4167	42531	51257					
CD [P = 0.05] FS1 vs FS3			876	876	12902	9037	9832	2518	3047	4167	42531	51257					

CD [P = 0.05] FS1 vs FS4			777	776	11436	8011	8715	2232	2701	3693	37699	45434					
CD [P = 0.05] FS1 vs FS5			831	831	12240	8574	9327	2389	2891	3953	40348	48627					
CD [P = 0.05] FS2 vs FS3			876	876	12902	9037	9832	2518	3047	4167	42531	51257					
CD [P = 0.05] FS2 vs FS4			777	776	11436	8011	8715	2232	2701	3693	37699	45434					
CD [P = 0.05] FS2 vs FS5			831	831	12240	8574	9327	2389	2891	3953	40348	48627					
CD [P = 0.05] FS3 vs FS4			777	776	11436	8011	8715	2232	2701	3693	37699	45434					
CD [P = 0.05] FS3 vs FS5			831	831	12240	8574	9327	2389	2891	3953	40348	48627					
CD [P = 0.05] FS4 vs FS5			726	725	10684	7484	8142	2085	2523	3450	35219	42445					
Fatehpur																	
FC +D	0.67	24	23336 (1873)	20276 (1767)	109793 (5807)	286914 (29917)	234901 (28241)	30887 (1091)	28173 (1068)	214159 (7295)	310912 (11571)	264775 (11899)	-	-	-	-	-
Overall FS			P value Significance - Existing vs Improved										<0.001***	<0.001***	<0.001***	0.382	0.273
Baghpat																	
FC +D	1.25	24	6414 (852)	-25176 (1683)	42394 (1134)	66651 (14315)	-470387 (28762)	11526 (202)	7996 (219)	71494 (190)	124451 (3402)	64440 (3694)	-	-	-	-	-
Overall FS			P value Significance - Existing vs Improved										<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
Nalanda																	
FC+H	0.86	4	7589 (2493)	6845 (2925)	75164 (26121)	53845 (32274)	41206 (31976)	3014 (1758)	2666 (1781)	29721 (16199)	21520 (17835)	15601 (19043)	0.250	0.250	0.250	0.250	0.250
FC+D	0.94	20	13071 (1316)	12140 (1308)	121579 (11682)	100620 (14433)	84800 (14300)	8669 (786)	8284 (797)	68056 (7244)	79323 (7976)	72769 (8516)	<0.001***	<0.001***	<0.001***	0.076*	0.261
Overall FS			P value Significance - Existing vs Improved										<0.001***	<0.001***	<0.001***	0.030**	0.156
CD [P = 0.05] FS1 vs FS2			6686	6644	59343	73320	72644	3995	4047	36801	40517	43261					
Nadia																	
FC+D+F	0.63	4	4200 (1438)	2900 (1413)	53120 (14872)	18277 (11860)	-3816 (11714)	10132 (2904)	6656 (2399)	82680 (20314)	89571 (30209)	30478 (22236)	0.125	0.125	0.125	0.125	0.375
FC+D	0.63	8	6037 (1017)	4438 (999)	76308 (10516)	26324 (8386)	-854 (8283)	8490 (2053)	5814 (1696)	76578 (14364)	67749 (21361)	22261 (15723)	0.109	0.078*	0.742	0.016**	0.039**

FC+Po+F	0.53	2	3869 (2033)	2251 (1999)	50495 (21032)	15271 (16772)	-12229 (16566)	7600 (4107)	3317 (3393)	65487 (28729)	63721 (42723)	-9097 (31446)	0.500	0.500	0.500	0.500	0.500
FC+D+H	0.51	10	9880 (909)	8253 (894)	105802 (9406)	62153 (7501)	34500 (7409)	15217 (1837)	12659 (1517)	126089 (12848)	132603 (19106)	89110 (14063)	0.037**	0.049**	0.322	0.020**	0.014**
Overall FS			P value Significance - Existing vs Improved										<0.001***	0.002***	0.046**	<0.001***	<0.001***
CD [P = 0.05] FS1 vs FS2			3673	3611	37995	30299	29927	7419	6129	51899	77178	56807					
CD [P = 0.05] FS1 vs FS3			5195	5106	53733	42849	42323	10492	8668	73396	109146	80337					
CD [P = 0.05] FS1 vs FS4			3549	3488	36706	29272	28912	7167	5921	50139	74561	54881					
CD [P = 0.05] FS2 vs FS3			4742	4661	49051	39116	38635	9578	7913	67001	99637	73338					
CD [P = 0.05] FS2 vs FS4			2845	2797	29431	23470	23181	5747	4748	40201	59782	44003					
CD [P = 0.05] FS3 vs FS4			4647	4567	48060	38326	37855	9384	7753	65647	97624	71856					
Dungarpur																	
FC+H+D	0.82	8	12032 (1355)	10418 (1392)	87215 (6096)	117324 (18787)	89886 (19482)	12096 (1372)	7666 (1017)	127117 (11585)	78517 (24320)	3209 (18247)	0.844	0.109	0.039**	0.383	0.039**
FC+D	0.88	4	16432 (1916)	15198 (1969)	112915 (8620)	166423 (26568)	145459 (27552)	13857 (1940)	9539 (1438)	114691 (16384)	120885 (34394)	47465 (25805)	0.625	0.125	0.875	0.625	0.125
FC+D+Po	0.80	12	12843 (1106)	11630 (1137)	76678 (4977)	141650 (15339)	121040 (15907)	11423 (1120)	8091 (830)	88418 (9459)	105774 (19857)	49124 (14899)	0.151	<0.001***	0.043**	0.016**	<0.001***
Overall FS			P value Significance - Existing vs Improved										0.157	<0.001***	0.005***	0.011**	<0.001***
CD [P = 0.05] FS1 vs FS2			4880	5015	21956	67669	70174	4940	3663	41730	87601	65726					
CD [P = 0.05] FS1 vs FS3			3638	3738	16365	50438	52304	3682	2730	31104	65294	48989					
CD [P = 0.05] FS2 vs FS3			4601	4728	20700	63799	66160	4658	3453	39343	82591	61967					
Dausa																	
C+D	2.46	8	41289 (5454)	39395 (5456)	140799 (6421)	561121 (90442)	528910 (90518)	28935 (3215)	26166 (3302)	31810 (5195)	460077 (56509)	413005 (58091)	0.008***	0.008***	0.008***	0.547	0.313
C+H+D	4.16	8	24999 (5454)	22970 (5456)	133409 (6421)	291577 (90442)	257073 (90518)	17143 (3215)	14188 (3302)	33635 (5195)	257804 (56509)	207557 (58091)	0.008***	0.008***	0.008***	0.024**	0.008***
C+D+G	3.10	8	22028 (5454)	19973 (5456)	127063 (6421)	247419 (90442)	212479 (90518)	14909 (3215)	11911 (3302)	39167 (5195)	214284 (56509)	163320 (58091)	0.008***	0.008***	0.008***	0.039**	0.024**
Overall FS			P value Significance - Existing vs Improved										<0.001***	<0.001***	<0.001***	0.051*	0.015**

CD [P = 0.05] FS1 vs FS2			16040	16047	18883	265991	266216	9454	9711	15279	166194	170846					
CD [P = 0.05] FS1 vs FS3			16040	16047	18883	265991	266216	9454	9711	15279	166194	170846					
CD [P = 0.05] FS2 vs FS3			16040	16047	18883	265991	266216	9454	9711	15279	166194	170846					
East Singhbhumi																	
FC +G/Sh+P	0.76	24	2894 (157)	1677 (154)	28819 (1197)	20374 (1779)	-313 (7769)	8414 (68)	4225 (152)	51700 (0)	91344 (1158)	20126 (2576)	-	-	-	-	-
Overall FS			P value Significance - Existing vs Improved										<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
Kalahandi																	
FC+D+G	1.09	15	5078 (606)	3933 (573)	60634 (3280)	25687 (8718)	6222 (8228)	4702 (484)	3603 (458)	36473 (1349)	43468 (7817)	24785 (7350)	0.168	0.244	<0.001***	0.002***	0.001***
FC+D	1.75	4	5954 (892)	4784 (843)	69750 (4827)	31454 (12832)	11571 (12112)	5651 (712)	4488 (674)	41250 (1985)	54809 (11506)	35050 (10819)	0.688	0.688	0.031**	0.031**	0.031**
FC+D+G+Po	1.14	5	5938 (977)	4921 (923)	70900 (5288)	30050 (14058)	12765 (13268)	4893 (780)	3979 (738)	40050 (2175)	43136 (12605)	27587 (11851)	0.813	0.813	0.063*	0.438	0.313
Overall FS			P value Significance - Existing vs Improved										0.056*	0.082*	<0.001***	<0.001***	<0.001***
CD [P = 0.05] FS1 vs FS2			2556	2416	13838	36786	34720	2041	1932	5691	32984	31013					
CD [P = 0.05] FS1 vs FS3			2345	2217	12699	33757	31861	1873	1773	5222	30268	28459					
CD [P = 0.05] FS2 vs FS3			3046	2880	16496	43852	41389	2433	2303	6784	39319	36969					
Keonjhar																	
FC +H+P+G	0.75	19	4737 (586)	3862 (597)	37833 (4334)	42700 (6166)	27822 (6463)	9430 (567)	6931 (515)	56077 (3466)	104236 (7047)	61742 (6224)	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
FC +H+P	0.79	5	3412 (1142)	2143 (1164)	27888 (8448)	30121 (12020)	8548 (12598)	8899 (1106)	7009 (1005)	47496 (6757)	103786 (13738)	71655 (12133)	0.063*	0.063*	0.063*	0.063*	0.063*
Overall FS			P value Significance - Existing vs Improved										<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
CD [P = 0.05] FS1 vs FS2			3341	3407	24716	35166	36859	3235	2940	19768	40193	35496					
Annupur																	
FC+D	0.86	19	4768 (375)	3190 (380)	43316 (1097)	37747 (5743)	10915 (5905)	7626 (609)	5052 (425)	37035 (2093)	92602 (9098)	48845 (5741)	<0.001***	<0.001***	0.012**	<0.001***	<0.001***
FC+G +Po	0.92	05	8708 (732)	7517 (741)	46578 (2139)	101463 (11194)	81203 (11511)	24741 (1186)	10572 (829)	49110 (4080)	371493 (17735)	130613 (11192)	0.063*	0.063*	0.630	0.063*	0.063*

Overall FS			P value Significance - Existing vs Improved									<0.001***	<0.001***	0.031**	<0.001***	<0.001***
CD [P = 0.05] FS1 vs FS2			1706	1727	4986	26092	26830	2765	1933	9509	41336	26087					
Umaria																	
FC+D	1.22	24	6160 (356)	4561 (348)	56167 (2735)	48550 (3510)	21370 (3417)	9670 (435)	7293 (409)	26910. (1160)	137482 (6309)	97072 (5853)	-	-	-	-	-
Overall FS			P value Significance - Existing vs Improved									<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
Hingoli																	
FC+Se	0.65	4	17151 (4804)	3050 (3301)	28418 (8214)	263143 (76991)	23440 (49929)	4887 (1108)	4607 (1095)	35904 (7005)	47174 (13269)	42413 (13115)	0.375	0.250	0.375	0.375	0.250
FC+H	0.82	4	3137 (4804)	2950 (3301)	31809 (8214)	21524 (76991)	18342 (49929)	6109 (1108)	5858 (1095)	43984 (7005)	59877 (13269)	55607 (13115)	0.125	0.125	0.125	0.125	0.250
FC+G	0.86	9	4813 (3203)	4369 (2200)	42617 (5476)	39202 (51327)	31655 (33286)	9494 (739)	7967 (730)	58673 (4670)	102730 (8846)	76772 (8744)	0.004***	0.004***	0.004***	0.004***	0.004***
FC+D	0.86	7	15452 (3632)	14179 (2495)	57996 (6209)	204684 (58200)	183052 (37743)	10213 (838)	8834 (828)	62368 (5295)	111260 (10031)	87815 (9914)	0.297	0.297	0.469	0.219	0.219
Overall FS			P value Significance - Existing vs Improved									0.538	0.686	0.001***	0.354	0.943
CD [P = 0.05] FS1 vs FS2			14173	9737	24232	227123	147291	3269	3232	20664	39145	38690					
CD [P = 0.05] FS1 vs FS3			12044	8275	20593	193017	125173	2778	2746	17561	33266	32880					
CD [P = 0.05] FS1 vs FS4			12563	8631	21479	201323	130560	2898	2865	18316	34698	34295					
CD [P = 0.05] FS2 vs FS3			12044	8275	20593	193017	125173	2778	2746	17561	33266	32880					
CD [P = 0.05] FS2 vs FS4			12563	8631	21479	201323	130560	2898	2865	18316	34698	34295					
Satara																	
FC+D+G	0.63	7	11662 (3034)	11307 (3113)	130169 (16562)	68080 (53659)	62057 (55518)	12351 (1142)	10551 (1084)	82971 (10486)	127002 (15376)	96397 (12574)	0.813	0.938	0.031**	0.297	0.469
FC+D+G+P	0.69	6	14051 (3278)	12983 (3363)	165138 (17890)	73732 (57958)	55575 (59966)	14064 (1233)	11694 (1171)	96257 (11326)	142829 (16608)	102535 (13581)	1.000	0.688	0.063	0.156	0. 313
FC+D+P	0.84	7	18747 (3034)	19197 (3113)	138320 (16562)	180381 (53659)	188032 (55518)	13036 (1142)	11271 (1084)	104563 (10486)	117044 (15376)	87047 (12574)	0.469	0.297	0.109	1.000	0.375
FC+D	0.55	4	6787 (4014)	6882 (4119)	121315 (21910)	-5934 (57984)	-4324 (73444)	12459 (1510)	10800 (1434)	84040 (13871)	127759 (20340)	99553 (16634)	0.125	0.125	0.625	0.125	0.125
Overall FS			P value Significance - Existing vs Improved									0.780	0.245	<0.001***	0.248	0.772
CD [P = 0.05] FS1 vs FS2			9317	9560	50854	164758	170466	3505	3329	32196	47210	38607					

CD [P = 0.05] FS1 vs FS3			8952	9185	48859	158294	163778	3368	3198	30933	45358	37093					
CD [P = 0.05] FS1 vs FS4			10497	10770	57293	185616	192047	3949	3750	36272	53187	43495					
CD [P = 0.05] FS2 vs FS3			9317	9560	50854	164758	170466	3505	3329	32196	47210	38607					
CD [P = 0.05] FS2 vs FS4			10810	11091	59003	191158	197781	4067	3862	37355	54775	44794					
CD [P = 0.05] FS3 vs FS4			10497	10770	57293	185616	192047	3949	3750	36272	53187	43495					
Erode																	
FC+D+P	0.92	12	19901 (4146)	18997 (4059)	93149 (13156)	245172 (63590)	229799 (62117)	29254 (3485)	27569 (3493)	137679 (12593)	359640 (50040)	331002 (50308)	0.151	0.129	0.092*	0.204	0.266
FC + D + P + G/Sh	0.90	12	21197 (4146)	20332 (4059)	124488 (13156)	235868 (63590)	221155 (62117)	35911 (3485)	33903 (3493)	141760 (12593)	468721 (50040)	434598 (50308)	0.034**	0.043**	0.204	0.021**	0.027**
Overall FS			P value Significance - Existing vs Improved										0.003***	0.005***	0.017**	0.005***	0.010**
CD [P = 0.05] FS1 vs FS2			12161	11904	38585	186504	182183	10221	10244	36934	146763	147549					
Chikkabellapura																	
FC+D+Sh	0.52	5	16574 (10017)	16009 (10038)	104534 (17808)	127508 (128820)	119590 (129139)	16192 (4789)	16170 (5369)	122791 (29863)	152473 (55094)	152092 (65882)	1.000	0.813	1.00	0.438	0.438
FC+D	0.65	4	11345 (11199)	11118 (11223)	98934 (19910)	59901 (144025)	56716 (144381)	16228 (5354)	14865 (6003)	144242 (33388)	131631 (61597)	108462 (73658)	0.375	0.625	0.375	0.250	0.375
FC+D+Po	0.83	3	9938 (12931)	9566 (12959)	131647 (22990)	7484 (16636)	2281 (166717)	21461 (6182)	20184 (6932)	175955 (38553)	188886 (71126)	167174 (85053)	0.250	0.250	0.250	0.250	0.250
FC + D + H +Sh + Po	0.76	6	21613 (9144)	21438 (9163)	145033 (16256)	157551 (117596)	155098 (117887)	18848 (4371)	20304 (4901)	115619 (27261)	204803 (50293)	229554 (60142)	0.844	0.688	0.438	0.438	0.438
FC+D+H	0.84	6	33868 (9144)	33203 (9163)	144782 (16256)	329370 (117596)	320064 (117887)	22639 (4371)	25460 (4901)	149057 (27261)	235810 (50293)	283772 (60142)	0.844	1.000	1.000	0.844	0.688
Overall FS			P value Significance - Existing vs Improved										0.781	0.963	0.449	0.640	0.486
CD [P = 0.05] FS1 vs FS2			31447	31515	55908	404436	405436	15034	16857	93756	172969	206839					
CD [P = 0.05] FS1 vs FS3			34236	34309	60865	440294	441382	16367	18352	102069	188305	225177					
CD [P = 0.05] FS1 vs FS4			28387	28448	50467	365073	365975	13571	15216	84631	156134	186707					
CD [P = 0.05] FS1 vs FS5			28387	28448	50467	365073	365975	13571	15216	84631	156134	186707					

CD [P = 0.05] FS2 vs FS3			35804	35881	63654	460471	461609	17117	19192	106746	196934	235496					
CD [P = 0.05] FS2 vs FS4			30260	30325	53798	389169	390131	14466	16221	90217	166439	199030					
CD [P = 0.05] FS2 vs FS5			30260	30325	53798	389169	390131	14466	16221	90217	166439	199030					
CD [P = 0.05] FS3 vs FS4			33148	33220	58932	426313	427367	15847	17769	98828	182325	218027					
CD [P = 0.05] FS3 vs FS5			33148	33220	58932	426313	427367	15847	17769	98828	182325	218027					
CD [P = 0.05] FS4 vs FS5			27066	27124	48118	348083	348943	12939	14508	80692	148868	178018					
Dharwad																	
FC+D+H	1.03	13	4405 (389)	4119 (396)	59141 (2690)	28955 (6778)	23237 (6960)	2991 (375)	1867 (302)	28767 (3558)	22088 (3501)	2969 (3142)	0.002***	<0.001***	<0.001***	0.455	0.022**
FC+D	1.01	11	4871 (423)	4669 (431)	56254 (2925)	41160 (7369)	37133 (7566)	1902 (407)	990 (328)	16176 (3868)	16150 (3806)	659 (3415)	0.002***	0.002***	0.001***	0.024**	0.003***
Overall FS			P value Significance - Existing vs Improved										<0.0001***	<0.0001***	<0.0001***	0.012**	<0.0001***
CD [P = 0.05] FS1 vs FS2			1193	1214	8241	20764	21319	1148	924	10899	10725	9624					
Medak																	
FC+D+Po	1.30	5	18910 (5608)	17800 (5497)	156436 (17572)	165037 (87360)	146165 (85326)	7281 (2467)	6319 (2164)	27230 (12957)	96546 (32899)	80197 (28278)	0.063*	0.063*	0.063*	0.063*	0.063*
FC+D+Sh	2.36	5	10754 (5608)	9640 (5497)	64269 (17572)	118551 (87360)	99612 (85326)	24701 (2467)	18613 (2164)	101864 (12957)	318045 (32899)	214557 (28278)	0.125	0.188	0.313	0.125	0.313
FC+D+Sh+H	2.00	4	8092 (6270)	7191 (6145)	79158 (19643)	43093 (95397)	58400 (94731)	19605 (2758)	14679 (2419)	69093 (14486)	264185 (36782)	180451 (31616)	0.125	0.250	0.625	0.125	0.125
FC+D	1.60	5	19788 (5608)	18218 (5497)	106393 (17572)	203305 (87360)	230008 (85326)	9748 (2467)	8931 (2164)	26008 (12957)	139713 (32899)	125811 (28278)	0.438	0.625	0.063*	0.813	0.625
FC+D+H	1.32	5	7029 (5608)	5927 (5497)	94930 (17572)	5829 (87360)	24560 (85326)	6761 (2467)	6237 (2164)	36144 (12957)	78794 (32899)	69878 (28278)	1.000	1.000	0.188	0.063*	0.063*
Overall FS			P value Significance - Existing vs Improved										0.938	0.689	0.004***	0.225	0.429
CD [P = 0.05] FS1 vs FS2			16599	16270	52014	258584	252562	7302	6405	38352	97379	83703					
CD [P = 0.05] FS1 vs FS3			17606	17257	55169	274270	267883	7745	6793	40679	103286	88781					
CD [P = 0.05] FS1 vs FS4			16599	16270	52014	258584	252562	7302	6405	38352	97379	83703					
CD [P = 0.05] FS1 vs FS5			16599	16270	52014	258584	252562	7302	6405	38352	97379	83703					
CD [P = 0.05] FS2 vs FS3			17606	17257	55169	274270	267883	7745	6793	40679	103286	88781					

CD [P = 0.05] FS2 vs FS4			16599	16270	52014	258584	252562	7302	6405	38352	97379	83703					
CD [P = 0.05] FS2 vs FS5			16599	16270	52014	258584	252562	7302	6405	38352	97379	83703					
CD [P = 0.05] FS3 vs FS4			17606	17257	55169	274270	267883	7745	6793	40679	103286	88781					
CD [P = 0.05] FS3 vs FS5			17606	17257	55169	274270	267883	7745	6793	40679	103286	88781					
CD [P = 0.05] FS4 vs FS5			16599	16270	52014	258584	252562	7302	6405	38352	97379	83703					
Thiruvananthapuram																	
H+FC+D	0.49	8	18003 (4425)	17270 (4419)	-	-	-	46810 (7426)	44201 (7452)	400828 (31120)	394950 (100952)	350586 (101712)	0.008***	0.008***	0.008***	0.008***	0.008***
H+P	0.34	12	8471 (3613)	8277 (3608)	50789 (2096946)	93210 (2045389)	89921 (2045192)	26639 (6024)	20924 (6085)	233645 (25409)	219223 (82427)	122070 (83047)	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
H+D	0.35	4	28256 (6258)	27468 (6250)	-	-	-	54744 (10502)	52889 (10539)	448760 (44010)	481885 (142768)	450349 (143842)	0.125	0.125	0.125	0.125	0.125
Overall FS			P value Significance - Existing vs Improved										<0.001***	<0.001***	0.002***	0.002***	0.002***
CD [P = 0.05] FS1 vs FS2			11881	11865	-	-	-	19938	20008	83549	271033	273073					
CD [P = 0.05] FS1 vs FS3			15940	15919	-	-	-	26750	26843	112093	363629	366366					
CD [P = 0.05] FS2 vs FS3			15028	15008	-	-	-	25220	25308	105683	342832	345413					
Thane																	
FC+D	0.21	12	4870 (124)	3901 (150)	51205 (1671)	31583 (1879)	15104 (2125)	1126 (47)	720 (32)	1000 (0)	18137 (800)	11234 (543)	<0.001***	<0.001***	<0.001***	<0.001***	0.266
FC+Po	0.23	12	2228 (124)	1416 (150)	40009 (1671)	-2138 (1879)	-15945 (2125)	1129 (47)	583 (32)	1000 (0)	18185 (800)	8915 (543)	<0.001***	<0.001***	<0.001***	<0.001***	<0.001***
Overall FS			P value Significance - Existing vs Improved										<0.001***	<0.001***	<0.001***	0.379	0.005***
CD [P = 0.05] FS1 vs FS2			362	439	4901	5511	6233	138	94	0	2347	1592					
Patan, Gujarat																	
FC+D	0.90	24	28731 (6954)	26986 (6902)	168818 (16439)	319614 (103754)	289940 (102863)	28295 (3053)	24903 (2989)	38467 (1064)	442540 (52027)	384888 (50955)	-	-	-	-	-
Overall FS			P value Significance - Existing vs Improved										0.935	0.6918	<0.001***	0.126	0.224

7.3.3 On-Farm evaluation of farming system modules

Title of the experiment: On-Farm evaluation of farming system modules for improving profitability and livelihood of small and marginal farmers

Objectives

- To address critical constraints of small and marginal farm holders for overall improvement of productivity
- To increase the profitability of small and marginal households and ensure livelihood

Year of start: 2011-12 (Implemented in new districts from 2017-18)

Modules: The experiment was designed with holistic approach where in improvement of productivity of existing components of the farming system was concentrated by appropriate interventions besides farmer opinion-based introduction of new components in optional module. Benchmarking of all components was done before making interventions in different modules. Four modules comprising of crop (low cost interventions in existing cropping systems based constraint analysis), Livestock (low cost interventions in existing livestock components based on constraint analysis), On farm processing & value addition (on farm agro processing and value addition of marketable surplus produces) and optional (Introduction of additional components based on households perception) were implemented in 2 farm households in each village comprising of 1 marginal and small household. The experiment was implemented in randomly selected 12 marginal farm households in each district. The general guidelines used for designing the modules are given below

Farming System	Notation	Module name	Details
Existing	M0	Bench mark	Recording of bench mark data on crop, livestock, other components and household as a whole
Improved	M1	Crop	Low cost interventions in existing cropping systems based constraint analysis
	M2	Livestock	Low cost interventions in existing livestock components based on constraint analysis
	M3	On farm processing & value addition	On farm agro processing and value addition for marketable surplus
	M4	Optional	Introduction of additional components based on households perception

Households: Twelve households consisting of 6 each in small and marginal categories was selected for experiment in all the locations. A total of 344 farm households were covered during the year. The average holding size of households in the study locations ranged

from 0.44 to 3.97 ha for small households. At very few locations and farming systems, the size of holding of farming system was higher than 2 ha due to non-availability of small households for diversification.

Locations: During 2020-21, a total of 29 districts in 14 agro climatic where in programme were implemented with the interventions in different modules. The details of locations, number of households covered and farming systems are given in Table 7.3.1.

Data analysis methodology: Based on the benchmark data, farming systems practiced by the households were identified and grouped in to different farming system categories such as field crops+ dairy, field crops + dairy+ goat etc as given in Table 7.3.1. Four parameters namely production (on equivalent basis of base pre-dominant crop), marketable surplus (calculated by deducting the family consumption for food, feed, seed etc from the total production), cost (total cost of the system including all components and diversification) and profit (calculated by deducting the cost of the system from the gross income obtained from marketable surplus) were used for comparison of existing with improved system and also different farming systems. Farming system with more than one household was subjected to ANOVA and paired t-test analysis. Paired t-test has been carried out for comparing existing and diversified systems with respect to production, marketable surplus, cost and profit. Similarly, one-way ANOVA has been carried out to identify the best farming system with respect to production, marketable surplus, cost and profit for the district. Standard error of mean values is also presented in parenthesis in Table 7.3.2.

Results

The interventions made in different modules are given in Table 7.3.1, while the production, marketable surplus and economics of different farming systems are given in 7.3.2. Location wise and summary of results is explained briefly below.

Western Himalayan

Udham Singh Nagar (Uttarkhand): Two farming systems viz; field crops + dairy, field crops were found, and both the farming systems were found dominant. Diversification of existing systems resulted in significantly higher return in crop (Rs 11,914) the system.

Bilaspur (Himachal Pradesh): Two farming systems viz; field crops + dairy, field crops+dairy+goat were found, and both the farming systems were found equally dominant. Diversification of existing systems resulted in significantly higher return in both the system. Improve in the net return Rs 82,763 recorded with average holding size 0.44 ha in crops+dairy+goat.

Eastern Himalaya

Goalpara (Assam): Three farming systems namely field crops + dairy +piggery + poultry + fishery, field crops + goat + piggery + poultry and field crops + dairy + goat + poultry was found. Interventions made in crop, livestock, processing and optional module in Crop+Dairy+Pigs+Fishery+Poultry resulted in significantly higher improvement in profit (Rs 77,051 from 1.7 ha).

Upper Gangetic Plain

Fathepur (Uttar Pradesh): Two farming systems viz; field crops + dairy, field crops + dairy + horticulture were found, and both the farming systems were found dominant. Diversification of existing systems resulted in significantly higher return in both and profit among the system resulted in significantly higher improvement in profit (Rs 1,18,307 from 0.92 ha).

Lower Gangetic plains

Nadia (West Bengal): Two farming systems namely field crop + dairy + fishery and field crop + dairy + horticulture were found with mean area of 1.16 and 1.07 ha respectively. Interventions made in crop, livestock, processing and optional modules resulted in significant improvement in production, marketable surplus and profit in both the farming systems. Among the farming systems, field crop + dairy + horticulture resulted in higher profit of Rs 1,43,954 from 1.07 ha after the interventions.

Trans Gangetic plains

Fathehabad (Haryana): All the households were having only one farming system of field crops + dairy with mean area of 0.91 ha. Interventions in crop, livestock, processing and optional modules result in significant change in production, marketable surplus and profit, trough intervention from 0.91 ha area Rs 31,363 increase in profit recorded.

Central plateau and hills

Dungarpur (Rajasthan): Two farming systems namely field crop + dairy, and field crop + dairy + poultry were found and both are equally dominate. Diversification helps to slight improve in production and marketable surplus in both system.

Dausa (Rajasthan): Two farming systems namely field crop + dairy, and field crop + dairy + goat were found both systems is found equally dominant. Crop+ Dairy+Goatry resulted in higher profit of Rs 2,66,820 from 1.65 ha.

Umaria (Madhya Pradesh): Two farming systems namely field crop + dairy, and field crop + dairy+goat with mean area of 1.36 and 2.0 ha. Diversification resulted in higher production, marketable surplus, return and profit.

Eastern plateau and hills

Keonjhar (Odisha): Three farming systems namely field crops + horticulture + goat + poultry, field crops + horticulture + goat + poultry + fishery and field crops + dairy + horticulture + goat + poultry with mean holding area of 1.13, 1.22 and 1.05 ha respectively. Interventions made in crop, livestock, processing and optional modules resulted in significantly higher production, marketable surplus and profit in all the systems. Among the three farming systems, after interventions, crop+horticulture+ poultry+goatry system resulted in higher profit of Rs 50,457 from 1.13 ha.

Kalahandi (Odisha): All the households were having only one farming system of field crops + dairy with mean area of 1.52 ha. Trough intervention almost no change in production and marketable surplus but due reduction in cost of cultivation by recycling increase in profit (Rs 28,418) from 1.52 ha area recorded.

Annupur (Madhy Pradesh): Two farming systems namely field crop + dairy and field crops + goatry + Poultry was found with mean area of 1.16 and 1.2 ha respectively and both the systems were found dominant. Diversification made in field crop + goatry+dairy resulted in significant improvement in profit (Rs 75,842 from 1.2 ha) due to diversification.

East Singhbhum (Jharkhand): Two farming systems namely field Crop + Poultry and field Crop + Goatery + Poultry was found with mean area of 1.29 and 1.11 ha respectively. Diversification made in field Crop + Goatery + Poultry resulted in significant improvement in profit (Rs 76,641from 1.1 ha) due to diversification.

Western Plateau and hills

Hingoli (Maharashtra): Three farming systems namely field crop + horticulture, field crop + goat and field crops + dairy was practiced with mean holding size of 1.13, 0.92 and 1.13 ha respectively. Diversification made in field crop +goatry resulted in significant improvement in profit (Rs 46,934 from 0.92 ha) due to diversification.

Nagpur (Maharashtra): Three farming systems namely crop+dairy+bullock pair,

crop+dairy and crop+hort.+dairy+bullock pair was found among crop+hort.+dairy+bullock pair dominating by 50 % households. Due to high cost of cultivation farming system not performed well but field crop+dairy+bullock pair found most remunerative among the system.

Padegaon (Maharashtra): Three farming systems namely crop+dairy+goatry, crop+dairy and crop + dairy+ poultry was found among crop+dairy+goatry dominating by 50 % households. Diversification made in crop+dairy+goatry resulted in significant improvement in profit (Rs 1,49,935 from 0.86 ha) due to diversification.

Southern Plateau and hills

Chikkaballapura (Karnatka): Three farming system namely field crop + dairy + horticulture, Crop+Dairy+Horticulture + Sheep+Poultry and Crop+Dairy+Horticulture +Sheep. Diversification made in field crop + dairy + poultry resulted in significant improvement in profit over the existing (Rs 91,793 from 1.33 ha) due to diversification.

Salem (Tamil Nadu): Two farming systems namely field crops + dairy and field crops + horticulture + goat/sheep + poultry was found among which 66 % households were practicing field crops + horticulture + goat/sheep + poultry system with mean area of 1.20 ha.

Erode (Tamil Nadu): Two farming systems namely field crops + dairy + poultry and field crops + dairy + goat/sheep + poultry was found among which 75 % households were practicing field crops + dairy + poultry system with mean area of 1.15 ha. Interventions made in both the systems resulted in significant improvement in profit. Among the systems, field crop + dairy + poultry recorded higher profit of Rs 3,96,230 from 1.34 ha.

Dharwad (Karnatka): Two farming systems namely field crop + dairy and field crops + dairy + horticulture was found with mean area of 0.86 and 1.28 ha respectively and both the systems were found dominant. Increase in COC was recorded in both the system but thorough improved practices and diversification improvement in net return and profit was observed.

Medak (Telangana): Three farming system namely field crops + dairy, field crop + dairy + sheep and field crop + dairy + vegetable all the farming system almost equally practiced. Diversification made in Crop+ Dairy+Sheep resulted in significant improvement in profit over the existing (Rs 2,42,178 from 1.05 ha) due to diversification.

West coast plains and ghats

Thiruvananthapuram (Kerala): Two farming systems namely field horti.+crop+dairy and horti.+ poultry was found both were fond equally dominate. Among the systems, horticulture + poultry farming system recorded higher profit over exsiting of Rs 1,48,486 from 0.95 ha.

Gujarat plains and hills

Dahod (Gujarat): Two farming systems namely field crops + dairy and field crops + dairy + poultry were found with mean area of 1.60 and 1.06 ha, respectively. Diversification made in field crop + dairy+ poultry resulted in slight improvement in net return over existing (Rs 37,481 from 1.06 ha).

The results across the locations are summarized as below:

- The number of farming systems in different districts ranged between 1 (Baghpat, Fatehabad, Jammu, Patan, Patiala and Kalahandi) to 3 (Goalpara, Keonjhar, Chickballapura, Vizianagaram, Nagpur, Medak, Padegaon and Hingoli). It clearly

indicates that paletu and hills area more diversified than plain area and having more number of farming component.

- Among all the farming systems, field crops + dairy was found to be the dominant farming system based on number of households in 22 districts (75 % of of study district).
- Based on the statistical analysis, best performing farming system has been identified for each district which can be scaled along with all possible interventions and diversification approach for improving the livelihood of marginal farm households.

Fig Different module wise intervention in Plateau and costal region (a) Nutritional Kitchen Gardening (b) Fodder bank with annual moringa (c) Goat farming with low cost bamboo structure (d) Vegetable farming

Table 7.3.3 Components of existing and diversified farming systems in marginal farm households at different locations

Farming System	Area (ha)	No. of House-holds	Existing System				Improved (Diversified System)				P value Significance - Existing vs Improved			
			Production (kg)	Market-able Surplus (kg)	Cost (Rs)	Profit (Rs)	Produc-tion (kg)	Marketable Surplus (kg)	Cost (Rs)	Profit (Rs)	Production (kg)	Marketable Surplus (kg)	Cost (Rs)	Profit (Rs)
Udham Singh Nagar														
Crop+Dairy	0.76	5	14367 (1254)	12462 (1292)	93081 (3014)	151159 (22557)	11287 (765)	8784 (698)	94931 (6540)	96947 (10699)	0.313	0.063	0.813	0.125
Crop	0.66	7	3110 (1060)	2445 (1092)	38288 (2547)	14587 (19064)	3676 (646)	2699 (590)	35999 (5527)	26501 (9042)	0.156	0.375	1.000	0.031*
Overall FS			P value Significance - Existing vs Improved								0.322	0.166	0.909	0.316
CD [P = 0.05]	FS1 Vs FS2		3659	3771	8793	65805	2231	2035	19079	31212				
Bilaspur														
Crop+Dairy	0.58	6	5423 (1123)	3423 (905)	52670 (8004)	39521 (15398)	5381 (1226)	2237 (734)	6276 (129)	85207 (20849)	0.844	0.438	0.031*	0.063
Crop + Dairy +Goat	0.44	6	5194 (1123)	4336 (905)	44738 (8004)	43552 (15398)	7814 (1226)	4040 (734)	6515 (129)	126315 (20849)	0.219	1.000	0.031*	0.063
Overall FS			P value Significance - Existing vs Improved								0.240	0.337	<0.001**	0.004**
CD [P = 0.05]	FS1 Vs FS2		3538	2851	25222	48520	3863	2314	405	65695				
Goalpara														
Crop + Dairy + Pigs + Fishery + Poultry	1.70	4	2572 (331)	1612. (368)	26621 (6108)	17104 (6881)	6655 (1262)	5651 (1105)	18975 (3095)	94155 (18464)	0.250	0.250	0.875	0.250
Crop +Goatry+ Pigs+ Poultry	2.12	4	3000 (331)	1962. (368)	42469 (6108)	171034 (6881)	8766 (1262)	5824 (1105)	17625 (3095)	131394 (18464)	0.125	0.125	0.125	0.125
Crop + Dairy+Goatry+ Poultry	3.53	4	4384 (331)	3286 (368)	77143 (6108)	-2618 (6881)	6239 (1262)	5297 (1105)	15825 (3095)	90242 (18464)	0.125	0.125	0.125	0.125
Overall FS			P value Significance - Existing vs Improved								0.001**	<0.001**	0.002**	<0.001**
CD [P = 0.05]	FS1 Vs FS2		1058	1178	19540	22015	4036	3534	9900	59070				
CD [P = 0.05]	FS1 Vs FS3		1058	1178	19540	22015	4036	3534	9900	59070				

CD [P = 0.05]	FS2 Vs FS3		1058	1178	19540	22015	4036	3534	9900	59070				
Fatehpur														
Crop+Dairy+Hort.	0.92	6	24975 (6786)	23116 (6821)	87651 (13130)	336932 (116769)	32792 (199739)	30037 (7678)	102220 (13675)	455239 (3395387)	0.438	0.438	0.031*	0.438
Crop + Dairy	0.92	6	19673 (6786)	17281 (6821)	97843 (13130)	236599 (116769)	467055 (199739)	30489 (7678)	111159 (13675)	7828781 (3395387)	0.031*	0.031*	0.031*	0.031*
Overall FS			P value Significance - Existing vs Improved								0.157	0.147	<0.001**	0.159
CD [P = 0.05]	FS1 Vs FS3		21382	21494	41372	367947	629389	24195	43090	10699082				
Nadia														
Crop+Dairy+Fishery	1.165	6	8659 (2174)	7721 (2101)	99278 (20968)	47925 (19496)	17909 (1998)	13053 (2044)	132931 (12732)	171524 (23027)	0.031*	0.031*	0.031*	0.031*
Crop + Dairy + Horticulture	1.07	6	12404 (2174)	11494 (2101)	137860 (20968)	73014 (19496)	27064 (1998)	23054 (2044)	243123 (12732)	216968 (23027)	0.031*	0.031*	0.031*	0.031*
Overall FS			P value Significance - Existing vs Improved								<0.001**	<0.001**	0.003**	<0.001**
CD [P = 0.05]	FS1 Vs FS2		6850	6621	66072	61433	6297	6442	40119	72559				
Fatehabad														
Crop+ Dairy	0.91	12	15823 (1771)	13856 (1750)	121531 (16663)	147457 (15510)	18629 (2273)	15953 (2243)	137874 (16414)	178820 (22353)	-	-	-	-
Overall FS			P value Significance - Existing vs Improved								0.025*	0.069	<0.001**	0.090
Dungarpur														
Crop+Dairy	0.87	6	4412 (233)	2269 (206)	29673 (4010)	45332 (6246)	5500 (813)	2293 (665)	23249 (4497)	42751 (10749)	0.563	1.000	0.063	0.844
Crop + Dairy+Poultry	0.93	6	3929 (233)	1955 (206)	33290 (4010)	33495 (6246)	5628 (813)	2134 (665)	24685 (4497)	42849 (10749)	0.031*	0.844	0.031*	0.219
Overall FS			P value Significance - Existing vs Improved								0.015*	0.793	<0.001**	0.591
CD [P = 0.05]	FS1 Vs FS3		735	648	12634	19683	2561	2096	14170	33871				
Dausa														
Crop+ Dairy	3.97	6	38520 (4019)	31362 (4098)	230093 (18862)	424747 (54575)	39894 (4604)	30249 (2880)	45875 (1617)	632317 (77527)	0.688	0.563	0.031*	0.031*

Crop+ Dairy+Goatry	1.65	6	24291 (4019)	17462 (4098)	195517 (18862)	217432 (54575)	31066 (4604)	22449 (2880)	43875 (1617)	484252 (77527)	0.063	0.156	0.031*	0.031*
Overall FS			P value Significance - Existing vs Improved								0.081	0.326	<0.001**	<0.001**
CD [P = 0.05]	FS1 Vs FS2		12663	12914	59436	171968	14507	9075	5095	244294				
Umaria														
Crop+Dairy	1.36	11	9084 (807)	7770 (799)	59461 (5490)	94969 (8615)	5205 (934)	3276 (771)	6700 (-)	81783 (15884)	0.486	0.001**	0.001**	0.376
Crop+Dairy+Goat	2.00	1	9938 (2676)	8364 (2649)	64875 (18210)	104065 (28574)	173349 (3099)	5171 (2556)	6700 (-)	2940222 (52681)	-	-	-	-
Overall FS			P value Significance - Existing vs Improved								0.486	<0.001**	<0.001**	0.366
Keonjhar														
Crop+Hort.+ Poultry+Goatry.	1.13	3	4697 (174709)	3838 (174599)	43478 (33531)	36374 (2948928)	8103 (1298)	6114 (1124)	50915 (23290)	86831 (21601)	0.250	0.250	0.500	0.250
Crop+Hort.+ Poultry+Fishery	1.22	4	7951 (135729)	6859 (135244)	67555 (25973)	67614 (2284230)	8337 (1006)	6307 (871)	71550 (18040)	70185 (16732)	0.625	0.625	0.625	0.625
Crop+Hort.+ Poultry+Dairy	1.05	5	294955 (151703)	293782 (151207)	53133 (29039)	4961098 (2553847)	7737 (1124)	5874 (974)	44659 (20170)	86877 (18707)	0.125	0.125	1.000	0.125
Overall FS			P value Significance - Existing vs Improved								0.308	0.304	0.908	0.306
CD [P = 0.05]	FS1 Vs FS2		522826	522497	100344	8824823	3885	3365	69697	64641				
CD [P = 0.05]	FS1 Vs FS3		499918	499603	95948	8438145	3715	3217	66643	61809				
CD [P = 0.05]	FS2 Vs FS3		459204	458915	88133	7750931	3412	2955	61215	56775				
Kalahandi														
Crop+ Dairy	1.52	12	6094 (469)	4774 (408)	61150 (3286)	42446 (6356)	7028 (555)	5353 (528)	48617 (2075)	70864 (7784)	-	-	-	-
Overall FS			P value Significance - Existing vs Improved								0.014*	0.104	<0.001**	<0.001**
Annupur														
Crop+Dairy	1.16	5	13640 (2700)	11820 (2723)	79679 (10534)	152209 (35807)	13934 (2296)	11025 (2019)	95479 (14856)	141402 (24659)	0.688	0.578	0.031*	0.813
Crop + Goatry + Poultry	1.20	7	7485 (3195)	6331 (3222)	41962 (12464)	85288 (42367)	12642 (2716)	10338 (2389)	53787 (17577)	161130 (29177)	0.063	0.063	0.063	0.063

Overall FS			P value Significance - Existing vs Improved								0.030*	0.248	0.006**	0.175
CD [P = 0.05]	FS1 Vs FS2		9320	9401	36361	123599	7924	6970	51279	85119				
East Singhbhumi														
Crop+Goatery+ Poultry	1.11	3	4506 (1338)	4506 (1338)	30468 (4883)	46139 (21361)	11089 (883)	6574 (498)	65740 (514)	122780 (14952)	0.250	0.250	0.250	0.250
Crop + Poultry	1.29	9	4984 (773)	2057 (239)	31889 (2819)	52843 (12333)	9804 (510)	6046 (287)	65878 (297)	100790 (8632)	0.004**	0.203	0.004**	0.004**
Overall FS			P value Significance - Existing vs Improved								<0.001**	0.045*	<0.001**	<0.001**
CD [P = 0.05]	FS1 Vs FS2		3443	3443	12562	54959	2272	1281	1323	38468				
Hingoli														
Crop+Sericulture	1.13	4	33843 (17456)	32914 (17567)	44385 (5583)	530945 (296899)	5332 (815)	5030 (752)	42116 (5841)	48528 (8865)	1.000	1.000	0.625	0.875
Crop +Goatry	0.92	5	4294 (15614)	3978 (15712)	34470 (4993)	38523 (265554)	8484 (729)	7542 (673)	58774 (5225)	85457 (7930)	0.063	0.063	0.063	0.063
Crop + Dairy	1.13	3	25016 (20157)	24660 (202853)	72574 (6447)	352697 (342829)	10360 (942)	9153 (868)	63048 (6745)	113078 (10237)	0.500	0.500	0.250	0.500
Overall FS			P value Significance - Existing vs Improved								0.280	0.270	0.202	0.260
CD [P = 0.05]	FS1 Vs FS2		52980	53316	16944	901089	2475	2283	17729	26907				
CD [P = 0.05]	FS1 Vs FS3		60321	60703	19292	1025935	2818	2599	20185	30635				
CD [P = 0.05]	FS2 Vs FS3		57678	58043	18446	980981	2694	2485	19301	29292				
Padegaon														
Crop+Dairy+Goatry	1.16	6	18494 (5448)	16079 (5262)	179429 (22426)	134969 (77397)	18328 (1897)	16289 (1790)	129889 (14175)	181693 (26638)	0.844	1.000	0.156	0.219
Crop+Dairy	0.86	3	15689 (7705)	13320 (7441)	200600 (31716)	66119 (109456)	22374 (2683)	19893 (2531)	164309 (20046)	216054 (37671)	0.250	0.250	0.250	0.250
Crop + Dairy+ Poultry	1.10	3	27662 (7705)	25998 (7441)	187237 (31716)	283020 (109456)	22252 (2683)	19474 (2531)	155636 (20046)	222648 (37671)	1.000	1.000	0.750	1.000
Overall FS			P value Significance - Existing vs Improved								0.948	0.974	0.037*	0.369
CD [P = 0.05]	FS1 Vs FS2		21347	20617	87870	303254	7432	7013	55540	104371				
CD [P = 0.05]	FS1 Vs FS3		21347	20617	87870	303254	7432	7013	55540	104371				

CD [P = 0.05]	FS2 Vs FS3		24650	23806	101464	350167	8582	8097	64132	120517				
Chikkaballapura														
Crop+Dairy+Horticulture	1.33	3	18110 (20157)	17457 (20246)	184113 (22189)	123764 (334210)	30528 (6554)	38472 (11229)	303413 (68723)	215557 (59033)	0.500	0.500	0.250	0.500
Crop+Dairy+Horticulture + Sheep+Poultry	0.63	6	27650 (14253)	26819 (14316)	129027 (15690)	341015 (236322)	19988 (4634)	29480 (1498)	192395 (41743)	147405 (414893)	0.563	0.563	0.219	0.563
Crop+Dairy+Horticulture +Sheep	1.43	3	20021 (20157)	19685 (20246)	195922 (22189)	144428 (334210)	23330 (6554)	22890 (11229)	160465 (68723)	236139 (59033)	0.750	0.750	0.500	0.750
Overall FS			P value Significance - Existing vs Improved								0.991	0.508	0.127	0.756
CD [P = 0.05]	FS1 Vs FS2		55847	56093	61476	925951	18158	31112	190400	163555				
CD [P = 0.05]	FS1 Vs FS3		64486	64770	70986	1069196	20966	35925	219856	188857				
CD [P = 0.05]	FS2 Vs FS3		55847	56093	61476	925951	18158	31112	190400	163555				
Erode														
Crop+ Dairy+Poultry	1.34	3	12279 (4894)	11367 (4826)	94594 (12528)	114147 (73121)	40698 (8017)	39513 (8127)	181494 (17858)	510377 (128959)	0.500	0.500	0.500	0.500
Crop+ Dairy+Poultry+Goat/ Sheep	1.15	9	8890 (2826)	7709 (2786)	70921 (7233)	80209 (42217)	33065 (4628)	31891 (4692)	143412 (10310)	418697 (74454)	0.004**	0.004**	0.004**	0.004**
Overall FS			P value Significance - Existing vs Improved								0.001**	0.001**	<0.001**	0.002**
CD [P = 0.05]	FS1 Vs FS2		12592	12416	32233	188129	20626	20909	45946	331790				
Dharwad														
Crop+ Dairy+Hort.	1.28	8	5299 (954)	5016 (919)	64414 (6223)	94547 (24735)	3574 (687)	3054 (623)	31045 (5075)	29716 (8054)	0.055	0.039*	0.008**	0.008**
Crop+ Dairy	0.86	4	3313 (1349)	3082 (1300)	40256 (8801)	59144 (34981)	3061 (972)	2354 (880)	24416 (7177)	27620 (11391)	1.000	1.000	0.250	0.625
Overall FS			P value Significance - Existing vs Improved								0.147	0.070	<0.001**	0.015*
CD [P = 0.05]	FS1 Vs FS2		3682	3549	24016	95458	2652	2403	19586	31084				
Medak														
Crop+ Dairy+Sheep	1.05	2	3838 (19675)	2994 (19618)	49533 (31193)	15707 (316937)	19643 (5364)	18389 (5531)	76050 (18930)	257885 (73227)	0.500	0.500	0.500	0.500

Crop+ Dairy	0.87	6	27031 (11359)	26039 (11327)	106240 (18009)	353279 (182984)	13957 (3097)	13181 (3193)	50135 (10929)	187133 (42277)	0.219	0.219	0.156	0.563
Crop+Dairy+Vegetables	1.27	4	37930 (13912)	36685 (13872)	115871 (22057)	528938 (224108)	14924 (3793)	14223 (3911)	55275 (13386)	198438 (51779)	0.250	0.250	0.125	0.250
Overall FS			P value Significance - Existing vs Improved								0.133	0.138	0.01*	0.205
CD [P = 0.05]	FS1 Vs FS2		51393	51246	81479	827876	14012	14447	49447	191276				
CD [P = 0.05]	FS1 Vs FS3		54510	54354	86422	878095	14862	15323	52447	202879				
CD [P = 0.05]	FS2 Vs FS3		40630	40513	64415	654493	11078	11421	39092	151217				
Thiruvananthapuram														
Horti.+Crop+Dairy	0.99	6	34392 (6347)	33701 (6380)	358635 (52220)	226034 (63357)	40308 (9325)	37670 (9310)	449924 (109692)	235311 (52443)	0.438	0.438	0.438	0.484
Horti.+ Poultry	0.95	6	5413 (6347)	5259 (6380)	21370 (52220)	70646 (63357)	35095 (9325)	34313 (9310)	377488 (109692)	219132 (52443)	0.032*	0.032*	0.032*	0.032*
Overall FS			P value Significance - Existing vs Improved								0.017*	0.025*	0.017*	0.065
CD [P = 0.05]	FS1 Vs FS2		19999	20105	164548	199643	29385	29338	345646	165252				

7.3.4 Frontline Demonstration on Cropping Systems Involving Oilseeds

India holds a prominent position, ranking fourth globally in oilseed production, encompassing 20% of the global area and contributing 10% to worldwide production. The collective cultivation of all oilseed crops spans an extensive 25.3 million hectares, surpassing all crops except for food grains. Over the past three decades, oilseed crops have experienced noteworthy growth in both area and production. However, in comparison to staple cereals such as paddy and wheat, the growth rate in the area and production of oilseeds is relatively modest, exhibiting considerable variability in yield across different states in the country.

Farmers have consistently sought technological solutions and practices that promise higher returns, readily responding to various economic incentives. Notable oilseed crops include groundnut, rapeseed, mustard, sunflower, safflower, soybean, sesame, and castor. While the production and productivity of these oilseeds have largely remained stable, there has been a modest increase in select crops following the initiation of the technology mission on oilseeds.

The Indian Institute of Farming Systems Research (IIFSR), operating through its 32 on-farm centers nationwide, has implemented Farmer's Field Demonstrations (FLDs) as part of a crop diversification strategy to enhance income. Oilseed crops have been introduced into various existing farming systems. The outcomes of the FLDs conducted in farmers' fields by the On-Farm Research (OFR) units of the All India Coordinated Research Project on Integrated Farming Systems (AICRP-IFS) during the 2021-22 period are detailed in the report.

Objectives

- To demonstrate the production potential and monetary advantages of well identified cropping and inter cropping systems under real farm situation involving oilseed as one of the component crops in various agro ecosystems.

Technical Programme

The Farmer's Field Demonstrations (FLDs) were carried out at two On-Farm Research (OFR) units under the All India Coordinated Research Project on Integrated Farming Systems (AICRP on IFS) in two distinct agro ecosystems, namely Semi-Arid and Coastal, spanning across two states. Table 1 provides details on the crops and cropping systems involved in the FLDs. In both the Semi-Arid and Coastal ecosystems, 15 FLDs were conducted each on soybean and groundnut. Soybean was cultivated in the kharif season as part of

the Soybean-Wheat system, while groundnut was planted in the rabi season within the Rice-Wheat system. The comparison between two treatments, namely farmers' practice (FP) and improved practice (IP), was undertaken. These treatments were applied to well-established and time-tested oilseed-based cropping systems specific to the respective locations.

Table 1: List of centres of Front Line Demonstrations (FLD) on oilseed based cropping systems (2021-22)

Agro Ecosystem	Name of Centre (State)	Crop/cropping system (s)	Number of demonstrations
1. Semi-Arid	Kota	Soybean	15
2. Coastal	Vizianagaram (AP)	Groundnut	15
Total			30

Crop varieties along with other management practices adopted in farmers and improved practice under various cropping systems are presented in Table 2. At both centre Kota and Vizianagaram latest improved varieties along with optimum seed rate and with nutrient management practices adopted. In general farmers have tendency to use local or old varieties with higher seed rate and imbalanced fertilizers which is one of the major reason that farmer not harvest desirable yield. Other than this incase of oilseeds crops application of sulphur fertilizers is very crucial for synthesis of oils in the plant so in the improved practices instead of using DAP suggested to apply phosphorous trough SSP so it will fulfill sulphur demand.

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

Agro Ecosystem	Name of Centre (State)	Intervention	Farmer practices	Improved practices
1. Semi-Arid	Kota	Varieties	Soybean variety JS 20-34	Soybean variety (JS-95-60)
		Seed rate	100	80
		Seed treatment	-	Fungiside, Rhizobium and PSB
2. Coastal	Vizianagaram (Andhra Pradesh)	Varieties	K-6	Kadiri Lepakshi
		Seed rate	60	50
		Nutrient management	Farmers use suboptimal nutrient dose	RDF

Financial source

FLDs on oilseed based cropping systems were 100% financed by Department of Agriculture and Coopeartion, Ministry of Agriculture, Government of India through Directorate of Oilseeds Research, Hyderabad. During 2021-22, an amount of Rs 2,37,000/- has been released to the different centres as indicated in Table 3.

Table 3: Centre wise budget allocation for FLD (2021-22)

a) FLD on oilseed				
Agro Ecosystem	**Name of Centre (State)**	**Name of crop**	**Number of demonstrations conducted**	**Amount released (Rs)**
1. Semi-Arid	Kota (Rajasthan)	Soybean	15	45,000
2. Coastal	Vizianagaram (AP)	Groundnut	15	60,000
a) Total				1,05,000
b) Training of Extension Officers/workers/input dealers* "New technologies and developments in oilseed (Soybean/Groundnut/other)".				
1. Arid	Dungarpur (Rajasthan)	-do-	1	36,000
	Panchmahal (Gujarat)	-do-	1	36,000
b) Total				72,000
c) Training of farmers "Crop diversification and remunerative cropping system involving oilseeds (Soybean/ Groundnut/other)".				
Semi-Arid	IIFSR, Modipuram, Uttarpradesh		1	24,000
	Palghar, Maharashtra		1	12,000
Coastal	Vizianagaram (Andhra Pradesh)		1	24,000
c) Total				60,000
Grand total				2,37,000

Salient findings

Out of 45 demonstrations on oilseed based cropping systems, 56 were on cropping system involving mustard at 8 centres, 2 on castor based intercropping system, 18 on cropping system involving gobhisarson, 15 on groundnut and 5 on soybean crops. Gobhisarson and groundnut was evaluated in two centres each while other crops are evaluated in one centre only.

Yield

The mean yield of soybean under improved package was recorded 1459 kg ha^{-1} at Kota, Rajasthan (Table 5). The yield increase in soybean due to improved package was higher (17%) with improved variety (JS 20-34) and other agronomic practices. In Groundnut, 87% increase in yield was observed at Vizianagaram (Andhra Pradesh) with improved variety of Kadiri Lepakshi + lower seed rate + balanced nutrient application changing the source of P from DAP to SSP. Average yield of rabi groundnut was recorded 1297 kg ha^{-1} and with improved package 2424 kg ha^{-1}. Rabi groundnut in coastal area showing very encouraging results and farmers are feel happy with an alternative crop after rice harvesting.

Gross and Net returns

Gross returns were higher in improved package for both soybean and groundnut due to increase in yield. Higher gross return of was realized in groundnut (Rs 121219 ha^{-1}) followed by soybean (Rs 57617 ha^{-1}). In case of per cent improvement 87 % increase was recorded in rabi groundnut followed by 17% in soybean. Across the locations, the improvement in net returns with improved package in groundnut was recorded 874% and 23% in case soybean.

Fig 1: FLD demonstration at Kota Rajasthan

Fig 2: FLD rabi groundnut demonstration at Vizianagaram (Andhra Pradesh)

Table 4: Influence of farmers and improved practices on grain or pod yield (kg/ha) of various crops under FLD (2021-22)

Agro Ecosystem	Name of Centre (State)	Crop/cropping system (s)	Number of demonstrations	Yield farmer practices	Yield improved practices	per cent increase
1. Semi-Arid	Kota	Soybean	15	1248	1459	17%
2. Coastal	Vizianagaram (Andhra Pradesh)	Groundnut	15	1297	2424	87%

Table 5: Influence of farmers and improved practices on gross returns (Rs/ha) of various crops under FLD (2021-22)

Agro Ecosystem	Name of Centre (State)	Crop/cropping system (s)	Number of demonstrations	gross returns farmer practices	gross returns improved practices	per cent increase
1. Semi-Arid	Kota	Soybean	15	49283	57617	17%
2. Coastal	Vizianagaram (Andhra Pradesh)	Groundnut	15	64844	121219	87%

Table 6: Influence of farmers and improved practices on net returns (Rs/ha) of various crops under FLD (2021-22)

Agro Ecosystem	Name of Centre (State)	Crop/cropping system (s)	Number of demonstrations	net returns farmer practices	net returns improved practices	per cent increase
1. Semi-Arid	Kota	Soybean	15	19583	24124	23%
2. Coastal	Vizianagaram (Andhra Pradesh)	Groundnut	15	4636	45152	874%

Awareness through training

Total six training 3 for extension officer and three for farmers conducted during 2021-22 in which total 87 extension workers (75 male and 12 female) and 225 farmers (167 male and 58 female) participated

Table 7 Training of Extension Officers/workers/input dealers (2021-22)

Name of Centre	Date	Participants		
		Male	Female	Total
Dungarpur, Rajasthan	02nd &3rd March, 2022	26	1	27
Dahod, Gujarat	29th -30th Dec. 2021	27	3	30
Medak, Telangana	21-22 March 2022	22	8	30
Total		75	12	87

Table 8 Detail training of farmers

Name of Centre	Date	Participants		
		Male	Female	Total
IIFSR, Modipuram, Uttarpradesh	26-10-2021	107	13	120
Palghar, Maharashtra	01-02-2022	20	10	30
Vizianagaram (Andhra Pradesh)	23-12-2021	40	35	75
Total		167	58	225

Fig 3. Glimpse of training programme conducted across the centre

Constraints encountered in implementation of the programme

- Demonstration cost of Rs 3000-4800/ demonstration is too low to meet all the expenditures on improved package like seeds of improved varieties, fertilizers, other inputs and organizing field days. This needs to be enhanced to at least Rs 7500/ demonstration for meeting all the expenditures of inputs, training, labelling of demonstration plots etc.

8 General/Miscellaneous

8.8.1 LIST OF PUBLICATION (21-22 Annual Report)

8.1.1 Research Papers

Authors	Title of paper	Journal	Volume, Number, Pages	NAAS rating
AAU,Jorhat				
Gogoi, B.; Borah, N.; Baishya, A.; Nath, D.J.; Dutta,S.; Das,R.; Bhattacharyya, D.; Sharma, K.K.; Valente, D and Petrosillo, I.2021	Enhancing soil ecosystem services through sustainable integrated nutrient management in double rice –cropping system of North – East India.	Ecological Indicators	132(10):1-10.	12.26
Gogoi, B.; Kalita,B.; Bhupenchandra,I.; Sutradhar,P. and Sharma,K.K 2021	Soil carbon, microbial biomass carbon, soil health and productivity of toria(Brassica campestris L.) crop as affected by the application of organic manures.	Journal of Environmental Biology	42 (5): 1379-1386	5.57
Bhabesh Gogoi. (2021).	Rabi niger crop (GuizotiaabyssinicaL.) fits well under Assam condition.	International Journal on Agricultural Sciences	12 (1): 41-46. 2021.	2.60
Bhabesh Gogoi, Borah N., Baishya A., . Dutta S, Nath D.J., Das R., Bhattacharryya D., Sharma K.K., Mishra G., Francaviglia R.. (2021).	Yield trends, soil carbon fractions and sequestration in a rice-rice system of North-East India: Effect of 32 years of INM practices.	Field Crops Research	272. (2021). https://doi.org/10.1016/j.fcr.2021.108289	11.224

ANGRAU, Guntur				
Y.G.N.V.M. Manikanta, Manukonda Srinivas, L. Rajasekhara Reddy and C.V. Reddy.2021	Research Review on Pulses in Rice (Oryza sativa L) fallow situations	Frontiers in crop improvement	Vol 9 Special Issue (II): 574-578	3.62
Rao Srinivasa M M V, Roy G S and Lakshamana K.2021	Evaluation of Weed Management Practice in Rice fallow Blackgram to manage Vicia sativa in Farmers fields in Vizianagaram District of North Coastal Zone of Andhra Pradesh	Journal of Pharmacognosy and phytochemistry	2021 10(1)	5.21
Rao M M V Srinivasa, Patro T S S K, Kella Lakshman,N Ravisankar and Panwar A S .2021	Study on perception and extent of adoption of Natural Farming practices in Vizianagaram District of Andhra Pradesh, India	The Pharma Innovation Journal	SP10(1): 989-993	5.53
Srinivasa Rao MMV, Roy GS, P Seetharamu and K Lakshmana.2021	Performance and evaluation of seed production of green manure crops Sunhemp (Crotalaria juncea L.) and Dhaincha (Sesbania aculeata L.) in rice fallow situation	The Pharma Innovation Journal	10(7): 1657-1660	5.53

BAU, Sabour				
Ranjan Shivani , Kumar Sanjay , Sow Sumit and Kumar Dutta Swaraj (2021)	Impact of Integrated Nutrient Management in Rice (Oryza sativa) on Grain and Protein Yield of Succeeding Wheat (Triticum aestivum) in Long Term Rice-Wheat Cropping System	Biological Forum – An International Journal	13(3a): 448-450(2021)	5.11
Peter R. Brown, Mazhar Anwar, Md. Shakhawat Hossain, Rashadul Islam, Md. Nur-E.-Alam Siddquie, Md. Mamunur Rashid, Ram Datt, Ranvir Kumar, Sanjay Kumar, Kausik Pradhan, K. K. Das, Tapamay Dhar, Prateek M. Bhattacharya, Bibek Sapkota, Dinesh B. Thapa Magar, Surya P. Adhikari, Maria Fay Rola-Rubzen, Roy Murray-Prior, Jay Cummins, Sofina Maharjan, Mahesh K. Gathala, Brendan Brown & T. P. Tiwari (2021)	Application of innovation platforms to catalyse adoption of conservation agriculture practices in South Asia	INTERNATIONAL JOURNAL OF AGRICULTURAL SUSTAINABILITY	DOI: 10.1080/14735903.2021.1945853	8.28

Kumar Ajay , Kumar Sanjay , Mohammad Rashid Ashrafi, Prithvi Raj , Kumar Pal Ravikesh and Kumar Dutta Swaraj (2021)	Performance of Chemical Herbicides on Weed Dynamics and Economics of Direct Seeded Rice	Biological Forum – An International Journal	13(3a): 427-432(2021)	5.11
Raj, Rishav, Kumar Sushant, Birendra and Singh, Mahendra (2021).	Efficacy of different weed management practices on growth and yield of wheat (Triticum aestivum L.)	Journal of Pharmacognosy and sPhytochemistry	09 (5): 2250-2253.	-
Bihari Bipin, Singh Y. K., Shambhavi S., Mandal, J., Kumar Sanjay and Kumar, R. (2021)	Nutrient Use efficiency indices of N, P, and K under rice-wheat cropping system in LTFE after 34th crop cycle.	Journal of Plant Nutrition	DOI.org/10.1080/01904167.2021.1943674	7.13
JAU, Junagadh				
Damor, N.N., Solanki, R.M., Hadiyal, J.G. and Dharaiya, B.K.2021	Effect of drip irrigation schedule and fertigation levels on growth parameters and yield of wheat (Triticum aestivum L.).	Journal of pharmacognosy and photochemistry,	10(2): 1546-1550.	5.21
Damor, N.N., Solanki, R.M., Hadiyal, J.G. and Dharaiya, B.K.2021	Effect of drip irrigation schedule and fertigation levels on growth parameters and yield of wheat (Triticum aestivum L.).	Journal of pharmacognosy and photochemistry,	10(2): 1546-1550.	5.21

AU, Navsari				
Patel Mahendra M, Meena L. K., Arvadiya L.K., Patel D. D. and Zinzala M.J.2021	Comparative study on improved organic practices of summer greengram (Vigna radiata L.) at Bharuch district of Gujarat	International Journal of Chemical Studies	9(1): 2368-2370	
Jakkannagari Chaithanya, Arvadiya LK and Yallanagouda Madagoudra.2021	Yield potential, land equivalent ratio and economic viability of summer sorghum (Sorghum bicolor L.) under sole crop and intercropping systems in south Gujarat condition.	The Pharma Innovation Journal	10(5): 753-755	5.23
SDAU, S K Nagar				
Nayana V Nisarata, KM Patel, SS Muniya, GI Chaudhari and TalaviyaPriyanshi L .2021	Influence of organic and inorganic sources of nutrients on N and P content and uptake from seed and stover of coriander (Coriandrumsativum L.).	The Pharma Innovation Journal	10(12): 2741-2744	5.23
Khadadiya M.B., Patel A.P., Desai L..J., Patel U.J. and Desai N.B. (2021).	Effect of integrated nutrient management on yield and economics of summer pearlmillet (Pennisetum glaucum L.) under south Gujarat condition.	The Pharma Innovation Journal 2021;	10(12): 1734-1736	

CSA Kanpur				
Ajay Kumar, Sanjiv Kumar, Naushad Khan, CB Singh and Shubham Singh.2021	Weather based agromet advisory bulletin to the farmers under Gramin Krishi Mausam Seva (GKMS) project during lockdown period (Covid-19) at Kanpur region of Uttar Pradesh	Journal of Pharmacognosy and Phytochemistry".	Sp 10(1): 623-624.	NR
Vikas Tomar, Naushad Khan, Ravinder Tomer & Narinder Panotra.2021	Effect of chemical weed management and sowing method practices in late sown wheat (Triticum aestivum L.	International Journal of Chemical Studies".	Vol. 8(2):2326-2329	
Sauhard dubey, M.Z.Siddiqui, Manish Bhatt, Gaurav Shukla, Saurabh Rana, and Dharmendra Singh.2021	Efeect of INM on quality, nutrient content and take of various nutrient by Brassica juncea L. (Indian Mustard)."	International Journal of Chemical Studies	8(2):2326-2329	
ICAR,Old Goa				
Paramesh, Venkatesh, E. B. Chakurkar, Tejasvi Bhagat, G. B. Sreekanth, HB Chetan Kumar, Solomon Rajkumar, P. P. Gokuldas, Gopal R. Mahajan, K. K. Manohara, and N. Ravisankar 2021	Impact of integrated farming system on residue recycling, nutrient budgeting and soil health	Indian Journal of Agricultural Sciences	91, 44-52	6.35

Venkatesh Paramesh, N. Ravisankar, U. K. Behera, Vadivel Arunachalam, Shiva Dhar Misra, Mohan Kumar, A. K. Prusty, D. Jacob, A. S. Panwar, Viswanatha K. Reddy & Trivesh Mayekar. 2021	. Integrated farming system for achieving food and nutritional security, enhancing Profitability,employment opportunity, and climate resilience in India.	A Review. Food and Energy Security	Vol 11 Issue 2, 1-16	10.25
PJTSAU, Rajenderanagar				
Pragathi Kumari, Ch., Goverdhan, M., Sridevi, S and Reddy, G.K. 2021	Identification of a suitable crop sequence module for integrated farming system of Telangana (India) under irrigated situation.	Applied Biological Research.	23(2): 179-187.	4.96
Firdoz Shahana*, S.Sridevi, M. Goverdhan , Swapna Naguri and M.Venkataiah .2021	Nutrient Efficient and Productive Cropping Systems for Northern Telangana Zone, of Telangana	International Journal of Bio-resource and Stress Management (IJBSM)	Article no.AR2237a. Pending for publication	5.11
Kumar Nagesh, Ramya M.V., , Kumar V., Sameer, Raju C.V., , Kumar T., Sunil, Seshu N.M., , G., Sathish, Bhadru.G. , D. and Ramana, M.V.2021	Identification of pigeonpea genotypes with wider adaptability to rainfed environments through AMMI and GGE biplot analyses.	Indian Journal of Genetics and Plant Breeding.	81(1): 1-11	6.55

Ramanjaneyulu, A.V., Reddy Indudhar, Kumar K., Nagesh, M.V., Madhavi, A., Venkata Ramana, Srinivas M., , A. and Suresh, G.2021	Agro-economic feasibility and indices of Castor+Groundnut intercropping system under irrigated conditions during Rabi season in Telangana	International journal of Bio-resource and stress management.	12(2): 74-81	5.11
Kumar Nagesh, Ramya M.V., , Govindaraj V., , Sameer M., Kumar, C.V., Maheshwaramma, S., Seshu, G., Prabhakar, M., Krishna, H., Srishar, M., Venkata Ramana, Kumar M., Avil, K. and Jagadeeshwar, R.2021	Harnessing sorghum land races to breed high yielding grain mold tolerant cultivars with high protein for drought prone environments	Frontiers in Plant Science	12	10.40
TNAU,Coimbatore				
Varshini, S.V. and Jayanthi, C.2021	Influence of Sett Treatments on Biochemical, Weed, Physiological Parameters and Nutrient Uptake of Bajra napier Hybrid Grass [CO (BN)5]	Madras Agricultural Journal	7 -9 (108): 344-348	4.52
Porpavai S and D.Yogeswari.2021	Alternate Wetting and Drying Irrigation in Direct Seeded Rice: A Review	Agricultural Reviews. 10.18805/ag.R-2043.	Vol. 1 P.No.1-7.	4.63

M.Nagarajan S.Porpavai and G.Thiyagarajan.2021	Evaluation of safe alternative wetting and drying and its influence on growth, yield and water use efficiency of rice (Oryza sativa l.).	Journal of Applied and Natural Science.	(13): 407-413 (2021).	4.28
S.Vallalkannan, A.Veeramani, M.Hemalatha, S.Elamathi, S.C.Umamageswari, N. Satheeshkumar and S.R. Rangasami.2021	Suitability of rice transplanters and weeders in different soil types	.Journal of Experimental Agriculture international	Vol. 43, Issue No. 4, 103-113	
DBSKVV,Karjat				
Bhosale S. S., Jondhale D. G., Khobragade N. H., Dahiphale A. V., Bhagat S. B., Bedse T. J. and Mhaskar N. V.2021	Impact of integrated nutrient management on physical properties of inceptisols under rice – rice cropping system in North konkan coastal zone of Maharashtra	J. of The Pharma Innovation	10(1): 500-505	5.23
Bhosale S. S. and Jondhale D. G.,2021	Long term effect of INM on yield and nutrient uptake of rice – rice cropping system in North konkan	Int. J. of Trend in Scientific Research and Development	4(1): 513 - 519	7.25
MAU,Parbhani				

Shahajahan M and S.T.Shirale.2021	Influence of INM on yield and soil physico chemical properties in wheat (NIAW-1994) under vertisols	International journal of agriculture sciences	Vol.13 issue -11, 2021 PP 10960-10963	4.53
A. A. Chavan, W. N. Narkhede and H.S. Garud.2021	Evaluation of organic weed management practices on growth, yield and weed control efficiency in soyabean-chickpea sequence under irrigated condition.	Legume Research - An International journal,	Vol.44 issue 8-921-928 (August 2021).	6.53
H. S. Garud, A.S.Asewar, and A. A. Chavan, D. N. Gokhale, W. N. Narkhede.2021	Production potential of pigeon pea based intercropping systems under various land configurations in Marathwada region of Maharashtra.	Legume Research - An International journal,	Vol.44 issue 8-947-951 (August 2021).	6.53
Md. Shahajahan, S.T. Shirale and P.H.Gourkhede.2021	Impact of different nutrient sources on yield and nutrient uptake and quality of wheat, (triticum aestivium)	The pharma Innovation Journal	Vol 11 (2), 1085-1087(2022)	5.23
BAU,Ranchi				
Kumar, R., Karmakar, S., Minz, A., Singh, J., Kumar, A. and Kumar, A. 2021..	Assessment of greenhouse gases emission in Maize-Wheat cropping system under varied N-fertilizer application using Cool Farm Tool	Frontiers in Environmental Science,	9:710108. DOI:10.3389/ fenvs.2021. 710108	

KAU,Karamana				
George, A.M., Sudha,B., John, J., and Sajeena,A.2021	Different composting methods in bio recycling nutrient rich manures: A comparative analysis	Journal of Tropical Agriculture.	59(1): 95-101	4.85
Nair, D.S., Sajeena A., Johnson, J.M., Mathew, D., John J., Sarada ,S. 2021	First report of leaf blight of yardlong bean caused by Diaporthe tectonae in India	Journal of Plant Pathology		7.15
Sudha, B., John,J., Meera, A.V., Sajeena,A., Jacob, D and Bindhu, J. S.2021	Coconut based integrated farming: A climate smart model for food security and economic prosperity	Journal of Plantation Crops	49 (2): 104-110	4.66
K.V. Athira, B. Sudha, Jacob John. Shalini Pillai P and R.V. Manju.2021	Generation of paddy straw composts in rice based integrated farming system and evaluating in organic production of fodder maize.	Indian Journal of Ecology.	48(6):1772-1779	5.79
Jose, A., Jacob, D., Bindhu, J. S., and Meera, A. V.2021	Biofortification of rice grain with zinc through inorganic fertilization	Journal of Tropical Agriculture	59 (2): 286-291	4.85
John, J., Shirmila, J., and Meera, A.V.2021	Role of tree leaf loppings and leachates in vermicomposting and earthworm morphology	Environment and Ecology	39 (4A): 1037-1042	5.25

Reddy,D.R., Pillai, P.S., John, J., Sajeena,, A., Aswathy, J.C. .2021	Growth and yield of pulses as influenced by intercropping with finger millet [Eleusine coracana (L.) Gaertn.] in the southern laterites of Kerala.	Legume Research	DOI: 10.18805/LR-4480	6.53
BCKV,Kalyani				
Kaur, Jashanjot., Prusty, A. K., Ravisankar, N., Panwar, A. S., Shamim, M., Walia, S. S., Chatterjee, S., Pasha, M. L., Babu, Subhash, Jat, M. L., Ridaura, Santiago-López, Groot, Jeroen C. J., Toorop, Roos Adelhart, Escoto, Luis-Barba, Noopur, Kohima and Kashyap, Poonam.2021	Farm typology for planning targeted farming systems interventions for smallholders in Indo-Gangetic Plains of India	Scientific Reports	https://doi.org/10.1038/s41598-021-00372-w	Impact Factor 4.13
MPKV,Rahuri				
A.S.Dhonde,.S.Raskar, U.S.Surve. 2021	Effect of organic farming packages on yield, biochemical properties and energy balance study under diversified cropping systems.	Agricultural Mechanization in Asia, Africa and Latin America (AMA) (ISSN:00945841)	Volume 52, Issue 01	6.17
HAU Hisar				

Kavita, Ajay Kumar, Parminder Singh, Sumit and Mehta, V. P. 2021.,	Indian agricultural trade in WTO regime	Indian Journal of Agricultural Sciences	91 (2): 274–78	6.21
Kautilya, Chaudhary, Tripathi, H. C., Singh, Kuldeep, Shweta and Kumar, Ashok. (2021).	Response of INM in rice in rice–wheat cropping system.	Indian Journal of Agricultural Sciences	91(1): 39–43.	6.21
PAU, Ludhiana				
Das R, Purakayastha T, Das D, Ahmed N, Kumar R, Walia S S, Singh R, Shukla V K, Yadava M S, Ravisankar N and Dutta S C 2021	Effect of Chemical Pre-treatment for Identification of Clay Minerals in Four Soil Orders by X-ray Diffraction Technique.	National Academy of Sciences Letters	https://doi.org/10.1007/s40009-021-01077-4.	6.41
Dhaliwal S S,Sharma S, Sharma V, Shulka A K, Walia S S, Alhomrani M, Gaber A, Toor A S, Verma V, Randhawa M, Pandher L, Singh P and Hussain A. 2021	Long-Term Integrated Nutrient Management in the Maize-Wheat Cropping System in Alluvial Soils of North-Western India: Influence on Soil Organic Carbon, Microbial Activity and Nutrient Status.	Agronomy	Vol. 11, 2258. https://doi.org/ 10.3390/ agronomy 11112258.	8.60
Jiwan, Sharma Rajni, Walia, S.S. 2021	Weed composition and nutrient uptake by weeds in sole and intercrops during rabi season.	Indian Journal of Ecology	Vol. 48 (1): 300-303.	5.79

Kaur J, Prusty A K, Ravisankar N, Panwar A S, Shamim M, Walia S S, Chatterjee S, Pasha M L, Babu S, Jat M L, Lopez-Ridaura S, Groot JCJ, Toorop R A, Escoto LB, Nopur K and Kashyap P 2021	Farm typology for planning targeted farming systems interventions for smallholders in IndoGangetic Plains of India.	Scientific Reports	Vol. 11: 20978 https: //doi.org/10.1038/s41598-021-00372-wwww.nature.com/scientific reports.	10.00
Khipla Neha, Kaur J, Gosal S.K., Gill R.I.S. and Walia S.S. 2021	Integrated nutrient management to improve soil health, nutrient uptake and growth of Poplar (Populus deltoides) seedlings in nursery conditions.	Indian Journal of Agroforestry	Vol. 23(2): 45-52	5.19
Ratanoo R, Walia S S, Saini K S and Dheri G S 2021	Effect of biofertilizers, graded levels of chemical fertilizers and FYM on soil properties and yield of Gobhi sarson (Brassica napus L.).	The Pharma Innovation Journal	Vol. 10(7): 10-17.	5.23
Ratanoo Rekha, Walia S S and Saini K S 2021	Residual effects of chemical fertilizers, organic manure and biofertilizers applied to preceding gobhi sarson (Brassica napus) crop on summer mung bean (Vigna radiata L.).	Legume Research		

Sandhu P S, Walia S S and Kaur A 2021	Yield quality parameters of rice-wheat system in response to integrated nutrient management over 31 years.	Agricultural Research Journal	Vol. 58(5): 794-800.	5.44
Sheikh Md. Mohiuddin, Riar T S, Walia S S, Garg L 2021	A comparative study of productivity and economic profitability of integrated farming systems in Punjab, India and northern part of Bangladesh.	Indian Journal of Extension Education	Vol. 57 (1): 136-141.	5.95
Walia S S and Patidar A 2021	Effect of organic, integrated and chemical sources of nutrient on growth and productivity of maize (Zea mays).	Indian Journal of Agronomy	66 (4): 419-424.	5.55
Walia S S, Kumar N and Kaur T 2021	Response of different cultivars of basmati rice (Oryza sativa) on nutrient uptake and quality parameters under direct seeding.	Journal of Krishi Vigyan	10(1):223-229.	4.55
Walia S S, Singh S and Kaur K 2021	Sulphur application enhanced yield in groundnut (Arachis hypogaea) under furrow sowing technique.	Journal of Krishi Vigyan	9(2):229-233.	4.55

Yadav, R. K., Purakayastha, T.J., Nayan Ahmed, Ruma Das, Bidisha Chakrabarty, Sunanda Biswas, Sharma, V.K., Pooja Singh, Daizee Talukdar, Mourya, K.K., Walia, S.S., Rohitasav Singh, Shukla, V.K., Yadava, M.S., Ravisankar, N., Yadav, Basu Devi 2021	Long-term effect of fertilization and manuring on soil aggregate carbon mineralization.	The Indian Journal of Agricultural Sciences	Vol. 91(2)	6.21
Rani N and Singh D 2021	Remediation of Phytotoxic effect of chromium by different amendments in berseem-spinach rotation.	Journal of Eco-Friendly Agriculture	16(2): 109-115 doi: 10.5958/2582-2683.2021.00030.7.	5.23
SKUAST JAMMU				
Permendra Singh, Dileep Kachroo, N.P. Thakur, R.Punia, Shushma Shekhar Singh 2021	Impact of crop Bio intensification and nutrient management on production and productivity of lentil crop under north-western Himalayan region of Jammu and Kashmir.	International journal of Ecology & Environmental Science.	3(1) 485-489.	4.76
Ashu Sharma, Dileep Kachroo, N.P. Thakur, Anil Kumar, Lobzang Stanzen and Amit Mahajan 2021	Effect of organic sources of nutrients and weed management on weed flora, basmati rice growth and yield in Jammu region.	Indian journal of weed Science.	53(3): 238-243	5.84

Ashu Sharma, dileep Kachroo, R.Punia, N.P. Thakur, Anil Kumar, Amit Mahajan, Lobzang Stanzen, Rakesh Sharma and Sapna Bhagat 2021	Weed dynamics and productivity of potato as influenced by organic sources of nutrients and weed management.	Agricultural Mechanization in Asia.	52(1) 2702-2713.	6.29
R.S. Bochalya,A.K. Gupta, B.C. Sharma, R. Puniya, N.P. Thakur, Manish Sharma and Praveen Singh 2021	Residual effect of biofertilizer consortium and foliar nutrition on plant height of summer blackgram (Vigna Mungo) under different fertility levels subtropical condition of Jammu.	The Pharma Innovation Journal	10 (7): 609-611	5.23
R.S. Bochalya,A.K. Gupta, B.C. Sharma, R. Puniya, N.P. Thakur,Manish Sharma and Praveen Singh 2021	Residual effect of biofertilizer consortium and foliar nutrition on soil chemical properties after harvest of black gram crop as affected by different fertility levels under subtropical condition of Jammu.	The Pharma Innovation Journal.	10 (6): 605-608	5.23
Parshotam Kumar, N.P. Thakur, A.K. Gupta, Rohit Sharma, Manpreet Kour, Archana, R.S. Bochalya and Deepak Kumar 2021	Conservation agriculture practices in intensive cropping systems and its effect on crop productivity and soil health under North-Western Himalaya.	The Pharma Innovation Journal.	10 (8): 875-883.	5.23

CSKHPKVV,Palampur				
Sharma M, Parmar DK, Sharma Sanjay K, Kumar P and Kumar Praveen.2021	Influence of zinc nutrition on zinc availability, uptake and crop yield of rainfed maize-pea sequence in Northwestern Himalaya. 2021	Journal of Plant Nutrition.		6.75
Sharma M, Parmar DK and Sharma Sanjay K 2021	On-farm seed priming with zinc nutrition: a cost effective way to increase the yield of resource poor farmers. 2021	Journal of Plant Nutrition.		6.75
Sharma Anshumali, Pathania S.K., Pawan and Katoch Mittu 2021	Impact of COVID_19 on Agriculture and Allied Sectors 2021.	International Journal of Advances in Agricultural Science and Technology.	8(7): 34-42	3.77
OUAT,Bhubaneswar				
AK Patra, L M Garnayak, B B Behera, D Swain and R K Paikaray. 2021	Productivity, resource use efficiency and economics of rice (Oryza sativa)-based bio-intensive cropping systems in western Odisha.	Indian Journal of Agronomy	66(2): 157-162.	5.55

GBPUAT,Pantnagar				
Ram, B.; Singh, A.P.; Singh, V. and Pareek, N 2021	Effect of different land uses on soil physical properties at different depth in a Mollisol.	The Pharma Innovation Journal.	10(4): 763-767.	5.23
SKN, Durgapur				
Singh Pratibha, Sammauria R, Singh Surendra, Meena O P, Sharma Seema, Gupta Shweta and Singh A P. 2021	Effect of Foliar Nutrition of Water-Soluble Fertilizers on Crop Growth, Yield and Economics of Mustard under Semi-arid Conditions.	Indian Res. J. Ext. Edu.	21 (2&3):144-149	5.23
Bairwa, P.C, Sammauria, R, Gupta, KC, Singh Pratibha and Meena O.P. 2021	Direct and residual effect of phosphorus rich organic manure on phosphorus mobility: its use efficiency and sustainability in clusterbean –wheat cropping sequence in loamy sand alkali soils of Rajasthan.	Journal of Soil Salinity and Water Quality	13(1):86-93,2021	4.94
MPUAT,Udaipur				
Singh Hari, Meena, G.L.2021	Integrated Farming System: A profitable venture of Tribal farmers in Sourthen	Economic affairs	Vol, 66, No. 2 pp349-353 Rajasthan	5.58

A U, Kota				
Choudhary, M., Tetarwal, J.P., Ram, Baldev., Sharma. M.K. and Meena, C.B. 2021	Effect of land configuration and irrigation scheduling on growth, yield attributes and yield of quinoa under vertisols of Rajasthan.	Annals of Agricultural Research	2021. Vol 42(3): 299-307.	4.78
Bijarnia, A., Tetarwal, J.P., Ram, Baldev., Bijarnia, A.L., Kumar, R., Kumawat, R. and Choudhary, M.	Effect of nitrogen and phosphorus fertilization along with foliar spray of calcium chloride and potassium nitrate on performance of cowpea (Vigna unguiculata.)+baby corn (Zea mays) intercropping systems.	Indian Journal of Agronomy	2021, Vol. 66 (3): 79-84. (In press)	5.55

8.1.2 Paper presented in seminar/symposia

Author	Year	Date	Title of the Paper	Conference Name and vanue	Organized by
ANGRAU.Guntur					
Y.G.N.V.M. Manikanta, Manukonda Srinivas. Reddy Rajasekhara and Reddy C.V.	2021	19-21 July, 2021	Research review on pulses in rice (Oryza sativa) fallow situations	International Web Conference on Innovative and Current Advances in Agriculture & allied Sciences	Society for Scientific Development in Agriculture and Technology (SSDAT), Meerut, U.P
PAU,Ludhiana					
Neeraj Rani, Walia S S and Aulakh C S	2021		Effect of liquid humic Fertilizer on growth and productivity of transplanted basmati rice.	Extended Summaries of 5th International Agronomy Congress. 110012, Vol. 3 pp 1200-1201.	The Indian Society of Agronomy, IARI, New Delhi
Ratanoo Rekha, Walia S S and Saini K S	2021		Performance of gobhisarson (Brassica napus L.) under different doses of chemical fertilizers, FYM and different biofertilizers	Extended Summaries of 5th International Agronomy Congress.	The Indian Society of Agronomy, IARI, New Delhi 110012, Vol. 3 pp 1421-1423.
Kaur Prabhjit, Saini K S and Walia S S	2021		Production potential and soil nutrient availability of rice (Oryza sativa)- wheat (Triticum aestivum) cropping system influenced by organic amendments and different levels of nitrogen.	Extended Summaries of 5th International Agronomy Congress.	The Indian Society of Agronomy, IARI, New Delhi 110012, Vol. 3 pp 1495-1496.

PDKV,Akola					
B. V. Saoji, B. S. Morwal, D. S. Kankal & P. H. Bansod	2021	28-29th Jan., 2021	Studies on cropping system module for higher productivity, profitability, soil fertility and nutrient recyclying under Western Vidarbha region condition of Maharashtra	NAHEP National e Conference on "Agricultural Education, Innovation and Research for Future Livelihood - Indian Scenario in 2050"	Dr. PDKV, Akola
AAU,Jorhat					
Gogoi Bhabesh, Borah N., Kalita J.J., Borah M. and Sharma K.K..	2021	February 12-13	Yield trend and carbon sequestration in a rice-rice system of the Brahmaputra Valley of India: Effect of 32 years of INM practices.	2nd Asian Web Conference on "Managing Hill Resources and Diversities for Zero Hunger and Climate Resilience".	Soil Conservation Society of India, New Delhi.
BCKVV,Kalyani					
Chatterjee Soumitra, Boubaker Al Bashir Dhehibi, Karak Sabyasachi, Hazra Soumavho, Nath Rajib, Sarker Ashutosh	2021	17-31 August, 2021	Oral presentation on "Economic Impact of Lentil Cultivation on Marginal and Small Farm Households in Eastern India " August 18, 2021	31st Triennial Conference of International Conference of Agricultural Economist (ICAE) New Delhi	International Assosciation of Agricultural Economist (IAAE)

Saha Sushanta, Mohanty S., Mukhopadhyay S.K., Rayand M. Chatterjee S.	2021	26-27 August, 2021	Inorganic-organic fertilization on system productivity and soil nutrient balance in different rice-based cropping systems of the sub-humid tropical Inceptisols	NAHEP sponsored Virtual National Seminar on "Advances in Sustainable Management of Natural Resources for Food and Nutritional Security"	Navsari Agricultural University, Navsari
PJTSAU,Rajenderanagar					
Pathak Sushant, , S. K. and Kumar, Sanjay	2021	September 11-12, 2020	Integrated Farming Systems : An approach for livelihood security of small marginal farmers.	(In:) Souvenir and Abstract e-Book of International Web- Conference on Resource Management and Biodiversity Conservation to Achieve Sustainable Development Goals . Lucknow, U.P.	online by Academy of Natural Resource Conservation and Management (ANRCM), Lucknow, U.P.
Pragathi Kumari, Ch., Suneetha Devi, K.B., Rekha, K.B., Sridevi, S and Narender Reddy	2021		Evapotranspiration and Water Use Efficiency of Bt Cotton as Influenced by Different Land Configurations and Integrated Nutrient Management Practices	Global Conference on Innovative Approaches for Enhancing Water Productivity in Agriculture including Horticulture	PJTSAU, Rajendranagar

Latheef Pasha, Md., Sridevi, S., Ramana, M.V., Goverdhan, M., Reddy, P.R and Pragathi Kumari, Ch.	2021	December 14-16	Diversification of farming systems for doubling of income and sustainability of resources under marginal holdings of Telangana	30th National web conference on Soil and water management technologies for climate resilience, agricultural and environmental sustainability, , 2021,	OUAT, Bhubaneswar, Odisha, India.
Pragathi Kumari, Ch., Goverdhan, M., Ramana, M.V., Sridevi, S., Reddy, G.K and Latheef Pasha, Md	2021	November 23-27	Productivity and profitability of crop sequence module for integrated farming systems of Telangana	5th International Agronomy Congress, , 2021,	PJTSAU, Hyderabad, India.
Reddy, G.K., Sridevi, S., Goverdhan, M., Pragathi Kumari, Ch., Ramana, M.V., Latheef Pasha, Md and Kumar, S.M	2021	November 23-27	Integrated farming systems – a viable technology to reduce the green house gas emissions	5th International Agronomy Congress, November 23-27, 2021,	PJTSAU, Hyderabad, India.
Goverdhan, M., Pragathi Kumari, Ch., Reddy, G.K., Ramana, M.V and Kumar, S.M	2021	November 23-27	Evaluation of Crop + Horti – Pastoral + Livestock model under irrigated conditions of Telangana	5th International Agronomy Congress, November 23-27, 2021,	PJTSAU, Hyderabad, India.

Sridevi, S., Goverdhan, M., Pragathi Kumari, Ch., Latheef Pasha, Md., Ramana, M.V and Reddy, G.K	2021	November 23-27	Carbon footprint in crop + horti-pastoral + livestock integrated farming systems under irrigated dry conditions of Telangana, India	5th International Agronomy Congress, November 23-27, 2021,	PJTSAU, Hyderabad, India.
Shahana, F., Goverdhan, M., Sreedhar, M., Eswara Reddy, G and Ramana, M.V.	2021	November 23-27	Evaluation of Integrated Farming System model for irrigated situations for small and marginal farmers of Northern Telangana Zone	5th International Agronomy Congress, November 23-27, 2021,	PJTSAU, Hyderabad, India.
Nthebere, K., Sharma, S. H K., Pragathi Kumari, Ch. and Qureshi, A. A	2021	November 23-27	Cropping system effect on soil organic carbon and soil microbial population in an inceptisol of Southern Telangana zone	5th International Agronomy Congress, November 23-27, 2021,	PJTSAU, Hyderabad, India.
Latheef Pasha, Md., Sridevi, S., Ramana, M.V., Goverdhan, M., Reddy, P.R and Pragathi Kumari, Ch	2021	November 23-27	Diversification of farming systems for doubling of income and sustainability of resources under marginal holdings of Telangana	5th International Agronomy Congress, November 23-27, 2021,	PJTSAU, Hyderabad, India.
TNAU, Coimbatore					
K.R. Latha, S.P Sangeetha and V.Vasuki	2021	November 23-27, 2021	Integrated farming systems for irrigated uplands of Western Zone of Tamil Nadu.	5th International Agronomy Congress,	Faculty of Veterinary and Animal Sciences, MNS- Uni.of Agri. Multan. ISBN: 978-969-2201-02-5

S.P. Sangeetha, K.R. Latha and A. Renukadevi	2021	November 23-27, 2021	Identification of cropping systems module for different farming systems of Western zone of Tamil Nadu.	5th International Agronomy Congress,	Faculty of Veterinary and Animal Sciences, MNS- Uni.of Agri. Multan. ISBN: 978-969-2201-02-5
A .Renukadevi,. K.R. Latha, N. Ravisankar and Debashis Dutta	2021	November 23-27, 2021	Integrated livestock and crop production systems for irrigated uplands	5th International Agronomy Congress,	Faculty of Veterinary and Animal Sciences, MNS- Uni.of Agri. Multan. ISBN: 978-969-2201-02-5
K.R Latha., A. Renukadevi and S.P. Sangeetha	2021	November 23-27, 2021	Soil Health Improvement in Integrated Farming System Under Irrigated Dryland of Tamil Nadu	5th International Agronomy Congress,	
K.R. Latha., P. Chandana, N.Thavaprakaash and S.P. Sangeetha	2021	November 23-27, 2021	Integrated Organic Farming System Model Under Wetland Ecosystem	5th International Agronomy Congress,	Faculty of Veterinary and Animal Sciences, MNS- Uni.of Agri. Multan. ISBN: 978-969-2201-02-5
KAU,Karamana					
Meera, A. V. and Thampatti, M. K. C	2021	13-17 September 2021	Biochar: Natural viable technology for metal decontamination	In: Proceedings of the 9th International Symposium Wetland Pollutant Dynamics and Control (WETPOL 2021)	BOKU University, Vienna Austria fully in Virtual mode

John, J. Sudha, B., Meera A..V, and Sajeena, A	2021	November, 23-27	Integrated Farming Systems Models for Different Agro Ecological Units of Kerala	In: Extended Summaries of Fifth International Agronomy Congress.	The Indian Society of Agronomy, IARI, New Delhi, India
Greeshma, U., Bindhu, J. S., Pillai, P. S., Jacob, D., and Sarada, S.	2021	14-16, December	Wicking bed irrigation for urban and periurban nutritional security	In: Abstracts, International Conference on Vegetable Research and Innovations for Nutrition, Entrepreneurship and Environment; p.515, Abstract No. TS-V/TH-2/P-206.	Indian Society of Vegetable Science, Varanasi,

8.1.3 Popular Articles

Auther	Year	Title of Paper
ANGRAU,Gunture		
Manukonda Srinivas, B. Anusha, C. Venkata Reddy and G. Jogi Naidu		Rabi Varilo Digubadi penche melakuvalu. Oct, 2021. Annadata. Pp: 38-39
BAU,Sabour		
Sharma, R.P., Kumar Sushant, , Sanjay, Pathak, S. K. and Singh, Satyaveer 2021.	2021	Samanvit Krishi Pranali Se Uvaao ka aarthik vikas. Smarika, Kisan Mela-2021. Pp 17-26.
Kumar, Sanjay, Dutta, S.K., Kumar, Birendra, Sushant, Pathak, S. K.and Singh, Garima 2021	2021	Dhan ki seedhi bovaai: eak unnat krishi takneek. Smarika, Kisan Mela-2021. Pp 64-70.
PJTSAU, Rajenderanagar		
Ramanjaneyulu, A.V., Sainath, N. and Venkata Ramana, M.	2021	Multifarious uses of Vetiver grass. Chronicle of Bioresource Management- An International E-magazine. June: 26-32
SKN, Durgapura		
B.L. Meena, S.S. Yadav, M.K. Meena and M.L. Meena	2021	Present need of organic Farming ,Pp 1-5, Sept.2021Krishi Sewa
B.L. Meena, M.L. Meena and R.K. Meena	2021	Scientific cultivation of chickpea crop, Pp 1-5, 2021, Jobner Krishi
Singh Pratibha, Gupta K C, Singh, Meena O P and Baloda A S.	2021	Integrated Farming System: Key for Sustainable Agriculture ,Just Agriculture (3): 1
Singh Pratibha	2021	Phasal Utpadanmein Nano Urea Ka MahatvevamUpyog. Abhinav Krishi.Vol 3 (2) 2021. 44-45.
Singh Pratibha	2021	Kharif Ki PraamukhPhaslomeinKhadevamUrvarakPrabandhan. HaritKrati.June 2021, pp 5.
शर्मा डॉ रिधि शंकराकयंप्रि, ,डॉ गुप्ता कैलाश चन्द एवम डॉ शर्मा योगेश	2021	जीरा व सोफ़ मसाला वर्गीय फसलो के प्रमुख रोग एवम प्रबन्धन 'हरित क्रांति 52 ,जनवरी ,1202

प्रियंका, रिधिशंकर शर्मा॔ड , मव, रथुामीस एडॉ के सी गुप्ता	2021	."कद्दू वर्गीय सब्जियों में लगने वाले रोग व उनका प्रबंधन " हरित क्रांति 52,फेरवरी ,20,12
A U Kota		
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MPUAT,Udaipur		
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CCSHAU,Hisar		
Kavita, R.S Dadarwal and Jat R.D	2021	Samanvit Krishi Pranali – lagat kam munafa aadhik
Jat R.D, R.S Dadarwal and Kavita	2021	Khaad Ak – laabh anek : kenchua khaad
JAU,Junagadh		
Gohil, G. R., Solanki, R. M. and Sharma P. S.	2021	Sankalit Khet Padhdhatee mate agatyni Mahitee" Krushi Prabhat
Rupareliya, V.V. and Solanki, R.M.	2021	Addressing multi nutrient deficiency in crops through customized fertilizers.
Solanki, R.M.; Sagarka, B.K.; Mathukia, R.K. and Panara, D.M	2021	Kheti nee Avak Bamani Karva ma Adachano ane Upayo (Gujarati)
Solanki, R.M. and Sagarka, B.K.	2021	Integrated Farming Systems in Saurashtra Region (Gujarat): An Overview.

KAU,Karamana		
John J, Sudha, B., Sajeena,A., Meera A.V, kumar Hirosh, K.S., kumar Krishna,G.	2021	Manassundenkil idavum undavum (Farming options for small homesteads) in Malayala Manorama daily - 14-01-2021
Sudha B and Asha K.Raj	2021	Krishiankanam - Samyojithakrishiyile theettasekharam : Fodder vrikshangal (Fodder trees in IFS): 44-46
John, J., B.Sudha, Sajeena, A., A.V Shanas Meera, , S.,Krishnakumar G, kumar Hirosh , K.S.	2021	Nutrient gardens for health benefits (Aaarogya samrakshanathinu poshakathottangal) . Kerala Karshakan of FIB, Dept of Agril Development and Farmers welfare, GoK
PAU,Ludhiana		
Dhkal Manmohan, Aulakh, C. S. and Walia, S. S. (2021).	2021	Good Agricultural Practices in basmati for safe food production. Progressive Farming57 (7): 18-19.
Singh, S. And Walia, S. S. (2021).	2021	Use of need based inputs is a key of safe food. Punjab Cooperation. pp 28-29.
UAHS, Shimoga		
Kumara, O. AND Priya, Y. H.	2021	Verticle Farming- Suitable technique for small scale holdings and water scares condition
BCKVV,Kalyani		
Saha Sushanta, Saha Bholanath, Basak Nirmalendu, Rakshit Rajiv and Jha Vidya Bhushan	2021	Cropping System Diversification: Stabilizing smallholders' income and enhancing agro-ecosystem services; Indian Farming 71(02): 03–05; February 2021

8.1.4 Book and Book Chapter

Authors	Title of paper/ pamphlet/ bulletin	Volume, pages	Publisher name	Year
TNAU,Coimbatore				
A. Valliammai N. Satheeshkumar and V.K. Duraisamy	Effect of drip irrigation on yield and water use efficiency of rice cultivation	Pp .140	Shanlax Publications, Madurai (978-93-91373-96-3)	2021

A.Valliammai V.Vageswaran N.Satheeshkumar and V.K.Duraisamy	An Economic analysis of mechanization in rice cultivation	Pp .367	Shanlax Publications, Madurai (978-93-91373-96-3)	2021
N.Satheeshkumar and V.K. Duraisamy	Integrated farming systems implemented in Erode District farmers fields (Tamil).	220-231	Thannambikkai publisher, Coimbatore (978-93-91845-48-3)	2021
SKN, Durgapura				
B.L. Meena	Nanotechnology in agriculture	PP. 90 vol 01	Advancing innovations in sustainable agriculture	2021
B.L. Meena and M.L. Meena 2021	Importance of agriculture crops in Kolhapur district of Maharashtra	PP 207 vol 01	Advancing innovations in sustainable agriculture	2021
Singh Pratibha and Singh A. P.	Nanomaterials in Soil Health Management and Crop Production: Potentials and Limitations		In: Handbook of Nanomaterials and Nanocomposites for Energy and Environmental Applications, Springer Nature Switzerland	2021
Singh Pratibha, Sammauria R, Singh M, Singh S K, Jatav H S, Mehjabeen, Yadav M R and Dwivedi A K	Rhizobia: A Potent Tool for Amelioration of Drought Stress in Legumes.		*In: Plant Growth Regulators,* Springer Nature	2021
Singh A, Rajput P, Chopra R, Ankush, Singh S, Singh A and Singh Pratibha	Application of Nanomaterials in Agriculture and Environment Management. *In: Microbial Synthesis of Nanomaterials*.	PP,163-177.	Nova Science Publishers ISBN: 978-1-68507-614-6	2021
Kumar D, Yadav M R, Makrana G, Rajput Vishnu D, Biswal B, Kashyap S, Kumar Rakesh, Singh Pratibha and H S Jatav	Effects Uptake Translocation and Toxicity of Ti based Nanoparticles in plants. *In: Toxicity of Nanoparticles in Plants.*		Nature Switzerland ISBN: 978-0-323-90774-3	2021

SDAU,S K Nagar				
Deepak Kumar, S.K. Arya, Deepti Srivastava, Md. Shamim, L.J. Desai and Manjusha Tyagi.	Impact of major rice bacterial diseases on agriculture and food security published in book name: Bacterial Diseases of Rice and Their Management		Vol-I in the book series “Pathogens of Rice and Their Management published by Apple Academic Press, USA	2021
Deepak Kumar, L.J. Desai, Chandrabhanu, Sanjay K. Singh, K.P. Singh, N. Balasubramani, and A. Sadalaxmi	Pre-harvest management of aflatoxin contamination in groundnut through biocontrol products		Applied Mycology in Agriculture, Food and Industrial Applications, Vol-I. published by Apple Academic Press, USA	2021

8.3 TRAING,GROUP MEETING,WORKSHOP ORGANIZED

The Annual Group Meeting of ICAR-AICRP on Integrated Farming Systems was organized during 18-20 December 2021 in hybrid mode (virtual & physical) 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 Natural Farming demonstration. All the Chief Agronomist, Agronomist of AICRP-IFS from on-station and on-farm centres participated besides scientists from ICAR-IIFSR.

Dr S.K. Chaudhari, Deputy Director General (Natural Resource Management), ICAR inaugurated the Annual Group Meeting as Chief Guest while Dr S. Bhaskar, ADG (AAFCC) participated as Guest of Honour and Special invitee respectively. Dr A.S. Panwar, Director, ICAR-IIFSR, Modipuram welcomed the guests and delegates. He briefly informed about research activities being carried out by the institute and the importance of farming systems research for enhancing the sustainability and income of the farmers. Dr N. Ravisankar, Principal Scientist and Programme Facilitator (Coordination Unit) presented the brief achievements of the scheme including details of

60 prototype IFS models developed, 31 bankable projects on IFS and 63 farmer participatory refined farming systems suitable to various States. He also highlighted, recent initiatives such as model value chain development in IFS and scaling of farming system models by Kerala, Tamil Nadu and Telangana States. Dr S. Bhaskar, ADG (AAFCC) in his address emphasized on need to promote IFS in convergence mode besides developing value chain development and constant follow up for impact study. He also emphasized on besides improvement in income, IFS results in several other benefits which includes greater sustainability in production and income due to diversity, round the year income and employment, improving the land use efficiency, cropping intensity especially in waterlogged and rainfed lowlands, improvement in share of renewable energy, increase in water productivity and addressing the sustainable development goals. It was also pointed out that outputs from each component of IFS is classified as direct and indirect economic benefits. Indirect economic benefits are obtained through utilization of wastes and by-products from one component is used as input for other components. Recycling of dung, urine from livestock, crop residues, mulching, cropping systems involving legumes and green manures, crop diversity and soil cover contributes significantly for reducing the mineral fertilizers. Considering the multiple benefits of IFS and its contribution to meeting the Sustainable Development Goals (SDGs), there is a need to develop model Climate Smart IFS (CS-IFS) village covering most vulnerable eco-systems (Arid and coastal). Through implementation of Integrated Farming System models, SDGs can be addressed effectively and achieved by 2030. This will also improve the sustainability

in farming, farm production and natural resources utilization. Guest of honour released the publications from the scheme and congratulated all the Scientists involved in the scheme for their significant achievements especially development of IFS models.

Recommendations

1. Natural farming is emerging as an alternative production system. Farmer participatory research cum demonstration on “Natural Farming” should be initiated by On-Farm Research Centres in all the 32 operational districts. Demonstration on Complete natural farming (practice involving PMDS, use of natural farming inputs, soil cover and prophylactic control measures using botanicals and bioagents), organic farming and integrated crop management (ICM) to be implemented at all the locations from pre-kharif 2022. Two farm households each in low and high productive blocks of the mandated district to be involved with minimum area of 0.10 ha in each of practices such as Natural Farming, Organic farming and ICM. Marginal & Small (<2 ha) and under privileged (SC/ST) farm households who have native breeds of cow is to be involved. In case, the minimum area specified is not available in the OFR villages, centres may be allowed to take up the activity with lesser area.
2. Land configuration based integrated farming system should be further expanded and strengthened in coastal and waterlogged areas. Diversification should be made by incorporating high value fishery component including indigenous catfish.
3. Cost analysis of IFS models should be made with distributed capital investment over the years. Nutrient based costing should be considered for working out equivalent yield and income from green manures, green leaf manures and recycling of wastes in the IFS models.
4. Agroclimatic zone specific sub-groups involving Scientists from concerned AICRP-IFS centres and ICAR-IIFSR should be constituted. The subgroup can pool all the data, analyse, and publish the research papers, technical bulletins, and policy briefs. Synthesis and writing lab may be organized by involving subject experts and AICRP-IFS centre at ICAR-IASRI.
5. Meta analysis on Integrated Farming Systems should be made by using the published research papers from AICRP-IFS.
6. Centres of Excellence on Integrated Farming Systems Research should be developed at selected Centres. Lead centre may facilitate for submitting the proposals to State and Central agencies for funding under RKVY & other schemes.

Appendix 9

APPENDIX IA : WEATHER PARAMETERS (MONTHELY AVERAGES RAINFALL) AT DIFFERENT FARMING SYSTEM CENTERS DURING 2020-21

Centre	June	July	August	Sept	October	Nov	December	January	February	March	April	May
Akola	165.2	264.9	212.8	90.7	32	5.5	0.5	2.5	0	14.4	1.0	42.8
Bhubneswar	95.3	158.9	585.4	211.7	247.6	5.6	0.0	0.0	0.0	7.5	7.2	200.3
Chiplima	261.0	208.8	383.7	100.3	16.4	10.0	0.0	0.0	4.2	3.3	52.2	34.6
Coimbatore	22.5	83.5	49.5	140.5	36	103	32	141.5	2.9	0	34	25.5
Durgapura	21.8	32.8	387.0	61.2	1.0	14.2	0.0	6.8	0.0	4.6	0.0	81.4
Faizabad	23.8	254.2	273.4	93.8	3	6.2	0	0	0	0	0	140.8
Goa												
Hisar	48.8	172.9	62	39.5	0.0	19.9	0.0	8.9	8.7	5.6	1	33.5
Indore	176.6	93.6	572.2	192.8	23.3	0	11.4	0	0	5.3	0	8
Jabalpur	75.3	289.4	698.4	149.8	0.0	6.6	2.3	0.9	12.6	6.2	0.6	77.5
Jammu	87.3	159	594.2	19	0	35.8	37.2	92	0	18.8	22.2	52.0
Jorhat	410.3	358.7	325.7	210.3	180.8	19.3	4.0	14.3	2.6	52.4	4.9	55.2
Junagadh	301.9	454.0	866.0	136.1	48.9	0.0	1.2	0.0	0.0	0.0	1.7	51.4
Kalyani	206.1	346.1	367.0	167.4	247.1	0.3	0.0	0.0	1.1	0.0	25.9	352.4
Kanpur	97.0	446.6	353.2	62.6	0	38.4	0	0.3	4.8	0.6	10.8	31.8
Karmana	173.8	128.6	140.2	615.7	169.0	106.5	107.3	65.0	0.0	60.2	81.8	820.8
Kathalagere	88.00	139.00	122.00	474.00	155.00	20.50	0.00	33.40	3.40	0.00	46.20	348.60
Kota	102.5	97.5	335.6	118.6	0.0	0.0	17.0	57.0	0.0	7.0	0.0	65.0
Ludhiana	9.6	232.0	145.6	13.6	0.0	15.6	6.0	11.0	17.0	5.0	14.3	37.3
Modipuram	65.2	63.7	49.5	27	27	27.0	27	23.9	10.6	0	7.1	153.2
Maruteru	92.9	427.2	169.6	301.0	374.9	240.4	0.0	0.0	0.0	0.0	6.4	24.6

Navsari	117.00	674.00	1265.00	210.00	5.00	0.00	39.00	0.00	0.00	0.00	0.00	144.00
Palampur	259.4	508.8	634.6	98.4	0	26	41.8	51.6	22.4	18	153.8	108
Parbhani	199.5	256.0	132.7	318.4	117.0	0.0	0.0	0.0	16.3	14.3	2.0	69.1
Pantnagar	155.0	384.5	267.7	56.3	0.0	0.0	2.5	18.6	4.6	0	0.7	240.2
Portblair	657.1	382.5	351.7	403.9	461.8	192.9	163.3	25.5	92.2	0.0	247.9	469.1
Powarkheda	236.5	148.8	1016.0	67.3	15.6	0.0	7.2	1.5	1.0	1.8	0.0	52.4
Rajendranagar	145.2	266.8	234.2	384.8	344.6	15.2	0.0	4.2	0.4	0.0	12.2	112.6
Rewa	283.0	304.8	260.2	121.0	0.0	0.0	10.6	0.0	0.0	0.0	0.0	74.4
Sabour	155.8	353.5	112.8	238.0	20.8	0.0	0.0	0.0	0.0	0.4	0.0	251.3
Siruguppa	93.0	272.7	103.8	187.0	148.6	29.0	0.0	3.0	5.0	0.0	9.2	42.5
Thanjavur	32.1	222.1	155.2	117.1	144.1	112.8	320.1	245.8	0.0	0.0	12.3	82.8
SK Nagar	75.0	195.0	785.0	165.5	35.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5
Umiam	463.5	627.7	197.6	695.2	484.6	79	25.4	0	20.4	29.6	57.7	334.9

Appendix II B : Maximum and minimum temperature(0C) (June 2020 to May 2021)

Centre	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	35.20	24.60	32.70	23.70	29.60	22.70	32.80	22.00	33.20	19.60	32.00	12.50	30	12.6	30.7	15.4	32.4	14.6	37.4	19.3	40.5	23.3	40.5	26.5
Bhubneswar	34.9	26.7	34.4	26.5	32.7	26.0	34.1	26.2	31.9	24.4	31.4	19.6	29.8	14.3	30.5	16.3	32.8	15.3	37.7	23.0	38.5	25.8	36.5	26.1
Chiplima	37.1	24.4	34.8	25.8	34.5	22.8	29.5	20.7	33.1	17.6	32.0	15.3	26.9	11.5	27.1	10.7	30.0	11.3	31.0	16.2	35.0	19.7	40.2	22.6
Coimbatore	32.5	24.0	31.6	23.2	31.1	23.4	30.3	23.1	30.8	23.6	30.5	22.1	28.0	21.0	27.8	21.0	31.51	20.13	34.9	22.6	35.2	24.4	33.6	24.6
Durgapura	38.6	26.2	36.3	26.2	32.0	24.3	34.5	24.7	34.3	19.9	28.3	13.3	25	9.7	22.0	8.8	28.7	12.0	34.4	17.8	37.6	21.3	37.8	24.9
Faizabad	33.5	26.3	32.9	26.9	32.9	26.7	33.6	26.0	33.8	19.9	28.2	11.8	23.5	7.8	19.9	7.8	27.0	10.1	32.9	15.0	36.8	18.5	33.9	24.0
Goa																								
Hisar	38.2	26.1	36.0	26.9	34.8	26.6	36.0	24.3	34.4	14.8	26.1	9.9	21.6	5.0	17.4	6.0	25.7	8.1	31.0	13.5	36.3	16.2	37.7	22.8
Indore	34.1	24.2	32.3	24.7	27.9	23.7	31.0	23.3	32.2	18.9	28.7	11.9	24.9	10.6	25.2	11.1	28.4	10.6	34.9	17.1	38.7	21.6	38.6	25.5
Jabalpur	34.8	24.7	32.8	24.8	29.9	24.0	32.7	23.8	32.5	19.8	29.3	11.2	25.7	8.9	25.0	9.7	28.0	10.1	34.0	14.9	37.9	17.3	37.1	23.3
Jammu	38.7	26.0	35.6	26.0	33.2	25.7	34.4	24.6	32.2	15.2	24.4	9.2	18.8	6.0	17.5	6.6	22.9	9.5	28.1	12.3	32.4	14.3	36.1	19.9
Jorhat	31.5	24.3	31.5	25.0	33.6	25.6	32.4	24.8	31.7	23.3	21.1	15.8	24.9	10.5	23.4	10.4	27.3	11.5	29.3	16.2	31.7	18.6	31.5	19.4
Junagadh	35.1	26.3	32.2	26.0	30.5	25.2	33.1	25.4	35.4	23.1	33.0	17.1	30.2	14.0	28.3	11.1	33.1	14.7	38.2	19.9	40.1	23.2	38.4	25.9
Kalyani	33.6	26.2	33.1	26.4	32.1	26.6	32.9	26.2	32.6	24.8	31.3	15.8	25.9	11.5	24.8	11.9	29.4	13.9	36.0	20.8	37.0	24.6	34.2	24.7
Kanpur	34.9	26.4	33.8	26.8	33.0	26.6	34.5	26.6	34.2	19.4	27.5	12.3	23.4	8.7	20.3	8.4	27.3	10.9	33.2	17.1	38.7	20.2	35.8	24.8
Karamana	32.3	26.0	31.7	23.8	31.5	25.6	30.9	23.5	31.2	23.6	32.1	23.8	33.0	24.5	31.8	22.5	32.3	22.7	33.6	22.9	34.0	22.9	31.8	23.4
Kathalagere	30.88	21.58	28.98	21.44	27.83	21.18	29.23	20.92	29.50	19.70	30.50	17.70	29.50	16.80	35.00	17.90	36.20	20.30	37.70	22.40	37.20	24.80	35.50	25.00
Kota	39.83	23.27	37.18	23.63	34.83	22.86	35.14	23.12	35	20.29	31.38	14.66	26.83	10.21	23.79	8.29	26.92	10.1	34.6	13.68	39.41	15.83	40.74	19.77
Ludhiana	37.6	26.5	34.4	26.9	33. 5	26.8	34.5	24.9	32.6	15.9	25.3	9.8	19.4	7.1	16.9	7.1	23.8	10.2	29.5	14.9	34.2	16.9	36.3	22.6
Modipuram																								

Maruteru	33.2	22.8	31.1	25.6	30.6	25.9	31.8	26.8	30.7	26.0	30.3	23.5	29.2	20.2	29.5	21.5	29.3	21.0	31.8	29.3	33.3	25.3	33.9	27.4
Navsari	33.2	25.6	31.8	25.2	29.5	24.5	32.4	24.7	34.9	22.5	33.6	16.7	30.7	14.8	30.4	13.9	33.5	14.3	37.3	17.0	36.1	21.5	35.2	24.7
Palampur	28.2	17.3	28.1	18.2	27.3	19.2	27.9	16.4	26.9	11.5	20.3	6.3	17.8	3.4	16.6	3.9	19.8	7.1	23.8	11.0	25.4	12.7	27.7	16.1
Parbhani	33.8	23.5	31.9	23.1	30.2	22.1	31.7	22.1	32.2	20.6	30.3	14.0	30.8	11.6	30.6	14.9	31.5	12.7	36.7	17.3	38.8	20.3	38.5	24.3
Pantnagar	35.2	24.1	33.3	25.6	32.5	25.4	34.2	21.3	34.0	12.4	28.5	8.6	20.8	4.1	18.8	6.1	29.3	7.8	33.4	13.6	36.8	14.1	36.3	19.9
Portblair	30.3	25.1	30.2	24.8	30.5	25.3	30.1	24.7	29.8	24.3	30.8	33.4	29.8	32.5	30.2	24.7	30.5	24.1	32.2	25	32.1	24.8	33.4	25.4
Powarkheda	40.0	19.0	37.0	22.0	36.5	21.5	35.0	22.0	35.2	14.0	34.0	11.0	31.5	8.5	28.5	5.5	34.5	5.5	40.2	11.0	41.2	12.5	41.3	20.0
Rajendranagar	37.5	23.3	39.6	22.1	33.5	22.0	30.5	21.8	30.0	20.4	29.4	16.7	28.5	12.5	29.5	15.3	30.7	13.8	35.9	17.0	37.4	22.1	36.3	24.8
Rewa	35.1	24.6	34.0	25.9	32.6	25.3	32.9	25.2	34.6	20.9	29.8	11.8	24.8	9.0	22.9	6.4	27.9	9.0	34.9	15.1	39.3	18.4	37.2	22.6
Sabour	33.8	26.1	33.1	25.9	34.1	26.3	32.9	25.7	33.8	22.6	30.5	15.4	23.6	10.8	21.6	11.0	25.5	12.7	32.7	19.2	36.4	24.4	33.6	24.4
Siruguppa	35.9	24.0	34.7	16.5	32.3	21.4	31.2	22.5	31.2	19.6	32.0	21.9	39.3	18.6	31.7	19.7	33.1	29.1	38.3	23.4	40.6	26.7	39.5	26.9
Thanjavur	37.6	NR	34.9	20.8	34.8	25.9	34.2	26.4	32.6	24.1	30.5	23.8	28.9	22.7	30.1	22.8	31.8	21.2	36.0	24.1	36.4	26.7	35.7	27.1
SK Nagar	39.4	25.8	37.3	26.0	33.4	25.3	34.7	24.7	35.7	19.8	33.8	13.0	27.9	8.5	24.9	8.5	35.9	11.8	37.5	16.7	40.4	21.9	40.9	24.9
Umiam	27.0	20.4	26.7	20.9	28.6	21.1	27.1	20.0	26.9	18.1	24.7	10.9	21.2	8.3	21.2	7.2	23.6	9.3	27.3	12.9	29.1	16.3	26.8	17.9

APPENDIX III : CENTRE-WISE STAFF POSITION

1. AAU JORHAT (ASSAM)	
Main Centre, Jorhat	
Chief Agronomist	Dr.K K Sharma
Jr. Agronomist	Mrs. J. R. Hazarika
Jr. Soil Scientist	Mr. Bhabesh Gogoi
Technical Asstt.	Mr. K. K. Bordoloi
On-Farm Centre,Goalpara	
Agronomist	Mr. Ajoy Sankar Bora
Jr.Economist	Mrs. M. Borah
Field assistant	Mr. R. Borah
Field assistant	Mr. D. Sarma
Field assistant	Mr. L. Khaund
Field assistant	Mr. A.K.Borthakur
Driver	Sri Suresh Boro

2. ANGRAU, Guntur (A.P.)	
Sub Centre,Maruteru	
Agronomist	Dr. M. Srinivas
Technical Asstt.	A. S. Saibaba Reddy
On-Farm Centre,Vizianagaram	
Agronomist	Dr.M.M.V.Srinivasa 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
On-Farm Centre,Nalanda	
Agronomist	Dr. D.K. Mahto
Jr. Economist	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Driver	Vacant

4. IGKVV, RAIPUR (CHHATISSGARH)	
Main Centre,Raipur	
Chief Agronomist	Dr. M.C. Bhambri
Jr. Soil Scientist	Mr.S.S. Porte
Jr. Agronomist	Mr. Sunil Kumar
Technical Asstt.	Mr. B.K.Chandrakar
On-Farm Centre, Kanker	
Agronomist	Shri Anil Kumar Netam
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 A.M Patel
Jr. Soil Scientist	Mr. P.K.Patel
Jr. Agronomist	Dr. K. M. Patel
Technical Assistant	Vacant
On-Farm Centre, Adiya, Patan	
Agronomist	Dr. L. J. Desai
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 Girishbhai J Patel
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. Pawan Kumar
Jr.. Agronomist	Dr. Uma Devi
Sr. Soil Scientist	Vacant
Technical Asstt.	Vacant
OFR Centre,Fatehabad	
Agronomist	Vacant
Jr. Scientist(Ag. Econ.)	Dr. Gulab Singh
Field Assistant	Mr.Mahinder Singh
Field Assistant	Sh. Sadi Lal
Field Assistant	Sh. Hariom
Field Assistant	Mr.Sube Singh
Driver	Vacant
10. CSK HPKVV,PALAMPUR (H.P.)	
Main Centre, Palampur	
Chief Agronomist	Dr.S.C Negi
Jr. Soil Scientist	Dr. Sanjay K Sharma
Jr. Agronomist	Dr.Pawan Pathania
Technical Asstt.	Sh. Manohar Lal

On-Farm Centre, Bilaspur	
Agronomist	Dr.S.K.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	Prof. Dileep Kachroo
Jr. Soil Scientist	Dr.N. P.Thakur
Jr. Agronomist	Dr. Vijay Khajuria
Technical Asstt.	Vacant
OFR Centre ,Jammu	
Agronomist	Dr. A.K.Gupta
Field assistant	Kuldeep Sharma
Field assistant	Dheeraj Rajwal
Field assistant	Mr.A.W. Katoch
Field assistant	Vikas Koul
Driver	Mohd.Saleem

12. BAU,Ranchi (JHARKHAND)	
Main Centre,Ranchi	
Chief Agronomist	Dr. M. S. Yadava
Jr. Soil Scientist	Mr. A. N. Puran
Jr. Agronomist	Mr.R.P.Manjhi
Technical Asstt.	Mr.Rakesh Mitra

On-Farm Centre,East Singhbhum	
Agronomist	Dr.Shambhu Saran Kumar
Field assistant	Rajesh Kujur
Field assistant	Parvej Alam
Field assistant	Anant Kumar Mandal
Field assistant	Tulsi Baitha
Driver	Vacant

13. UAHS, Shivamoga	
Main Centre, Kathalagera	
Chief Agronomist	Dr.H.G.Sannathimmappa
Jr. Soil Scientist	Dr. Rajashakhar L
Jr. Agronomist	Dr.H.G.Sannathimmappa
Technical Asstt.	Mr. VijayS.Dannaraddi

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	
Chief Agronomist	Dr.Basavarajappa M.A
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. V.V. Angadi
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.Sudha. B
Technical Asstt.	Mr. Krishnakumar.G
On-Farm Centre, Thiruvananthapuram	
Agronomist	Dr. D. Jacob
Jr. Ag. Economist	Dr. Bindhu J.S.
Field assistant	Sri. Manu M.
Field assistant	Sri Santhosh N.
Field assistant	Vacant
Field assistant	Vacant
Driver	Vacant
18. JNKVV,Jabalpur (M.P.)	
Main Centre,Jabalpur	
Chief Agronomist	Dr. P B Sharma
Jr. Soil Scientist	Vacant
Jr. Agronomist	Dr. R.P.Sahu
Technical Asstt.	Dr. Abhijeet Dubey
Sub Centre,Rewa	
Agronomist	Dr.B.M.Mourya
Tech.Assistant	Vacant
Sub Centre,Powerkheda	
Agronomist	Dr. V.K. Singh
Tech.Assistant	Shri. Sudhir Dubey
On Farm Centre,Anuppur	
Agronomist	Dr D.N. Shrivash
Field assistant	Mr.V.R.Ghorke
Field assistant	Shri Sunil kumar Malviya
Field assistant	Vacant
Field assistant	Vacant
Driver	Vacant
On Farm Centre,Umaria	
Agronomist	Dr. Namrata Jain
Field assistant	Shri M. S. Prajapati
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Driver	Vacant
19. RMVRSUA&T GWALIAR ,(M.P.)	
Sub Centre, Indore	

Agronomist	Dr. S.K. Choudhary
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, Satara	
Agronomist	Dr. Arun D. Tumbare
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. B. V. Saoji
Jr. Agronomist	Mr.B.S. Morwal
Jr.Soil Scientist	Vacant
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. A. S. Karle
Jr.Economist/ Jr.Agronomist	Vacant
Jr.Soil Scientist	Dr. S. T. Shirale
Tech. Assistant	Shri. D. Y. Chavan
On Farm Centre, Hingoli	
Agronomist	Dr. D. C. Lokhande
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. S. B. Bhagat
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 Amol V Dahiphale
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.Rabindra Kumar Paikaray
Jr. Agronomist	Dr.Alok Kumar Patra
Jr. Soil Scientist	Mr.B.B.Behera
Tech. Assistant	Mr.Dilip Kumar Rout
Sub Centre,Chiplima	
Agronomist	Dr. Sanjukta Mohapatra
Tech. Assistant	Vacant
On Farm Centre, Kendujhar	
Agronomist	Dr.T. R. Mohanty/ Dr. K.C. 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
25. PAU, Ludhiana (PUNJOB)	
Main Centre,Ludhiana	
Chief Agronomist	Dr.Sohan Singh Walia
Agronomist	Dr.C.S.Aulakh
Jr.Soil Scientist	Dr (Mrs). Neeraj Rani
Tech. Assistant	Manpreet Singh
On Farm Centre,Patiala	
Agronomist	Dr Jashanjot Kaur
Field Assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Driver	Mr.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. L N Dashora
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. B. L. Meena
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.M.Goverdhan
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.Md Lateef Pasha
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.K.R.Latha
Jr.Soil Scientist	Dr.A.Renukadevi
Jr. Agronomist	Dr. S.P.Sangeetha
Tech. Assistant	Mrs. P.Kasthuri
Sub Centre, Thanjavur	
Agronomist	Dr.S. Porpavai
Tech. Assistant	S.Palanisamy
On farm, OFR Centre Erode, Bhavanisagar	
Agronomist	Dr.N.Satheeshkumar
Field Assistant	Th. R. Rajesh
Field Assistant	Ms. A. Kasthuri
Field Assistant	Th. M. Vijay
Field Assistant	Th. S.Sakthivel
Driver	Th.S.Sureshkumar
On farm, OFR Centre, Salem, Yethapur,	
Agronomist	Dr.D.Raja/ Dr.D.Ravisankar
Jr. Ag economist	Vacant
Field Assistant	Mr.V.Sekar

Field Assistant	Mr.A.Ravichandran
Field Assistant	Mr.A.Murugan
Field Assistant	Mr.C.Muthulakshmi
Driver	Mr.P.Govindaraju
31. CSAUA & T, Kanpur (UTTAR PRADESH)	
Main Centre,Kanpur	
Chief Agronomist	Dr. Karam Husain
Jr. Soil Scientist	Dr.U.S.Tiwari
Jr. Agronomist	Vacant
Technical Asstt.	Mr. U. S. Yadav
On Farm Centre,Fatehpur	
Agronomist	Vacant
Field Assistant	Mr. Sudhir Pratap Singh
Field Assistant	Mr. Jagdish Chandra
Field Assistant	Mr. R.B.Yadav
Field Assistant	Vacant
Driver	Mr. Vijay Kumar
32. ANDUAT, Ayodhya (UTTAR PRADESH)	
Main Centre, Ayodhya	
Chief Agronomist	Dr.N.B.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
34. BHU, Varanasi (UP)	
Sub Centre,Varanasi	
Agronomist	Dr.J.S.Bohra
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. S. K. Mukhopadhyay
Jr. Soil Scientist	Dr. Sushanta Saha
Jr. Agronomist	Vacant
Technical Asstt.	Mr.Basudeb Datta

On-Farm Centre, Nadia	
Agronomist	Dr.Manabendra Ray
Jr. Economist	Dr.Soumitra Chatterjee
Field assistant	Mr.A.K.Bhaumik
Field assistant	Mr.K.Maiti
Field assistant	Mr.N.Das
Driver	Vacant

APPENDIX IV SOIL FERTILITY STATUS AND NUTRIENT UPTAKE 2020-21

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
Akola	Kharif	OC%	0.53	0.45	0.57	0.54	0.54	0.44	0.50	0.43	0.48	0.48
		N	182.51	198.16	211.30	203.89	191.94	194.20	186.65	179.42	188.33	187.70
		P	16.83	18.00	21.68	20.47	19.08	18.14	17.16	15.10	21.26	17.67
		K	347.81	336.93	380.11	367.01	354.33	349.06	341.14	302.07	329.79	335.10
	Rabi	OC%	0.53	0.52	0.57	0.54	0.53	0.51	0.50	0.45	0.51	0.50
		N	194.39	198.46	209.55	204.51	200.60	191.55	188.24	183.42	199.73	188.63
		P	19.54	18.60	22.67	21.01	18.85	15.40	18.72	14.35	20.00	16.88
		K	357.58	335.17	391.37	383.78	354.98	345.16	341.61	294.93	335.18	339.06
Ayodhya	Kharif	OC%	0.411	0.447	0.492	0.461	0.491	0.486	0.445	0.429	0.459	0.456
		N	209.35	221.3	224.5	230.2	220.1	222.8	216	211.6	219	231.1
		P	20.98	23.96	24.8	27.23	23	23.4	23	21.65	24.15	24.8
		K	233.1	262	266.85	260	261.86	262.1	245.1	242	261	264.1
	Rabi	OC%	0.41	0.448	0.49	0.46	0.489	0.488	0.447	0.426	0.456	0.458
		N	211.2	221	223.01	229.9	221.06	223.38	215	208.9	219.16	229.6
		P	21.35	23.1	24.6	27	23.19	23.96	22.86	22.76	23.06	23.98
		K	230	262.6	268.5	259.9	262	260.7	247.6	239.86	263.5	262.7
	Summer	OC%	0.412	0.449	0.491	0.46	0.49	0.478	0.446	0.428	0.457	0.457
		N	210.2	221.2	224.8	230.1	220.9	223.8	215.16	210.1	218.96	230.2
		P	21.2	23.9	24.7	27.4	23.16	23.86	23.22	22.11	23.09	24.6

		K	232	262.1	267.9	260.1	261	261.1	246.2	241.2	261	263.5
Bhubaneswar	Summer	OC%	0.71	0.72	0.76	0.76	0.73	0.73	0.73	0.72	0.72	0.73
		N	275	274	293	295	278	261	265	277	284	269
		P	11.3	11.8	12.6	12.5	12.5	11.5	12.0	12.2	12.0	11.7
		K	171	174	177	173	173	176	179	163	181	173
Coimbatore	Kharif	OC%	0.56	0.56	0.56	0.56	0.55	0.57	0.58	0.59	0.52	0.55
		N	230	246	226	221	238	232	294	284	239	220
		P	17.5	20.7	18.8	19.2	17.9	21.2	20.8	20.9	20.5	19.1
		K	673	671	667	660	651	667	680	683	671	666
	Rabi	OC%	0.53	0.52	0.56	0.55	0.58	0.64	0.59	0.6	0.53	0.52
		N	205	208	258	546	257	240	259	262	235	228
		P	19.2	19.5	20.5	21.2	20	20.7	19.6	20.1	19.5	18.9
		K	663	662	660	659	652	650	656	640	657	641
	Summer	OC%	0.51	0.52	0.54	0.52	0.53	0.51	0.58	0.57	0.52	0.53
		N	227	219	243	232	231	210	263	267	224	222
		P	19.4	18.9	20.4	19.2	19.4	19.8	20.9	21.4	19.2	19.4
		K	639	604	658	607	635	627	638	645	607	620
Indore	Kharif	N	172	172	228	184	180	165	172	172	172	158
		P	9.7	9.6	11.0	11.1	7.8	7.9	8.1	11.0	9.6	9.6
		K	500	475	500	500	525	400	375	450	550	500
	Rabi	OC%	0.32	0.38	0.54	0.45	0.38	0.35	0.42	0.42	0.42	0.36
		N	150	172	214	190	172	162	188	184	184	165
		P	9.6	9.5	11.3	11.3	7.9	7.9	7.9	11.3	11.4	9.6

		K	450	475	425	475	425	350	425	500	550	475
	Summer	OC%	0.36	0.38	0.56	0.48	0.42	0.37	0.38	0.40	0.34	0.38
		N	171	172	221	196	184	168	172	180	158	172
		P	9.60	9.73	11.35	11.23	8.20	8.20	8.20	11.23	11.3375	9.6
		K	475	475	425	525	400	450	400	475	550	525
Jabalpur	Summer	OC%	0.75	0.76	0.75	0.74	0.72	0.76	0.77	0.75	0.74	0.73
		N	230	235	234	240	225	232	238	241	242	233
		P	9.4	9.7	9.6	10.4	9.4	10.12	10.5	10.1	9.4	9.7
		K	305	307	308	308	306	307	312	307	308	309
,Jammu	Summer	OC%	5.8	6.6	6.8	6.6	6.5	6.3	6.5	6.5	6.4	6.2
		N	220	238	245	225	232	230	235	232	220	215
		P	19.1	23.2	22.12	21.7	21.85	22.1	23.8	22.65	23.1	23.1
		K	122	130	135	128	126	132	131	128	122	118
Jorhat	Kharif	OC%	6.62	6.6	6.65	6.67	6.65	6.65	6.67	6.66	6.63	6.65
		N	223.5	226.7	228.5	233.5	232	230	228	230	226.5	230
		P	7.74	7.84	8.53	8.72	8.56	8.5	8.23	8.35	8.04	8.14
		K										
	Rabi	OC%	6.64	6.64	6.67	6.68	6.67	6.68	6.68	6.67	6.65	6.66
		N	220	225	227.5	234.5	233	232	227.5	233	227	231
		P	7.7	7.77	8.55	8.74	8.61	8.55	8.25	8.36	8.07	8.17
		K										
	Summer	OC%	6.65	6.67	6.67	6.67	6.7	6.67	6.67	6.7	6.65	6.67
		N	225	228.5	230	235.1	234.5	231	229.5	233	227.7	234.5

		P	7.79	7.87	8.65	8.78	8.65	8.7	8.27	8.46	8.12	8.22
Kalyani	Kharif	OC%	0.74	0.86	0.82	0.8	0.83	0.76	0.88	0.84	0.84	0.88
		N	222.5	232.8	245.6	252.2	252.8	236.8	242.7	251.8	242.9	252.7
		P	90.2	92.2	80.7	78.8	92.8	72.2	100.8	78.5	88.9	112.4
		K	136.8	142.2	182.5	132.5	169.3	158.4	156.4	135.2	130.2	175.4
	Rabi	OC%	0.76	0.82	0.74	0.71	0.77	0.72	0.79	0.76	0.73	0.82
		N	210.2	218.5	225.4	235.6	245.8	225.9	222.4	230.7	224.6	226.3
		P	88.2	92.2	72.5	70.2	84.2	66.8	90.4	68.7	82.4	105.2
		K	130.1	132.8	165.7	122.4	155.8	147.5	148.2	122.4	118.4	162.7
	Summer	OC%	0.78	0.84	0.79	0.79	0.81	0.74	0.87	0.85	0.79	0.90
		N	213.5	221.8	234.1	240.2	252.6	230.0	230.0	238.2	230.0	230.0
		P	89.5	94.2	76.3	75.6	94.9	68.5	102.7	72.2	87.5	109.2
		K	134.9	139.7	181.1	128.7	166.1	153.3	152.9	129.1	123.6	170.5
Kanpur	Summer	OC%	0.442	0.457	0.495	0.480	0.442	0.472	0.450	0.442	0.465	0.435
		N	198.90	205.65	222.75	216.00	198.90	212.40	202.50	198.90	209.25	195.75
		P	13.36	13.50	13.58	13.54	13.40	13.52	13.48	13.38	13.46	13.36
		K	188.05	188.10	189.08	189.06	187.46	188.50	186.90	187.28	187.65	187.06
Karamana	Summer	OC%	1.25	1.31	1.64	1.57	1.37	1.51	1.69	1.55	1.82	1.62
		N	313.6	319.8	351.2	342.8	321.9	324	328.2	324	340.8	326.1
		P	35.03	36.91	48.96	45.57	36.53	39.92	42.18	41.81	42.56	43.5
		K	163.9	166.5	192.8	184.9	176.6	167.5	169.6	168.8	179	176.8
Karjat	Kharif	OC%	1.07	1.08	1.01	1.01	0.99	0.98	1.01	1.01	1	1.02
		N	226.42	223.28	239.59	238.96	237.08	229.56	219.52	220.15	218.27	218.89

		P	11.3	11.51	12.01	11.81	11.71	11.61	10.69	10.79	10.49	10.59
		K	184.24	200.76	204.68	207.2	202.72	194.6	179.48	189.56	182.84	195.44
	Rabi	OC%	1.11	1.15	1.18	1.15	1.16	1.18	1.1	1.12	1.07	1.1
		N	231.44	233.95	248.37	247.12	244.61	240.22	227.05	228.93	221.4	225.16
		P	11.71	11.91	12.32	12.22	12.12	12.01	11.2	11.3	10.59	10.89
		K	199.64	197.4	194.88	193.76	189.12313	192.92	191.24	189.28	211.96	209.72
Kota	Kharif	OC%	0.42	0.51	0.51	0.52	0.43	0.51	0.5	0.51	0.4	0.42
		N	210	220	250	248	193	233	225	228	209	215
		P	25	26	31.5	33.5	25.5	29	27.5	27	25	25
		K	360	372	406	402	340	390	382	380	345	347
	Rabi	OC%	0.44	0.53	0.55	0.55	0.45	0.54	0.53	0.53	0.43	0.45
		N	220	227	263	255	209	239	229	230	219	221
		P	26	27	34.5	34.2	27.6	31.5	31	29.5	27	26.5
		K	366	378	415	408	345	408	389	390	355	360
	Summer	OC%	0.4	0.49	0.47	0.5	0.4	0.47	0.48	0.49	0.38	0.4
		N	200	215	245	240	185	222	217	220	202	205
		P	21	22	25	27.5	21	26.2	25	24.3	22.5	21
		K	351	368	400	395	333	400	376	375	338	342
Ludhiana	Rabi	OC%	0.52	0.54	0.59	0.576	0.56	0.54	0.539	0.528	0.5	0.57
		N	208	235	260	286	251	216	260	223	236	251
		P	43	52	58	66	59	60	54	49	54	52
		K	110	117	124	135	123	130	131	120	119	136
Maruteru	Kharif	OC%	1.12	1.14	1.14	1.14	1.14	1.13	1.13	1.13	1.12	1.12

		N	0.99	1.05	1.08	1.12	1.12	1.10	1.06	1.06	1.13	1.11
		P	0.44	0.50	0.48	0.45	0.48	0.47	0.46	0.47	0.49	0.49
		K	3.10	2.24	2.41	2.34	2.52	2.31	2.48	2.40	2.74	2.81
	Rabi	OC%	1.14	1.14	1.14	1.14	1.14	1.13	1.14	1.14	1.13	1.14
		N	2.28	2.89	3.46	2.50	3.41	2.91	0.34	0.21	0.21	7.33
		P	1.08	1.46	1.73	1.21	1.66	1.41	0.17	0.10	0.11	3.58
		K	6.66	8.32	10.09	7.19	9.72	8.37	0.95	0.60	0.63	21.38
Navsari	Summer	OC%	0.65	0.72	0.71	0.72	0.66	0.67	0.66	0.60	0.62	0.61
		N	232.0	236.0	237.0	243.7	229.0	236.0	235.0	229.0	234.0	236.0
		P	28.6	28.5	31.7	32.7	30.0	30.1	28.4	29.6	31.4	30.9
		K	257.3	272.7	272.7	276.3	274.3	272.7	269.0	257.7	265.3	254.0
Palampur	Kharif	OC%	11.23	11.61	12.62	12.76	11.86	12.51	11.22	10.81	10.96	11.4
		N	352	364	407	404	394	350	390	389	374	371
		P	44	43	51	51	43	47	48	49	50	48
		K	151	155	136	141	155	133	174	145	167	189
	Rabi	OC%	11.33	11.71	12.57	12.86	12.06	12.51	11.21	10.94	10.92	11.41
		N	369.5	381.4	435.7	423.5	411.4	389.7	409.7	411.7	392.5	390.5
		P	205.9	57.8	58.7	64.8	58.6	54.2	56.6	60.9	56.3	57.9
		K	168.4	173.6	157.8	158.2	170.4	146.3	170.4	168.2	183.5	207.4
Pantnagar	Kharif	OC%	0.75	0.81	0.95	0.94	0.87	0.86	0.9	0.92	0.81	0.8
		N	181.3	200.7	237	237	236	237.3	235	235	221.7	226.7
		P	24.3	35.5	33.4	37.6	36.7	32.7	31.8	32.8	28.7	29.9
		K	242.3	287.7	281.3	312.7	304.7	291	259.3	264.3	250.7	254

	Rabi	OC%	0.75	0.81	0.95	0.94	0.87	0.86	0.9	0.92	0.81	0.8
		N	181.3	200.7	237	237	236	237.3	235	235	221.7	226.7
		P	24.3	35.5	33.4	37.6	36.7	32.7	31.8	32.8	28.7	29.9
		K	242.3	287.4	281.3	312.7	304.7	291	259.3	264.3	250.7	254
	Summer	OC%	0.75	0.81	0.95	0.94	0.87	0.86	0.9	0.92	0.81	0.8
		N	181.3	200.7	237	237	236	237.3	235	235	221.7	226.7
		P	24.3	35.5	33.4	37.6	36.7	33.8	31.8	32.8	28.7	29.9
		K	245.4	286.7	282.3	312.7	304.7	291	259.3	263.5	250.7	254
Rajenderanagar	Kharif	OC%	0.4	0.39	0.42	0.45	0.42	0.44	0.44	0.43	0.4	0.38
		N	193	175.9	219.5	233.5	211	204.1	230.1	220.1	210.1	184.5
		P	35.62	33.25	42.6	44.6	46.56	40.1	40.6	48	36.5	38.6
		K	218.2	204.7	206.5	211.3	205.6	204.5	185.3	211.3	193.2	190.2
	Rabi	OC%	0.41	0.39	0.43	0.46	0.43	0.44	0.45	0.44	0.4	0.38
		N	192.4	175.9	221.6	234.2	209.3	205.2	232.3	221.7	200.9	183
		P	34.27	33.27	43.63	45.4	47.67	40.6	41.5	48.6	36.07	39.8
		K	219.17	204.73	207.7	212.37	210.83	206.73	187	213.57	194.83	191.2
Ranchi	Summer	OC%	0.46	0.46	0.50	0.55	0.51	0.51	0.49	0.46	0.45	0.47
		N	213.2	203.6	234.7	241.1	236.5	231.6	228.6	221.8	222.4	220.5
		P	30.40	29.10	37.40	43.60	39.50	34.80	33.10	27.40	32.40	31.00
		K	133.1	137.0	167.9	186.2	175.7	162.6	155.9	129.4	130.8	150.9
Rudrur	Summer	OC%	0.52	0.55	0.57	0.68	0.65	0.64	0.6	0.6	0.57	0.49
		N	186.28	206.62	189.33	229.41	218.3	223.27	188.71	179.43	183.55	195.17
		P	36.12	37.23	35.31	43.54	44.72	44.37	36.13	38.46	32.82	38.21
		K	415.19	408.47	413.66	392.53	361.92	406.11	442.36	429.51	392.43	405.28

Sabour	Kharif	OC g/kg	4.84	4.86	4.83	4.93	4.84	4.91	4.85	4.83	4.94	4.83
		N	240.4	252	257.6	261.8	235.4	247.8	233.4	227.7	221.3	219.8
		P2O5	29	32.6	35.4	36.7	30.6	33	30.9	32.4	30.8	31.7
		K2O	183.4	186.4	194.3	182.2	171.2	189.3	181.3	174.3	176.4	174.1
	Rabi	OC g/kg	4.81	4.83	4.8	4.9	4.81	4.88	4.82	4.8	4.91	4.8
		N	239.1	250.7	256.2	260.5	234.1	246.5	232.2	226.5	220.1	218.7
		P2O5	28.8	32.5	35.2	36.5	30.4	32.8	30.7	32.2	30.7	31.6
		K2O	182.4	185.4	193.2	181.2	170.3	188.3	180.4	173.4	175.4	173.2
	Summer	OC g/kg	4.8	4.85	4.82	4.92	4.83	4.9	4.84	4.82	4.93	4.82
		N	238.6	251.48	257.06	261.31	234.89	247.33	232.9	227.2	220.84	219.38
		P2O5	28.77	32.56	35.33	36.64	30.51	32.92	30.82	32.3	30.77	31.65
		K2O	182.01	186.02	193.86	181.81	170.81	188.95	180.93	173.97	176.01	173.78
Sriguppa	Summer	OC%	5.8	6.3	7.1	7.1	6.8	6.8	5.9	6.3	6.7	6.9
		N	184	196	200	196	186	190	173	174	188	186
		P	9.9	13	14.1	16.1	14.9	14.3	15.2	15.4	15.0	12.5
		K	365	357	367	354	374	362	343	365	364	370

Thanjavur	Kharif	OC%	0.482	0.477	0.532	0.523	0.497	0.494	0.511	0.484	0.458	0.491
		N	222	233	251	247	257	242	252	229	214	234
		P	21.5	21.3	22.2	23.4	24.5	23.7	22.5	21.3	20.4	20.7
		K	151	146	174	162	162	162	164	157	143	144
	Rabi	OC%	0.481	0.482	0.519	0.532	0.481	0.484	0.484	0.489	0.49	0.479
		N	228	224	243	253	221	214	229	233	218	217
		P	22	21.9	23.4	23.9	22.3	21.5	20.1	22.7	21.5	22.3
		K	159	161	161	167	154	146	146	153	144	150
	Summer	OC%	0.51	0.475	0.509	0.495	0.491	0.485	0.499	0.517	0.485	0.491
		N	232	233	244	244	235	218	238	217	238	243
		P	22.3	21.7	23.2	24.3	21.1	21.7	22.8	24.1	22.1	21.6
		K	146	135	160	150	135	140	155	160	146	147
Varanasi	Kharif	OC%	0.41	0.41	0.41	0.53	0.53	0.53	0.54	0.54	0.54	0.54
		N	184.89	183.04	183.49	187.33	187.80	188.27	188.74	189.21	189.69	190.16
		P	11.33	11.22	11.25	13.89	13.93	13.96	14.00	14.03	14.07	14.10
		K	181.81	179.99	180.44	178.42	178.87	179.31	179.76	180.21	180.66	181.11
	Rabi	OC%	0.38	0.37	0.38	0.47	0.47	0.47	0.48	0.48	0.48	0.48
		N	172.56	170.83	171.26	166.14	166.56	166.97	167.39	167.81	168.23	168.65
		P	10.58	10.47	10.50	12.97	13.00	13.03	13.07	13.10	13.13	13.16
		K	169.69	167.99	168.41	166.53	166.94	167.36	167.78	168.20	168.62	169.04
	Summer	OC%	0.39	0.38	0.38	0.48	0.48	0.48	0.48	0.49	0.49	0.49
		N	176.08	174.32	174.76	169.53	169.96	170.38	170.81	171.23	171.66	172.09
		P	10.79	10.68	10.71	13.23	13.27	13.30	13.33	13.37	13.40	13.43
		K	173.15	171.42	171.85	169.92	170.35	170.77	171.20	171.63	172.06	172.49

Table A : Nutrient uptake N P and K kg/ha in exp no1(a) 2020-21

Name of CSR centre	Season	Nut/ treat	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10
Akola	Kharif	N	94.4	186.5	322.5	276.2	116.3	134.3	178.9	109.9	364.6	244.5
		P	115.3	46.8	56.5	50.3	19.4	199.8	36.3	14.2	39.3	65.1
		K	71.9	137.0	236.4	132.2	146.9	70.9	183.1	198.0	268.2	296.6
	Rabi	N	0.0	0.0	110.9	41.8	44.7	96.5	285.7	468.8	109.5	105.8
		P	0.0	0.0	18.0	17.1	12.5	26.8	56.0	64.7	12.8	22.2
		K	0.0	0.0	65.6	72.7	33.3	136.1	257.7	224.8	122.7	92.8
Ayodhya	Kharif	N	91.4	93.3	94.5	89.3	90.9	90.8	83.8	87.6	92.1	86.5
		P	17.8	19.3	20.2	19.3	20.0	19.5	17.7	17.9	20.8	20.9
		K	102.0	104.6	104.9	102.5	104.6	102.6	96.3	100.3	103.4	100.4
	Rabi	N	87.9	88.4	98.2	81.2	110.9	109.0	265.7	230.6	63.8	114.1
		P	17.2	16.9	14.3	13.5	23.2	15.7	48.0	33.6	17.9	25.2
		K	89.8	85.3	44.1	41.4	95.1	31.1	204.3	256.4	106.9	212.3
	Summer	N	Fallow	53.3	54.1	56.1	50.5	51.7	169.9	132.9	74.2	46.9
		P	Fallow	8.7	9.4	21.1	8.3	5.5	32.3	22.1	23.0	22.7
		K	Fallow	33.4	35.9	91.4	33.4	34.2	147.6	153.6	162.1	75.7
Bhubaneswar	Kharif	N	62.53	65.12	65.24	66.56	63.69	64.01	63.04	62.32	60.99	59.82
		P	15.71	16.90	16.54	16.98	16.84	16.79	17.03	18.15	15.37	15.17
		K	74.34	75.22	78.41	75.91	73.44	74.96	78.17	74.68	66.93	65.12
	Rabi	N	76.93	38.75	82.45	56.53	20.85	75.85	56.01	58.71	88.23	79.52
		P	8.87	5.11	8.96	7.68	6.24	8.27	7.47	7.23	13.18	7.37
		K	23.65	14.81	24.18	22.32	18.79	21.63	60.07	24.22	44.73	27.43

	Summer	N	24.61	15.38	55.55	41.54	46.95	42.45	72.69	80.77	26.43	12.32
		P	11.38	2.38	6.13	4.79	5.49	5.29	6.09	6.65	11.38	6.29
		K	56.68	14.45	35.68	12.05	13.61	12.29	43.59	43.91	64.00	20.49
AAU, Jorhat	Kharif	N	36.9	38.1	34.6	17.3	35.9	37.9	152.8	148.2	131.9	82.9
		P	19.9	20.1	17.0	7.0	18.6	19.6	88.3	84.7	95.4	57.6
		K	24.4	25.8	22.2	8.8	23.2	24.4	110.3	105.1	111.0	68.5
	Rabi	N	0.0	32.3	32.8	36.0	37.2	30.0	122.8	126.7	181.7	340.3
		P	0.0	11.2	14.2	12.4	14.4	11.1	81.9	76.2	112.9	188.2
		K	0.0	13.1	16.1	15.1	18.7	13.4	93.9	91.6	227.8	272.3
	Summer	N	42.1	0.0	42.6	20.7	122.2	19.7	72.9	58.0	148.9	92.5
		P	24.6	0.0	26.0	8.3	41.5	7.8	25.8	22.9	91.3	35.3
		K	31.0	0.0	33.0	10.3	51.5	9.8	32.7	28.3	112.1	41.9
Junagadh	Summer	N	199	184	201	101	235	114	195	206	174	168
		P	31.91	33.3	27.85	10.62	38.27	13.88	49.97	33.69	20.01	26.59
		K	95	140	115	25	158	59	152	145	72	128
Kalyani	Kharif	N	182.9	78.3	129.2	103.3	213.6	303.9	167.2	165.0	0.0	135.0
		P	72.1	27.7	64.0	46.6	75.9	98.0	67.5	74.0	0.0	99.0
		K	248.2	79.4	147.9	95.3	250.0	404.3	239.0	257.2	0.0	285.0
	Rabi	N	113.7	54.1	10.1	43.9	16.4	65.1	163.5	46.3	19.9	279.8
		P	45.7	7.6	1.3	8.6	11.3	12.8	110.9	13.1	4.8	84.1
		K	178.6	27.8	5.8	17.0	17.0	55.3	195.2	21.9	12.5	261.2
	Summer	N	0.0	62.5	90.9	322.2	83.6	70.6	96.5	220.4	102.6	0.0
		P	0.0	53.4	29.7	87.6	28.1	26.6	37.6	66.7	46.8	0.0

		K	0.0	210.7	59.1	170.1	52.6	43.4	66.8	119.9	99.0	0.0
Karamana	Kharif	N	29.82	34.33	37.92	35.98	50.64	49.94	33.6	37.49	40.4	37.42
		P	4.36	4.74	5.32	5.08	6.75	6.37	4.19	4.9	5.16	4.9
		K	5.34	6.13	6.57	7.1	8.69	9.1	6.14	7.08	6.85	6.99
	Rabi	N	0	40.45	86.36	43.36	40.29	40.99	94.35	89.02	3.57	7.37
		P	0	6.27	7.45	6.77	6.16	5.75	16.25	15.45	0.41	0.76
		K	0	6.18	29.28	6.58	42.88	41.79	86.72	75.03	3.65	6.48
	Summer	N	0	0	1.87	18.6	14.69	1.4	84.06	47.6	15.55	11.15
		P	0	0	0.11	1.05	1.49	0.09	6.84	12.55	1.09	0.78
		K	0	0	0.84	8.63	18.58	0.71	63.25	58.72	20.06	5.44
Karjatt	Kharif	N	56.24	61.64	68.37	45.96	62.36	43.20	60.82	63.74	66.98	72.00
		P	12.60	14.21	15.91	10.74	14.15	10.79	15.20	14.65	15.29	15.71
		K	61.80	68.82	76.00	48.37	70.04	64.94	75.24	74.63	72.58	75.88
	Rabi	N	45.15	47.00	48.88	55.46	32.39	126.24	56.02	29.41	50.79	8.86
		P	12.15	11.19	10.35	6.74	7.16	25.86	8.88	4.63	14.03	4.47
		K	43.08	33.78	31.79	18.27	11.96	66.12	70.32	33.74	56.06	14.04
Kota	Kharif	N	143.19	75.17	67.12	143.86	71.29	156.90	87.73	74.97	123.83	95.52
		P	9.19	11.60	11.68	15.64	22.03	23.97	29.04	33.06	21.71	12.91
		K	70.53	37.55	35.59	86.88	37.83	91.62	75.66	78.71	71.46	54.74
	Rabi	N	141.31	43.88	112.89	130.98	57.39	113.94	111.31	120.23	76.10	90.00
		P	20.82	4.94	21.58	18.23	5.42	20.29	11.25	30.29	47.92	18.70
		K	175.03	158.04	72.22	38.08	159.61	179.57	85.05	312.32	11.90	48.50
	Summer	N	0.00	0.00	0.00	68.36	62.42	51.03	102.57	55.70	118.54	108.50

		P	0.00	0.00	0.00	12.11	11.10	8.74	13.57	23.63	35.40	28.50
		K	0.00	0.00	0.00	40.12	36.49	26.55	63.21	58.37	94.50	56.50
Ludhiana	Kharif	N	62.0	47.1	30.9	71.2	76.6	78.4	557.1	472.3	136.0	43.8
		P	10.5	7.3	8.1	10.0	9.7	9.3	186.3	177.1	48.0	8.0
		K	15.6	11.0	8.7	10.7	12.2	11.8	239.2	206.6	106.8	10.2
	Rabi	N	70.5	129.5	19.4	21.3	325.5	239.5	139.3	1444.3	582.1	344.1
		P	20.7	18.4	17.5	6.9	74.2	58.6	134.6	350.5	92.4	91.6
		K	21.6	20.3	16.8	7.5	175.9	61.5	284.8	404.6	534.1	503.2
	Summer	N			16.5		63.2	15.3			10.2	
		P			4.8		17.4	4.5			3.3	
		K			3.9		17.5	4.5			5.1	
Maruteru	Kharif	N	141	152	155	165	162	164	158	158	160	158
		P	62.4	72.1	68.4	66.8	70.2	70.8	68.8	69.9	69.9	70.1
		K	444	324	345	345	365	345	368	359	388	400
	Rabi	N	131	135	138	140	142	141	141	130	135	131
		P	62	68	69	68	69	68	69	66	69	64
		K	383	388	402	403	405	405	388	381	402	382
HPKVV, Palampur	Kharif	N	44.53	46.13	139.4	162.9	60.91	59.9	79	83.04	44.88	46.99
		P	11.67	10.42	18.28	22.06	11.25	13.43	19.13	19.58	11.99	11.88
		K	14.74	14.33	53.46	58.23	17.78	27.56	87.74	97.97	16.14	15.45
	Rabi	N	74.07	42.63	88.27	104.08	25.43	64.26	57.04	71.46	72.68	68.69
		P	10.55	12.83	14.68	24.72	12.43	12.51	21.47	22.97	16.76	27.42
		K	17.92	23.37	31.83	28.88	19.58	18.31	33.74	60.21	54.27	61.4

	Summer	N	0.0	0.0	11.9	22.7	0.0	0.0	0.0	0.0	14.5	20.3
		P	0.0	0.0	4.3	5.8	0.0	0.0	0.0	0.0	4.3	6.4
		K	0.0	0.0	13.0	13.9	0.0	0.0	0.0	0.0	12.4	16.2
Pantnagar	Kharif	N	114.8	115.4	84.8	119.3	81.9	119.3	184.2	58.9	80.5	115.2
		P	24.5	24.4	13.0	40.1	19.9	25.4	74.4	122.9	20.2	97.4
		K	152.6	103.3	32.0	172.0	94.8	157.9	588.1	174.5	87.8	377.0
	Rabi	N	110.3	303.8	107.9	162.6	32.6	33.0	443.5	12.2	121.7	166.1
		P	18.7	39.9	19.8	45.1	16.4	15.9	179.5	11.6	59.6	52.3
		K	136.3	230.9	133.0	140.3	39.9	42.8	1151.1	0.0	476.1	325.1
	Summer	N	0.0	0.0	211.5	18.6	19.7	20.3	0.0	66.6	82.2	40.4
		P	0.0	46.0	71.6	15.6	14.9	15.4	59.2	13.9	49.8	28.8
		K	0.0	716.1	175.4	83.6	28.6	34.3	358.0	0.0	299.8	116.7
Rajenderanagar	Kharif	N	93.9	108.1	101.4	96.0	63.0	129.7	311.7	202.9	143.3	70.4
		P	26.0	9.4	11.6	9.3	9.8	13.5	28.9	33.5	34.0	12.4
		K	113.5	59.5	63.1	40.5	46.3	48.8	174.2	373.3	205.8	80.5
	Rabi	N	108.0	0.0	74.3	35.4	76.2	54.1	29.1	312.5	109.9	103.5
		P	31.0	0.0	8.7	8.4	8.7	8.1	5.2	17.3	27.7	16.7
		K	86.2	0.0	20.7	17.3	21.0	19.0	33.5	202.1	99.0	95.7
	Summer	N							148.7			170.9
		P							9.9			30.7
		K							119.1			62.2
Ranchi	Season	Nut/ treat	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10

	Kharif	N	58.9	63.3	83.3	56.1	57.2	58.0	70.6	62.4	-	68.3
		P	10.3	14.2	18.9	13.5	13.4	14.1	15.1	14.8	-	14.5
		K	61.2	66.2	83.8	61.0	61.1	60.3	75.1	84.5	-	73.4
	Rabi	N	85.5	88.6	82.2	71.4	15.9	20.7	97.8	53.8	-	66.6
		P	19.0	24.0	4.4	8.2	12.5	12.4	19.0	13.3	-	7.1
		K	98.0	112.9	17.9	26.2	21.0	18.2	25.4	63.7	-	15.8
Rudrur	Summer	N	381.5	266.7	218.0	282.7	222.1	481.9	595.6	778.3	353.2	472.6
		P	81.9	70.5	47.0	28.4	24.7	62.8	119.6	163.2	64.5	92.4
		K	388.2	294.3	211.1	149.5	144.5	258.8	615.1	698.3	251.0	487.1
Sabour	Kharif	N	70.8	78.1	70.7	69.3	77.8	72.7	66.1	62.6	74.0	66.9
		P	21.2	23.6	21.3	20.8	23.2	21.6	19.6	18.7	22.8	20.1
		K	89.5	97.7	87.7	86.9	93.9	92.7	82.3	83.5	111.3	87.1
	Rabi	N	80.6	85.6	46.0	102.8	65.6	48.1	151.3	111.5	103.3	245.0
		P	21.3	21.3	7.6	58.5	76.7	26.5	31.5	73.4	44.9	84.3
		K	92.3	95.6	28.4	59.8	85.4	28.9	95.8	80.9	131.9	228.6
	Summer	N	0.0	80.02	266.72	101.94	71.11	87.69	96.26	98.06	32.44	38.07
		P	0.0	20.4	32.4	24.9	20.0	21.9	30.2	23.2	11.6	13.3
		K	0.0	42.7	83.3	52.9	80.1	47.2	79.9	72.6	49.7	45.2
Siruguppa	Kharif	N	111.0	53.6	28.7	68.0	129.1	25.7	328.7	64.0	14.7	69.7
		P	28.4	16.6	6.3	14.8	39.4	10.7	100.2	19.0	7.8	24.9
		K	143.0	102.5	14.2	46.9	169.5	39.0	1183.6	217.7	76.2	127.3
	Rabi	N	103.2		42.2		18.9	41.9		22.4	2.3	10.7
		P	30.9		9.2		3.7	8.4		6.0	0.8	4.3
		K	138.8		17.3		11.9	20.3		22.8	1.1	35.4

	Summer	N	20.4	18.3	31.0	27.9	28.0	23.8		14.1	14.3	11.0
		P	4.6	5.0	6.5	6.0	5.5	4.8		4.2	4.1	4.4
		K	14.6	14.4	20.7	26.2	16.6	13.2		30.1	42.8	36.7
Thanjavur	Kharif	N	102.9	96.8	0.0	0.0	26.0	23.9	0.0	0.0	314.9	20.9
		P	20.7	19.8	0.0	0.0	1.5	1.6	0.0	0.0	246.7	7.6
		K	49.0	49.0	0.0	0.0	6.1	4.7	0.0	0.0	339.2	28.8
	Rabi	N	82.9	77.0	90.3	89.6	80.7	53.2	78.0	92.8	41.8	32.0
		P	17.9	17.9	21.4	26.5	17.7	11.6	16.1	18.5	10.3	8.2
		K	44.2	43.3	50.5	49.2	42.4	29.0	40.6	44.5	21.5	16.7
	Summer	N	31.4	10.3	30.8	41.3	82.5	11.0	0.0	0.0	373.5	516.2
		P	1.6	8.4	1.5	1.9	12.4	8.9	0.0	0.0	89.4	59.3
		K	6.0	5.5	6.7	4.0	19.1	4.2	0.0	0.0	450.8	101.8
BHU, Varanasi	Kharif	N	68.86	69.55	70.24	70.94	71.65	72.37	73.09	73.82	74.56	75.31
		P	13.98	14.12	14.26	14.40	14.54	14.69	14.84	14.98	15.13	15.28
		K	84.16	85.00	85.85	86.71	87.58	88.45	89.34	90.23	91.13	92.04
	Rabi	N	91.09	92.01	92.93	93.86	94.79	95.74	96.70	97.67	98.64	99.63
		P	15.40	15.56	15.71	15.87	16.03	16.19	16.35	16.51	16.68	16.85
		K	88.95	89.84	90.74	91.65	92.56	93.49	94.43	95.37	96.32	97.29
	Summer	N	0.00	0.00	63.125	73.427	57.873	43.834	38.683	33.027	19.695	19.089
		P	0.00	0.00	39.289	45.349	38.077	43.834	38.683	33.027	15.049	19.089
		K	0.00	0.00	24.442	27.169	22.119	11.312	25.957	43.43	8.888	12.12

10 Annexures

ANNEXURE-1

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Annexure-II

PRICE (Rs./Q) & CALORIE PER 100 GM FOR 2021-22

Crops	Price (Rs./q) 2020-21	Price (Rs./q) 2021-22	Cal./ 100 gm	Crops	Price (Rs./q) 2020-21	Price (Rs./q) 2021-22	Cal./ 100 gm
All Fodders**	200	210	16	Groundnut*	5275	5550	567
All green manuring**	295	300	16	Knolkhol**	1400	1600	43
Amaranthus grain**	5600	5800	49	Ladyfinger**	1850	2000	35
Arhar/ Pigeonpea/*Redgram	6000	7275	335	Lentil /Masur*	5100	6000	343
Baby Corn**	3400	3800	125	Linseed**	4400	4500	530
Barley*	1600	1635	336	Maize(Grain)*	1850	1870	342
Beetroot**	625	650	25	Maize (green cobs)**		10 s/ cob	125
Berseem (seed)**	1800	2000	344	Maize Sweet Corn**	2000	2200	342
Bitter Gourd**	1200	1250	25	Marigold**	2600	2800	4
Blackgram/Urad*	6000	6300	347	Rapeseed& Mustard*	4650	5050	541
Bottle gourd (Lauki)**	2500	3000	12	Gobi sarson/ Hayola**	3000	3100	541
Brinjal**	2000	2200	24	Niger Seed*	6695	6930	515
Broccoli**	4500	4500	45	Oat**	1750	1800	374
Buck Wheat**	1400	1600	346	Onion (big)**	1900	2000	50
Cabbage**	1000	1100	27	Pea*	6500	6500	315
Carrot**	1400	1500	48	Pea (veg.)**	3000	3000	93
Cassava**	1800	2000	134	Pearlmillet/ Bajra**	2150	2250	361
Castor**	4800	5000	440	Potato**	1500	2000	97
Cauliflower**	1500	1500	66	Pumpkin**	1700	1750	25
Chillies(green)**	2800	3000	29	Radish (White)**	595	600	17
Clusterbean **	2400	2600	35	Ragi/ Fingermillet**	3295	3377	328
Coleus**	2200	2500	86	Rice(coarse)*	1868	1960	346

Coriander(S)**	5700	6000	288	Ricebean fodder**	215	275	16
Coriander(L)**	1650	1800	49	Ridge /Round gourd**	3100	3100	17
Cotton(F-4/1180)*	5515	5726	332	Safflower**	5327	6015	356
Cotton (H-1380)*	5825	6025	332	Sesamum/ Gingely/ Til**	6855	7307	563
Cowpea/Lobia(S)**	3000	3000	323	Sorghum/ Jowar*	2620	2738	349
Cowpea (Veg.)pod**	1800	2000	48	Soyabean (b)*	3000	-	432
Cucumber**	1000	1200	13	Soyabean (y)*	3880	3950	432
Cumin/SiyaZeera**	1500	1700	356	Sugar beat**	1200	1200	48
Fennel grain**	7600	7800	31	Sugarcane*	285	305	34
Fennugreek (seed)**	5500	5800	333	Summer Squash**	1650	1800	16
Fennugreek leaves/ spinach**	1600	1700	49	Sweet Potato**	1700	2000	120
Field bean**	2950	3000	48	Tomato (green)	2100	2500	23
Fieldpeas/Veg.peas**	2700	3000	93	Toria/Raya/*	4500	4800	541
Frenchbeans**	2200	2500	26	Turmeric**	7800	7900	349
Garlic**	5700	6000	145	Wheat*	1975	2125	346
Ginger**	2550	3000	67	White gingely**	7400	7600	563
Gram/Chickpea/ Bengalgram*	5100	5230	360	Rajmash/ Rajmah**	5900	6000	346
Greengram/Moong*	7196	7275	334	Sunflower seed *	5327	6015	620

* Minimum support price fixed by Government of India for 2021-22.

**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 lycopersicumL./ Lycopersicon esculantum/L. lycopersicum	Tamatar
61	Turmeric	Curcuma longa L.	Haldi
62	Wheat	Triticum aestivum L.emend .Fiori $ Paol.	Gehun

अखिल भारतीय समन्वित कृषि प्रणाली अनुसंधान परियोजना

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