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वार्षिक प्रतिवेदन Annual Report 2013-14



भाकृअनुप-भारतीय कृषि प्रणाली अनुसंधान संस्थान
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ICAR-Indian Institute of Farming Systems Research
Modipuram, Meerut-250 110 (U.P.), India



About IIFSR

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).

Mandate

- To undertake basic and strategic research in integrated farming system on production technologies for improving productivity and resource use efficiencies.
- To develop efficient, economically viable and environmentally sustainable integrated farming system models for different farming situations.
- To undertake on-farm testing, verification and refinement of system-based farm production technologies.
- To undertake human resource development and capacity building in integrated farming system.
- To act as a repository of information on all aspects of farming systems research and development.
- To 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 75 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.

**ALL INDIA CO-ORDINATED RESEARCH PROJECT ON
INTEGRATED FARMING SYSTEMS**

Annual Progress Report 2013–14



ICAR-Indian Institute of Farming Systems Research
(Indian Council of Agricultural Research)
Modipuram, Meerut- 250 110, India

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Important Notes:

- This compilation is a joint contribution of all the associated scientists and technical staff of 74 AICRP-IFS centers (data generation), IASRI New Delhi (statistical analysis) and IIFSR, Modipuram (report writing, compilation, editing and printing).
- The report is based on experimental data generated during *kharif*, *rabi* and summer seasons of 2012-13 (period ending June 2013), under 'on-station' and 'on-farm' research programmes of AICRP on Integrated Farming Systems. The other details are relevant to 31st March 2014.
- 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.

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(B. Gangwar)
Director, IIFSR

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1. INTRODUCTION

The Genesis of the “**All India Coordinated Research Project on Integrated Farming Systems**” may be traced back to the visit of Dr A.B. Stewart of Macaulay Institute of Soil Research, Aberdeen U.K., somewhere in mid-forties. He was invited by 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 yields. 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 Trials 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 fertilizer use for the production of crops

Subsequently in 1956, experiments on carefully selected centers called ‘Model Agronomic Experiments’ were added to the project and started as all India Coordinated Agronomic Experiments 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 acquired 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 1968-69, 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 agronomic factors such as fertilizer (including micronutrients), irrigation, weed control, liming etc.;
- ii. To study the manure requirements of important crop rotations 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-climate condition of the country; and
- v. To determine the most suitable cropping patterns and fertilizer responses under rainfed condition.

Under the revised scheme, the main objectives of the simple fertilizer trial were:

- i. To study the responses of introduced high yielding and locally improved varieties to nitrogen and phosphorus applied alone and in combination and to potassium in the presence of nitrogen and phosphorus under irrigated as well as dry land condition;
- ii. To compare different methods of application of nitrogen on cereals 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 soils 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-Farm Research' remaining intact.

However, within two decades of existence of PDCSR, the mandate of the Directorate was broadened during 2009-10 to undertake research in integrated farming system mode and the 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 testing, verification and refinement of system-based 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.

2. OBJECTIVES

On-Station Research

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

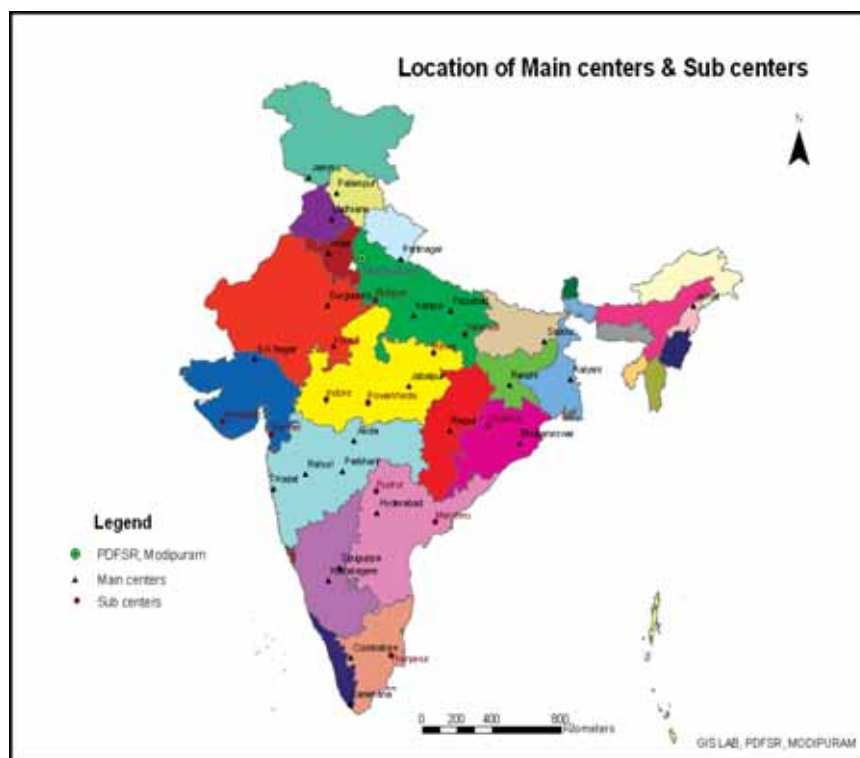
On-Farm Research

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

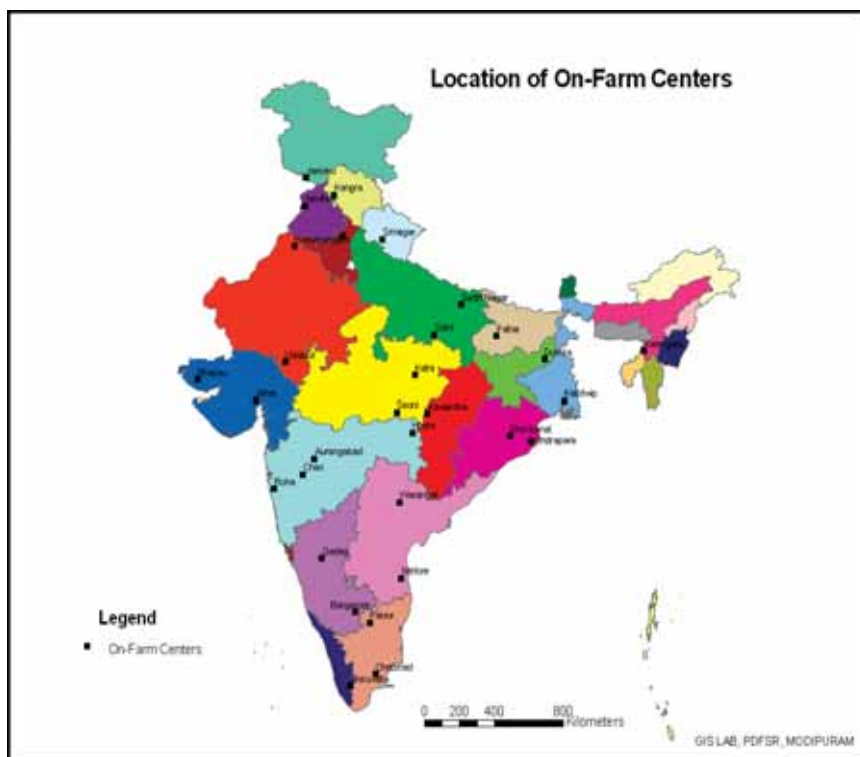
3. LOCATION

Under the aegis of AICRP-IFS there are 25 main centers, 12 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 centers (earlier known as Experiments on Cultivators' Fields/ ECF Centers)

are engaged in farmers' participatory research and are located in different agro-climatic zones. These OFR centers 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 centers during the year under report (2012-13) is depicted in Map-1& 2, and details are given in Table-3/1.



Map 1. Locations of on-station research centres of AICRP-IFS during 2012-13



Map 2. Locations of on-farm research centres of AICRP-IFS during 2012-13

Table-3/1: Location of Different AICRP-IFS centres during the year under report (2012-13)

S. No.	State	Centre/district	Status	Ecosystem	Agro-climatic Regions/Sub-Region of Planning	NARP Zone
1.	A&N	CARL, Port Blair	Voluntary	Island	Island region	Northern Zone AN-1
2.	Andhra Pradesh	Rajendranagar (Dist. Rangareddy)	Main centre	Semi-Arid	Southern Plateau and Hills Region/ South Telangana Sub-Region	Southern Telangana Zone (AP-5)
3.		Maruteru (Dist. W. Godavari)	Sub Centre	Coastal	East Coast Plains and Hills Region/ South Coastal Andhra Sub-Region	Krishna Godavari Delta Zone (AP-1)
4.		Rudrur (Dist. Nizamabad)	Sub Centre	Semi-Arid	Southern Plateau and Hills Region/ North Telangana Sub-Region	Northern Telangana Zone (AP-4)
5.		Warangal	OFR Centre	Semi-Arid	Southern Plateau and Hills Region	Southern Telangana (AP-5)
6.		Srikakulam	OFR Centre	Sub-Humid	East Coast Plains and Hills Region	North Coastal zone (AP-2)
7.	Assam	Jorhat	Main Centre	Humid	Eastern Himalayan Region/Upper Brahmaputra Valley Sub-Region	Upper Brahmaputra Valley Zone (AS-2)
8.		Kokrajhar	OFR Centre	Humid	Eastern Himalayan Region	Central Brahmaputra Valley (AS-3)
9.	Bihar	Sabour (Dist. Bhagalpur)	Main Centre	Sub-Humid	Middle Gangetic Plains Region/ South Bihar Plains Sub-Region	South Bihar Alluvial Plain Zone (B1-3)
10.		Purnea	OFR Centre	Sub-Humid	Middle Gangetic Plains Region	North-east Alluvial Plain (B1-2)
11.	Chhattisgarh	Raipur	Main Centre	Sub-Humid	Eastern Plateau & Hills Region/ Wainganga Sub-Region	Chhattisgarh Plain Zone (CG-1)
12.		Kabirdham	OFR Centre	Sub-Humid	Eastern Plateau & Hills Region	Chhattisgarh Plain Zone (CG-1)
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.		Deesa	OFR Centre	Semi Arid	Gujarat Plains and Hills Region/ North Gujarat Sub-Region	North Gujarat Zone (GJ-4)

Contd..../-

S. No.	State	Centre/district	Status	Ecosystem	Agro-climatic Regions/Sub-Region of Planning	NARP Zone
17.		Thasra	OFR Centre	Arid	Gujarat Plains and Hills Region/North west Sub-Region	Middle Gujarat Zone (GJ-3)
18.	Haryana	Hisar	Main Centre	Arid	Trans –Gangetic Plains Region/ Arid Sub-Region	Western Zone (HR-2)
19.		Sirsa	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.		Kangra	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.		Samba	OFR Centre	Humid	Western Himalayan Region	Low altitude Sub-Tropical Zone (JK-1)
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.		Pakur	OFR Centre	Sub-Humid	Eastern Plateau & Hills Region	Central and North Eastern Plateau Zone (JH-1)
26.	Karnataka	Kathalgere (Dist. Davangere)	Main Centre	Semi Arid	Southern Plateau and Hills Region	Southern Transition Zone (KA-7)
27.		Kolar	OFR Centre	Semi Arid	Southern Plateau and Hills Region	Eastern Dry Zone (KA-5)
28.		Siruguppa (Dist. Bellary)	Main Centre	Arid	Southern Plateau and Hills Region/ Northern Dry Region of Karnataka	Northern Dry Zone (KA-3)
29.		Gadag	OFR Centre	Arid	Southern Plateau and Hills Region	Northern dry Zone (KA-3)
30.	Kerala	Karamana (Dist. Thiruvananthapuram)	Main Centre	Coastal	West Coast Plains and Ghats / Mid land Sub-Region	Coastal Southern Zone (KE-2)
31.		Pathanamthitta	OFR Centre	Coastal	West Coast Plains and Ghats	Problem Areas Zone (KE-5)

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S. No.	State	Centre/district	Status	Ecosystem	Agro-climatic Regions/Sub-Region of Planning	NARP Zone
32.		Indore	Sub Centre	Semi-Arid	Western Plateau & Hills Region/ Central Plateau Sub-Region	Malwa Plateau Zone (MP-10)
33.		Powarkheda (Dist. Hoshangabad)	Sub Centre	Sub-Humid	Central Plateau & Hills Region/ Central Narmada Valley Sub-Region	Central Narmada Valley Zone (MP-6)
34.		Rewa	Sub Centre	Sub-Humid	Central Plateau & Hills Region/ Kymore Plateau and Satpura Hills Sub-Region	Kymore Plateau and Satpura Hills Zone (MP-4)
35.		Dindori	OFR Centre	Semi-Arid	Eastern Plateau and Hills	Northern hill zone of Chattisgarh (CG-3)
36.		Katni	OFR Centre	Semi-Arid	Central Plateau & Hills Region	Kymore Plateau and Satpura Hills (MP-1)
37.	Maharashtra	Akola	Main Centre	Semi-Arid	Western Plateau & Hills Region/ Central Plateau Sub-Region	Western Vidarbha Zone (MH-8)
38.		Amravati	OFR Centre	Semi-Arid	West Coast Plains and Ghats	Central Maharashtra Plateau (MH-7)
39.		Karjat (Dist. Raigad)	Main Centre	Coastal	Western Plains & Ghat Regions/ Coastal Hilly Sub-Region	North Konkan Coastal Zone (MH-2)
40.		Raigad	OFR Centre	Coastal	West Coast Plains and Ghats	North Konkan Coastal Zone (MH-2)
41.		Parbhani	Main Centre	Semi Arid	Western Plateau & Hills Region/ Central Plateau Sub-Region	Central Maharashtra Plateau Zone (MH-7)
42.		Aurangabad	OFR Centre	Semi Arid	Western Plateau & Hills Region	Central Maharashtra Plateau Zone (MH-7)
43.		Rahuri (Dist. Ahmednagar)	Main Centre	Semi Arid	Western Plateau & Hills Region/ Scarcity Sub-Region	Scarcity Zone (MH-6)
44.		Pune	OFR Centre	Semi Arid	Western Plateau & Hills Region	Western Maharashtra Plain Zone Ganeshkhind (MH-5)
45.	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)
46.		Chiplima (Dist. Sambalpur)	Sub Centre	Sub-Humid	Eastern Plateau & Hills Region/ Wainganga Sub-Region	West-Central Table Land Zone (OR-9)
47.		Angul	OFR Centre	Sub-Humid	Eastern Plateau & Hills Region	Mid-Central Table Land (OR-10)

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S. No.	State	Centre/district	Status	Ecosystem	Agro-climatic Regions/Sub-Region of Planning	NARP Zone
47.		Kendrapara	OFR Centre	Coastal	East Coast Plains and Hills Region/ Orissa Coastal Sub-Region	East and South –Eastern Coastal Plain Zone (OR-4)
48.	Punjab	Ludhiana	Main Centre	Semi-Arid	Trans-Gangetic Plains Region/ Plains Sub-Region	Central Plain Zone (PB-3)
49.		Amritsar	OFR Centre	Semi-Arid	Trans-Gangetic Plains Region/ Plains Sub-Region	Central Plain Zone (PB-3)
50.	Rajasthan	Durgapura (Jaipur)	Main Centre	Semi-Arid	Central Plateau & Hills Region/ Eastern Plains of Rajasthan	Semi-Arid Eastern Plain Zone (RJ-5)
51.		Hanumangarh	OFR Centre	Semi-Arid	Central Plateau & Hills Region/ Eastern Plains of Rajasthan	Transitional Plain Zone of Inland Drainage (RJ-3)
52.		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)
53.		Chittorgarh	OFR Centre	Semi-Arid	Central Plateau & Hills Region/ Southern Plains of Rajasthan	Sub-Humid Southern Plain & Aravali Hills Zone (RJ-7)
54.	Tamil Nadu	Coimbatore	Main Centre	Semi-Arid	Southern Plateau and Hills Region/ Central Plateau of Tamil Nadu Sub-Region	Western Zone (TN-3)
55.		Thanjavur	Sub Centre	Coastal	East Coast Plains and Hills Region/ Thanjavur Sub-Region	Cauvery Delta Zone (TN-4)
56.		Paiyur	OFR Centre	Semi Arid	Southern Plateau and Hills Region	North western Zone (TN-2)
57.		Chettinad	OFR Centre	Semi Arid	East Coast Plains and Hills Region	Sothorn Zone (TN-5)
58.	Uttar Pradesh	Kanpur	Main Centre	Semi Arid	Upper Gangetic Plains Region/ South Western Plains Sub-Region	Central Plain Zone (UP-6)
59.		Kaushambi	OFR Centre	Semi Arid	Upper Gangetic Plains Region/ South Western Plains Sub-Region	Central Plain Zone (UP-4)
60.		Faizabad	Main Centre	Sub-Humid	Middle Gangetic Plains Region/ Eastern Plains Sub-Region	Eastern Plain Zone (UP-9)
61.		Santkabirnagar	OFR Centre	Sub-Humid	Eastern Himalayas Region/ Eastern Plains Sub-Region	Eastern Plain Zone (UP-7)

Contd..../-

S. No.	State	Centre/district	Status	Ecosystem	Agro-climatic Regions/Sub-Region of Planning	NARP Zone
62.		Bichpuri (Dist. Agra)	Sub Centre	Semi-Arid	Upper Gangetic Plains Region/ Western Plains Sub-Region	South-Western Semi-Arid Zone (UP-5)
63.		Varanasi	Sub Centre	Sub-Humid	Middle Gangetic Plains Region/ Eastern Plains	Eastern Plain Zone (UP-9)
64.	Uttarakhand	Pantnagar (Dist. US Nagar)	Main Centre	Sub-Humid	Western Himalayan Region/ Valley Temperate Sub-Region	Bhawal and Tarai Zone (UP-2)
65.		Nainital	OFR Centre	Sub-Humid	Western Himalayan Region/High hill Temperate Sub-Region	Hill Zone (UK-1)
66.	West Bengal	Kalyani (Dist. Nadia)	Main Centre	Sub-Humid	Lower Gangetic Plains Region/ Central Alluvial Plains Sub-Region	New Alluvial Zone (WB-3)
67.		24-Parganas South	OFR Centre	Humid	Lower Gangetic Plains Region	Coastal Sline Zone (WB-6)

4. SOIL AND CLIMATE

The major group of soils (centre-wise), on which on-station experiments of CSR were conducted during the year 2012-13, and geographical coordinates (Latitude and Longitude)

of the different research locations are given in table-4/1. The general climatic conditions for the experimental locations are described below in brief.

Table-4/1: Soil type and geographical coordinates of different on-station CSR 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	Eutrochrepts (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° 19' N	72° 19' E
8.	Junagadh	Ustochrepts deep medium black soils	21° 30' N	70° 30' E
9.	Navsari	Vertic Ustochrepts deep black soils	20° 57' N	72° 54' E
10.	Hisar	Ustochrepts, very deep silty alluvial soils	29° 08' 55" N	74° 41' 16" E
11.	Palampur	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 Palustalfs, very deep (90 cm) red soils	23° 17' N	85° 19' E
14.	Kathalagere	Alfisols, 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 Tropofluvents, very deep (90 cm depth)	11° N	77° E
17.	Jabalpur	Chromusterts, very deep (90 cm depth), medium to deep black soils	23° 10' N	79° 57' E
18.	Indore	-	22° 04' N	79° 57' E
19.	Powarkheda	-	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 depth), deep black soils	19° 08' N	76° 05' E
24.	Rahuri	Chromusterts, fine clayey soils	19° 47' N	74° 18' E
25.	Bhubaneswar	Haplustalfs, very deep (90 cm depth), medium textured 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

Contd..../-

S.No.	Centre	Soil Type	Latitude	Longitude
27.	Ludhiana	Ustochrepts-Ustic Psamments Association, 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 RhodustalFs, 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, lowland clayey soils	26° 47' N	82° 12' E
34.	Bichpuri	Ustochrepts, very deep (90 cm depth) alluvial soils	27° 02' N	77° 09' E
35.	Varanasi	Aeric Chroquals very deep (90 cm depth) alluvial clayey soils	25° 18' N	83° 03' E
36.	Pantnagar	Hapludolls, very deep (90 cm depth) alluvium coarse loamy soils	29° 08' N	79° 05' E
37.	Kalyani	Fluventic Eutrochrepts, very deep (90 cm depth) alluvial soils	23° 40' N	88° 52' E
38.	PDFSR, Modipuram			
39.	ICAR-RC, Patna		25° 50' N	84° 45' E
40.	ICAR-RC, Umiam			
41.	ICAR-RC, Goa		15° 29'22" N	73° 55'10" E
42.	CARI, Port Blair			

Weather conditions at different farming systems research centres During 2012-13

The seasonal (July to June) conditions of important weather parameters e.g., rainfall (mm), monthly average maximum temperature (°C) and minimum temperature (°C) prevailed during the reporting period (2012-13) at the various centers of All India Coordinated Research Project (AICRP) on Integrated Farming Systems (IFS) are depicted in figures 1-3 and described below.

Akola: The normal annual rainfall of the reporting centre is 811.0 mm which comes from 43 rainy days of the year. The amount of precipitated rain

during the reporting period was 721.0 mm which lower than the average rain. SW monsoon contributed 68% to the total rainfall. Onset of monsoon occurred in July and it remained active throughout the season and resulted in fair distribution of rainfall. The highest (42.4 °C) and lowest (29.5 °C) monthly average maximum temperature were recorded during May and December, respectively.

Bichpuri: Total rainfall precipitated during the reporting period (579.0 mm) was better than the previous season. 82% of the total rainfall occurred during the months of July and August, whereas September, October, November, December and

March remained dry months during which not a single rainy day was observed. The highest monthly average maximum temperature (43.2°C) was recorded during the May whereas; lowest monthly average maximum temperature (20.2°C) was recorded in January which was also reported as the coldest months where mercury dropped down to 5.4°C.

Coimbatore: The total rainfall (425.0 mm) received during the reporting period was about 40% lower than the previous year out of which a major amount (85%) was contributed by NE monsoon. The distribution of rain was good during the season where only January was recorded as dry month during which no rainy day was observed. The highest monthly average maximum temperature (35.8 °C) was recorded during month of April whereas it was lowest (30.3 °C) in October. The monthly average night temperature ranged between 18.9 to 24.6 °C and January was found the coldest month during the season.

Durgapura (Jaipur): The total rainfall precipitated during the season was 860.0 mm, out of which 97% precipitation was contributed by S-W monsoon. August was observed as wettest month of the season where 574.0 mm rainfall occurred. Since October 2012 to June 2013 only 28 mm rain was precipitated during the month of February and March. Highest monthly average maximum temperature (37.5 °C) was recorded during April whereas; lowest average monthly maximum temperature (21.8 °C) and minimum temperature (7.1 °C) was recorded during January.

Goa: The rainfall received during reporting period was 2740.0 mm which was almost 1000 mm lower than the previous season and it was due to lower percentage of S-W monsoon i.e. 65%. The distribution of rain was fairly good during the kharif season, and it was also extended during post monsoon season. The highest monthly average maximum temperature (36.3°C) was recorded in March however, average minimum night temperature (18.9°C) was observed during the month of January.

Hisar: SW monsoon poured 77.0 mm rain in the start of the season and its contribution in total seasonal precipitation was 65 %. The distribution of the rain was fairly good in the season but August was observed as wettest month of the season during which 283.0 mm rainfall was recorded. As usual summer was very hot and monthly average maximum temperature (46.1°C) was reported highest during the May and winter was severe during which average monthly minimum temperature dropped below minus and mercury was dropped to -1.5 in the month of January.

Indore: The center observed 1332 mm rainfall during the reporting period, where S-W monsoon contributed almost two-third to the total precipitation. The distribution of the rain was good but the amount of precipitation was decreasing from July to September. The highest monthly average maximum temperature (40.7°C) was recorded during March whereas it was lowest (23.3°C) in the month of January during which least average monthly night temperature was also recorded and mercury dropped to 5.6 °C in the month of January.

Jabalpur: The total rainfall (1267.0 mm) recorded during the reporting period was higher than the previous year out of which 92% was contributed by the SW monsoon. The distribution of the rainfall was fairly good in the kharif season but August was reported as wettest month in which more than 50% of the precipitation occurred. Summer season was hot and average monthly maximum temperature reached up to 45.0°C during June whereas, winter was severe and monthly mean minimum temperature was dropped to 7.0°C in January.

Jammu: South-west monsoon added 1122.0 mm of rain to the total seasonal rainfall i.e.1611 mm. During the reporting period only October month was observed as dry where no rainy day was recorded. Almost half of the S-W monsoon rain was precipitated during the month of August whereas; a good quantity of the rain was also recorded during the month of February. Monthly average maximum temperature was increased up

to 38.7°C during May however mercury remained above to 4.8 °C during winter month of January.

Junagarh: The rainfall received during reporting period was only 345.0 mm which was one third of the previous year. These were July, August and September which poured all the rain at the centre remaining other nine months were dry. The highest monthly average maximum temperature (39.6°C) was observed during May whereas; lowest minimum temperature (12.3°C) was recorded during January.

Kalyani: The reporting period received 1071.0 mm rainfall with 70% contribution from the S-W monsoon. The total seasonal rain was almost 300 mm lower than the previous year and it was due to lower contribution of the monsoon. Every months of the report period observed rainy days except March and June. The distribution pattern of rain was also good during the monsoon season with more than 200.0 mm rain in first three months. April month was observed as the hottest month of the season where monthly mean maximum temperature was 37.6 °C whereas; night mean monthly temperature was remained above to 9.6°C during January.

Kanpur: The total rainfall of 1135.0 mm was recorded during the reporting season which was about 25% higher than the previous season. But contribution of the SW monsoon was lower than the previous season. The rainfall was evenly distributed during the monsoon season while October, November, December, April and May were deprived of the rains. The highest (41.7°C) and lowest (19.4°C) monthly average maximum temperature was observed during May and January respectively. Winter season was moderately cold and average monthly minimum temperature dropped below 7°C during January.

Karmana: During the reporting period, the total rainfall (1372.0 mm) was received at this center which was many folds higher than the preceding seasons however contribution of the S-W monsoon was decreased to 24%. The distribution of rain was good and there was not a single month which was deprived of the rainy days. The highest

monthly average maximum temperature ranged between 29.7 to 32.9°C whereas; same parameter for night was 21.8 to 25.5°C.

Kathalagere: Total rainfall received during the reporting period was 437.0 mm which was almost three times of the previous season and it was due to major contribution of the S-W monsoon. Five months out of twelve for which report is prepared observed no rainy day. The month of May was observed as hottest month of the season during which monthly average maximum temperature ranged between 24.2 to 32.0°C. The monthly average minimum temperature range was 18.0 to 23.7 °C during the same period.

Ludhiana: The total rainfall recorded during the reporting season was about 50 per cent lower (461.0 mm) than the preceding season. However distribution of the rainfall during the season was good and only three months out of twelve observed as dry where no rainy day was recorded. Summer season was moderately hot and maximum temperature reached up to 40.6°C during the June while winter was severely cold and monthly mean minimum temperature dropped to 5.7°C during January.

Maruteru: In the State of Andhra Pradesh, South West and North East Monsoons are the two important periodic winds, which are the important sources of the rain. South-West Monsoon (66%) is spread over the period from June to September and North-East Monsoon (24%) from October to December. The rest 10% of the rainfall is received during the winter and summer months. The total rainfall (1611 mm) received during reporting period at the centre was almost double of the preceding season. Higher precipitation was due to about 40% contribution of the post monsoon or N-E monsoon. Highest average monthly maximum temperature (36.8°C) was recorded during the month of May while minimum temperature (17.8°C) was recorded during the month of December.

Navsari: The annual rainfall at the centre is 1959 mm and it is due to cent per cent contribution of the S-W monsoon. The normal onset of the monsoon is 2nd week of the June and Normal

Cessation is 4th week of September. The precipitation occurred during the reporting period was 1101 mm which was due to 99% contribution of the S-W monsoon. The distribution of the rain during the monsoon season was fairly good whereas; October month also received a meager amount of the rain. The range of the average monthly maximum temperature was 29.7 to 35.2°C and the same value for minimum temperature was 15.5 to 27.0°C.

Palampur: The average annual rainfall of the area is around 2100-2200 mm. The total rainfall received during the reporting period was about 20% higher than the normal and it was 2546 mm. The S-W monsoon was contributed up to 80 per cent to the total rainfall and August was reported as the wettest month of this crop season during which 846 mm rain water was added to the total rainfall. The distribution of the rainfall during the monsoon season as well as the crop season was good where only June was recorded as dry month. The highest average monthly maximum temperature (33.8°C) was recorded during June whereas lowest minimum temperature (3.7°C) was recorded during January.

Pant Nagar: The normal annual rainfall of the centre is 1285.8 mm. The rainfall received during reporting period was 1060 mm which was about 500 mm lower than the previous period. The lower to the normal rainfall was due to lower contribution of the S-w monsoon in comparison to the last season. The distribution of the rainfall during the e monsoon was fairly good however it was observed that more than half period of the season was deprived of the rain. The highest monthly average maximum temperature (39.1°C) was recorded in the month of April however, average minimum temperature (6.7°C) was observed during the month of January.

Parbhani: The normal annual rainfall of the reported centre is 957.6 mm from the 44 rainy days spread during a year. SW monsoon contributed 804.9 mm to the total rainfall of the centre during the June to September. The total rainfall recorded during the reporting period was 864 mm and it was

85% contributed by the SW monsoon. The distribution of the rainfall during the monsoon season was quite good and extended up to post monsoon month of the October. The highest average monthly maximum temperature (41.6°C) was recorded during May whereas lowest minimum temperature (10.5°C) was recorded during December.

Powarkheda: Total rainfall recorded during the reporting year was 1314 mm which was higher than the previous season. The contribution of the SW monsoon in this season was 100%. Only first three months of the season were observed as wet month and remaining last nine months were totally dry and there was no rainy days observed. May was reported as the warmest month where maximum temperature recorded was 43.5°C whereas, January was observed as coldest month and monthly mean minimum temperature dropped to 6.6°C.

Rahuri: The average annual rainfall in the district is 578.8 mm. The district mostly is in rain shadow to the east of Western Ghats. On an average there are 31 rainy days in a year in the district. Total annual rainfall precipitated during the reporting period was 391 mm that was too lower than the preceding season whereas contribution of SW monsoon was 65%. Total rainfall precipitated during the month of July to October and then there was no rainy day observed in the season. The highest average monthly maximum temperature (40.1°C) was recorded during May whereas lowest minimum temperature (5.9°C) was recorded during January.

Raipur: The annual rainfall of the reported centre is 1197.1 mm from the 59 rainy days distributed in the year. Out of total rainfall 1035.0 mm rainfall is being receiving from the 48 rainy days. The total annual rainfall received during the reporting period was 1252 mm and it was contributed by 94% by the SW monsoon. Distribution of rainfall was good during the monsoon season but only January and April months received 76 mm of rain during post monsoon and pre monsoon season. The highest monthly mean maximum temperature (43.5°C)

was observed during May whereas; lowest minimum temperature (11.2°C) was recorded during December.

Rajendra Nagar: The amount of rainfall occurred during the reported season was 862.0 mm and normal annual rainfall of the reported centre is 797.0 mm. SW monsoon contributed very meager amount (56%) to the total rainfall. Only December and March were observed as dry months of the season. The maximum temperature recorded was 40.4°C during May whereas; minimum temperature was 13.0°C during December.

Ranchi: Agro-climatic sub-zone of Jharkhand received 942 mm rainfall during the reporting year which is too lower than the normal rainfall (1430.0 mm) for this zone. The distribution of the rain was fairly good during the season but July was recorded as wettest month in the season. The highest monthly average maximum temperature (37.6 °C) was observed during May whereas; lowest minimum temperature (5.0°C) was recorded during January.

Rewa: Total rainfall recorded during the reporting year was 1179.0 mm and 90 per cent rainfall was added by the SW monsoon. July was found wettest month of the season and 592.0 mm rain was precipitated during this month. June was reported as the warmest month where maximum temperature recorded was 38.1°C whereas, December was observed as coldest month and monthly mean minimum temperature dropped to 4.9°C.

Rudrur: The annual normal rainfall of the reporting centre is 813.0 mm which is added through 48 rainy days of the year. Both SW (June-September) and NE (October-December) monsoon are active at this centre. But contribution of NE monsoon is up to 9% only. The total rainfall recorded during the reporting period was 625.0 mm which was only three-fourth of the normal rainfall. Lower rainfall was due to weak SW monsoon but the distribution of rainfall was good. The highest average monthly maximum temperature (42.5°C) was recorded during May whereas lowest minimum temperature

(15.7°C) was recorded during January and February months.

Sabour: During the reporting season, the total rainfall received was 977.0 mm out of which 520.0 mm rain was from the SW monsoon. The normal rainfall of this centre is 1208.0 mm and 992.0 mm rain added by the SW monsoon. In the reporting period SW monsoon contributed only 53% to the total rain instead of 82.1% (Normal). However, the distribution of rain was good throughout the monsoon season. The range of average monthly maximum temperature was 20.6 to 36.1 °C during the season whereas, January was very cool and dry with 5.2 °C monthly minimum temperature.

S.K.Nagar: The total rainfall (794 mm) received during reporting period which higher than the normal rainfall (591.9 mm) and it is the SW monsoon which contributed 87% rain to the total rainfall at this centre. The distribution of the rainfall during the monsoon season was good but July was reported as wettest month of the season. Highest average monthly maximum temperature (40.3°C) was recorded during the month of May while minimum temperature (9.4°C) was recorded during the month of January.

Thanjavur: The total rainfall received during this reporting period was lower than the preceding two seasons and it was 539.0 mm. But contribution of the SW monsoon was unusual and it was 87% to the total rainfall at this center. The lowest monthly average maximum and minimum temperature recorded during the season was 31.6°C and 21.2°C respectively.

Varanasi: The average annual rainfall of this centre is 1081.7 mm from 48 rainy days of the year. SW monsoon contributes 87.3% to the total annual rainfall of this centre. A very low rainfall (689.0mm) than the normal was precipitated during the reporting period and it was due to lower post monsoon and pre monsoon rainfall. The highest average monthly maximum temperature (40.0°C) was observed during May whereas; lowest minimum temperature (8.1°C) was recorded during January.

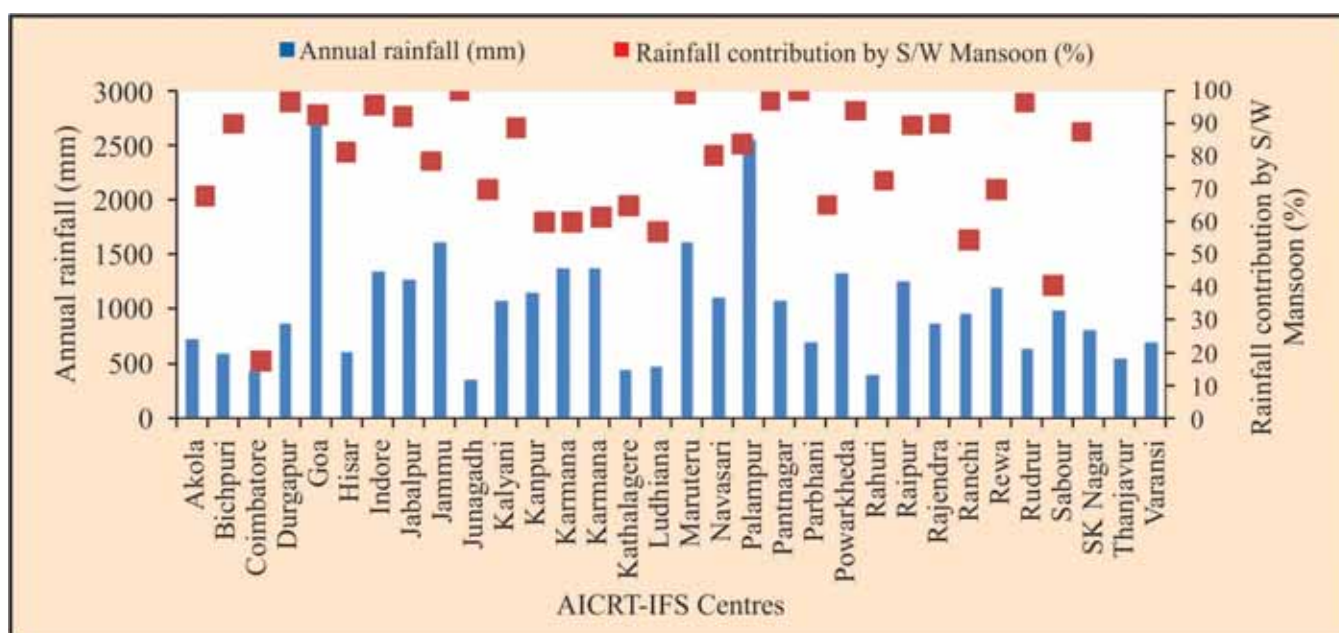


Fig. 4/1 Annual rainfall (mm) and contribution of the S-W monsoon to the total precipitation during the reporting year (2012-13) at various Cropping Systems Research Centres of the AICRP on IFS

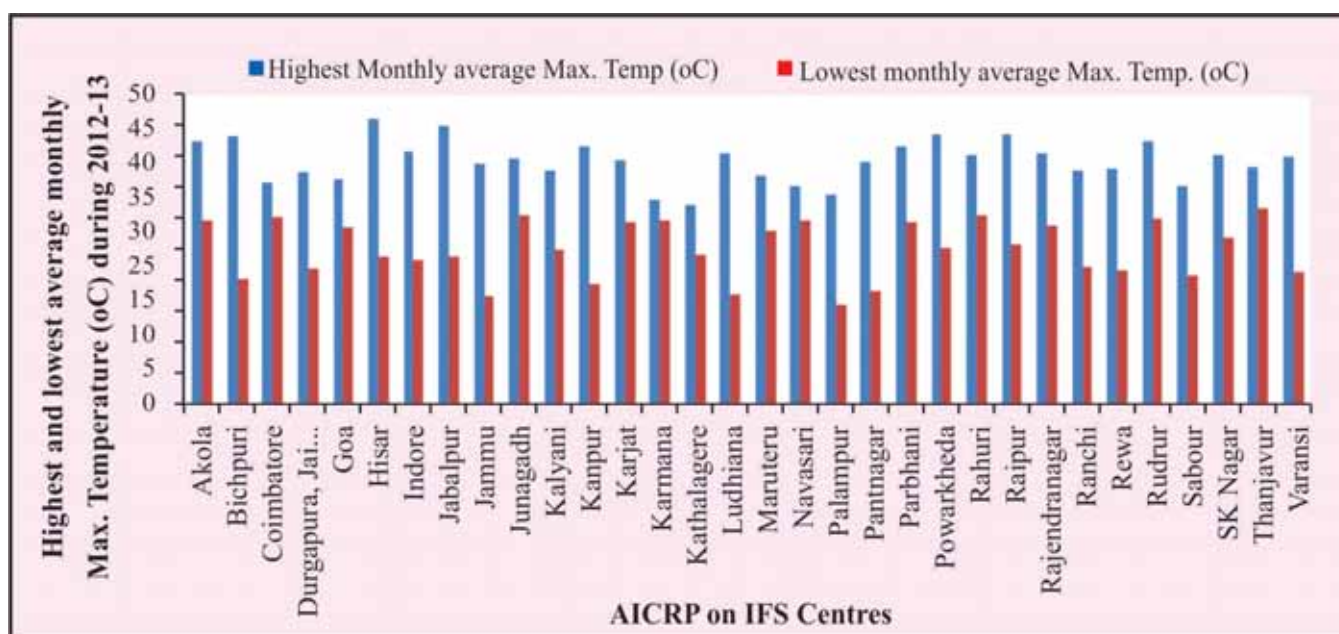


Fig. 4/2 Highest and lowest monthly average maximum (°C) temperature during the reporting year (2012-13) at various Cropping Systems Research Centres of the AICRP on IFS

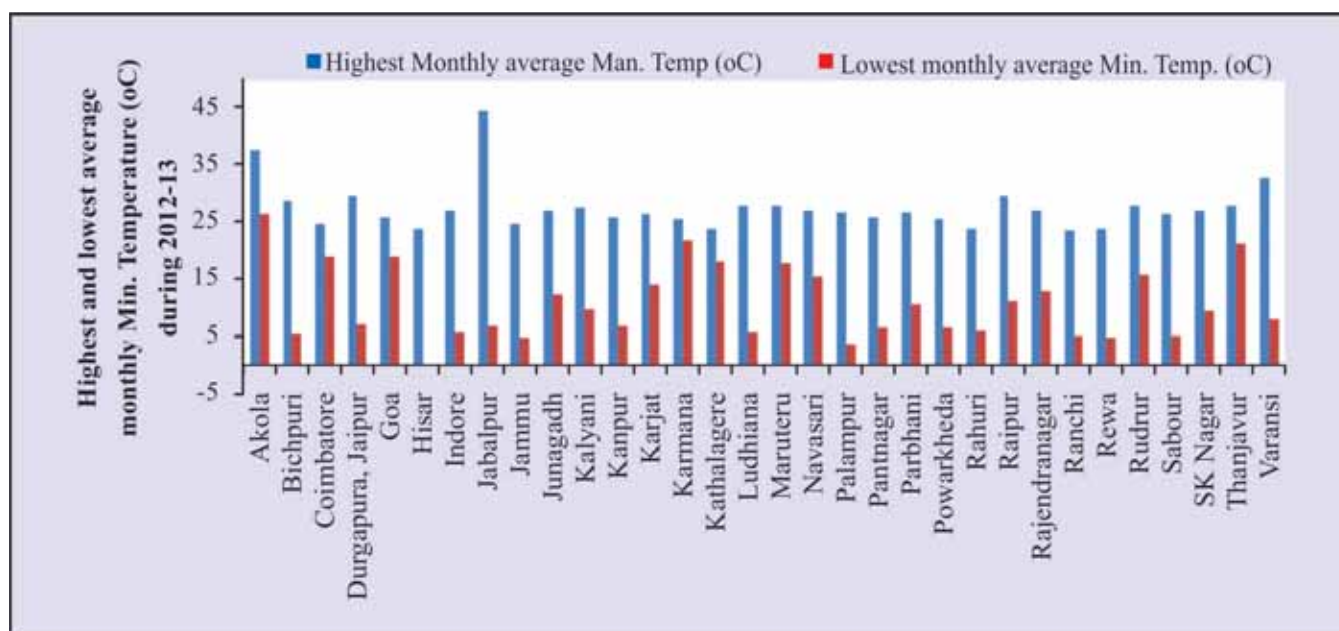


Fig. 4/3 Highest and lowest monthly average minimum (°C) temperature during the reporting year (2012-13) at various Cropping Systems Research Centres of the AICRP on IFS

5. STAFF POSITION

Out of 618 total staff sanctioned for different centers, 459 staff were actually in position as on 31st

March 2014, suggesting that 25.7 per cent of total posts were vacant (Table-5/1 and Appendix-III).

Table-5/1: Staff position under AICRP-IFS (university-wise) as on 31.3.2014

S.No.	Name of the University	Scientific		Technical		Administrative		Supporting	
		Sanctioned	Filled	Sanctioned	Filled	Sanctioned	Filled	Sanctioned	Filled
1.	ANGRAU, Hyderabad	8	8	23	16	5	3	3	1
2.	AAU, Jorhat	5	3	11	10	2	2	2	2
3.	BAU, Sabour	4	4	11	5	2	1	2	2
4.	IG KV, Raipur	5	4	11	7	2	2	2	2
5.	SDAU, S.K. Nagar	5	5	11	8	2	2	2	2
6.	JAU, Junagadh	1	1	3	3	1	1	-	-
7.	NAU, Navsari	1	1	3	2	1	0	-	-
8.	AAU, Anand	1	1	8	6	1	0	1	0
9.	CCS HAU, Hisar	5	5	11	7	2	2	2	0
10.	CSK HPKV, Palampur	4	4	11	11	2	2	2	1
11.	SKUAST, Jammu	4	4	11	11	2	1	2	2
12.	BAU, Ranchi	4	4	11	11	2	2	2	2
13.	UAS, Bangalore	5	4	11	2	2	0	2	1
14.	UAS, Dharwad	1	1	8	7	1	0	1	0
15.	UAS, Raichur	3	3	3	3	1	1	1	1
16.	KAU, Thrissur	5	5	11	10	2	2	2	2
17.	JNKVV, Jabalpur	8	7	23	11	5	2	3	1
18.	RVS KVV, Gwalior	1	1	3	1	1	1	-	-
19.	MP KV, Rahuri	5	5	11	9	2	2	2	1
20.	MAU, Parbhani	4	3	11	7	2	0	2	0
21.	DPD KV, Akola	4	3	11	6	2	0	2	2
22.	DBS KKV, Dapoli	4	3	11	10	2	0	2	1
23.	OUAT, Bhubaneswar	7	7	22	21	4	4	3	3
24.	PAU, Ludhiana	4	4	11	8	2	2	2	2
25.	SK RAU, Bikaner	4	2	11	7	2	0	2	2
26.	MP UAT, Udaipur	3	3	8	7	2	1	1	1
27.	TNAU, Coimbatore	7	7	22	16	4	4	3	3
28.	CSA UAT, Kanpur	4	4	11	8	2	1	2	2
29.	ND UAT, Faizabad	4	3	11	9	2	2	2	1
30.	SVP UAT, Modipuram	1	0	8	0	1	0	1	0
31.	BHU, Varanasi	1	1	3	0	1	1	-	-
32.	RBS College, Bichpuri	1	1	3	2	1	1	-	-
33.	GBP UAT, Pantnagar	5	4	11	7	2	0	2	1
34.	BC KVV, Kalyani	4	3	11	11	2	1	2	2
TOTAL		132	117	360	259	69	42	57	41

6. BUDGET

Table 6/1. Funds (Rs. in Lakhs) released during financial year 2012-13 and 2013-14 under AICRP on integrated farming systems (ICAR share only).

S. No.	Name of University/ ICAR Institute	Pay & allow.	T.A.	Other contingencies	Contr. Services	POL/Veh. Hiring	NRC	TSP	Total
Fin. Year 2012-13									
1.	ANGRAU, Hyderabad	115.00	20.06	16.00	3.75	0.75	4.00	4.00	145.56
2.	HPKV, Palampur	65.00	0.87	9.00	3.75	0.50	3.00	2.00	84.12
3.	GBPUA&T, Pantnagar	63.50	0.85	8.00	2.75	0.50	3.00	1.00	79.6.0
4.	CSAU&T, Kanpur	60.00	0.87	8.00	3.75	0.55	7.90	2.00	83.07
5.	NDUA&T, Faizabad	65.00	0.87	8.00	3.75	0.50	3.00	2.00	83.12
6.	BHU, Varanasi	20.00	0.39	3.50	5.00	0.20	1.00	2.00	32.09
7.	BAU, Ranchi	46.50	0.89	7.00	4.75	0.50	4.00	6.00	69.64
8.	BAU, Sabour	45.00	0.87	7.00	3.75	0.50	3.00	2.00	62.12
9.	BCKVV, Kalyani	65.00	0.87	9.00	3.75	0.50	4.00	2.00	85.12
10.	AAU, Jorhat	100.00	3.00	23.00	4.00	2.00	38.00	0.00	170.0
11.	PAU, Ludhiana	70.00	0.87	7.00	3.75	0.50	3.00	2.00	87.12
12.	HAU, Hisar	65.00	0.87	8.00	3.75	0.50	3.00	0.00	81.12
13.	RAU, Bikaner	60.00	0.87	8.55	3.75	0.50	3.00	3.00	79.67
14.	SDAU, S.K. Nagar	65.00	0.87	7.50	3.75	0.50	3.00	2.00	82.62
15.	NAU, Navsari	15.00	0.24	4.00	0.00	0.10	2.00	0.00	21.34
16.	JAU, Junagadh	15.00	0.24	4.00	0.00	0.10	2.00	0.00	21.34
17.	AAU, Anand	20.00	0.39	3.00	0.00	0.25	2.00	2.00	27.64
18.	JNKVV, Jabalpur	115.00	2.05	19.50	3.75	0.75	5.00	2.00	148.05
19.	RVSKVV, Gwalior	15.00	0.26	2.00	0.00	0.10	2.00	2.00	21.36
20.	IGKV, Raipur	45.00	0.87	4.50	3.75	0.50	5.00	5.00	64.62
21.	OUAT, Bhubaneswar	115.00	1.80	16.00	3.75	0.75	6.00	5.00	148.3
22.	PDKV, Akola	65.00	0.87	7.50	3.75	0.50	3.00	4.00	84.62
23.	MAU, Parbhani	65.00	0.87	6.50	3.75	0.50	3.00	4.00	83.62
24.	MPKV, Rahuri	65.00	0.87	7.00	3.75	0.50	3.00	4.00	84.12
25.	KKV, Dapoli	60.00	0.87	7.00	3.75	0.50	8.50	4.00	84.62
26.	UAS, Raichur	30.00	0.52	3.50	3.75	0.50	3.00	4.00	45.27
27.	UAS, Dharwad	30.00	0.39	2.50	0.00	0.25	3.00	2.00	38.14
28.	UAS, Bangalore	65.00	0.87	9.00	3.75	0.50	3.00	4.00	86.12
29.	TNAU, Coimbatore	115.00	1.80	10.05	3.75	0.75	5.00	5.00	141.35
30.	SKUAST, Jammu	65.00	0.87	12.05	3.75	0.50	4.00	5.00	91.17
31.	KAU, Thrissur	65.00	0.87	9.30	3.75	0.50	3.00	4.00	86.42
32.	MPUAT, Udaipur	35.00	0.64	3.00	0.00	0.38	2.00	6.00	47.02
33.	RBS College, Bichpuri	10.00	0.26	3.50	0.00	0.10	2.00	2.00	17.86
34.	PDFSR, Modipuram	0.00	0.38	3.50	8.00	0.25	1.08	0.00	13.21
35.	ICAR Res. Comp., Patna	0.00	0.38	3.50	4.75	0.25	3.00	1.50	13.38
36.	ICAR Res. Comp., Umiam	0.00	2.00	19.00	5.00	1.00	4.52	1.50	33.02
37.	ICAR Res. Comp., Old Goa	0.00	0.38	4.00	4.75	0.25	3.00	1.00	13.38
38.	CARI, Port Blair	0.00	0.38	8.50	4.93	0.25	3.00	2.00	19.06
TOTAL		1915.00	34.09	301.95	126.43	18.53	164.00	100.00	2660.00

S. No.	Name of University/ ICAR Institute	Pay & allow.	T.A.	Other contingencies	Contr. Services	POL/Veh. Hiring	NRC	Total
Fin. Year 2013-14								
1.	ANGRAU, Hyderabad	148.57	1.25	39.50	8.00	2.00	0.00	199.32
2.	HPKV, Palampur	91.50	0.50	10.00	6.00	0.20	0.00	108.20
3.	GBPUA&T, Pantnagar	61.42	0.50	10.00	6.00	0.20	0.00	78.12
4.	CSAU&T, Kanpur	49.00	1.00	9.70	6.00	0.20	0.00	65.90
5.	NDUA&T, Faizabad	6.72	0.50	10.00	6.00	0.20	0.00	79.42
6.	BHU, Varanasi	30.00	0.25	5.00	6.00	0.10	0.00	41.35
7.	BAU, Ranchi	29.00	0.50	15.83	6.00	0.70	1.00	53.03
8.	BAU, Sabour	34.65	0.50	8.00	5.33	0.20	0.00	48.68
9.	BCKVV, Kalyani	65.00	0.50	19.00	9.10	0.95	0.00	94.55
10.	AAU, Jorhat	52.00	0.80	7.50	3.25	0.50	0.00	64.05
11.	PAU, Ludhiana	106.62	0.50	10.00	6.00	0.40	0.00	123.52
12.	HAU, Hisar	65.00	1.00	9.50	5.00	0.20	0.00	80.70
13.	RAU, Bikaner	52.50	0.70	10.00	5.00	0.20	0.00	68.40
14.	SDAU, S.K. Nagar	70.00	0.70	16.05	6.50	0.95	0.00	94.20
15.	NAU, Navsari	15.00	0.20	5.00	1.00	0.10	0.00	21.30
16.	JAU, Junagadh	25.20	0.20	5.00	1.00	0.10	0.00	31.50
17.	AAU, Anand	13.00	0.25	10.25	2.00	0.60	0.00	26.10
18.	JNKVV, Jabalpur	89.00	1.00	26.25	8.00	1.00	0.00	125.25
19.	RVSKVV, Gwalior	22.00	0.20	5.00	1.00	0.00	0.00	28.20
20.	IGKV, Raipur	31.00	0.65	22.47	4.50	1.	0.00	60.07
21.	OUAT, Bhubaneswar	134.00	1.00	12.50	6.00	1.45	0.00	154.00
22.	PDKV, Akola	30.85	0.50	10.00	6.00	0.50	0.00	47.55
23.	MAU, Parbhani	34.00	0.50	10.00	6.00	0.20	0.00	50.70
24.	MPKV, Rahuri	80.91	1.00	10.00	6.00	0.20	0.00	98.11
25.	KKV, Dapoli	68.48	1.50	22.75	7.00	0.70	0.00	100.43
26.	UAS, Raichur	12.00	0.20	5.00	6.00	0.20	0.00	23.40
27.	UAS, Dharwad	12.00	0.30	5.00	1.00	0.10	0.00	18.40
28.	UAS, Bangalore	57.00	0.25	19.55	4.20	0.85	0.00	81.85
29.	UAHS, Shimoga	13.00	0.20	1.50	2.00	0.10	0.00	16.80
30.	TNAU, Coimbatore	140.00	2.40	25.60	7.20	1.25	0.00	176.45
31.	SKUAST, Jammu	1000.10	0.50	10.00	6.00	0.20	0.00	116.80
32.	KAU, Thrissur	97.90	0.50	7.00	6.00	0.20	0.00	111.60
33.	MPUAT, Udaipur	51.00	0.80	13.80	8.50	1.45	0.00	75.55
34.	RBS College, Bichpuri	15.00	0.20	3.00	1.00	0.10	0.00	19.30
35.	PDFSR, Modipuram	0.00	0.40	7.00	9.00	0.20	0.00	16.60
36.	ICAR Res. Comp., Patna	0.00	0.25	8.50	6.95	0.95	0.00	16.65
37.	ICAR Res. Comp., Umiam	0.00	1.80	19.50	12.75	5.75	0.00	39.80
38.	ICAR Res. Comp., Old Goa	0.00	0.25	11.50	4.25	0.20	0.00	16.20
39.	CARI, Port Blair	0.00	0.50	13.55	6.95	0.95	0.00	21.95
TOTAL		1959.42	24.75	469.80	214.48	24.55	1.00	2694.00



7. RESEARCH RESULTS

7.1 INTEGRATED FARMING SYSTEMS

7.1.1 DEVELOPMENT OF REGION-SPECIFIC ON-STATION IFS MODELS

Study on “Development of Region Specific on-station Integrated Farming Systems Research Models for Small & Marginal Farmers” was initiated in the year 2010-11 at 31 AICRP-IFS centres, representing almost all the 15 agro-climatic regions of the country. The report contains data related to year 2012-13 mainly on the composition of the model, total production, monetary returns, and resource recycling potential (Table 7.1/1-4)

Pantnagar (Uttarakhand)

At Pantnagar, model is established on an area of 1.0 ha to meet out household food and fodder demand along with livelihood improvement of an average family of five members. The results of first two years (2011-12 & 2012-13) have indicated that diversification of existing farming system – crop+horticulture (60%) or crop+dairy (30%) by proper integration of all the three farm components, viz., field crops, horticultural crops (fruits & vegetables) and livestock; along with on-farm value addition practices like vermi-composting, resulted in total farm production – in terms of rice equivalent yield (REY) – to the tune of 19.0 t/ha/yr during first year to 24.2 t/ha/yr during 2nd year of the study. The annual net monetary returns in second year of the study were ₹ 1,72,034/- as compared to ₹ 1,17,500/- in prevailing farming system adopted by the farmers of the region. Annual production of cereals (4,029 kg), pulses (396 kg), oilseeds (300 kg), vegetables (833 kg), milk (3,281 litre) and green fodder (20,700 kg) from 1.0 ha land, is not only sufficient to fulfill food and fodder needs of the farm family but also may reduce market dependency for dietary items.

Chatha (J & K)

At Chatha, IFS model is developed on 1.5 ha land for a 7-member family. Here components of field crops, horticultural crops, livestock, fishery, poultry, apiary, vermi-composting and boundary plantation have been included. A production of 11.54 t/ha/yr in terms of REY, was recorded from the model, whereas annual income was ₹ 1,90,071/ha as gross returns and ₹ 78,459/ha as net returns. During the year under report, diversification/intensification of the prevailing farming system (crop + dairy) led to production of 1,362 kg cereals, 58 kg pulses, 80 kg oilseeds, 3,824 litre milk, 2019 kg vegetables, 571 poultry eggs and 10,912 kg green fodder. The total cost of production under different farm components/enterprises of IFS model was ₹ 2,02,428/yr, of which 47.7% was in the form of market-purchased inputs whereas the rest of the expenditure was met from recycling of farm products/ by-products/ wastes etc. within the system (17.8%) and 34.5% as family labour.

Palampur (Himachal Pradesh)

Crop+livestock/horticulture is the predominant farming system in hilly areas of Himachal Pradesh. Scientifically managed IFS model of 1.0 ha; comprising of field crops, dairy animals (cows), horticultural crops & value addition of farm products; recorded a production of 4,190 kg cereals, 4,396 litre milk, 1,471 kg vegetables and 26,930 kg green fodder. In terms of REY, the total production was 13.9 t/yr. In monetary terms, the annual output was ₹ 2,21,453 as gross returns

and ₹ 84,390 as net returns. The results of the study further envisage that by proper recycling of farm by-products and use of family labour, cost of production can be minimized by 49.1% or more.

Ludhiana (Punjab)

In this part of the country; field crops+dairy animals (cow/ buffalo) is the dominant farming system, being adopted by 82% of farm families, with average annual net returns of ₹ 1,63,938. IFS model developed at PAU, Ludhiana on 1.0 ha land, comprised of fieldcrops+dairyanimals+horticulture crops+fishery+mushroom along with kitchen gardening and boundary plantation. From this model a gross production of 29.17 t/ha rice equivalent during first year and 36.2 t/ha during second year of the study was recorded. In terms of net returns the output was ₹ 1,55,207 and 2,08,720 per ha per year in first and second year, respectively. Total production cost of different farm components/enterprises of the IFS model was ₹ 1,96,489/ha/yr. However, only 50.40% was required to be purchased from the market and rest of the amount (49.6%) was met out from internal inputs (23.7%) and family labour (25.9%).

Hisar (Haryana)

At Hisar also, IFS model is established on an area of 1.0 ha assuming an average farm family size of five members. The results for 2012-13 revealed that diversification of existing farming system (field crops+dairy animals) with horticulture and vermi-compost unit in an integrated manner produced gross yield (in terms of rice equivalent) to the tune of 40.4 t/yr. The net monetary returns were ₹ 1,12,583/ha/yr as compared to ₹ 61,855/ha/yr, achieved in prevailing farming system of the region. The component-wise production from the model, in a year, was 3,484 kg cereals, 106 kg pulses, 482 kg oilseeds, 1,130 kg vegetables and 11,534 kg green fodder.

Modipuram (U.P.)

At Modipuram the IFS model is being developed for marginal farmers of the region on 0.70 ha irrigated land, assuming a 6-member farm family and two dairy animals (one buffalo+one cow). In addition to two dairy animals, the model comprises of field crops (3,800 m²), banana and mandarin var. kinnow based agri-horti system and boundary plantation of guava+karonda. Total annual farm production, in terms of REY, during the year 2011-12 and 2012-13 was recorded to be 20.42 t/ha and 29.2 t/ha with net returns ₹ 1.32 and 1.89 lakhs, respectively, as compared to prevailing farming system of field crops + dairy (₹ 0.68 lakhs/ha/yr). The total cost of production of different farm components/enterprises under IFS approach was ₹ 2.35 lakhs/yr. However, farmer is required to invest only 42% of it on external inputs and remaining inputs are managed within the system.

Kanpur (U.P.)

One hectare model developed at Kanpur comprised of field crops (0.72 ha), dairy animals (1 cow + 1 buffalo) and horticulture (fruits) (0.2 ha). The model realized gross returns of ₹ 2.36 and ₹ 1.90 lakhs during 2011-12 and 2012-13, respectively. The net returns for these initial two years were, ₹ 1.34 and ₹ 0.97 lakhs/ha as compared to prevailing farming system of crop + dairy (₹ 0.68 lakhs/ha). The total production cost involved for the system was ₹ 1.02 lakhs in first year and ₹ 1.32 lakhs in second year, out of which about 26.0% was met through on-farm recycling. An employment of 452 man days was also generated through the IFS.

Sabour (Bihar)

At Sabour also the model has been developed on 1.0 ha area and consists of farm components of field crops (0.70 ha), livestock (2 cows + 11

goats), horticulture garden (0.14 ha), fish pond (0.08 ha) and mushroom cultivation (0.03 ha). The results of initial two years of the study have shown highly encouraging results with total production of 24.94 and 40.60 t/ha/annum, in terms of rice equivalent yield and net returns of ₹ 1,03,684 and ₹ 1,98,706 during 2011-12 and 2012-13, respectively. The quantity of major products from the IFS unit was; 5220 kg cereals, 135 kg pulses, 140 kg oilseeds, 3,472 litre milk, 475 kg fruits, 2065 kg vegetables, 1125 eggs, 148 kg fish, 27.8 t green fodder and 7.14 t dry fodder. The overall production cost was reduced to 86.6% due to efficient use of recycled farm products and by-products (50.3%) and farm labour (36.3%) within the system.

Patna (Bihar)

IFS studies conducted at RCER, Patna revealed that a diversified farming system, consisting of a combination of field crops (0.60 ha), livestock (1 cow, 700 broilers and 20 goats), fruit crops (0.38 ha), fish pond (0.10 ha) and other supplementary enterprises like vermi-compost etc. could produce significantly higher annual production, in terms of rice equivalent yield (50.86 t in first year to 67.7 t in second year) and realized net returns of ₹ 2,40,273 and ₹ 3,03,508, respectively, as compared to ₹ 60,252 in prevailing system of crop + dairy. The major products from the farm unit were; cereals (2.03 t), pulses (140 kg), oilseeds (150 kg), milk (4500 litre), fruits (770 kg), vegetables (3.65 t), fish (280 kg), eggs (1110 nos.) and green fodder (7.48 t). Proper recycling of farm wastes/ crop residues and use of family labour within the system brought a reduction of 64.8% in total cost of cultivation (₹ 1,76,565) and farmer has to spent only 35.2% on market inputs under IFS model leading to enhanced farm profits.

Varanasi (U.P.)

One hectare IFS model, developed at BHU Varanasi, consisted of field crops (0.81 ha), dairy

animals (4 cows), poultry (400 broiler + 800 croilers), fruit crops (0.06 ha), fish (0.1 ha) and mushroom (0.01 ha). During initial two years of the study, total farm production, in terms of rice equivalent yield was 43.76 and 49.90 t per year, and in terms of gross and net returns it was ₹ 6,56,481 and ₹ 7,48,769 and ₹ 2,50,465 and ₹ 2,59,673 per annum, respectively, during 2011-12 and 2012-13. Major primary products (average for 2 years) of the farm unit were; cereals (4.29 t), pulses (590 kg), oilseeds (180 kg), milk (6000 litre), fruits (440 kg), vegetables (2.50 t) and green fodder (22.00 t). The total cost of production for different farm components of IFS model (1.0 ha) was ₹ 4,89,095, however, only 36.9% was for external/purchased inputs from market and remaining cost could be met out from recycled by-products/farm wastes (39.4%) and family labour (23.7%).

Faizabad (U.P.)

Crop + dairy animal is a prevailing farming system in Faizabad and adjoining districts, representing Middle Gangetic Plain Region. Scientific management and integration of horticultural crops into prevalent farming system in a 1.0 ha IFS study – initiated during 2011-12 at Kumarganj (Faizabad) – revealed that production from the 7000 m² crop component is sufficient to meet the household annual food demand for a 7 member family along with fodder demand for the dairy animals (2 cows and their young ones). During first year of the study, total farm production (in terms of REY) was 22.37 t/ha with gross monetary returns of ₹ 2,46,175 and net monetary returns of ₹ 1,42,406. However, in second year the production as well as profits, were reported to decline to 5.4 t, ₹ 1,79,023 and ₹ 64,962/ha/year, respectively. The total input cost for the system was ₹ 1,17,024, of which only 45% was procured from market and rest was generated within the farm through recycling of on-farm products and by-products (19%) and family labour (782 man days, 36%).

Kalyani (W.B.)

Field crops + dairy and field crops + vegetables, having a share of 70 and 20 percent, respectively, are the dominant farming systems of the lower Gangetic plain region. Integration of fishery and on-farm value addition into existing farming practices could realize total farm production (in terms of REY) of 6.26 t/ha during first year and 24.4 t/ha during second year, with respective net returns of ₹ 20,665 and ₹ 1,11,439. Farm production consisted of cereals (3.60 t), pulses (74 kg), oilseeds (170 kg), vegetables (440 kg), and milk (3472 litre). The total cost of production of different farm components of the IFS model was Rs. 1,03,703/yr, out of which only 18% was spent on externally purchased inputs.

Umiam (Meghalaya)

One-hectare IFS model developed at Umiam also consisted of field crops (0.70 ha), pig, poultry (broilers—600 nos.), horticultural/ plantation crops (0.22 ha), fish pond (0.05 ha). The total production (in terms of REY) during 2011-12 and 2012-13 was to the tune of 24.94 and 25.3 t/ha/year, respectively, with net returns of ₹ 1,88,277 and ₹ 1,86,750. Farm production (mean of two years) consisted of cereals (1.98 t), pulses (182 kg), oilseeds (540 kg), fruits (180 kg), vegetables (5.46 t), eggs (1000 nos.) and poultry chicks (1444 nos.). Out of total cost of production (₹ 2,09,560/ha/year), 72.3% inputs were purchased from the market and the rest (27.7%) were managed within the system at farm itself, in the form of recycled inputs and farm labour.

Jorhat (Assam)

The IFS model developed at Jorhat, comprised of field crops, dairy animals, fishery, apiary and plantations all along the farm boundary. Total farm production, in terms of rice equivalent yield, was recorded to be 14.16 t/ha during 2011-12 and 27.30 t/ha during 2012-13 with respective net returns of ₹ 89,120 and ₹ 1,47,321 per hectare. Net returns

under prevailing farming system were ₹ 40,809 only. Farm production consisted of cereals (2.37 t), pulses (100 kg), oilseeds (363 kg), fruits (270 kg), vegetables (1.76 t), milk (3600 liter), green fodder (12.18 t) and honey (60 kg). Out of the total cost of production, inputs worth ₹ 1,52,698 (56.8%) were required to be purchased from market and rest (43.2%) were managed within the system itself through recycling on farm by-products and family labour.

Raipur (Chhattisgarh)

The system of crop+dairy animals (cow/ buffalo) is the most dominant farming system of Chhattisgarh state with 90% farm families adopting it. An one hectare IFS model was established at IGKV, Raipur (Chhattisgarh) during 2011-12 with composition having crops (0.59 ha), dairy animals (2 cows), poultry (150 birds), horticulture/ plantation crops (0.23 ha) and fish pond (0.08 ha). During initial two years of establishment of the IFS model the total production of the model in term of rice yield equivalent was 13.13 & 12.50 t/ha/year with net returns of ₹ 82,613 & ₹ 90,073/ha/annum. The production of different farm commodities included cereals 1920 kg, pulses 620 kg, oilseeds 270 kg, vegetables 1600 kg and milk 2432 litre, 13890 kg green fodder, poultry meat 174 kg, fish 13 kg. The total input cost for the model was ₹ 67162/year of which 50.8 % was saved through use of family labour (41.2%) and about 9.60 % through on-farm resource recycling making the model profitable and sustainable.

Ranchi (Jharkhand)

The major farming system of Jharkhand state are field crops + goat/poultry (60%) and or field crops + dairy animals + poultry (20%) with an average land holding of less than 1.45 ha. During second year of establishment (2012-13), the total production (soybean equivalent yield), cost of production and net monetary returns were 10.90 t/ha/year, ₹ 40,635 and ₹ 1,08,664/ha/year, respectively showing increasing trend in profits.

The production of different farm commodities included cereals (3.46 t), pulses (416 kg), oilseeds (654 kg), green fodder (17.10 t), mushroom (60.00 kg), honey (20.50 kg) and fish (150 kg).

Jabalpur (M.P.)

An IFS model of 1.0 ha was established at Jabalpur and comprised of field crops (0.90 ha), dairy animals (3 cows), nutritional garden (24 m²), fishery (0.06 ha) and other secondary farm components, viz; vermi-composting unit, mushroom, and boundary plantation. For initial two years (2011-12 and 2012-13) model recorded gross and net monetary return of ₹ 300276 and ₹ 134674, respectively, with total farm production of 25.00 t/ha/annum in term of rice equivalent yield. Among the different IFS component integrated in to the model, the maximum contribution in gross return (60.4 %) was obtained from livestock cum vermicompost module followed by crops (32.9%) model. The total cost of production of different farm components/enterprises was recorded to be ₹ 1,78,628. However, inputs costing only ₹ 69,278 (38.78%) were purchased from the market, 8.38% derived from on farm recycling and 52.57% by utilizing family labour

Parbhani (Maharashtra)

Studies on development of IFS model for the small farm holders (1.0 ha) of the region were initiated at Parbhani during 2010-11. After two years of the study, the farm production reached to the level of 7.46 t/ha/year with gross and net returns of ₹ 2,20,168 and 95,744, respectively. The total cost of production of different farm components/enterprises of the model was ₹ 1,12,567/ha/year and the production of different farm commodities included cereals (2.50 t), pulses (600 kg), oilseeds (659 kg), vegetables (5.00 t), milk (975 litre), and green fodder (42.10 t). The total external input cost was ₹ 67,162; of which 50.8% was saved through the use of family labour (41.2%) and about 9.6% through on-farm resource recycling making the model profitable and sustainable.

Akola (Maharashtra)

At Akola, the results during first year of establishment were not consistent and have been ignored. The results of second year, however, were found to be acceptable. During second year of the study the farm production (in terms of pearl millet yield equivalent) was recorded to be 30.0 t/ha/year with gross and net returns of ₹ 1,53,034 and ₹ 52,321; respectively. Net returns in IFS model were more than 200% higher as compared to farmers' fields (₹ 19,270). The farm production included cereals (503 kg), pulses (780 kg), oilseeds (932 kg), vegetables (201 kg), green fodder (130 kg) and eggs (25 nos.). The total input cost for the model was Rs.1,59,745 of which only 15.1% was spent on externally purchased inputs and rest 84.9% was the cost of 515 farm labour (38.7%) and about 46.2% of on-farm recycled resourced; making the model profitable and sustainable.

Rahuri (Maharashtra)

In Rahuri district and its adjoining areas; field crops + dairy is the most dominant farming system. An IFS study was initiated at Rahuri in 2011-12 for small farmers of the region on 1.0 ha land. The IFS model developed at the center included field crops (0.60 ha), dairy animals (2 cows + 2 buffaloes), poultry unit (400 birds) and horticultural crops (0.20 ha). The results for the first two years of the study recorded total production (in terms of REY) of 13.7 and 29.8 t/ha, respectively, with gross and net returns of ₹ 2,05,624 & ₹ 3,28,188 and ₹ 1,42,068 & ₹ 1,71,379/ha/annum in respective years. Production included cereals (2.23 t), pulses (260 kg), oilseeds (732 kg), milk (5,470 litre), fruits (1.10 t), vegetables (3.11 t) and green fodder (15.45 t). The total cost of production of different farm components of the model was ₹ 1,56,809/year. However, only 38% of it was required for external inputs, whereas rest of inputs were generated internally through recycled farm products/ by-products (62%) and utilization of family labour (32%).

Rajendranagar (A.P.)

The IFS model, developed on 1.0 ha at Rajendranagar, comprised of field crops (0.70 ha), livestock (4 buffaloes, 20 hens and 6 goats), and fruit crops (0.20 ha). In its third year of establishment, the system could generate a net return of Rs. 46,047 with total farm production of 20.3 t REY/ha/year. The total cost of production for the unit was worked out to be ₹ 2,26,805; of which about 61.6% was generated within the farm itself in the form of recycled farm products/ by products (0.4%) and family labour (61.2%).

Coimbatore (T.N.)

The dominant farming systems of the region and their spread are field crops + dairy animals (60%) and field crops + goats (40%) with average net returns of ₹1,32,005. Production of different commodities, as obtained from IFS model of 1.2 ha in its initial two years of establishment was cereals (3.27 t), pulses (225 kg), oilseeds (818 kg), vegetables (7.62 t), fruits (112 kg), milk (3080 litre), green fodder (24.80 t) and goat meat (503 kg). During 2011-12 and 2012-13, total farm production (REY) was recorded to be 25.55 t/ha and 39.0 t/ha, gross returns to be ₹ 4,59,934 and ₹ 4,81,781 and net returns to be ₹ 2,28,070 and ₹ 2,38,192, respectively. The total production cost during 2011-12 was ₹ 2,31,864 of which only 34.4% was spent on inputs purchased from the market, whereas during 2012-13 the respective values were ₹ 2,32,620 and 61.0% for production cost and share of market inputs.

Kathalgere (Karnataka)

The dominant farming system of the district Davangere, represented by Kathalgere centre, is field crops + dairy animals (60% of farm households), followed by field crops + dairy animals + horticulture (40% of farm households). IFS model developed on 1.0 ha area comprised of field crops, dairy animals and horticulture component. This IFS model gave a total production

(REY) of 20.0 t during 2011-12 and 13.5 t during 2012-13. The gross monetary returns for respective years were; ₹ 2,80,762 and 1,95,876; whereas net monetary returns were; ₹ 1,95,577 and 1,51,078. Total cost of production was ₹ 1,26,460; of which 87.50% was saved through use of family labour (12.5%) and 75.0% through on-farm recycling of farm products/by-products within the IFS system.

Siruguppa (Karnataka)

The predominant farming system of district Siruguppa is crop + dairy with 80% spread among farm households. With an objective of diversifying the farming system of small farm holders for getting higher profits, along with food and fodder security, an IFS model – consisting of field crops (0.72 ha), dairy animals (1 cow+1 buffalo), horticultural crops (0.20 ha), fish pond (0.03 ha) and other subsidiary units like mushroom, kitchen garden, boundary plantation etc. – was established in 2011-12. Total farm production (in terms of REY) from 1.0 hectare area was 14.67 t during 2011-12 and 23.60 t during 2012-13. Major commodities produced on the farm were; cereals (5.52 t), pulses (248 kg), oilseeds (81.0 kg), milk (1,213 litre), fruits (100 kg), vegetables (1.97 t), and green fodder (15.00 t).etc. Gross monetary returns for two years were; ₹ 1,90,764 and 2,60,252 and net monetary returns ₹ 1,04,324 and ₹1,32,895, respectively. Cost of cultivation for the respective years was recorded to be ₹ 86,440 and ₹ 1,23,357 of which only 59.3% was spent on externally purchased inputs and rest was managed through recycling of farm products/by-products (16.2%) and farm-family labour (24.5%).

Bhubaneswar (Odisha)

Predominant farming system of the region is field crops + dairy animals (80%) followed by field crops + dairy animals + fish (20%). The IFS model, being developed at Bhubaneswar on 1.25 ha area, comprises of field crops (0.38 ha), dairy animals (2 cows), poultry (80 birds), ducks (20 birds),

horticulture (0.09 ha), fish pond (0.33 ha) along with other supplementary enterprises like mushroom, kitchen garden, boundary plantation etc. During first year of the study the total farm production – in terms of REY – was 15.0 t and during second year 18.8 t/ha with respective gross returns of ₹ 2,87,861 and ₹ 1,87,681 and net returns of ₹ 55,030 & ₹ 54,978, respectively. Major farm products included cereals (1.32 t), pulses (22.0 kg), oilseeds (19.0 kg), vegetables (983.0 kg), fruits (1514 kg) milk (5298 litre), eggs (851 nos.), mushroom (74 kg), and green fodder (25.60 t). The total cost of production of different farm components was ₹ 1,66,039; of which only ₹ 83,603 (50.35%) was required for purchase of external inputs from market whereas remaining cost was met out from recycling of farm products/by-products (15.35%) and farm-family labour (34.3%).

Ela (Goa)

Field crops + dairy animals, in general, and plantation crops in particular, is the farming scenario of the region. From a 0.74 ha IFS model, being evaluated at this centre, we could record an annual production of 5.50 t cereals, 39 kg pulses, 22 kg oilseeds, 1.00 t vegetables, 150 kg fruits, 4474 litre milk, 200 nos. eggs, 140 kg mushroom, 12.34 t green fodder, 30 kg poultry meat and 230 kg pork. Gross returns from the model were ₹ 80,320 during 2011-12 and ₹ 4,36,491 during 2012-13 with respective net returns of ₹ 35,020 and ₹ 2,61,970. The system productivity in terms of REY was reported to be 7.23 and 25.7 t/ha/year during 2011-12 and 2012-13, respectively. During 2nd year, the total cost of production for the system was ₹ 1,22,165 of which only 41.8% was on purchase of cash inputs from the market, whereas remaining cost could be managed through internal resources, i.e. 45.9% for farm family labour and 12.9% through recycling of farm products/by-products.

Karmana (Kerala)

Coconut-based homestead farming is the major type of farming in the region. An IFS model of 1.00 ha, being developed at the center consists of field crops (0.50 ha), dairy animals (2 cows), horticulture (0.06 ha), fishery (0.05 ha) and other subsidiary components (mushroom, kitchen garden, boundary plantation etc.). From this IFS model an annual production (in terms of REY per ha) was recorded to be 5.59 t during 2011-12 and 36.7 t during 2012-13. During 2nd year, the gross and net monetary returns were recorded to be ₹ 3,56,908 and ₹ 1,73,930/ ha/annum. Major farm products were; cereals (784 kg), oilseeds (220 kg), vegetables (2.28 t), fruits (1.28 t), milk (4,150 litre) and mushroom (17 kg). The total production cost for different farm components/enterprises of IFS model was ₹ 1,82,978. However, expenditure incurred on purchase of external inputs was only 36.6% of the total cost, whereas remaining expenditure was met out from recycling of farm products/ farm wastes (19.1%) and farm-family labour (44.4%).

Karjat (Maharashtra)

IFS model (1.0 ha) developed at Karjat center comprises of field crops (0.5 ha), horticulture (0.4 ha) and dairy animals (3 cows). Total production (in terms of rice equivalent yield) from the model was recorded to be 22.1 t/ha with gross and net monetary returns of ₹ 2,76,243/ha/year and ₹ 87,261; respectively during 2012-13. Different farm products included; cereals (1.08 t), pulses (100 kg), oilseeds (350 kg), vegetables (3.50 t), fruits (460 kg), milk (435 litre) and green fodder (4.60 t). The total cost of production for different farm components/ enterprises of IFS model was ₹ 1,88,982 per ha per year. However, expenditure incurred on purchase of inputs from market was only 27.2% of total cost and remaining expenditure was met from recycling of farm by-products/wastes (12.8%) and farm-family labour (60%).

S.K. Nagar (Gujarat)

The IFS model at S.K. Nagar comprised of field crops (0.70 ha), dairy animals (2 buffaloes) and perennial horticultural crops (0.25 ha). During initial two years of the establishment, the total farm production from the model (in terms of REY) was recorded to be 22.61 and 23.70 t/ha/annum. The major products included; cereals (1.54 t), pulses (479 kg), oilseeds (625 kg), milk (2,564 litre), vegetables (3.05 t), fruits (317 kg) and green fodder (25.92 t). Gross and net monetary returns during 2011-12 were recorded to be ₹ 3,39,244 and ₹ 1,99,483; respectively, whereas during 2012-13 they were ₹ 3,31,177 and ₹ 1,61,785; respectively. The average total cost of production for different farm components/enterprises of model (1.0 ha) was ₹ 1,69,392; of which 31.4% could be met through recycling of farm products/ by-products and 32.7% through the use of family labour. The remaining cost was towards purchase of cash inputs from the market

Durgapura (Rajasthan)

Field crops + dairy animals is the most dominant farming system of western dry region of Rajasthan with 90% farm families adopting the system. To improve the livelihood of small land holders of the region an IFS model on 1.45 ha area with diversified nature of farm components; including field crops (1.0 ha), dairy animals (2 cows), goat (10+1 goats), fruit crops (0.25 ha) and other supporting activities like vermi-compost unit, kitchen garden and boundary plantation etc. was

initiated at Durgapura (Jaipur) during 2011-12. During first two years (2011-12 and 2012-13) the annual total production (in terms of REY/ha) from the unit was 14.12 t and 49.65 t, respectively. Gross and net monetary returns during second year (2012-13) were ₹ 1,96,016 and ₹ 82,513/ha/annum; respectively. It was also noted that out of the total input cost of ₹ 1,66,598; amount spent on cash inputs was only 32.0% and rest 68% could be generated through on-farm recycling of farm-products/ by-products (35.0%) and family labour (33.0%). The major products from the model comprised of 1.55 t cereals, 224 kg pulses, 381 kg oilseeds, 3.55 t vegetables, 3,898 litre milk and 20.10 t green fodder.

Port Blair (A & N Islands)

Plantation crops + pig (50%) followed by field crops + dairy animals (cow) + fish (45%) are two equally important and prevalent farming systems of this island region. IFS model of 1.0 ha area, developed at the centre comprises of field crops (0.61 ha), dairy animals (2 cows), horticulture crops (0.20 ha) and piggery. The model realized gross and net returns of ₹ 79,691 and ₹ 48,486; respectively. Component-wise products from the model included cereals (1.41 t), pulses (32 kg), vegetables (1.76 t), and fruits (50 kg). The total cost of production of different farm components/enterprises was ₹ 30,416, of which only 22.0% was required for purchase of off-farm inputs from the market, inputs worth 16.3% of production cost were generated internally and remaining 65.0% cost was in the form of family labour.

7.2 CROPPING SYSTEMS MANAGEMENT

7.2.1 CROPPING SYSTEMS DIVERSIFICATION/ INTENSIFICATION

Title of the Experiment: Identification of need based cropping systems for different agro-ecosystems (Expt. No. 1a).

Objectives: To identify appropriate cropping systems with high productivity and profitability to suit the specific needs of different agro-ecosystems.

Year of start: 1990-91. The treatments are, however, modified every 3-4 years.

Treatments: There are no common treatments for all the centres; they vary from location to location. The number of cropping systems tested at each location also varies from 6 to 15. The details of treatments are given in table-7.2/1 along with experimental results.

Locations:

A brief description of centre-wise results is given below.

Arid Ecosystem

Hisar : Seven cropping systems were evaluated at Hisar. Out of those, cotton-wheat system was identified to be distinctly better than others including prevailing (pearl millet-wheat-fallow) system with gross returns of ₹ 1,61,920/ha/year. The next best sequence in the order of merit was green gram-mustard + kasni- fallow, which gave gross returns of ₹ 1,09,175/ha/year. This, however, proved to be at par with prevailing pearl millet-wheat-fallow system (₹ 105103/ha/year). But in terms of energy production, existing pearl millet-wheat-fallow system was better which gave highest energy production of $(28.3 \text{ K} \times 10^6 \text{ ha/year})$. The other sequences were at par with or inferior than existing pearl millet-wheat system.

Ecosystem	Centre (State)
Arid	Hisar (Haryana), S.K. Nagar (Gujarat) and Siruguppa (Karnataka).
Semi-Arid	Ludhiana (Punjab), Kanpur (U.P.), Bichpuri (U.P.), Junagadh (Gujarat), Durgapura (Rajasthan), Rajendranagar (A.P.), Kota (Rajasthan), Rudrur (A.P.), Rahuri (Maharashtra), Parbhani (Maharashtra) and Coimbatore (T.N.).
Sub-humid	Faizabad (U.P.), Pantnagar (Uttarakhand), Varanasi (U.P.), Sabour (Bihar), Ranchi (Jharkhand), Raipur (Chhattisgarh), Jabalpur (M.P.), Rewa (M.P.), Powarkheda (M.P.), Chiplima (Odisha) and Kathalgere (Karnataka).
Humid	Jammu (J & K), Palampur (H.P.), Jorhat (Assam) and Kalyani (W.B.).
Coastal	Bhubaneswar (Odisha), Maruteru (A.P.), Thanjavur (T.N.), Karmana (Kerala), Karjat (Maharashtra) and Navsari (Gujarat).

Results:

Data were recorded on yields, annual gross returns and annual energy output at each of the centres which have been presented in table 7.2/1.

S.K. Nagar : Out of eight cropping systems evaluated, the cropping system involving green gram-fennel + cauliflower-fallow recorded the highest gross returns of ₹ 3,49,898/ha/year. It was significantly followed by cotton + sun hemp (F) +

bitter guard–castors equence with gross returns of (₹ 2,83,421/ha/year). In terms of energy production, green gram + sun hemp (F)-castor-green gram sequence was better which gave highest energy output of 31.4 K*10⁶/ha/year. Cotton + sun hemp (F) + bitter gourd-castor sequence, however, also proved at par with green gram + sun hemp (F)-castor-green gram (30.3 K*10⁶ /ha/year) sequence with regards to energy production.

Siruguppa : Ten cropping systems were evaluated at Siruguppa. Among those, rice-fallow- Indian bean was identified to be the most profitable with gross returns of ₹ 89,993/ha/year, Energy production was also recorded highest (24.3 K*10⁶/ha/year) in the same cropping sequence. Rice-fallow-mustard, rice-fallow-Ashwagandha, rice-fallow-ridge gourd and rice-fallow-cumin were also proved at par with rice-fallow-Indian bean both from gross returns and energy production point of view.

Semi-Arid Ecosystem

Ludhiana : Among the twelve crop sequences, evaluated at Ludhiana, maize + turmeric-wheat + linseed-fallow sequence was identified to be most suited with highest gross returns of ₹ 5, 46,450/ha/year with highest energy production of (91.9,K*10⁶/ ha/year). Maize + turmeric-barley + linseed-fallow sequence was, however, statistically prove at par with respect to both gross return and energy production. These two cropping systems were distinctly better than other systems, including rice-wheat-fallow.

Kanpur : Out of ten cropping systems evaluated, maize-garlic-green gram system found to record highest gross returns of ₹ 3,45,044/ha/year. Maize + black gram-potato-onion proved to be the next best cropping system with a gross return of ₹ 2,54,428/ha/year. However, in terms of energy production, rice-wheat-green gram sequence gave highest energy production of (46.8 K*10⁶/ha/ year).

Maize-wheat-fallow cropping system recorded the lower gross return.

Bichpuri : Ten cropping systems were evaluated at Bichpuri out of which sesbania-potato-okra recorded the highest gross return of ₹ 1,99,319/ha/year closely followed by pearl millet-potato-cluster bean. The highest energy value of (37.5 K*10⁶/ha/year) was also recorded under pearl millet-potato-cluster bean cropping system followed by sesbania-potato-lady's finger.

Junagadh : Among 10 cropping systems evaluated at Junagadh, groundnut-onion-sorghum (F) found to be the best with gross return of ₹ 4,38,095/ha/ year. The highest energy output (32.0 K*10⁶/ha/ year) was also recorded from the same cropping systems. Onion-wheat-green gram was found to be second best with gross return of ₹ 2,26,706/ha/year.

Durgapura : Among 9 cropping systems evaluated, green gram-isabgol cropping system recorded the highest gross returns of ₹ 2,12,991/ha/year. Pearl millet-wheat recorded the second highest gross return of ₹ 79,596/ha/year. The highest energy value of 20.9 K*10⁶/ha/year was also recorded from the same treatment.

Rajendranagar : Out of eight cropping systems evaluated at Rajendranagar, soybean-sunflower cropping system recorded the highest gross return of ₹ 1,66,374/ha/year, closely followed by maize-sunflower (₹ 1,63,120/ ha/year) which were statistically at par with each other. As regards the energy production is concerned, soybean-maize was found to be the best with calorific value of 39.4 K*10⁶/ha/year.

Kota : Eight cropping systems were evaluated at Kota, out of which maize-garlic-fallow recorded the highest gross returns of ₹ 4,00,611/ha/year along with highest energy production (25.7 K*10⁶/ha/ year). Maize+soybean-garlic+wheat proved to be

the next best cropping system with gross income of ₹ 2,30,772/ha/year.

Rudrur : Among ten cropping systems evaluated at Rudrur, rice-rice cropping system was found to be better in terms of gross returns (₹ 1,75,155/ha/year), closely followed by rice-maize (₹ 1,71,703/ha/year), rice-sunflower (₹ 1,64,963/ha/year) and soybean-maize (₹ 1,57,920/ha/year). Rice-maize also recorded the highest energy production of (47.9 K*10⁶/ha/year) followed by soybean-maize (37.7 K*10⁶/ha/year).

Rahuri : Out of fifteen cropping systems evaluated at Rahuri, pearl millet-onion recorded the highest gross returns of ₹ 3,76,802/ha/year, closely followed by pearl millet + soybean-onion (₹ 3,71,149/ha/year) and soybean-onion (₹ 3,68,472/ha/year), which were at par to each other. As far as energy production is concerned, pearl millet-potato was found to be the best (44.1 K*10⁶/ha/year) followed by pearl millet+soybean-potato (43.8 K*10⁶/ha/year).

Parbhani : Among twelve cropping systems evaluated, turmeric+castor-fallow was found to be the best, both in terms of gross return (₹ 3,53,040/ha/year) and energy production (52.1 K*10⁶/ha/year). Soybean-wheat-cowpea was found to be the next best with gross return of ₹ 2,91,571/ha/year. Sorghum-wheat-fallow recorded the lowest gross return of ₹ 1,11,061/ha/year.

Coimbatore : Nine cropping systems were evaluated at Coimbatore. Out of which, sorghum(F)-cotton+onion-lablab was recorded highest gross return of ₹ 2,91,086/ha/year. Green chillies-maize-sunhemp fodder was found to be statistically at par recording gross return of ₹ 2,77,123/ha/year. As far as energy production is concerned, cowpea-maize+cowpea (F)-sunflower was found to be the best (35.5 K*10⁶/ha/year), closely followed by onion-cotton-maize (34.2 K*

10⁶/ha/year) and maize+cowpea-sunflower-cowpea (34.2 K*10⁶/ha/year).

Sub-Humid Ecosystem

Faizabad : Eight cropping systems were evaluated at Kumarganj, out of which rice-lentil-sudan chari(F) recorded the highest gross return of ₹ 2,58,016/ha/year. Rice-sunflower-cowpea proved the next best with gross return of ₹ 2,31,275/ha/year, whereas rice-wheat-fallow the popular cropping system recorded the lowest gross return (1,24,283/ha/year). Rice-potato-green gram recorded the highest energy value (43.6 K*10⁶/ha/year).

Pantnagar: Among eight cropping systems evaluated at Pantnagar, rice-pea (veg)-green gram recorded the highest gross return of ₹ 2,04,462/ha/year, closely followed by rice-pea (veg)-wheat (1,96,524/ha/year). Rice-wheat-fallow the common cropping system, however, recorded the lowest gross return (1,23,928/ha/year). Regarding energy production, rice-wheat-green gram was found to be the best 39.6 K*10⁶/ha/year closely followed by rice-pea(veg)-wheat (39.4 K*10⁶/ha/year).

Varanasi : Out of ten cropping systems evaluated, rice-potato-green gram was found to be the best in terms of both, gross return (2,16,445/ha/year) and energy production (40.2 K*10⁶/ha/year). Rice-toria-okra proved to be the next best with a gross return of ₹ 1,97,539/ha/year. Rice-wheat-fallow, the common cropping systems, however recorded the lowest gross return of ₹ 1,05,358/ha/year.

Sabour : Twelve cropping systems were evaluated at Sabour. Out of those, rice-cabbage-lady's finger was found to be the best in terms of gross return (4,44,296/ha/year), followed by rice-garlic-maize (₹ 3,59,535/ha/year). Whereas, with regard to energy value, rice-maize-sorghum proved to be the best (60.9 K*10⁶/ha/year) closely followed by rice-garlic-maize (56.9 K*10⁶/ha/year).

Ranchi : Out of seven cropping systems evaluated at Ranchi, rice-potato+wheat-sesame was found to be the best in terms of both, gross return (₹ 1,53,911/ha/year) and energy production (39.1 K*10⁶/ha/year). Rice-potato-sesame (₹ 1,31,843/ha/year), rice-mustard-sesame (₹ 1,18,089/ha/year) and rice-wheat+mustard-sesame (₹ 1,08,810/ha/year) found to be at par with rice-potato+wheat-sesame as far as gross return are concerned.

Raipur : Eight cropping systems were evaluated at Raipur. Among them, rice-onion+cowpea+coriander-cowpea(S) recorded the highest gross return of Rs. 2,92,888/ha/year as well as the highest energy value (51.3 K*10⁶/ha/year). Rice-sunflower+lentil-cowpea was found to be the next best, both in terms of gross return (2,66,984/ha/year) and energy production (42.1 K*10⁶/ha/year). Rice-wheat-cowpea, however recorded the lowest gross return of Rs. 1,46,902/ha/year.

Jabalpur : Out of twelve cropping systems evaluated, rice (basmati)-fallow-berseem (seed+fodder) recorded the highest gross return of ₹ 2,75,861/ha/year, followed by rice-marigold-sesame (₹ 1,48,830/ha/year). Regarding energy production, rice-wheat-fallow produced the highest calories (32.7 K*10⁶/ha/year).

Rewa : Out of ten cropping systems evaluated at Rewa, rice-toria-onion recorded the highest gross return of ₹ 3,20,336/ha/year, followed by rice-garlic-fallow (₹ 2,92,022/ha/year). Rice-pea-wheat, however, recorded the highest calories (45.6 K*10⁶/ha/year) closely followed by rice-potato-wheat (44.8 K*10⁶/ha/year). Rice-chickpea-fallow recorded the lowest gross return of (₹ 1,15,221/ha/year) and energy production (23.3 K*10⁶/ha/year).

Powarkheda : Out of ten cropping systems evaluated at Powarkheda, soybean-potato-okra proved to be the best with highest gross return of

₹ 2,87,672/ha/year and energy production of 40.8 K*10⁶/ha/year. Soybean-potato-sesame found to be the next best with gross return of ₹ 1,83,125/ha/year.

Chiplima : Among ten cropping systems evaluated at Chiplima, rice-groundnut-bottle gourd were found to be the best as far as gross return (₹ 2,14,471/ha/year) is concerned. Rice-maize(cob)-cowpea recorded the highest energy value (68.4 K*10⁶/ha/year). Rice-radish-green gram was found to be next best cropping system with gross returns of ₹ 1,84,955/ha/year.

Kathalgere : Twelve cropping systems were evaluated at Kathalgere. Out of these rice-okra was found to be the best with gross returns of ₹ 1,68,186/ha/year. This was followed by rice (IR64)-rice (JGL-1798) cropping system (₹ 1,48,506/ha/year). As regards energy value is concerned rice-maize proved to be the best with energy value of (42.4 K*10⁶/ha/year.)

Humid Ecosystem

Jammu : Out of 10 cropping systems, evaluated rice-broccoli-black gram recorded the highest gross returns of ₹ 2,90,488/ha/year, closely followed by rice-spinach-okra (₹ 2,70,196/ha/year). From energy value point, rice-potato-maize (cob) recorded the highest calories of 56.8 K*10⁶/ha/year followed by rice-potato-onion (33.3 K*10⁶/ha/year).

Palampur : Among eight cropping systems evaluated at Palampur, maize (cob)+ asparagus bean-broccoli-radish recorded the highest gross returns (₹ 1,90,279/ha/year) closely followed by maize-garlic-fallow (₹ 1,84,567/ha/year) and maize-radish-onion (₹ 1,83,605/ha/year) which were at par to each other. Regarding energy production, the popular cropping system of maize-wheat-fallow recorded the highest calories (24.9 K*10⁶/ha/year).

Jorhat : Eight cropping systems were evaluated at Jorhat. Out of these, rice-radish-black gram recorded the highest gross returns of ₹ 1,31,652/ha/year, closely followed by rice-green chillies-cowpea (fodder) (₹ 1,26,056/ha/year). Rice-fallow-rice, however, recorded the highest energy value (17.6 K*10⁶/ha/year).

Kalyani : Out of ten cropping systems evaluated at Kalyani, elephant foot yam-dolichos bean-ginger+turmeric system recorded the highest gross return of ₹ 7,83,162/ha/year. The same cropping system also recorded the highest energy value (55.5 K*10⁶/ha/year). Cauliflower radish+amaranthus+french bean-okra proved to be the next best with gross return of ₹ 2,29,535/ha/year. Rice-rice-fallow the common cropping system, recorded the lowest gross return of ₹ 83,547/ha/year.

Coastal Ecosystem

Bhubaneswar : Ten cropping systems were evaluated at Bhubaneswar. Out of these, rice-tomato-cowpea recorded the highest gross return of ₹ 2,19,212/ha/year, closely followed by rice-french bean-bitter gourd (₹ 2,03,552/ha/year). As regard energy production, rice-maize (cob)-okra found to be best with calorific value of (70.5 K*10⁶/ha/year).

Maruteru : Out of nine cropping systems evaluated, rice-maize-sunhemp proved to be the best with highest gross return of ₹ 2,08,043/ha/year and energy value of 46.4 K*10⁶/ha/year. Rice-rice-sunhemp was, however, found at par with rice-maize-sunhemp as far as gross return (₹ 2,04,795/ha/year) is concerned.

Karjat : Among the eleven cropping systems evaluated at Karjat, rice-brinjal was found to be superior with respect to gross return (₹ 2,03,580/ha/year) followed by rice-dolichos bean (₹ 1,62,921/ha/year). As regard energy production is concerned, rice-rice proved to be the best with calorific value of (29.7 K*10⁶/ha/year) followed by rice-groundnut (28.4 K*10⁶/ha/year).

Navsari : Ten cropping systems were evaluated at Navsari. Out of these, rice-maize (sweet corn)-ground nut was proved to be the best both from gross return (₹ 1,91,351/ha/year) as well as energy production (29.7 K*10⁶/ha/year) point of view. Rice-fenugreek (green leaves)-cluster bean were found to be the second best from gross return (₹ 1,69,121/ha/year) point of view, whereas rice-castor from energy production (23,068 K*10³/ha/year) point of view.

Table 7.2/1: Crop productivity, energy yield and gross returns* under different crop sequences (2012-13)

*Note: Monetary returns given here are indicative only for comparison and not absolute, as prices of different commodities may vary to a great extent, from location to location, season to season and even according to time of harvest, especially in case of, vegetables spice crops, fodder crops etc. The average price considered are given in Annexure -III

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return	Energy yield
Kharif	Rabi	Summer	Kharif	Rabi	Summer	(Rs/ha)*	Calories (K*10 ⁶)
A.ARID ECOSYSTEM HISAR (HARYANA)							
Pearl millet (HHB-197; 77) 125-62.5-0	Wheat (PBW-502; 162) 150-60-0	-	2832	5266	-	1,05,103	28.3
Cotton (H-1226; 153) 175-60-0	Wheat (PBW-502; 162) 150-60-0	-	2375	5197	-	1,61,920	25.7
Pearl millet (HHB-197; 77) 125-62.5-0	Barley (BG-75; 154) 60-30-0	Green gram (Asha; 74) 20-40-0	2945	2975	360	79,239	21.7
Cluster bean (HG-365; 97) 20-40-0	Broccoli (Green Head; 84) 100-50-0	Onion (Hisar-2; 101) 125-50-25	896	1580	2425	6,8872	23.1
Green gram (Asha; 77) 20-40-0	Mustard (RH-30; 149) 80-30-0	-	862	2258	-	1,09,175	15.0
	+			+			
	(NA; NA) 0-0-0			144			
Pearl millet (HHB-197; 77) 125-62.5-0	Wheat (C-306; 160) 60-30-0	Cowpea (Pusa Komal; 74) 25-40-0	3025	2821	655	81,392	21.2
Pearl millet (HHB-197; 77) 125-62.5-0	Wheat (PBW-502; 162) 150-60-0	-	2346	4706	-	95,088	25.6
	+			+			
	Mustard (RH-30; 149) 0-0-0			141			
S.E. ±						4.272	8.4
CD at 5%						9,105	1.8
SK NAGAR (GUJARAT)							
Pearl millet (GHB-558; 87) 80-40-40	Mustard (GM-2; 126) 50-50-0	-	1988	2070	-	85,486	18.3
Green gram (GM-4; 78) 20-40-0	Castor (GCH-7; 203) 120-25-0	Green gram (GM-4; 85) 20-40-0	767	5180	1438	2,31,002	31.4
+				+			
Sunhemp Fodder (Local; 40) 20-40-0			8059				

Contd.../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Green gram (GM-4; 78) 20-40-0	Castor (GCH-7; 203) 120-25-0	-	718	4863	-	1,32,263	23.7
Green gram (GM-4; 78) 20-40-0	Castor (GCH-7; 203) 120-25-0	-	789	5795	-	2,01,461	29.9
+			+				
Sunhemp (Fodder) (Local; 40)			7840				
+			+				
Bottle gourd (GCH-7; 133)			4649				
Cotton (Hy-8; 225) NR	Castor (GCH-7; 203) 120-25-0	-	3075	3876	-	2,83,421	30.3
+			+				
Sunhemp (Fodder) (Local; 40)			14978				
+			+				
Bitter gourd (Local; 123)			2746				
Green gram (GM-4; 78) 20-40-0	Fennel (GF-11; 179) NR	-	1129	1851	-	3,49,897	21.8
	+			+			
	Cauliflower (Snowball 1; 116) NR			26543			
Green gram (GM-4; 78) 20-40-0	Mustard (GM-2; 126) 50-50-0	-	1195	1991	-	2,33,397	14.9
	+			+			
	Lucerne seed (Anand-2; 193)			697			
Cotton (Hy-8; 225) NR	Castor (GCH-7; 203) 120-25-0	-	2851	3942	-	2,27,748	29.3
+			+				
Green gram (GM-4; 78)			773				
S.E. ±						9,983	1.7
CD at 5%						21,414	3.6

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
<i>Kharif</i>	<i>Rabi</i>	<i>Summer</i>	<i>Kharif</i>	<i>Rabi</i>	<i>Summer</i>		
SIRUGUPPA (KARNATAKA)							
Rice (BPT-5204; 0) 150-75-75	Fallow	Rice (BPT-5204; NA) NR	5502	-	0.00*	70,434	1 9.0
Rice (BPT-5204; NA) 150-75-75	Fallow	Ridge gourd (Jaipur long; NA) NR	6909	-	0.00*	88,443	23.9
Rice (BPT-5204; NA) 150-75-75	Fallow	Mustard (Varuna; NA) NA	7007	-	0.00*	89,693	24.2
Rice (BPT-5204; 0) 150-75-75	Fallow	Indian bean (Local; NA) NA	7030	-	0.00*	89,993	24.3
Rice (BPT-5204; NA) 150-75-75	Fallow	Cumin (Local; NA) NA	6729	-	0.00*	86,135	23.2
Rice (BPT-5204; NA) 150-75-75	Fallow	Ashwagandha (Jowahar; NA) NA	6951	-	0.00*	88,972	24.0
Rice (BPT-5204; NA) 150-75-75	Spinach (NA; NA) NA	Black gram (T-9; NA) NA	6207	0.00*	0.00*	79,449	21.4
Rice (BPT-5204; NA) 150-75-75	Fenugreek (Leaves) (NA; NA) NA	Green gram (China mung; NA) NA	6273	0.00*	0.00*	80,294	21.7
Rice (BPT-5204; NA) 150-75-75	Fallow	Rice (RASI; NA) NA	6296	-	0.00*	80,593	21.7
Rice (BPT-5204; NA) 150-75-75	Sesbania (NA; NA) NA	Rice (Rasi; NA) NA	6253	0.00*	0.00*	80,042	21.6
S.E. ±						3,404	0.92
CD at 5%						7,152	1.93
*All <i>rabi</i> and summer crops failed							
B. SEMI-ARID ECOSYSTEM							
LUDHIANA (PUNJAB)							
Rice (PR-116; 110) 120-30-30	Wheat (PBW-509; 147) 120-60-30	-	6230	5370	-	1,28,760	40.6
Basmati Rice (Super; 102) 40-0-0	Hayola (PAC-401; 130) 100-30-15	Green gram (SML 668; 82) 15-40-0	3890	1800	1140	2,73,060	27.2

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Basmati Rice (Super; 102) 40-0-0	Radish (Pusa Himgiri; 90) (NR)	Maize (PMH-1; 87) 120-60-30	3910	19650	6360	24,866	38.2
Maize (PMH-1; 142) 120-60-30	Potato (K.C.Mukhi; 101) 120-60-120	Maize (PMH-1; 87) 120-60-30	5180	21025	6310	2,47,530	60.7
Maize (Furrow) (PMH-1; 142) 120-60-30	Barley (Bed) (DW RVB-52; 139) - 60-30-15		4067	3693	-	4,29,348	88.7
+	+		+	+			
Turmeric (Bed) (Local; 207) NIL	Linseed (Furrow) (LC 2063; 129) NIL		19672	354			
Maize (PMH-1; 142) 120-60-30	Wheat (DBW-17; 147) 120-60-30	-	4239	4029	-	4,58,319	91.9
+	+		+	+			
Turmeric (Local; 207) NIL	Linseed (LC 2063; 129) NIL		20424	388			
Maize (PMH-1; 142) 120-60-30	Wheat (DBW-17; 147) 160-30-30		4030	3780	1100	2,38,650	33.8
+	+	Green gram (SML-668; 82)	+	+			
Radish (Pusa Chetna; NA) NIL	Linseed (LC 2063; 129) NIL	15-40-0	803	390			
Groundnut (SG-99; 139) 15-20-25	Wheat (DBW-17; 147) 120-60-30		1800	4770	-	1,32,090	30.2
+	+		+	+			
Pigeon Pea (AL-15; 150) NIL	Mustard (GSL-1; 156) NIL		520	280			
Cotton (Bt-134; 176) 75-30-0	Radish (Pusa Chitki; 90) 100-30-15		1358	13475		1,05,672	77.1
	+			+	-		
	Hayola (PAC-401,149; NA) NIL	-		1544			
Cotton (Bt-134; 176) 75-30-0	Wheat (DBW-17; 147) 120-60-30		1475	3765		1,03,785	18.2
	+			+	-		
	Linseed (LC 2063; 129) NIL	-		386			

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return	Energy yield Calories
Kharif	Rabi	Summer	Kharif	Rabi	Summer	(Rs/ha)*	(K*10 ⁶)
Maize(Cob) (PMH-1; 95) 120-60-30 +	Chickpea (CPF-2; 144) 15-20-0 +	Green gram (SML-668; 82) 15-40-0	21380 +	300 +	1092	2,80,380	42.3
Cowpea (Veg.) (Cowpea 263; NR) NIL	Mustard (GSL-1; 156) NIL		3022	1690			
Sorghum(F) (Local; 0) 220-125-50	Wheat (DBW-17; 147) NA + Mustard (GSL-1; 156)	Cowpea (C-263; NA) NA	58690	4830 + 260	4260	1,44,300	20.0
S.E. ± CD at 5%						16,633 33,865	2.5 8.0
KANPUR (UTTAR PRADESH)							
Rice (Pant Dhan-12; 95) NA	Wheat (PBW-343; 135) NA	-	4890	4274	-	1,20,291	31.7
Rice (PHB-71; 95) NA	Wheat (PBW-343; 135) NA	-	7985	4511	-	1,63,106	43.2
Rice (PHB-71; 95) NA	Wheat (PBW-343; 135) NA	Green gram (K-851; 86) NA	8192	4612	750	2,03,869	46.8
Maize (Utkala Manika; 86) NA	Wheat (PBW-343; 135) NA	-	2820	4673	-	96,220	25.8
Maize (Azad Uttam; 86) NA	Mustard (P. Kranti; 126) NA	Onion (Nasik Red; 103) NA	2857	1726	12250	1,96,457	25.2
Maize (Azad Uttam; 86) NA	Mustard (P. Kranti; 126) NA	Green gram (K-851; 86) NA	2959	2071	840	1,38,058	24.1
Maize (Azad Uttam;86) NA	Potato (K-3797; 76) NA	-	2800	20619	-	1,76,128	42.0
+	+		+	+			
Green gram (K-851; 86)	Wheat (K-7903; 76)		339	3285			
Maize (Azad Uttam; 86) NA	Potato (K-3797; 76) NA	Onion (Nasik Red; 103) NA	2976	22464	12650	2,54,427	39.5
+			+				
Black gram (Azad-1; 86)			351				

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Maize (Azad Uttam; 86)	Garlic (Local; 164)	Green gram (K-851; 86)	3050	7738	960	3,45,044	24.8
NA	NA	NA					
Rice (Sugandha; 95)	Wheat (K-7903; 135)	Ladys finger (Azad Bhindi-1; 116)	4690	4393	3940	1,62,244	32.8
NA	NA	NA					
S.E. ±						4,375	0.53
CD at 5%						8,978	1.09
BICHPURI, AGRA (UTTAR PRADESH)							
Pearl millet (Shakti-7173; NA)	Wheat (HD-2687; 148)	-	2710	4335	-	90,375	24.7
80-40-40	120-60-40						
Pearl millet (Shakti-7173; NA)	Wheat (HD-2687; 148)	Green gram (K-851; NA)	2520	4520	1170	1,47,988	28.6
80-40-40	120-60-40	25-50-0					
Pearl millet (Shakti-7173; NA)	Lentil (DPL-15; 121)	-	2570	1621	-	77,235	14.8
80-40-40	25-50-0						
Soybean (PK-1092; NA)	Wheat (HD-2687; 148)	-	1110	3710	-	89,385	20.3
20-80-40	120-60-40						
	+			+			
	Mustard (Rohini; 155)			495			
Pigeon Pea (UPAS-120; NA)	Wheat (HD-2687; 148)	-	1830	4213	-	1,27,356	20.7
30-60-30	120-60-40						
Green gram (K-851; NA)	Mustard (Rohini; 155)	-	1500	2520	-	1,49,125	18.6
25-50-0	80-40-40						
Sesbania (GM) (Local; NA)	Potato (K-3797; 130)	Lady's finger (Ar.Anamika; NA)	NR	30219	7230	1,99,319	31.8
NA	150-80-60	120-60-60					
Pearl millet (Shakti-7173; NA)	Potato (K-3797; 130)	Cluster bean (Amul-51; NA)	2530	27250	5540	1,94,306	37.5
80-40-40	150-80-60	20-40-0					

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Sesamum (Guj-1; NA) 30-15-15	Barley (PL-172; 142) 60-30-20	Green gram (K-851; NA) 25-50-0	840	4012	1480	1,47,184	23.1
Sorghum(F) (Samrat; NA) 30-30-0	Oat (F) (Local; 138) 60-30-20	Cowpea (F) (Local; NA) 20-40-0	25175	18465	10386	1,00,283	8.6
S.E. ± CD at 5%						11,870 24,358	0.86 1.76
JUNAGADH (GUJARAT)							
Groundnut (GG-20; 120) 12.5-25-0	Wheat (GW-366; 104) 120-60-0	-	1340	4280	-	1,07,372	22.4
Groundnut (GG-20; 120) 12.5-25-0	Onion (AGF-red; 94) 75-60-50	Sorghum (F) (Gundari; 53) 80-40-0	1470	38662	27304	4,38,095	32.0
Groundnut (GG-20; 120) 12.5-25-0	Potato (K. Badshah; 89) 220-110-220	Sesamum (GT-2; 88) 25-25-0	1261	11502	1029	1,35,792	24.1
Sorghum (Gundari; 108) 80-40-0	Cumin (GC-4; 103) 30-15-0	Green gram (GM-4; 69) 20-50-0	1728	896	874	1,01,662	12.1
Sorghum(F) (Gundari; 64) 80-40-0	Castor (GCH-7; 206) 75-50-0	Castor Contd.	27448	-	2115	75,441	13.7
Onion (AGF-red ; 77) 75-60-50	Wheat (GW-366; 104) 120-60-0	Green gram (GM-4; 69) 20-50-0	14773	3917	812	2,26,706	23.6
Onion (AGF-red; 77) 75-60-50	Chick Pea (GG-1; 104) 25-50-0	Maize (F) (African Tall; 60) 100-80-0	14855	1195	30678	2,07,722	16.6
Sesamum (GT-2; 91) 25-25-0	Potato (K. Badshah; 89) 220-110-220	Maize (F) (African Tall; 60) 80-40-0	710	11069	29958	1,10,266	19.5
Bt Cotton (Hybrid; 174) 16NA	Cotton Contd.	Groundnut (GG-20; 120) 25-50-0	-	1831	1669	1,28,230	15.5
Pigeon Pea (BDN-2; 212) 25-50-0	Pigeon Pea Contd.	Pearl millet (GHB-558; 82) 80-40-0	-	1505	2916	92,226	15.5
S.E. ± CD at 5%						11,259 23,655	1.56 3.28

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
DURGAPUR, JAIPUR (RAJASTHAN)							
Pearl millet (Raj-171; 85) 45-30-0	Wheat (Raj-4037; 128) 45-30-0	--	2177	3778	--	76,596	20.9
Cluster bean (RGC-1038; 106) 45-30-0	Barley (RD-2715; 121) 45-30-0	--	2009	3825	--	57,740	13.5
Green gram (RMG-492; 67) 20-40-0	Chandrasur (Local 112; 97) NA	--	917	1221	--	67,135	6.7
Pearl millet (Raj-171; 96) NA	Lentil (Sapna 121; 97) NA	--	756	1203	--	43,801	6.8
Cluster bean (RGC-1038; 106) NA	Onion (RO-252; 138) 45-30-0	--	2013	3854	--	55,257	2.6
Green gram (RMG-492; 67) 45-30-0	Isabgol (RG 2; 141) NA	--	2297	1394	--	2,12,991	9.4
Cluster bean (RGC-1038; 106) 45-30-0	Barley (RD-2715; 121) NA	--	1762	857	--	26,173	3.4
Pearl millet (Raj-171; 117) NA	Garlic (Local; 161) NA	--	1413	1603	--	70,914	7.4
Pearl millet (Raj-171; 96) 20-40-0	Lentil (Raj-4037; 125) NA	--	636	1462	--	49,905	7.3
S.E. ±						5,876	0.60
CD at 5%						12,128	1.25
RAJENDRANAGAR (ANDHRA PRADESH)							
Maize (DHM-117; 105) 180-60-60	Groundnut (K-6; 105) 30-40-50	--	4391	2509	--	1,44,427	29.2
Maize (DHM-117; 105) 180-60-60	Sunflower (Agsun; 95) 90-60-30	--	4272	3052	--	1,63,120	33.5
Maize (DHM-117; 105) 180-60-60	Castor (PCH-111; 135) 90-40-30	--	4296	1572	--	81,869	21.6

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Maize (DHM-117; 105) 180-60-60	Wheat (Local; 115) 120-60-40	-	4124	2131	-	77,229	21.4
Soybean (JS-335; 95) 80-60-40	Maize (DHM-117; 105) 180-60-60	-	2298	8624	-	1,51,902	39.4
Soybean (JS-335; 95) 80-60-60	Wheat (Local; 115) 30-40-50	-	2349	2226	-	81,733	17.8
Soybean (JS-335; 95) 80-60-60	Castor (PCH-111; 135) 90-40-30	-	2311	1868	-	88,140	18.2
Soybean (JS-335; 9) 80-60-60	Sunflower (Agsun; 95) 90-60-30	-	2170	3206	-	1,66,374	29.2
S.E. ±						5,083	1.11
CD at 5%						10,903	2.39
KOTA (RAJASTHAN)							
Soybean (RKS-24; 92) 40-40-0	Wheat (Raj-3765; NA) 120-40-0	Fallow	1872	4747	-	1,05,277	24.5
Maize (PEHM-2; 84) 90-30-0	Garlic (Local; 159) 120-40-100	Fallow	2042	5673	-	2,30,772	17.7
Soybean (RKS-24; 92) 90-30-0	+ Green Fodder (Local; NA) 120-40-100		+ 559	+ 926			
Maize (PEHM-2; 84) 90-30-0	Mustard (P. Bold; 141) 80-40-0	Fallow	2856	1930	-	91,458	20.2
Maize (PEHM-2; 84) 90-30-0	Chick Pea (Samrat; 149) 20-40-0	Green gram (AKM-8802; 62) 20-40-0	2084	926	482	1,14,029	16.8
+	+		+	+			
Black gram (KU 96-3; 84) 90-30-0	Mustard (P. Bold; 141) 20-40-0		482	578			
Maize (PEHM-2; 84) 90-30-0	Chick Pea (Veg.) (Samrat; 149) 20-40-0	Cowpea (Local; 63) 20-40-0	3281	1389	3601	1,63,800	22.8
+	+		+	+			
Black gram (KU 96-3; 84) 90-30-0	Linseed (Meera; 149) 20-40-0		762	424			

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Maize (PEHM-2; 84) 90-30-0	Garlic (Local; NA) 120-40-100	Fallow	2933	10807	-	4,00,611	25.7
Cotton (H-8; 201) 100-50-0	Cotton (Contd.)	Green gram (AKM-8802; 51) 20-40-0	-	2045	849	1,54,578	12.3
+	+	+	+				
Black gram (KU 96-3; 84) 100-50-0	Fallow (Contd.)	Green gram (AKM-8802; 51) 20-40-0	772				
Cotton (H-8; 201) 100-50-0	Cotton (Contd.)	Greengram	-	2103	906	1,38,532	10.4
+				+			
Cluster bean (Pusa Bahar; 42) 100-50-0				1196			
S.E. ±						7,531	0.522
CD at 5%						16,155	1.12
RUDRUR (ANDHRA PRADESH)							
Rice (MTU-1010; 125) NA	Rice (MTU-1010; 120) NA	-	7464	6220	-	1,75,155	47.3
Rice (MTU-1010; 125) NA	Maize (NHM-117; 120) NA	-	7475	6470	-	1,71,702	47.9
Rice (MTU-1010; 125) NA	Sunflower (DRSH-2; 110) NA	-	7384	1904	-	1,64,963	37.3
Rice (MTU-1010; 125) NA	Mustard (GM-2; 95) NA	-	7306	978	-	1,22,856	30.5
Soybean (JS-335; 95) NA	Sunflower (DRSH-2; 110) NA	-	2800	1900	-	1,31,900	23.8
Soybean (JS-335; 95) NA	Sesamum (Swetha Til; 90) NA	-	4011	898	-	1,46,671	24.1
Red gram (Asha; 155) NA	Sunflower (DRSH-2; 110) NA	-	+ 538		-		

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Maize (DHM-117; 120)	Sunflower (DRSH-2; 110)	-	4080	1944	-	1,19,868	26.0
NA	NA						
Soybean (JS-335; 95)	Maize (NHM-117; 120)	-	3948	6048	-	1,57,920	37.7
NA	NA						
Maize (DHM-117; 120)	Chick Pea (Annapurna; 110)	-	4320	1845	-	1,06,110	21.4
NA	NA						
Sunflower (DRSH-2; 110)	Maize (NHM-117; 120)	-	2036	5882	-	1,44,470	32.7
NA	NA						
S.E. ±						16,803	2.8
CD at 5%						35,303	5.9
RAHURI (MAHARASHTRA)							
Pearl millet (Shraddha; 87)	Wheat (Trimbak; 110)	-	6342	4211	-	1,31,371	37.4
60-30-30	120-60-40						
Pearl millet (Shraddha; NA)	Onion (N-241; 131)	-	7268	32127	-	3,76,801	42.3
60-30-30	100-50-50						
Pearl millet (Shraddha; 87)	Potato (Kufri Jyoti; 87)	-	6598	20938	-	1,61,070	44.1
60-30-30	100-60-120						
Pearl millet (Shraddha; 87)	Chick Pea (Virat; 112)	-	6250	2397	-	1,45,361	31.1
60-30-30	25-50-0						
Pearl millet (Shraddha; NA)	Cabbage (Kranti; 94)	-	6844	21360	-	2,09,650	30.4
NA	160-80-80						
Soybean (JS-335; 107)	Wheat (Trimbak; 110)	-	2189	5239	-	1,18,893	27.5
50-75-0	120-60-40						
Soybean (JS-335; 107)	Onion (N-241; 131)	-	2412	34774	-	3,68,471	27.8
50-75-0	100-50-50						
Soybean (JS-335; 107)	Potato (Kufri Jyoti; 87)	-	2494	23740	-	1,49,593	33.8
NA	100-60-120						
Soybean (JS-335; 107)	Chick Pea (Virat; 112)	-	1874	2996	-	1,31,125	18.8
50-75-0	25-50-0						

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Soybean (JS-335; 107) 50-75-0	Cabbage (Kranti; 94) 160-80-80	-	2301	26376	-	2,10,215	17.0
Pearl millet (Shraddha; 87) 60-30-30	Wheat (Trimbak; 110) 120-60-0	-	6326	4195	-	1,34,234	37.9
+			+				
Soybean (JS-335; 107) 50-75-0		-	148				
Pearl millet (Shraddha; 87) 60-30-30	Onion (N-241; 131) 100-50-50	-	6806	31725	-	3,71,148	41.1
+			+				
Soybean (JS-335; 107) 50-75-0		-	155				
Pearl millet (Shraddha; 87) 60-30-30	Potato (Kufri Jyoti; 87) 100-60-120	-	6243	21221	-	1,61,488	43.8
+			+				
Soybean (JS-335; 107) 50-75-0		-	157				
Pearl millet (Shraddha; 87) 50-75-0	Chick Pea (Virat; 112) 25-50-0	-	6269	2555	-	1,53,700	32.4
+			+				
Soybean (JS-335; 107) 50-75-0		-	153				
Pearl millet (Shraddha; 107) 60-30-30	Cabbage (Kranti; 94) 160-80-80	-	6671	24963	-	2,32,512	31.4
+			+				
Soybean (JS-335; 107) 50-75-0			140				
S.E. ±						10,741	1.99
CD at 5%						21,998	4.07

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return	Energy yield
Kharif	Rabi	Summer	Kharif	Rabi	Summer	(Rs/ha)*	Calories (K*10 ⁶)
PARBHANI (MAHARASHTRA)							
Sorghum (CSH-16; 113) 80-40-40	Wheat (HD-2189; 110) 100-50-50	Fallow	3777	3973	-	1,11,061	26.9
Bt Cotton (Bt. Malika; 148) 120-50-50	Bt Cotton (contd.)	Groundnut (TAG-24; 125) 25-50-0	-	2471	2147	1,69,147	20.3
Soybean (MAUS-71; 107) 30-60-60	Onion (AFLR; 126) 100-50-50	Fallow	2268	20079	-	2,32,025	19.8
Soybean (MAUS-71; 107) 30-60-60	Wheat (HD-2189; 110) 100-50-50	Cowpea (NA; 110) 25-50-50	2268	4070	17798	2,91,570	32.4
Pigeon Pea (BSMR-853; 184) 25-50-0	Pigeon Pea (contd.)	Groundnut (TAG-24; 125) 25-50-0	2166	-	2055	1,59,472	18.9
Maize (Maharaja; 120) 120-50-50	Wheat (HD-2189; 110) 100-50-50	Green gram (BPMR-145; 70) 25-50-0	6453	4134	1311	1,95,925	40.7
Bt Cotton (Bt. Malika; 148) 120-50-50	Wheat (HD-2189; 110) 100-50-50	Coriander (Multicut; 47) 50-50-50	2594	4074	3625	1,88,667	33.1
Maize (Maharaja; 120) 120-50-50	Chick Pea (Digvijay; 121) 25-50-0	Ladys finger (Anamika; 83) 50-50-50	6591	2166	4310	1,89,394	31.8
Soybean (MAUS-71; 107) 30-60-60	Chick Pea (Digvijay; 121) 25-50-0	Coriander (Multicut; 47) 50-50-50	2312	2088	3765	1,54,540	28.3
Turmeric (Salem; 240) 100-50-50	Continue	Fallow	-	13939	-	3,53,040	52.1
+				+			
Castor (DCH-9; 178) 60-40-30			-	787			
Bt Cotton (Bt. Malika; 148) 120-50-50	Chick Pea (Digvijay; 121) 25-50-0	Fallow	2463	1974	-	1,48,671	15.2
Soybean (MAUS-71; 107) 30-60-60	Safflower (PBNS-12; 122) 60-40-0	Maize fodder African Tall :70 100-50-50	2200	1666	16559	1,15,117	18.0
S.E. ±						5,022	0.72
CD at 5%						10,417	1.51

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return	Energy yield
Kharif	Rabi	Summer	Kharif	Rabi	Summer	(Rs/ha)*	Calories (K*10 ⁶)
COIMBATORE(TAMIL NADU)							
Green gram (Vamban-2; 80)	Cotton (Bunny Bt. hybrid; 152)	Sunflower (Sunbreed; 90)	985	2826	1946	2,30,518	24.7
25-50-25	150-75-75	60-90-60					
Sorghum(F) (CO-26; 55)	Cotton (Bunny Bt. hybrid; 152)	Lublub (NA; NA)	28417	2816	7599	2,91,085	18.0
60-40-20	150-75-75 + Onion (Local; NA)	NA		+ 986			
Onion (Local; 80)	Cotton (Bunny Bt. hybrid; 152)	Maize (NK-6240; 110)	4902	2614	6771	2,25,974	34.2
30-60-30	150-75-75	150-62.5-50					
Maize (NK-6240; 110)	Cowpea(S) (CO(CP)-7; 85)	Tomato (DKM-1; 120)	6518	876	9594	1,75,913	27.3
150-62.5-50	25-50-25	150-100-50					
Maize (NK-6240; 110)	Sunflower (Sunbreed; 90)	Cowpea (Co-2; 90)	6358	1863	1028	1,64,295	34.2
150-62.5-50	60-90-60	25-50-25					
+		+					
Cowpea (Co-2; 90)			940				
Beet root (Ruby queen; 120)	Green gram (Vamban-2; 75)	Maize (NK-6240; 110)	8963	802	6797	2,53,813	30.0
60-160-100	25-50-25	150-62.5-50 + Cowpea fodder (Co-2; 60)			+ 1861		
Cowpea (Co-2; 90)	Maize (NK-6240; 110)	Sunflower (Sunbreed; 90)	2746	6640	1807	1,78,333	35.5
25-50-25	150-62.5-50 + Cowpea fodder (Co-2; 60)	60-90-60		+ 1918			
Sunflower (Sunbreed; 100)	Pigeonpea (VBN(Rg)-3; 110)	Snake gourd (NA; 120)	1971	1056	10100	2,35,797	17.4
60-90-60	25-50-25	25-50-25					
Green chillies (K-2; 135)	Maize (NK-6240; 110)	Sunhemp (F) (Local; 45)	9726	6852	8297	2,77,122	27.5
120-60-30	150-62.5-50	0-0-0					
S.E. ±						8,381	1.23
CD at 5%						17,769	2.61

Contd.../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return	Energy yield
Kharif	Rabi	Summer	Kharif	Rabi	Summer	(Rs/ha)*	Calories (K*10 ⁶)
C.SUB-HUMID ECOSYSTEM							
FAIZABAD (UTTAR PRADESH)							
Rice (NDR-359; 133) 150-60-60	Wheat (PBW-343; 130) 150-60-60	Fallow	5108	4362	-	1,24,282	32.7
Rice (NDR-359; 133) 150-60-60	Potato (K. Ashoka; 93) 150-60-90	Green gram (NDM-1; 125) 15-40-0	5128	23233	1018	2,08,225	43.6
Rice (NDR-359; 133) 150-60-60	French bean (Pusa Vishal; 116) 150-60-40	Lady's finger (Parbhani Kranti; 95) 100-50-50	5066	2566	6941	1,90,908	20.6
Rice (NDR-359; 133) 150-60-60	Mustard (NDR-8501; 117) 120-60-60	Black gram (NDU-1; 100) 15-40-0	5035	1966	920	1,62,988	31.2
Rice (NDR-359; 133) 150-60-60	Berseem (Vardan; 117) 20-80-0	Berseem seed (Vardan; 117) 20-80-0	5090	55633	144	2,13,788	27.0
Rice (NDR-359; 133) 150-60-60	Chick Pea (Awarodhi; 125) 20-60-0	Maize fodder (Jabakusam; 90) 100-40-0	4933	1675	47000	1,70,266	30.6
Rice (NDR-359; 133) 150-60-60	Lentil (NDL-1; 128) 20-60-0	Green Fodder (Sudanchari; 80) 80-40-0	4900	1392	64020	2,58,016	31.9
Rice (NDR-359; 133) 150-60-60	Cauliflower (Pusa Snowball; 108) 120-60-40	Cowpea (Nakhara local; 115) 15-40-0	5110	12491	7166	2,31,275	29.3
S.E. ±						7,265	1.03
CD at 5%						15,584	2.22
PANTNAGAR, (UTTARAKHAND)							
Rice (PR-113; 120) 120-60-40	Wheat (PBW-343; 155) 150-60-40	Fallow	5130	4320	-	1,23,927	32.6
Rice (PR-113; 120) 120-60-40	Pea veg (Arkel; 116) 20-60-40	Wheat (PBW-343; 155) 150-60-40	5650	7690	3690	1,96,524	39.4
Rice (PR-113; 120) 120-60-40	Pea veg (Arkel; 116) 20-60-40	Green gram (PM-2; 95) 20-60-40	6210	8030	960	2,04,462	32.1
Rice (PR-113; 120) 120-60-40	Toria (PT-303; 74) 100-60-40	Green gram (PM-2; 95) 20-60-40	5710	1920	890	1,73,926	33.1

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (PR-113; 120) 120-60-40	Mustard (Kranti; 109) 100-60-40	Green gram (PM-2; 95) 20-60-40	5470	1970	820	1,69,496	32.3
Rice (PR-113; 120) 120-60-40	Potato (K.C. Mukhi; 140) 120-60-60	Green gram (PM-2; 95) 20-60-40	5690	1450	920	1,75,867	36.8
Rice (PR-113; 120) 120-60-40	Toria (PT-303; 74) 100-60-40	French bean (Contender; 78) 10-60-40	5192	1790	810	1,35,512	27.8
Rice (PR-113; 120) 120-60-40	Wheat (PBW-343; 155) 150-60-10	Green gram (PM-2; 95) 20-60-40	5930	4690	850	1,80,821	39.5
S.E. ±						6,874	1.15
CD at 5%						14,299	2.40
VARANASI (UTTAR PRADESH)							
Rice (Pusa sugandha-4; 140) 150-75-75	Wheat (HUW-468; 125) 150-75-75	Fallow	3506	4479	-	1,05,357	27.6
Rice (Pusa sugandha-4; 140) 150-75-75	Wheat (HUW-468; 125) 150-75-75	Green gram (Pusa Vishal; NA) 25-60-25	3923	4641	1192	1,71,292	33.6
Rice (Pusa sugandha-4; 140) 150-75-75	Wheat (HUW-468; 125) 150-75-75	Sesbania (Local; NA) NA	4282	4907	NR	1,21,064	31.7
Rice (Pusa sugandha-4; 140) 150-75-75	Wheat (HUW-468; 130) 150-75-75	Black gram (Azad; NA) 25-60-25	3865	3333	636	1,36,090	29.6
	+ Mustard (PRO-4001; 130)			+ 474			
Rice (Pusa sugandha-4; 140) 150-75-75	Wheat (HUW-468; 130) 150-75-75	Cowpea (CP-4; NA) 22.5-57.5-25	4027	3321	3807	1,36,343	27.2
Rice (Pusa sugandha-4; 140) 150-75-75	Mustard (PRO-4001; 130) 112-56-56	Green gram (Pusa Vishal; NA) 25-60-25	3981	1590	1493	1,71,850	27.3
Rice (Pusa sugandha-4; 140) 150-75-75	Toria (PT-303; 95) 90-45-0	Lady's finger (Mahyco; NA) 120-60-60	3634	1053	10995	1,97,539	22.1

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (Pusa sugandha-4; 140) 150-75-75	Pea veg (Early Apoorva; 96) 25-60-25	Ladys finger (Mahyco; NA) 120-60-60	3657	3854	11840	2,13,063	20.3
Rice (Pusa sugandha-4; 140) 150-75-75	Maize(Cob) (Bio-9681; 155) 120-60-40 + Pea veg (Early Apoorva; 96)	Cowpea fodder (Local; NA) 25-60-25	3865	10654 + 3209	22175	1,42,742	33.2
Rice (Pusa sugandha-4; 140) 150-75-75	Potato (Kufri Sinduri; 122) 160-80-80	Green gram (Pusa Vishal; 0) 25-60-25	3981	21717	1608	2,16,445	40.2
S.E. ±						7,152	0.96
CD at 5%						15,026	2.03
SABOUR(BIHAR)							
Rice (Sita; 137) 100-40-20	Wheat (HD-2733; 128) 120-60-40	Fallow	5257	4595	-	1,29,339	34.0
Rice (Sita; 137) 100-40-20	Maize (Shaktiman-3; 163) 60-37.5-25 + Potato (Kufri Ashoka-79) 150-90-100	Maize (Suwan; 46) 80-40-20	5175	6008 + 16144	0.00*	2,01,251	54.1
Rice (Sita; 137) 100-40-20	Wheat (HD-2733; 128) 120-60-40 + Febugreek Leaves (Rajendra Kranti; 128) 20-30-20	Green gram (SML-668; 82) 20-50-0	5195	4326 + 279	725	1,63,493	35.5
Rice (Rajendra suwasini; 133) 100-40-20	Potato (K. Ashoka; 77) 150-90-100 + Radish (Pusa Chetki; 50) 30-20-20	Onion (Nasik Red; 147) 100-80-80 + Maize(Cob) (Shaktiman-3; 71) 50-30-20	4988	21299 + 5776	8953 + 5666	2,52,079	50.4
	Cabbage (Pusa Mukta; 104) 120-80-80 + Radish (Pusa Chetki; 48) 30-20-20	Ladys finger (Parbhani Kranti; 128) 100-60-60 + Green gram (SML-668; 800) 10-25-0	5071	37172 + 6310	11430 + 222	4,44,296	33.4

NA

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (JKRH-401; 125) 100-40-20	Maize (Shaktiman-3; 161) 60-37.5-25 + Potato (K. Ashoka; 77) 150-90-100	Sorghum (SSG-99; 46) 60-30-20	7017	6166 + 16012	0.00*	2,26,169	60.9
Rice (JKRH-401; 125) 100-40-20	Maize (Shaktiman-3; 161) 60-37.5-25 + Rajma (PDR-14; 130) 50-25-15	Maize fodder (Suwan; 46) 80-40-20	7183	7490 + 397	0.00*	1,87,754	51.8
Rice (JKRH-401; 125) 100-40-20	Garlic (Yamuna Safed; 144) 100-80-80 + Coriander (Pant Haritima; 55) 30-20-15	Maize (Suwan; 46) 100-60-40	7079	5276 + 4978	3060	3,59,535	56.9
Rice (R Mahsuri-150) 100-40-20	Wheat (HD-2733; 128) 120-60-40	Green gram (SML-668; 80) 20-50-0	6479	4368	680	1,75,223	39.8
Rice (R Mahsuri-150) 100-40-20	Maize (Shaktiman-3; 163) 120-75-50	Cluster bean (Golden early-36; 61) 20-50-0	6438	7410	0.00*	1,69,481	47.6
Rice (R Mahsuri-150) 100-40-20	Oats (JHO-822; 128) 80-40-20	Pearl millet (GFB-1; 60) 60-30-20	6272	NR	0.00*	80,281	21.7
Rice (R Mahsuri-150) 100-40-20	Chick Pea (Baibhav; 138) 20-50-0 + Coriander (Rajendra Swati; 135) 30-20-15	Maize (Suwan; 60) 100-60-40	6355	1746 + 1891	3173	1,91,623	44.5
S.E. ±						11,777	2.71
CD at 5%						24,427	5.62
RANCHI (JHARKHAND)							
Rice (Sahbaghi; 112) 80-40-20	Wheat (K-9107; 139) 100-50-25	Sesamum (Kanke Safed; NR) 40-20-20	3432	4197	-	82,589	21,783
Rice (Sahbaghi; 112) 80-40-20	Mustard (P. Bold; 128) 80-40-20	Sesamum (Kanke Safed; NR) 40-20-20	3839	1288	-	1,18,089	25,716

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (Sahbaghi; 112) 80-40-20	Linseed (Swetha Til; 143) 50-30-20	Sesamum (Kanke Safed; NR) 40-40-20	3897	835	-	75,469	17,915
Rice (Sahbaghi; 112) 80-40-20	Potato (Kufri Jyoti; 95) 120-80-100	Sesamum (Kanke Safed; NR) 40-40-20	3990	20242	-	1,31,843	33,441
Rice (Sahbaghi; 112) 80-40-20	Wheat (K-9107; 139) 100-50-25 + Mustard (P. Bold; 128) 80-40-20	Sesamum (Kanke Safed; NR) 40-40-20	3606	3916 + 325	-	1,08,810	27,792
Rice (Sahbaghi; 112) 80-40-20	Wheat (K-9107; 139) 100-50-25 + Linseed (Swetha Til; 143) 50-30-20	Sesamum (Kanke Safed; NR) 40-40-20	3839	3533 + 175	-	88,845	23,013
Rice (Sahbaghi; 112) 80-40-20	Potato (Kufri Jyoti; 95) 120-80-100 + Wheat (K-9107; 139) 100-50-25	Sesamum (Kanke Safed; NR) 40-40-20	4130	19899 + 1603	-	1,53,910	39,140
S.E. ± CD at 5%						21,231 46,262	4643.64 10118.48
RAIPUR (CHHATTISGARH)							
Rice (MTU-1010; 112) 80-60-40	Wheat (NA; 125) 100-60-40	Cowpea(S) (NA; 85) 20-50-00	5375	3843	1271	146901	36.0
Rice (MTU-1010; 112) 80-60-40	Castor (NA; 138) 80-50-30 + Lentil (NA; NA)	Cowpea (NA; 85) 20-50-00	5540	121 + 1146	8958	200537	27.9
Rice (MTU-1010; 112) 80-60-40	Mustard (NA; 126) 80-50-30 + Lentil (NA; NA)	Cowpea fodder (NA; 85) 20-50-00	5260	1000 + 977	39792	221975	33.3

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (MTU-1010; 112) 80-60-40	Wheat (NA; 125)* 100-60-40	Green gram (NA; 76) 20-50-00	5437	4052	1427	1,94,248	37.60
Rice (Mahamaya; 128) 100-60-40	Sunflower (NA; 125)* 80-50-30 + Lentil (NA; NA)*	Cowpea (NA; 85) 20-50-00	6562	1973 + 1041	7604	2,66,984	42.16
Rice (Mahamaya; 128) 120-60-40	Wheat (NA; 125)* 100-60-40 + Febugreek Leaves (NA; 85)*	Cowpea fodder (NA; 85)* 20-50-00	6239	2843 + 750	43281	2,31,165	38.7
Rice (Indira sona; 130) 100-60-40	Wheat (NA; 125)* 100-60-40 + Lentil (NA; NA)*	Cowpea (NA; 85)* 20-50-00	6760	2208 + 593	8125.33	2,18,795	36.9
Rice (Indira sona; 130) 120-60-40	Onion (NA; 115)* 80-60-100 + Cowpea (NA; 85)* + Coriander (NA; NA)	Cowpea(S) (NA; 85)* 20-50-00	6494	12246 + 306 + 6518	1187.67	2,92,888	51.34
S.E. ±						9,359	1142
CD at 5%						20,076	2451
*variety/duration not reported by the Centre							
JABALPUR (MADHYAPRADESH)							
Rice (MR-219; 145) 120-60-40	Wheat (GW-273; 135) 120-60-40	Fallow	5358	4107	-	1,24,033	32.7
Rice (MR-219; 145) 120-60-40	Chick Pea (JG-322; NA) 20-60-20	Fallow	5143	1397	-	1,07,747	22.8
Rice (Danteshwari; 136) 120-60-40	Onion (Pusa red; NA) 100-60-20	Green gram (Pusa Vishal; NA) NA	5594	6285	513	1,40,967	20.7

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Basmati Rice (Pusa; 126) 120-60-40	Fallow	Berseem seed (JB-5; NA) NA + Berseem (JB-5; NA) NA	3648	-	414 + 54844	27,586	24.2
Rice (JRH-5; 119) 120-60-40	Potato (Kufri Sinduri; NA) 120-60-40	Sesamum (TKG-55; NA) NA	4549	2738	-*	69,151	18.3
Rice (JRH-5; 119) 120-60-40	Gobhi sarson (Terriuttam; NA) 60-30-50	Black gram (CU-19; NA) NA	4701	1041	710	1,35,387	26.4
Rice (JRH-5; 119) 120-60-40	Pea veg (Arkel; NA) 20-60-20	Sesamum (TKG-55; NA) NA	4486	3540	NR	91,704	18.8
Rice (JRH-5; 119) 120-60-40	Potato (Kufri Sinduri; NA) 120-60-40	Groundnut (Jyoti; NA) NA	4675	2619	1190	1,42,698	29.8
Rice (JRH-5; 119) 120-60-40	Gobhi sarson (Terriuttam; NA) 60-30-30	Sorghum(F) (Madhur; NA) NA	4546	1021	43100	1,17,098	26.5
Rice (JRH-5; 119) 120-60-40	Gobhi sarson (Terriuttam; NA) 60-30-30	Ladys finger (Parbhani Kranti; NA) NA	4836	1001	3571	1,18,978	23.4
Rice (JRH-5; 119) 120-60-40	French bean (Arka komal; NA) 20-60-40	Sorghum(F) (MP-chari; NA) NA + Cowpea (Local; NA) NA	4691	NR	25210 + 3609	1,28,425	21.9
Rice (Danteshwari; 136) 120-60-40	Merigold (African Giant; NA) 100-80-40	Sesamum (TKG-55; NA) NA	4547	4992	NR	1,48,829	15.9
S.E. ±						14,645	1.22
CD at 5%						29,817	3.90
REWA (MADHYAPRADESH)							
Rice (Danteshwari; 98) 120-60-40	Wheat (GW-273; 155) NA	Fallow	4537	5050	-	1,26,262	33.1
Rice (Danteshwari; 98) 120-60-40	Chick Pea (JG-322; 131) NA	Fallow	4940	1732	-	1,15,221	23.3

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (Danteshwari; 98) 120-60-40	Berseem (Local; 160) NA	Berseem seed (N-241; 160) NA	5579	72758	372	2,83,546	32.2
Rice (Danteshwari; 98) 120-60-40	Potato (K.C. Mukhi; 70) NA	Wheat (HD-2864; 155) NA	5216	11647	4482	1,73,753	44.8
Rice (Danteshwari; 98) 120-60-40	Garlic (N-241; NA) NA	Fallow	4182	7039	-	2,92,022	24.6
Rice (Danteshwari; 98) 120-60-40	Toria (N-241; 70) NA	Onion (NA; 160) NA	4955	726	25946	3,20,336	34.0
Rice (Danteshwari; 98) 120-60-40	Lentil (N-241; 112) NA	Green Manure (Local; NA) NA	5334	1262	15088	1,41,412	25.6
Rice (Danteshwari; 98) 120-60-40	Pea (N-241; 70) NA	Wheat (HD-2864; 155) NA	5350	3552	4592	2,07,865	45.5
Rice (Danteshwari; 98) 120-60-40	Chick Pea (JG-322; 131) NA + Linseed (NA; 125) NA	Linseed (NA; 112) NA	4703	1104	NR	1,18,951	24.6
Rice (Danteshwari; 98) 120-60-40	Mustard (N-241; 127) NA	Green Manure (Local; 70) NA	4545	2777	15309	1,78,563	33.2
S.E. ±						6,299	1.25
CD at 5%						12,927	2.56
POWARKHEDA (MADHYA PRADESH)							
Soybean (JS 95-60; 89) 20-60-20	Wheat (GW-273; 125) 120-60-40	Fallow	1305	4555	-	90,222	21.4
Soybean (JS 95-60; 89) 20-null-20	Chick Pea (JG-130; 115) 20-60-40	Fallow	1319	1416	-	71,527	10.8
Sugarcane (Co 86032; 232) 300-80-60	Sugarcane (contd.) (Co 86032; 232) 300-80-40	Fallow	95138	-	-	1,61,736	32.3
Soybean (JS 95-60; 89) 20-60-20	Sugarcane (Co 86032; 0) 300-80-40	Fallow	NR	102083	-	1,73,541	34.7

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (Pusa sugandha-5; 110) 100-40-25	Wheat (GW-273; 125) 120-60-40	Green gram (PDM-54; 70) 20-60-20	3736	4472	618	1,38,482	30.4
Soybean (JS 95-60; 89) 20-60-20	Potato (Chip Sona; 96) 120-100-75	Ladys finger (Parbhani Kranti; NA) 80-60-20	1326	31805	12083	2,87,672	40.8
Soybean (JS 95-60; 89) 20-60-20	Maize fodder (African Tall; 70) 120-60-40	Fallow	1013	40277	-	71,041	10.8
Rice (Pusa sugandha-5; 110) 100-40-20	Linseed (Kiran; 114) 75-50-25	Green gram (PDM-54; 70) 20-60-20	3805	1388	597	1,20,489	22.5
Rice (Pusa sugandha-5; 110) 100-40-20	Linseed (Kiran; 114) 75-50-25	Sesamum (TKG-55; 75) 50-30-20	3944	1208	590	1,12,267	23.3
Soybean (JS 95-60; 89) 20-60-20	Potato (Chip Sona; 96) 120-100-75	Sesamum (TKG-55; 75) 50-30-20					
S.E. ± CD at 5%			1416	31944	583	1,83,125	40.3
						7,376	1.50
						15,136	3.0
CHITPLIMA (ODISHA)							
Rice (Naveen; 120) 80-40-40	Groundnut (Smruti; 125) 20-40-40	-	4087	1996	-	1,26,177	25.4
Rice (Naveen; 120) 80-40-40	Toria (Keshari-101; 90) 60-30-30	-	3946	1104	-	83,317	19.6
Rice (Naveen; 120) 80-40-40	Groundnut (Smruti; 125) 20-40-40	Green gram (K-851; 65) 20-40-40	4108	1900	901	1,67,039	27.9
Rice (Naveen; 120) 80-40-40	Groundnut (Smruti; 125) 20-40-40	Cowpea (NA; 60) 25-50-50	4191	1949	3109	1,58,404	27.0
Rice (Naveen; 120) 80-40-40	Groundnut (Smruti; 125) 20-40-40	Bottle gourd (US-15; 58) 0-30-50	4214	1908	14865	2,14,470	27.1
Rice (Naveen; 120) 80-40-40	Toria (Keshari-101; 90) 60-30-30	Green gram (K-851; 65) 20-40-40	3965	1011	988	1,29,241	22.4

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (Naveen; 120) 80-40-40	Radish (Pusa Chetki; 56) 50-50-75	Cowpea (NA; 60) 25-50-50	4471	27634	3871	1,81,574	22.0
Rice (Naveen; 120) 80-40-40	Radish (Pusa Chetki; 56) 50-50-75	Green gram (K-851; 65) 20-40-40	4603	25125	1018	1,84,955	23.6
Rice (Naveen; 120) 80-40-40	Rajma (Chit cobra; 90) 50-80-80	Green gram (K-851; 65) 20-40-40	4178	1906	1040	1,41,932	24.5
Rice (Naveen; 120) 80-40-40	Maize(Cob) (Kamal; 95) 120-60-60	Cowpea NA :60 25-50-60	4136	41873	3659	1,24,826	68.4
S.E. ±						6,633	1.50
CD at 5%						13,937	3.16
KATHALAGERE (KARNATAKA)							
Rice (IR-64; 120) 100-60-50	Rice (JGL-1798; 98) 120-60-60	-	5766	4949	-	1,37,164	37.0
Maize (IR-64; 120) 150-75-40	Rice (JGL-1798; 98) 120-60-60	-	3726	4984	-	1,07,584	29.9
Rice (IR-64; 120) 100-50-50	Rice (JGL-1798; 98) 120-60-60	-	5066	5567	-	1,36,115	36.7
Rice (IR-64; 120) 100-50-50	Rice (JGL-1798; 98) 120-60-60	-	5533	5100	-	1,36,115	36.8
Rice (IR-64; 120) 100-50-50	Tomato (L-15; 90) 60-50-30	-	5200	8992	-	66,560	17.9
Rice (IR-64; 120) 100-50-50	Ladys finger (Arka; 90) 120-75-60	-	5200	9332	-	1,68,185	21.2
Rice (IR-64; 120) 100-50-50	Rice (JGL-1798; 98) 120-75-60	-	6166	5435	-	1,48,505	40.1
Rice (IR-64; 120) 100-50-50	Rice (JGL-1798; 98) 100-50-50	-	5100	5429	-	1,34,775	36.4
Maize (Nityshri; 110) 150-75-40	Rice (JGL-1798; 98) 120-60-60	-	4023	5184	-	1,13,634	31.6

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (IR-64; 120) 100-50-50	Maize (Hybrid; 109) 150-75-60	-	4600	7762	-	1,50,091	42.0
Rice (IR-64; 120) 100-50-50	Groundnut (TMV-2; 112) 25-50-60	-	4166	1435	-	1,06,428	22.5
Maize (Nityshri; 110) 100-75-40	Green gram (KKM-3; 56) 25-50-0	-	4187	892	-	92,909	17.3
S.E. ±						8,784	2.18
CD at 5%						18,219	4.53
D. HUMID ECOSYSTEM							
JAMMU (J & K)							
Rice (Jaya; 141) NA	Wheat (DBW-17; 125) 100-50-25	Fallow	5291	3591	-	1,16,219	30.7
Rice (IET-1410; 121) NA	Berseem (Muscavi; 181) 50-50-0	Berseem (Muscavi; NA) NA	3916	41374	NR	1,50,259	20.1
Rice (IET-1410; 121) NA	Potato (K. Badshah; 111) 120-60-120	Onion (N-55; 122) 100-50-50	4312	15437	6895	1,79,340	33.3
Rice (PC-19; 126) NA	Knol Khol (G-40; 59) 100-50-50	Tomato (Sonia; 107) 120-60-60	4183	14791	6283	2,09,106	25.7
Rice (IET-1410; 121) NA	Garlic (Local; 177) 100-50-50	Cowpea (Baramasi-2020; 42) 50-60-50	3583	5301	NR	22,549	20.0
Rice (PC-19; 126) NA	Merigold (Pusa Narangi; 108) 120-100-100	French bean (Golden early-36; 87) 50-100-50	4666	5541	3895	2,36,904	17.3
Rice (PC-19; 126) NA	Spinach (Local; 137) 80-25-25	Ladys finger (Arca Anamica; 109) 60-30-30	3916	12082	8125	2,70,196	22.3
Rice (PC-19; 126) NA	Broccoli (Evergreen; 121) 120-60-60	Black gram (NUL-7; 82) 16-40-0	4208	7083	1516	2,90,488	23.0
Rice (IET-1410; 121) NA	Cabbage (Golden Acre; 97) 120-60-60	Onion (N-55; 122) 100-50-50	4583	11770	6208	1,86,187	22.1

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (PC-19; 126)	Potato (Kufri Sinduri; 113)	Maize(Cob) (Monsantoo double; 94)	4225	15229	17250	1,76,312	56.8
NA	120-60-60	90-60-30 + Green gram (NA; 94)			+ 710		
S.E. ±						25,298	3.36
CD at 5%						51,912	6.90
PALAMPUR (H.P)							
Maize (Early composite; 101)	Wheat (HPW-155; 178)	Follow	2272	4964	-	93,718	24.9
120-30-40	120-45-30						
Maize(Cob) (Early composite; 101)	Pea (Palampriya; 152)	Summer squash (Australian Green; 70)	3598	3574	4959	1,32,374	16.5
120-30-40	25-45-60	100-37.5-55	+ 184				
French bean (Pole type; 110)							
Maize (Early composite; 101)	Garlic (GHC-1; 222)	Fallow	2367	4442	-	1,84,566	15.7
120-30-40	125-56-60						
+			+				
Soybean (Harit Soya; 127)			284				
120-30-40							
Maize(Cob) (Early composite; 101)	Broccoli (Palam Samidhi; 101)	Potato (Kufri Jyoti; 94)	3428	5662	8636	1,74,240	15.2
120-30-40	150-75-55	120-60-60					
Maize (Early composite; 101)	Radish (Early Apoorva; 94)	Onion (Patna Red; 119)	2367	18939	10606	1,83,604	16.6
120-30-40	100-37.5-35	125-56-60					
+			+				
Asparagus beans (DP ASB-1; 110)			151				
120-30-40							
Maize(Cob) (Early composite; 101)	Cauliflower (Palam Uphar; 131)	French bean (Laxmi; 103)	3589	8901	2220	1,17,673	11.3
120-30-40	125-56-70	50-75-50					

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
+			+				
Green gram (RD-2715; 111)			133				
Maize(Cob) (Early composite; 101) 120-30-40	Cauliflower (Palam Uphar; 131) 125-56-70	Buck wheat (Sangla B1; 74) 40-30-20	3702	9090	1894	1,29,424	17.7
+			+				
Rajma (BRS-II; 132)			161				
Maize(Cob) (Early composite; 101) 120-30-40	Broccoli (Palam Samridhi; 101) 125-56-55	Radish (Early Apoorva; 74) 100-37.5-35	3484	6553	8901	1,90,279	8.8
+			+				
Asparagus beans (DP ASB-1; 110)			133				
S.E. ±						16,384	2.48
CD at 5%						34,079	5.16
JORHAT (ASSAM)							
Rice (Rajendra suwasini; 132) 80-40-40	Fallow	Rice (Disang; 114) 80-40-40	2862	-	2237	65,280	17.6
Rice (Rajendra suwasini; 132) 80-40-40	Toria (TS-38; 95) 60-40-40	Fallow	2925	1162	-	71,966	16.4
Rice (Rajendra suwasini; 132) 80-40-40	Cabbage (Golden Acre; 108) NA	Green gram (Pratap; 75) 15-35-10	2712	6275	367	90,691	12.3
Rice (Rajendra suwasini; 132) 80-40-40	Cauliflower (Pusa Snowball; 108) 15-35-10	Black gram (PU-31; 75) 15-35-10	2737	3000	495	78,105	13.1
Rice (Rajendra suwasini; 132) 80-40-40	Knol Khol (White Vienna; 89) 15-35-10	Cowpea fodder (EC-4216; 74) 15-35-10	2832	4175	NR	9,542	12.0
	+ French bean (Annapurna; 50)			+ 1725			
Rice (Rajendra suwasini; 132) 80-40-40	Capsicum (California Wonder; 150) NA	Cowpea fodder (EC-4216; 74) 20-40-20	2662	812	NR	48,826	9.4

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Rice (Rajendra suwasini; 132) 80-40-40	Green chillies (Local; 100) NA	Cowpea fodder (EC-4216; 74) 20-40-20	2750	4937	512	1,26,055	11.0
Rice (Rajendra suwasini; 132) 80-40-40	Radish (P. Chetki; 35) 15-35-10 + French bean (Annapurna; 50)	Black gram (PU-31; 75) 15-35-10	2887	11650 + 2162	392	1,31,651	13.8
S.E. ±						5,871	0.82
CD at 5%						12,212	1.72
KALYANI (WEST BENGAL)							
Rice (IET-4786; 114) 80-40-40	Rice (IET-4786; 114) 100-50-50	-	3110	3947	-	90,346	24.4
Rice (BCKV-1; 112) 80-40-40	Rice (IET-4786; 114) 100-50-50	-	2350	4177	-	83,546	22.5
Rice (BCKV-1; 114) 80-40-40	Potato (Kufri Jyoti; 90) NA	Jute (JRO-524; 110) NA	4000	10460	3055	1,60,151	34.6
Rice (BCKV-1; 114) 80-40-40	Wheat (UP-262; 144) NA	Maize (Datta; 80) NA + Groundnut (TAG-24; NA) NA	3760	2227	2014 + 1504	1,57,524	36.1
Rice (IET-4786; 114) 80-40-40	Mustard (B-9; 98) NA	Green gram (Sonali; 80) NA	3889	1502	881	1,38,030	24.5
Rice (BCKV-1; 112) 80-40-40	Lentil (B-67; 120) NA + Mustard (B-9; 98) NA	Sesamum (B-76; 95) NA	3704	1965 + 512	262	1,30,798	23.8
Amaranthus (Jabakusam; NA) NA	Brinjal (Muktakeshi; 172) NA + Coriander (Hybrid; 55) NA	Bitter gourd (Meghna-2; 85) NA	7333	10108 + 858	2352	2,25,346	9.0

Contd.../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
Kharif	Rabi	Summer	Kharif	Rabi	Summer		
Cauliflower (Radha; NA) NA	Radish (Kalpin; 65) NA + Amaranthus (Jabakusam; 48) NA + French bean (Contender; NA) NA	Ladys finger (Mahyco; 90) NA	10187	20652	5241	2,29,535	13.5
EFY (Bidhan kusam; 198) NA	Dolichos bean (Hybrid; 162) NA	Ginger (Bidhan kusam; 85) NA + Turmeric (Suranjana; NA) NA	37250	3112	471	7,83,162*	55.5
Rice (BCKV-1; 114) 80-40-40	Wheat (UP-262; 144) 100-50-50	Green gram (Sonal; 80) NA	3527	2683	395	1,00,767	22.8
S.E. ±						15,378	2.51
CD at 5%						32,310	5.27
E.COASTAL ECOSYSTEM							
BHUBANESWAR (ODISHA)							
Rice Naveen :128 80-40-40	Groundnut (Smruti; 116) 20-40-40	-	4733	2009	-	1,34,919	27.7
Rice (Naveen; 128) 80-40-40	Maize(Cob) (Navjyot; 94) 80-40-40	Cowpea (Utkala Manika; 68) 25-50-50	5056	39738	3407	1,32,262	68.8
Rice (Naveen; 128) 80-40-40	Maize(Cob) (Navjyot; 94) 80-40-40	Lady finger (BO-2; 68) 80-40-40	5266	40515	4778	1,51,865	70.5
Rice (Naveen; 128) 80-40-40	Toria (Parbati; 72) 60-30-30	Lady finger (BO-2; 68) 80-40-40	5494	1087	4405	1,50,608	26.4
Rice (Naveen; 128) 80-40-40	Toria (Parbati; 72) 60-30-30	Cowpea (Utkala Manika; 68) 25-50-50	5222	1176	3307	1,36,480	26.0
Rice (Naveen; 128) 80-40-40	French bean (Selection-9; 85) 80-40-40	Bitter gourd (Nakhara local; 54) 80-40-40	5164	4029	3208	2,03,551	19.7

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return (Rs/ha)*	Energy yield Calories (K*10 ⁶)
<i>Kharif</i>	<i>Rabi</i>	<i>Summer</i>	<i>Kharif</i>	<i>Rabi</i>	<i>Summer</i>		
Rice (Naveen; 128) 80-40-40	Groundnut (Smruti; 116) 20-40-40	Cucumber (Summer Queen; 62) 80-40-40	4755	2064	3662	1,72,712	28.6
Rice (Naveen; 128) 80-40-40	Tomato (BT-10; 115) 80-40-40	Cowpea (Utkala Manika; 68) 25-50-50	4950	14441	3197	2,19,211	21.9
Rice Naveen :128 80-40-40	Radish (Chetki long; 61) 80-40-40	Sesamum (Uma; 97) 60-30-30	3201	16772	810	1,25,840	18.4
Rice (Naveen; 128) 80-40-40	French bean (Selection-9; 85) 80-40-40	Sesamum (Uma; 97) 60-30-30	4661	3985	776	1,70,630	21.5
S.E. ±						13,727	2.58
CD at 5%						28,842	5.43
MARUTERU (ANDHRA PRADESH)							
Rice (MTU-1075; 140) 60-40-40	Maize (DHM-117; 100) NA	Green Fodder (Local; NA) NA	5809	6922	15226	1,92,546	46.2
Rice (MTU-1075; 140) 60-40-40	Maize (DHM-117; 100) NA	Green Fodder (Local; NA) NA	5773	6653	23126	2,08,043	46.4
Rice (MTU-1075; 140) 60-40-40	Soybean (JS-335; 90) NA	Green Fodder (Local; NA) NA	5954	1232	16020	1,42,110	28.4
Rice (MTU-1075; 140) 60-40-40	Soybean (JS-335; 90) NA	Green Fodder (Local; NA) NA	5882	1208	23080	1,57,723	29.2
Rice (MTU-1075; 140) 60-40-40	Finger millet (Godavari; 120) NA	Green Fodder (Local; NA) NA	5991	1357	14006	1,30,949	27.4
Rice (MTU-1075; 140) 60-40-40	Finger millet (Godavari; 120) NA	Green Fodder (Local; NA) NA	5954	1317	23160	1,52,030	28.6
Rice (MTU-1075; 140) 60-40-40	Rice (MTU-1010; 120) NA	Green Fodder (Local; NA) NA	5991	5584	15626	1,85,988	42.5
Rice (MTU-1075; 140) 60-40-40	Rice (MTU-1010; 120) NA	Green Fodder (Local; NA) NA	6100	5712	22146	2,04,795	44.4
Rice (MTU-1075; 140) 60-40-40	Black gram (PU-31; 85) NA	Green Fodder (Local; NA) NA	5918	584	20500	1,50,509	25.7
S.E. ±						4,897	0.97
CD at 5%						10,382	2.06

Contd.../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return	Energy yield
Kharif	Rabi	Summer	Kharif	Rabi	Summer	(Rs/ha)*	Calories (K*10 ⁶)
KARJAT (MAHARASHTRA)							
Rice (Palghar-1; 130)	Groundnut (SB-XI; 110)	-	4623	2154	-	1,38,904	28.2
150-50-50	25-50-0						
Rice (Palghar-1; 130)	Mustard (Varuna; NA)	-	4181	937	-	81,656	19.5
150-50-50	90-50-0						
Rice (Palghar-1; 130)	Sunflower (Morden; NR)	-	4009	844	-	82,562	19.1
150-50-50	60-30-30						
Rice (Palghar-1; 130)	Brinjal (Krishna F; NR)	-	4261	15395	-	2,03,579	18.4
150-50-50	150-50-50						
Rice (Palghar-1; 130)	Cabbage (Mahyco-118; NR)	-	4076	12918	-	1,30,335	17.5
150-50-50	120-60-60						
Rice (Palghar-1; 130)	Maize fodder (A. Tall; NR)	-	3825	63074	-	1,25,289	23.3
150-50-50	120-50-50						
Rice (Palghar-1; 130)	Cowpea (Konkan Sadabahar)	-	4835	1043	-	72,833	17.2
150-50-50	25-50-0						
Rice (Palghar-1; 130)	Dolichos bean (Konkan Bhushan)	-	4502	5801	-	1,62,921	18.3
150-50-50	90-60-30						
Rice (Palghar-1; 130)	Lady finger (Arka; Anamika)	-	4339	5339	-	1,13,687	16.8
150-50-50	100-50-0						
Rice (Palghar-1; 130)	Green chillies (Pusa Jwala)	-	4102	1699	-	83,358	14.6
150-50-50	60-40-40						
Rice (Palghar-1; 130)	Rice (KJT-3; 130)	-	3968	4636	-	1,10,138	29.7
150-50-50	120-50-50						
S.E						4,937	0.74
CD at 5%						10,081	1.51

Contd..../-

Cropping system/variety /duration in days/ Fertilizer (N:P ₂ O ₅ :K ₂ O Kg/ha)			Yield (kg/ha)			Annual Gross Return	Energy yield
Kharif	Rabi	Summer	Kharif	Rabi	Summer	(Rs/ha)*	Calories (K*10 ⁶)
NAVSARI (GUJARAT)							
Rice (Jaya; 115) 100-30-0	Chick Pea (GG-2; 106) NA	Fallow	3429	834	-	68,930	14.8
Rice (Gurjari; 105) 100-30-0	Sorghum (HG-365; 122) NA	Sorghum(F) (Local; 90) NA	3406	1703	1881	71,769	18.0
Rice (Gurjari; 105) 100-30-0	Maize Sweet corn (Madhur; 89) NA + Green gram (GM-4; 90) NA	Green gram (GM-4; 90) NA	3452	3086 + 537	794	1,46,788	2.0
Rice (Gurjari; 105) 100-30-0	Febugreek Leaves (NA; 112) NA	Cluster bean (Pusa; 132) NA	3486	6035	5829	1,69,121	17.0
Rice (Gurjari; 105) 100-30-0	Castor (GCH-7; 197) NA	Continue	3497	-	2492	94,514	23.0
Rice (Gurjari; 105) 100-30-0	Brinjal (Ruby queen; 172) NA + Radish (NA; 72) NA	Continue	3680	- + 7201	9602	1,61,885	16.2
Rice (Jaya; 115) 100-30-0	Sunhemp Fodder (Local; 147) NA	Groundnut (GG-2; 120) NA	3669	NR*	1411	99,203	20.7
Rice (Jaya; 115) 100-30-0	Cabbage (Golden Acre; 90) NA	Green gram (NA; 90) NA	3863	13831	988	1,81,589	20.4
Rice (Jaya; 115) 100-30-0	Maize Sweet corn (Madhur; 135) NA	Groundnut (GG-2; 120) NA	3417	7773	1447	1,91,351	29.7
Rice (Jaya; 115) 100-30-0	Lucerne (Anand-2; 84) NA	Lucerne seed (Anand-2; 106) NA	3646	0.00*	246	87,416	12.6
S.E. ±						10,126	1.26
CD at 5%						21,275	2.64

7.2.2 CONSERVATION AGRICULTURE AND CLIMATE CHANGE

Title of the experiment : Development of innovative farming practices to mitigate the effects of climate change

Objective:

1. To design and identify economically viable and efficient farming practices for resource conservation and counteracting adverse effects of climate change.
2. To study the effects of resource conservation technologies on photosynthetic efficiency, biomass production, economic yield, soil thermal regimes and soil health.

Year of start : 2011-12

Treatments

A. Main plots (Crop establishment methods x Cropping Systems) - 8

I. Crop establishment method - 2

T_1 = No tillage/minimum tillage/bed planting/and other suitable seed drill/planter

T_2 = Conventional tillage

II. Cropping systems (location specific) - 4

CS_1 = Predominant cropping system of the region

CS_2 = Best identified cropping system from expt. 1(a)

CS_3 and CS_4 = New cropping systems designed by involving C_4 plants (as they are known to perform better under enhanced CO_2 and higher

ambient temperatures), low water requiring and physiologically more efficient crops.

B. Sub-Plots (Mulch x Fertilizer) - 4

I. Mulch - 2

M_1 = No mulch

M_2 = Crop residue mulch (crop residue - straw or stover - to be recycled *in situ*, especially in *rabi* season crops, and to be applied uniformly on inter - row space after crop seeding establishment

II. Fertilizer rates - 2

F_1 = Recommended dose of fertilizer (RDF)

F_2 = 75% RDF + 25 % N through organic manure

Experimental Design : Split Plot with three replications

Results: Centre-wise results are given in tables 7.2/2 (a-g) and discussed below:

1. S.K. Nagar

Among tillage treatments, conventional tillage showed significantly higher pearl millet equivalent yield (PEY) (113 q ha^{-1}) over minimum tillage (Table 7.2/2 (a). In case of cropping systems castor + green gram-summer green gram gave significantly better PEY (139.5 q ha^{-1}) followed by green gram-mustard- summer pearl millet (125 q ha^{-1}). Incorporation of mulch significantly increased the PEY to the order of 11.4 per cent, compared to no mulch. Among the fertilizer treatments, application of 25% organic manure along with 75 % recommended dose of fertilizer (RFD) gave significantly higher PEY (119.57 q ha^{-1}) over RDF.

Table 7.2/2 (a). Effect of different innovative farming practices on system productivity at S.K. Nagar

Treatment	Pearlmillet Equivalent Yield (q/ha)			System	System
	Kharif	Rabi	Summer	PEY (q/ha/yr)	Productivity (kg/ha/day)
Crop establishment method					
Minimum tillage	47.07	51.27	37.64	106.34	29.14
Conventional tillage	50.94	53.65	39.27	112.89	30.93
C.D.(5%)	1.55	NS	NS	3.03	0.831
Cropping systems					
Pearl millet-Mustard	13.39	50.99		64.38	17.64
Castor+green gram-Summer Green gram	98.36		41.13	139.50	38.22
Green gram-mustard-Summer Pearl millet	35.26	53.93	35.77	124.97	34.24
C.D.(5%)	1.90	NS	1.73	3.72	1.02
Mulch					
No mulch	43.15	47.85	35.01	98.39	26.96
Crop residue mulch	49.43	52.75	38.23	109.59	30.03
C.D.(5%)	2.82	3.33	2.32	3.69	1.01
Fertilizer rates					
RDF	49.43	53.68	38.65	110.91	30.39
75 % RDF+25 % OM	54.50	55.68	41.92	119.57	32.76
C.D.(5%)	2.82	3.33	2.32	3.69	1.01

2. Bhubaneswar

No significant difference was noted in rice equivalent yield (REY) between two tillage practices (Table 7.2/2 (b)). However, conventional tillage gave significantly higher yield during *kharif*. Among the cropping systems rice-maize-okra produced significantly higher REY (210 q ha⁻¹) followed by rice-tomato-cowpea (188 q ha⁻¹). Between mulch and no mulch treatments, application of mulch resulted in significantly higher REY (151.8 q ha⁻¹), which was 8.3% higher over no mulch. Substitution of 25% RDF through organic manure resulted in a significantly higher yield of (10.7 q ha⁻¹) over RDF.

3. Raipur

At Raipur, conventional tillage showed significantly higher REY (107.08 q ha⁻¹), which is 7.3% higher compared to minimum tillage. In case of cropping systems, rice-sunflower produced

significantly higher REY (118.4 q ha⁻¹) followed by rice-maize (109.63 q ha⁻¹). Application of crop residue mulch did not influence the yield significantly. Substitution of 25% RDF through organic manure resulted in the marginally higher REY (107.64 q ha⁻¹) over RDF (106.85 q ha⁻¹).

4. Palampur

At Palampur, conventional tillage produced significantly higher maize equivalent yield (MEY) (844.68 q ha⁻¹), which is 10.8% higher over minimum tillage (762.01 q ha⁻¹). As far as cropping systems are concerned, baby corn+French bean -veg. pea produced significantly higher MEY (1852.56 q ha⁻¹), followed by maize+soybean-gobhi sarson+toria (315.85 q ha⁻¹). One of the reasons for higher MEY may be due to higher price of baby corn compared to other crops in the cropping systems selected. Application of crop residue mulch significantly increased the MEY by 7 per cent compared to no mulch. Substitution of

Table 7.2/2 (b). Effect of different innovative farming practices on system productivity at Bhubaneswar

Treatment	Rice Equivalent Yield (q/ha)			System REY (q/ha/yr)	System Productivity (kg/ha/day)
	Kharif	Rabi	Summer		
Crop establishment method					
Minimum tillage	54.36	68.25	37.69	150.87	41.33
Conventional tillage	61.45	65.79	36.10	154.31	42.28
C.D.(5%)	2.11	NS	NS	NS	NS
Cropping systems					
Rice-Groundnut-Fallow	58.41	48.20	31.20	106.61	29.21
Rice-Tomato-Cowpea	57.46	93.93	35.62	188.11	51.54
Rice-Maize-Okra	58.58	99.91	37.87	209.87	57.50
Rice-Toria-Greengram	57.16	26.02	42.87	105.76	28.98
C.D.(5%)	NS	6.25	6.40	9.40	2.58
Mulch					
No mulch	55.61	61.23	31.20	140.24	38.42
Crop residue mulch	55.93	67.50	37.87	151.83	41.60
C.D.(5%)	2.58	4.24	4.12	5.66	1.55
Fertilizer rates					
RDF	60.13	66.96	35.62	153.80	42.14
75 % RDF+25 % OM	59.93	72.39	42.87	164.47	45.06
C.D.(5%)	2.58	4.24	4.12	5.66	1.55

Table 7.2/2 (c). Effect of different innovative farming practices on system productivity at Raipur

Treatment	Rice Equivalent Yield (q/ha)		System REY (q/ha/yr)	System Productivity (kg/ha/day)
	Kharif	Rabi		
Crop establishment method				
Minimum tillage	46.15	53.66	99.82	27.35
Conventional tillage	45.49	61.59	107.08	29.34
C.D.(5%)	NS	2.23	2.58	0.71
Cropping systems				
Rice-Wheat	42.08	44.81	86.88	23.81
Rice-Brinjal	49.40	49.48	98.87	27.10
Rice-Maize	42.47	67.16	109.63	30.04
Rice-Toria-Sunflower	49.34	69.07	118.41	32.44
C.D.(5%)	1.28	3.15	3.65	0.10
Mulch				
No mulch	45.54	54.00	99.53	27.27
Crop residue mulch	45.68	54.50	99.77	27.34
C.D.(5%)	NS	NS	NS	NS
Fertilizer rates				
RDF	46.17	60.68	106.85	29.28
75 % RDF+25 % OM	46.31	61.33	107.64	29.49
C.D.(5%)	NS	NS	NS	NS

Table 7.2/2 (d). Effect of different innovative farming practices on system productivity at Palampur

Treatment	Maize Equivalent Yield (q/ha)		System MEY (q/ha/yr)	System Productivity (kg/ha/day)
	Kharif	Rabi		
Crop establishment method				
Minimum tillage	480.63	145.54	762.01	208.77
Conventional tillage	510.53	164.02	844.68	231.42
C.D.(5%)	NS	14.28	45.60	12.49
Cropping systems				
Maize-Wheat	41.53	200.09	241.63	66.20
Baby corn+FrenchBean-Pea	1362.08	134.07	1852.56	507.55
Maize+Soybean-Gobhi (veg) sarson+Torla	83.127	130.16	315.85	86.54
C.D.(5%)	41.08	17.49	55.85	15.30
Mulch				
No mulch	459.86	145.61	742.22	203.35
Crop residue mulch	482.41	156.24	794.76	217.74
C.D.(5%)	24.40	9.02	35.72	9.79
Fertilizer rates				
RDF	506.40	152.58	817.13	223.87
75 % RDF+25 % OM	533.64	164.69	859.28	235.42
C.D.(5%)	24.40	9.02	35.72	9.79

25% organic manure along with 75% RDF significantly increased the MEY (5 per cent) compared to RDF.

5. Rajendranagar

At Rajendranagar, no significant difference was observed between maize equivalent yield (MEY) under different tillage practices (Table 7.2/2 (e)). Among the cropping systems, significantly higher MEY was recorded under groundnut-maize (97.03 q ha⁻¹) followed by maize-sunflower (76.40 q ha⁻¹). As far as different mulch treatments are concerned, application of crop residue as mulch significantly increased the MEY (82.59 q ha⁻¹) compared to no mulch (77.51 q ha⁻¹). Between fertilizer treatments, supplementing 25% with organic manure resulted in significantly higher MEY (81.02 q ha⁻¹) compared to RDF, even though yield increase is only marginal (4.5 per cent).

6. Kota

Data presented in Table 7.2/2 (f) shows that conventional tillage produced significantly higher soybean equivalent yield (SEY) (76 q ha⁻¹), which is 13.1 per cent higher compared to minimum tillage. Among the cropping systems, soybean-linseed produced significantly higher SEY (119.97 q ha⁻¹) followed by soybean-wheat (48.98 q ha⁻¹). Treatments of mulch and no mulch were found at par with each other. Between fertilizer treatments, substitution of 25% N with organic manure along with 75% recommended dose of fertilizer (RDF) gave higher SEY (73.34 q ha⁻¹) compared to RDF.

7. Kalyani

At Kalyani, there was no significant difference in rice equivalent yield (REY) under conventional and minimum tillage. However, a higher REY of

Table 7.2/2 (e). Effect of different innovative farming practices on system productivity at Rajendranagar

Treatment	Maize Equivalent Yield (q/ha)		System MEY (q/ha/yr)	System Productivity (kg/ha/day)
	Kharif	Rabi		
Crop establishment method				
Minimum tillage	40.21	39.63	79.84	21.87
Conventional tillage	40.93	37.55	78.48	21.50
C.D.(5%)	NS	NS	NS	NS
Cropping systems				
Maize-Castor	40.90	26.24	67.13	18.40
Maize-Sunflower	40.48	35.92	76.40	20.93
Soybean-Maize	31.75	44.34	76.09	20.85
Groundnut-Maize	49.17	47.85	97.03	26.58
C.D.(5%)	1.21	4.16	4.31	1.18
Mulch				
No mulch	39.82	37.70	77.52	21.24
Crop residue mulch	40.65	41.94	82.59	22.63
C.D.(5%)	NS	0.81	1.68	0.46
Fertilizer rates				
RDF	40.35	35.17	75.52	20.69
75 % RDF+25 % OM	41.47	39.55	81.02	22.19
C.D.(5%)	NS	0.81	1.68	0.46

Table 7.2/2 (f). Effect of different innovative farming practices on system productivity at Kota

Treatment	Soybean Equivalent Yield (q/ha)		System SEY (q/ha/yr)	System Productivity (kg/ha/day)
	Kharif	Rabi		
Crop establishment method				
Minimum tillage	17.84	49.35	67.20	18.41
Conventional tillage	24.55	51.46	76.01	20.83
C.D.(5%)	0.24	0.47	0.58	0.16
Cropping systems				
Soybean-Wheat	20.68	28.30	48.98	13.42
Soybean-Linseed	26.97	93.00	119.97	32.87
Maize-Wheat	15.95	29.92	45.87	12.57
C.D.(5%)	0.30	0.57	0.71	0.19
Mulch				
No mulch	20.72	49.47	70.19	19.23
Crop residue mulch	21.09	49.93	71.03	19.46
C.D.(5%)	NS	NS	NS	NS
Fertilizer rates				
RDF	21.17	50.71	71.87	19.69
75 % RDF+25 % OM	21.83	51.51	73.34	20.09
C.D.(5%)	NS	NS	NS	NS

Table 7.2/2 (g). Effect of different innovative farming practices on system productivity at Kalyani

Treatment	Rice Equivalent Yield (q/ha)			System REY (q/ha/yr)	System Productivity (kg/ha/day)
	Kharif	Rabi	Summer		
Crop establishment method					
Minimum tillage	31.83	57.52	43.97	114.15	31.27
Conventional tillage	35.47	55.55	49.10	122.60	33.32
C.D.(5%)	NS	NS	NS	NS	NS
Cropping systems					
Rice-Rice	39.34	-	57.16	96.50	26.44
Rice-Potato-Jute	30.06	54.44	42.76	127.27	34.87
Rice-Potato-Maize	31.55	58.64	39.69	129.87	35.58
C.D.(5%)	7.21	NS	7.19	14.80	4.05
Mulch					
No mulch	32.33	56.75	45.41	116.84	32.01
Crop residue mulch	33.59	57.75	47.71	118.13	32.36
C.D.(5%)	NS	NS	NS	NS	NS
Fertilizer rates					
RDF	33.59	54.93	44.89	116.60	31.94
75 % RDF+25 % OM	35.07	57.33	48.12	119.93	32.85
C.D.(5%)	NS	NS	NS	NS	NS

(122.6 q ha⁻¹) was recorded under conventional tillage compared to minimum tillage (114.15 q ha⁻¹). Among the cropping systems, rice-potato-maize recorded the highest REY (129.87 q ha⁻¹) followed by rice-potato-jute (127.27 q ha⁻¹). Between mulch and no mulch treatments, application of crop residue mulch resulted into

higher REY (118.13 q ha⁻¹) compared to no mulch. Between fertilizer treatments, no significant difference was observed with respect to REY. However, substitution of 25% N with organic manure along with 75% RDF resulted in higher REY (119.93 q ha⁻¹) compared to RDF (116.6 q ha⁻¹).

7.3 SUSTAINABLE RESOURCE MANAGEMENT

7.3.1 INTEGRATED NUTRIENT MANAGEMENT (INM)

Title of the Experiment: Permanent plot experiment on integrated nutrient management in cereal based cropping systems (Expt. No.2a).

productivity of cereal based crop sequences and on soil health.

Objectives:

1. To develop suitable integrated nutrient supply and management system.
2. To study the long-term effect of conjunctive use of fertilizers and organic manures on the

Results:

Rice-Rice Cropping System

At **Rajendranagar**, the highest yield of rice was recorded under T11 (4687 kg/ha) during *kharif*, and under T5 during *rabi* (4086 kg/ha). The increase in crop yield under highest yielding treatment over

Treatments:

	<i>Kharif</i>	<i>Rabi</i>
T ₁	No fertilizer, no organic manure (control)	No fertilizer, no organic manure (control)
T ₂	50% rec. NPK dose through fertilizers	50% rec. NPK dose through fertilizers
T ₃	50% rec. NPK dose through fertilizers	100% rec. NPK dose through fertilizers
T ₄	75% rec. NPK dose through fertilizers	75% rec. NPK dose through fertilizers
T ₅	100% rec. NPK dose through fertilizers	100% rec. NPK dose through fertilizers
T ₆	50% rec. NPK dose through fertilizers + 50% N through FYM	100% rec. NPK dose through fertilizers
T ₇	75% rec. NPK dose through fertilizers + 25% N through FYM	75% rec. NPK dose through fertilizers
T ₈	50% rec. NPK dose through fertilizers + 50% N through straw	100% rec. NPK dose through fertilizers
T ₉	75% rec. NPK dose through fertilizers + 25% N through straw	75% rec. NPK dose through fertilizers.
T ₁₀	50% rec. NPK dose through fertilizers + 50% N through GM	100% rec. NPK dose through fertilizers.
T ₁₁	75% rec. NPK dose through fertilizers + 25% N through GM	75% rec. NPK dose through fertilizers.
T ₁₂	Farmer's conventional practice	Farmer's conventional practice

(FYM=Farm Yard Manure and GM=Green Manure)

Locations

Cropping System	Ecosystem/ Centre (State)
Rice-rice	Semi-arid: Rajendranagar (A.P.); Sub-humid: Chiplima (Orissa); Humid: Jorhat (Assam); Coastal: Maruteru (A.P.), Bhubaneswar (Orissa), Karjat (Maharashtra), Karamana (Kerala)
Rice-wheat	Semi-arid: Ludhiana (Punjab), Kanpur (U.P.); Sub-humid: Jabalpur (M.P.), R.S. Pura (J & K), Varanasi (U.P.), Pantnagar (Uttarakhand), Faizabad (U.P.), Sabour (Bihar), Raipur (Chhattisgarh), Humid: Kalyani (W.B.), Coastal: Navsari (Gujarat).
Rice-maize	Semi-arid: Kathalgere (Karnataka)
Rice-mustard	Semi-arid: Rudrur (A.P.)
Maize-wheat	Sub-humid: Ranchi (Jharkhand)
Pearl millet-wheat	Arid: S.K. Nagar (Gujarat), Hisar (Haryana), Junagadh (Gujarat)
Sorghum-wheat	Semi-arid: Akola (Maharashtra), Parbhani (Maharashtra), Rahuri (Maharashtra)

Year of start, crop varieties and fertilizer doses:

The centre-wise details in respect of year of start, crop varieties and fertilizer doses are given hereunder

Centre	Year of start	Crop variety		Recommended fertilizer dose (N:P ₂ O ₅ :K ₂ O, kg/ha)		Farmers' practice (N:P ₂ O ₅ :K ₂ O, kg/ha) + FYM, t/ha	
		Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
Rice-Rice Cropping System							
Rajendranagar	1988	MTU-1010	MTU-1010	120:60:60	120:60:60	80:50:20	120:60:40
Chiplima	1983	Swarna	Khandagiri	80:40:40	100:50:50	40:20:20+4.5	50:25:25
Jorhat	1987	Ranjit	Disang	45:30:40	45:30:40	12.5:0:0	12.5:0:0
Maruteru	1989	MTU-1075	MTU-1010	60:40:40	120:60:40	90:60:0	180:90:0
Bhubneswar	1983	Pratiksha	Naveen	80:40:40	100:50:50	20:0:0+2.0	20:0:0+2.0
Karjat	1986	Palghar-1	Karjat-3	100:50:50	120:50:50	45:45:45	90:45:45
Karamana	1985	Aiswarya	Aiswarya	90:45:45	90:45:45	95:30:40	90:22:5:2.5
Rice-Wheat Cropping System							
Ludhiana	1983	PR-116	PBW-343	120:30:30	120:60:30	120:30:30	150:60:30
Kanpur	1983	Pant-12	PBW-343	120:60:60	120:60:60	80:30:0	80:30:0
Jabalpur	1985	MR-219	GW-273	120:60:40	120:60:40	40:20:0	40:20:0
R.S.Pura	1985	Jaya	DBW-17	100:60:30	100:50:25	34:25:22	56:25:0
Palampur	1985	Arize-6129	HPW-155	90:40:40	120:60:30	36:16:16 +5.0	48:36:12 +5.0
Varansi	1985	HUR-105	HUW-234	120:60:60	120:60:60	50:0:0	60:0:0
Pantnagar	1983	PR-113	PBW-343	120:60:40	120:60:40	120:48:24	120:48:24
Faizabad	1984	Sarju-52	PBW-343	120:60:60	120:60:60	90:40:0	90:40:0
Sabour	1984	Sita	PBW-343	80:40:20	80:40:20	60:30:15	68:33:0
Raipur	1991	Mahamaya	GW-273	80:60:40	100:50:30	60:40:20	60:40:20

Centre	Year of start	Recommended fertilizer		Farmers' practice dose (N:P ₂ O ₅ :K ₂ O, kg/ha)		(N:P ₂ O ₅ :K ₂ O, kg/ha) + FYM, t/ha	
		<i>Kharif</i>	<i>Rabi</i>	<i>Kharif</i>	<i>Rabi</i>	<i>Kharif</i>	<i>Rabi</i>
Kalyani	1986	IET-4094	UP-262	80:40:40	100:60:40	50:30:20	60:20:20
Navsari	1987	Jaya	GW-496	100:30:0	120:60:0	50:25:0+2.5	60:30:0
Rice-Maize Cropping System							
Kathalegere	1988	JGL-1798	Kaveri	46:16:60	46:16:60	NR	NR
Rice-Mustard Cropping System							
Rudrur	1984	MTU-1010	GM-1	120:60:40	80:40:30	150:40:0	60:0:0
Pearl millet-Wheat Cropping System							
S.K.Nagar	1986	GHB-558	GW-496	80:40:0	120:60:0	40:0:0	80:0:0
Hisar	1985	HHB-223	WH-711	125:62.5:0	150:60:0	NR	NR
Junangarh (With K)	1987	GHB-538	GW-366	0:0:25	0:0:25	40:0:0	80:0:0
Junangarh (Without K)	2001	GHB-538	GW-366	0:0:25	0:0:25	80:40:0	120:60:0
Bichpuri	1990	Bioseed-8510	UP-2338	80:40:40	120:60:40	40:0:0	40:0:0

100% RDF was 2.42 percent, during *kharif*. It was statistically at par with T5 and T10. Whereas, during *rabi* T5 was at par with T10 and T11.

At **Chiplima**, the highest grain yield of rice was achieved under T10 during *kharif* (5040 kg/ha) and during *rabi* (5665 kg/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 10.40 and 11.49 percent during *kharif* and *rabi*, respectively. It was statistically at par with T5, T6, T7 and T9 and during *rabi* it was statistically at par with T3, T5, T6, T7, T8 and T9.

At **Jorhat**, the highest yield of rice was recorded under T9 (5087 kg/ha) during *kharif*, and during *rabi* (2637 kg/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 12.12 and 8.20 percent, during *kharif* and summer, respectively. During *kharif* T5 was statistically at par with T9 and same trend was also observed during summer.

At **Maruteru**, the highest yield of rice was recorded under T11 (5952 kg/ha) during *kharif*. The increase in crop yield under highest yielding treatment over 100% RDF was 4.47 percent. The highest yielding treatment (i.e., T11) was at par with T5, T6, T7 and T10. During *rabi* T6 treatment gave the maximum yield (5632 kg/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 8.37 percent.

At **Bhubaneswar**, the highest yield of rice was recorded under T10 (4370 kg/ha) during *kharif*. The corresponding highest yield increase in respective season was 9.11 and 11.62 per cent higher than 100% RDF. The highest yielding treatment (T10) was at par with T5, T6, T7, T8, T9 and T11 during *kharif* whereas in *rabi* the highest yielding treatment T6 was at par with T5, T7, T8, T9, T10 and T11, respectively.

Table 7.3/1 (a): Grain yield(kg/ha) of rice-rice crop sequence under different integrated nutrient management treatments

Treatment	Rajendranagar		Chiplima		Jorhat		Maruteru		Bhubneswar		Karjat		Karamana	
	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi / Summer	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
T ₁	1801	1605	2267	2590	2362	1000	3231	1684	2305	2165	3682	3839	2235	1603
T ₂	3073	2309	3378	4161	2737	1250	4280	4239	2965	2870	4520	4830	3317	3108
T ₃	3142	3224	3680	4955	3215	1450	4337	4617	3010	3655	4866	5824	2971	2481
T ₄	3159	3466	4230	4387	3587	1850	4819	4587	3430	3390	5161	4940	3346	1979
T ₅	4576	4086	4565	5081	4537	2437	5697	5197	4005	3700	6068	6320	3202	2536
T ₆	3364	3394	4773	5499	3462	2000	5839	5632	4290	4130	5968	6530	2308	2313
T ₇	3535	2896	4614	5286	3737	2175	5895	5081	4160	3980	5587	5488	2711	3136
T ₈	3176	3185	4402	5252	4012	2137	5357	4820	3930	3920	5223	6384	2726	3456
T ₉	3347	2828	4493	5098	5087	2637	5244	4994	3865	3860	5292	5053	3058	2314
T ₁₀	4508	3964	5040	5665	3325	1950	5669	5197	4370	4090	5725	6468	2106	2648
T ₁₁	4687	3814	4758	5215	3262	1787	5952	5052	4045	3950	5454	5396	2769	2955
T ₁₂	3466	3310	3396	3968	2850	1175	3231	4675	3105	2800	4238	5167	2235	3888
SEm±	167.4	165.8	371.5	396	240	124	156	189	297	274	183	245	-	-
CD at 5%	347	344	770.5	821	489	252	323	393	605	559	374	499	NS	NS

At **Karjat**, the highest yield of rice (6068 kg/ha) was recorded under T5 treatment during *kharif*. Whereas, in *rabi* the highest yield of second crop of rice was recorded under T6 (6530 kg/ha). The highest yielding treatment (T5) was at par with T6 and T 10 during *kharif*, whereas, in *rabi* the highest yielding treatment (T6) was at par with T5, T8 and T10.

At **Karamana**, the highest yield of rice was recorded under T4 (3346 kg/ha) during *kharif* season. Whereas in *rabi* the highest rice yield was recorded under T12 treatment (3888 kg/ha). The highest yielding treatments during *kharif* and *rabi* seasons were not statistically significant over other treatments.

Rice-Wheat Cropping System

At **Varanasi**, in rice-wheat cropping system, the treatment T6 gave maximum yield of rice (5445 kg/ha) and wheat (4185 kg/ha) which was 10.78 and 12.50 per cent higher over recommended dose of fertilizers (T5). The yield under highest yielding treatment (T6) during *kharif* was at par with T7 and T10 whereas during *rabi* T6 treatment was at par with T8.

At **Jammu**, in rice-wheat cropping system, the treatment T6 gave the maximum yield of rice (5174 kg/ha) and wheat (3914 kg/ha) which was 11.29 and 19.29 per cent higher over recommended dose of fertilizers (T5).

At **Kanpur**, the highest yield of rice was recorded under T6 (4515 kg/ha) during *kharif*, and in wheat. T6 gave the maximum yield (4603 kg/ha). Slightly higher yield in rice and wheat (1.34 and 1.72 per cent) was recorded with T6 treatment as compared to recommended dose of fertilizers (T5). The yield under highest yielding treatment (T6) during *kharif* was at par with T5, T7 and T10, whereas, during *rabi* T6 it was at par with T5.

At **Kalyani**, the maximum rice yield was recorded (3222 kg/ha) under T6 which was 4.81 per cent higher over recommended dose of fertilizers and maximum yield of wheat (3644 kg/ha) was under T8, which was 13.55 per cent higher than recommended dose of fertilizers. The yield under highest yielding treatment (T6) during *kharif* was at par with T5, T8 and T11. While in *rabi* season highest yielding treatment (T8) was at par with T6.

At **Jabalpur**, the highest yield of rice was recorded under T10 during both *kharif* and *rabi* seasons (3174 and 3080 kg/ha, respectively). The increase in crop yield under highest yielding treatment (T10) over 100% RDF during *kharif* was 7.30% and it was at par with T5, T6, T7 and T8 whereas during *rabi* T10 it was at par with T5.

At **Faizabad**, maximum yield of rice (5321 kg/ha) was recorded under T6 which was 8.08 per cent higher than recommended dose of fertilizer. The maximum wheat yield (3501 kg/ha) was also recorded under T6 which was 6.21 per cent higher than recommended dose of fertilizers. During *kharif* T6 was statistically at par with T7, T10 and T11. Whereas, during *rabi* T6 was statistically non-significant over other treatments.

At **Navsari**, the highest yields of rice and wheat were recorded under T6 (3497 and 2637 kg/ha, respectively). The increase in crop yield under highest yielding treatment (T6) over 100% RDF was 1.68 and 7.85 per cent, during *kharif* and *rabi* seasons, respectively. The yield under highest yielding treatment during *kharif* T6 was at par with T5, T7, T9, T10 and T11 whereas during *rabi* it was at par with T4, T5, T7 and T10.

At **Palampur**, the rice yield was maximum (5250 kg/ha) under T6 and 7.38 per cent higher than recommended dose of fertilizer and the maximum yield of wheat (1239 kg/ha) was under T11 which was 10.03 per cent higher than recommended

Table 7.3/1 (b): Grain yield (kg/ha) of rice-wheat crop sequence under different integrated nutrient management treatments.

Treatment	Ludhiana		Kanpur		Jabalpur		Jammu		Varanasi		Faizabad	
	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
T ₁	2600	2525	980	622	1126	744	1982	1085	2490	1035	1573	686
T ₂	6058	6558	3188	3066	1870	1643	3744	3047	4145	2605	3244	1855
T ₃	6388	8692	3480	3487	2301	1849	3924	3188	4555	3600	3432	2899
T ₄	8025	8112	3388	3394	2576	2333	4205	2851	4695	3400	4015	2457
T ₅	10793	9375	4455	4525	2958	3051	4649	3281	4915	3720	4923	3296
T ₆	11141	9792	4515	4603	2903	2764	5174	3914	5445	4185	5321	3500
T ₇	11374	9535	4278	4369	2753	2445	5034	3140	5030	3745	5082	3145
T ₈	9392	9275	4144	4259	2876	2672	4250	2844	4505	3870	3813	3255
T ₉	9699	8912	4078	4198	2630	2363	4564	2953	4660	3585	4456	2741
T ₁₀	11641	9569	4363	4444	3174	3080	4533	2929	5025	3660	5026	3239
T ₁₁	11966	9183	4244	4331	2814	2449	4205	3109	4845	3450	5206	3044
T ₁₂	11908	10054	3025	2816	1499	1561	3564	2671	4305	2980	3541	2280
T ₁₃	11642	9930	-	-	-	-	-	-	-	-	-	-
T ₁₄	10816	9458	-	-	-	-	-	-	-	-	-	-
SEm±	736	566	128	48	148	116	116	108	226	158	130	77
CD at 5%	151	1164	262	98	302	236	236	220	459	321	265	156

Table 7.3/1 (c): Grain yield (kg/ha) of rice-wheat crop sequence under different integrated nutrient management treatments.

Treatment	Sabour		Raipur		Kalyani		Navasari	
	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
T ₁	927	771	1312	541	1155	900	1253	1335
T ₂	2421	1927	4354	1864	2043	1856	2542	1229
T ₃	2567	4048	5208	2239	2407	3055	2611	2199
T ₄	3368	3068	6177	2104	2518	2805	2852	2312
T ₅	4551	4200	7010	2725	3074	3209	3439	2445
T ₆	5030	4682	6927	2510	3222	3472	3497	2637
T ₇	4605	4305	6750	2387	2259	3141	3462	2479
T ₈	4789	4465	6073	2325	3027	3644	2875	2219
T ₉	4413	4217	5760	2364	2577	3227	3014	2210
T ₁₀	4927	4602	7023	2779	2481	3186	3304	2291
T ₁₁	4582	4289	6829	2491	2925	2889	3290	2102
T ₁₂	2988	2466	5104	1975	2447	2414	2887	1993
SEM±	203	202	392	162	218	168	249	180
CD at 5%	414	412	814	337	445	343	506	367

Table 7.3/1 (d): Grain yield (kg/ha) of rice-wheat crop sequence under different integrated nutrient management treatment at Pantnagar.

Treatment	Set (1)					Set (2)						
	P0	P40	Mean	P0	P40	Mean	P0	P60	Mean	P0	P60	Mean
T ₁	850	2250	1550	1600	1700	1650	2150	2600	2375	1800	2300	2050
T ₂	2550	2900	2725	2300	2700	2500	2200	3350	2775	2800	2800	2800
T ₃	3250	3650	3450	2900	2500	2700	3050	4150	3600	2700	2900	2800
T ₄	3250	400	3625	3000	2700	2850	2970	4400	3685	3100	3200	3150
T ₅	3600	4550	4075	3000	2700	2850	3150	4650	3900	3900	3600	3750
T ₆	3550	4950	4250	3600	3950	3775	3850	5400	4625	2900	4050	3475
T ₇	3720	5550	4635	3800	4500	4150	4150	5850	5000	3500	5050	4275
T ₈	3500	5300	4400	3000	4300	3650	4300	5770	5035	3500	5250	4375
T ₉	4000	5250	4625	3200	4400	3800	3800	5750	4775	3100	4500	3800
T ₁₀	3400	5400	4400	3850	4500	4175	4100	5900	5000	3600	4850	4225
T ₁₁	3500	5400	4450	3500	4200	3850	3660	6120	4890	3200	4700	3950
T ₁₂	3300	4300	3800	2700	3900	3300	3100	4850	3975	2700	4100	3400
T marginal means		298.14	656.2		325.26	715.9	S.E(d), CD at 5%					
P marginal means		136.55	297.51		158.44	345.22		327.54	720.91		469.16	1032.62
T means at same level of P		473.01	NS		548.86	NS		282.36	615.2		469.93	NS
P means at same level of T		448.06	NS		506.38	NS		383.6	841.98		574.92	NS
General means			3832.08			3308.33			4136.25			3504.17
C.V. (%)			MP-11.0026			MP-13.9040			MP-11.1989			MP-18.9345
C.V. (%)			SP-12.3435			SP-16.5903			SP-6.8264			SP-13.4106

dose of fertilizers. During *kharif* T3, T7, T10 and T11 were statistically at par with T6.

At **Sabour**, the maximum (5030 kg/ha) rice yield was recorded under T6 which was 10.52 per cent higher over recommended dose of fertilizer and maximum yield of wheat (4682 kg/ha) was recorded under T6 which was 11.47 per cent higher than recommended dose of fertilizers. The yield under highest yielding treatment during *kharif* was at par with T8 and T10, whereas, during *rabi* T6 was at par with T7, T8 and T10.

At **Raipur**, the highest yields of rice and wheat were recorded under T10 (7023 kg/ha) and (2779 kg/ha) during *kharif* and *rabi*, respectively. The increase in crop yield under highest yielding treatments over 100% RDF during both the seasons were meagre. The yield under highest yielding treatment during *kharif* was at par with T5, T6, T7 and T11, whereas during *rabi* T10 treatment was at par with T5, T6 and T11.

At **Pant Nagar**, the grain yield of rice and wheat were influenced significantly under IPNS and phosphorus levels. Whereas, the interaction between IPNS and phosphorus levels exhibited non-significant effect during both the seasons. The maximum rice yield was recorded under T7 and P40 (5550 kg/ha) during *kharif*. The mean data also revealed highest rice grain yield under T7 and P40 (4635 kg/ha). During *rabi* season the interaction effect of IPNS and P40 gave maximum wheat yield under T7 (4500 kg/ha). The mean interaction effect of IPNS and P40 had produced maximum wheat yield under T10 (4175 kg/ha).

In another set of experiment, the interaction effect of IPNS and P40 revealed T11 and P60 had produced the maximum rice yield (6120/ha) during *kharif* season. Whereas, in *rabi* season the

maximum wheat yield was recorded under T8 and P60 (5250 kg/ha). Mean data of interaction effect gave the highest rice yield with T8 and P60 (5035 kg/ha) and same trend was also observed for wheat grain yield (4375 kg/ha).

Rice-Maize Cropping System

At **Kathalgere**, in rice-maize cropping system the treatment T9 yielded maximum (7149 kg/ha) rice yield during *kharif*, which was 9.88 per cent higher over RDF. During summer T6 treatment (100% recommended NPK dose through fertilizers) gave the highest grain yield (5143 kg/ha) of hybrid maize during *rabi*, which was 16.01 per cent higher over RDF. The yield under highest yielding treatment during *kharif* T9 was at par with T1 and T12. Whereas, during *rabi* it was at par with T7.

Table 7.3/2 (d): Grain yield (kg/ha) of rice-maize crop sequence under different integrated nutrient management treatments

Treatment	Kathalgere	
	<i>Kharif</i>	<i>Rabi</i>
T ₁	4101	1314
T ₂	6213	3639
T ₃	6287	4412
T ₄	6469	3823
T ₅	6506	4433
T ₆	6250	5143
T ₇	6396	4556
T ₈	6798	3901
T ₉	7149	3774
T ₁₀	6308	3616
T ₁₁	6360	4010
T ₁₂	5694	3232
SEm±	483	317
CDat 5%	982	645

Rice-Mustard Cropping System

At **Rudrur**, the rice-mustard system, the treatment T₁₁ (75% recommended NPK dose through fertilizers+ 25% N through GM) yielded maximum of rice during *kharif* (6430 kg/ha), which was 8.98 per cent higher than RDF (T₅) while in *rabi* the same treatment gave highest (935 kg/ha) yield of mustard, which was 10 per cent higher than RDF (T₅).

Table 7.3/2 (e): Grain yield (kg/ha) of rice-mustard crop sequence under different integrated nutrient management treatments

Treatment	Rudrur	
	<i>Kharif</i>	<i>Rabi</i>
T ₁	2820	498
T ₂	4000	540
T ₃	4210	660
T ₄	5610	610
T ₅	5900	850
T ₆	5560	820
T ₇	6320	894
T ₈	5420	916
T ₉	6170	849
T ₁₀	5725	885
T ₁₁	6430	935
T ₁₂	5280	698
SEm±	88	10
CDat 5%	183	21

Maize-Wheat Cropping System

At **Kanke (Ranchi)**, in maize-wheat cropping system, the treatment T₆ yielded the maximum (3240 kg/ha) maize during *kharif* season which was 15.30 per cent higher than RDF (T₅). While in *rabi* T₆ treatment gave the highest (4128 kg/ha) yield of wheat grain, which was 4.21 per cent higher

as compared to RDF (T₅). The highest yielding treatment (T₆) was found at par with T₅ and T₇ during *kharif* as well as *rabi* season.

Table 7.3/2 (f): Grain yield (kg/ha) of maize-wheat crop sequence under different integrated nutrient management treatments

Treatment	Ranchi	
	<i>Kharif</i>	<i>Rabi</i>
T ₁	586	674
T ₂	1603	2571
T ₃	1977	3495
T ₄	2031	3404
T ₅	2810	3961
T ₆	3240	4128
T ₇	3019	3878
T ₈	2687	3703
T ₉	2087	3462
T ₁₀	2622	3753
T ₁₁	2248	3046
T ₁₂	739	1082
SEm±	192	370
CDat 5%	399	768

Pearl millet-Wheat Cropping System

At **S.K.Nagar**, the highest grain yield of pearl millet was recorded under T₆ (1607 kg/ha) during *kharif* season and wheat yield was also recorded to be the highest (3731 kg/ha) under the same treatment (T₆) during *rabi*. The increase in pearl millet yield under highest yielding treatment (50% recommended NPK dose through fertilizers + 50% N through FYM) over 100% RDF (T₅) was 74.48 per cent. Whereas, in wheat the highest yielding treatment had produced 62.78 per cent higher grain yield over RDF treatment. The yield under highest yielding treatment during *kharif* (T₆) was at par with T₇, T₁₀ and T₁₁. Whereas, during *rabi* T₆ was at par with T₇ and T₁₀.

Table 7.3/1 (g): Grain yield (kg/ha) of pearl-millet-wheat crop sequence under different integrated nutrient management treatments.

Treatment	S.K. Nagar			Junagadh (P)			Junagadh (WP)			Hisar		Bichpuri		
	Kharif	Rabi		Kharif	Rabi		Kharif	Rabi		Kharif	Rabi	Kharif	Rabi	
T ₁	44	102		1073	1490		901	1152		731	893	1100	1035	
T ₂	540	936		1999	2580		1823	2087		1397	2858	1511	2605	
T ₃	567	1183		1991	2476		1913	2498		1489	4030	1631	3600	
T ₄	666	1477		2058	2802		2117	2415		1931	3665	2001	3400	
T ₅	921	2292		2287	2908		2374	2654		2309	4265	2441	3720	
T ₆	1607	3731		2730	3533		2793	3336		2327	4305	2836	4185	
T ₇	1589	3424		2525	3148		2417	2982		2218	3797	2430	3745	
T ₈	1441	3370		2644	3347		2456	2869		1863	4066	2206	3870	
T ₉	1349	3171		2415	3184		2358	2715		1997	3687	2115	3585	
T ₁₀	1493	3462		2553	3278		2380	2597		2199	4350	2709	3660	
T ₁₁	1455	3258		2434	3049		2270	2542		2150	3757	2420	3450	
T ₁₂	558	1444		2327	2895		2007	2477		2109	3992	1491	2980	
SEM±	75	138		219	185		226	250		156	108	54	158	
CD at 5%	153	280		445	375		459	509		318	221	109	322	

At **Junagadh** (with Potash), the highest yield of pearl millet and wheat were attained under T6 treatment (2730 and 3533 kg/ha, respectively). The increase in crop yield under highest yielding treatment (50% recommended NPK dose through fertilizers+ 50% N through FYM) over 100% RDF was 19.37 and 21.49 per cent, during *kharif* and *rabi* seasons, respectively. The yield under highest yielding treatment during *kharif* was at par with most of the cases except from T1 to T4 treatments. Whereas, during *rabi* it was at par with T8, T9 and T10.

At **Junagadh** (without Potash), the highest yields were attended in pearl millet (2793 kg/ha) and wheat (3336 kg/ha) under T6. The increase in yields under highest yielding treatment over 100% RDF were 17.64 and 25.69% during *kharif* and *rabi* seasons, respectively. During *kharif* the crop yield was statistically at par with T5, T7, T8 and T9 and T10. Whereas, in *rabi* season T6 treatment was statistically at par with T7 and T8 treatments.

At **Hisar**, in pearl millet-wheat system, the treatment T6 gave the maximum yield of pearl millet (2327kg/ha) and wheat (4305 kg/ha). However, these yields were not increased significantly as compared to 100% recommended dose of NPK through fertilizers. The yield under highest yielding treatment (T6) during *kharif* season was at par with T5, T7, T10, T11 and T12. Whereas, in *rabi* T6 treatment was at par with T5 and T10 treatments.

At **Bichpuri**, in pearl millet – wheat cropping system, the treatment T6 gave the maximum yield of pearl millet (2836 kg/ha) and wheat (4185 kg/ha) which were 16.18 and 12.50 per cent higher over 100% recommended dose of NPK through fertilizers (T5). The yield under highest yielding treatment during *rabi* was at par with T8. But during *kharif* various IPNS packages had significant effect on crop yield.

Sorghum-Wheat Cropping System

At **Akola**, the grain yield of both crops was influenced significantly after the application of recommended dose of NPK (120:60:60 kg/ha). All the fertility treatments were found significant over control treatment where no fertilizer and no organic manure were applied. The grain yield of sorghum achieved highest where 100% recommended dose of NPK through fertilizers was applied. Similar, dose of N, P and K was used in succeeding wheat crop during *rabi* season (100% recommended NPK dose through fertilizers) gave the positive response up to T5 treatment and there after yield of both crops were declined. The next best treatment in respect of sorghum grain yield was observed T10 where 50% recommended NPK dose supplied through fertilizers + 50% N through GM (green manuring). Whereas, the wheat grain yield under sorghum-wheat cropping system was recorded maximum (3448 kg/ha) where 100% recommended NPK dose through fertilizers (T6) followed by (T3) treatment where 100% recommended NPK dose through fertilizers.

At **Rahuri**, the maximum grain yield of sorghum (4684 kg/ha) was produced by T6 treatment which had 100% recommended dose of NPK fertilizers followed by T5 treatment (4533 kg/ha). However, it was at par with T5 treatment where 50% recommended NPK dose supplied through fertilizers+ 50% N through FYM. The similar results were also obtained in wheat crop. However, the maximum grain yield (4010 kg/ha) was recorded under T-6 treatment which produced 9.98% higher than RDF (T5). During *kharif* season T6 treatment was found statistically at par with T5, T7 and T10, respectively. Whereas, in *rabi* season various IPNS packages exerted significant effect on wheat crop yield.

At **Parbhani**, the grain yield of sorghum in sorghum – wheat cropping system was recorded highest

Table 7.3/1 (h). Grain yield (kg/ha) of sorghum-wheat crop sequence under different integrated nutrient management treatments

Treatment	Akola		Rahuri		Parbhani	
	<i>Kharif</i>	<i>Rabi</i>	<i>Kharif</i>	<i>Rabi</i>	<i>Kharif</i>	<i>Rabi</i>
T ₁	580	775	171	529	293	319
T ₂	2183	2710	2281	2887	1780	1883
T ₃	2397	3143	3898	3378	1970	2006
T ₄	2457	2705	3729	3060	2238	2227
T ₅	2724	3205	4423	3646	2701	2690
T ₆	2600	3448	4684	4010	2762	2737
T ₇	2507	2758	4533	3459	2392	2428
T ₈	2562	3079	3266	3280	2299	2279
T ₉	2493	2633	4261	3246	1970	2027
T ₁₀	2703	2713	4476	3552	2593	2603
T ₁₁	2589	3118	4353	3479	1816	1862
T ₁₂	2119	2162	2438	2414	1646	1692
T ₁₃					2227	2325
T ₁₄					2562	2603
SEm±	254	327	336	174	123	93
CD at 5%	517	666	684	353	252	191

(2762 kg/ha) under T₆ treatment (50% recommended NPK dose through fertilizers+50% N through FYM) and closely followed by T₅ treatment (100% recommended NPK dose through fertilizers), i.e. (2701 kg/ha). Whereas, the maximum wheat grain yield was recorded under same treatment (T₆), i.e. (2737 kg/ha) and

followed by T₅ treatment (2690 kg/ha). During kharif season, T₂ and T₃, T₅ and T₆, T₇ and T₈ and T₁₁ and T₁₂ treatments were remained statistically at par with each other order to sorghum grain yield. Similar trend was also observed in case of wheat grain yield during rabi season.

7.3.2 LONG-TERM FERTILIZER APPLICATION

Title of the experiment: Long range effect of continuous cropping and manuring on soil fertility and yield stability (Expt. No.2b)

Objectives:

To study the long range effects of graded fertilizer levels on yield stability and soil fertility under cereal – cereal cropping with high yielding varieties.

Year of start: 1977-78

Treatments:

Eighteen combinations of 3 levels of N (40, 80 and 120 kg ha⁻¹), 3 levels of P₂O₅ ha⁻¹ (0, 40 and 80 kg ha⁻¹) and two levels of K₂O (0 and 40 kg ha⁻¹) with one absolute control plot in each block.

Locations:

Crop Sequence	Ecosystem/center
Rice-wheat	Semi-Arid/ Faizabad, Rewa
Maize-wheat	Arid/Siruguppa, Sub-Humid/Kanke

Results:

The centre –wise results are presented in table 7.3/2 (a-d) and their brief description is given below.

Rice-Wheat Cropping System

In rice-wheat cropping system, the graded levels of N up to 120 kg/ha gave significantly higher rice grain yield, the highest being 3.00 and 5.74 t/ha at Faizabad and Rewa, respectively. The same was also true with the highest dose of P (80 kg P₂O₅/ha) where rice yields were 2.99 and 5.67 t/ha at Faizabad and Rewa. The highest rice yield were 2.52 and 5.44 t/ha with the application of K₂O (40 kg/ha) at Faizabad and Rewa. During *rabi*, at Faizabad, the highest dose of N, P and K gave yield levels of wheat 1.88, 2.48 and 1.67 t/ha and at Rewa 4.08, 3.88 and 3.48 t/ha, respectively. At Faizabad the interaction effects of N, P, K and NP were highly significant in *Kharif* and *rabi*. N, P, K and NP were also highly significant. Whereas, at Rewa the interaction effects of NPK was significant in *Kharif* and *rabi* seasons.

Maize-Wheat Cropping System

In maize-wheat system the graded levels of N, P and K at the highest level gave the maximum yield during both *Kharif* and *rabi* seasons at Kanke. Whereas, the yield data of maize- wheat system at Siruguppa not provided for both the seasons. The test varieties of maize and wheat were 'M-9000' and 'DWR-162'. The yield levels of maize were 1.71, 2.45 and 1.74 t/ha at Kanke with the highest levels of N, P and K tried (120, 80 and 40 kg /ha) during *Kharif* season. Whereas, at Kanke the corresponding values of wheat yield were 3.31, 3.81 and 2.91 t/ha with the application of highest levels of N, P and K.

Table 7.3/2(a): Average yield (kg/ha) of crops in different crop rotations as affected by different levels of N,P and K fertilizers during 2011-12.

Crop sequence / Centre	Variety	Av. yield of unfertilized plot	Av. yield with N (kg/ha)			Av. yield with P ₂ O ₅ (kg/ha)			Av. yield with K ₂ O (kg/ha)			S.E.(d) C.D. (5%)	C.V (%)	G.M. (%)	Remarks				
			40	80	120	0	40	80	0	40	80								
			3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		
RICE – WHEAT																			
Faizabad	Sarjoo-52	950	Kharif - Rice														2183	5	(N _i ,P,K,NP) ^{**} , NK
			1686	2475	3003	34	7693	2486	2985	34	2254	2522	28	(56)					
						(69)				(69)									
Rewa	HUW-234	540	Rabi - Wheat														1425	13	(N _i ,P,K,NP) ^{**}
			1261	2581	875	56	243	1995	2479	56	1478	1667	46	(92)					
						(113)				(113)									
Kanke	WGL-32100	3202															5024	7	(N _i ,P,K) ^{**}
			4920	5318	5742	101	4893	5414	5674	101	5217	5437	82	(173)					
						(212)				(212)									
MAIZE – WHEAT																			
Kanke	Suwan	414	Kharif - Maize(R)														1412	14	(N _i ,P,K,NP, NK) ^{**} P
			1364	1659	1713	62	819	1466	2451	62	1414	1743	51	(101)					
						(124)				(124)									
Kanke	K-9107	549	Rabi - Wheat(I)														2503	17	(N _i ,PNP) ^{**}
			2236	2951	3297	131	1165	3507	3813	131	2749	2908	107	(288)					
						(288)				(288)									

Note : Data not received of experiment Karamana (Kharif & Rabi) and Siruguppa (Kharif & Rabi).

Summary: Following treatments are significant. Karamana (Kharif) NIL Rewa (Kharif) (N,P,K)** Siruguppa (Kharif) NIL Karamana(Rabi) NIL, Rewa (Rabi) (N,P,K)** NP* Siruguppa (Rabi) (N,P,K)** NP* Faizabad (Kharif) (N,P,K,NP)** Kanke (Kharif) (N,P,K,NP)** Faizabad (Rabi) (N,P,K,NP)** Kanke (Rabi) (N,P,NP)** K*

Table 7.3/2(b): Average yield (kg/ha) as affected by N and P interaction (2012-13)

Crop sequence/ Centre	Levels of P ₂ O ₅ (kg/ha)	Average yield with N application (kg/ha)			CD at 5%
		40	80	120	
RICE-WHEAT					
Rabi - Wheat (I)					
Faizabad	0	299	252	219	209
	40	1572	1897	2454	
	120	1957	2532	2969	
MAIZE-WHEAT					
Kharif - Maize (R)					
Kanke	0	904	918	633	230
	40	1151	1659	1582	
	80	2060	2412	2890	
Rabi - Wheat (I)					
Kanke	0	1052	1254	1130	487
	40	2634	3657	4280	
	80	3058	3978	4412	

Table 7.3/2(c): Average yield (kg/ha) as affected by P and K interaction (2012-13)

Crop sequence/ Centre	Levels of K ₂ O (kg/ha)	P ₂ O ₅ (kg/ha)			CD at 5%
		0	40	120	
MAIZE-WHEAT					
Kharif - Maize (R)					
Kanke	0	753	1213	2277	176
	40	886	1718	2625	

Table 7.3/2(d): Average yield (kg/ha) as affected by N and K interaction (2012-13)

Crop sequence/ Centre	Levels of P ₂ O ₅ (kg/ha)	Average yield with N application (kg/ha)			CD at 5%
		40	80	120	
RICE-WHEAT					
Kharif - Rice (I)					
Faizabad	0	1566	1380	2816	97
	40	1805	2570	3189	
MAIZE-WHEAT					
Kharif - Maize (R)					
Kanke	0	1287	1533	1423	176
	40	1440	1785	2004	

7.3.3 DEVELOPMENT OF ORGANIC FARMING PACKAGE

Title of the Experiment: Development of organic farming packages in system based high value crops.

Objectives:

- i. To develop organic nutrient management packages for system-based high value crops
- ii. To recycle farm waste to value added compost
- iii. To monitor soil health and crop quality and also to develop holistic approach for nutrient, pest and disease management as well as moisture conservation

Year of start: 2003-04

Treatments:

- T₁: 50% recommended NPK + Zn + S as per soil test + 50% N as FYM
- T₂: 100% organic nutrient sources as FYM, vermi compost and neem oil cake each equivalent to 1/3 of recommended N doses of crops
- T₃: T₂ + intercropping / Trap Cropping
- T₄: T₂ + agronomic practices for weed and pest control
- T₅: 50% N as FYM + seed treatment with Azotacter and PSB + rock phosphate.
- T₆: T₂ + Azospirillum & phosphate solubilizing bacteria (PSB)
- T₇: 100% NPK + Zn + S based on soil test

Results:

The centre wise results are presented in table 7.3/3 (a-d) and their brief description is given below.

Rice-based cropping systems

Chiplima

At Chiplima, highest yield of rice (5.03 t ha⁻¹) and tomato (161.39 t ha⁻¹) were recorded under treatment T₆ which received 1/3 N each in the form of FYM, vermi-compost (VC), neem oil cake (NOC) and bio-fertilizers containing N and P carriers. The present increase in crop yield under this treatment was 10% and 7%, respectively for rice and tomato over RDF (T₇). During summer season, highest lady's finger yield (5.91 t ha⁻¹) was achieved under recommended dose of fertilizer and micro and secondary nutrients as per soil (T₇) test in rice-tomato-lady's finger system.

Karjat

At Karjat, in rice-maize system, highest grain yield of rice and maize were recorded under RDF (4.31 and 9.50 t ha⁻¹, respectively. Among organic nutrient management packages, treatment T₄ recorded highest crop yields of 3.43 and 4.42 t ha⁻¹, respectively, during *kharif* and *rabi* seasons.

Navsari

At Navsari, in rice-fallow-groundnut system, highest grain yield of rice (4.09 t ha⁻¹) was recorded under RDF during *kharif* whereas during summer highest groundnut yield (1.87 t ha⁻¹) was recorded under T₁. The organic nutrient management package receiving 1/3 N as FYM, VC and NOC each recorded highest yield among organic nutrient management packages. Yield increase in groundnut under this treatment was 23% compared to RDF with a yield level of 1.52 t ha⁻¹.

Raipur

At Raipur, in rice-potato-onion system, highest grain yield of rice during *kharif* was recorded to be

Table 7.3/3 (a): Effect of organic nutrient management packages on crop yield (kg ha⁻¹) in rice based cropping systems 2012-13

Treatment	Crop season	Jorhat Rice- Tomato- Chickpea	Karnama		Rewa		Siruguppa		Maruteru		Bhubaneswar		Kalyani
			Rice- Cucumber- Okra	Rice-Wheat+ Maize- Fallow	Rice- Fallow- Sesame	Rice- Rice	Rice- Potato- Okra	Rice- Potato- Groundnut					
T1	Kharif	2055	5094	3421	3024	4814	4715	2034					
	Rabi	325	13699	3519	0	5353	13320	14542					
	Summer	328	6528	0	0	0	6365	1593					
T2	Kharif	2120	5078	2620	2554	4330	4482	1653					
	Rabi	329	10340	2097	0	4195	12020	11921					
	Summer	386	6489	0	0	0	6260	1361					
T3	Kharif	4110	4950	2809	2440	4247	4845	1873					
	Rabi	430+	9273	1997	0	4272	12658	15272					
		1100*	0	486	0	0	0	0					
		400+	6588	0	0	0	6453	2763					
	Summer	1200**	0	0	0	0	0	0					
T4	Kharif	2062	5300	2739	2491	4017	4588	1792					
	Rabi	322	11156	2215	0	4021	11918	11396					
	Summer	419	6543	0	0	0	6290	1652					
T5	Kharif	1857	5180	2858	2546	3939	4567	1769					
	Rabi	237	12475	1924	0	4073	13098	10650					
	Summer	353	6181	0	0	0	6668	1424					
T6	Kharif	1779	5133	2937	2675	4213	5217	1662					
	Rabi	225	12596	2170	0	4299	15143	11602					
	Summer	318	5863	0	0	0	7585	1547					
T7	Kharif	1853	5357	3513	3145	4902	4520	1664					
	Rabi	295	13764	4119	0	5402	12658	17962					
	Summer	446.4	6225	0	0	0	6142	1676					

(6.73 t ha⁻¹) under T3. Rice yield under this treatment increased by 2% over RDF. During *rabi* season, the highest potato yield (131.5 t ha⁻¹) was recorded under T1, i.e., integrated nutrient management package (IPNS) with a yield increased of 81% over RDF.

Sabour

At Sabour, in rice-potato-onion system, highest rice yield was recorded under T7 (RDF) at 4.90 t ha⁻¹ whereas during *rabi* and summer seasons, highest tuber yield of potato (24.23 t ha⁻¹) and onion were recorded and (13.0 t ha⁻¹) under treatment T1 (IPNS). The increase in crop yields under this treatment was 3% and 1% respectively, compared to crop yields under RDF.

Jabalpur

At Jabalpur, in rice-potato-fallow system, highest grain yield of rice (3.95 t ha⁻¹) and potato (147.63 t ha⁻¹) were recorded under T7 (RDF) during *kharif* and *rabi* seasons, respectively. Among organic treatments, T4 which received FYM+VC+NOC each equivalent to 1/3 N requirement of crops and agronomic management packages for weed and pest control, recorded the highest crop yield (3.14 and 98.54 t ha⁻¹) with yield reduction of 21 and 33%, respectively, compared to crop yields under RDF.

Chatha

At Chatha, in rice-potato-onion system, highest yields of rice and potato were recorded under T6 (2.91 and 10.63 t ha⁻¹) during *kharif* and *rabi* seasons, respectively. The yield increase in these crops over RDF was 4 and 22%, respectively. During summer season highest tuber yield of onion was recorded under RDF 33.42 t ha⁻¹ being at par with T2 at (33.38 t ha⁻¹).

Jorhat

At Jorhat, in rice-toria-chickpea system, highest grain yield of rice was recorded under T7 (4.11 t ha⁻¹) with inter crop yield of 0.43 t ha⁻¹. During *rabi* season highest toria yield was recorded under T2 (0.329 t ha⁻¹). Increase in crop yield under these

two treatments was 12 and 122%, respectively, over T7. During summer season, however, highest grain yield of chickpea was recorded under T7 at (0.45 t ha⁻¹) being almost at par with T4 under organic nutrient management package (0.42 t ha⁻¹).

Karmana

At Karmana, in rice-cucumber-lady's finger system, highest crop of rice (5.65 t ha⁻¹) and cucumber (14.95 t ha⁻¹) was recorded under T7. Among organic nutrient management packages, treatment T4 was higher yielder (5.30 t ha⁻¹) which was at par with T7. Cucumber yield under organic nutrient management package (125.96 t ha⁻¹) was at par with T6 but 9% yield reduction over T7.

Rewa

At Rewa, in rice-wheat system, highest yields of rice (3.51 t ha⁻¹) and wheat (4.20 t ha⁻¹) were recorded under T7. The lowest yield reduction in rice 16% was recorded under organic nutrient management package (T6) and wheat yield reduction was the lowest under T4 (46%).

Siruguppa

At Siruguppa, in rice-fallow sesame system, highest rice yield was recorded under T7 (3.15 t ha⁻¹). The yield (2.45 to 2.68 t ha⁻¹) under T6 (2.68 t ha⁻¹).

Maruteru

At Maruteru, in rice-rice system, highest rice yield, during both *kharif* and *rabi* seasons, was recorded at 4.90 and 5.40 t ha⁻¹, respectively, under T7. Among organic nutrient management package, T6 was superior in attaining highest rice yield (4.20 and 4.30 t ha⁻¹) respectively, with a corresponding yield reduction of 14 and 20% over T7 (RDF).

Bhubaneswar

At Bhubaneswar, in rice-potato-lady's finger system, highest yield of rice and potato were recorded under T6 and T5 (22.00 and 151.43 t

Table 7.3/3 (b): Effect of organic nutrient management packages on crop yield (kg ha⁻¹) in rice based cropping systems 2012-13

Treatment	Crop season	Chiplima	Karjat	Navsari	Raipur	Sabour	Jabalpur	Chatha
		Rice-Tomato-Lady's finger	Rice-Maize	Rice-Fallow-Groundnut				
T1	Kharif	4454	3882	3993	6658	4860	3647	2770
	Rabi	14772	7309	1841	13146	24232	13126	8205
	Summer	5819	0	0	0	13088	0	3190
T2	Kharif	4535	3265	3767	6291	4591	2999	2890
	Rabi	14702	4196	1872	9459	22861	9557	9772
	Summer	5694	0	0	0	11873	0	3338
T3	Kharif	4631	3334	3756	6730	4459	3098	2843
	Rabi	14870	4295	1696	10760	21820+	9319.97+	9666
	Summer	0	0	0	0	6570*	512	0
T4	Kharif	5593	0	0	0	9900+	0	3041
	Rabi	0	0	0	0	6250**	0	0
	Summer	4702	3428	3506	6431	4692	3139	2848
T5	Kharif	15249	4418	1589	9708	23576	9854	10072
	Rabi	5856	0	0	0	12163	0	3008
	Summer	4700	3173	3382	6097	4341	2916	2802
T6	Kharif	14740	4045	1510	5833	20318	9632	8884
	Rabi	5825	0	0	0	10576	0	2803
	Summer	5030	3400	3908	6532	4688	2908	2908
T7	Kharif	16139	4363	1561	9813	23236	9654	10629
	Rabi	6666	0	0	0	12172	0	3098
	Summer	4560	4307	4089	6682	4901	3950	2805
	Kharif	15134	9496	1519	12219	23445	14763	8734
	Rabi	5907	0	0	0	13005	0	3342
	Summer							

ha⁻¹, respectively) during *kharif* and *rabi* seasons. Increase in crop yield in this treatment over T7 was 15 and 20%, respectively. During summer season highest lady's finger yield was recorded under T5 (6.67 t ha⁻¹) with 12 % yield increase over T7.

Kalyani

At Kalyani, in rice-potato-groundnut system, highest grain yield of rice was recorded under T1 (IPNS) at 2.03 t ha⁻¹. Potato yield was highest (17.96 t ha⁻¹) under T7 and groundnut yield under T3 (2.76 t ha⁻¹) compared to 1.68 t ha⁻¹ under T7.

Maize based cropping systems

Kathalgere

At Kathalgere, in maize-fallow-groundnut system, highest yield of maize (5.32 t ha⁻¹) was recorded under recommended doses of fertilizers (T7) during *kharif* whereas during summer season, highest groundnut yield was recorded under T1 (integrated nutrient management packages). Among organic treatments, T6 recorded the highest yield with yield reduction of maize and groundnut to the extent of 13 and 3% over T7 (RDF).

Rajendranagar

At Rajendranagar, in maize-onion-fallow system, highest maize yield (4.68 t ha⁻¹) was recorded under T7 during *kharif* but during *rabi*, highest onion yield (13.6 t ha⁻¹) was recorded under T7. As per yield performance of organic nutrient management packages is concerned, the treatment T4, which received organic sources of nutrients and inter crops, inter cropped maize produced total grain yield of 4.64 t ha⁻¹ during *kharif* whereas during *rabi*, the yield of main crop (onion) and inter crop were 95.25 and 4.8 t ha⁻¹, respectively.

Thanjavur

At Thanjavur, in maize-rice-green gram system, highest crop yield was recorded under integrated nutrient management package (T1) in all crops namely, maize, rice and green gram (5.22, 5.34 and 1.02 t ha⁻¹) compared to respective crop yields

at 3.94, 4.30 and 0.76 t ha⁻¹ under T7. The increase in yield during *kharif*, *rabi* and summer was 33, 24, and 33%, respectively. However, among organic treatments, T6 recorded 11% higher crop yield and during summer T2 recorded 19% higher yield over RDF.

Indore

At Indore, in maize-potato-onion system, the highest crop yields during *kharif* and *rabi* seasons were 0.93 and 3.94 t ha⁻¹, respectively. The yield of summer crop (onion) was not reported.

Kumarganj

In maize-potato-onion system at Kumarganj, maize yield was the highest (3.42 t ha⁻¹) under RDF whereas, potato and onion yields were highest under organic nutrient management packages of T2 (12.25 t ha⁻¹) and T4 (10.18 t ha⁻¹).

Ludhiana

At Ludhiana, in maize-potato-onion system, maize and potato yields were highest under organic nutrient management package which received organics in the form of FYM, VC and NEOC and inter cropping (T3) with yield levels of 5.90 and 22.58 t ha⁻¹ whereas, onion yield was the highest (23.33 t ha⁻¹) under T1.

Kanpur

At Kanpur, in maize-potato-onion system, highest cob yield of maize (77311 nos.) was recorded under T3, whereas, potato yield was the highest at (77.21 t ha⁻¹) under T6, Onion crop failed.

Miscellaneous Cropping Systems

Coimbatore

At Coimbatore, in chilly-chickpea baby corn system, the highest green chilly yield of 8.67 t ha⁻¹ was recorded under T3, the organic nutrient management package receiving 1/3 each of crop requirement N as FYM, VC and NEOC intercropping. During *rabi* season also the highest

Table 7.3/3 (c): Effect of organic nutrient management packages on crop yield in maize based cropping systems 2012-13

Treatment	Crop season	Kathalagere	Rajendra Nagar	Thanjavur	Indore	Kumarganj	Ludhiana	Kanpur
		Maize- Fallow- Groundnut	Maize- Onion- Fallow	Maize- Rice- Greengram	Maize- Potato- Onion	Maize- Potato- Onion	Maize- Potato- Onion	Maize- Potato- Onion
T1	<i>Kharif</i> <i>Rabi</i> Summer	4609 1340 0	4412 12760 0	5222 5341 1020	731 2379 0	3256 18218 8968	5829 23893 23333	76073 23530 0
T2	<i>Kharif</i> <i>Rabi</i> Summer	3897 1269 0	3901 12903 0	4670 4819 909	133 1742 0	3198 19256 9944	5613 22457 21991	74411 18987 0
T3	<i>Kharif</i> <i>Rabi</i> Summer	4399 0 1195.2	3455+ 1186* 9525.3+	4595 174 4763	113 0 1616	3000 0 15578	5900 N.R. 42582	77311 232 21798
	<i>Rabi</i> Summer	0 0 0	4800** 0 0	0 860 0	0 0 0	0 8346 0	N.R. 20256 410***+56***	1166 0 0
T4	<i>Kharif</i> <i>Rabi</i> Summer	3718 1170 0	3800 12468 0	4482 4775 856	110 1597 0	3365 18675 10148	5600 22225 22237	74666 17570 75484
T5	<i>Kharif</i> <i>Rabi</i> Summer	3583 1197 0	3401 11179 0	3950 4196 627	121 1514 0	2577 16520 8470	3997 14959 13297	20111 75096 0
T6	<i>Kharif</i> <i>Rabi</i> Summer	4648 1332 0	3873 12284 0	4464 4778 858	206 1654 0	3202 18569 10122	5736 23004 22243	19813 77212 0
T7	<i>Kharif</i> <i>Rabi</i> Summer	5321 1291 0	4683 13677 0	3941 4303 765	931 3935 0	3420 17612 9598	4861 20145 18987	24667 0 74460

Table 7.3/3 (d). Effect of organic farming packages on crop yield in miscellaneous cropping systems (2012-12).

Treatment	Season	Coimbatore	Durgapura	Kota	Palampur	Parbhani	Powerkheda
		Chilly- Chickpea- Baby corn	Groundnut- Onion- Fallow	Chickpea- Coriander	Baby corn- Chinese cabbage- Onion	Soybean- Onion- Fallow	Soybean- Wheat- Fallow
T1	Kharif	8462	1083	1639.	2427	2263	1402
	Rabi	1029	15511	2417	9911	21399	3963
	Summer	0	0	0	29680	0	0
T2	Kharif	8559	1067	1571	1805	1954	1193
	Rabi	1013	14488	2368	7702	15535	2847
	Summer	0	0	0	25321	0	0
T3	Kharif	8671	1213+	1778+	1778	1749+	1186
		0	296*	1041	0	1060*	0
	Rabi	950	15430	4891+	8939	16975	2817
	Summer	0	0	362	0	0	0
		0	0	0	23722	0	0
		0	0	0	0	0	0
T4	Kharif	8233	1167	1644	1445	2366.26*	1188
	Rabi	1043	16416	2426	7972	17078	2833
	Summer	0	0	0	22699	0	0
T5	Kharif	7111	1048	1464	1591	1748	1134
	Rabi	902	14316	2213	889	13580	2704
	Summer	0	0	0	26116	0	0
T6	Kharif	7961	1140	1533	1912	2263	1169
	Rabi	948	15471	2292	7739	17181	2724
	Summer	0	0	0	25167	0	0
T7	Kharif	7633	1219	1603	1916	2572	1573
	Rabi	1032	17875	2409	4724	23251	4686
	Summer	0	0	0	2189	0	0

Table 7.3/3 (e). Effect of organic farming packages on crop yield in miscellaneous cropping systems (2012-12).

Treat	Seasons	Akola	S.K.Nagar	Bichpuri	Rudur	Hissar
		Sweet corn- Rajmash- Onion	Green manure- Potato- Onion	Cluster bean- Potato- Onion	Turmeric- Sesame- Fallow	Moong bean- Wheat
T1	Kharif Rabi Summer	25231 697 7130	23603 2092	6315 21117 4943	17959 0 0	63 152 0
T2	Kharif Rabi Summer	23368 464 5324	0 20282 2023	6142 17627 4610	16537 0 0	52 132 0
T3	Kharif Rabi Summer	9679+ 1.23* 2.78+ 29.01*** 54.71+ 12.35***	0 0 28417+ 135* 1975+ 105*	5679 0 17268 0 4393 0	11840 0 0 0 0 0	39 0 116 0 0 0
T4	Kharif Rabi Summer	21903 477 5575	0 19733 1956	6155 19676 4765	604 0 0	52 133 0
T5	Kharif Rabi Summer	23933 596 6258	0 15867 1593	5640 17805 3962	15157 0 0	30 90 0
T6	Kharif Rabi Summer	24001 575 6876	0 20968 2063	5724 17871 4741	16333 0 0	54 134 0
T7	Kharif Rabi Summer	25915 642 5914	0 25133 1709	6247 18238 4991	16808 0 0	66 172 0

chickpea yield (1.04 t ha^{-1}) was recorded under T4, receiving 1/3 N requirement of crops through each of FYM, VC and NEOC agronomic practices for weed and pest management. The baby corn crop in the summer season failed and the yield was not reported.

Durgapura

At Durgapura, in groundnut-onion-fallow system, highest groundnut yield (1.22 t ha^{-1}) was recorded under T7 and that of onion (17.87 t ha^{-1}) under the same treatment. But, if the yield of intercrop in T3 is also considered, the treatment T3 was superior in attaining the highest yield levels.

Kota

At Kota in chickpea-coriander cropping system, T4 recorded the highest crop yield at 1.65 and 2.49 t ha^{-1} , during *kharif* and *rabi* seasons respectively but numerically at par with T7.

Palampur

At Palampur, in baby corn-chinese cabbage-onion system, integrated nutrient management package proved superior with yield levels of 2.43 , 9.92 and 29.68 t ha^{-1} , respectively. Organic nutrient management packages which performed better were; T6 for baby corn (1.91 t ha^{-1}), T2 for chinese cabbage yield (8.94 t ha^{-1}) and onion (25.12 t ha^{-1}).

Parbhani

At Parbhani, in soybean-onion-fallow system, the highest crop yield was recorded under T7 with soybean yield of 2.56 t ha^{-1} and onion yield of 23.25 t ha^{-1} . Among, the organic nutrient management packages T4 proved better during *kharif* with soybean yield of 2.36 t ha^{-1} and 12% yield reduction over T7. But during *rabi* season, the same treatment recorded onion yield of 17.18 t ha^{-1} with 26% yield reduction.

Powarkheda

At Powarkheda, in soybean-wheat-fallow system, T7 recorded the highest crop yield during both *kharif* and *rabi* seasons (1.57 and 4.68 t ha^{-1} respectively). Soybean yield in organic nutrient management packages revolves around 1.20 t ha^{-1} with yield reduction of about 24%.

Akola

At Akola, in sweet corn-rajmash-onion system, highest mean yield was recorded at 25.91 and 0.64 t ha^{-1} during *kharif* and *rabi* seasons, respectively, under T7 whereas during summer, highest crop yield was recorded under T1 (8.54 t ha^{-1}). The performances of organic nutrient management packages which provided better yield were; T3 during *kharif* (24.00 t ha^{-1}), T5 (0.59 t ha^{-1}) for *rabi* crop and T6 (6.88 t ha^{-1}) during summer seasons.

Bichpuri

At Bichpuri, in cluster bean-potato-onion system, highest yields of cluster bean and potato were recorded under T1 (IPNS) (6.32 and 21.12 t ha^{-1}) and that of onion under T7 (4.99 t ha^{-1}). However, under organic nutrient management package, the treatments T2, T4 and T6 were found better for attaining yield levels of 6.14 , 19.68 and 5.72 t ha^{-1} for cluster bean, potato and onion, respectively. Cluster bean and potato yields decreased by 2 per cent while potato and onion yield increased by 8 and 15 per cent.

Rudrur

At Rudrur, in turmeric-sesame-fallow system, yield of turmeric was highest under integrated nutrient management packages (T1) with mean yield of 17.96 t ha^{-1} . However, yield of sesame during *rabi* was not reported.

7.4 TECHNOLOGY TRANSFER AND REFINEMENT

7.4.1 ON-FARM RESEARCH

7.4.1.1 On-farm crop response to application of nutrients

Title of the experiment: On farm crop response to application of major plant nutrients in pre dominant cropping systems

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

Year of start: 1999-2000, treatments are modified in 2010-11.

Treatments: There are seven common treatments at various locations. They are control

N, NP, NK, NPK, NPK + micronutrients and farmer's practice in which all the nutrients are applied as per the recommended rates of crops/ cropping system evaluated at particular location. Two more treatments namely NPK + supplement of deficient micro nutrient based on soil test and farmer's practice was added during 2010-11.

Locations: Various cropping systems evaluated along with locations and number of trials in each system are given below.

Cropping system	OFR district (State)	No. of trials
Rice-rice	Warangal (Telangana), Seethampeta (A.P.), Thiruvalla (Kerala), Chettinad (T.N.), Raigad (Maharashtra)	118
Rice-wheat	Kawardha (Chhattisgarh), Pakur (Jharkhand), Katni (M.P.), Dindori (M.P.), Amritsar (Punjab), Sant Kabir Nagar (U.P.), Jeolikote (U.K.), Dhainsar (J.K.)	205
Rice-green gram	Kendrapara (Odisha)	24
Rice-groundnut	Angul (Odisha)	24
Rice-cabbage	Paiyur (T.N.)	24
Rice-tomato	Paiyur (T.N.)	12
Rice-maize	Purnea (Bihar)	24
Pearl millet-wheat	Thasra (Gujarat), Pune (Maharashtra)	35
Pearl millet-mustard	Deesa (Gujarat)	8
Maize-wheat	Kangra (H.P.), Udaipur (Rajasthan), Dhainsar (J.K.)	55
Maize-chickpea	Gadag (Karnataka)	12
Soybean-wheat	Amravati (Maharashtra)	12
Soybean-chickpea	Amravati (Maharashtra)	13
Cotton-wheat	Sirsa (Haryana), Aurangabad (Maharashtra)	36
Cotton-chickpea	Aurangabad (Maharashtra)	12
Cotton-pearl millet	Deesa (Gujarat)	8
Castor	Deesa (Gujarat)	8
Cluster bean-wheat	Sikar (Rajasthan)	24
Tobacco-pearl millet	Thasra (Gujarat)	12
Groundnut-sorghum	Gadag (Karnataka)	12
Total		678

Results

The centre-wise details of varieties, nutrients used, crop yield and response to NPK application in terms of yield difference, are presented in Table 7.4/1. Brief description of centre-wise results is given below.

Rice-rice: A total of 118 trials were conducted at 5 locations comprising of 5 NARP zones in Telangana, Andhra Pradesh, Tamil Nadu, Kerala and Maharashtra. Except two zones, namely; high altitude and tribal zone (Andhra Pradesh) and problem areas zone (Kerala), in other zones, significantly higher yield due to application of Zn as micronutrient in both seasons was recorded and highest percent increase in yield over recommended nutrients (NPK only) were recorded at Andhra Pradesh (High Altitude and Tribal Zone) in *rabi* season which is 14.2% higher, followed by Maharashtra (North Konkan Coastal Zone) with 12.3% increase in *kharif* season. In southern telangana zone (Warangal), application of micronutrient based on soil test resulted in additional system yield of 457 kg ha⁻¹ in rice-rice system. Application of zinc @ 20 kg ha⁻¹ in both the crops resulted in additional yield of 293 and 1088 kg ha⁻¹ in *kharif* and *rabi* season over and above the recommended nutrient at Andhra Pradesh (High Altitude and Tribal Zone). However, application of recommended dose of nutrient recorded higher yield (70% to 221%) over the control at all the locations and highest yield gap of 6142 kg ha⁻¹ was recorded at High Altitude and Tribal Zone (Seethampeta) of Andhra Pradesh in *kharif* season and highest increase in yield (220.7%) was recorded in Problem Areas Zone (Thiruvalla) of Kerala during *rabi* season. Around 2058 kg ha⁻¹ of yield gap in *kharif* season and 1189 kg ha⁻¹ in *rabi* season exists between recommended nutrient dose and farmer practice in North Konkan Coastal Zone of Maharashtra. But at other locations, there was no significance of yield difference recorded between recommended nutrient dose and farmer practices. In North Konkan Coastal zone of Maharashtra, application of 120:50:50:10 kg NPK Zn ha⁻¹ during *kharif* and 120:50:50:10kg NPK Zn ha⁻¹ during *rabi* resulted in

2792 kg ha⁻¹ and 1438 kg ha⁻¹ additional yield which was 72% high in *kharif* and 43% high in *rabi* than farmer practices. At all the locations, application of zinc along with recommended dose of nutrient (NPK) resulted in significantly higher yield than farmer practices with yield increase in the range of 15-20%. In rice-rice system, yield gap of 3247 kg ha⁻¹ exists between farmers and recommended nutrient practice in Maharashtra and it widens to 4230 kg ha⁻¹, if zinc application also considered. In rice-rice system, across the NARP zones, it was found that mean yield gap of 650 kg ha⁻¹ exists between farmers and recommended nutrient practice. Additional yield of 787 kg ha⁻¹ is possible through application of required quantity of zinc to the system in addition to recommended level of NPK nutrient.

Rice-wheat: A total of 205 trials were conducted at 9 locations comprising of 9 NARP zones in 7 states (Jharkhand, Chhattisgarh, Madhya Pradesh, Uttar Pradesh, Uttarakhand, Punjab and Jammu Kashmir). In all the locations, significantly higher yield was recorded due to application of Zn in both the crops and highest increase in yield over recommended nutrient (NPK only) were recorded at Keymore Plateau satpurra hills zone (Katni) of Madhya Pradesh (14.7 and 9.3% higher in rice and wheat), followed by central plain zone (Kaushambi) of Uttar Pradesh (9.1 and 8.5% in rice and wheat). However, application of recommended dose of nutrients recorded higher yield over the control at all the 9 locations with the increase ranging from 58 to 334% and highest yield gap 3550 kg ha⁻¹ in rice and 2436 kg ha⁻¹ in wheat was recorded at central plain zone (Amritsar) of Punjab and highest increase in yield of 270 % in rice and 334 % in wheat was recorded at central and north eastern plateau zone (Pakur) of Jharkhand. Higher yield gap was also recorded between recommended NPK application and farmer practice in both crops at keymore plateau satpura hills zone (Katni) of Madhya Pradesh. In case of rice, application of 120:60:40 kg NPK ha⁻¹ gave additional yield of 1518 and 1507 kg ha⁻¹ over the control and farmer practice respectively and in wheat application of 120:60:40 Kg NPK ha⁻¹ gave additional yield of 1588 kg and 1315 kg ha⁻¹. In hill zone (Jeolikote) of

Uttarakhand, 24 trials were conducted and it was found that significantly higher additional yield of 1535 and 1447 kg ha⁻¹ can be obtained from rice and wheat respectively through application of 150:60:60: kg NPK + 20 kg zinc ha⁻¹ to rice and 150:60:40: kg NPK + 20 kg zinc ha⁻¹ to wheat, which is 33.8 and 40.3% increase in yield over the farmers practice. At central plain zone (Amritsar) of Punjab, no significant additional yield was recorded due to application of recommended NPK or with micronutrient compared to farmers practice as farmers are already using high dose of NPK. It was observed that in eastern plain zone of Uttar Pradesh (Santkabirnagar), significantly higher yield was recorded (1365 kg and 763 kg ha⁻¹ in rice and wheat) with application of recommended dose of NPK over farmer practice, but in central plain zone (Kanpur), only marginal additional yield was recorded by application of recommended dose of NPK over the farmer practice. In rice-wheat system, across central plateau (Chhattisgarh and Jharkhand) zone system yield gap of 2503 kg ha⁻¹ exists between farmers and recommended nutrient practice and widens to 2836 kg ha⁻¹ if Zn is not applied along with recommended dose of NPK. In rice-wheat system, across the NARP zones, it was found that mean system yield gap of 1816 kg ha⁻¹ exists between farmers and recommended nutrient practice. Additional yield of 438 kg ha⁻¹ is possible through application of required quantity of zinc to the system in addition to recommended level of NPK nutrient.

Rice-green gram: In east & south eastern coastal plain zone (Kendrapara) of Odisha, 24 trials were conducted and it was found that significantly higher additional yield of 1452 kg ha⁻¹ can be obtained from rice through application of 80:40:40: kg NPK + 25 kg zinc ha⁻¹. In green gram, the additional yield over farmer practice was found to be 259 kg ha⁻¹ due to application of 20:40:20 kg NPK ha⁻¹. Application of zinc as micronutrient in rice and Molybdenum in green gram gave 7.1 and 4.2 % additional yield than recommended NPK alone.

Rice-groundnut: Significantly higher yield of rice and groundnut was observed due to addition of zinc @ 25 kg and calcium @ 250 kg gypsum ha⁻¹

to these crops respectively in mid central table land (Angul) of Odisha. The increase was observed to be 2.6 and 63.8% in rice and 3.6 and 58.6% in ground nut, over recommended nutrient application and control respectively.

Rice-cabbage: A total of 12 trials were conducted in north western zone (Paiyur) of Tamil Nadu. Addition of 25 kg zinc ha⁻¹ along with recommended NPK to rice recorded significantly higher grain yield (additional yield of 388 kg ha⁻¹ than NPK alone), and in case of cabbage, additional yield of 2235 kg ha⁻¹ recorded due to application of boron as a micronutrient which was 3.4% higher than NPK alone.

Rice-tomato: In the north western zone (Paiyur) of Tamil Nadu, a total of 12 trials were conducted and it was found that significantly higher additional yield of 1195 kg ha⁻¹ can be obtained from rice through application of 150:50:50: kg NPK + 25 kg zinc ha⁻¹. In tomato, the additional yield over farmer practice was found to be 6438 kg ha⁻¹ due to application of 200:250:200: kg NPK + 2 kg calcium ha⁻¹. The increase in yield due to recommended NPK + micronutrient was found to be 20.3 and 14.2% higher than farmer practice in rice and tomato respectively.

Rice-maize: Total of 24 trials was conducted in north east alluvial plain zone (Purnea) of Bihar. Yield gap between exists between recommended NPK application and farmer practice in both the crops. In case of rice, application of 100:40:20 kg NPK ha⁻¹ gave additional yield of 2254 kg ha⁻¹ and 891 kg ha⁻¹ which is 127.4 and 28.4% higher over the control and farmer practice respectively. In case of maize, application of 120:75:50 kg NPK ha⁻¹ gave additional yield of 4282 kg ha⁻¹ and 1428 kg ha⁻¹ which is 127.2 and 22.9% higher over the control and farmer practice respectively.

Pearlmillet-wheat: A total of 35 trials were conducted in 2 NARP zones. In middle gujarat zone (Anand) of Gujarat, yield difference between farmers and recommended NPK practices was found to be 976 kg ha⁻¹ in pearl millet and 835 kg ha⁻¹ in wheat. Application of micronutrient @ 12.5

kg ha⁻¹ to both the crops in the form of ZnSO₄ resulted in significantly higher yield (309 and 274 kg ha⁻¹ respectively) than application of recommended quantity of NPK alone. In the western maharashtra plain zone (Pune) of Maharashtra, it was observed that farmer's practice of nutrient management resulted in lower yield (675 and 1141 kg ha⁻¹) of pearl millet and wheat compared to application of recommended quantity of NPK alone. Application of 20 kg each of Fe and zinc ha⁻¹ in addition to recommended NPK to both crops recorded significantly higher yield (129 and 272 kg ha⁻¹ of pearl millet and wheat) than recommended quantity of NPK alone.

Pearlmillet-mustard: In the North Gujarat zone (Deesa) of Gujarat, significantly higher yield was obtained with recommended NPK over farmer practice which is 8.6 and 10.1% higher pearl millet and mustard respectively. Application of 25 kg ha⁻¹ of zinc in addition to recommended NPK to both crops resulted in additional yield of 166 and 188 kg ha⁻¹ in pearl millet and mustard respectively.

Maize-wheat: A total of 55 trials were conducted in 3 NARP zones. In sub-mountain and low hills sub-tropical zone (Kangra) of Himachal Pradesh, application of 25 kg zinc ha⁻¹ recorded additional yield of 227 and 276 kg ha⁻¹ in maize and wheat. It was recorded that application of 90:45:30: kg NPK + 20 kg zinc ha⁻¹ in maize and 80:40:40: kg NPK + 20 kg zinc ha⁻¹ in wheat gave significantly higher yield than farmer practice and it was observed 98.2 and 83.1% higher than farmer practice 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 gave additional yield of 248 kg ha⁻¹ which was 9.3% higher than NPK alone. It was observed that farmer's practices of nutrient management resulted in lower yield (1804 and 3186 kg ha⁻¹) of maize and wheat compared to application of recommended quantity of NPK. In the sub-tropical zone (Dhainser) of Jammu & Kashmir, application of 90:60:30 kg NPK + 10 kg zinc ha⁻¹ in maize and 100:50:25 kg NPK ha⁻¹ in wheat gave significantly higher yield which is 27.3 and 32.7% higher than farmer practices.

Maize-chickpea: A total of 12 trials were conducted in northern dry zone (Gadag) of Karnataka. Yield difference between farmers and recommended NPK practices were found to be 1283 kg ha⁻¹ in maize and 373 kg ha⁻¹ in chickpea. Application of zinc @ 25 kg ha⁻¹ to maize and @ 15 kg ha⁻¹ in wheat in the form of ZnSO₄ resulted in significantly higher yield (322 and 141 kg ha⁻¹ respectively) than application of recommended quantity of NPK alone.

Soybean-wheat: A total of 12 trials were conducted in western vidarbha zone (Amravati) of Maharashtra. It was observed that farmer's practice of nutrient management resulted in lower yield (660 and 738 kg ha⁻¹) of soybean and wheat compared to application of recommended quantity of NPK. Application of sulphur in addition to recommended NPK resulted in additional yield of 217 kg ha⁻¹ in soybean.

Soybean-chickpea: A total of 13 trials were conducted in western vidarbha zone (Amravati) of Maharashtra. It was observed that, higher yield gap between farmer's practices and recommended nutrient application was observed. Additional yield of 601 and 532 kg ha⁻¹ in soybean and chickpea could be obtained with recommended nutrient application compared to farmer practice which was 41.3 and 44.6% higher in soybean and chickpea respectively.

Cotton-wheat: A total of 36 trials were conducted in 2 NARP zones. In western zone (Sirsa) of Haryana, application of recommended dose of nutrient (175:60:60 Kg NPK ha⁻¹ to cotton and 80:40:40: kg NPK ha⁻¹ to wheat) gave significantly higher yield over the control (additional yield of 1526 and 3528 kg ha⁻¹) and over farmer practices (253 and 257 kg ha⁻¹ additional yield). Micronutrient application had only marginal effect on cotton and wheat. In central maharashtra plateau zone (Aurangabad) of Maharashtra, application of 150:75:75 kg NPK + 20 kg magnesium ha⁻¹ in cotton and 120:60:60kg NPK ha⁻¹ in wheat gave significantly higher yield than farmer practices which is 30.4 and 30.2% higher than farmer practices.

Cotton-chickpea: Though the yield difference between farmer practices and recommended NPK application to cotton and chickpea was significantly higher (28.2 and 9.5% higher over the farmer practices) in central maharashtra plateau zone (Aurangabad) of Maharashtra, but application of micronutrient had only marginal effect on cotton and chickpea.

Cotton-pearlmillet: In North Gujarat (Deesa) zone, application of 200:40:40 kg NPK ha⁻¹ to cotton and 120:60:60 kg NPK ha⁻¹ to pearlmillet resulted in higher yield (1526 and 3528 kg ha⁻¹). However application of 25 kg Mn ha⁻¹ to cotton and 15 kg Zn ha⁻¹ to pearlmillet gave additional yield of 263 and 491 kg ha⁻¹ respectively.

Castor: In North Gujarat (Deesa) zone, application of 200:40:40 kg NPK ha⁻¹ with 15 kg Zn ha⁻¹ resulted in additional yield of 250 kg ha⁻¹ than NPK alone.

Cluster bean-wheat: The yield difference between farmers and recommended nutrient management practices was found to be 341 kg ha⁻¹ in cluster bean and 341 kg ha⁻¹ in wheat in transitional plain zone of inland drainage (Sikar) of Rajasthan. Micronutrient addition to cluster bean was found to be non-significant in terms of yield and marginal additional yield was recorded in case of wheat. The yield difference between control and recommended NPK application was found to be higher in wheat (1495 kg ha⁻¹).

Tobacco-pearlmillet: In Middle Gujarat (Thasra) zone, application of 220:45:45 kg NPK ha⁻¹ to tobacco and 80:40:40 kg NPK ha⁻¹ to pearlmillet resulted in higher yield (910 and 835 kg ha⁻¹ respectively) over the farmer practice. Effect of micronutrient was found to be non-significant in both the crops.

Groundnut-sorghum: Application of 25:50:25 kg NPK + 25 kg Fe ha⁻¹ to groundnut and 50:25:0 kg NPK + 15 kg Zn ha⁻¹ to sorghum gave additional yield of 1526 and 3528 kg ha⁻¹ respectively over the farmer practices in northern dry zone (Gadag) of Karnataka. The contribution of micronutrient to yield was found to be 88 and 127 kg ha⁻¹ only in groundnut and sorghum.

The response of prevalent cropping system to applied nutrient in various NARP zones are summarized below:

- Across the various NARP zones and cropping systems, farmer's package resulted in lower yield compared to recommended package owing to the 28, 21, 68 and 98 % lower application of N, P₂O₅, K₂O and micronutrients.
- On-farm system yield gap between recommended dose of N, P₂O₅, K₂O + micronutrient and farmer's package was found to be 1437, 1816, 4042, 1332 and 1622 kg ha⁻¹ in rice-rice, rice-wheat, maize-wheat, pearlmillet-wheat and rice-green gram respectively.
- Application of micronutrients based on soil test resulted in additional yield of 787, 438, 767, 260 and 416 kg ha⁻¹ in rice-rice, rice-wheat, maize-wheat, pearlmillet-wheat and rice-green gram systems respectively.
- In all the NARP zones and systems, application of recommended N, P₂O₅, K₂O alone or N, P₂O₅, K₂O + micronutrient resulted in higher yield and use efficiency of nutrients. Suboptimal application in terms of number and quantity resulted in significantly lower yield and use efficiency of nutrients especially nitrogen.

Table 7.4.1/1: Yield potential of different cropping systems under researcher and farmer managed conditions (2012-13)

RICE-RICE																						
State	NARP Center/ No. of	Soil Type	Variety / Recommend Fertilizer Micro FP(Fert.)	Initial Soil Status				Yield(kg/ha)														
				pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Cont-rol	N	NP	NK	NPK	NPK+ M.Nu trient	F.Pra ct.	SE(d)	SE(M)	CD -5%	CV	Yield gap 1 RF vs Control (kg/ ha)	Yield gap 2 RF vs RF (kg/ ha)	Yield gap 3 RF vs FP (kg/ ha)
Telangana	CT Zone/ Warangal/24	Red & Black	BPT-5204/	7.7	0.7	273	47	185	2580	4102	4824	4983	5423	5912	5145	214	151	299	15.73	2843	489	278
			120- 60-40/ ZnSO4(50)																			
			130- 80-40																			
			MTU-1010/	-	--	--	--	2640	4349	5171	5372	5720	6145	5352	220	156	309	15.36	3080	425	368	
Andhra Pradesh	High Altitude and Tribal Zone - Rastakuntabai/ Chintapalli/Seethampeta /24	Alluvial	MTU-1064/	7.3	3.5	159	46	332	4429	6517	7783	8107	10571	10864	10350	273	193	382	11.31	6142	293	221
			80- 60-50/ Zinc(20)																			
			140- 60-40																			
			MTU-1010/ 120- 60-50/ Zinc(20) 130- 80-40	-	--	--	--	3169	4329	6698	6747	7634	8722	9038	276	195	386	14.47	4465	1088	-1404	
Kerala	Problem Areas Zone - Kumarakom/Thiruvalla/24	Coastal Alluvial	Uma/	5.4	0.8	270	15	176	1636	2219	3629	3859	5143	5467	4914	98	70	139	8.89	3507	324	229
			90- 45 -45 / ZnSO4(25)																			
			115- 25-20																			
			Uma/	-	--	--	--	1554	2289	3713	3733	4985	5061	4611	77	55	109	7.23	3431	76	374	
			90- 45 -45 / ZnSO4(25) 115- 25-20																			

Tamil Nadu	South TN 5 & 6/ Chettinad /24	Sandy Clay	IR 20/ 150- 50-50/ ZnSO4(25) 170- 50-30	6.6	0.5	225	10	238	2937	4155	4584	4463	5837	6391	6087	38	27	53	2.7	2900	554	-250
			ADT-45/ 120- 38 -38 / ZnSO4(25) 130- 40-30	-	--	--	--	--	3083	4316	4825	4650	6225	6535	6264	45	32	63	3.04	3142	310	-39
Maharashtra	North Konkan Coastal Zone - Karjat/ Roha/24		Shyadri/ 120- 50-50/ ZnSO4(10) 85- 25-25	0	0	0	0	0	2825	4622	5222	5571	5935	6669	3877	92	65	129	6.17	3110	734	2058
			Not Available/ 120- 50-50/ ZnSO4(10) 85- 25-25	-	--	--	--	--	2662	3599	4127	4067	4523	4772	3334	66	46	91	5.62	1861	249	1189
Rice-Greengram																						
Orissa	East & South Eastern Coastal Plain / Kendra para/24		Pratikshya/ 80- 40-40/ ZnSO4(25) 20 - 30 -20	5.9	0.6	273	16	160	2983	3602	3910	4329	4849	5197	3745	79	56	111	6.69	1866	348	1104
			Local/ 20 - 40-20 / Molybdenum 7.5 - 15-0	-	--	--	--	--	628	726	802	815	902	940	681	12	8	16	5.25	274	38	221
Rice-Groundnut																						
Orissa	Mid Central Table Land /Angul/24		Lalat/ 80- 40-40/ ZnSO4(21%) 30 - 15-15	5.9	0.6	274	15	150	2805	3682	3958	4130	4477	4595	3810	33	23	46	2.92	1672	118	667
			Devil/ 20 - 40-40/ Gypsum(250) 20 - 20 -0	-	--	--	--	--	1464	1833	2034	2003	2241	2323	1984	22	15	30	3.81	777	82	257
Rice-Cabbage																						
Tamil Nadu	North Western Zone - Paiyur/12	Sandy Clay Loam	Sona Mussoorie/ 150- 50-50/ ZnSO4(25) 140- 57-5-0	7.5	0.4	256	26	243	3408	4994	6379	5963	7239	7627	6593	130	92	182	5.27	3831	388	646

[illegible]

Madhya Pradesh	Keymore Plateau Satpura hills /Katni/ 24	Black Soil (Shallow Black)	JRH-5/ 120-60-40/ ZnSO4(21%) 50-25-0	0	0	0	0	0	0	0	0	2606	3049	3856	3417	4124	4732	2617	79	56	111	8.03	1518	608	1507
			GW-273/ 120-60-40/ ZnSO4(21%) 50-25-0	-	--	--	--	--	--	--	--	1914	2565	3124	2767	3502	3829	2187	81	57	113	10.07	1588	327	1315
Madhya Pradesh	Northern hill zone of chhat isgarh- Dindori/ 24	Medium Black Soil	PS-5/ 120-60-40/ Zinc(25) 20-46-0	0	0	0	0	0	0	0	0	1028	2067	2546	2428	2820	2954	1993	54	38	74	8.33	1792	134	827
			GW-273/ 120-60-40/ Zinc(25) 20-46-0	-	--	--	--	--	--	--	--	1308	1581	2042	1708	2403	2431	1509	48	34	67	8.87	1095	28	894
Punjab	Central Plain Zone III/ Amritsar/ 24		PR-111/ 120-30-30 / ZnSO4(25) 150-30-0	8	0.5	255	35	133	35	133	35	3519	6409	6797	6636	7069	7180	6950	87	61	121	4.71	3550	111	119
			PBW 621/ 120-60-30 / control 150-60-0	-	--	--	--	--	--	--	--	2748	4167	4833	4578	5184	5418	5317	105	74	147	7.92	2436	234	-133
Uttar Pradesh	Eastern Plain Zone - Kumar ganj/ Santkabir nagar/20	Alluvial	Vardan/ 150-60-60/ ZnSO4(25) 100-40-0	7.4	0.5	166	14	232	14	232	14	2150	3147	4439	3534	5032	5374	3667	60	43	85	4.87	2882	342	1365
			HD - 3733/ 150-60-40/ ZnSO4(25) 100-40-0	-	--	--	--	--	--	--	--	1463	2345	3314	2653	3799	4050	3036	44	31	61	4.71	2336	251	763
Uttar Pradesh	Central Plain Zone - Kausha mbi/24	Sandy Loam	Pant - 12/ 100-50-50/ control 120-40-80	8.1	0.4	5	11	153	11	153	11	1430	2746	3551	3040	4047	4417	4230	196	139	272	20.24	2617	370	-183
			PBW-343/ 120-60-40/ control 120-40-80	-	--	--	--	--	--	--	--	1818	22899	3474	2986	3893	4227	3589	40	28	55	4.24	2075	334	304

Uktara Khand	Hilli Zone - Ranich auri/ Jeolikote/ 24	Hilly	PRH 10/ 150- 60-60/ Zinc(20) 100- 40-100	6.8	0.8	313	16	208	2928	4115	5238	4799	5890	6069	4534	76	55	109	5.64	2962	179	1356	
			DBW-17/ 150- 60-40/ Zinc(20) 100- 40-100	--	-	--	--	--	--	2440	3310	4140	3839	4928	5031	3584	87	61	121	7.71	2488	103	1344
			Basmati- 370/ 30 - 20 -10/ ZnSO4(20) 20 - 220-0	7.9	0.6	216	17	131	1520	2023	2646	2446	2850	3010	3050	84	59	118	8.18	1330	160	-200	
			PBW-550/ 100- 50-10/ 0 63- 45 -0	--	-	--	--	--	1506	2110	2730	2458	3076	3214	2635	56	39	78	5.4	1570	138	441	
Pearlmillet-Wheat																							
Gujarat	Middle Gujarat Zone / Thasra/ 11	Clay	GHB-30/ 80- 80-40/ ZnSO4(12.5) 50- 30 -0	7.8	0.5	229	18	223	1616	2066	3187	2457	2871	3180	1895	108	76	152	10.27	1255	309	976	
			GW-496/ 120- 120-60/ ZnSO4(12.5) 80- 50-0	--	-	--	--	--	1950	2729	3548	3548	3472	3746	2637	149	105	210	11.63	1522	274	835	
Maharas htra	Western Maharas htra Plain Zone - Pune/24	Sandy Clay	86 M 52/ 60- 30 -30 / Fe(20)+Zn(20) 70- 0-0	7.8	10	192	27	561	1527	1833	1995	2141	2430	1626	39	27	83	6.74	774	129	675		
			NIAW-301/ 120- 60-40/ Fe(20)+Zn(20) 95- 0-0	--	-	--	--	--	2489	3001	3392	3671	3931	4203	2970	32	23	45	3.31	1442	272	1141	
Pearlmillet-Mustard																							
Gujarat	North Gujarat Zone - Dantiwa da/ Deesa/8		86 M 52/ 80- 40-40/ Znso4(15) 40- 20 -0	7.7	0.4	203	19	234	982	1475	1810	1630	2084	2248	1918	80	56	113	9.2	1102	164	166	
			GM-3/ 50- 50-25/ ZnSO4(25) 50- 40-0	--	-	--	--	--	868	1399	1786	1700	2053	2207	1865	75	53	107	8.9	1185	154	188	

Maize-Wheat																
Himachal Pradesh	Sub-mountain and low hills	Sub-mountainous	HPQM-1/90-45-30 / Zinc(20) 15-0-0	5.8	0.6	280	19	125	1398	1792	2579	2374	3099	3326	1678	1421
	sub-tropical zone / Kangra / 20		HPW-236/80-40-40/ Zinc(20) 25-0-0	-	--	--	--	--	1434	1870	2443	2306	2821	3097	1691	1130
Rajasthan	Sub-Humid Southern Plain and Aravalli Hill Zone / Chittorg arh/23		PEHM-2/90-35-30 / ZnSO4(25) 55-25-0	7.7	0.6	430	39	3346	863	1789	2380	2126	2667	2915	1728	939
			RAJ-4037/120-40-30 / control 80-20-0	-	--	--	--	--	1557	3207	4415	3483	4743	4952	3317	1426
J & K	Sub-Tropical Zone/ Dhinasar/ 12	Sandy Loam	Kanchan/90-60-30 / ZnSO4(10) 45-30-0	7.7	0.6	254	18	125	1459	2160	2661	2506	3095	3303	2593	502
			PBW175/100-50-25/ 0 50-25-0	-	--	--	--	--	1467	2054	2705	2515	3152	3279	2470	682
Maize-Chickpea																
Karnataka	Northern dry zone/ Gadag/ 12	Clay Loam	M900/150-75-38 / ZnSO4(25) 100-57.5-0	8.1	0.4	72	12	601	1638	2651	3315	2950	4004	4326	2766	1238
			JG 11/25-50-0/ Znso4(15) 15-35-0	-	--	--	--	--	423	574	880	715	993	1134	620	373
Soybean-Wheat																
Maharashtra	Western Vidarbha Zone/ Amravati/ 11	Black Cotton Soil	NRC 37/30-75-30 / NPK+Sulphur 25-57.5-0	0	0	0	0	0	1429	1619	1898	1772	2106	2323	1446	660
			AKW-1071/100-50-50/ NPK+Sulphur 25-57.5-0	-	--	--	--	--	1876	2146	2519	2529	3087	3403	2349	738

Soybean-Chickpea																							
Mahara shtra	Western Vidarbha Zone/ Amravati /13	Black Cotton Soil	NRC 37/ 30 - 75-30 / NPK+Sulphur 25- 25-0	0	0	0	0	0	0	1253	1464	1803	1712	2054	2177	1453	66	46	92	9.83	801	123	601
				--	-	--	--	--	--	1142	1353	1502	1555	1723	1857	1191	45	32	67	7.85	581	134	532
Cotton-Wheat																							
Haryana	Western Zone - Sirsa/24	Alluv ial	Bio6488/ 175- 60-60/ ZnSO4(21%) 150- 60-30	7.4	0.3	120	11	156	1115	1901	2392	2203	2641	2759	2388	49	35	69	7.73	1526	118	253	
				--	-	--	--	--	1394	3768	4741	4096	4922	5109	4665	82	58	115	6.94	3528	187	257	
Mahara shtra	Central Mahara shtra Plateau Zone - Auranga bad/12		banny BG II/ 150- 75-75/ MnSO4(20) 90- 50-50	0	0	0	0	0	552	736	833	870	936	994	762	28	20	40	8.35	384	58	174	
				--	-	--	--	--	803	1142	1281	1293	1366	1468	1127	39	28	56	7.88	563	102	239	
Cotton-Chickpea																							
Mahara shtra	Central Mahara shtra Plateau Zone - Auranga bad/12		B.T./ 150- 75-75/ MnSO4(20) 100- 50-50	0	0	0	0	0	524	736	794	802	863	900	673	25	18	36	8.15	339	37	190	
				--	-	--	--	--	476	662	749	809	869	890	793	15	10	20	4.81	393	21	76	
Cotton-pearlmillet																							
Gujarat	North Gujarat Zone - Dantiwa da/ Deesa/8		Krushni Dhan-2/ 200 - 40-40/ MgSo4 (25) 220- 100-0	7.7	0.4	246	26	306	1053	2072	2379	2250	2713	2976	2509	119	84	170	10.45	1660	263	204	
				--	-	--	--	--	1893	2900	3404	3315	3817	4308	3887	164	116	234	9.78	1924	491	-70	

Castor		GCH-7/ 120- 25-25/ ZnSO4(25) 80- 40-0	7.7	0.4	231	22	297	1085	2254	2838	2607	3155	3405	2922	165	117	236	12.67	2070	250	233
Gujarat	North Gujarat Zone - Dantiwada/ Deesa/8																				
Clusterbean-Wheat																					
Rajasthan	Transitio nal Plain Zone of Inland Drainage- Fatehpur (Sikar)/24	Light Soil	8.1	0.3	257	16	199	1006	1069	1139	1123	1251	1259	1051	21	15	30	6.33	245	8	200
		RGC-1003/ 10- 40-20 / Zinc(20) 0- null-0																			
		RAJ-4037/ 90- 35 -30 / Zinc(25) 60- 20 -0	--	--	--	--	--	2666	3482	3801	3734	4161	4358	3414	45	32	63	4.18	1495	197	447
Tobacco-pearlmillet																					
Gujarat	Middle Gujarat Zone - Thasra / 12	Sandy Clay	7.6	0.5	237	18	296	1968	3300	3440	3644	3402	3593	2494	194	137	274	15.22	1434	191	910
		GTH-1/ 220- 45 -45 / ZnSO4(25) 150- 80-0																			
		GBH-558/ 80- 40-40/ ZnSO4(25) 100- 50-0	--	--	--	--	--	1713	2394	2957	2568	2976	3066	2141	148	105	210	14.27	1263	90	835
Groundnut-Sorghum																					
Karnataka	Northern dry zone /Gadag /12	Sandy Clay Loam	8.3	0.5	94	15	380	716	802	1036	901	1106	1194	897	34	24	48	8.68	390	88	209
		GPBD-4/ 25- 50-25/ Feso4 25 15- 40-0																			
		M35-1/ 50- 25-0/ Znso4 15 null- 25-0	--	--	--	--	--	509	806	869	804	1011	1138	733	28	20	40	8.17	502	127	278

7.4.1.2 On-farm evaluation of diversified cropping systems

Title of the experiment: On farm evaluation of new diversified cropping system under irrigated /rainfed conditions

Objectives: To assess the on-farm performance of alternative crops and cropping systems for increasing intensity as well as yield potential, calorific values and net returns in different agro climatic zones.

Year of start: 1999-2000

Treatments: Four to seven best crop sequences involving three to four crops (cereals, pulses, oil seeds, vegetables and fodder crops) suited for specific requirement of different regions were evaluated at all the centers. The cropping system evaluated and crop cultivars used are given in Table 7.4.1/2. Eco system wise number of experiments conducted are given below.

than existing system. At Seethampeta also, existing rice-rice system can be replaced with rice-hybrid maize as it registered 11365 kg ha⁻¹ of rice equivalent yield besides 9.6 and 45% increase in total calories and net return over existing system and all the other system evaluated did not perform better than existing system. At Purnea, except rice-mustard (4668 kg ha⁻¹), all other three cropping systems, rice-potato-greengram (16561 kg ha⁻¹), rice-wheat-greengram (12245 kg ha⁻¹) and rice-winter maize (8162 kg ha⁻¹) recorded significantly higher rice equivalent yield over existing rice-wheat (5494.2 kg ha⁻¹) system, and besides this rice-potato-greengram also recorded higher total calories (71%) and net return over existing system. At Kawardha, it was observed that in place of soybean-wheat-cowpea (6338 kg ha⁻¹) or soybean-field pea-okra (7196 kg ha⁻¹) diversified systems such as soybean-potato-cowpea (15216 kg ha⁻¹), soybean-tomato-cowpea (13716 kg ha⁻¹) and

Ecosystem	OFR district (state)	No. of trials
Arid	Deesa (Gujarat)	24
Semi-Arid	Warangal (Telangana), Seethampeta (A.P.), Kawardha (Chhattisgarh), Sirsa (Haryana), Thasra (Gujarat), Katni, Dindori (M.P.), Aurangabad, Pune, Roha, Amravati (Maharashtra), Amritsar (Punjab), Chittorgarh (Rajasthan), Chettinad, Paiyur (T.N.), Kaushambi (U.P.), Gadag, Kolar (Karnataka)	421
Sub Humid	Purnea (Bihar), Dhainsar (J & K), Pakur (Jharkhand), Sant Kabir Nagar (U.P.), Jeolikote (Uttarakhand), Angul, Kendrapara (Odisha)	164
Humid	Kakdwip (W.B.), Kangra (H.P.)	52
Costal	Thiruvalla (Kerala)	24
Total	685	

Results

Performance of various cropping systems in term of grain yield, total calories and net returns are presented in Table 7.3/2. At, Warangal, the existing rice-rice system can be replaced with rice-hybrid maize as it registered 11236 kg ha⁻¹ of rice equivalent yield besides 10.9 and 10.7% increase in total calories and net return over existing system. All the other system evaluated did not perform better

soybean-brinjal-cowpea (11324 kg ha⁻¹) are more remunerative in terms of soybean equivalent yield over existing cropping system Soybean-chick pea (11236 kg ha⁻¹). In terms of calorific value and net return, soybean-potato-cowpea recorded highest increase followed by soybean-tomato-cowpea.

Tobacco-pear millet system resulted in higher tobacco equivalent yield of 3673 kg ha⁻¹ compared to existing sole tobacco (3101 kg ha⁻¹) at Thasra.

However, the increase in net return was found to be higher in tobacco-multicut fodder sorghum as it registered 46.4% increase over existing system. This was closely followed by tobacco-multicut fodder rajka bajari system which resulted in 37% increase in net returns. At Deesa, it was found that greengram-fennel can replace existing system of pearl millet-mustard as green gram-fennel recorded pearl millet equivalent yield of 2738 kg ha⁻¹ compared to only 2378 kg ha⁻¹ pearl millet-mustard. Fennel-rajaka bajari system resulted in higher castor equivalent yield of 2964 kg ha⁻¹ compared to existing sole castor (2199 kg ha⁻¹). The other pre dominant existing system hybrid cotton-pearl millet system was found to be better than other alternative systems evaluated. At, Sirsa, the existing cotton-wheat system can be replaced with cluster bean-wheat and cluster bean-rama as it registered 806 and 763 kg ha⁻¹ of cotton equivalent yield besides 53 and 44% increase in net return over existing system. All the other system evaluated did not perform better than existing system. At, Kangra, all the alternate systems evaluated resulted in significantly higher net return (67% in rice-potato-onion, 58% in rice-radish-potato, 52% in rice-garlic and 49% in rice-berseem+oat over the existing rice-wheat system. higher rice equivalent yield was recorded with rice-radish-potato (43356 kg ha⁻¹) which was six times higher than existing rice-wheat system (6714 kg ha⁻¹). Similarly, maize-wheat system can be replaced by maize-potato-onion (maize equivalent yield: 12193 kg ha⁻¹) or maize+soybean-wheat (8095 kg ha⁻¹). Maize-potato-onion gave 172% increase in net returns and 54% increase in total calories compared to maize-wheat system. Rice-potato-onion at Dhinasar in Jammu and Kashmir recorded higher rice equivalent yield, net returns (243%) and total calories (95%) over the existing rice-wheat system. Rice-garlic was found to be the next best alternative in terms of net return and calories. Similarly the maize-potato-onion was found to be the alternative to maize-wheat system as it recorded higher yield, net returns (254 %) and total calories (60%). Maize-garlic also found to increase the net returns by 128%.

Among the various varieties of rice evaluated for rice-wheat cropping system at Pakur, it was found that all four varieties gave significantly higher REY of the system than existing Swarna (2625 kg ha⁻¹). Arize-6444 (3891 kg ha⁻¹), PAC-801 (3781 kg ha⁻¹) and Sahbhagi (3454 kg ha⁻¹) and Naveen (3396 kg ha⁻¹). At, Gadag, existing hybrid maize-chick pea performed better than all the other alternative systems evaluated. In the other group of systems, sunflower-chickpea resulted in higher chilli equivalent yield of (32318 kg ha⁻¹) compared to existing sole chilli (16341 kg ha⁻¹). Alternate systems to cabbage-tomato and finger millet-tobacco cropping system was evaluated at Kolar, in which it was found that the existing systems are performing better than the other systems. At, Thiruvalla, addition of yardlong bean, okra, cucumber and amaranths as a summer crop in existing rice-rice cropping system gave significantly higher REY. The net return can be increased by five times in case of yardlong bean, three times with okra and two times with cucumber and amaranths than existing rice-rice system. Soybean-chickpea and green gram-wheat recorded marginal additional yield over the soybean-wheat at Dindori. At Katni, existing system of rice-wheat was found to be better than all the other systems evaluated.

At Amravati, soybean (JS-335)-wheat (Lok-1) and soybean (JS-335)-wheat (AKW-3722) with addition of fenugreek as intercrop in wheat gave additional soybean equivalent yield (SEY) of 1233 and 1349 kg ha⁻¹ respectively over the control. Increase in net return was found to be 67 and 51% over the existing system. In case of soybean-chickpea, addition of linseed as an intercrop in chickpea variety (Vijay and PKV NL 260), gave additional SEY of 577 and 795 kg ha⁻¹ and increase net return was found to be 26 and 27% over existing system. Pearl millet-wheat system can be replaced with pearl millet-onion at Pune as it registered 15460 kg ha⁻¹ of pearl millet equivalent yield besides 223% increase in net return over existing system and all the other system evaluated did not perform better than existing system. At Roha, rice-cowpea-

okra recorded REY of 12897 kg ha⁻¹ followed by rice-groundnut +sweet corn (11653 kg ha⁻¹) and rice-chilli (10490 kg ha⁻¹) compared to existing system. At Aurangabad, cotton-chickpea system with addition of either green gram or chickpea as intercrop in cotton gave additional cotton equivalent yield (CEY) of 389 and 316 Kg ha⁻¹. Same result was found in case of cotton-wheat where in addition of either greengram or chickpea as intercrop in cotton gave additional CEY of 431 and 303 Kg ha⁻¹.

At Kendrapara, all the three cropping systems viz., rice-bitter guard (11990 kg ha⁻¹), rice-groundnut (9053 kg ha⁻¹) and rice-sunflower (7133 kg ha⁻¹) recorded significantly higher rice equivalent yield over existing rice-green gram (6754 kg ha⁻¹) system. Rice-bitterguard recorded higher increase in net return (135%) over existing system. At Aungul, all the three alternative systems evaluated viz., rice-onion (12450 kg ha⁻¹), rice-okra (11243 kg ha⁻¹) and rice-cowpea (8427 kg ha⁻¹) recorded significantly higher rice equivalent yield over existing rice-green gram (5646 kg ha⁻¹) system. Rice-onion recorded higher increase in calories (16%) and net returns (252%) over existing system. At Amritsar, it was found that only replacement of wheat with alternate crops such as gobhisarson, chickpea and pea was found to be not productive and remunerative. However, addition of summer greengram in rice-wheat system resulted in higher REY (7580 kg ha⁻¹) followed by rice-chickpea-greengram (7460 kg ha⁻¹) and rice-gobhisarson-greengram (7307 kg ha⁻¹) over existing rice-wheat (4769 kg ha⁻¹). These systems also resulted in 57, 55 and 55% increase in net return over existing system respectively.

At Chittorgarh, the existing maize-wheat system can be replaced with cluster bean-wheat as it registered maize equivalent yield of 11199 kg

ha⁻¹ besides 53% increase in net return over existing system. All the other system evaluated did not perform better than existing system. At Chettinad, the existing rice-rice system can be replaced with rice-sesame as it registered REY of 11188 kg ha⁻¹ besides 56% increase in net return over existing system. At Kaushambi, blackgram-wheat (19478 kg ha⁻¹) and sesame-wheat (18699 kg ha⁻¹) gave significantly higher sorghum equivalent yield over the sorghum-wheat (17662 kg ha⁻¹), but sesame-pea gave less SEY (12223 kg ha⁻¹). In terms of net return, all the three systems performed better than existing system and gave 17, 32 and 31% increase over the existing system. At Santkabirnagar, it was found that replacement of wheat with its alternate crop mustard, lentil and berseem under rice-wheat cropping system was not found to be significant and it gave at par or less yield. Highest rice equivalent yield was recorded in rice-vegetable pea-maize for cobs (15117 kg ha⁻¹) followed by rice-chickpea-cowpea (14698 kg ha⁻¹) and rice-wheat-cowpea (14076 kg ha⁻¹) which were significantly higher than existing rice-wheat (12223 kg ha⁻¹) system at Jeolikote. These systems resulted in 46, 57 and 68% additional increase in net returns over the existing system. At Kakdwip, the existing rice-greengram system can be replaced with rice-okra as it registered REY of 21752 kg ha⁻¹ besides improvement in calories (21%) and net returns (3 times).

Across the locations and systems, the diversified system registered net returns and total calories of ₹ 1,64,925 ha⁻¹ and 39,447 x 1000 kcal ha⁻¹ compared to the existing system (₹ 1,17,769 ha⁻¹ and 24,248 x 1000 kcal ha⁻¹). On an average, the net return and total calories can be increased by 40 % and 63% through diversification of existing cropping systems with location specific identified alternative systems.

Table 7.4/2: Productivity, calorific value and net returns of different crop sequences (2012-2013)

State/NARP Zone/ Centre/No. of trials	Crop sequences / Variety / N-P-K (kg/ha)			Mean grain (straw) yields (kg/ha)			Total Calories (Kx1000)	Net returns (Rs/ha/yr)
	Kharif	Rabi	Summer	Kharif	Rabi	Summer		
1	2	3	4	5	6	7	8	9
Telangana CT/Warangal (24)	Rice (BPT-5204) 120-60-40	Rice (MTU-1010) 120-60-40		4561 (6151)	6078 (7633)		36813	84751
	Rice (BPT-5204) 120-60-40	Maize (Pinnacle) 120-60-50		4576 (6162)	7318 (9143)		40860	93880
	Rice (BPT-5204) 120-60-40	Sun hemp (local) 30-60-60		4561 (6167)	1778 (3527)		23603	78902
	Rice (BPT-5204) 120-60-40	Blackgram (LBG-752) 20-50-20		4580 (6163)	1180 (3102)		19941	50991
	Rice (BPT-5204) 120-60-40	Greengram (WGG-35) 20-50-20		4585 (6158)	1311 (3224)		20242	59659
								S.E.(m) 163 c.d.(5%) 323 C.V. 2.83
								1264 2502 8.41
Andhra Pradesh High Altitude & Tri- bal & North Coastal/ Seethampeta (24)	Rice (MTU-1010) 120-60-50	Rice (MTU-1010) 120-60-50		4631 (4902)	5137 (5889)		33798	44865
	Rice (MTU-1010) 120-60-50	Maize (P Hybrid) 180-60-50		4894 (6302)	5889 (7310)		37071	65058
	Rice (MTU-1010) 120-60-50	Greengram(LGG-407) 20-50-0		4689 (6397)	1349 (2896)		20730	43972
	Rice (MTU-1010) 120-60-50	Blackgram (LBG-752) 20-50-0		4879 (6424)	1127 (2719)		20793	28001
	Rice (MTU-1010) 120-60-50	Sesame (YLM-66) 40-20-20		4877 (6496)	1350 (2740)		24476	54415
								S.E.(m) 206 c.d.(5%) 408 C.V. 3.69
								791 1566 8.2
Bihar North East Alluvial(BI-2)/ Purnea (24)	Rice(R. Shweta) 80-40-20	Wheat(PBW-343) 120-60-40		2547 (3189)	2411 (3086)		17156	11889
	Rice(R. Shweta) 80-40-20	Wheat(PBW-343) 120-60-40	Greengram (SML-668) 20-40-0	2621 (3302)	2430 (3116)	1711 (1626)	23193	76189
	Rice(R. Shweta) 80-40-20	W. Maize(Shaktiman-4) 120-75-50		2778 (3473)	5701 (8355)		29110	45244
	Rice(R. Shweta) 80-40-20	Mustard (R. Suphalam) 80-40-40		2564 (3205)	631 (1756)		12287	6754
	Rice(R. Shweta) 80-40-20	Potato(K.Kanchan) 150-90-120	Greengram (SML-668) 20-40-0	2640 (3300)	14080 (1105)	1971 (1872)	29373	90349
								S.E.(m) 177 c.d.(5%) 351 C.V. 3.9
								908 1798 9.65

Chhattisgarh Chhattisgarh Plain / Kawardha/ (24)	Soybean(JS-335)	Chick Pea (JG-315)	2064	1580	14603	60904
	20-50-20	20-50-20	'(2948)	'(1953)		
	Soybean(JS-335)	Wheat(DL-788-2)	2041	2942	23199	134720
	20-50-20	100-60-40	'(2897)	'(4384)		
	Soybean(JS-335)	Fieldpea(Prakash)	2047	2008	13729	143275
	20-50-20	20-50-20	'(2917)			
	Soybean(JS-335)	Brinjal(VNR-218)	2038	30138	20305	209218
	20-50-20	120-60-40	'(2889)			
	Soybean(JS-335)	Tomato(US-404)	2046	39718	22153	303158
	20-50-20	120-60-40	'(2897)			
Gujarat MGAC/ Thasra (12)	Soybean(JS-335)	Potato(K.Chandramukhi)	2054	35679	47784	341706
	20-50-20	150-100-100	'(2934)			
						S.E.(m) 165 C.D.(5%) 328 C.V. 3.43
	Tobacco(GTH-1)		3349			119874
	220-45-00					
	Tobacco(GTH-1)	Pearlmillet (GHB-558)	3271	2576		139371
	220-45-00	80-40-00		'(3609)		
	Tobacco(GTH-1)	F-Sorghum(Multicute)	3073			175503
	220-45-00	80-40-00		'(30214)		
	Tobacco(GTH-1)	F-Rajka Bajri(Multicute)	3244			164292
Gujarat NGAC/ Deesa '(8)	220-45-00	80-40-00		'(23053)		
						S.E.(m) 7490 c.d.(5%) 15369 C.V. 17.32
	Pearlmillet(86M52)	Mustard(GM-3)	1764	1655	15320	30341
	80-40-40	50-50-25	(3916)	(2692)		
	Pearlmillet(86M52)	Fennel (GF-11)	1826	1051	6706	31868
	80-40-40	90-45-30	(4047)	(2052)		
	Greengram (GM-4)	Fennel (GF-11)	816	1099	2846	38471
	20-50-50	90-45-30	(1337)	(2094)		
	Greengram (GM-4)	Mustard(GM-3)	796	1696	11833	36204
	20-50-50	50-50-25	(1368)	(2698)		
Gujarat NGAC/ Deesa '(8)						S.E.(m) 128 C.D.(5%) 2672 C.V. 3.93
						10.51

Gujarat NGAC/ Deesa '(8)	Hy. Caster(GCH7) 120-25-25	-	2199 (4612)	-	-	33730
	Fennel(GF 2) 90-45-30	-	1897 (3929)	-	27023	71133
	Hy. Caster(GCH7) 120-25-25	Lucerne(Anand 2) 20-40-0	2128 (4532)	19852	-	44841
	Hy. Caster(GCH7) 120-25-25	Chicory(Local) 0-0-0	2139 (4551)	20894	-	37814
						2448 5143 14.77
						S.E.(m) C.D.(5%) C.V.
						58663
						63024
						47376
						27231
Gujarat NGAC/ Deesa '(8)	Hy. Cotton(Krushni Dhan 2) 200-40-40	Pearlmillet(86M52) 120-60-50	2217 '(4431)	3203 '(6254)		
	Hy. Cotton(Krushni Dhan 2) 200-40-40	Pearlmillet(86M52) 120-60-50	2115 (4253)	3197 '(6185)		
	+		+			
	Cowpea (GC-4) 20-40-00		659 '(1293)			
	Hy. Cotton(Krushni Dhan 2) 200-40-40	F Rajakabajri(Local) 150-60-00	2135 '(4193)	'(36155)	S.E.(m) C.D.(5%) C.V.	
	+		+			
	Cowpea (GC-4) 20-40-00		696 '(1321)			
	Hy. Castor (GCH-7) 120-25-25	F Rajakabajri(Local) 150-60-00	2580 '(5699)	'(36953)	S.E.(m) C.D.(5%)	5459 11470
						88980
						136109
Haryana Western Alluvial Plain/ Sirsa (24)	Cotton (Bio-6488) 175-60-60	Wheat (HD-2851) 150-60-60	2168 (6053)	4839 (4972)		
	Clusterbean (HG-220) 20-40-0	Wheat (HD-2851) 150-60-60	1197 (1183)	4842 (5077)		
	Clusterbean (HG-220) 20-40-0	Raya (RH-30) 80-30-0	1183 (1182)	1862 (4255)		
	Greengram (Satya) 15-40-0	Wheat (HD-2851) 150-60-60	1213 (1213)	5035 (5177)		
	Cotton (Bio-6488) 175-60-60	Barley (BH-393) 60-30-15	2198 (6268)	3809 (3918)		
						2110 4178 10.24
						S.E.(m) C.D.(5%) C.V.
						88980
						136109
						128105
						85413
						66007
						2110 4178 10.24
						S.E.(m) C.D.(5%) C.V.

H.P.	Rice (HPR-1068)	Wheat (HPW-236)		2690	3088	19993	67235
Sub Mountain and	90-40-40	120-60-30		(4447)	(4121)		
Low Hills Sub-	Rice (HPR-1068)	Radish (J. White)	Potato (K. Jyoti)	2763	13427	23059	106506
Tropical/Kangra	90-40-40	100-50-40	120-80-60	(4553)	-	11565	(1084)
(12)	Rice (HPR-1068)	Garlic (Selection-I)		2736	4428	15885	102508
	90-40-40	125-75-60		(4538)	-		
	Rice (HPR-1068)	Potato (Pukhraj)	Onion (AFDR)	2784	12442	20550	112252
	90-40-40	120-80-60	125-75-60	(4517)	(1035)		
	Rice (HPR-1068)	Berseem+Oat(Local)		2764	-	9563	100503
	90-40-40	30-50-00		(4491)	(46974)		
						S.E.(m)	3677
						C.D.(5%)	7431
						C.V.	13.02
H.P.	Maize (HPQM-1)	Wheat (HPW-236)	-	3019	2922	20435	55535
Sub Mountain and	90-45-30	80-40-40		(5830)	(3902)		
Low Hills Sub-	Maize (HPQM-1)	Wheat (HPW-236)		2757	2921	22554	70162
Tropical/Kangra	90-45-30	80-40-40	-	(5500)	(3945)		
(16)	+			+			
	Soybean (Palam Soya)			699			
				(873)			
	Maize (HPQM-1)	Chickpea (GPF-2)	-	3009	975	13800	44376
	90-45-30	30-60-30		(5921)	(958)		
	Maize (HPQM-1)	G.Sarson (HPN-3)		3043	1133	20207	37869
	90-45-30	120-60-40	-	(5993)	(1371)		
		+			+		
		Toria (Bhawani)			679		
		-			(941)		
	Maize (HPQM-1)	Potato (Pukhraj)	Onion (AFDR)	3062	15545	31561	151265
	90-45-30	120-80-60	125-75-60	(5978)	(1654)		
						S.E.(m)	1795
						C.D.(5%)	3628
						C.V.	9.99

J & K Sub Tropical low altitude/ Dhansaur (12)	Rice (Basmati-370)	Wheat (PBW-550)	-	2885 '(3531)	3268 '(4948)	-	21291	93463
	30-20-10	100-50-25	-	4120	6014	-	22976	188846
	Rice (IET-1410)	Garlic (Local)	-	'(4927)	19270	17472	41598	321170
	50-30-20	100-50-50	Onion(N-53)	4095				
	Rice (IET-1410)	Potato(Badsah)	100-50-50	'(4912)	5471	5444	21286	86389
	50-30-20	120-60-120	Okra	4131				
	Rice (IET-1410)	Veg. Peas (Arkel)	60-30-20	'(4874)				
	50-30-20	50-60-50						
							S.E.(m)	3838
							C.D.(5%)	7876
J & K Sub Tropical low altitude/ Dhansaur (12)	Maize (Kanchan)	Wheat (PBW-175)	-	3150	3588	-	23186	71838
	90-60-30	100-50-25	-	'(6338)	'(5358)	-		
	Maize (Kanchan)	Garlic (Local)	-	3071	5867	-	19623	164105
	90-60-30	100-50-50		'(6178)				
	+			+				
	Cowpea (Local)			190				
	Maize (Kanchan)	Potato(Badsah)	Onion(N-53)	2987	18361	16959	37117	254475
	90-60-30	120-60-120	100-50-50	'(6007)				
	+			+				
	Ladiesfinger(Ladyluck)			1751	5239	4842	17916	106904
Jharkhand Central and North Eastern Plateau/ Pakur(24)	Maize (Kanchan)	Veg. Peas (Arkel)	Okra	3115				
	90-60-30	50-60-50	60-30-20	'(6289)				
	+			+				
	Blackgram (T-9)			200				
Jharkhand Central and North Eastern Plateau/ Pakur(24)	Rice (Swarna)	Wheat (Local)		2534	2174		16289	30865
	60-30-0	60-30-0		'(2877)	'(2898)			
	Rice (Sahbhagi)	Wheat ((K9107)		3466	2755		21527	44189
	100-50-25	100-50-25		'(3888)	'(3948)			
	Rice (Naveen)	Wheat ((K9107)		3224	2857		21041	42920
	100-50-25	100-50-25		'(3563)	'(4095)			
	Rice (PAC-801)	Wheat ((K9107)		3969	2876		23685	51832
	100-50-25	100-50-25		'(4492)	'(4123)			
	Rice (Arize-6444)	Wheat ((K9107)		4342	2754		24553	54408
	100-50-25	100-50-25		'(5033)	'(3947)			

Karnataka Northern Dry/ Gadag (12)	Hy.Maize (Super M-900) 150-75-37.5	Chickpea (JG-11) '25-50-0	2682	1275	40160
	Sunflower(Swati) 60-75-60	Chickpea (JG-11) '25-50-0	988	1238	52773
	Bt Cotton(Chiranjivi -II) 150-75-75		1405		41093
	Chilli (Byatagi dabbi) 150-75-75		865		27950
					S.E.(m) 2801 C.D.(5%) 5661 C.V. 23.96
	Chilli (Byatagi dabbi) 100-50-50		325		22897
	+ Onion (Arkakalyan) 62.5-25-62.5		+		
	Sunflower(Swati) 35-50-35	Chickpea (JG-11) '10-25-0	2154	916	27041
	Bt Cotton(Chiranjivi -II) 100-50-50		764		18004
	Groundnut(GPBD-4) 25-50-25	Sorghum(M-35-1) 50-25-0	729	850	10121
Karnataka Eastern Dry / Kolar '(12)	Cabbage (Unnati) 150-100-125	-	62103		1158 2341 20.56
	Tomato (US-3140) 250-250-250	'Coriander (Durga) 35-35-35	35540	20593	883337
	Tomato (US-3140) 250-250-250	'Radish (Durga) 75-38-38	35659	20530	323455
	Cabbage (Unnati) 150-100-125	'Coriander (Durga) 35-35-35	59390	20713	533979
	Cabbage (Unnati) 150-100-125	'Radish (Durga) 75-38-38	61360	21038	389081
					585871
					S.E.(m) 1721 C.D.(5%) 3442 C.V. 13.88
					67706 ***** 43.18

Karnataka Eastern Dry / Kolar '(12)	Fingermillet (ML 365) 100-50-50	Tomato (US-3140) 250-250-250	3847 '(5101)	38381	21445	667672
	Tomato (US-3140) 250-250-250	'Radish (Durga) 75-38-38	33584	6097	14703	324469
	Tomato (US-3140) 250-250-250	'Coriander (Durga) 35-35-35	33793	37047	54028	673357
	Cabbage (Unnati) 150-100-125	'Radish (Durga) 75-38-38	63561	6487	24511	291383
	Cabbage (Unnati) 150-100-125	'Coriander (Durga) 35-35-35	73619	35039	68961	610113
					S.E.(m) C.D.(5%) C.V.	26909 53819 18.16
Kerala Special Problem/ Thiruvalla (24)	Rice (Uma) 90-45-45	Rice (Uma) 90-45-45	5089 (6111)	-	34165	66088
	Rice (Uma) 90-45-45	Rice (Uma) 90-45-45	5137 (6198)	13201	40413	413098
	Rice (Uma) 90-45-45	Okra(Arka Anamica) 50-08-25	5138 (6177)	12110	38385	283950
	Rice (Uma) 90-45-45	Cucumber (Soubhagya) 70-25-25	5156 (6157)	16960	36477	233028
	Rice (Uma) 90-45-45	Amaranthus (Arun) 100-50-50	5152 (6171)	15832	76813	198973
					S.E.(m) C.D.(5%) C.V.	4688 9283 9.61
M.P. Northern Hill Zone of Chhattisgarh / Dindori (24))	Soybean(JS-335) 20-60-20	Wheat(GW-273) 120-60-40	905 (1419)	2495 (3782)	12544	49585
	Greengram(HUM-1) 20-50-0	Wheat(GW-273) 120-60-40	625 (1222)	2662 (4030)	11298	59217
	Maize(Swarna-589) 100-50-40	Chickpea (Vaibhav) 20-60-20	981 (2843)	1394 '(1675)	8373	46989
	Soybean(JS-335) 20-60-20	Chickpea (Vaibhav) 20-60-20	859 (1424)	1368 (1785)	8635	59958
					S.E.(m) C.D.(5%) C.V.	1773 3511 16.11

M.P. Kymore Plateau & Satpura Hills / Katni (25)	Rice(JRH-5)	Wheat(GW-273)	3287	2552	20205	49294
	120-60-40	120-60-40	(3421)	(3246)		
	Soybean(JS-97-52)	Wheat(GW-273)	664	2611	11899	28591
	20-60-20	120-60-40	(714)	(3342)		
	Maize(SMH-36)	Chickpea (JG-11)	528	709	4358	4730
	60-40-30	20-60-20	(1105)	'(1044)		
	Greengram (Pusa Vishal)	Wheat(GW-273)	336	2740	10602	37187
	20-60-20	120-60-40	(581)	(3511)		
					S.E.(m)	1245
					C.D.(5%)	2489
Maharashtra Cent Mah Plateau/ Amravati (12)	Soybean (JS-335)	Wheat (Lok-1)	1817	2538	16628	59051
	30-75-30	100-50-50	(2730)	(3781)		
	Soybean (JS-335)	Wheat (AKW-3722)	2364	2917	20306	84126
	30-75-30	100-50-50	(3546)	(4340)		
	Soybean (JS-335)	Wheat (Lok-1)	1806	2622	34498	99141
	30-75-30	100-50-50	(2735)	(3824)		
		+		+		
	Fenugreek			5293		
	Soybean (JS-335)	Wheat (AKW-3722)	2442	2960	39397	127589
	30-75-30	100-50-50	(3668)	(4302)		
Maharashtra Cent Mah Plateau/ Amravati (12)	Soybean (JS-335)	Chickpea (Vijay)	1872	1588	13805	72477
	30-75-30	20-40-20	(3616)	(1422)		
	Soybean (JS-335)	Chickpea (Jaki-9218)	2373	1885	17038	97045
	30-75-30	20-40-20	(3560)	(1700)		
	Soybean (JS-335)	Chickpea (Vijay)	1907	1601	17261	91346
	30-75-30	20-40-20	(3824)	(1439)		
		+		+		
	Linseed (PKV NL 260)			615		
	Soybean (JS-335)	Chickpea (Jaki-9218)	2543	1874	21696	123731
	30-75-30	20-40-20	(3782)	(1687)		
		+		+		
	Linseed (PKV NL 260)			748		
					S.E.(m)	2107
					C.D.(5%)	4382
					C.V.	7.59

Maharashtra	Pearlmillet(86M52)	Wheat (NIAW-301)	2267	4088	22327	55836
Deccan Plateau, Hot	60-30-30	120-60-40	(4915)	(6125)		
Semi arid & Eco Sub/	Pearlmillet(86M52)	Chickpea(Digvijay)	2258	2327	16528	66796
Pune (24)	60-30-30	25-50-30	(4899)	(3940)		
	Pearlmillet(86M52)	Onion (N-2-4-1)	2253	24954	20609	180357
	60-30-30	100-50-50	(4885)			
	Pearlmillet(86M52)	Fenugreek(Deepak)	2248	8525	12293	33700
	60-30-30	80-40-40	(4855)			
					S.E.(m)	66
					C.D.(5%)	133
					C.V.	1.81
						5.49
Maharashtra	Rice (Sahyadri)	Cowpea(Konkan Safed)	6383	1564	27137	66849
North Konkan	120-50-50	25-50-00	'(8717)	'(2407)		
Coastal/	Rice (Sahyadri)	Groundnut(TAG 24)	6296	2212	34326	69592
Roha	120-50-50	25-50-00	'(8629)	'(3661)		
'(24)	Rice (Sahyadri)	Maize(Ganga Safed)	6071	6815	44314	75151
	120-50-50	100-50-50	'(8240)	'(6365)		
	Rice (Sahyadri)	Marigold(Indica Orange)	6275	5494	21931	47213
	120-50-50	150-75-50	'(8613)	'(4523)		
	Rice (Sahyadri)	Chilli (Sitara)	6150	9065	23908	146827
	120-50-50	90-60-30	'(8513)	'(6548)		
	Rice (Sahyadri)	Groundnut(TAG 24)	6198	1835	33430	86262
	120-50-50	25-50-00	'(8619)	'(3167)		
		+		+		
		Sweet Corn (Sugar-75)		1835		
		100-50-50		'(3294)		
	Rice (Sahyadri)	Cowpea(Konkan Safed)	6119	1335	12544	
	120-50-50	25-50-00	'(8435)	'(2652)	'(4440)	256048
		Okra (Mahyco-10)				
		100-50-50				
					S.E.(m)	316
					C.D.(5%)	620
					C.V.	5.04
						15.68

Maharashtra CMP/ Aurangabad '(12)	Cotton(Bunny BG-2) 90-45-40	Chickpea (BDNG-797) 20-40-10	772 '(1117)	552 '(791)	12309
	Cotton(Bunny BG-2) 150-75-75	Chickpea (BDNG-797) 25-50-30	979 '(1407)	790 '(1121)	23362
	Cotton(Bunny BG-2) 150-75-75	Chickpea (BDNG-797) 25-50-30	871 '(1254)	838 '(1183)	28072
	'+ 1:1 Greengram(BM 2003-2) 25-50-0		+ 200 '(286)		
	Cotton(Bunny BG-2) 150-75-75	Chickpea (BDNG-797) 25-50-30	880 '(1267)	822 '(1170)	22829
	'+ 1:1 Chickpea (TAU-1) 25-50-0		+ 172 '(245)		
					S.E.(m) C.D.(5%) C.V.
					920 1887 14.72
	Cotton(Bunny BG-2) 90-45-40	Wheat(Trimbak) 91-45-45	671 '(1079)	1133 '(1747)	20126
	Cotton(Bunny BG-2) 150-75-75	Wheat(Trimbak) 120-60-60	933 '(1497)	1293 '(2021)	28229
	Cotton(Bunny BG-2) 150-75-75	Wheat(Trimbak) 120-60-60	820 '(1331)	1372 '(2127)	33404
	'+ 1:1 Greengram(BM 2003-2) 25-50-0		+ 273 '(434)		
Maharashtra CMP/ Aurangabad '(12)	Cotton(Bunny BG-2) 150-75-75	Wheat(Trimbak) 120-60-60	815 '(1311)	1341 '(2091)	25078
	'+ 1:1 Chickpea (TAU-1) 25-50-0		+ 211 '(342)		
					S.E.(m) C.D.(5%) C.V.
					1278 2623 16.58

Odisha Mid Central Table Land/ Angul/ '(24)	Rice(Lalat) 80-40-40	Greengram(K-851) 20-40-20	4413 (4818)	804 (2609)	17953	26497
	Rice(Lalat) 80-40-40	Cowpea(Utkal Manika) 25-50-60	4386 (4787)	5676 (1798)	17901	61654
	Rice(Lalat) 80-40-40	Okra(VNR Supergreen) 80-40-40	4453 (4856)	8642 (2487)	18433	78545
	Rice(Lalat) 80-40-40	Onion(Nasik N-53) 120-60-100	4445 (4921)	10926	20843	93501
					S.E.(m) C.D.(5%) C.V.	116 2492 9.38
Odisha East & South Eastern Coastal Plain/ Kendrapara/ '(24)	Rice(Pratikshya) 80-40-40	Greengram(Local) 20-40-20	4980 (6651)	882 (2776)	20177	37211
	Rice(Pratikshya) 80-40-40	Sunflower(KBSH-1) 60-80-60	4966 (6725)	1534 (3745)	26695	37240
	Rice(Pratikshya) 80-40-40	Groundnut(TMV-2) 20-40-40	5011 (6824)	2398 (2372)	30933	50129
	Rice(Pratikshya) 80-40-40	Bittergourd(Karan) 50-30-50	4982 (6719)	6874 (1404)	18405	87629
					S.E.(m) C.D.(5%) C.V.	169 2296 10.6
Punjab Central Plain/ Amritsar (24)	Rice (PR-111) 120-00-00	Wheat (PBW-621) 120-60-30	6793 (8690)	5111 (6300)	41188	107693
	Rice (PR-111) 120-00-00	G.Sarson (GSL-1) 100-30-00	6856 (8654)	1533 (3548)	32018	83466
	Rice (PR-111) 120-00-00	Greengram (SML-668) 12.5-40-00	7011 (8815)	1550 (3606)	40132	166894
	Rice (PR-111) 120-00-00	Gram .	6870 (8500)	4828 (8695)	41151	25423
	Rice (PR-111) 120-00-00	Gram .	6852 (8627)	4992 (8902)	49186	167609
	Rice (PR-111) 120-00-00	Gr.Peas (P-89) 50-62,50-00	6984 (9063)	2084 (3772)	26104	94991
	Rice (PR-111) 120-00-00	Gr.Peas (P-89) 50-62,50-00	6542 (8281)	2061 (4272)	32035	169561
					S.E.(m) C.D.(5%) C.V.	298 2750 5.84

Rajasthan Sub Humid Southern Plain & Aravali Hills/ Chittorgarh(24)	Maize (PEHM-2) 90-35-30	Wheat (Raj 4037) 120-40-30	2677 '(3969)	4290 '(6271)	23998	74114
	Maize (Aravali-1) 90-35-30	Barley (RD 2035) 120-40-30	2956 '(4440)	3975 '(5875)	23466	55394
	Maize (PM 1) 90-35-30	Wheat (Raj 4037) 120-40-30	3169 '(4804)	4642 '(6996)	26897	87337
	Soybean (RKS-24) 20-40-0	Wheat (Raj 3765) 120-40-30	1615 '(2385)	4250 '(6190)	21680	75640
	Clusterbean (RGC-936) 20-40-00	Wheat (Lok 1) 120-40-30	1113 '(1729)	3704 '(5613)	12994	113327
					S.E.(m) C.D.(5%) C.V.	194 383 9.01
T.N. Southern/ Chettinad '(24)	Rice (ADT-39) 150-50-50	Rice (ADT-39) 150-50-50	5167 '(5910)	5884 '(6766)	38234	75999
	Rice (ADT-39) 150-50-50	Blackgram (ADT-5) 25-50-25	5662 '(6470)	951 '(2044)	23012	64151
	Rice (ADT-39) 150-50-50	Greengram(VBN-3) 25-50-25	6174 '(7100)	960 '(2401)	24570	81690
	Rice (ADT-39) 150-50-50	Sesame(SVPR-1) 35-23-23	6624 '(7618)	797 '(3187)	27405	118362
					S.E.(m) C.D.(5%) C.V.	276 552 9.67
T.N. North West/ Paiyur '(12)	Rice (Sonamusoorie) 150-50-50	Cabbage(Hari Rani) 100-125-25	6925 '(9022)	60987	40426	278322
	Rice (Sonamusoorie) 150-50-50	Cabbage(Hari Rani) 100-125-25	8137 '(10637)	66922	46222	330815
	Rice (Sonamusoorie) 150-50-50	Cabbage(Hari Rani) 100-125-25	7580 '(9848)	63638	43408	304704
	Rice (Sonamusoorie) 150-50-50	Cabbage(Hari Rani) 100-125-25	7903 '(10503)	63912	44600	312024
					S.E.(m) C.D.(5%) C.V.	247 498 1.96
						1894 3827 2.14

T.N. North West/ Paiyur '(12)	Rice (Whiteponni)	Tomato (Sivam)	6236	40343	30855	673782
	150-50-50	200-300-200	'(8336)			
	Rice (Whiteponni)	Tomato (Sivam)	7041	44068	34498	761913
	150-50-50	200-300-200	'(9672)			
	Rice (Whiteponni)	Tomato (Sivam)	6703	43545	33206	743158
	150-50-50	200-300-200	'(9034)			
	Rice (Whiteponni)	Tomato (Sivam)	6776	45939	34010	790070
	150-50-50	200-300-200	'(9294)			
					S.E.(m) 218	6807
					C.D.(5%) 441	13757
U.P. Central Plain/ Saini, Kaushambi (24)	Sorghum (CSV-13)	Wheat(PBW-343)	900	3916	16690	43649
	80-40-20	120-60-40	(2746)	(4827)		
	Blackgram (Shekhar-2)	Wheat(PBW-343)	453	4133	15873	51153
	15-40-0	120-60-40	(229)	(5042)		
	Sesame (Shekhar)	Wheat(PBW-343)	430	4014	16309	57680
	20-15-15	120-60-40		(4807)		
	Sesame (Shekhar)	Pea(KPMR-522)	440	2161	9287	57174
	20-15-15	20-40-20		(1083)		
					S.E.(m) 61	519
					C.D.(5%) 121	1028
U.P. North Eastern Plain/ Sant Kabir Nagar (20)	Rice(Bardhan)	Wheat(HD-3733)	4702	3574	28634	69535
	150-60-60	150-60-40	(5823)	(4290)		
	Rice(Bardhan)	Mustard(Varuna)	4672	1595	24791	67514
	150-60-60	120-60-40	(5845)			
	Rice(Bardhan)	Lentil (NDL-1)	4692	1449	21204	72184
	150-60-60	18-46-00	(5854)			
	Rice(Bardhan)	Berseem (Vardan)	4715	297	17335	70951
	150-60-60	60-60-40	'(5921)	'(44775)		
					S.E.(m) 129	591
					C.D.(5%) 259	1181
					C.V. 2.52	3.77

Uttarakhand Hills of Uttarakhand / Jeolikot(24)	Rice (PRH-10)	Wheat (DBW-17)	-	5652 (6887)	5083 (6288)	37143	133640
	150-60-60	150-60-40					
	Rice (PRH-10)	Wheat (DBW-17)	Cowpea(PL-3)	5705 (6956)	5113 (6331)	39708	224374
	150-60-60	150-60-40	15-45-0		'(16376)		
	Rice (PRH-10)	Gram(PG-114)	Cowpea(PL-3)	5697 (6949)	1941 (1326)	28973	209773
	150-60-60	15-45-0	15-45-0		'(16473)		
	Rice (PRH-10)	Lentil(PL-4)	F Maize (African Tall)	5644 (6899)	1593 (1020)	24990	87981
	150-60-60	15-45-0	100-60-40		'(33017)		
	Rice (PRH-10)	Veg. Pea .(Arkil)	Maize cob (Naveen)	5679 (6922)	7443 -	40033	194534
	150-60-60	30-70-50	100-60-40		'(9814)		
W. B. Coastal Saline/ Kakdwip (24)	Rice (Ranjit)					S.E.(m)	4452
	80-40-40					C.D.(5%)	8816
	Rice (Ranjit)					C.V.	12.83
	80-40-40						
	Rice (Ranjit)						
	80-40-40						

7.4.1.3 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

Modules: Five location specific household centric modules were designed and implemented in 12 households in each location. The general guidelines used for designing the modules are given below

Locations : 28 centres in 12 agro climatic regions covering 27 NARP zones have implemented the interventions for improved farming systems while others have partially made the interventions. The details of locations, number of households covered along with existing farming system and interventions in improved farming systems are given in Table 7.3/3.

Results: The location specific details of interventions in various farming system modules are presented in Table 7.4/5 to 7.4/16. Brief description of agroclimatic and NARP zone wise results pertaining to 16 locations are presented below.

Western Himalayas

Three NARP Zones namely sub montane low hills subtropical in Himachal Pradesh, Low attitude

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 except Kangra (Himachal Pradesh) and South 24 Paragnas (West Bengal) where in all the selected 12 households belongs to marginal. The average holding size of marginal households in the study locations ranged from 0.39 to 0.95 ha while it was 1 to 1.85 ha for small households.

sub-tropical in Jammu and Kashmir and hill in Uttarakhand has been covered in the study area.

Sub montane and low hills sub-tropical (HP-1): The results of 12 experimental households in Kangra district indicates, in the second year, interventions in crop and processing modules are found to be significant between existing and improved farming systems while livestock module

Table 7.4/4: Details of existing and improved farming systems in study area

Agro climatic zone	NARP zone code	Study district	Holding size (ha) of study area		Existing	Farming systems			
						Improved			
			Marginal	Small	M0	M1	M2	M3	M4
Western Himalayas	HP-1	Kangra	0.39	-	Crop + cow/buffalo	IV* +BNA + IPM + Weed management	RYFS + MM	CAG +SS+SEM	NKG
	JK-1	Samba	0.83	1.65	Crop + cow/buffalo	IV + Dfn + BNA	MM	CAG	BYP + Mushroom
	UK-1	Nainital	0.47	1.08	Crop + cow	IV + Dfn + BNA	RYFS + DW + MM + SANI	CAG	Horticultural crops & cucurbits in homestead
Upper Gangetic Plains	UP-4	Kaushambi	0.78	1.33	Crop + buffalo /cow	BNA	RYFS + MM	CAG	NKG + horticultural crops
Middle Gangetic Plains	B1-2	Purnea	0.72	1.53	Crop + cow/ poultry/pig	IV+BNA+ MN+IPM	AI +RYFS + DW+ MM	CAG + SS	NKG + fish
Lower Gangetic Plains	WB-6	24 Paragnas South	0.61	-	Crop + cow/goat/duck	BNA+Chelated Zn + green manuring +line sowing +IPM	RYFS +BN+ Vacci.	Oil extraction	NKG + composite fish culture
Trans Gangetic Plains	HR-2	Sirsa	0.82	1.38	Crop + Cow/buffalo	IV+BNA + MN	MM	Ghee from milk	NKG
	PB-3	Amritsar	0.82	1.38	Crop + Cow/buffalo	IV+BNA + MN + IPM	RYFS + MM + AI	CAG	NKG
Eastern Plateau and Hills	CG-1	Kabirdham	0.65	1.30	Crop + Cow/ buffalo /goat/poultry/fish	IV + BNA + MN + ST	AI + MM + urea treatment to straw	Besan, curd and ghee making	NKG + mushroom
	JH-1	Pakur	0.61	1.43	Crop + goat/ pig	IV	Improved breed	CAG	NKG
	CG-3	Dindori	0.77	1.11	Crop + cow/buffalo	IV+BNA	RYFS + MM	VA + CAG	NKG + horticultural fruits

Agro climatic zone	NARP zone code	Study district	Holding size (ha) of study area		Farming systems				
					Existing	Improved			
			Marginal	Small	M0	M1	M2	M3	M4
Central Plateau and Hills	OR-10	Angul	0.85	1.10	Crop + cow/goat	IV+BNA + MN + PDM + IPM	RYFS + MM + Vacci + SANI + AI	VA + CAG + SS	NKG +BYP + VC + CC for fish + intercropping in orchard
	MP-1	Katni	0.59	1.40	Crop + cow/buffalo	IV+BNA	RYFS + MM	VA + CAG	NKG + horticulture fruits
	RJ-7	Chittorgarh	0.75	1.00	Crop + cow/buffalo	IV+BNA + IPM	Balanced nutrition + MM	VA	vegetables for home consumption
Western Plateau and Hills	MH-5	Pune	0.53	1.05	Crop + cow/goat	IV+BNA + ST + Pheromone trap	RYFS + MM + Vacci+ AI + BYP	CAG + VC + VA + SS	Fruit plantations
	MH-7	Aurangabad	0.95	1.29	Crop + cow	BNA + IPM + drip irrigation	RYFS + MM	CAG + SS + ghee making	NKG
	MH-7	Amravati	0.70	1.58	Crop + cow/buffalo/ goat/poultry	IV + BNA	AI + MM	CAG	NKG
Southern Plateau and Hills	AP-5	Warangal	0.63	1.35	Crop + cow/buffalo	IV+BNA + Dfn + green manuring	RYFS + MM + Azolla + BYP	-	-
	KA-5	Kolar	0.55	1.33	Crop + buffalo/sheep	IV+bio-fertilizer + MN	Improved fodder slips + MM + health camps	CAG	BYP
	KA-3	Gadag	0.72	1.70	Crop + cow/buffalo	IV+Dfn	RYFS + MM	CAG + SS	NKG

Agro climatic zone	NARP zone code	Study district	Holding size (ha) of study area		Farming systems				
					Existing	Improved			
			Marginal	Small	M0	M1	M2	M3	M4
East Coast Plains and Hills	TN-2	Dharmapuri & Krishnagiri	0.48	1.07	Crop + cow	IV+BNA+ IPM+ IWM	RYFS + MM + Vacci	CAG	Azolla + VC
	AP-2	Srikakulam	0.92	1.85	Crop + cow/buffalo	Green manuring + BNA + Dfn	RYFS + MM + Azolla + BYP	-	NKG
	OR-4	Kendrapara	0.69	1.12	Crop + cow/goat/poultry	IV+BNA + IPM + IWM	AI + Azolla feeding + MM + Vacci.	VA + CAG	NKG + BYP + CC for fish
	TN-5	Sivagangai & Pudukottai	0.40	1.23	Crop + cow	IV+Dfn + line planting + SRI in rice + BNA + MN	RYFS + MM + Vacci + DW	CAG	BYP + NKG + fruits
	KE-5	Pathinamthitta	0.87	1.68	Crop + milch animals	IV+BNA	RYFS + MM	CAG	NKG
West Coast Plains and Ghats	MH-2	Raigad	0.39	1.08	Crop + cow / buffalo / poultry	BNA + IPM	RYFS + MM + AI	CAG + ghee	Fruit trees
	GJ-4	Banaskantha/ Patan	0.85	1.38	Crop + cross bred cow/buffalo	IV	RYFS + MM	CAG +ghee	NKG + horticultural crops
Gujarat Plains and Hills	GJ-3	Kheda	0.74	1.10	Crop + cow/buffalo	IV + BNA + IWM	RYFS + MM	CAG+ SS + ghee	NKG + horticultural crops

* Note:

M1: IV: Improved variety, BNA: Balanced nutrient application, Dfn.: Diversification, PDM: Pest and disease management, CZn: Chelated zinc, LT: Line transplanting, OP: Optimum population, Gvi: Green manure, MN: Micro nutrient, IPM: Integrated Pest management, ST: Seed treatment, SRI: System of Rice Intensification, LS: Line sowing, SC: Seed compaction

M2: AI: Artificial Insemination, RYFS: Round the year fodder supply, MM: Mineral Mixture, Sani : Sanitation, DW: Deworming, BN: Balanced nutrition, Vacci: Vaccination, BYP: Backyard poultry, CMP: Clean milk production

M3: CAG: Cleaning and Grading, SS: Seed storage, SEM: Sale of excess of milk through co-operative union, VC: Vermicompost, VW: Vermi wash

M4: NKG: Nutritional Kitchen Garden, CC: Composite culture, VC: Vermicompost

is non-significant for study parameters. The intervention in crop, livestock and processing module resulted in net return of ₹ 19,329 from 0.39 ha. Additional return of ₹ 11,172 can be obtained by investing ₹ 5,223 on improved varieties, balance nutrient application, weed and pest management in crop, round the year fodder supply and mineral mixture to livestock and cleaning and grading along with sale of excess milk through co-operative union. Return per rupee invested in the improved farming system was found to be 1.19 which is 15% higher than existing farming system.

Low attitude sub-tropical (JK-1): The average holding size in Samba district was found to be 1.14 ha with marginal experimental households having an area of 0.63 ha and small households with 1.65 ha. The cost of interventions on account of improving the existing farming systems was found to be ₹ 9,764 ha which gave additional return of ₹ 16,798 from 1.14 ha. The per day profit in improved farming system was found to ₹ 256 from 1.14 ha area. The total returns including value of household consumption was found to be ₹ 1,67,271 in the existing system while the same could be improved to ₹ 1,84,068 in the improved system.

Hill (UK-1): The mean holding size was found to be 0.72 ha in Nainital district of Uttarakhand with existing system recording net income of ₹ 2,84,860/- including household consumption. The net returns can be improved to ₹ 5,55,266/- by inclusion of horticultural plantation like guava and cucurbits in homestead as optional module. Due to the interventions in existing farming system, the per day profit is enhanced to ₹ 1290 from 613.

Upper Gangetic Plains

The study of 12 households in Kaushambi district in central plain zone (UP-4) of Uttar Pradesh reveals that mean holding size is 1.05 ha and intervention in crop, livestock and optional module resulted in additional returns of ₹ 8,800/-. Inclusion of horticultural crop and kitchen garden resulted in net return per rupee invested as 5.

Middle Gangetic Plains

The mean holding size of 1.12 ha observed in Purnea district in north East Alluvial (B1-2) zone of Bihar. The existing farming system was giving net return of ₹ 87,472 including household consumption which can be increased to ₹ 91,906 through interventions in farming systems perspective. Among the different modules, optional module comprising of nutritional kitchen garden + fish + recycling of organic animal and kitchen waste to pond resulted in higher return per rupee invested on intervention (₹ 4.49). The per day profit and employment for the family can be increased to ₹ 251 and 170 man days from ₹ 221 and 167 man days due to interventions.

Lower Gangetic Plains

The study of 12 households in South 24 Parganas district of West Bengal covering the coastal saline zone (WB-6) reveals that average holding size is 0.61ha and interventions in crop, livestock, processing and optional module resulted in additional return of ₹ 5,830/-. The return per rupee invested on interventions was found to be 3 while per day profit can be enhanced to ₹ 118 from 66 in the zone with interventions in various modules.

Trans Gangetic Plains

Two NARP zones namely western zone in Haryana and Central Plain zone in Punjab were covered for study.

Western (HR-2): The holding size of marginal and small farm households is found to be 0.82 and 1.38 ha respectively with mean holding of 1.1 ha. The total returns over variable cost which also includes family consumption was found to be ₹ 2,95,902 and 3,36,557 in the existing and improved farming system respectively. With the intervention cost of ₹ 20,581, additional return of ₹ 45,185 can be obtained. The existing per day profit of ₹ 798 can be enhanced to ₹ 922 through low cost interventions in crop, livestock and processing modules. The interventions also resulted in additional employment of 4 man days.

Central Plain Zone (PB-3): The mean holding size of experimental farm households in Amritsar district was found to be 0.98 ha with total return of ₹ 89,311 in the existing system. Due to interventions in various modules, the returns can be enhanced to ₹ 1,21,149 with return per rupee invested as 1.22. The existing per day profit of ₹ 218 can be enhanced to ₹ 269. The intervention also resulted in additional employment generation of 45 man days.

Eastern Plateau and Hills

Four NARP zones, namely Chhattisgarh plain zone in Chhattisgarh, central and north eastern plateau zone in Jharkhand, northern hill zone in Madhya Pradesh and mid central table land in Odisha were covered.

Chhattisgarh plain (CG-1): The holding size of marginal and small farm households in Kabirdham district was found to be 0.65 and 1.30 ha respectively. Total returns including household consumption in the existing farming system was found to be ₹ 72,212 which can be increased to ₹ 1,59,849 with critical constraint based intervention in crop, livestock, processing and optional modules. Return over variable cost from interventions was found to be 5 in the improved system. The per day profit for the household can also be increased from ₹ 159 to 324.

Central and north eastern plateau (JH-1): The mean holding size was found to be 1.02 ha in Pakur district of Jharkhand. Analysis of existing system of rice-wheat, rice-chickpea with 2 no's each of pig and goat revealed that return of ₹ 58,208 can be obtained with per day profit of ₹ 59 only.

Northern hill (CG-3): Mean holding size of marginal and small households in Dindori district was found to be 0.77 and 1.11 ha. The interventions of improved rice and wheat variety, balanced fertilizer application, year round fodder supply to cow and buffalo, cleaning and grading along with kitchen garden and horticultural crops resulted in increase in per day profit.

Mid central table land (OR-10): The marginal and small farm households were having the holding size of 0.85 and 1.10 ha respectively. The total returns over variables cost of intervention was found to be ₹ 63,754 in the existing system which can be further improved to ₹ 72,264 through critical interventions. The cost of interventions was found to be ₹ 4,897 in all the modules which resulted in additional return of ₹ 8,510. Additional household employment of 28 man days can be generated through interventions.

Central Plateau and Hills

Two NARP zones namely Kymore plateau Satpura hill in Madhya Pradesh and sub humid southern plain and Aravali hills in Rajasthan was covered for improving the existing systems.

Kymore Plateau and Satpura hill (MP-1): The mean holding size in Katni district of Madhya Pradesh was found to be 0.93 ha and total returns in the existing farming system was found to be ₹ 1,00,642. The interventions in crops, livestock, processing and optional modules resulted in increase in return over variable cost per rupee invested to the level of ₹ 4 from 3.

Sub- humid southern plain and Aravali hills (RS-7): Mean holding size was found to be 0.92 ha in Chittorgarh district of Rajasthan. The total returns in existing farming system were found to be ₹ 37,102 which can be increased to ₹ 40,182 through low cost interventions. Additional employment of 6 man days can be generated with the low cost of interventions.

Western Plateau and Hills

Two NARP zones viz, western and central Maharashtra Plateau zone in Maharashtra were covered for improving the existing farming systems.

Western Maharashtra Plateau (MH-5): Mean holding size was found to be 0.79 ha in Pune district of Maharashtra. The total returns in the existing

system was found to be ₹ 3,84,094 which can be improved to ₹ 4,55,799 through low cost interventions. Additional employment of 26 man days can be generated through interventions.

Central Maharashtra Plateau (MH-7): Two districts namely Aurangabad and Amravati were covered for improving the existing systems. The mean holding size in Aurangabad district was found to be 1.12 ha and total returns from the existing system was only ₹ 53,296 which can be further improved to ₹ 56,579 through critical low cost interventions costing ₹1693/-. Additional employment of 9 man days can be generated through interventions. In Amravati district of Maharashtra, mean holding size was found to be 1.36 ha with total returns including household consumption was found to be ₹ 1,73,655 with per day profit of Rs. 400/- in the existing system.

Southern Plateau and hills

Four NARP zones viz, central Telangana zone in Andhra Pradesh, Eastern dry zone and Northern dry zone in Karnataka and North western zone of Tamil Nadu was covered for improving farming systems.

Central Telangana (AP-5): Mean holding size was found to be 0.99 ha in Warangal district of Andhra Pradesh with total returns from existing system as ₹ 1,52,632 through low cost interventions.

Eastern dry (KA-5): The mean holding size was found to be 0.74 ha in Kolar district of Karnataka. The total returns from the existing system were found to ₹ 1,43,979 with per day profit for household as 379 and employment of 87 man days.

North dry zone (KA-3): Mean holding size was found to be 1.12 ha in Gadag district of Karnataka with total returns from existing system was found to be ₹ 48,007 only with per day profit of ₹ 109/ household.

North Western Zone (TN-2): Mean holding size was found to be 0.78 ha in Krishnagiri and Dharmapuri district of Tamil Nadu with total returns

in the existing system of crop + dairy found to be ₹ 57,303 which can be increased to ₹ 83,969. The per day profit can be enhanced from ₹ 156 to 230 per household through interventions in crop, livestock, processing and value addition modules.

East Coast Plains and Hills

Three NARP zones namely southern zone in Andhra Pradesh, East south eastern coastal plain zone in Odisha and southern zone in Tamil Nadu were covered for improving the existing farming systems.

Southern (AP-2): Mean holding size of experimental households in Srikakulam district of Andhra Pradesh was found to be 1.38 ha with returns in existing farming system as ₹ 30,645 which can be further improved to ₹ 65,279 through interventions. The per day profit could be enhanced to ₹ 96 from 70/-.

East south eastern coastal plain (OR-4): Mean holding size was found to be 0.90 ha in Kendrapara district of Odisha. The returns in existing farming system of ₹ 26,907/- can be improved to ₹ 32,495/- through low cost interventions. The per day profit can be increased to ₹ 89 from ₹ 51. The existing system generated only 198 man days for the household.

Southern (TN-5): Mean holding size of experimental household was found to be 0.83 ha in Sivagangai and Pudukottai district of Tamil Nadu. The returns from existing system were found to be only ₹ 61,986, which can be increased to ₹ 74,540 through low cost interventions. The per day profit for household can be increased to ₹ 204 from 169 through interventions. Additional employment of 38 man days can be generated for farm household by improving existing farming system.

West Coast Plains and Ghats

Two NARP zones namely problem zone in Kerala, and north konkan coastal zone in Maharashtra were covered for improving the existing farming systems.

Table 7.4/5: Interventions and returns from on-farm farming system modules in Western Himalayan region

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): Kangra (Himachal Pradesh) NARP zone: Sub montane and low hills sub-tropical, No. of households: 12, Average holding size: 0.39 ha Marginal (12) 0.39 ha											
Existing FS (M0)	Crop	1802	10385	7635	-	7635	-	-	0.74	20	-
	Livestock	1180	659	521	-	521	-	-	0.79	1	-
	Total	19200	11044	8156	1192	9348	-	-	0.74	22	87
Improved FS	M1	30056	14786	15270	1054	16324	4400	7634	1.03	41	58
	M2	1406	832	574	-	574	173	53	0.69	1	22
	M3	4135	650	3485	-	3485	650	3485	5.36	9	18
	Total (M1 to M4)	35597	16268	19329	-	19329	5223	11172	1.19	52	98
Mo: Crop (Maize-wheat, rice-wheat) Livestock: Cow (1 no's), buffalo (1 no's); M1: Maize : Hybrid + balanced application of RDF 90:45:30 kg/ha + weed and pest management, Wheat: HPW 184 & HPW 211 + balanced nutrient application @ 80:40:40 kg NPK/ha Rice: Kasuri Basmati + balanced nutrient application @ 90:40:40 kg NPK/ha + weed and pest management; M2: Cow & Buffalo: Round the year fodder supply by growing cereal and legume fodder + Mineral mixture; M3: Rice, wheat and maize: cleaning and grading + seed storage, Milk: sale of excess milk through cooperative union; M4: Nutritional kitchen garden											
Interventions in crop and processing module are found to be significantly higher while livestock module is found to be non-significant for all the parameters.											
Paired t test											
District (state): Samba (Jammu & Kashmir) NARP zone: Low altitude Subtropical, No. of households: 12, Average holding size: 1.14 ha Marginal (6) 0.63 ha and small (6) 1.65 ha											
Existing FS (M0)	Crop	96736	29123	67612	41482	109094	-	-	2.32	185	-
	Livestock	85825	54098	31727	26450	58177	-	-	0.59	86	-
	Total	182561	83222	99339	67932	167271	-	-	3.00	272	-
Improved FS	M1	90061	36902	53159	63669	116828	7779	7734	1.44	145	-
	M2	92668	55688	37080	27112	64191	1490	6015	0.67	101	-
	M4	3544	495	3049	-	3049	495	3049	6.16	8	-
	Total (M1 to M4)	186273	92985	93288	90781	184068	9764	16798	8.00	256	-
Mo: Crop : (Rice, Wheat) Livestock: Cow, Buffalo M1: High yielding variety of crops, crop diversification, balanced fertilization. M2: Cattle: Mineral mixture M3: Cleaning and grading M4: Backyard poultry and mushroom											
Interventions in all the modules except optional are found to be significantly higher for all the parameters											
Paired t test											
District (state): Nainital (Uttarakhand) NARP zone: Hill, No. of households: 12, Average holding size: 0.72 ha Marginal (6) 0.47 ha and Small (6) 1.08ha											
Existing FS (M0)	Crop	286117	81963	204154	47838	251992	-	-	2.49	559	-
	Livestock	-	-	108706	21444	130150	-	-	-	297	-
	Total	286117	81963	312860	69282	382143	-	-	2.00	857	-
Improved FS	M1	283091	59183	223908	60952	284860	22780	32868	3.78	613	-
	M2	90120	87479	2641	16656	19297	87479	110853	0.03	7	-
	M3	-	-	-	-	6880	3729	6880	-	-	-
	Total (M1 to M4)	271420	27191	244229	-	244229	27191	244229	8.98	669	-
	Total (M1 to M4)	644631	173853	470779	77608	555266	95619	173124	13.00	1290	-
Mo: Crop (Rice-wheat-maize for fodder, rice-wheat-okra, rice-potato-okra, soybean-onion-okra, rice-wheat-coriander, soybean-lentil-maize) Livestock: cow; M1: Improved wheat (UP2572) and tomato variety, inclusion of onion and vegetable pea during <i>rabi</i> through diversification and balanced nutrient application to all crops M2: Livestock: Green fodder through legumes, mineral mixture, sanitation and deworming; M3: Grading of onion and tomato; M4: Horticultural crops and cucurbits in homestead											

Table 7.4/6: Interventions and returns from on-farm farming system modules in Upper Gangetic Plains

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): Purnea (Bihar) NARP zone: North East Alluvial (Bt-2), No. of households: 12, Average holding size: 1.12 ha Marginal (6) 0.72 ha and small (6) 1.53ha											
Existing FS (M0)	Crop	118583	64850	53732	-	53732	-	-	0.83	147	-
	Livestock	43127	15978	27149	-	27149	-	-	1.70	74	-
	Total	161710	80828	80882	6590	87472	-	-	1.00	221	167
Improved FS	M1	124684	68702	55981	5420	61401	3852	2248	0.81	153	74
	M2	48975	18911	30063	-	30063	2933	2913	1.59	82	51
	M3	3870	1372	2497	-	2497	1372	2497	1.82	6	45
	M4	4115	750	3365	-	3365	750	3365	4.49	9	-
	Total (M1 to M4)	181644	89737	91906	-	91906	8909	11024	1.02	251	170

Mo: Crop (rice-wheat, rice-maize, rice-vegetable) Livestock: cattle, poultry, pig; **M1:** Rice : MTU 7029, balance application of 100:40:20 kg NPK ha⁻¹ + 25 kg Zn + IPM, Wheat : PBW 373, 10 kg Boron + IPM; **M2:** Livestock: round the year fodder supply through planting of green fodder in 0.04 ha area + artificial insemination+ supplementation of mineral mixture in feeds + De worming ; **M3:** Cleaning and grading in rice and wheat, proper storage of seeds for next season; **M4:** Nutritional kitchen garden + fish (Pond 0.10 ha)+ recycling of organic animal and kitchen wastes to pond

Table 7.4/7: Interventions and returns from on-farm farming system modules in Middle Gangetic Plains

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): Purnea (Bihar) NARP zone: North East Alluvial (Bt-2), No. of households: 12, Average holding size: 1.12 ha Marginal (6) 0.72 ha and small (6) 1.53ha											
Existing FS (M0)	Crop	118583	64850	53732	-	53732	-	-	0.83	147	-
	Livestock	43127	15978	27149	-	27149	-	-	1.70	74	-
	Total	161710	80828	80882	6590	87472	-	-	1.00	221	167
Improved FS	M1	124684	68702	55981	5420	61401	3852	2248	0.81	153	74
	M2	48975	18911	30063	-	30063	2933	2913	1.59	82	51
	M3	3870	1372	2497	-	2497	1372	2497	1.82	6	45
	M4	4115	750	3365	-	3365	750	3365	4.49	9	-
	Total (M1 to M4)	181644	89737	91906	-	91906	8909	11024	1.02	251	170

Mo: Crop (rice-wheat, rice-maize, rice-vegetable) Livestock: cattle, poultry, pig; **M1:** Rice : MTU 7029, balance application of 100:40:20 kg NPK ha⁻¹ + 25 kg Zn + IPM, Wheat : PBW 373, 10 kg Boron + IPM; **M2:** Livestock: round the year fodder supply through planting of green fodder in 0.04 ha area + artificial insemination+ supplementation of mineral mixture in feeds + De worming ; **M3:** Cleaning and grading in rice and wheat, proper storage of seeds for next season; **M4:** Nutritional kitchen garden + fish (Pond 0.10 ha)+ recycling of organic animal and kitchen wastes to pond

Table 7.4/8: Interventions and returns from on-farm farming system modules in Lower Gangetic Plains

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): 24 Parganas (S) (West Bengal) NARP zone: Coastal Saline Zone, No. of households: 12, Average holding size: 0.61 ha Marginal (12) 0.61 ha											
Existing FS (M0)	Crop	46580	22319	24261	-	24261	-	-	1.09	66	-
	Total	46580	22319	24261	-	24261	-	-	1.00	66	-
	M1	89580	49329	40252	26314	66566	27010	42305	0.82	110	-
	M2	13124	17456	(2877)	6415	3538	17456	3538	(0.16)	(7)	-
Improved FS	M3	-	-	-	-	6823	-	6823	-	-	-
	M4	8108	2,474	5635	-	5635	2474	5635	2.28	15	-
	Total	110813	69258	43010	32729	82562	46939	58301	3.00	118	-
	(M1 to M4)										
M0: Crop (Rice-okra, rice-green gram, rice-sunflower); Livestock: Deshi cow (5 nos), Jersey (1 nos), Heifer (1 nos), calves (2 nos), hen (2 nos), goat (1 nos), ducks (5 nos); M1: Chelated Zn and green manuring in rice, maintaining optimum plant population through line sowing, recommended dose of fertilizer and scheduled spray for all crops; M2: Live stock: balanced nutrition + vaccination, supply green fodder round the year, M3: Oil extraction from Sunflower seed; M4: Nutritional kitchen garden + liming of pond + optimum density of fingerlings											

Table 7.4/9: Interventions and returns from on-farm farming system modules in Trans Gangetic Plains

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): Sirsa (Haryana) NARP zone: Western, No. of households: 12, Average holding size: 1.1 ha Marginal (6) 0.82 ha and small (6) 1.38 ha											
Existing FS (M0)	Crop	340799	117997	222801	-	222801	-	-	1.88	610	-
	Livestock	120510	51939	68571	-	68571	-	-	1.32	187	-
	Total	461308	169936	291372	4530	295902	-	-	1.71	798	106
	M1	364300	119506	244793	2360	247153	1509	21992	2.04	670	73
Improved FS	M2	125216	50249	74967	-	74967	(-1690)	6396	1.49	205	37
	M3	37560	20762	16797	-	16797	20762	16797	0.80	46	-
	Total	527076	190518	336557	-	336557	20581	45185	1.76	922	110
	(M1 to M4)										
M0: Crop (Cotton-wheat & groundnut-wheat), Livestock: buffalo + cattle; M1: Cotton: balanced nutrient application + Zinc Sulphate @ 25 kg ha ⁻¹ ; Wheat: Improved variety (HD-2851); M2: Livestock: Supplementation of mineral mixture in feeds; M3: Preparation of ghee; M4: Nutritional kitchen garden											

District (state): Amritsar and Taranitaran (Punjab) NARP zone: Central Plain, No. of households: 12, Average holding size: 0.98 ha Marginal (6) 0.82 ha and small (9)												
Existing FS (M0)	Crop	111833	52992	58841	-	58841	-	-	1.11	161	-	-
	Livestock	39192	18222	20970	-	20970	-	-	1.15	57	-	-
	Total	151025	71214	79811	-	83311	-	-	1.12	218	130	-
Improved FS	M1	121900	56601	65299	4580	69879	3609	6458	1.15	178	96	-
	M2	44342	20632	23710	7054	30764	2410	2740	1.15	64	45	-
	M4	12374	3172	9202	1804	11006	(68042)	(70609)	2.90	25	34	-
	Total (M1 to M4)	178616	80405	98211	22938	121149	(62023)	(61411)	1.22	269	175	-
Mo: Crop (Rice-wheat), Livestock: Cow (1 nos) & Buffalo (1 nos); M1: Rice: Pusa 1121, balance application of 40:0:0; NPK to rice + 12.5 kg Zn ha ⁻¹ + IPM using <i>Trichogramma</i> cards, Wheat: PBW 621, balance application of 120:60:30 NPK to rice + 12.5 kg Zn ha ⁻¹ + IPM using <i>Trichogramma</i> cards; M2: Livestock: round the year fodder supply through planting of green fodder in 0.04 ha area + artificial insemination + supplementation of mineral mixture in feeds; M3: Cleaning and grading in rice and wheat; M4: Nutritional kitchen garden												
Table 7.4/10: Interventions and returns from on-farm farming system modules in Eastern Plateau and Hills												
Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)	
District (state): Kabirdham (Chhattisgarh) NARP zone: Chhattisgarh Plain, No. of households: 12, Average holding size: 0.97 ha Marginal (6) 0.65 ha and Small (6) 1.30 ha												
Existing FS (M0)	Crop	64614	25958	38656	6243	44899	-	-	1.49	105	-	-
	Livestock	-	-	19208	8104	27313	-	-	-	52	-	-
	Total	64614	25958	57864	14348	72212	-	-	1.00	159	-	-
Improved FS	M1	91719	36659	55061	8548	63609	10700	18709	1.50	150	-	-
	M2	54225	18918	35308	10063	45370	18918	18058	1.87	96	-	-
	M3	-	-	-	-	23000	10500	23000	-	-	-	-
	M4	46960	19091	27870	-	27870	19091	27870	1.46	76	-	-
	Total (M1 to M4)	192905	74667	118238	18610	159849	59209	87637	5.00	324	-	-
Mo: Crop (Rice/soybean-gram/ wheat), Livestock: Cow (2 nos) & buffalo (3 nos), Goat (8 nos) Poultry (60 nos) + fish pond; M1: Rice: MTU1010, recommended dose of nutrients @ 100:60:40 kg NPK/ha + 20 kg ZnSO ₄ seedling treatment by Chloropyrifos, Soybean: Hyb. B.N.R.2355, Pro-agro 6444, Seed treatment by Carbendazim, Gram- JG-74, recommended dose of nutrients @ 20:50:20 kg NPK/ha. M2: Livestock: artificial insemination+ 30 g mineral mixture in feeds/ cattle /day + urea treatment to rice straw (Paira), Fish: 800 fingerling of Common carp, Rohu & Mriagal + 3 duck (1 male & 2 female); M3: Making gram flour (Besan) and Making Curd & Ghee; M4: Nutritional kitchen garden, plantation of papaya & banana + chilli, tomato & Brinjal each at 0.1 acre area + Mushroom												

District (state): Pakur (Jharkhand) NARP zone: Central and north eastern Plateau zone, No. of households: 12, Average holding size: 1.02 ha Marginal (6) 0.61 ha and small (9) 1.43ha											
Existing FS (M0)	Crop	73533	62205	11328	36680	48008	-	-	0.18	31	-
	Livestock	-	-	10200	-	10200	-	-	-	27	-
	Total	73533	62205	21528	36680	58208	-	-	-	59	-
Mo: Crop : (Rice –Wheat, rice-chickpea, Livestock: Pig (2), Goat (2) M1: Improved varieties of rice, wheat and chickpea M2: Cattle: Improved breed of goat and pig M3: Cleaning and grading of economic produces M4: Kitchen gardening											
District (state): Dindori(Madhya Pradesh) NARP zone: Northern Hill zone, No. of households: 12, Average holding size: 1.37 ha Marginal (3) 0.77 ha small (6) 1.11ha and Medium (3) 2.5ha											
Existing FS (M0)	Mo Crop	42124	21933	20191	-	20191	-	-	0.92	55	-
	Mo Livestock	6827	2110	4717	-	4717	-	-	2.24	12	-
	Mo Total	48951	24043	24908	-	24908	-	-	1.04	68	113
Improved FS	M1	51348	22846	28502	520	29022	912	8311	15	78	65
	M2	18116	13205	4911	-	4911	11095	194	0.37	13	30
	M3	15175	3820	11355	-	11355	3820	11355	2.97	31	12
	M4	43375	157832	275542	-	275542	157832	275542	1.75	75	15
Overall Total	Total (M1 to M4)	518014	197704	320310	520	320310	173661	295402	1.62	197	122
Mo: Crop: Rice- wheat, Livestock: Cattle and buffalo; M1: Rice: IR-24, fertilizer @ 49 :24:0 NPK Kg/ha, wheat : JW-3020, fertilizer @ 49 :24:0 NPK Kg/ha.; M2: Cow & buffalo: round the year fodder supply by growing cereal dry fodder + mineral mixture; M3: Crops: Cleaning of rice and milling and wheat-flour ,livestock : ghee making of excess milk; M4: kitchen gardening + horticulture crops											
District (state): Angul (Odisha) NARP zone: Mid central table land, No. of households: 12, Average holding size: 0.98 ha Marginal (6) 0.85 ha and small (6) 1.10 ha											
Existing FS (M0)	Crop	55345	29244	26102	-	26102	-	-	-	71	181
	Livestock	11383	7187	4196	-	4196	-	-	-	11	13
	Optional	56594	23137	33817	-	3317	-	-	-	92	36
Improved FS	Total	123322	59568	63754	-	63754	-	-	1.07	174	230
	M1	60450	32386	28064	-	28064	3142	1963	0.87	76	194
	M2	13005	8288	4717	-	4717	1101	521	0.57	12	18
	M3	1233	879	354	-	354	879	354	-	-	2
	M4	62041	22912	39129	-	39129	-225	5672	1.71	107	44
	Total (M1 to M4)	136729	64465	72264	-	72264	4897	8510	3	197	258
Mo: Crop (Rice – greengram, rice-vegetable, rice/arhar-maize, rice-sunflower, jute-rice, vegetable. – vegetable, Maize-vegetable), Livestock: Cow (4 nos), Bullock 4 nos), calves (2 nos), Goat (4 nos); M1: Rice : HYV (lalat), balanced nutrient application to rice @ 80:40:40 kg NPK/ha and zinc sulphate @25 kg/ha , chemical weed control in paddy with butachlor, Pulses: Use of <i>rhizobium</i> and paper mill sludge in pulse. Adoption of IPM with use of pheromone traps & imidacloprid, vegetable: HYV (Tomato-Utkal Raja, Pointed gourd-swama alokik), balanced nutrient applications with micronutrients; M2: Cattle: round the year green fodder and supplementing feed with mineral mixture @ 15 g/day + PPR vaccination & administering albendazole for deworming+ shed cleaning with disinfectants like Phenyle, CaOCl ₂ & CaCO ₃ + Al of desi cows, Goat: Crossing desi goat with improved breed; M3: Ghee and cheese making, pickle making from mango, pickle and ketchup from tomato, cleaning, grading & storing of greengram; M4: Nutritional kitchen garden+ backyard poultry with vanaraja+ culture of fast growing fish species. with IMC and supplemental feeding + intercropping of vegetables in mango orchard. + stocking of quick growing species of fishes in composite pisciculture, mushroom											

Table 7.4/11: Interventions and returns from on-farm farming system modules in Central Plateau and Hills

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): Katni (Madhya Pradesh) NARP zone: Kymore Plateau and Satpura Hill zone, No. of households: 12, Average holding size: 0.93 ha Marginal (7) 0.59 ha and Small (5) 1.40 ha											
Existing FS (M0)	Crop	108279	37792	70488	13562	84050	-	-	1.87	193	-
	Livestock	21577	11169	10408	6185	16592	-	-	0.93	28	-
	Total	129856	48961	80896	19746	100642	-	-	3.00	222	-
Mo: Crop: Rice- wheat / gram, Livestock: Cow and buffalo; M1: Rice: IR-24, fertilizer apply @ 37 :31:0 NPK Kg/ha, wheat : JW-3020, fertilizer apply @ 37 :31:0 NPK Kg/ha; M2: Cow & buffalo: round the year fodder supply by growing cereal dry fodder + mineral mixture; M3: Crops: Cleaning of rice livestock : ghee making of excess milk; M4: Kitchen gardening + horticulture crops											
District (state): Chittorgarh (Rajasthan) NARP zone: Sub-Humid Southern Plain & Aravalli Hills (RJ-7), No. of households: 12, Average holding size: 0.92 ha Marginal (4) 0.75 ha and small (8) 1.0 ha											
Existing FS (M0)	Crop	88675	52350	36325	1285	37610	-	-	0.69	99	-
	Livestock	2648	1871	777	-	777	-	-	0.41	2	-
	Total	91323	54221	37102	-	37102	-	-	0.68	101	46
Improved FS	M1	89101	49962	39139	1256	40395	(2388)	2814	0.78	107	22
	M2	2806	1995	811	-	811	124	34	0.40	2	14
	M4	486	254	232	-	232	254	232	0.91	0.63	16
	Total (M1 to M4)	92393	52211	40182	-	40182	(2010)	3080	0.76	110	52
Mo: Crop (Maize-wheat), Livestock: Cow (2 nos), Buffalo (2 nos); M1: Wheat : Raj variety, balanced nutrient application @ 120:40:30 kg NPK/ha+ IPM + sale of produce at Mandi; M2: Cattle: Information for balanced ration, addition of mineral mixture in feed; M3: Making of pop corn; M4: Vegetables											

Table 7.4/12: Interventions and returns from on-farm farming system modules in Western Plateau and Hills

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): Katni (Madhya Pradesh) NARP zone: Kymore Plateau and Satpura Hill zone, No. of households: 12, Average holding size: 0.93 ha Marginal (7) 0.59 ha and Small (5) 1.40 ha											
Existing FS (M0)	Crop	510817	271720	239096	-	239096	-	-	0.88	655	-
	Livestock	216610	78080	138529	-	138529	-	-	1.77	379	-
	Total	727427	349800	377626	6468	384094	-	-	1.08	1034	107
Improved FS	M1	657421	364131	293289	4520	297809	92410	54192	0.81	803	68
	M2	248960	102283	146676	-	146676	24202	8146	1.43	401	36
	M3	26286	10453	15833	-	15833	10453	15833	1.51	43	29
	Total (M1 to M4)	932667	476867	455799	4520	455799	127066	78172	0.96	1248	133
Mo: Crop (Pearl millet- pea-vegetable, groundnut- wheat, soybean- gram, greengram-onion, maize-berseem, sorghum-marvel grass, lucern grass, hybrid napier), Livestock: Cow/bullock/goat; M1: Improved variety of all crops, balanced nutrient application, timely harvest of crops, seed treatment and use of pheromone trap; M2: Artificial insemination, round the year fodder production, mineral mixture, vaccination as per schedule and backyard poultry; M3: Cleaning and grading of grains, seed storage, ghee making, vermicompost, M4: Improved package of practices for fruit plantation											
District (state): Chittorgarh (Rajasthan) NARP zone: Sub-Humid Southern Plain & Aravalli Hills (R-J-7), No. of households: 12, Average holding size: 0.92 ha Marginal (4) 0.75 ha and small (8) 1.0 ha											
Existing FS (M0)	Crop	89372	37253	52199	-	52119	-	-	1.40	142	-
	Livestock	3067	1890	1177	-	1177	-	-	0.62	3	-
	Total	92439	39143	53296	-	53296	-	-	1.36	146	180
Improved FS	M1	92601	38576	54025	-	54025	1323	1905	1.40	148	78
	M2	3924	1900	2024	-	2024	10	846	1.07	5	65
	M4	890	360	530	-	530	360	530	1.47	1	46
	Total (M1 to M4)	97415	40836	56579	-	56579	1693	3282	1.39	155	189
Mo: Crop (Pearl millet – chickpea, cotton – maize, maize – wheat, sugarcane / cotton, vegetable – sweet corn, sugarcane / maize/ vegetable – wheat, cotton – wheat/ fodder maize – fodder – sugarcane, sorghum-cotton + Maize), Livestock: Cow (2 nos), Bullock (1 nos) M1: Balanced nutrient application for sugarcane (250:115:115 kg/ha), cotton (50:75:75 kg / ha), wheat (120:60:60 kg/ha, maize fodder (100:50:50 kg/ha), cauliflower (160:80:80 kg/ha) and ginger (190:50:50 kg/ ha) + IPM + use of drip irrigation system; M2: Cattle: Making available good quality fodder seed during rabi and summer + supplementing feed with mineral mixture; M3: Cleaning and grading of grains and pulses, grading of cauliflower before marketing, sugarcane Juice centre at road side in (Aurangabad – Ajanta high way) in summer, proper storage of grains and making ghee from excess milk M4: NKG											
District (state): Amravati (Maharashtra) NARP zone: Central Maharashtra plateau zone (MH-VII), No. of households: 12, Average holding size: 1.36 ha Marginal (3) 0.70 ha and small (9) 1.58 ha											
Existing FS (M0)	Crop	122958	62142	60817	11451	72268	-	-	0.98	166	-
	Livestock	173262	87935	85328	16060	101388	-	-	0.97	233	-
	Total	296220	150076	146144	27511	173655	-	-	2.00	400	-
Mo: Crop : (Cotton, soybean -chickpea /wheat, Soybean+pea-wheat, Sorghum-wheat, Sorghum-pea-wheat, Sorghum-cotton+pea-wheat) Livestock: Cow (2Nos), Buffalo 4Nos), goats and birds.											

Table 7.4/13: Interventions and returns from on-farm farming system modules in Southern Plateau and Hills

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): Warangal (Andhra Pradesh) NARP zone: Central Telangana Zone, No. of households: 12, Average holding size: 0.99 ha Marginal (6) 0.63 ha and small (6) 1.35 ha											
Existing FS (M0)	Crop	237817	92658	145159	-	145159	-	-	1.57	397	-
	Livestock	1790	1084	705	-	705	-	-	0.65	1	-
	Total	239607	93743	145864	7078	152942	-	-	1.56	399	98
Mo: Crop (Turmeric-banana, rice-fallow, cotton-fallow, rice-rice, turmeric-fallow, rice-vegetables, vegetables-vegetables), Livestock (cow/buffalo); M1: Crop : green manuring before kharif rice, high yielding varieties of rice, remunerative irrigated dry crops in rabi, balanced nutrient application (NPK&Zn) for rice & Irrigated dry crops; M2: Raising of Green fodder +balanced cattle feed + azolla in trenches as cattle feed + Giriraja birds @ 20 per household											
District (state): Kolar (Karnataka) NARP zone: Eastern Dry Zone (Zone-5) , No. of households: 12, Average holding size: 0.74 ha Marginal (9) 0.55 ha and Small(6) 1.33ha											
Existing FS (M0)	Crop	98533	30446	68087	-	68087	-	-	2.24	186	-
	Livestock	97102	26550	70552	-	70552	-	-	2.66	193	-
	Total	195635	56996	138639	5340	143979	-	-	2.43	379	87
Mo: Crop : (Finger millet+ Filed bean+ Redgram/ Fodder maize, mulberry, Pole beans, Veg.) Livestock: Buffalo, Sheep, Bullock M1: Improved varieties of crops, bio-fertilizer and micro nutrient application. M2: Improved fodder slips, mineral mixture supplementation and health camps M3: Grading of vegetables, scientific cleaning and grading of finger millet M4: Replacement with new method, disinfectant and improved rearing package for poultry											
District (state): Gadag (Karnataka) NARP zone: Northern dry zone, No. of households: 12, Average holding size: 1.12 ha Marginal (7) 0.72 ha and small (5) 1.70ha											
Existing FS (M0)	Crop	36833	11321	26221	3847	30068	-	-	2.32	71	-
	Livestock	18164	4590	13574	4365	17939	-	-	2.96	37	-
	Total	54998	15911	39795	8212	48007	-	-	5.00	109	-
Mo: Crop: Chilly + onion-cotton, maize-bengalgram, sunflower-sorghum, Livestock: Cow, Jersey (1no's), buffalo(2 no's); M1: Crop : Chilly + onion-cotton, maize-bengalgram, sunflower- sorghum; M2: Cow & buffalo: round the year fodder supply by growing cereal and legume fodder + Mineral mixture; M3: Crops: Cleaning and grading in bajra, wheat, tobacco and clusterbean. + proper storage of seeds for next season, livestock : ghee/Khoa making of excess milk; M4: kitchen gardening											
District (state): Krishna giri& Dharmapuri (Tamil Nadu) NARP zone: North Western Zone , No. of households: 12, Average holding size: 0.78 ha Marginal (6) 0.48 ha and Small(6) 1.07ha											
Existing FS (M0)	Crop	96596	64367	32229	-	-	-	-	-	88	-
	Livestock	51346	32817	18529	-	-	-	-	-	50	-
	Poultry	9417	2842	6575	-	-	-	-	-	18	-
Improved FS	Total	157359	100056	57303	-	-	-	-	0.57	156	-
	M1	108508	56679	51829	-	51829	-7688	19600	0.91	142	-
	M2	58346	36150	22196	-	22196	3333	3667	0.61	60	-
	M3	4340	2546	1794	-	1794	2546	1794	0.70	4	-
	M4	13417	5267	8150	-	8150	2425	1575	1.55	22	-
	Total	184611	100642	83969	-	83969	616	26636	4.00	230	-
	(M1 to M4)										
Mo: Crop (rice-ragi, rice-coriander, rice-tomato, rice- beet root, groundnut-cabbage, sugarcane- rice, ragi-fallow, rice-fallow, Mint, rice- rice, rice- peas, banana), Livestock (cow); M1: Crop (improved varieties+ INM+ IPM+ IWM); M2: Livestock: mineral mixture+ green fodder+ vaccination; M3: Cleaning&grading; M4: Azolla + Vermicompost											

Table 7.4/14: Interventions and returns from on-farm farming system modules in East Coast Plains and Hills

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): Srikulam (Andhra Pradesh) NARP zone: Southern, No. of households: 12, Average holding size: 1.38 ha Marginal (6) 0.92 ha and small (6) 1.85 ha											
Existing FS (M0)	Crop	41213	26923	14290	19964	34254	-	-	0.53	39	-
	Livestock	59327	48053	11274	9268	20542	-	-	0.23	30	-
	Total	100540	74976	25564	29232	54796	-	-	1.00	70	-
	M1	25191	532	19868	10777	30645	(21600)	(3609)	3.7	54	-
	M2	19417	13223	6194	-	6194	(34830)	(14348)	3.47	16	-
	M3	-	-	-	-	19478	1150	19478	-	-	-
Improved FS	M4	9358	396	8962	-	8962	396	8962	22.64	24	-
	Total (M1 to M4)	53965	18942	35024	10777	65279	(54884)	10483	27.00	96	-
Mo: Crop (cashew + turmeric, rice-rice, cotton-fallow, rice-maize, turmeric-fallow, rice-vegetables, vegetables-vegetables), Livestock (cow/buffalo); M1: Crop : green manuring before <i>kharrif</i> rice, high yielding varieties of rice, remunerative irrigated dry crops in <i>rabi</i> , balanced nutrient application (NPK&Zn) for rice & Irrigated dry crops; M2: Raising of Green fodder +balanced cattle feed + azolla in trenches as cattle feed + Giriraja birds @ 20 per household; M4: Nutritional Kitchen Garden											
District (state): Kendrapara (Odisha) NARP zone: East South eastern coastal plain, No. of households: 12, Average holding size: 0.90 ha Marginal (6) 0.69 ha and Small (6) 1.12ha											
Existing FS (M0)	Crop	55585	41309	14276	-	14276	-	-	0.35	39	-
	Livestock	9620	5133	4487	-	4487	-	-	0.87	12	-
	Total	65206	46442	18764	-	18764	-	-	0.40	51	198
Improved FS	M1	56857	29949	26907	-	26907	(11359)	12630	0.90	73	-
	M2	9980	6093	3886	-	3886	(960)	(601)	0.64	10	-
	M3	6202	4500	1702	-	1702	4500	(1702)	0.38	4	-
	Total (M1 to M4)	73039	40543	32495	-	32495	(5898)	13731	0.80	89	-
Mo: Crop (Rice-fallow, Rice-rice, Rice-greengram / blackgram, Jute-rice-tomato/bitter gourd, Jute-blackgram, mango, Coconut Livestock: Cow (3 no's), bullock (2 no's), Goat (5 no's), Poultry (5 no's) M1: Crop (Improved variety + IPM + IWM + INM), M2: Cow: Artificial Insemination + Azolla feeding @ 2 kg/day/animal + mineral mixture @ 15 g/day + vaccination as per schedule Goat: Albendazole for deworming Poultry: Improved breed of Vanaraja, cleaning of shed with disinfectant like lime; M3 Rice: Cleaning and grading, flaked rice preparation, Pulses: Pulses storage with metal bin, Mango: Pickle making, Coconut: flavoured oil preparation, Tomato and bitter gourd: cleaning and grading ; M4: Nutritional Kitchen garden + Backyard poultry with vanaraja breed + Culture of fast growing fish species. (pacu, pangatious & silver carp											

District (state): Sivagangai and Pudukottai (Tamil Nadu) NARP zone: Southern , No. of households: 12, Average holding size: 0.83ha Marginal (6) 0.4 ha and small (6) 1.23 ha											
Existing FS (M0)	Crop	78777	30171	48605	-	48605	-	-	-	1.61	133
	Livestock	24370	10990	13380	-	13380	-	-	-	1.22	36
	Total	103148	41161	61986	2476	64462	-	-	-	1.51	169
	M1	90630	37333	53296	1890	55186	161	4691	1.43	146	82
	M2	22348	18094	4253	-	4253	7104	(9127)	0.24	11	30
Improved FS	M4	24672	7681	16990	-	16990	7681	16990	2.21	46	35
	Total	137650	63109	74540	-	74540	21947	12554	1.18	204	147
	(M1 to M4)										
Mo: Crop: (Rice/maize/blackgram/soybean/cucumber, rice-rice-blackgram/groundnut/ sugarcane), Livestock: Cross bred dairy cow; M1: Rabi: rice (0.4ha), Summer:rice (0.2 ha), Blackgram (0.2 ha), Summer: brinjal & okra (0.10 ha),rice (0.2 ha), Cucumber (0.1 ha) rice: SRI method, pre & early post emergence application of herbicide, balanced application of NPK and micro nutrient and split application. Blackgram: VBN5, line planting, pre & early post emergence application of herbicide, groundnut: TMV 13 line sowing raised bed planting, pre & early post emergence application of herbicide, balanced application of NPK and Micro nutrient and split application, Use of bio inoculants PGPR and IPM, M2: Livestock: Supply of green fodder round the year BNH CO 4+ supplementation of mineral mixture+ artificial insemination+ De worming and vaccination and Dual purpose Kavery Chicks; M3: Cleaning, grading and packing; M4: Backyard Poultry and Kitchen garden, Hybrid vegetables (tomato, chilli, bhendi, radish & greens) annual moringa, Jack Fruit Hybrid vegetables (tomato, chilli, bhendi, radish & greens) Silpaulin vermi compost											

Table 7.4/15: Interventions and returns from on-farm farming system modules in West Coast Plains and ghats

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): Pathanamthitta (Kerala) NARP zone: Problem, No. of households:12, Average holding size: 1.27 ha Marginal (6) 0.87 ha and small (6) 1.68 ha											
Existing FS (M0)	Crop	145708	65840	79868	2683	82551	-	-	1.21	218	-
	Livestock	124091	75056	49035	12211	61247	-	-	0.854	134	-
	Total	269800	140896	128903	14895	143798	-	-	2.00	353	-
Improved FS	M1	170828	86504	84324	2864	87188	20664	4637	0.97	231	-
	M2	138762	84198	54564	12749	67314	9142	6067	0.65	149	-
	M3	-	-	-	-	7038	1903	7038	-	-	-
	M4	5616	2665	2951	-	2951	2665	2951	1.11	8	-
	Total (M1 to M4)	315206	173366	141840	15613	164490	34373	20692	3.00	389	-
Mo: Crop: (Coconut, banana, vegetables) Livestock: Milch animals (3) M1: Improved variety of banana, vegetables, balanced fertilization for coconut M2: Round the year fodder supply, mineral mixture M3: Cleaning and grading M4: Kitchen gardening											
District (state): Raigarh (Maharashtra) NARP zone: North Konkan Coastal Zone, No. of households: 12, Average holding size: 0.74 ha Marginal (6) 0.39 ha and small (6) 1.08 ha											
Existing FS (M0)	Crop	170360	146015	24344	-	24344	-	-	0.17	66	-
	Livestock	113879	60200	53679	-	53679	-	-	0.89	147	-
	Total	284239	206215	78024	5430	83454	-	-	0.38	213	130
Improved FS	M1	72405	30593	41812	4535	46347	(115423)	17467	1.37	114	74
	M2	154605	93945	60659	-	60659	33745	6980	0.65	166	46
	M3	6550	3050	3500	-	3500	3050	3500	1.15	9	18
	Total (M1 to M4)	233560	127588	105971	-	105971	(78627)	27947	0.83	290	138
Mo: Crop : (Rice,Cowpea,Chilli,Brinjal) Livestock:Cow ,Buffalo,Poultry M1: Rice : HYV (Karijat-3), Balanced fert. appln. to rice 100:50:50 kg NPK/ha, pest control measure M2: Round the year fodder supply, mineral mixture and Artificial insemination M3: Cleaning, grading and storage of rice, ghee from excess milk M4: Fruit trees with improved varieties and balanced fertilizer application											

Table 7.4/16: Interventions and returns from on-farm farming system modules in Gujarat Plains and Hills

Farming System (FS)	Module (s)	Total gross returns (Rs)	Total cost of the module (Rs)	Return over variable cost from module (Rs)	Value of household consumption (Rs)	Total returns over variable cost (Rs)	cost of intervention (Rs)	Returns over variable cost from interventions (Rs)	Return over variable cost per rupee invested	Per day profit (Rs/day)	Household employment generation (man days)
District (state): Banaskantha/Deesa(Gujarat) NARP zone: North Gujarat agro climatic zone, No. of households: 12, Average holding size: 1.2 ha Marginal (4) 0.85 ha and small (8) 1.38ha											
Existing FS (M0)	Crop	450480	235883	214597	-	214597	-	-	0.91	587	-
	Livestock	32909	22254	10655	-	10655	-	-	0.48	29	-
	Total	483389	258137	225252	-	225252	-	-	0.87	617	93
Improved FS	M1	462894	247862	215032	-	215032	11979	435	0.87	589	54
	M2	43000	25684	17316	-	17316	3430	6661	0.67	47	24
	M3	6200	2113	4087	-	4087	2113	4087	1.93	11	18
	Total (M1 to M4)	512094	275659	236435	-	236435	17522	11183	0.86	647	96
Mo: Crop: Groundnut- potato- pearl millet, cotton- carrot- rajaka bajra, cotton, castor – wheat – pearl millet, cotton, sorghum, moong & castor - mustard & lucerne. Livestock: Cross breed (HF) and buffalo; M1: groundnut; GG-2; potato: Local; cotton: Ajit-155; rajaka bajari: GRB-1; castor: GCH-7; sorghum: SSG-59; moong: GM-4; mustard: GM-3; lucerne: Anand-2; M2: cow & buffalo: round the year fodder supply by growing cereal dry fodder + mineral mixture; M3: Crops: Cleaning of rice livestock: ghee making of excess milk; M4: kitchen gardening + horticulture crops.											
District (state): Kheda (Gujarat) NARP zone: MGACZ, No. of households: 12, Average holding size: 1.93 ha Marginal (7) 0.74 ha ,small (4) 1.10 ha and Medium (2).55 ha & Large (1) 7.20ha											
Existing FS (M0)	Crop	151327	37130	114197	10090	124286	-	-	3.08	312	-
	Livestock	297995	-	-	27280	27280	-	-	-	816	-
	Total	449322	37130	114197	37370	151566	-	-	3.00	1129	-
Mo: Crop: Bajra - wheat, tobacco- bajra, clusterbean-Wheat, Livestock: cow (2no's), buffalo (4 no's),+calves 2 +Bullock (2 no's); M1: bajra: GHB 30, Atrazine weedicide + balanced nutrient application @ 80:40:0 kg NPK/ha, wheat: GW 496, 2,4-D+ balanced nutrient application @ 120-60-0 NPK kg/ha, tobacco: GTH1, Stomp 2% + balanced nutrient application @ 220-0-0 NPK kg/ha, clusterbean: pusa navbahar, Basalin+ balanced nutrient application @ 20-40-0 NPK kg/ha.; M2: cow & buffalo: Round the year fodder supply by growing cereal and legume fodder + Mineral mixture; M3: Crops: Cleaning and grading in bajra, wheat, tobacco and clusterbean. + Proper Storage of seeds for next season livestock : ghee/Khoa making of excess milk.; M4: kitchen gardening+ horticulture crop											

Problem zone (KE-5): The mean holding size was found to be 1.27 ha in Pathinamthitta district of Kerala and the existing system resulted in total return of ₹ 1,43,798 which can be enhanced to ₹ 1,64,490. Return over variable cost per rupee invested can be enhanced to ₹ 3 from 2 and per day profit for household can be enhanced to ₹ 389 from 353.

North Konkan Coastal (MH-2): The mean holding size was found to be 0.74 ha in Raigarh district of Maharashtra where in existing farming system gives total return of ₹ 83,454 only including household consumption. The returns can be enhanced to ₹ 1,05,971. Further, the per day profit and additional employment in the existing farming system was found to be ₹ 290 and 138 man days.

Gujarat Plains and Hills

Two NARP zones viz., North Gujarat and middle Gujarat zone was covered for improving the farming systems.

North Gujarat (GJ-4): The mean holding size was found to be 1.2 ha in Banaskantha district of Gujarat. The total returns in existing system were found to be ₹ 2,25,252 which can be improved to ₹ 2,36,435 through low cost interventions in crops, livestock, processing and optional modules. The per day profit for household can be enhanced to ₹ 647 from 617 through interventions.

Middle Gujarat (GJ-3): Mean holding size in Kheda district of Gujarat was found to be 1.93 ha

with existing farming system recording net return of ₹ 1,51,566 and net return per rupee invested as ₹ 3.

The result of on farm farming system modules evaluated in various NARP zones are summarized and the gist is given below.

- The total cost of intervention in all the modules was found to be ₹ 8700 for 0.97 ha area
- The increase in net returns over variable cost of intervention in improved farming systems was found to be 5 times.
- The value of households consumption increased by 53 % due to the improved farming systems.
- The per day profit of marginal and small households can be increased by 57% through low cost intervention in farming system perspective.
- An additional employment of 38 man days/ year can be generated through interventions in various modules such as crop, livestock, processing and optional in farming system mode.

Important note: The results of 12 centres are from the first year of interventions and 16 centres are from second year and intervention at few places was partial. The field staff were also new to the on-farm farming system experiment.

7.4.2 FRONTLINE DEMONSTRATIONS ON CROPPING SYSTEMS INVOLVING OILSEEDS

The results of the FLD's conducted in farmer's field's by OFR units of AICRP on IFS during 2012-13 are given below.

Objective: 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 FLD's were conducted at 8 OFR units of All India Coordinated Research Project on Integrated Farming Systems (AICRP on IFS) in four agro ecosystems viz., Semi Arid, Sub Humid, Humid and Coastal; covering 5 states. Crops/cropping systems in which FLDs were conducted are given in Table 1. In Semi Arid ecosystem, 25 demonstrations in total were conducted by Aurangabad, Modipuram, Thasra and Kaushambi centres. A total of 5 demonstrations were conducted in Sub Humid ecosystem at Pune. In Humid and Coastal ecosystem, a total of 5 and 10 demonstrations were conducted respectively at Dhainser, Raigad and Thiruvalla. The major cropping systems in which oilseed crops were tested are soybean-gram, mustard and groundnut in Semi Arid, Soybean-wheat in Sub Humid, gobhisarson in Humid and rice-groundnut and Sesamum in Coastal ecosystems. A total of 20 demonstrations were on systems involving mustard. The systems involving groundnut and soybean were undertaken in 10 demonstrations of each while sesamum and gobhisarso crops were taken in 5 demonstrations each. There were only two treatments taken for comparison, i.e. farmers practice (FP) and improved practice (IP). These treatments were applied on a time tested; well recognized oilseed based cropping systems of the location.

Financial source: FLDs on oilseed based cropping systems were 100% financed by Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India through Directorate of Oilseeds Research, Hyderabad.

During 2012-13, an amount of ₹ 1,00,000/- has been released to the different centres.

Salient findings

Yield: The mean yield of mustard under improved package ranged from 1790 kg ha⁻¹ (Kaushambi) to 2180 kg ha⁻¹ (Modipuram) (Table 1). The yield increase in mustard due to introduction of improved variety like "Pusa bold" and "Varuna" was found to be 22.5% and 19.3% higher compared to farmer practice at Modipuram and Kausambhi respectively. On an average, 39.3% increase in yield was observed in case of gobhisarson under improved package at Dhainser centre. Due to improved package of practices in groundnut (TAG-24), (two ploughing), (25:50:0, 500 kg gypsum), (30X10 cm dibbling), (100 kg), (One hoeing with weeder, one handweeding + earthing up 35-40 DAS) at Raigad 40.9% increase in yield was observed. An yield increase of 19.4% was observed in groundnut with Improved Practices such as improved variety-GG 5, application of Sulfur @20 kg/ha in the form of Gypsum @ 750 kg/ha and Fertilizer (NPK kg/ha): 25-50-0 instead of local variety and no sulfur application at Thasra, Gujarat. In case of Soybean 33.9% and 13.9% yield increase were reported at Pune and Aurangabad centre respectively by adoption of improved practices. A significant 78.9% yield increase was reported at Thiruvalla in sesamum due to introduction of Tilak variety with improved practices in place of Kayamkulam1. Significant improvement in yield of other crops grown in the system such as rice, wheat and gram was also observed under improved package. The increase was found to be 78.7, 33.8 and 15.3% in rice, wheat and gram respectively.

Gross and Net returns: Gross returns were higher in improved package for all the crops at all locations due to increase in yield. Higher gross return of mustard was realized at Modipuram (₹ 74120 ha⁻¹) followed by Kaushambi (₹ 53717 ha⁻¹). Among the oil seed crops evaluated at

various locations, groundnut registered highest gross return of ₹ 96557 ha⁻¹ (Table 2) at Raigad with improved package of TAG-24, two ploughing, 25:50:0, 500 kg gypsum, 30X10 cm dibbling, 100 kg seed rate, one hoeing with weeder, one hand weeding + earthing up 35-40 DAS. On an average, gobhisarson recorded gross income of ₹ 34480 ha⁻¹, while sesamum registered ₹ 50912 ha⁻¹ with improved package. On an average soybean recorded ₹ 79786 ha⁻¹ gross return at Pune followed by ₹ 37285 ha⁻¹ at Aurangabad. Other crops grown in the system such as rice, wheat and gram was also recorded positively increase in return ₹ 91823 ha⁻¹, 65366 ha⁻¹ and 46239 ha⁻¹ respectively. In terms of net returns (Table 3), 33.9% increase was observed at Modipuram in mustard with improved package followed by 22.2% at Kaushambhi. At

Dhainser, gobhisarson recorded an increase in net return to the tune of 66.0 In groundnut, improved package led to 46.8 and 41.7% increase in net return at Raigad and Thasra respectively over farmers practice. In soybean, the increase was found to be 48.5 and 21.3% at Raigad and Aurangabad respectively. Among the oil seed crops evaluated at various locations, sesamum registered highest increase 202% at Thiruvalla by improved practices. The higher increase was due to very low yield recorded under farmer practice (358.8 kh ha⁻¹ only), scope exists in this region to improve the productivity of sesamum through management practices. The other crops such as rice, wheat and gram evaluated in the system gave 117.1, 46.9 and 38.1% increase in net returns with improved package compared to farmers practice.



Plate 1: FLD demonstration at (a) Thiruvalla (Kerala) on sesame and (b) Modipuram U.P.) on Mustard

Table 7.4.2/1. Influence of farmers and improved practices on grain or pod yield (kg/ha) of various crops under FLD (2012-13)

Agro Eco system/Centre	Cropping system		No. of demonstrations	Farmers Practice (FP)		Improved Practice (IP)		% increase over FP	
	Kharif	Rabi		Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
1. Semi Arid									
Aurangabad (Maharashtra)	Soybean	Chickpea	5	1342	1560	1260	1488	13.9	15.3
Modipuram (Uttar Pradesh)	-	Mustard	10	-	1780	-	2180	-	22.5
Kaushambi (Uttar Pradesh)	-	Mustard	5	-	1500	-	1790	-	19.3
Thasra (Gujarat)	Groundnut	-	5	2240	-	2780	-	19.4	-
2. Sub Humid									
Pune (Maharashtra)	Soybean	Wheat	5	1662	2266	2641	3533	33.9	33.8
3. Humid									
Dhainser (Jammu)	-	Gobhisarso	5	-	616	-	862	-	39.3
4. Coastal									
Raigad	Rice	Groundnut	5	3436	6142	1729	2437	78.7	40.9
Thiruvalla	Sesamum	-	5	-	358	-	642	-	78.9

Table 7.4.2/2. Influence of farmers and improved practices on gross returns (Rs./ha) of various crops under FLD (2012-13)

Agro Eco system/Centre	Cropping system		No. of demonstrations	Farmers Practice (FP)		Improved Practice (IP)	
	Kharif	Rabi		Kharif	Rabi	Kharif	Rabi
1. Semi Arid							
Aurangabad (Maharashtra)	Soybean	Chickpea	5	33152	39002	37285	46239
Modipuram (Uttar Pradesh)	-	Mustard	10	-	60520	-	74120
Kaushambi (Uttar Pradesh)	-	Mustard	5	-	45010	-	53717
Thasra (Gujarat)	Groundnut	-	5	67200	-	83400	-
2. Sub Humid							
Pune (Maharashtra)	Soyabean	Wheat	5	57009	46362	79786	65366
3. Humid							
Dhainser (Jammu)	-	Ghobhisarso	5	-	24640	-	34480
4. Coastal							
Raigad (Maharashtra)	Rice	Groundnut	5	52264	68509	91823	96557
Thiruvalla (Kerala)	Sesamum	-	5	28592	-	50912	-

Table 7.4.2/3. Influence of farmers and improved practices on grain or pod yield (kg/ha) of various crops under FLD (2012-13)

Agro Eco system/Centre	Cropping system		No. of demonstrations	Farmers Practice (FP)		Improved Practice (IP)		% increase over FP	
	Kharif	Rabi		Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
1. Semi Arid									
Aurangabad (Maharashtra)	Soybean	Chickpea	5	14193	18776	17221	25925	21.3	38.1
Modipuram (U.P.)	-	Mustard	10	-	15083	-	63520	-	22.2
Kaushambi (U.P.)	-	Mustard	5	-	23010	-	29918	-	30.0
Thasra (Gujarat)	Groundnut	-	5	43810	-	62065	-	41.7	-
2. Sub Humid									
Pune (Maharashtra)	Soyabean	Wheat	5	37159	28562	55186	41949	48.5	46.9
3. Humid									
Dhainser (Jammu)	-	Ghobhisarso	5	-	13060	-	21686	-	66.0
4. Coastal									
Raigad (Maharashtra)	Rice	Groundnut	5	11524	23189	25103	34047	117.1	46.8
Thiruvalla (Kerala)	Sesamum	-	5	9808	-	29630	-	202.1	-

Results for large scale exploitation

The cropping systems involving oilseeds promise to increase the production of oilseeds on the one hand and improve the profitability for farmers

on the other hand. In all the FLDs, it was proved that yield and net returns can be increased by adopting improved package in place of farmers practice. The gist of the practices for various crops is given below for large scale adoption.

Sl. No.	Crop	Location (ecosystem)	Improved Package	Increase in yield (%)	Increase in net returns (%)
1.	Mustard	Modipuram (Semi Arid)	Improved variety of "Pusa Bold"	22.5	33.9
		Kaushambi (Semi Arid)	Improved variety of "Varuna"	19.3	30.0
2.	Gobhi sarson	Dhainser (Sub Humid)	Improved package	39.3	66.0
3.	Groundnut	Thasra (Semi Arid)	Improved variety-GG 5, application of Sulfur @20 kg/ha in the form of Gypsum @ 750 kg/ha , Fertilizer (NPK kg/ha): 25-50-0	19.4	41.7
		Raigad (Coastal)	TAG-24 variety + 1 ploughing + 1 harrowing + 30 X 10 cm dibbling+ seed rate of 100 kg/ha + 1 hoeing with weeder + 1 hand weeding + earthing up at 35-40 DAS + Cypermethrin @ 1 litre/ha + Monocrotophos 1 litre/ha + Bavistin 500 g/ha + NPK @ 25:50:0 kg/ha + 500 kg gypsum/ha	40.9	46.8
4.	Soybean	Pune (Sub Humid)	JS-335, 30 x 5 cm,50:75:00 Kg/ha	33.9	48.5
		Aurangabad (Semi Arid)	MAUS-71 + 1 additional ploughing + 2 spraying of Quinolphos 35 EC @ 15 ml in 10 litres of water + NPK @ 30:60:30 kg ha ⁻¹	13.9	21.3
5.	Sesamum	Thiruvalla (Coastal)	Tilak variety	78.9	202.0
6.	Rice	Raigad (Coastal)	Sahyadri variety + 1 ploughing + 1 harrowing + 20 X 15 cm line transplanting + seed rate of 20 kg/ha + 2 hand weeding + 1 hoeing + Phorate @ 10 kg/ha + Monocrotophos 700 ml/ha+ NPK @ 100:50:50 kg/ha (N in 3 split doses)	78.7	117.1
7.	Wheat	Pune (Sub Humid)	NAIW-301, 120:60:40	33.4	46.9
8.	Gram	Aurangabad (Semi Arid)	BDNG. 797, NPK25:50:25	15.3	38.1

8. GENERAL/MISCELLANEOUS

- 8.1 List of Publications**
- 8.2 Participation of Scientists in Symposia/Seminars/Workshops/Trainings etc.**
- 8.3 Group Meetings/Workshops Organised**
- 8.4 Radio and Television Talks Delivered by Project Staff**

8. GENERAL/MISCELLANEOUS

8.1 LIST OF PUBLICATIONS

8.1.1 Research Papers

ANGRAU, Rajendranagar (AP)

Sridevi, S. and Venkata Ramana, M. 2012. Soil quality and yield sustainability of maize-onion cropping system under organic farming, *Crop Research* **44**(3): 261-268.

Sridevi, S. and Venkata Ramana, M. 2012. Quantity/intensity relations of potassium in rice soils under long term nutrient management. *The Journal of Research ANGRAU*, **40**(2):11-16.

BAU, Sabour (Bihar)

Kumar, Rajendra, Singh V.K., Sharma, R.P., Kumar, Anil and Gyan Singh. 2012. Impact of Nitrogen, Phosphorus, Potash and Sulphur on productivity of rice-wheat system in sub-humid region. *Journal of Agricultural Physics*, **12**(2): 84-88.

IGKV, Raipur (Chhattisgarh)

Sarawgi, S.K., Chitale, S., and Bhoi, S. 2012. Effect of phosphorus application along with PSB, Rhizobium and VAM on P fractionation and productivity of soybean (*Glycine max*). *Indian Journal of Agronomy*, **57**(1): 55-60.

SDAU, SK Nagar (Gujarat)

Singh, Jitendra, Patel, B.S., Patel, G.N., and Shaukat Ali. 2012. Studies on inter/mix cropping systems of mustard [*Brassica juncea* (L.) Czern & Coss] + lucerne (*Medicago sativa*) under agro-climatic conditions of northern Gujarat. *Journal of Oilseeds Research*, **29**(1):106-10.

JAU, Junagadh (Gujarat)

Dabhi, B.M., Solanki, R.M. and Sagarka, B.K. 2012. Cropping system diversification its production potential and economics under Saurashtra region of Gujarat. *Journal of Oilseeds Research*, **29**(1): 37-40.

NAU, Navsari

Desai, L.J., Patel, M.M., Chaudhari, P.P., Saukat, Ali and Patel, J.K. 2013. Influence of integrated nitrogen management on nutrient content and uptake of grain amaranth (*Amaranthus hypochondriacus* L.). *Journal of Soils and Crops*, **23**(1): 53-60.

CSK HPKVV, Palampur (H.P.)

- Sepehia, Swapna, Subehia, S.K., Rana, S.S. and Negi, S.C. 2012. Effect of nutrient management on rice-wheat yield and soil properties in a north western Himalayan region. *Indian Journal of Soil Conservation*, **40**(2):135-140.
- Sepehia, Swapna and Subehia, S.K. 2012. Nitrogen dynamics as influenced by long-term fertilization and amendments under rice-wheat system in a north-western Himalayan soil. *Crop Research*, **44**(1&2): 94-101.
- Subehia, S.K. and Dhanika. 2013. Soil nitrogen fractions and its effect on rice (*Oryza sativa*) yield under integrated nutrient management in a north-western Himalayan soil. *Indian Journal of Soil Conservation*, **41**(1):47-51.
- Subehia, S.K. and Sepehia, Swapna. 2012. Influence of long-term nitrogen substitution through organics on yield, uptake and available nutrient in a rice-wheat system in an acidic soil. *Journal of Indian Society of Soil Science* **60**(3): 213-217.
- Sepehia, Swapna, Subehia, S.K., Negi, S.C., Rana, S.S. and Sharma, S.K. 2012. Potassium dynamics with long-term addition of chemical fertilizers and organics in rice-wheat sequence. *Research on Crops*, **13**(3):822-828.

SKUSAT, Jammu (J&K)

- Kachroo, Dileep, Thakur, N.P., Kour, Manpreet, Kumar, P., Sharma, Rohit and Kajuria, Vijay. 2013. Diversification of rice based cropping system. *Indian Journal of Agronomy* **58**(4): 58-62.
- Kachroo, Dileep, Thakur, N.P., Kour, Manpreet, Kumar, P. and Sharma, Rohit. 2012. Productivity and energetic of rice based cropping system under sub-tropical condition of Jammu. *Indian Journal of Agronomy* **57**(2): 290-294.
- Khokhar, Anil, Gupta, A.K., Thakur, N.P. and Sharma, Rohit. 2012. Effect of rice straw management in wheat on soil fertility, nutrient uptake and yield of rice and wheat in a system under sub-tropical conditions of Jammu. *Journal of Soil and Water Conservation*, **11**(1):19-23.
- Thakur, N.P., Kachroo, Dileep and Kumar, Jai. 2012. Sustainable production management for rice-wheat cropping system under irrigated condition of Jammu. *Journal of Soil and Water Conservation*, **11**(3): 226-270.

KAU, Karamana (Kerala)

- Rani, B., Kuruvilla, Varughese, Suja, Abraham and Jacob, John. 2012. Yield performance and agronomic efficiency of wet land rice under long term cultivation in an Entisol. *Agri. Sci. Digest. Agri. Res. Comm. Centre, Karnal*.

JNKVV, Jabalpur (M.P.)

Verma, Nidhi, Vishwakarma, S.K. and Upadhyay, V.B. Diversification and intensification of rice based cropping systems for higher production efficiency, water productivity and economic viability in Jabalpur. *Journal of Soil and Crops*, **22**(1): 21-27.

Dwivedi, B.S., Pandey, A.K., Tiwari, R.K., Jha, A. K. and Khamparia, N.K. 2012. Performance of integrated nutrient management on yield and uptake direct seeded rice. *Progressive Agriculture (International Journal)*, **12**(2): 381-385.

PAU, Ludhiana (Punjab)

Dhaliwal, S.S., Sadhana, U.S., Sidhu, S.S., Walia, S.S. and Sidhu, S.S. 2012. Long-term effects of manures and fertilizers on chemical fractions of Fe and Mn and their uptake under rice-wheat cropping system in northwest india. *International Journal of Agricultural Sciences*, **8**(1): 98-107.

Singh, Gurpreet, Dhaliwal, S.S., Sadana, U.S. and Walia, S.S. 2012. Influence of cropping systems on Micronutrient availability in typic ustochrept soil of Punjab. *Journal of Research PAU* **48**(3&4): 128-135.

Dhaliwal, S.S., Walia, S.S., Walia M.K. and Manchanda, J.S. 2013. Build up of macro and secondary nutrients status of soil in site specific nutrient management experiment under rice-wheat system. *International Journal of Sciences Environment and Technology*, **2**(2): 236-244.

Dhaliwal, S.S., Manchanda, J.S., Walia, S.S. and Dhaliwal, M.K. 2013. Different response of manures in transformation of DTPA and total zinc and iron in rice transplanted on light textured soils of Punjab, *International Journal of Sciences Environment and Technology*, **2**(3): 300-312.

Singh, Gurupreet, Dhaliwal, S.S., Sadana, U.S. and Walia, S.S. 2013. Long term effect of cropping systems on Fe and Mn fractions in alluvial soils of north-west India. *Indian Journal of Ecology* **40**(1): 57-60.

Brar, B.S., Dheri, G.S., Singh, Kamalber and Walia, S.S. 2012. Long-term effects of cropping systems and fertilizer management on carbon sequestration. *Proc. International Conference on Sustainable Agriculture for food and Livelihood Security*, held at PAU, Ludhiana on 27-29 November, 2012. The Crop Improvement, **39** (special issue): 593-594.

Walia, S.S. and Gill, R.S. 2012. Effect of long term integrated nutrient management on grain yield and soil fertility status under rice-wheat cropping system. *Proc. International Conference on Sustainable Agriculture for Food and Livelihood Security*, November 27-29, 2012, Ludhiana, India: 1707-1708.

TNAU, Coimbatore (T.N.)

Sangeetha, S.P., Balakrishnan, A. and Devasenapathy. 2013. Influence of organic manure on yield and quality of rice (*Oryza sativa* L.) and blackgram (*Vigna mungo* L.) in rice-blackgram cropping sequence. *American Journal of Plant Science*, **4**: 1151-1157.

CSAUAT, Kanpur (U.P.)

Rai, J. and Tiwari, U.S. 2012. Economics and productivity of biologically efficient to and profitable cropping systems in central plain zone of Uttar Pradesh. *International Journal of Agricultural Science*. **8**(1): 125-127.

GBPUAT, Pantnagar (Uttarakhand)

Barthwal, Ashutosh, Bhardwaj, A.K., Chaturvedi, Sumit and Pandiaraj, T. 2013. Site specific NPK recommendation in wheat (*Triticum aestivum*) for sustained crop and soil productivity in mollisols of Tarai region. *Indian Journal of Agronomy*, **58**(2): 4-10.

BHU, Varanasi

Pandey, Divya, Agrawal, Madhoolika and Bohra, Jitendra Singh. 2012. Green house gas emission from rice crop with different tillage practices in rice-wheat system. *Agriculture Ecosystem and Environment*, **159**: 133-144.

Singh, Ravikant, Bohra, J.S., Nath, Triyugi and Srivastav, Rajeev Kumar. 2013. Effect of varying levels of diversification and intensification of rice-wheat cropping system on the production potential and nutrient balance of soil in Indo-Gangetic plains of India. *Agricultura*, **9** 1-2 (Special issue):9-17.

Pandey, Divya, Agrawal, Madhoolika and Bohra, J.S. 2013. Effects of conventional tillage and no tillage permutations on extracellular soil enzyme activities and microbial biomass under rice cultivation. *Soil and Tillage Research*, **136**: 51-60.

8.1.2 Papers presented in seminar/ symposia**ANGRAU, Rajendranagar (AP)**

Rajendra Prasad, V., Tejeswara Rao, K. and Chinnam Naidu, D. 2013. Identification of predominant farming systems in high altitude and HAT zone of Andhra Pradesh. Paper presented in National Conference on Agro Biodiversity Management for Sustainable Rural Development held at NAARM, Hyderabad. p.17 (Abstract).

BAU, Sabour (Bihar)

Sharma, R.P., and Raman, K.R. Diversification and intensification of rice-wheat cropping system for higher profitability in south Bihar alluvial plain. Paper presented in 3rd International Agronomy Congress held at New Delhi on 26-30 November, 2012, pp. 641-642.

Choudhury, S.R., Sharma, R.P., Mahdi, S.Sheraz and Gupta, S.K. 2013. Climate change and agriculture –impact and mitigation. Paper presented in National Seminar on Climate Change held at Bihar Agricultural University, Sabour on 25-27 May, 2013, pp. 83-84.

Sharma, R.P., Gosh, M., Dutta, S.K and Choudhury, A. Roy. 2013. Evaluation of different cropping systems under resource conservation practices for enhancing profitability under climate change. Paper presented in National Seminar on Climate Change held at Bihar Agricultural University, Sabour on 25-27 May, 2013, pp. 150.

IGKV Raipur (Chhattisgarh)

Chitale, S., Sarawgi, S.K., Tiwari, A., Bhoi, S., Dubey, A., Dhurandhar, T., Singh, A.P. and Patel, S.R. 2012. Crop diversification for uplifting the livelihood of rice growing farmers in Chhattisgarh Plains. Paper presented in 3rd International Agronomy Congress on "Agriculture Diversification, Climate change, Management and Livelihoods" held at New Delhi on 26-30 November 2012, Vol 2: 430-431.

SDAU, SK Nagar (Gujarat)

Patel, P.K., Patel, B.S., Patel, S.M., Patel, J.K., and Ali, Shaukat. 2013. Long-term effect of integrated nutrient management in pearl millet-wheat sequence on soil fertility status and bulk density at different depth of soil profile in loamy sand soils. Presented in National Seminar on Developments in Soil Science held at CAZRI, Jodhpur on October 23-26, 2013.

Patel, S.K., Patel, B.S., Patel, P.K., Patel, S.M., Patel, R.R., Ali, Shaukat and Singh, Jitendra. 2013. Intensification and/or diversification of the cropping system by fennel on farmer's field. Presented in National Seminar on Production, Productivity and Quality of spices held at Jaipur (Rajasthan) on 02-03 February, 2013, pp. 128.

Patel, B.S., Patel, S.M., Patel, P.K., Ali, Shaukat, Bhatt, P.K. and Yadav, B.L. 2013. Development of organic farming package for system based high value crops of green manuring-potato-summer groundnut sequence. Presented in National Seminar on Role of Organic Farming in Climate Resilient and Sustainable Agriculture held at NAU, Navsari (Gujrat) on 09-10 January, 2014, p. 184.

JAU, Junagadh

Dabhi, B.M., Sagarka, B.K., Mathukia, R.K., and Dabhi, Anup. 2012. Cropping system diversification for enhancing productivity, profitability and input use efficiency. Presented in 3rd International Agronomy Congress held at New Delhi on 26-30 November, 2012.

CCS HAU, Hisar (Haryana)

Yadav, S.K., Kumar, Pawan, Kumar, Manoj. 2012. Cropping systems for higher productivity in semi-arid low rainfall areas of Haryana. Presented in 3rd International Agronomy Congress held at New Delhi on 26-30 November, 2012.

CSK HPKV, Palampur (H.P.)

Negi, S.C., Rana, S.S., Subehia, S.K., Sharma, S.K. and Sharma, H.L. 2012. Long-term effect of integrated nutrient management on the productivity and sustainability of rice-wheat cropping system in an acid

alfisol of Himachal Pradesh. Presented in 3rd International Agronomy Congress on “Agriculture Diversification, Climate change, Management and Livelihoods” held at New Delhi on 26-30 November, 2012, pp. 417-418.

Ramesh, Rana, S.S., Kumar, Suresh and Negi, S.C. 2012. Influence of tillage/planting techniques on weed dynamics in maize-wheat cropping systems. Presented in National Seminar on Sustainable Agriculture and Food Security: Challenge in Changing Climate, held at CCS HAU, Hisar on 27-28 March, 2012, pp. 237-238.

Rana, S.S., Subehia, S.K., Negi, S.C., Sharma, Rakesh Kumar and Sharma, S.K. 2012. Alternative cropping systems for mid hills agroclimatic conditions of Himachal Pradesh. Presented in 3rd International Agronomy Congees on “Agriculture Diversification, Climate change, Management and Livelihoods” held at New Delhi from 26-30 November, 2012, pp. 394-395.

SKUAST, Jammu (J & K)

Thakur, N.P. 2012. Long term sustainable effects of integrated plant nutrient management (IPNM) in rice-wheat cropping system under subtropical condition of Jammu. Presented in 2nd Jammu and Kashmir Agricultural Science Congress held at SKUAST-J, Chatha, Jammu on 15-17 December, 2012.

Thakur, N.P. 2013. Organic farming for high value crops and its impact on soil health under hill ecosystem of north western Himalayas. Presented in 78th Annual convention. Indian society of Soil Science held at CAZRI, Jodhpur on 23-26 October, 2013.

JNKVV, Jabalpur (M.P.)

Vishwakarma, S.K., Verma, Nidhi, Agrawal, K.K., Dubey, Megha and Gangwar, Suchi. 2012. Study of weed flora and weed control efficiency under diversification and intensification of rice based cropping systems. Presented in 3rd International Agronomy Congees on “Agriculture Diversification, Climate change, Management and Livelihoods” held at New Delhi on 26-30 November, 2012, pp. 621.

Verma, Nidhi, Vishwakarma, S.K., Gangwar, Suchi and Agrawal, K.K. 2012. Productivity and profitability of diversified rice-wheat cropping systems under Kymore Plateau and Satpura Hill zone of MP. Presented in 3rd International Agronomy Congees on “Agriculture Diversification, Climate change, Management and Livelihoods” held at New Delhi on 26-30 November, 2012, pp. 1265.

PAU Ludhiana (Punjab)

Singh, Parminder, Walia, S.S. and Sandhu, P.S. 2012. Integtated farming system approachs-more remunerative. Proc. 5th Indian Horticulture Congress held at Punjab Agricultural University, Ludhiana, pp. 534-535.

Walia, S.S., Singh, P. and Chaudary, A. 2012. Integrated farming system approach for income generation. Proc. 5th Indian Horticulture Congress held at Punjab Agriculture University, Ludhiana, pp. 536-537.

Dhillon, B.S., Walia, S.S., Singh, Dhaminder, Singh, K.B. and Gill, N.S. 2012. Productivity and economic viability of prevailing cropping systems in Moga district of Punjab (India). Presented in 3rd International Agronomy Congress on 26-30 November, New Delhi, pp. 433-434.

Walia, S.S., Brar, A.S., Singh, Satpal, Gill, R.S., Aulakh, C.S. and Kaur, Navdeep. 2013. Feasibility of different cropping systems under irrigated conditions of Punjab. Presented in 16th Punjab Science Congress held at BFUHS, Faridkot on 7-9 February, pp. 105-106.

Walia, S.S., Gill, M.S., Aulakh, C.S. and Sandhu, P.S. 2013. Yield maximization of rice-wheat system through site specific nutrient management approach. Presented in 16th Punjab Science Congress held at BFUHS, Faridkot on 7-9 February, pp. 108-109.

TNAU, Coimbatore

Siddeswaran, K., Sangeetha, S.P. and Shanmugam, P.M. 2013. Integrated farming system for small farmers of irrigated upland. Organic rice production. In: Agriculture. All India Tamil Conference 2013 held at Perur, Coimbatore on 09-10 February, 2013, pp. 203-206.

Siddeswaran, K., Sangeetha, S.P., Shanmugam, P.M. and Thiyageswari, S. 2013. Integrated farming system for small farmers of irrigated upland..In: Agriculture. All India Tamil Conference 2013 held at Perur, Coimbatore on 09-10 February, 2013, pp. 197-198.

Jagathjothi, N. and Ramamoorthy, K. 2013. INM for rainfed ragi. (Tamil) In: Agriculture. All India Tamil Conference 2013 held at Perur, Coimbatore on 09-10 February, 2013, pp. 21-23.

Kathirvelan, P., Balasubramaniam, P. and Siddeswaran, K. 2012. Crop diversification: Enhancing the system productivity and profitability through on farm research. Presented in 3rd International Agronomy Congress on “Agriculture Diversification, Climate change, Management and Livelihoods” held at New Delhi from on 26-30 November, 2012.

Sarvan Kumar V., Siddeswaran, K., Yasodhagayathri, A. and Srinivasan, S. 2012. Economics analysis and resource use efficiency of predominant farming systems in Tamil Nadu. Presented in 3rd International Agronomy Congress on “Agriculture Diversification, Climate change, Management and Livelihoods” held at New Delhi on 26-30 November, 2012.

CSAUAT, Kanpur (U.P.)

Yadav, M.P., Tiwari, U.S., Khan, Naushad and Aslam, M. 2012. Effect of integrated nutrient management on system productivity and soil health in rice-wheat cropping system. Presented in 3rd International Agronomy Congress on “Agriculture Diversification, Climate change, Management and Livelihoods” held at IARI, New Delhi on 26-30 November, p. 24.

Khan, N., Yadav, M.P., Tiwari, U.S. and Md. Aslam. 2013. “Intensification of different cropping systems under irrigated condition in Central Plain Zone of U.P.” Presented in National Seminar on “Social

Dimensions of Extension Education in Holistic Development of Rural Livelihood” held at C. B. Gupta Agriculture P.G. College, Bakshi ka Talab, Lucknow, U.P. on 26-27 April, 2013, p. 11.

RBS College, Bichpuri, Agra (U.P.)

Singh, S.B. 2012. Development of organic farming package for system based high value crops in clusterbean-potato-onion cropping system for NWPZ. Presented in National Seminar held at Janta College, Bakewar (Etawah), on 26-27 February, 2012, p. 80.

Singh, S.B. 2013. Impact of integrated farming systems (IFS) on agriculture and rural development for small and marginal farmers. Presented in National seminar on impact of population growth on agriculture and rural development, held at Balawant Vidyapeeth Rural Institute, Bichpuri, Agra on 09-10 February, 2013, p. 31.

GBPUAT, Pantnagar (Uttarakhand)

Bhardwaj, A.K., Chaturvedi, Sumit and Pandiaraj, T. 2012. Screening different production models of rice-wheat for sustainability under changing scenario of climate. Presented in 3rd International Agronomy Congress held at New Delhi on 26-30 November, 2012, **3**: 344-345.

Chaturvedi, Sumit, Bhardwaj, A.K. and Pandiaraj, T. 2012. Potential of resource conserving techniques under various rice based cropping systems for climate resilience. Presented in 3rd International Agronomy Congress held at New Delhi on 26-30 November, 2012, **3**: 804-806.

Singh, D.K., Kumar, P. and Bhardwaj, A.K. 2012. Diversification of rice-wheat cropping system using oilseed and vegetables. Presented in National Seminar on New Frontiers and Future Challenges in Horticultural crops, held at PAU, Ludhiana, Punjab on 15-17 March, 2012, pp. 104-105.

KAU, Karmana (Kerala)

Jacob, J., Veena, V., Anju, C., Varughese, K. and Rani, B. 2012. Terrace gardens for food security in urban households - An integrated, eco-friendly and sustainable model for Kerala, India. Presented in 3rd International Agronomy Congress on “Agriculture Diversification, Climate Change Management and Livelihoods” held at New Delhi on 26-30 November, 2012, pp. 517-518.

Varughese, K., Rani, B. and Jacob, J. 2012. Diversified cropping systems in the wetlands of coastal ecosystems. Presented in 3rd International Agronomy Congress on “Agriculture Diversification, Climate Change Management and Livelihoods” held at New Delhi on 26-30 November, 2012, pp. 566-567.

8.1.3 Popular Articles

ANGRAU, Rajendranagar (A.P.)

Sridevi, S. and Venkata Ramana, M. Integrated Nutrient Management for Sustainable Agriculture (*Susthira vyavasayaniki samagra poshaka yajamanyam*), *Vyavasayam*, January 2012: 8-10.

- Tejeswara Rao, K., Upendra Rao, A. and Naidu, G.J. *Rabi leda vesavi Nuvu sagu-Yajamanya melakuvalu Rythu Bandhu*, January, 2013, p. 49.
- Tejeswara Rao, K., Upendra Rao, A. and Rao, N.V.G. *Pasu poshanaku ekavarshika grasalu, Annadata*, February, 2013, p. 12.
- Tejeswara Rao, K., Upendra Rao, A., Jyotsna and Poornima. *Drumseeder tho neruga vithae vari Rythu Bandhu*, February 2013, p. 10.
- Tejeswara Rao, K., Upendra Rao, A., Sekhar and Rao, N.V.G. *Agencylo vividha pantallo vathavaranadharitha amsalu, Rythunestham*, February 2013, pp. 48-49.
- Tejeswara Rao, K., Upendra Rao, A., Kumar, Pradeep and Rao, N.V.G. *Samagra vyavasaya padhathullo Mekala pempakam, Rythunestham*, February 2013, p. 17.
- Tejeswara Rao, K., Upendra Rao, A., Vidya and Sekhar, D. Market demand *unna sahaja rangunichu mokkalu, Rythunestham* March 2013, p. 8.
- Upendra Rao, A., Tejeswara Rao, K. and Rao, N.V.G. *Uthara kostha Jillalalo dalva (Rabi) varilo adhikothpathiki yajamanya padhathulu, Rythu Bandhu*, March 2013, pp. 54-55.
- Upendra Rao, A., Rao, K.T. and Rao, N.V.G. *Sendriya Vyvasayam avakasalu–avarodhalu*, Agri clinics, March 2013, pp. 07-10.
- Tejeswara Rao, K., Upendra Rao, A., Sekhar, D. and Pradeep Kumar, B. *Girijana vyavasaya prayogasala*, Agri clinics, March 2013, p. 18.
- Tejeswara Rao, K., Upendra Rao, A., Sekhar, D. and Pradeep Kumar, B. *Sampradaayethara pasugraasaala saagu*, Agri clinics, March 2013, pp. 21-22.
- Upendra Rao, A., Murthy, K.M.D. and Tejeswara Rao, K. *Varilo samardha sagu neeti yajamanyam, Vyavasayam*, March 2013, pp. 8-10.
- Upendra Rao, A., Tejeswara Rao, K. and Rao, N.V.G. *Nanyamaina Adhika digubadulaku potassium avasyakatha –yajamanyam, Vyavasayam*, March 2013, pp. 28-29.
- Tejeswara Rao, K., Upendra Rao, A., Jyotsna and Poornima. *Ippachetla pempakam, Rythu Bandhu*, April 2013, p. 34.
- Upendra Rao, A., Tejeswara Rao, K. and Rao, N.V.G. *Rythuku dhairyanni labhannichu rythusthayili vithanopathi, Rythuvani*, March 2013, pp. 29-30.
- K. Tejeswara Rao, Upendra Rao, A., Poornima and Jyotsna. *Kanugu chetla pempakam, Rythuvani*. March, 2013, p. 8.

Tejeswara Rao, K., Upendra Rao, A. and Sekhar, D. *Rabi varilo kalupu nivarana*, Agri Gold Swarna Sedyam, April 2013, pp. 18-20.

Upendra Rao, A., Tejeswara Rao, K., Sekhar and Rao, N.V.G. *Teku makkala pempakamtho adayam, Annadatha*, April 2013, pp. 14-15.

Tejeswara Rao, K., Upendra Rao, A., Sudhakar, Rathna and Sekhar. *Linseed-Girijana Pranthaniki kotha noonegija panta*, Agri clinics, April, 2013, p. 17.

Tejeswara Rao, K., Upendra Rao, A., Poornima and Jyotsna. *Kanugu chetla pempakam, Rythuvani*. April 2013, p. 7.

Tejeswara Rao, K., Upendra Rao, A., Poornima and Jyotsna. *Vanavyavasayamlo soobabul sagu, Sedyaphalam*, April 2013.

Ramu, Seetha, Tejeswara Rao, K., Upendra Rao, A. *Gidimamidilo sasyarakshana, Sedyaphalam* April, 2013.

Ramu, Seetha, Tejeswara Rao, K., Upendra Rao, A. *Mamidilo sasyarakshana, Sedyaphalam* May 2013, pp. 40-41.

Ramu, Seetha, Upendra Rao, A., Tejeswara Rao, K. and Srividya, S. *Verusanagasagu- yajamanya padhathulu*, Agri clinics, May 2013, pp. 30-32.

Tejeswara Rao, K., Upendra Rao, A., Sekhar and Rao, N.V.G. *Rythu sthayilo vana niti samrakshana*, Agri clinics, May 2013, pp. 50-52.

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CSK HPKV, Palampur (H.P.)

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IGKV, Raipur (Chhattisgarh)

Dubey, A., Sarawgi, S.K., Chitale, S., Tiwari, A., Manuel, S., Bhoi, S. and Dhurandhar, T. 2012. *Jaivik ki jad Pashudhan*. Krishak Jagat Weekly, 2-8 April, 2012, p. 7.

Bhoi, S., Chitale, S. and Tiwari, A. 2012. *Jaivik Dhan ki Utpadan Taknik. Chattisgarh kheti* 19(2):10-13.

Dubey, A., Chitale, S., Tiwari, A. Dhurandhar, T. and Manuel, S. 2012. *Samanvit Krishi Pranali mein Matsya palan ka Yogdaan. Chattisgarh kheti* **19**(2):39.

Chitale, S., Savu, R.M., Tiwari, A. and Pali, G.P. 2013. *Rabi Fasalon me Samanvit kharpatwar parbandhan. Chattisgarh kheti* **20**(1):35-37.

JNKVV, Jabalpur (M.P.)

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SDAU, SK Nagar (GUJARAT)

Patel, B.S., Sisodia, D.B. and Patel, P.M. 2012. *Uttar Gujaratna Pakoni pak paddhatio*. Chapter in Vividh Chomasu Pakoni Vaignanik Kheti Paddhatio. Published by T & V Yojana, S.D.A.U., Sardarkrushinagar, pp. 28-32.

SKNAU, Durgapura (Rajasthan)

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CSAUAT, Kanpur (UP)

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8.1.4 Books/Book chapter

CCS HAU, Hisar (Haryana)

Yadav, S.K., Kumar, Pawan, Nanwal, R.K., Kumar, Manoj and Rana, V.S. 2012. Diversification in Agriculture- Issues and Actions. *In: Crop Science and Technology for Food Security, Bioenergy and Sustainability (Eds. R.K. Behl, L. Bona, J. Pauk, W. Merbach and A. Vaha)* Published by Agrobios (International), Jodhpur, pp. 345-350.

Kumar, Pawan and Yadav, S.K. 2013. Importance of Integrated Farming System Management in Seed Production. *In: How the Farmers be a Quality Seed Producer (Eds. Arya Kumar Rajesh; Kumar, Suresh and Dahiya, K.K.)* **36**: 133-135.

PAU, Ludhiana (Punjab)

Walia, S.S., Gill, R.S., Aalakh, C.S. and Singh, Kulbir. 2013. Integration of farm enterprises for livelihood security. *In: Agri prenurship - An Opportunity for Rural Employment (Eds: Jasvir Singh and M.S.*

Mahal), Published by Director, PAMETI, PAMETI-43, Punjab Agricultural University, Ludhiana, pp. 137-147.

TNAU, Coimbatore (T.N.)

Siddeswaran, K., Jayanthi, C., Mohamed Amanullah, M., Yassin, Mohamed, Shanmugam, P.M., Ravisankar, D. and Asokaraja, N. 2013. Farming Systems for the future - Approaches and Applications. AE Publications, Coimbatore-41, Tamil Nadu (ISBN No.978-93-81972-12-0).

Devasenapathy, P., Shanmugam, P.M., Senthil Kumar, G. and Thiyageswari, S. 2012. Crop diversification strategies for profitable agriculture. (In) Cropping system management. (Eds: Gagwar, B.), pp. 27-44.

Devasenapathy, P., Shanmugam, P.M., Senthil Kumar, G. and Thiyageswari, S. 2012. Energy management in crop production. (In) Cropping system management. (Eds: Gangwar, B.), pp. 245-264.

Shanmugam, P.M. and Siddeswaran, K. 2013. Biointensive complementary cropping systems for high productivity and profitability. (In) Farming System for the Future - Approaches and Applications. (Eds: Siddeswaran, K., Jayanthi, C., Mohamed, Amanullah, M., Mohamed Yassin, M., Shanmugam, P.M., Ravishankar, D. and Asokaraja, N.), pp. 56-62.

Siddeswaran, K. and Sangeetha, S.P. 2013. Productivity enhancement in upland through integrated farming systems. (In) Farming Systems for the Future - Approaches and Applications (Eds.) Siddeswaran, K., Jayanthi, C., Mohamed, Amanullah, M., Mohamed Yassin, M., Shanmugam, P.M., Ravisankar, D., Asokaraja, N.), pp. 214-223.

Thiyageswari, S. 2013. Site specific nutrient management (SSNM) for different cropping systems. (In) Farming system for Future - Approaches and Application. (Eds:) Siddeswaran, K., Jayanthi, C., Mohamed, Amanullah, M., Mohamed Yassin, M., Shanmugam, P.M. Ravisankar, D. and Asokaraja, N.); pp. 91-99.

KAU, Karmana (Kerala)

Jacob, J. 2012. Integrated Farming Systems of Kerala. *In*: Entrepreneurship Development and Management for VHSE-Agripreneurs. (Eds.: Anil Kumar, A.S., Govindan, M., Nehru, S.M. and Anil Kumar, A.), pp. 66-68.

Jacob, John. 2013. Tuber crops in homestead and peri-urban farming systems. In: Empowering VHSE Agripreneurs (Eds. Anil Kumar, A.S. Govindan, M., Nehru, S.M. and Anil Kumar, A.), pp.73-79. College of Agriculture, Padannakkad, Kerala Agricultural University.

8.2 PARTICIPATION OF SCIENTISTS IN SYMPOSIA/SEMINARS/ CONFERENCES/WORKSHOPS/TRAININGS

BAU Sabour (Bihar)

Dr. R.P.Sharma, Chief Agronomist, AICRP on Integrated Farming Systems attended “Biennial work shop of AICRP on Integrated Farming Systems “at ICAR Research complex, Goa from 16-19 November, 2012

Dr. R.P. Sharma, Chief Agronomist, AICRP on Integrated Farming Systems attended 3rd International Agronomy Congress on Agricultural held at New Delhi from 26-30 November, 2012.

Dr. R.P. Sharma, Chief Agronomist, AICRP on Integrated Farming Systems attended National Seminar on Climate change held at Bihar Agricultural University, Sabour from 25-27 May,2013.

SKUAT, Jammu (J&K)

Dr. N.P. Thakur attended 78th Annual convention of ISSS during 23-26th Oct. 2013. at, CAZRI, Jodhpur.

Dr. Dileep Kachroo., Manpreet Kour., Dr. N.P. Thakur attended National symposium on climate Change and Indian Agriculture: slicing Down the uncertainties held at CRIDA, Hyderabad During January 22-23,2013.

Rohit Sharma, Dr.Dileep Kachroo, Dr. N.P. Thakur and P.Kumar. attended 2nd Jammu and Kashmir, Agricultural Science Congress held at SKUAST-J,Chatha, Jammu During December 15-17,2012.

Dr. N. P. Thakur., Dr. Dileep Kachroo, Rohit Sharma, Dr. Vijay Khajuria, Parshotam Kumar and Dr. A. K. Gupta Paper presented in 2nd Jammu and Kashmir Agricultural Science Congress held at SKUAST-J, Chatha, Jammu During December 15-17,2012.

CSK HPKVV Palampur (H.P.)

Negi, S.C., Rana, S.S., Subehia, S.K. Sharma, S.K. and Subehia S.K. attended Regional Training cum workshop on “Methology for OFR experiments with special emphasis for ON-Farm Integrated Farming Systems” at CSK Himachal Pradesh Krishi Vishvavidyalaya,Palampur,4-6 April 2013.

Negi, S.C., Rana, S.S., Subehia, S.K., Sharma, S.K. and Subehia S.K. attended Review Meeting of QRT held at SUAST-Jammu on March 22-23,2012.

Rana, S.S., attended meeting of REC on 2 April 2013, Directorate of Research CSKHPKV, Palampur.

Subehia, S.K. attended 77th Annual Convention of Soil Science held at Punjab Agricultural University, Ludhiana from 3-6th December, 2012.

SDAU, SK Nagar (GUJARAT)

Patel B.S, Chief Agronomist AICRP on Integrated Farming Systems attended “Biennial work shop of AICRP on Integrated Farming Systems “at ICAR Research complex, Goa from 16-19 November, 2012

Patel B.S, Chief Agronomist attended 4th National Conference on food security-present trends and emerging opportunities held at Ahmadabad on April 12-13, 2012.

Patel B.S, Chief Agronomist attended National Seminar on Production, Productivity and quality of spices held at Panchayati Raj Bhawan, Jaipur (Rajasthan) on February 02-03, 2013.

Patel, P.K attended National Seminar on “Development in soil science” held at CAZRI, Jodhpur organized By ISSS during October 23-26, 2013.

RBS College, Bichpuri, Agra (U.P.)

Dr.S.B.Singh attended National Seminar on “Impact of population Growth on Agriculture and Rural Development” held at BVRI Bichpuri Agra, U.P. during 9-10 Feb.

Dr.S.B.Singh attended Seminar on “Value added Functional Foods: Prospects and Future Challenges” Held at Janta inter college, Bakewar (Etawah) U.P. during 23-24 Feb. 2013.

CSA, Kanpur (U.P.)

Dr. Naushad Khan Participated in Third international Agronomy Congress “Agriculture Diversification, climate change management and livelihood, November 26-30, 2012, IARI, New Delhi.

Dr. Naushad Khan Participated in “Doubling food production in Five Years” February 1-3, 2013, Organized by crop care federation of India at Vigyan Bhawan, New Delhi.

Dr. Naushad Khan Participated in “Annual convention on Transforming Uttar Pradesh through agriculture”. December 01, 2012 Organized by Lucknow management association.

Dr. Naushad Khan Participated in “Agri-prenureship & Agribusiness: Opportunities & challenge”. 16-17 March, 2013, STEP-HBTI, Kanpur.

Dr. Naushad Khan and Dr. U.S. Tiwari Participated in Biennial work shop of AICRP on Integrated Farming Systems “at ICAR Research complex, Goa from 16-19 November, 2012

Karjat

Dr. L.S. Chavan, Dr. S.B. Bhagat, Dr. A.S. Dalvi attended Biennial work shop of AICRP on Integrated Farming Systems “at ICAR Research complex, Goa from 16-19 November, 2012

8.3 GROUP MEETING/ WORKSHOPS ORGANIZED

Annual Group Meeting of IFS: ICAR-RC-NEH, Umiam

Farming System (IFS)' was organized at ICAR Research Complex for NEH Region, Umiam, Meghalaya during 2-4th December, 2013. Dr. CelistineLyngdoh, Parliamentary Secretary for Agriculture and Food processing, Government of Meghalaya inaugurated the meeting. He expressed that due to continuous fragmentation and economic non-viability, many rice fields in Meghalaya have been converted into fish ponds. He also highlighted the need for integrating indigenous technology knowledge (ITK) and environment-friendly technologies into IFSs, being developed for small and marginal farmers. Dr. K.M. Bujarbaruah, Vice Chancellor, AAU, Jorhat and Guest of Honour of the programme, expressed his satisfaction over the progress made in IFS by the ICAR and emphasized upon the integration of household resources and recycling of farm waste to make small farm household economically viable. While delivering the Chairman's remarks, Dr. A.K. Sikka, Deputy Director General (NRM), ICAR emphasized upon the location-specific integration of best available technologies, which can minimise the risks under IFS. He said that adequate emphasis needs to be laid out by PDFSR on the characterization of farmers' resources and synthesis of scientifically designed, farmer-centric, location-specific IFS modules and models for all the agro-climatic regions.



Dr. B. Gangwar, Director, PDFSR presented the research achievements of the 'AICRP on Integrated Farming System' during last one year and stressed that this programme is mainly focussed on small and marginal farmers who constitute about 86% of the total farm households of the country.



Earlier, Dr. S.V. Ngachan, Director, ICAR Research Complex for NEH Region, Umiam welcomed dignitaries and emphasized upon the necessity of IFS research under climate-change



scenario. The programmes of on-station, on-farm and tribal sub-plan being carried out at different centres were thoroughly reviewed and several vital recommendations emerged out. Technical programmes to address location specific IFS modules were finalized during the workshop. Scientists and agronomists associated with

AICRP-IFS participated in the meeting. Dr. A.S. Panwar, organizing secretary of the meeting proposed the vote of thanks.

Regional Training cum Workshop for Eastern region

As finalized in the 30th biennial workshop held at ICAR Research Complex, Goa during 16-19 November, 2012, the Directorate organized the regional level training cum workshop on "Methodology for OFR experiments with special emphasis for On-Farm Integrated Farming Systems" for Agronomists, Associated Scientists and Field Assistants of On-Farm Research (OFR) centres from Eastern region comprising of Assam, Bihar, Chattisgarh, Jharkhand, Madhya Pradesh, Odisha and West Bengal during 28-30 January 2013 in collaboration with Indira Gandhi Krishi Vishwa Vidyalaya, Raipur (Chattisgarh). The programme was inaugurated by the chief guest Dr S.K. Patil, Vice Chancellor, IGKV, Raipur. Dr B. Gangwar, Project Director welcomed the gathering and thanked Dr S.K. Patil, vice chancellor for readily accepting the proposal to organise the training cum workshop at Raipur and inaugurating the programme. He informed the vice chancellor about usefulness of the programme in the context of changed mandate from cropping system to farming systems research.

Project Director specified that ECF (OFR) is the only scheme under AICRP which works directly with the farmers to solve their constraints. Dr S.K.



Patil, Vice Chancellor, IGKV, Raipur while thanking the Project Director for selecting IGKV, Raipur as venue for the meeting, he felt the need for such a interactions with grass root level workers (Field Assistants) which will improve the data generation in farming systems.

Dr Patil felt that, small and marginal farmers can take benefit only through farming system approach. Integrated farming system is essential for resource recycling thus saving the input costs in the present context of cost escalation. Hands on training, field visits, discussions and review of results were taken during the three day training cum workshop.



The major recommendations are given below.

- The comments and action initiated on the Goa proceedings to be obtained on priority from all the centres.
- Proforma for collecting the bench mark information of new OFR-2 experiment should be sent to centres by 15 March 2013 from PDFSR.
- Proforma for getting the technical programme of OFR-2 should be developed and sent to centres by PDFSR.
- Data collection schedule should be made in pdf and excel format and sent to centres for its use by field assistants.

- The detailed technical programme of new OFR 2 experiment should be submitted by the centres before 15 April 2013 in the prescribed proforma.
- All the centre should conduct formal monthly meetings with field assistant and submit the proceeding along with signature to PDFSR, Also, information on time of input supply to farmers should be communicated.
- Chief Agronomist in consultation with university authorities should take necessary action to delegate financial sanctioning power to OFR Agronomist up to the level of Rs. 20,000/-. This will help in timely procurement of inputs for experiments and ultimately will lead to enhanced quality of data and response from cultivators.
- The vacant position in the scheme needs to be filled on priority. Chief Agronomists are requested to take follow up action.



Regional Training cum Workshop for Western region

The regional training cum workshop on “Methodology for OFR experiments with special emphasis for ON-Farm Integrated Farming Systems” for Agronomists, Associated Scientists and Field Assistants of On-Farm Research (OFR) centres from Western region comprising of Gujarat, Maharashtra and Rajasthan (only

Chittorgarhcentre) was organized during 26-28 February 2013 in collaboration with OFR centre, Regional Research Centre of Dr Panjabrao Deshmukh Krishi Vidyapeeth located at Amravati Maharashtra). Dr. Mangala R. Ghanbagdur, Chief Agronomist, AICRP-IFS welcomed the gathering and thanked Project Director, PDFSR for having faith on Dr. PDKV, Akola and Regional Research centre of Amravati for organizing the training cum workshop for field assistants. Dr. J.P. Singh, Programme Facilitator (IFS) said that the farming system research is important in the context of sustaining the small and marginal farm holdings in the country.



Dr. B. Gangwar, Project Director, while highlighting the importance of the training cum workshop said, this is the first time the field assistants of OFR programme in western states are moving outside the state to learn and practice in their domain. He further added that, the training cum workshop is a right platform for clearing the



doubts and confusion. In the history of AICRP on IFS, both Chief Agronomist and OFR Agronomist are women and expressed satisfaction with good arrangement made for the programme.

Practical exercise on technical programme preparation and field visit to the OFR experiments were carried out as part of the training cum workshop.



The following recommendations were arrived at the end of training cum workshop.

- The training cum workshop is to be organized every year as considered very much useful by the field assistants.
- Best performing OFR centre and a field assistant can be considered for issuing a merit certificate. It should be based on the critical assessment report by the committee.
- Area under OFR 1 experiment can be extended, if the resources (fund) permit.
- Chief Agronomists should ensure allocation of contingency in 60:40 ratios to on- station and on-farm programme. As soon as Budget Estimate is communicated, the bifurcation should be made and communicated to OFR centre with a copy to PDFSR.
- Training should be organized at PDFSR by Dr Harbir Singh for economists/persons involved in characterisation of farming system to make

the uniform collection of data, synthesis and interpretation.

- Proposed new guidelines discussed during the programme would be finalized for characterization and circulated to all by PDFSR within one month. All the 60 experimental households of OFR should be compulsorily included in the survey.
- Proforma of characterization should be revisited and unwanted/ controversial statements be deleted by the characterisation unit of PDFSR.
- The intervention in the technical programme of OFR 2 and 3 should be of low/no cost and the total cost of intervention in all the modules should not exceed Rs 5000/households/year for OFR 2 and Rs 10,000/households/year for OFR 3.
- The centres should select the experimental households across the board, so that the benefits are extended to all sections of the society under marginal and small category.
- The bench mark using the proforma (M0_OFR 2 & M0_OFR 3) be collected and new technical proforma should be finalized for all the OFR experiments by 30th April 2013.

Regional Training cum Workshop for Northern region

The centres who have not got the economist post in their on- station or on- farm programme



can explore the possibility of involving economist from the university or by filling the approved post of RA/SRF in Agriculture Economics discipline under AICRP-IFS and utilized for characterization work.

Regional level training cum workshop on “Methodology for OFR experiments with special emphasis for On-Farm Integrated Farming Systems” for Agronomists, Associated Scientists and Field Assistants of On-Farm Research (OFR) centres from Northern region comprising of Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan (only Fatehpur centre), Uttar



Pradesh and Uttarakhand during 4-6 April 2013 in collaboration with CSK Himachal Pradesh Krishi Vishwa Vidyalaya, Palampur (Himachal Pradesh). Dr. B. Gangwar, Project Director in his address explained to the chief guest that the on- farm research programme is entirely different from normal work. The Project Director also clarified that the on station IFS models are created for education and components optimization point of view. In order to have impact study, GPS based



observations are also taken in the on- farm research. Dr. S.P. Sharma, welcomed the participants and complimented the PDFSR for bringing out the success stories in IFS. He highlighted success story of farmers from Kendrapara district of Odisha. Dr. S.K. Sharma, Vice Chancellor in his chief guest address said that only few people think about farmers and real problem faced by farmers. He also emphasized that cost of cultivation should be brought down to greater extent. Dr. Sharma was of the firm opinion that, AICRP-IFS should have more centres than existing one. In the next 10-15 years, there should be a scientifically developed linkage among different components. The training of field staff is appreciable.

The new methodology should be learned and more importantly, they should be practiced. Practical exercise on characterization of farming systems, technical programme preparation for all the OFR experiments and field visit to the OFR experiments were carried out as part of the training cum workshop.



The following recommendations came at the end of workshop cum training.

- The training cum workshop is to be organized every year as considered very much useful by the field assistants.
- Chief Agronomists should ensure allocation of contingency in 60:40 ratios to on- station and on-farm programme. As soon as Budget Estimate is communicated, the bifurcation

should be made and communicated to OFR centre with a copy to PDFSR.

- Training should be organized at PDFSR by Dr Harbir Singh for economists/persons involved in characterization of farming system to make the uniform collection of data, synthesis and interpretation.
- The bench mark using the proforma (M0_OFR 2 & M0_OFR 3) be collected and new technical

proforma should be finalized for all the OFR experiments by 31 May 2013.

- The centres who have not got the economist post in their on- station or on- farm programme can explore the possibility of involving economist from the university or by filling the approved post of RA/SRF in Agriculture Economics discipline under AICRP-IFS and utilized for characterization work.

8.4 RADIO AND TELEVISION TALKS DELIVERED BY PROJECT STAFF

Centre/Date	Title of the talk	Name of Doordarshan/Akaswani Kendra	Name of Staff
Rajendranagar			
23-10-12	Rabikunauvaina pantala sagu yajamanyam	AIR, Hyd	Dr. M. Venkataramana
03-11-12	Senega panta yajamanyam	AIR, Hyd	Dr. M. Venkataramana
11-12-12	Variki pratyamnaya pantalu	MAHA-TV	Dr.M.Goverdhan Principal Scientist (Agro)
06-12-12	Variki prathyamnayamga aruthadi pantalu-avasyakatha	TV-5	Dr.M.Goverdhan Principal Scientist (Agro)
29-05-13	Metta vyavasayam- Pantala empika-Panta marpidi	AIR, Hyd	Dr. M. Venkataramana (Principal (Agro) & Head)
01-04-13	Misrama vyavasayam	AIR, Hyd	Dr. S. Sridevi
17-01-13	Misrama vyavasayam lo aadhaya vyayalu	TV-5, Hyd	Dr. S. Sridevi
16-08-12	Agency prantallo samparadeyatara pratti sagulu yajamanyam	AIR Visakhapatnam	Dr.K.Tejeswara Rao
19-10-12	Agency prantallo samagra vyavasaya vidhanala avsyakatha	AIR Visakhapatnam	Dr.K.Tejeswara Rao
11-01-13	Girijanaprnatallo vari maganullo aparalallo maelaina yajamanyapaddatulu	AIR Visakhapatnam	Dr.K.Tejeswara Rao
March,2013	Samagra vyavasaya vidhanalalo Vanaraja kola pempakam	Annadata E-TV	Dr.K.Tejeswara Rao
March,2013	Mokkajonna prodhuthirugudu pantalalo paksahula bedada nivarana	Annadata E-TV	Dr.K.Tejeswara Rao
08-06-12	Given live programme on "Varshadharapu pantalalo adhika dhigubadulaku suchanalu"	Doordarshan – sapthagiri channel	Dr.M.Malla Reddy Hyderabad
21-06-12	Given live programme on "Weedicides"	All India Radio	Dr.M.Malla Reddy Warangal
09-08-12	Kharif crops-Problems and Solutions by at	All India Radio	Dr.M.Malla Reddy Warangal
17-08-12	Post-emergence weedicides	Electronic Wing, ANGRAU	Dr.M.Malla Reddy
29-08-12	Use of bios in different crops and negative effects and relevance	Studio-N	Dr.M.Malla Reddy
31-08-12	Fertilizer management in turmeric	CVR channel	Dr.M.Malla Reddy
20-09-12	Kharif crops-Problems and Solutions & Scope for rabi crops by	All India Radio	Dr.M.Malla Reddy Waranagal

Contd..../-

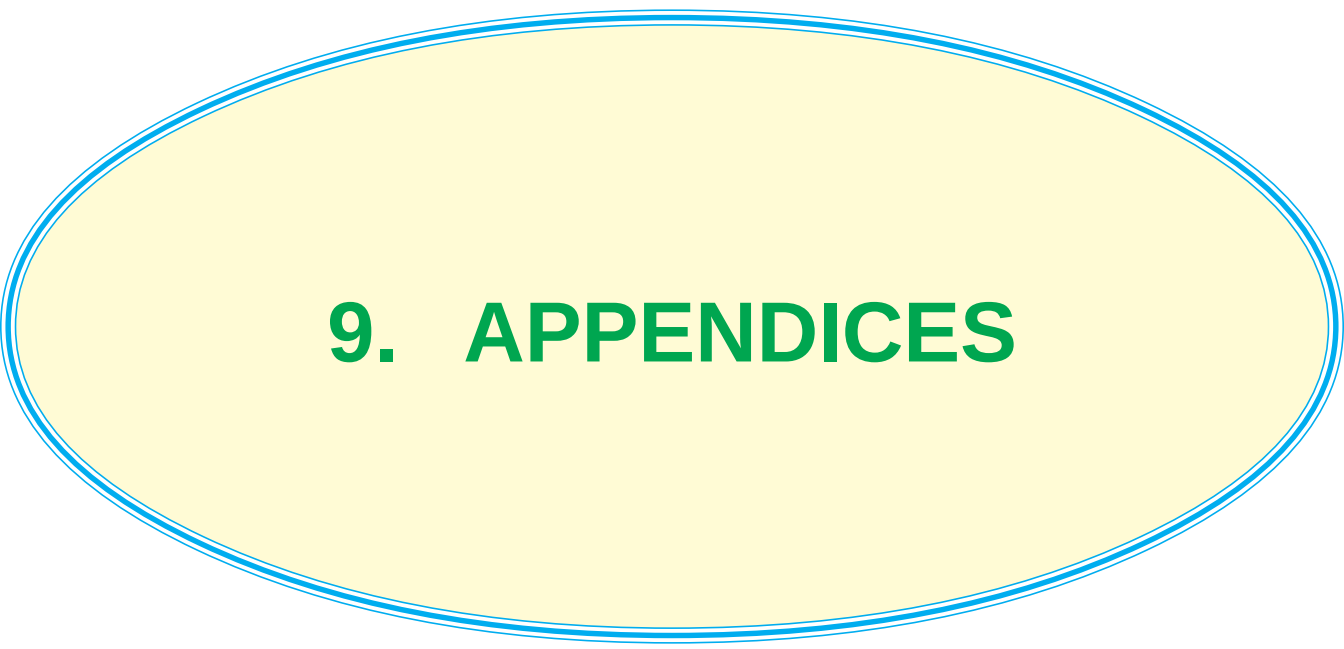
Centre/Date	Title of the talk	Name of Doordarshan/Akaswani Kendra	Name of Staff
11-10-12	Rabi crops	All India Radio	Dr. M. Malla Reddy
03-10-12	Impact of heavy rains on cotton rice and chillies in AP and remedial measures	ETV2	Dr. M. Malla Reddy Waranagal
11-10-12	Water logging in cotton-nutrition management	Studio-N	Dr. M. Malla Reddy
01-11-12	Reasons for low cotton yields and remedial measures for higher productivity	NTV	Dr. M. Malla Reddy
08-11-12	Zero tillage maize-management strategies	Doordarshan (Sapthagiri)	Dr. M. Malla Reddy
10-11-12	Integrated farming systems approach-ECF IFS villages- success story	ETV2 (Jaikisan)	Dr. M. Malla Reddy
21-11-12	Boron deficiency and management in banana and "Fe" deficiency and management in groundnut	CVR channel	Dr. M. Malla Reddy
06-12-12	Rabi crops and zero tillage maize.	All India Radio, Warangal	Dr. M. Malla Reddy
14-12-12	Alternate crops to rice during rabi	Doordarshan- Sapthagiri: Live	Dr. M. Malla Reddy
10-12-12	Crop diversification in rice fallows	ETV 2-Jaikisan	Dr. M. Malla Reddy
10-12-12	Zero tillage maize	ETV 2-Jaikisan	Dr. M. Malla Reddy
03-01-13	Scope of summer crops under wells and bore wells	All India Radio	Dr. M. Malla Reddy, Warangal
24-01-13	Scope of irrigated dry crops after cotton-Rabi groundnut and maize under wells and bore wells.	ETV- Annadhatha	Dr. M. Malla Reddy
14-02-13	Summer irrigated dry crops and rabi rice.	All India Radio	Dr. M. Malla Reddy, Warangal
18-03-13	Integrated farming systems	ETV2	Dr. M. Malla Reddy
25-04-13	Summer crops and Kharif plan, 2013	AIR, Warangal	Dr. M. Malla Reddy
22-04-13	Management Strategies for recently hailstorms and rains affected crops	ETV2	Dr. M. Malla Reddy
20-05-13	Green Manure crops & Measures for soil improvement.	ETV Annadhatha	Dr. M. Malla Reddy
24-05-13	Inter crops	ETV Annadhatha	Dr. M. Malla Reddy
Jabalpur 22-02-12	Gresmkalin moong v urd ki unnat krishi mala	AIR	Dr. V.K. Shukla
Sabour 01-07-12	Kisano ko samsayik salah	AIR, Bhagalpur	Dr. R. P. Sharma

Contd..../-

Centre/Date	Title of the talk	Name of Doordarshan/Akaswani Kendra	Name of Staff
21-10-12	Zero Technique vidhi se gahu ki kheti	AIR, Bhagalpur	Dr.R.P.Sharma
25-02-13	Gahu fasal ki dekhbhal	AIR, Bhagalpur	Dr.R.P.Sharma
08-08-13	Dhan ki Vageyanik kheti	AIR, Bhagalpur	Dr.R.P.Sharma
SK Nagar			
07-05-13	Crop rotation and its importance	DD, Girnar	Dr.L.J.Dasai
Rahuri			
Ludhiana			
04-10-12	<i>Higher productivity from rabi crops</i>	AIR, Jalandhar	Dr S.S.Walia
06-12-12	Late sown wheat	AIR, Jalandhar	Dr S.S.Walia
11-12-12	Resource conservative cropping systems	Doordarshan Kendra, Jalandhar	Dr S.S.Walia
01-02-13	Importance of legumes in cropping systems	AIR, Jalandhar	Dr S.S.Walia
29-05-13	Sowing of direct seeded rice	AIR, Jalandhar	Dr S.S.Walia
Karjat			
09-Oct-12	"Kaddhanya pikansathi ekaत्मik annadravya"	AIR, Ratnagiri	Dr.L.S.Chavan
12-11-13	"Konkan Vibhagat jaminichayaangolitawar vividh prakarchi lagwad"	AIR, Mumbai	Dr.L.S.Chavan
03-12-13	<i>Unhali bhuimugachi lagwad</i>	AIR, Mumbai	Dr.A.S.Dalvi
Coimbatore			
12-06-12	Intercropping in Coconut	Doordarshan Kendra, Chennai	
19-06-12	Nutrient Management for Coconut	Doordarshan Kendra, Chennai	
02-08-12	Water Management for Coconut	Doordarshan Kendra, Chennai	
29-08-12	Manavari nilakadalai sagupadi uthigal	AIR, Chennai	
03-04-13	Kadai uzhavum athan payangalum	AIR, Chennai	
29-08-13	Conservation Agriculture	AIR, Chennai	
Sirruguppa			
Parbhani			
23-10-12	Rabbi Hangamateel Aanterpeek Pathethi	AIR	Dr.W.N.Narkhede
Ranchi			
11-12-12	Water management in potato crops	TV Talk	Dr.R.Thakur

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Centre/Date	Title of the talk	Name of Doordarshan/Akaswani Kendra	Name of Staff
22-02-13	Cropping system in Jharkhand	TV Talk	Dr.R.Thakur
10-08-12	Farming System	TV Talk	Dr.R.P.Manjhi
08-11-13	Effect of mulching in wheat crop	Radio Programme	Dr.R.Thakur
07-05-12	fertilizers application and weeds control in summer rice	Radio Programme	Dr.R.P.Manjhi
04-09-12	Cultivation of early sowing potato	Radio Programme	Dr.R.P.Manjhi
04-12-12	weeds control in wheat	Radio Programme	Dr.R.P.Manjhi
Raipur			
17-01-13	Aaj ki Salah: Fasalon me Javik Urvarakon ki Awashyakta.	AIR, Raipur	Dr. Srikant Chitale
Palampur			
16-05-12	Diversification of existing cropping system-A way to earn higher profit	Doordarshan Kendra, Shimla	Dr.S.C.Negi
19-12-12	Live Phone-in programme on agriculture under the "Halo Jagran"	Danik Jagran Daily News	Dr.S.C.Negi
17-06-12	Field based programme, Kisan ki sewa main vermicomposting	Doordarshan Kendra, Shimla	Dr.S.S.Rana



9. APPENDICES

APPENDIX I: INITIAL SOIL PARAMETERS FOR ON-STATION EXPERIMENTAL SITES DURING 2012-13

Name of CSR centre	Experiment no	PH	EC (m mhos/cm)	O.C. (%/g/kg)	Available nutrient (kg/ha)		
					N	P	K
Rajendranagar	1(a)	7.72	0.27	0.51	210	32.0	288
	2(a)	8.5	0.24	0.54	-	34.0	224
	OF	7.6	0.54	0.36	-	24.0	293
	CA-CI	8.12	0.23	0.56	178	28.5	189
Maruteru	1(a)	-	-	0.9	-	38.0	314
	2(a)	5.1	0.38	0.9	-	38.0	344
	OF	5.8	0.76	0.8	-	34.0	479
Rudrur	1(a)	6.68	0.55	0.46	-	39.6	305
	2(a)	7.99	0.36	0.56	-	17.5	304
	OF	7.3	0.48	0.46	-	41.0	425
	CA-CI	7.43	0.23	0.52	-	32.1	259
Sabour	1(a)	7.5	0.13	0.63	213	23.6	226
	2(a)	7.4	0.23	0.46	246	23.6	155
	SPM	7.5	0.15	0.53	238	27.2	209
	CA-CI	7.5	0.11	0.64	201	16.5	220
	OF	8.1		0.50	153	26.9	122
	IFS	7.6	0.45	0.55	226	29.5	143
Hisar	1(a)	7.8	0.21	0.46	170	12.7	292
	2(a)	7.8	0.23	0.43	191	16.4	291
	TPM	7.9	0.23	0.46	161	16.4	256
	OF	7.8	0.21	0.49	162	15.5	238
Raipur	1(a)			0.49	248	18.6	262
	2(a)			0.51	234	11.5	232
	OF			0.58	169	17.4	270
Palampur	1(a)	5.6		0.99	293	63.1	11
	2(a)	5.5		0.60	667	21.9	221
	TPM	NR		NR	NR	NR	NR
	OF	5.7		0.80	505	35.5	186
Jammu	1(a)	8.4		0.55	216	23.0	119
	2(a)	7.1		0.62	456	13.8	154
	OF	8.1		0.51	210	14.7	114
	CA-CI	NR	NR	NR	NR	NR	NR
Ranchi	1(a)	6.0		0.38	225	20.0	115
	2(a)	6.5		0.42	260	19.5	195
	2(b)	6.4		0.42	260	19.5	195
	CA-CI	5.6		0.56	256	55.1	125
	IFS	5.6		0.50	282	25.8	123
S.K.Nagar	1(a)			0.33	195	15.9	198
	2(a)			0.30	190	38.0	230
	OF			0.26	195	23.9	261
	CA-CI			0.32	198	19.3	208
	IFS	7.7	0.13	0.33		18.6	172

Contd...

Name of CSR centre	Experiment no	PH	EC (m mhos/cm)	O.C. (%/g/kg)	Available nutrient (kg/ha)		
					N	P	K
Junagarh	1(a)			0.68	190	9.5	140
	2(a) with potash			0.77	240	29.9	165
	2(a) without potash			0.36	245	32.0	216
	OF			0.83	199	19.0	160
	CA-CI	NR	NR	NR	NR	NR	NR
Navsari	1(a)			0.59	194	18.2	153
	2(a)			0.58	297	29.0	317
	OF			0.56	176	16.5	219
	CA-CI			0.59	256	21.4	160
Kathalagere	1(a)	6.1	0.20	0.60		22.0	197
	2(a)	6.4	0.13	0.68	277	12.3	211
	CA-CI	5.2	0.09	0.60		22.0	197
	OF	5.3	0.14	0.52	203	12.0	234
	IFS	NR	NR	NR	NR	NR	NR
Siruguppa	1(a)	8.2	0.38	0.65	177	19.3	348
	TPM	8.1	0.36	0.38	165	16.6	341
	TPM	8.2	0.37	0.62	185	2.0	365
	OF	8.1	0.34	0.59	221	18.1	390
	IFS	8.2	0.34	0.67	212	10.5	364
Jabalpur	1(a)	7.7	0.48	0.68	266	9.2	300
	2(a)	7.6	0.55	0.65	240	16.0	448
	OF	7.5	0.50	0.64	210	8.8	370
	CA-CI	NR	NR	NR	NR	NR	NR
Powarkheda	1(a)	7.6	0.55	0.66	260	9.0	340
	OF	7.7	0.48	0.59	262	9.5	300
	SPM	7.7	0.48	0.59	262	9.8	300
Rewa	1(a)	7.7	0.53	0.65	260	9.0	295
	2(b)	7.5	0.54	0.63	258	12.5	500
	OF	7.3	0.46	0.56	224	8.2	315
Indore	1(a)	7.5	0.45	0.34	150	8.0	440
	CA-CI	7.6	0.46	0.28	122	9.6	480
	TPM	7.6	0.30	0.28	122	9.6	440
Rahuri	1(a)	8.0	0.26	0.62	178	7.0	585
	2(a)	8.2	0.35	0.64	153	14.2	705
	TPM	8.2	0.33	0.64	242	11.0	527
	OF(S-O)	8.4	0.33	0.64	209	13.0	442
	IFS	NR	NR	NR	NR	NR	NR
Akola	2(a)	7.4	0.20	0.40	209	11.0	350
	TPM			0.43	205	15.4	306
	OF				177	13.0	285
	IFS						
Karjat	1(a)	7.0	0.30	0.97	217	18.4	199
	2(a)	7.6	0.30	1.25	213	13.0	245
	OF						
	CA-CI						
	IFS						

Contd...

Name of CSR centre	Experiment no	PH	EC (m mhos/cm)	O.C. (%/g/kg)	Available nutrient (kg/ha)		
					N	P	K
Bhubaneswar	1(a)	6.7	0.27	0.69	212	15.7	189
	2(a)	5.1	0.36	0.43	254	20.0	210
	OF	5.8	0.13	0.62	245	18.5	165
	CA	5.5	0.29	0.65	260	14.6	130
Chiplima	1(a)	6.1	0.41	0.58	315	16.0	210
	2(a)	5.4	0.31	0.62	295	10.2	185
	OF	5.9	0.31	0.76	294	10.1	121
	CA	6.8	0.11	0.45	273	10.4	116
Ludhiana	1(a)	7.8	0.40	0.38	242	47.5	100
	2(a)	8.2	0.32	0.31	143	11.2	101
	SPM	7.8	0.38	0.44	134	20.4	140
	SSNM	7.2	0.40	0.38	120	41.4	90
	OF	7.5	0.20	0.39	179	22.3	136
Durgapura	1(a)	8.2	0.28	0.22	NR	38.1	180
	SPM	8.1	0.19	0.20	NR	33.9	190
	OF	8.1	0.18	0.21	NR	21.9	193
Coimbatore	1(a)			0.60	252	23.9	482
	OF			0.59	249	19.2	398
	TPM				238	21.8	528
Kanpur	1(a)	8.1	0.18	0.45	NR	11.5	205
	2(a)	8.1	0.18	0.24	NR	10.4	170
	TPM	8.0	0.23	0.51	NR	12.5	186
	OF	8.0	0.16	0.40	NR	14.4	125
	CA-CI	8.2	0.18	0.36	NR	14.0	203
	IFS	7.9	0.36	0.39	NR	11.5	198
Faizabad	1(a)	7.3	0.11	0.51	142	18.0	136
	2(a)	8.8	0.50	0.37	102	13.8	355
	2(b)	7.7	0.15	0.45	130	10.0	113
	OF	8.2	0.40	0.46	127	17.4	247
Varanasi	1(a)	NR	NR	NR	NR	NR	NR
	2(a)	7.9	0.22	0.44	192	12.0	216
	CA-CI	NR	NR	NR	NR	NR	NR
Bichpuri	1(a)	NR	NR	NR	NR	NR	NR
	2(a)	NR	NR	0.31	124	10.6	204
	OF	7.8	1.80	0.31	123	10.6	284
	SPM	NR	NR	NR	NR	NR	NR
Pantnagar	1(a)	7.8	NR	NR	122	5.6	156
	2(a)	5.5	NR	0.60	NR	20.0	143
	SPM	7.7	NR	NR	NR	16.0	125
	OF	7.8	NR	NR	NR	15.5	122
	CA-CI	NR	NR	NR	NR	NR	NR
Kalyani	1(a)	7.2	0.65	0.65	123.2	11.9	96
	2(a)	7.4	0.59	0.92	110	12.1	81
	OF	7.1	0.46	0.62	129.8	11.9	93
	CA-CI	NR	NR	NR	NR	NR	NR
	IFS	NR	NR	NR	NR	NR	NR

APPENDIX II A: WEATHER PARAMETERS (MONTHLY AVERAGES) AT DIFFERENT CROPPING SYSTEM CENTERS DURING 2012-13

Name of CSR centre	July	August	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June
Rajendranagar	261.6	99.4	117.9	58.9	47	0	5	23	0	46.2	57.3	145.7
Maruteru	307	286.2	322.2	237.2	416.4	0	0	13.6	0	18.4	10.4	NR
Rudrur	187.2	96	55	167.8	77.1	0	0	0	0	0	42	NR
Sabour	277.4	140.8	102.1	41	14.8	0	0	14.6	0	47.9	178.3	160.2
Rajpur	414.2	379.6	381.7	0.0	0.0	0.0	60.1	0.0	0.0	16.2	0.0	NR
SK Nagar	171.3	225.9	191.8	3.2	0.0	0.0	0.2	0.0	1.8	23.7	0.0	175.8
Junagadh	70.5	87.6	187.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NR
Navsari	271.0	200.0	618	12	0	0	0	0	0	0.1	0	NR
Hisar	76.6	282.5	32.9	0.0	0.0	5.5	43.0	32.7	31.1	2.3	0.0	97.3
Palampur	815.2	846.0	376.0	22.2	4.0	34.2	75.4	165.2	119.4	59.6	28.6	NR
Jammu	314.8	583.3	223.5	0.2	5.4	69.2	41.4	176.6	41.4	4.6	9.6	141.4
Ranchi	357.2	254.7	230.1	30.8	22.5	17.4	0.0	16.2	0.0	12.8	0.0	NR
Kathalagere	141.7	82.0	44.1	56.9	17.8	0.0	7.2	0.0	0.0	87.7	NR	NR
Karmana	96.0	188.0	51.5	122.5	98.6	40.5	41.5	38.0	86.0	1.5	123.1	484.7
Jabalpur	682.6	335.0	150.6	2.3	0.0	3.2	0.0	60.2	33.3	0.0	NR	NR
Powarkheda	721.0	416.6	176.8	0.0	0.0	0.0	NR	NR	NR	NR	NR	NR
Rewa	591.8	346.1	122.3	0.0	0.0	0.0	17.2	57.0	41.0	4.0	NR	NR
Indore	490	239.1	174.7	0	0	0	0	17.9	5.25	30.4	2.5	372.4
Rahuri	76.4	32.2	145.0	137.2	0.0	0.0	NR	NR	NR	NR	NR	NR
Akola	111.0	270.7	106.0	154.0	42.4	0.0	0.0	27.5	6.9	2.5	NR	NR
Karjat	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	NR
Ludhiana	77.9	161.6	59.2	1.0	0.0	17.4	30.8	78.1	30.2	4.4	NR	NR
Durgapura Jaipur	122.6	574.4	135.4	0.0	0.0	0.0	0.0	25.6	2.4	0.0	0.0	0.0

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Name of CSR centre	July	August	Sept	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June
Coimbatore	27.8	27.8	6.1	177.2	10.4	6.9	0	99.8	0	43	14.3	11.3
Thanjavur	16.6	91.4	76	227.3	68	0	5.3	0	21	0	0	33.2
Kanpur	406.5	125.7	114.9	0	0	0	4.6	121.2	1.9	0	0	359.8
Varanasi	359.7	102.4	139.7	6.4	0.0	0.0	0.0	66.8	3.6	10.2	0.0	0.0
Bichpuri	359.7	115.7	0.0	0.0	0.0	0.0	12.9	37.0	0.0	5.5	2.8	45.6
Pantnagar	416.6	244.4	224.6	0.0	0.0	0.0	41.2	132.1	0.2	0.6	0.0	0.0
Kalyani	264	203.3	278.8	29	50.2	7.3	1.9	9	0	113	114.8	NR
Parbhani	316.1	140.1	124.3	19.2	0.0	0.0	0.0	0.0	0.0	0.6	1.4	82.5
Goa	752.3	705.9	325.9	123.2	9.6	0	0	2.6	0	0	61.3	759

Appendix II B : Maximum and minimum temperature(⁰C) (July 2012 to June 2013)

Name of CSR centre	Temperature (⁰ C)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.
Rajendranagar	30.2 23.1	30.2 22.5	30.1 22.2	30.3 18.5	28.7 15.9	29.9 13.0	30.8 16.6	30.9 17.4	35.8 19.8	37.8 24.6	40.4 27.0	32.6 23.9
Maruteru	28.7 24.1	29.8 23.9	29.6 24.2	29.0 23.0	27.8 20.2	29.0 17.8	28.5 19.9	28.9 19.1	31.8 21.6	33.3 23.2	36.8 27.9	NR
Rudrur	39.6 22.5	39.6 22.5	33 18.0	29.8 22.1	33.5 21.9	31.9 17.3	35.1 15.7	33.6 15.7	34.6 23.2	38.6 23.3	42.5 27.7	NR
Sabour	32.3 25.2	31.8 25.5	31.0 24.5	30.8 19.6	27.0 12.4	21.0 8.6	20.6 5.2	25.2 9.7	31.3 13.6	35.1 18.1	33.7 23.9	32.3 26.3
Raipur	31.7 25.1	30.1 24.6	30.2 24.1	32.0 19.9	30.9 15.4	28.6 11.2	25.7 13.2	31.2 14.3	36.8 17.4	39.8 24.5	43.5 27.7	NR
SK Nagar	34.8 26.9	30.8 25.7	32.0 24.5	35.1 19.1	32.8 13.9	29.9 13.1	26.7 9.4	29.5 12.4	35.4 16.0	37.4 21.4	40.3 23.9	36.5 26.6
Junagadh	33.2 26.1	30.4 24.5	33.3 24.3	35.6 23.0	35.3 17.5	32.3 16.0	30.4 12.3	33.2 15.9	37.3 20.7	39.0 24.6	39.6 26.3	NR
Navsari	30.7 26.3	30 25.6	30 25.6	34.9 22.1	33.2 16.2	31.8 16.4	29.7 22.3	30.7 15.5	35.2 18.6	34.5 22.3	34.6 27	NR
Hisar	43.9 23.6	40.4 23.8	35.6 19.0	36.7 11.0	31.6 6.0	27.4 0.5	23.8 -1.5	25.7 4.2	32.4 6.5	39.2 12.0	46.1 15.2	44.4 21.5
Palampur	28.0 20.1	25.3 19.3	26.4 17.5	25.3 12.1	21.1 8.1	18.5 6.2	15.9 3.7	16.4 6.2	22.4 10.0	25.7 13.6	32.1 18.5	NR
Jammu	35.6 24.4	32.7 24.4	32.4 21.9	31.3 14.4	25.8 9.4	19.2 5.8	17.2 4.8	20.0 7.6	26.9 11.4	32.4 15.1	38.7 19.9	37.1 24.5
Ranchi	29.8 20.5	30.2 20.5	29.9 20.6	28.4 16.1	24.8 9.1	23.2 6.7	22.2 5.0	24.9 10.3	31.2 14.1	35.5 19.4	37.6 23.6	NR
Kathalagere	29.5 23.0	29.1 23.7	29.2 22.3	29.3 20.8	28.0 18.6	24.2 19.4	28.4 18.1	30.6 18.4	29.1 18.9	30.2 22.1	NR	NR
Karmana	29.8 24.3	29.7 23.7	30.2 24.1	30.4 23.6	30.4 23.0	30.7 22.8	30.3 21.8	31.7 22.3	32.3 24.3	32.9 25.5	31.6 25.4	116.4 90.8
Jabalpur	30.5 23.4	29.5 23.2	31.1 23.3	31.6 18.0	28.3 11.7	26.7 9.2	23.8 7.0	104.1 44.5	32.4 14.3	NR	NR	NR
Powarkheda	32.6 22.7	31.7 21.3	33.9 22.8	34.5 17.7	31.0 13.3	30.9 10.9	NR	NR	NR	NR	NR	NR
Rewa	30.0 23.2	30.5 23.7	32.2 22.4	31.0 17.4	27.7 10.4	21.6 4.9	23.3 5.9	24.8 8.0	33.5 12.4	NR	NR	NR
Indore	30.9 23.3	26.4 22	29.1 21.4	32 16.5	28.9 9	27 8.3	23.3 5.6	26.1 10.8	31.1 14.5	33.2 25.2	40.7 26.8	31.3 23.8
Rahuri	31.0 23.2	31.4 22.2	30.4 21.6	33.0 18.7	30.9 13.1	30.6 11.7	NR	NR	NR	NR	NR	NR
Parbhani	31.5 23.3	30.6 22.3	31.6 21.8	33.5 18.0	32.1 13.6	29.4 10.5	30.1 12.4	34.0 14.1	37.6 15.9	40.6 23.5	41.6 26.5	37.1 25.4
Akola	32.1 30.0	30.4 29.2	32.6 31.1	33.6 33.0	31.4 31.3	29.5 30.0	30.0 29.1	32.9 32.2	37.7 37.4	NR	NR	NR
Karjat	29.5 25.0	29.3 24.4	30.1 23.7	33.8 21.7	34.2 16.6	33.9 15.9	33.6 14.1	35.8 16.6	38.4 19.1	39.5 22.8	38.1 26.3	NR
Ludhiana	35.4 27.8	32.8 26.5	32.7 23.7	31.4 15.9	26.0 9.9	19.4 7.5	17.5 5.7	21.3 8.9	28.3 13.6	34.6 19.0	NR	NR
Durgapura, Jaipur	36.1 26.6	30.3 24.5	32.3 23.8	33.4 19.1	33.3 12.1	24.9 10.1	21.8 7.1	24.4 11.8	32.8 17.2	NR	NR	NR

Contd..../-

Name of CSR centre	Temperature (°C)											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.	max. min.
Coimbatore	31.5 23.6	31.1 22.9	32.5 22.5	30.3 22.2	31.2 20.2	30.5 20.5	31.5 18.9	32.4 20.6	34.3 23.6	35.8 24.6	35.1 24.3	32.2 23.7
Thanjavur	36.9 27.6	34.8 26.9	36.1 25.9	33.2 23.7	35.4 25.2	31.6 23.9	32 22.9	32.9 21.2	33.6 21.5	35.3 25.2	38.3 27.7	37.2 27.4
Kanpur	33.5 24.7	32.4 25.7	31.6 24.1	31.8 17.6	28.3 10.4	22.0 7.6	19.4 7.0	23.3 10.3	30.5 14.2	27.2 18.8	41.7 23.7	34.8 24.3
Varanasi	32.7 27.0	25.6 32.7	31.7 25.1	31.4 19.9	27.3 12.6	22.1 10.4	21.2 8.1	24.5 12.6	32.1 17.3	37.7 22.0	40.0 26.9	NR
Bichpuri	35.1 27.4	32.7 25.7	33.9 24.6	33.1 17.1	27.7 10.2	22.3 7.7	20.2 5.4	22.5 10.0	32.9 15.4	38.9 21.1	43.2 26.0	38.9 28.7
Pantnagar	32.6 25.9	32.2 25.3	31.8 23.4	30.4 14.3	26.0 8.4	20.4 6.9	18.2 6.7	24.2 10.6	33.4 15.1	39.1 20.8	NR	NR
Kalyani	32.3 26.5	32.3 26.4	32.6 26	33.5 22.5	29.5 17.3	25.3 11.7	24.8 9.6	29.3 13.5	36.2 20	37.6 24.2	34.8 25.6	NR
Goa	28.6 24.4	29.9 24	30.6 23.8	34.8 23.5	34.8 22	35.1 20.7	35.2 18.9	35.8 20.4	36.3 22.3	35.2 23.6	35.4 25.9	30.7 23.5

APPENDIX III: CENTRE-WISE STAFF POSITION

1. ANGRAU, HYDERABAD (A.P.)

Main Centre, Rajendranagar

Chief Agronomist	Dr. M. Venkata Ramana
Jr. Agronomist	Dr. M. Goverdhan
Jr. Soil Scientist	Dr. S. Sridevi
Technical Asst.	Vacant
Field assistant	Mr. K. Sugunanandam
Field assistant	Mr. K. Venugopalan
Jr. Steno/UDC	Vacant
Messenger	Mr. G. Saibaba

Sub Centre, Maruteru

Agronomist	Mr. K. Shyam Sunder
Technical Asstt.	Vacant
Field assistant	Mr. K. Viswanadham
Field assistant	Mrs. M. Neelima
LDC/Typist	Mr. Md. Khaja Babu

Sub Centre, Rudrur

Agronomist	Dr. U. Nagabhushanam
Technical Asstt.	Vacant
Field assistant	Mr. Shekar
Field assistant	Mr. Sailu
LDC/Typist	Mr. K. Sanker

On-Farm Centre, Seetampeta

Agronomist	Dr. K. Tejeswara Rao
Field assistant	Mr. T. Ramjogi/ Mr. N. Murali Mohan Rao
Field assistant	Mr. B.V.A. Satyanarayana
Field assistant	Mr. A.V. Ramana
Field assistant	Mr. K. Gopi
Field assistant	Mr. K. Jaganmohan Rao
Field assistant	Mr. T.D.M. Murthy
Jr.Stenographer	Vacant
Driver	Vacant
Watchman	Vacant

On-Farm Centre, Warangal

Agronomist	Dr. M. Malla Reddy/ Dr. P. Leela Rani/ Dr. Lateef Pasha
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Asst.Jr.Economist	Mr. V. Rajendra Prasad
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Mr. Md. Hafeiz/ Mr. Md. Afsar
Field assistant	Mr. K.V. Subramanyam
Field assistant	Mr. I. Babu Rao/ Mr. Y. Venkaiah
Field assistant	Mr. P. Yadagiri
Jr.Stenographer	Mr. T. Laxmi
Driver	Vacant
Watchman	Vacant

2. AAU JORHAT (ASSAM)

Main Centre, Jorhat

Chief Agronomist	Dr. Ajit Baishya
Jr. Soil Scientist	Dr. B.K. Medhi
Asst.Jr.Economist	Dr. J.P. Hazarika
Technical Asstt.	Mr. B. Dutta
Field assistant	Mr. T. Gogoi
Field assistant	Mr. J.C. Dutta
Jr. Steno/UDC	Mr. A.B. Rajkonwar
Messenger	Mr. B. Kalita

On-Farm Centre, Karimganj

Agronomist	Dr. M.C. Kalita
Asst.Jr.Economist	Dr. J.K. Gogoi
Field assistant	Mr. B. Saikia
Field assistant	Mr. S. Pathak
Field assistant	Vacant
Field assistant	Mr. N.N. Kalita
Field assistant	Mr. H.K. Goswami
Field assistant	Mr. I. Gogoi
Jr.Stenographer	Mrs Beauti Devi
Driver	Mr. B. Boruah
Watchman	Mr. D.P. Gohani

3. RAU, PUSA (BIHAR)

Main Centre, Sabour

Chief Agronomist	Dr. R.P. Sharma
Jr. Soil Scientist	Dr. N. Chattopadhyaya
Jr. Agronomist	Dr. S. Tyagi
Technical Asstt.	Mr. K.R. Raman

Field assistant	Mr. C.B. Prasad
Field assistant	Mr. Rajeev Kumar
Jr. Steno/UDC	Mr. A.P. Yadav
Watchman	Mr. Ganesh Ram

On-Farm Centre, Purnea

Agronomist	Dr. D.K. Mahto
Technical Asstt.	Vacant
Field assistant	Mr. Gautam Prasad
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Jr. Steno/UDC	Vacant
Driver	Mr. Surendra Kumar
Watchman	Mr. Brajendra Mandal

4. IGKV, RAIPUR (CHHATISSGARH)

Main Centre, Raipur

Chief Agronomist	Dr. G.P. Pali
Jr. Soil Scientist	Dr. Alok Tiwari/
	Mr. Anup Kumar Singh
Jr. Agronomist	Dr. Shrikant Chitale
Technical Asstt.	Mr. B.K. Chandrakar
Field assistant	Mr. Dilip Kumar Verma
Field assistant	Mr. G.P. Yadav
Jr. Steno/UDC	Ms. Rubi Majumdar
Messenger	Mrs. S Mishra

On-Farm Centre, Kawardha

Agronomist	Mr. Sunil Kumar
Technical Asstt.	Vacant
Field assistant	Mr. D D Singh
Field assistant	Mr. Amit Ku. Tondar
Field assistant	Mr. S.S. Mali
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Jr. Steno/UDC	Mr. Saiyyad Javed Ali
Driver	Mr. Prasant Kumar
	Choure
Watchman	Mr. Gairndlal Nirmalkar

5. SDAU, S.K. NAGAR (GUJRAT)

Chief Agronomist	Dr. B.S. Patel
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Jr. Soil Scientist	Mr. P.K. Patel
Jr. Agronomist	Mr S.M. Patel
Technical Asstt.	Vacant
Field assistant	Mr. B.R. Patel
Field assistant	Mr. S.L. Parmar
Jr. Steno/UDC	Mr. R.K. Gadhavi
Watchman	Mr. R.A. Joshi

On-Farm Centre, Deesa

Agronomist	Dr. S.K. Patel
Jr. Sci.(Eco)	Dr. R.R. Patel
Tech.Asstt.	Vacant
Field assistant	Mr. L.S. Chaudhary
Field Assistant	Mr. A.G. Patel
Field Assistant	Mr. Tusar Patel
Field Assistant	Mr. D.P. Parekh
Field Assistant	Mr. J.H. Chaudhary
Field Assistant	Mr. S.S. Patel
Jr.Stenographer	Mr. P.B. Joshi
Driver	Vacant
Watchman	Mr. G.K. Chaudhary

6. JAU, JUNAGADH (GUJARAT)

Sub Centre, Junagadh

Agronomist	Dr. B.M. Dabhi
Technical Asstt.	Mr. K.M. Joshi
Field assistant	Mr. C.T. Dalwadi
Field assistant	Mr. K.G. Rabadia
Jr. Steno/UDC	Mr. J.B. Sodha

7. NAU, NAVSARI (GUJRAT)

Sub Centre, Navsari

Agronomist	Dr. L.J. Desai
Technical Asstt.	Vacant
Field assistant	Mr. B.V. Patel
Field assistant	Mr. M.B. Solanki
Jr. Steno/UDC	Vacant

8. AAU, ANAND (GUJARAT)

On-Farm Centre, Thasra

Agronomist	Dr. V.V. Sonani
Field assistant	Mr. R.S. Rana
Field assistant	Mr. M.M. Mori
Field assistant	Mr. S.S. Rathava
Field assistant	Mr. K.B. Raval

Field assistant	Mr. D.J. Gohil
Field assistant	Mr. V.H. Rathva
Jr. Stenographer	Vacant
Driver	Vacant
Watchman	Vacant

9. CCS HAU, HISAR (HARYANA)

Main Centre, Hisar

Chief Agronomist	Dr. S.K. Yadav/ Dr. R.K. Nanwal
Jr. Soil Scientist	Dr. Manoj Kumar
Jr. Agronomist	Dr. Pawan Kumar
Technical Asstt.	Vacant
Technical Asstt.	Vacant
Field assistant	Mr. Tara Chand
Field assistant	Mr. Sat Narain
Jr. Steno/UDC	Mrs. Veena Kakkar
Watchman	Vacant

On-Farm Centre, Kurukshetra

Agronomist	Dr. Anil Mehta/ Dr. Hari Om
Jr. Agronomist	Dr. Mahesh Kumar
Field assistant	Mr. Sube Singh
Field assistant	Mr. Santosh Kumar
Field assistant	Mr. Pritam Singh
Field assistant	Mr. Ved Prakash
Field assistant	Vacant
Field assistant	Vacant
Jr. Steno/UDC	Mrs. Meenu Kumari
Driver	Mr. Dharam Pal
Watchman	Vacant

10. CSK HPKV, PALAMPUR (H.P.)

Main Centre, Palampur

Chief Agronomist	Dr. S.C. Negi
Jr. Soil Scientist	Dr. S.K. Subehia
Jr. Agronomist	Dr. S.S. Rana
Technical Asstt.	Dr. R.K. Sharma
Field assistant	Mr. Pradeep Kumar
Field assistant	Mr. Vikram Singh
Jr. Steno/UDC	Mr. Mehar Chand
Watchman	Mr. Surjeet Kumar

On-Farm Centre, Kangra

Agronomist	Dr. S.K. Sharma
Technical Asstt.	Mrs. Anuradha
Field assistant	Mr. Rakesh Kumar
Field assistant	Mr. Pratap Chand
Field assistant	Mr. Bihari Lal
Field assistant	Mr. Ramesh Chand
Field assistant	Mr. Amarjit Singh
Jr. Steno/UDC	Mr. Gyan Chand
Driver	Mr. Basu Dev
Messenger	Mr. Santosh Kumar
	Vacant

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.	Mr. Mahesh Kumar
Technical Asstt.	Mr. Parshotam Kumar
Field assistant	Mr. Bishan Lal
Field assistant	Mr. Romesh Lal
Jr. Steno/UDC	Mrs. Rajni Bharti
Messenger	Mr. Tarsem Singh

OFR Centre, Jammu

Agronomist	Dr. A.K. Gupta
Field assistant	Mr. Khazan Singh
Field assistant	Mr. Babu Ram
Field assistant	Mr. A.W. Katoch
Field assistant	Mr. Ashwani Sharma
Field assistant	Mr. Ghulam Mohd.
Field assistant	Mr. Jai Krishan
Jr. Steno/UDC	Mrs. Pardeep Kour
Driver	Mohd. Saleem
Watchman	Mohd. Yaqoob

12. BAU, RANCHI (JHARKHAND)

Main centre, Ranchi

Chief Agronomist	Dr. R. Thakur
Jr. Soil Scientist	Mr. A.N. Puran
Jr. Agronomist	Mr. R.P. Manjhi
Technical Asstt.	Mr. Rakesh Mitra

Field assistant	Mr. M. Munda
Field assistant	Mr. Raju Gari
Jr. Steno/UDC	Mr. S.S. Jha
Messenger	Mrs. Deomani Devi

On-Farm Centre, Pakur

Agronomist	Mr. W. Aind
Technical Asstt.	Mr. Rakesh K. Sinha
Field assistant	Mr. S.N. Baitha
Field assistant	Mr. Rajesh Kujur
Field assistant	Mr. Anand Kumar Mandal
Field assistant	Mr. Arvind Kumar
Field assistant	Mr. Parwej Alam
Field assistant	Mr. Jayant Kumar
Jr. Stenographer	Mr. Dinesh Toppo
Driver	Mr. Krishun Kujur
Watchman	Mr. Sarif Ansari

13. UAS, Bangalore (KARNATAKA)

Main Centre, Kathalgere

Chief Agronomist	Dr. H. Chandrappa
Jr. Soil Scientist	Dr. P. Chandravanshi
Jr. Agronomist	Vacant
Technical Asstt.	Mr. Nagaraja kusugur
Field assistant	Vacant
Field assistant	Mr. P. Maheshwarappa
Jr. Steno/UDC	Vacant
Messenger	Mr. K.M. Chandrakala

On-Farm Centre, Bangalore

Agronomist	Dr. A.P. Viswanath
Technical Asstt.	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Jr. Steno/UDC	Vacant
Driver	Vacant
Watchman	Vacant

14. UAS, Raichur (KARNATAKA)

Main Centre, Siruguppa

Chief Agronomist	Dr. Basavareppa M.A.
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Jr. Soil Scientist
Jr. Economist
Technical Asstt.
Technical Asstt.
Field assistant
Field assistant
Jr. Steno/UDC

Dr. Ashok Kumar Gaddi
Dr. Prabhuling Tewari
Mr. Erappa Yankannvar
Mr. Bhimanna Hugar
Mr. Somanagouda H
Mr. Gangadhar Swami S.
Vacant

15. UAS Dharwad

On-Farm Centre, Gadag (KARNATAKA)

Agronomist	Dr. M.H. Hosamani
Technical Asstt.	Mr. C.B. Koujalagi
Field assistant	Mr. B.Y. Bhajantri
Field assistant	Mr. Channabasappa
Field assistant	Mr. M.S. Talakeri
Field assistant	Mr. R.P. Pinjar
Field assistant	Mr. Vidyadher
Field assistant	Mr. N.N. Hokkundi
Jr. Steno/UDC	Vacant
Driver	Vacant
Watchman	Mr. A.M. Harinath

16. KAU, THRISSUR (KERALA)

Main Centre, Karmana (Thiruvananthapuram)

Chief Agronomist	Dr. Kuruvilla Varughese
	/Dr. Babu Mathew/
	Dr. P. Sukumari
Jr. Soil Scientist	Dr. B. Rani
Jr. Agronomist	Dr. B. Jacob John
Technical Asstt.	Mr. Hirosh Kumar
Technical Asstt.	Mr. K. Jayakumaran
Field assistant	Mr. Tomy Abraham
Field assistant	Mrs. K.S. Sujatha
Jr. Steno/UDC	Mrs. P.S. Sindhu
Messenger	Mr. K. Maniyan

On-Farm Centre, Thiruvalla

Agronomist	Dr. Thomas Mathew
Jr. Soil Scientist	Dr. D. Jacob
Field assistant	Mrs. S. Naseema
Field assistant	Mr. P.S. Sanal Kumar
Field assistant	Mr. K.O. Shahul Hamed
Field assistant	Mr. Georgy Joseph/
	Mr. T.S. Sajeesh
Field assistant	Mr. A.R. Venu
Field assistant	Mr. Mathew Thomas C

Jr. Steno/UDC	Mr. Aneesh Kumar M
Driver	Vacant
Messenger	Mr. K.G. Pushpakumari

17. JNKVV, Jabalpur (M.P.)

Main Centre, Jabalpur

Chief Agronomist	Dr. V.K. Shukla
Jr. Soil Scientist	Dr. B.S. Dwivedi/ Dr. N.K. Khamparia
Jr. Agronomist	Vacant
Technical Asstt.	Dr. S.K. Vishwakarma
Field assistant	Vacant
Field assistant	Mr. A.N. Goutam
Jr. Steno/UDC	Vacant
Messenger	Mr. N.L. Bhumiya

Sub Centre, Rewa

Agronomist	Dr. B.M. Mouya
Tech.Assistant	Mr. P.S. Yadav
Field assistant	Vacant
Field assistant	Vacant
Jr. Steno/UDC	Mr. S.S. Dwivedi

Sub Centre, Powarkheda

Agronomist	Dr. R.S. Lidder
Tech.Assistant	Vacant
Field assistant	Vacant
Field assistant	Mr. Sudhir Dubey
Jr. Steno/UDC	Mrs. Sushila Jhariya

On Farm Centre, Dindori

Agronomist	Dr. Rajesh K. Meshram
Jr.Economist	Vacant
Field assistant	Mr. V.R. Ghorke
Field assistant	Mrs. Jaya Kori
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Jr. Steno/UDC	Vacant
Driver	Vacant
Watchman	Vacant

On Farm Centre, Katni

Agronomist	Dr. R.P. Sahu
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Technical Asstt.	Mr. Atul Shrivastava
Field assistant	Vacant
Field assistant	Mr. B.L. Gupta
Field assistant	Vacant
Field assistant	Mr. R.D. Mahor
Field assistant	Mr. M.S. Prajapati
Field assistant	Mr. S.S. Baghel
Jr. Steno/UDC	Vacant
Driver	Vacant
Watchman	Vacant

18. RSKVV, GWALIOR

Sub Centre, Indore

Agronomist	Dr. S.K. Choudhary
Tech.Assistant	Mr. N.K. Sinha
Field assistant	Mr. R.K. Tamere
Field assistant	Mr. G.S. Yadav
Jr. Steno/UDC	Mr. N.K. Bangre

19. MPKV, RAHURI (MAHARASHTRA)

Main Centre, Rahuri

Chief Agronomist	Dr. B.S. Raskar
Jr. Agronomist	Dr. S.M. Shete
Jr. Soil Scientist	Dr. V.S. Patil
Tech. Assistant	Mr. A.B. Dhage
Field Assistant	Mr. B.K. Jadhav
Field Assistant	Mr. J.A. Rajnur
Jr. Stenographer	Mr. A.M. Chavan
Messenger	Mr. P.L. Dolas

On Farm Centre, Chas (Ahmednagar)

Agronomist	Dr. M.M. Desai
Jr.Economist	Dr. Y.C. Sale
Tech. Assistant	Vacant
Field Assistant	Mr. S.P. Kahar
Field Assistant	Mr. R.P. Gangurde
Field Assistant	Mr. N.S. Kudal
Field Assistant	Mr. R.H. Rathod
Field Assistant	Mr. A.B. Nikrad
Field Assistant	Vacant
Jr. Stenographer	Mr. A.M. Chavan
Driver	Mr. E.R. Jadhav
Watchman	Vacant

20. DDPKV, AKOLA (MAHARASHTRA)**Main Centre, Akola**

Chief Agronomist	Dr. (Mrs.) Mangala Ghanbahadur
Jr. Agronomist	Mr. B.S. Morwal
Jr. Soil Scientist	Dr. S.M. Jadhao
Tech. Assistant	Mr. M.G. Dikkar
Field Assistant	Mr. V. V. Bhagat
Field Assistant	Mr. T.L. Pawar
Jr. Stenographer	Vacant
Messenger	Mrs. L.P. Ingle

On Farm Centre, Hiwara

Agronomist	Mr. B.S. Morwal/ Dr. Varsha V. Tapre
Technical Assistant	Mr. F.F. Khan
Field Assistant	Mr. R.G. Langewar
Field Assistant	Mr. S.D. Kadam
Field Assistant	Vacant
Field Assistant	Vacant
Field Assistant	Vacant
Field Assistant	Vacant
Driver	Vacant
Jr. Stenographer	Vacant
Watchman	Mr. Y.S. Ghonmode

21. MAU, PARBHANI (MAHARASHTRA)**Main Centre, Parbhani**

Chief Agronomist	Dr. W.N. Narkhede
Jr. Economist	Vacant
Jr. Soil Scientist	Mr. R.N. Khandare
Jr. Stenographer	Vacant
Tech. Assistant	Vacant
Field Assistant	Mr. G.Y. Sonwane
Field Assistant	Vacant
Messenger	Vacant

On Farm Centre, Aurangabad

Agronomist	Prof. S.B. Pawar (Additional charge)
Tech. Assistant	Dr. D.P. Deshpande
Field Assistant	Vacant
Field Assistant	Mr. S.K. Choudhari
Field Assistant	Mr. B.N. Ambad
Field Assistant	Mr. R.P. Kerai

Field Assistant
Field Assistant
Jr. Stenographer

Mr. B.S. Kakade
Mr. S.S. Mundhe
Vacant

22. DBS KKV, DAPOLI (MAHARASHTRA)**Main Centre, Karjat**

Chief Agronomist	Dr. L.S. Chavan
Jr. Soil Scientist	Vacant
Jr. Agronomist	Mr. A.S. Dalvi
Technical Asstt.	Mr. P.M. Talha
Technical Asstt.	Mr. P.M. Hegade
Field assistant	Mr. A.B. Gaikwad
Field assistant	Mr. J.P. Hambir
Jr. Steno/UDC	Mr. R.L. Biwalkar
Messenger	Mr. L.N. Hambir

On Farm Centre, Palghar

Agronomist	Dr. S.B. Bhagat
Field Assistant	Mr. S.V. Kamble
Field Assistant	Mr. B.L. Shanwar
Field Assistant	Mr. S.R. Iware
Field Assistant	Mr. S.D. Phale
Field Assistant	Mr. V.S. Daphal
Field Assistant	Mr. N.H. Paradhi
Jr. Stenographer	Mr. K.P. Malche
Driver	Vacant
Messenger	Mr. V.D. Zagade

23. OUAT, BHUBANESWAR (ODISHA)**Main Centre, Bhubaneswar**

Chief Agronomist	Dr. L.M. Garnayak
Jr. Agronomist	Mr. A.K. Mohanty
Jr. Soil Scientist	Dr. K.N. Mishra
Tech. Assistant	Mrs. Somanath Sahu
Tech. Assistant	Mr. D.K. Raut
Field Assistant	Mr. Trinath Routray
Field Assistant	Mr. B. Biswal
Jr. Stenographer	Mr. S.K. Mallick
Messenger	Mr. G. Mahabhoi

Sub Centre, Chiplima

Agronomist	Mr. J. Haldar
Tech. Assistant	Mr. P.K. Mohanty
Field Assistant	Mr. Bhakta Danta
Field Assistant	Mr. J.K. Behera

Jr.Stenographer Vacant

On Farm Centre, Angul

Agronomist (I/C)	Dr.Alok Kumar Patra,
Jr.Economist	Dr. S.N. Mishra
Field Assistant	Mr. S. Baral
Field Assistant	Mr. Kasinath Mallick
Field Assistant	Mr. Sridhar Mallik
Field Assistant	Mr. Biranchi Pradhan
Field Assistant	Mr. Sarat Ch. Sahoo
Field Assistant	Vacant
Jr.Stenographer	Vacant
Driver	Mr. B. Behra
Watchman	Vacant

On Farm Centre, Kendrapara

Agronomist	Dr. S.K. Swain
Field Assistant	Mr. T. Sahoo
Field Assistant	Mr. P.K. Mohanty
Field Assistant	Mr. R.C. Singh
Field Assistant	Mr. M. Nayak
Field Assistant	Mr. A.C. Sahu
Field Assistant	Vacant
Driver	Mr. K.C. Mallick
Watchman	Mr. S. Munda

24. PAU, LUDHIANA (PUNJAB)

Main Centre, Ludhiana

Chief Agronomist	Dr. Sohan Singh Walia
Agronomist	Dr. C.S. Aulakh
Jr.Soil Scientist	Dr. Roopinder Singh
Tech. Assistant	Mr. Surender K. Sharma
Field Assistant	Vacant
Field Assistant	Mr. Baljit Singh
Field Assistant	Mr. Prem Prakash
Jr.Stenographer	Mr. Ram Ji Dass Yadav
Watchman	Mr. Jagmohan Singh

On Farm Centre, Amratsar

Agronomist	Dr. (Ms) Rajni
Field Assistant	Mr. Amrik Singh
Field assistant	Mr. Bhagwant Singh
Field assistant	Mr. Gurudip Singh
Field assistant	Mr. Sukhdev Singh
Field assistant	Mr. Joginder Singh
Field assistant	Vacant

Jr.Stenographer
Driver
Watchman

Mrs. Nirmala Rani
Vacant
Mr. Danial

25. MPUAT, Udaipur (RAJASTHAN)

Sub Centre, Kota

Agronomist	Dr. G.S. Bhatnagar
Tech. Assistant	Dr. H.P. Meghwal
Field Assistant	Mr. Bhagwan Singh
Field Assistant	Vacant
Jr.Stenographer	Vacant

On Farm Centre, Udaipur

Agronomist	Dr. S.K. Sharma
Jr.Economist	Mr. Hari Singh
Field Assistant	Mr. N.S. Jhala
Field Assistant	Mr. Ramji Lal
Field Assistant	Mr. Madan Lal
Field Assistant	Mr. A.S. Rathore
Field Assistant	Vacant
Field Assistant	Vacant
Jr.Stenographer	Mr. Vishal Ajmera
Driver	Mr. Yogesh C. Damami
Watchman	Mr. Shanker Lal Nagda

26. RAU, Bikaner, (RAJASTHAN)

Main Centre, Durgapura

Chief Agronomist	Dr. Rakesh Summauria
Jr. Soil Scientist	Vacant
Jr. Agronomist	Vacant
Technical Asstt.	Mr. M.R. Sharma
Field assistant	Mr. Nonand Singh
Field assistant	Mr. M.L. Kumawat
Jr. Steno/UDC	Vacant
Messenger	Mr. Kana Ram

On-Farm Centre, Hanumangarh

Agronomist	Dr. Harphool Singh
Technical Asstt.	Vacant
Field assistant	Mr. Banwari Lal
Field assistant	Mr. Chaju Ram Jat
Field assistant	Mr. Iswar Singh
Field assistant	Mr. Hanuman Lal
Field assistant	Vacant
Field assistant	Vacant

Driver	Vacant
Jr. Steno/UDC	Vacant
Watchman	Mr.Panna Lal

27. TNAU, COIMBATORE (T.N.)**Main Centre, Coimbatore**

Chief Agronomist	Dr. K. Siddeswaran
Jr. Soil Scientist	Dr. S. Thiyageshwari/
	Dr. K. Sathiyabama
Jr. Agronomist	Dr. P.M. Shanmugam
Jr. Economist	Dr. V. Sarvanakumar
Tech. Assistant	Vacant
Field Assistant	Mr. A. Gowthaman
Field Assistant	Vacant
Jr. Stenographer	Mrs. K. Suguna
Messenger	Mrs. M. Vijayalakshmi

Sub Centre, Thanjavur

Agronomist	Dr. R. Marimuthu
Tech. Assistant	Vacant
Field Assistant	Ms. S. Chitra Devi
Field Assistant	M. Periyasamy
Jr. Stenographer	Mr. R. Saravanan

On Farm Centre, Chettinad

Agronomist	Mr. P. Kathirvelan
Tech. Assistant	Vacant
Field Assistant	Mr. M. Baskarapandian
Field Assistant	Mr. M.K. Rajendran/
	Mr. P. Sakthivel
Field Assistant	Mrs. M. Punitha
Field Assistant	Mr. M. Periyasamy
Field Assistant	Mr. A.R. Sivamani
Field Assistant	Vacant
Jr. Stenographer	Mr. K. Paramasivam/
	Mr. S. Nagarajan
Driver	Mr. M. Ratha
Messenger	Mr. M. Annadurai

On Farm Centre, Paiyur

Agronomist	Dr. S. Vijayabhaskaran
Tech. Assistant	Vacant
Field Assistant	Mr. A. Murugan
Field Assistant	Mr. D. Gnanandurai
Field Assistant	Mr. K. Mohandass
Field Assistant	Mr. R. Solai

Field Assistant	Mr. A. Ravichandran
Field Assistant	Mr. G. Mahalingam
Jr. Stenographer	Mr. R. Chitra
Driver	Mr. K. Murugesan
Messenger	Mr. C. Murugesan

28. CSAUAT, KANPUR (U.P.)**Main Centre, Kanpur**

Chief Agronomist	Dr. M.P. Yadav
Jr. Soil Scientist	Dr. U.S. Tiwari
Jr. Agronomist	Dr. Naushad Khan
Technical Asstt.	Mr. U. S. Yadav
Field assistant	Mr. R.P. Dubey
Field assistant	Dr. A.K. Mishra/
	Mr. Anil Kumar
Jr. Steno/UDC	Mr. S.T. Siddiqui
Messenger	Mr. Vijay Bahadur

On Farm Centre, Saini (Kaushambi)

Agronomist	Dr. R.P. Singh
Technical Asstt.	Vacant
Field Assistant	Mr. Jagdish Chandra
Field Assistant	Mr. Ram Babu
Field Assistant	Mr. Virendra Singh
Field Assistant	Mr. Sudhir Pratap Singh
Field Assistant	Vacant
Field Assistant	Vacant
Jr. Stenographer	Vacant
Driver	Mr. Mahendra Singh
Watchman	Mr. Ashok Kumar

29. NDUAT, FAIZABAD (UP)**Main Centre, Faizabad**

Chief Agronomist	Dr. N.B. Singh
Jr. Soil Scientist	Dr. Alok Kumar
Jr. Agronomist	Dr. R.A. Yadav
Technical Asstt.	Mr. Ishwar Nath
Technical Asstt.	Dr. R.P. Dwivedi
Field assistant	Mr. A.P. Singh
Field assistant	Mr. R.A. Pandey
Jr. Steno/UDC	Mr. S.A.R. Zaidi
Messenger	Mr. Jag Jeevan

On Farm Centre, Sant Kabir Nagar

Agronomist	Vacant
Field Assistant	Mr. A.N. Pandey

Field Assistant	Mr. P.C. Tripathi
Field Assistant	Mr. Tilak Ram
Field Assistant	Mr. V.B. Singh
Field Assistant	Vacant
Field Assistant	Vacant
Jr.Stenographer	Mr. Ram Lal
Driver	Mr. J.P. Yadav
Watchman	Vacant

30. BHU, VARANASI (U.P.)

Sub Centre, Varanasi

Agronomist	Dr.J.S. Bohra
Tech. Assistant	Mr. Manoj K. Singh
Field Assistant	Vacant
Field Assistant	Vacant
Jr.Stenographer	Mr. Mohan Ram

31. RBS COLLEGE, BICHPURI (AGRA)

Agronomist	Dr. S.B. Singh
Tech. Assistant	Dr. Rahul Pundir
Field Assistant	Vacant
Field Assistant	Dr. Susheel K. Singh
Jr.Stenographer	Dr. Bhumi Raj Singh

32. GBPUAT, PANTNAGAR (UTTARAKHAND)

Main Centre, Pantnagar

Chief Agronomist	Dr. A.K. Bhardwaj
Jr.Soil Scientist	Dr. Ajeet Pratap Singh
Jr. Agronomist	Dr. Sumit Chaturvedi
Tech. Assistant	Mr. Y.S. Khokar
Field Assistant	Mr. A.K. Tiwari
Field Assistant	Mr. M.P. Singh
Jr.Stenographer	Vacant
Messenger	Mr. Laloo Singh

On Farm Centre, Jeolikot (Nainital)

Agronomist	Dr. D.K. Singh
Field Assistant	Mr. Y.P. Gangwar
Field Assistant	Mr. S.K. Verma
Field Assistant	Mr. Gulsher Ahmed
Field Assistant	Mr. Virendra Singh
Field Assistant	Vacant
Field Assistant	Vacant
Jr.Stenographer	Vacant
Driver	Vacant
Messenger	Vacant

33. BCKV, Kalyani

Main Centre, Kalyani

Chief Agronomist	Dr. M. Pramanick
Jr. Soil Scientist	Vacant
Jr. Economist	Dr. S. Chatterjee
Technical Asstt.	Dr. Dilip Saha
Technical Asstt.	Mr. Basudev Datta
Field assistant	Mr. Bipul Chandra Pal
Field assistant	Mr. Amar Chakrabarty
Jr. Steno/UDC	Vacant
Messenger	Vacant

On-Farm Centre, Kakdwip

Agronomist	Dr. Manabendra Ray
Field assistant	Mr. A.K. Bhaumik
Field assistant	Mr. K. Maiti
Field assistant	Mr. N. Das
Field assistant	Mr. Samir K. Chatterjee
Field assistant	Mr. Chiranjit Mandal
Field assistant	Mr. Uttam Mandal
Jr. Steno/UDC	Mr. Nilanjan Mukherjee
Driver	Mr. L.C. Das
Watchman	Vacant

APPENDIX IV: SOIL FERTILITY STATUS AND NUTRIENT UPTAKE

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 CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅
Rajendra nagar	<i>Kharif</i>	OC%	0.51	0.53	0.51	0.55	0.54	0.57	0.63	0.51	0.52						
		N	210	146.3	152.6	146.3	150.5	112.9	156.8	135.9	129.6						
		P	32.0	32.0	30.9	32.5	31.1	36.4	36.4	32.5	35.0						
	<i>Rabi</i>	K	288	341	358	391	363	335	360	342	354						
		OC%	0.50	0.50	0.55	0.64	0.64	0.70	0.68	0.64	0.50						
		N	153	107	132	125	125	113	135	119	153						
Maruteru	<i>Kharif</i>	P	29.1	25.1	29.9	45.4	48.8	42.1	28.8	42.1	29.1						
		K	273	316	224	354	261	368	238	386	273						
		OC%	1.05	1.05	1.06	1.01	1.07	1.07	1.07	1.09	1.15						
	<i>Rabi</i>	P	60.5	56.4	55.6	62.7	56.6	64.5	67.5	60.6	59.9						
		K	227	221	207.9	231.1	217.3	218.8	204.6	216.5	215						
		OC%	1.09	1.01	1.28	1.11	1.11	1.13	1.17	1.08	1.16						
Rudrur	<i>Kharif</i>	N	119	144	176	188	144	157	188	119	119						
		P	55.7	49.7	56.1	56.1	61.8	56.8	51.2	53.1	56.0						
		K	222	217	246	236	178	148	224	255	229						
	<i>Rabi</i>	OC%	0.57	0.52	0.63	0.59	0.47	0.42	0.44	0.42	0.62	0.66					
		P	147.8	196	156.5	151.1	143.3	125.9	126.3	106.9	13.7	132.9					
		K	328	362	323	311	341	380	362	310	377	337					
Sabour	<i>Kharif</i>	OC%	0.59	0.57	0.62	0.62	0.59	0.64	0.66	0.6	0.63	0.64					
		N	185	176	179	160	166	179	157	172	169	164					
		P	39.6	41.5	44.7	43.9	47.8	42.8	40.7	40.3	46.0	40.5					
	<i>Rabi</i>	K	305	298	250	270	284	251	248	235	283	308					
		OC%	0.57	0.59	0.61	0.56	0.6	0.58	0.59	0.60	0.62	0.58	0.56	0.59			
		N	208	191	213	191	206	188	190	207	216	212	195	205			
Raipur	<i>Kharif</i>	P	26.1	27.2	30.7	26.7	29.8	28	30.7	30.6	32.3	30.4	29.5	30.9			
		K	174	148	182	161	173	144	169	173	180	177	174	175			
		OC%	0.53	0.56	0.51	0.56	0.55	0.54	0.56	0.55							
	<i>Rabi</i>	N	264	260	256	262	266	260	269	262							
		P	20.2	21.3	19.6	20.7	20.8	19	21	19.4							
		K	274	286	264	266	277	277	288	281							
SK Nagar	<i>Kharif</i>	OC%	0.33	0.35	0.34	0.35	0.37	0.32	0.35	0.36							
		N	193	212	214	209	217	198	198	214							
		P	17.4	19.9	20.2	19.3	20.7	20.4	17.1	18.8							
	<i>Rabi</i>	K	197	205	194	211	215	204	197	225							
		OC%	0.57	0.52	0.63	0.59	0.47	0.42	0.44	0.42	0.62	0.66					
		P	147.8	196	156.5	151.1	143.3	125.9	126.3	106.9	13.7	132.9					

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Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅
Navsari	Summer	OC%	0.73	0.70	0.74	0.78	0.73	0.70	0.74	0.72	0.74	0.75					
		N	262	254	259	262	257	256	282	256	267	284					
		P	37.8	32.2	34.4	28.8	42.8	36.4	32.2	39.2	38.8	32.2					
Hisar	Kharif	K	242	235	203	188	217	243	272	220	194	305					
		OC%	0.46	0.46	0.44	0.45	0.46	0.46	0.44								
		N	145	145	144	149	156	145	156								
Rabi	P	P	12.5	13.0	11.0	14.0	14.5	13.0	13.5								
		K	261	284	269	271	280	275	289								
		OC%	0.45	0.44	0.45	0.46	0.46	0.47	0.45								
Summer	N	N	165	166	168	168	158	163	163								
		P	13.5	13.0	13.0	14.0	13.5	14.0	13.5								
		K	272	269	270	269	280	271	276								
Palampur	Kharif	OC%	NR	NR	0.5	0.5	NR	0.5	NR								
		N	NR	NR	170	175	NR	168.0	NR								
		P	NR	NR	11.0	14.0	NR	13.0	NR								
Jammu	Summer	K	NR	NR	260	263	NR	271.3	NR								
		OC%	0.99	1.15	1.0	1.1	1.11	1.1	1.1	1.1							
		N	298	292	326	306	327	309	316	312							
Ranchi	Kharif	P	53.0	81.4	67.9	79.2	80.6	72.4	61.2	67.2							
		K	92	103	100	115	98	134	124	99							
		OC%	1.03	1.14	1.01	1.19	1.18	1.08	1.13	1.22							
Siruguppa	Summer	N	295	288	328	397	415	427	355	383							
		P	54.5	72.4	74.7	79.1	80.6	69.4	69.4	66.5							
		K	96	108	106	119	111	130	135	106							
Kathalagere	Kharif	OC%	0.56	0.62	0.58	0.61	0.63	0.56	0.61	0.63	0.58	0.64					
		N	206	235	206	201	234	214	205	218	220	213					
		P	20.4	24.2	20.7	20.1	21.8	21.5	20.8	20.3	21.6	21.2					
Siruguppa	Summer	K	109	118	118	124	122	122	125	121	115	122					
		OC%	0.4	0.42	0.43	0.44	0.43	0.42	0.43								
		N	254	260	267	273	256	261	256								
Siruguppa	Kharif	P	33.3	31.3	32.2	24.8	24.9	31.5	26.1								
		K	108	111	114	108	103	110	106								
		OC%	0.55	0.62	0.59	0.63	0.64	0.72	0.74	0.73	0.75	0.72	0.73	0.59			
Siruguppa	Summer	N	290	331	337	341	335	343	338	337	347	348	337	346.6			
		P	18.3	21.4	22.5	19.5	22.6	22.8	23.0	23.5	24.6	21.3	21.0	23.2			
		K	151	192	185	178	177	201	191	204	211	190	176	172.5			
Siruguppa	Kharif	OC%	0.69	0.69	0.74	0.67	0.69	0.71	0.81	0.84	0.72	0.67					
		N	195	182	219	209	204	216	234	237	210	197					
		P	22.0	22.0	24.0	20.0	20.0	22.0	23.0	31.0	23.0	25.0					
Siruguppa	Summer	K	343	368	358	347	359	359	366	376	347	345					
		S	28	27	33	28	27	31	34	35	28	29					

Contd..../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅
Karmana	Kharif	OC%	2.0	2.1	1.8	2.1	1.7	1.9	2.0								
		N	159	165	182	161	176	161	161								
	Rabi	P	4.4	4.4	4.6	5.1	5.1	4.7	5.3								
		K	87	81	97	85	80	85	86								
	Rabi	OC%	2.0	2.1	1.8	1.7	1.7	1.9	2.0								
		N	159	165	182	161	176	161	163								
	Summer	P	4.4	4.7	4.6	5.1	5.3	4.7	5.3								
		K	87	81	97	85	80	85	86								
Jabalpur	Rabi	OC%	2.9	2.2	2.5	1.9	2.1	1.9	2.9								
		N	243	169	215	182	236	186	261								
		P	10.6	12.3	13.7	11.6	13.5	13.7	13.8								
		K	98	92	104	98	104	92	105								
Indore	Rabi	OC%	0.66	0.68	0.69	0.69	0.71	0.70	0.69	0.70	0.70	0.68	0.66	0.69			
		N	238	224	260	224	270	260	230	251	230	251	234	270			
		P	8.5	8.5	9	8.4	9.2	8.8	8.5	9.0	8.5	8.5	8.6	9.6			
		K	285	285	288	285	298	295	290	293	290	290	293	298			
Powarkheda	Rabi	OC%	0.35	0.29	0.28	0.32	0.35	0.42	0.32	0.35	0.38						
		N	162	143	122	148	162	184	148	162	176						
		P	8.0	5.6	9.6	9.6	9.6	8.0	8.0	9.6	9.6						
		K	440	320	440	480	480	400	440	480	520						
Rewa	Rabi	OC%	0.65	0.67	0.68	0.67	0.68	0.67	0.66	0.67	0.67	0.67					
		N	232	218	266	257	257	244	218	232	244	244					
		P	8.19	8.19	9.75	9.36	8.97	8.97	8.19	8.97	8.58	8.58					
		K	304	300	330	306	320	324	300	312	312	304					
Rahuri	Kharif	OC%	0.6	0.65	0.65	0.65	0.64	0.64	0.66	0.65	0.66	0.65					
		N	238	221	218	251	244	238	218	238	230	230					
		P	8.5	8.5	8.8	9.1	9.1	8.9	8.9	9	9	8.7					
		K	284	272	278	296	292	285	283	288	285	280					
Parbhani	Rabi	OC%	0.59	0.58	0.59	0.58	0.59	0.62	0.63	0.63	0.63	0.63	0.61	0.62	0.61	0.61	
		N	188	196	193	195	190	205	200	202	199	201	198	198	195	196	195
		P	15.0	15.0	16.0	17.0	16.0	20.0	19.0	20.0	21.0	17.0	19.0	18.0	19.0	15.0	16.0
		K	587	590	589	592	591	603	596	602	600	598	590	596	591	593	595
	Rabi	OC%	0.59	0.61	0.61	0.63	0.6	0.6	0.62	0.62	0.64	0.62	0.6	0.61	0.62	0.64	0.62
		N	183	192	195	200	189	198	193	196	202	190	188	194	193	202	195
		P	17.0	16.0	17.0	19.0	18.0	19.0	19.0	19.0	20.0	18.0	19.0	19.0	19.0	16.0	17.0
		K	593	594	597	592	593	600	595	600	595	595	593	598	592	596	597
	Rabi	N	163	188	188	171	187	151	165	160	175	189	170	155			
		P	12.0	13.8	14.7	12.8	12.9	12.2	12.2	12.6	12.4	14.8	12.9	11.4			
		K	359	384	385	369	383	354	362	343	377	387	363	376.6			

Contd..../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅
Akola	Rabi	N	180	186	175	178	178	184	189	205	190	196	180	186	172	188	
		P	14.4	15.6	15.3	16.28	16.7	17.2	16	18.22	15.3	16.6	14.8	15.6	15.8	20.2	
		K	323	330	370	368	317	328	310	322	325	337	358	350	309	321	
Karjat	Kharif	OC%	1.28	1.25	1.18	1.18	1.19	1.2	1.27	1.28	1.26	1.19	1.18				
		N	208	204	204	200	201	188	208	205	202	203	197				
		P	22.4	21.9	21.2	22.1	24.5	22.3	21.9	25.8	22.3	22.1	23.4				
Rabi	Rabi	K	223	225	233	229	237	226	223	234	218	234	233				
		OC%	1.4	1.3	1.2	1.2	1.2	1.2	1.4	1.3	1.3	1.2	1.2				
		N	269	244	232	218	229	218	267	246	242	221	216				
Coimbatore	Summer	P	26.2	24.1	24.6	22.1	24.7	22.4	25.7	25.8	24.3	25.6	23.9				
		K	227	237	249	248	273	248	225	258	223	252	250				
		OC%	0.62	0.65	0.63	0.65	0.67	0.64	0.66	0.64	0.67						
Kanpur	Rabi	N	272	290	265	292	294	267	288	275	290						
		P	19.9	20.6	19.6	21.8	19.6	19.1	20.4	18.9	20.1						
		K	593	625	600	567	637	562	577	562	586						
Faizabad	Summer	OC%	0.45	0.49	0.5	0.55	0.51	0.49	0.53	0.52	0.53	0.54	0.5				
		P	11.5	12.7	13.2	13.7	13.1	12.7	13.4	13	13.3	13.6	12.8				
		K	205	209	210	215	208	209	213	210	212	214	209				
Pantnagar	Rabi	OC%	0.4	0.46	0.45	0.43	0.46	0.45	0.44	0.45							
		N	142	147	144	146	149	148	145	144							
		P	17.4	18.2	17.8	18.4	19.0	17.2	18.0	17.6							
Ludhiana	Rabi	K	239	244	240	242	246	245	243	248							
		OC%	0.79	0.93	1.16	0.85	0.88	0.9	0.71	0.89							
		N	164	219	222	181	181	201	172	187							
		P	25.32	31.08	32.12	26.84	27.1	29.63	25.21	28.69							
		K	180	224	217	191	183	198	165	177							
		OC%	0.41	0.44	0.43	0.46	0.41	0.4	0.42	0.45	0.42	0.41	0.45				
		N	237	243	243	228	239	242	248	250	231	236	240				
		P	47.4	48.2	45.2	47.8	42.8	48.2	46	48.5	46.2	42.2	47.2				
		K	99	103	100	108	92	96	98	102	97	98	101				

Table B : Nutrient uptake N P and K kg/ha in exp no1(a)

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅
Rajendra nagar	Kharif	N	101.1	103.7	97.0	101.3	159.7	171.7	155.7	145.9							
		P	30.3	33.3	36.1	31.8	18.2	19.6	20.0	17.2							
	Rabi	K	110.7	106.6	105.1	122.1	58.2	60.6	56.9	51.6							
		N	73.3	63.1	64.1	40.8	137.3	46.2	71.6	71.5							
		P	9.5	10.4	9.9	9.0	36.6	11.4	8.1	14.8							
Maruteru	Kharif	K	32.9	47.1	35.1	47.9	169.4	52.5	35.5	41.0							
		N	92.1	94.8	102.2	94.7	99.9	100.5	92.7	99.7	98.2						
	Rabi	P	22.6	23.1	24.9	27.5	27.0	22.5	24.6	24.4	24						
		K	101.2	93.7	98.0	99.5	94.7	96.7	98.5	100.8	93.1						
		N	142.8	142.2	118.3	115.7	63.6	68.4	95.5	99	52.3						
Rudrur	Kharif	P	25.9	29.8	8.5	8.6	8.9	8.2	21	20.3	6.5						
		K	155.6	155.2	39.8	39.1	39.9	42.1	90.7	94.1	32.5						
	Rabi	N	109.7	105.0	98.9	104.7	185.1257.2	+11.865.7	246.6	71.7	79.1						
		P	23.5	22.4	21.1	22.4	10.1	14.0+1.4	15.4	13.4	16.8	77.2					
		K	112.0	107.2	101	106.9	54.8	76.2+7.7	46.7	73.1	50.4	50.6					
Sabour	Kharif	N	115.6	109.8	92.6	59.4	93.4	35.5	100.3	109.6	76.2	50.1					
		P	25.6	30.3	17.2	9.6	29.2	9	31.4	29.8	11.9	89.6					
	Rabi	K	117.8	85.3	50.9	23.7	41.8	23.1	44.9	83.7	49.3	24.3					
		N	94.3	91.9	92.8	89.9	89.8	124.4	129.1	126.4	117.5	116.1	112.5	114.4			
		P	28.1	27.6	24.5	26.6	26.6	37.2	38.7	37.9	35.3	34.8	33.7	34.5			
S.K.Nagar	Kharif	K	112.0	109.7	109.0	105.5	104.0	147.7	153.3	150.3	142.9	140.0	134.6	137.6			
		N	101.4	195.4	107.3	134.7	149.2	188.0	164.9	63.9	97.7	153.0	138.5	72.8			
	Summer	P	26.8	64.6	26.2	52.6	62.2	61.6	44.3	27.5	23.6	42.4	24.2	11.1			
		K	110.0	203.9	107.1	152.3	182.3	211.8	123.7	70.0	103.3	112.4	101.7	33.3			
		N	NR	102.0	30.7	96.6	51.8	94.9	93.6	64.0	27.7	52.2	121.0	66.4			
S.K.Nagar	Kharif	P	NR	17.0	4.7	32.1	16.9	29.2	17.3	17.3	4.4	13.1	29.2	18.0			
		K	NR	68.0	13.5	117.5	55.7	73.0	69.4	54.3	12.3	32.6	75.1	56.3			
	Rabi	N	89.3	234.9	239.2	246.9	337.5	69.9	71.0	314.0							
		P	19.7	35.5	36.6	37.5	58.8	9.9	10.0	45.6							
		K	74.0	118.3	121.7	125.0	213.4	46.2	44.1	147.2							
S.K.Nagar	Kharif	N	106.9	0.0	0.0	0.0	0.0	106.5	153.2	0.0							
		P	35.3	0.0	0.0	0.0	0.0	32.6	37.1	0.0							
	Summer	K	47.6	0.0	0.0	0.0	0.0	79.5	70.0	0.0							
		N	0	85.7	75.1	0.0	0.0	0.0	0.0	0.0							
		P	0.0	20.1	30.3	0.0	0.0	0.0	0.0	0.0							
S.K.Nagar	Kharif	K	0.0	61.1	105.3	0.0	0.0	0.0	0.0	0.0							
		N	0.0	61.1	105.3	0.0	0.0	0.0	0.0	0.0							
	Summer	P	0.0	20.1	30.3	0.0	0.0	0.0	0.0	0.0							
		K	0.0	61.1	105.3	0.0	0.0	0.0	0.0	0.0							
		N	0.0	61.1	105.3	0.0	0.0	0.0	0.0	0.0							

Contd.../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅
Junagadh	Kharif	N	72.2	77.9	67.9	73.7	97.5	110.1	110.4	35.5	96.4	60.5					
		P	7.0	7.5	6.6	20.9	14.6	16.0	15.6	11.3	13.5	10.5					
	Rabi	K	21.6	23.8	20.9	59.5	69.4	51.0	48.5	29.2	38.8	22.8					
		N	126.1	135.7	48.8	30.7	108.3	122.6	65.8	48.8	0.0	0.0					
	Summer	P	23.1	36.0	5.4	3.7	18.2	22.8	5.6	5.2	0.0	0.0					
		K	98.9	101.1	48.9	20.2	67.6	95.4	22.7	39.6	0.0	0.0					
		N	0.0	83.4	47.2	46.2	0.0	46.7	111.2	105.0	71.8	92.1					
		P	0.0	17.2	14.8	10.3	0.0	9.9	9.4	10.6	9.4	24.0					
		K	0.0	76.5	37.2	32.2	0.0	32.8	129.6	130.7	38.7	72.4					
		N	66.3	61.5	66.0	66.5	70.2	73.4	63.7	65.0	61.3	69.4					
Navsari	Kharif	P	14.1	12.3	12.8	15.0	15.2	16.3	12.6	13.8	14.3	14.7					
		K	76.7	66.7	67.9	71.0	80.4	88.2	76.3	76.2	67.5	78.0					
	Rabi	N	24.7	67.2	97.1	27.5	51.1	66.9	22.4	24.9	22.3	37.8					
		P	2.6	16.2	17.7	2.7	5.4	9.8	4.0	7.1	4.5	6.7					
	Summer	K	5.5	71.1	61.5	5.1	8.7	26.7	22.3	30.9	20.4	58.0					
		N	0.0	62.4	29.5	33.5	0.0	0.0	74.9	36.7	81.0	14.2					
		P	0.0	13.6	3.2	4.4	0.0	0.0	9.2	4.0	9.3	2.2					
		K	0.0	83.0	7.4	43.7	0.0	0.0	24.6	9.2	64.5	11.2					
		N	71.6	76.3	76.5	81.1	75.3	82.3	85.2								
		P	14.2	16.7	16.2	18.6	15.6	16.7	16.3								
Ranchi	Kharif	K	86.8	87.7	85	92.2	85.3	97	99.5								
		N	75.3	54.5	44.2	49.5	82.1	80.7	75.3								
	Rabi	P	13.2	4.5	5	21.2	11.1	12.7	31.9								
		K	60.1	28.2	3.1	56.7	67.6	66.2	101.4								
		N	195	216	225	211	690	1130	192	192	210	187	223	201			
		P	31.2	36.8	39.6	30.3	313.9	688.8	29.5	35.3	29.9	34.8	37.5	9.6			
		K	169	191	179	201	430	818	170	191	190	185	196	88			
		N	103.0	123.0	134.0	124.0	118.0	129.0	111.0	106.0	118.0	110.0					
	Kharif	P	22.0	26.0	29.0	26.0	22.0	26.0	23.0	25.0	26.0	28.0					
		K	175.0	173.0	186.0	168.0	170.0	178.0	141.0	130.0	141.0	144.0					
Siruguppa	Kharif	N	98.7	85.1	127.4	100.6	84.2	85.4	79.7								
		P	15.1	21.7	18.9	26.2	16.3	19.6	12.2								
	Rabi	K	123	123	170	157	99	106	120								
		N	50.2	52.0	43.7	63.7	46.9	79.3	45.2								
		P	11.4	15.0	10.7	17.1	12.3	18.6	11.3								
		K	56.7	61.6	56.6	66.3	59.3	89.2	58.6								
	KH+Rb	N	228.0	220.0	295.0	215.0	191.0	206.0	239.0	296.0	308.0	246.0	313.0	317.0			
		P	34.0	27.9	48.0	28.3	27.8	26.0	32.4	46.0	44.7	51.5	49.0	48.7			
		K	285.0	303.0	309.0	287.0	230.0	285.0	198.0	304.0	371.0	374.0	326.0	302.0			
		N															

Contd..../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅
Powarkheda	KH+Rb	N	245.0	218.0	341.0	307.0	316.0	304.0	264.0	296.0	256.0	264.0					
	P		31.6	25.5	46.4	55.6	47.1	31.6	42.2	37.7	31.4	34.8					
	K		297.0	371.0	330.0	284.0	304.0	306.0	244.0	318.0	292.0	318.0					
Rewa	KH+Rb	N	250.0	221.0	308.0	210.0	203.0	220.0	208.0	203.0	291.0	308.0					
	P		26.3	22.3	40.2	20.5	21.9	28.4	19.6	36.8	47.7	51.2					
	K		256.0	242.0	417.0	304.0	237.0	311.0	289.0	301.0	318.0	338.0					
Palampur	Kharif	N	240.9	150.2	148.8	172.5	167.3	142.8	155.8	158.2							
	P		44.6	24.3	28.1	32.8	37.3	23.3	22.0	28.0							
	K		117.4	59.3	53.8	107.5	96.3	79.6	69.2	81.7							
Rahuri	Kharif	N	169.1	181.2	165.8	165.5	167.8	135.1	146.6	152.2	123.1	140.6	159.5	173.4	159.5	157.0	170.3
	P		28.1	33.88	27.55	27.24	29.39	20.17	21.24	21.19	19.22	21.14	28.91	29.36	26.92	27.09	30.65
	K		320.3	319.7	303.8	315.1	289.5	50.4	49.4	52.6	56.4	46.0	288.2	294.2	316.5	301.1	304.1
	Rabi	N	88.8	56.3	158.6	146.6	109.0	109.5	59.9	186.2	182.6	138.9	90.1	55.5	168.7	159.8	129.0
	P		19.9	21.43	34.28	22.11	28.98	23.02	24.04	38.57	27.98	36.63	19.72	22.59	33.89	24.28	32.25
	K		67.2	68.7	30.3	90.5	115.9	78.3	78.4	36.0	109.2	138.9	68.2	69.9	30.8	98.4	133.0
Varanasi	Kharif	N	74	82.6	86.6	80.3	80.3	82.7	71.5	75.8	84.4	84.3					
	P		15.1	16.4	19.5	17.5	17.7	17.3	15.2	17	16.4	17.8					
	K		96.9	104.4	110.2	104.6	103.8	106.6	101	100.7	101.1	105.3					
	Rabi	N	100.7	106.8	113.8	98.9	102.3	78.9	48.9	26.2	81.4	82.3					
	P		14.4	14.6	15.3	14.5	14	9.3	5.7	4.3	11.1	12.9					
	K		88.7	90.1	92.9	67.7	75.1	46.3	25.3	21.6	90	69.3					
	Summer	N	0	43.9	0	57.4	20.6	56.2	34.8	35.7	68.8	60.3					
	P		0	4.38	0	5.78	2.1	5.94	3.35	3.36	7.67	6.24					
	K		0.0	9.3	0.0	20.0	20.0	8.7	12.6	26.4	39.2	14.2					
	Kharif	N	203.3	155.3	157.3	103.2	138.1	139.3	134.7	119.5	73.8	77.6	153.7	51.2			
	P		49.7	29.3	28.1	38.2	40.6	41.2	39	41.6	24.2	20.5	42	25.6			
	K		140.5	123.3	116.7	124.6	194.8	185.1	184.7	122.4	51.8	52.3	137.7	32			
Ludhiana	Rabi	N	121.5	105.8	64.2	102.7	92.1	105	105	125	96.7	98.28	20.5	138.5			
	P		22.7	18.9	5.4	10.8	17	19.4	20.1	22	18.2	23.5	3.6	27			
	K		78.8	151.4	91	98.3	52.6	81.8	82.7	77.8	141.4	58.1	24.8	79			
	Summer	N	0	91.1	181.8	158.9	0	0	90.9	0	0	0	52.9	39.6			
	P		0	28.7	57	41.9	0	0	25.2	0	0	0	11.9	5.3			
	K		0	74.4	159.3	164.6	0	0	79.7	0	0	0	43.3	27.4			
	Kharif	N	53.0	69.0	54.0	162.0	164.0	128.0	54.0	86.0	142.0						
	P		18.6	32.6	29.9	39.3	39.5	44	29.9	32.9	52.1						
	K		58.0	96.0	39.0	142.0	138.0	147.0	39.0	85.0	144.0						
	Rabi	N	123.0	128.0	127.0	52.0	82.0	52.0	123.0	114.0	162.0						
	P		50.0	50.0	48.1	25.6	31.3	17.5	41.5	25.9	46.4						
	K		121.0	128.0	124.0	51.0	79.0	52.0	139.0	67.0	148.0						

Contd..../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄	T ₁₅
Kalyani	Summer	N	89.0	118.0	169.0	167.0	53.0	169.0	68.0	138.0	68.0						
		P	54.0	47.3	40.4	19.9	26.2	40.4	33.7	31.8	33.7						
		K	85.0	66.0	143.0	121.0	51.0	143.0	85.0	79.0	85.0						
	Kharif	N	60.23	94.93	115.09	52.19	33.87	128.2	124.23	134.19	27.99	46.12					
		P	16.28	25.94	20.39	19.29	17.16	54.83	38.38	55.29	8.12	19.03					
		K	68.29	94.89	20.17	66.29	45.39	54.03	42.11	40.17	53.28	63.29					
	Rabi	N	63.29	94.28	103.29	53.97	38.2	129.19	125.39	138.22	19.23	48.29					
		P	18.23	24.2	23.19	17.39	16.03	55.39	38.45	54.32	40.29	15.33					
		K	70.23	93.09	18.12	64.2	45.46	54.29	64.92	44.1	51.32	60.23					
Hisar	Summer	N	0	56.77	103.74	210.39	25.35	33.72	77.93	70.38	64.38	22.18					
		P	0	16.55	48.34	44.3	13.29	18.09	25.23	30.29	19.02	10.12					
		K	0	74.23	100.23	17.58	9.02	0.93	1.29	2.42	2.6	7.26					
	Kharif	N	93.7	94.4	101.3	39.3	109	101.1	94.2								
		P	24.8	16.9	25.7	7.2	17.4	26.6	23.4								
		K	314.8	267.5	336.8	97.5	203.5	342.6	300.3								
	Rabi	N	126.1	130.8	68.5	140.5	116.8	75.5	125.3								
		P	24.0	25.9	13.2	17.8	29	12.3	22.5								
		K	153.8	157.6	104.2	223.2	134.2	130.4	157.2								
Summer	N	NR	NR	NR	36.6	53.5	NR	72.7	NR								
	P	NR	NR	NR	6.1	12.6	NR	7.8	NR								
	K	NR	NR	NR	54.6	67.1	NR	74.5	NR								

Table C : Soil fertility Status (kg/ha) of different crop sequence in Exp. No 2 (a)

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄
Rajendra nagar	Kharif	OC%	0.56	0.57	0.58	0.60	0.58	0.66	0.62	0.71	0.70	0.59	0.60	0.56		
		N	113.0	119.0	122.0	141.0	151.0	113.0	125.0	113.0	125.0	138.0	113.0	125.0		
		P	31.2	34.5	34.1	42.8	47.7	44.8	35.7	32.7	34.8	41.0	37.6	36.1		
	Rabi	K	153.4	113.1	108.1	144.5	144.5	121.5	154.0	179.8	190.4	138.3	117.0	141.1		
		OC%	0.53	0.58	0.51	0.52	0.54	0.62	0.61	0.68	0.68	0.60	0.59	0.54		
		N	174.0	181.0	172.0	173.0	176.0	186.0	184.0	194.0	194.0	183.0	182.0	176.0		
Maruteru	Kharif	P	28.4	30.4	32.1	38.0	45.7	43.2	40.6	37.1	37.3	42.6	38.7	38.2		
		K	169.0	170.0	164.0	176.0	163.0	184.0	191.0	207.0	209.0	179.0	169.0	162.0		
		OC%	0.96	0.96	1.09	1.04	1.13	1.13	1.10	1.09	1.08	1.11	1.02	1.1		
	Rabi	N	144.2	137.9	200.7	188.1	200.7	156.8	175.6	181.8	175.6	175.6	206.9	188.1		
		P	25.9	30.7	46.7	45.9	46.2	36.3	40.8	37.4	34.9	25.9	27.1	29.0		
		K	137.8	146.3	166.1	170.2	160.7	180.3	222.3	201.6	193.0	159.8	168.7	157.9		
Rudrur	Kharif	OC%	1.00	1.07	1.14	1.22	1.23	1.12	1.34	1.12	1.15	1.09	1.13	1.1		
		P	25.3	36.9	60.6	58.2	67.7	64.4	63.0	51.3	53.0	55.7	58.5	54.0		
		K	218.4	205.0	253.7	252.6	273.3	273.7	287.5	245.3	292.3	294.9	233.0	247.5		
	Rabi	OC%	0.45	0.46	0.46	0.45	0.35	0.51	0.56	0.60	0.72	0.68	0.62	0.76		
		N	158.2	170.2	168.2	163.0	175.6	181.8	186.3	174.5	179.2	194.4	169.0	163.0		
		P	45.9	52.4	57.7	64.0	69.1	59.1	57.3	62.0	56.1	57.9	53.8	61.7		
Sabour	Kharif	K	282.0	249.0	253.0	281.0	234.0	287.0	276.0	282.0	289.0	267.0	251.0	223.0		
		OC%	0.56	0.61	0.59	0.61	0.65	0.56	0.58	0.57	0.58	0.62	0.61	0.60		
		P	67.4	76.9	78.5	83.4	83.5	82.7	79.6	68.7	70.1	81.5	82.8	68.9		
	Rabi	K	273.0	256.9	283.0	285.6	291.0	288.0	265.0	291.0	271.0	250.0	259.0	238.0		
		OC%	0.36	0.41	0.49	0.54	0.57	0.77	0.72	0.74	0.70	0.75	0.71	0.45		
		N	120.6	141.3	159.4	166.6	172.3	225.6	212.8	219.2	196.7	221.8	206.1	148.4		
Raipur	Kharif	P	13.3	21.8	32.2	37.3	40.5	49.2	43.6	45.4	41.8	47.3	43.6	25.8		
		K	110.8	116.5	122.5	120.8	132.8	171.4	156.6	188.2	168.8	173.2	153.8	121.8		
		OC%	0.52	0.53	0.59	0.61	0.70	0.68	0.65	0.61	0.61	0.71	0.70	0.60		
	Rabi	N	167.0	211.0	238.0	253.0	271.0	269.0	258.0	251.0	248.0	279.0	268.0	236.0		
		P	9.1	17.0	18.8	19.8	28.4	24.1	25.5	21.9	19.1	27.7	24.1	20.1		
		K	175.0	240.0	250.0	258.0	284.0	294.0	307.0	280.0	268.0	304.0	300.0	263.0		
SK Nagar	Summer	OC%	0.09	0.17	0.17	0.20	0.20	0.30	0.25	0.28	0.25	0.31	0.30	0.19		
		N	111.0	162.0	166.0	169.0	197.0	211.0	207.0	209.0	203.0	208.0	202.0	180.0		
		P	14.8	18.3	18.6	21.4	23.2	31.4	29.1	30.2	29.1	26.9	27.4	21.8		
	Rabi	K	141	139	140	139	140	188	183	184	177	180	184	159		
		OC%	0.09	0.17	0.17	0.20	0.20	0.30	0.25	0.28	0.25	0.31	0.30	0.19		
		N	111.0	162.0	166.0	169.0	197.0	211.0	207.0	209.0	203.0	208.0	202.0	180.0		

Contd.../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄
Junagadh	Rabi With P Potash	OC%	0.56	0.62	0.67	0.65	0.66	0.73	0.71	0.77	0.74	0.69	0.67	0.68		
		N	197.0	207.0	225.0	225.0	229.0	266.0	249.0	264.0	253.0	248.0	241.0	226.0		
		P	8.4	15.4	22.7	24.6	25.2	38.6	31.6	33.0	32.2	32.2	31.4	22.7		
	Rabi Without Potash	K	137	150	169	172	174	181	174	177	165	180	177	165		
		OC%	0.68	0.67	0.62	0.68	0.69	0.76	0.74	0.74	0.69	0.71	0.71	0.71		
Navsari	Summer	N	207.0	239.0	230.0	249.0	249.0	282.0	263.0	272.0	244.0	259.0	254.0	259.0		
		P	9.0	19.3	24.9	29.1	29.4	34.4	28.8	34.4	26.0	30.0	29.7	29.4		
		K	148.0	149.0	138.0	134.0	124.0	152.0	130.0	136.0	122.0	138.0	124.0	141.0		
	Rabi	OC%	0.52	0.60	0.61	0.62	0.65	0.73	0.69	0.74	0.70	0.78	0.68	0.66		
		N	177.0	238.0	241.0	245.0	252.0	276.0	263.0	265.0	257.0	262.0	256.0	230.0		
Hisar	Kharif	P	19.6	20.2	20.4	20.7	20.4	30.8	25.5	26.6	21.0	24.6	22.1	22.4		
		K	192.0	216.0	221.0	205.0	223.0	251.0	228.0	261.0	223.0	241.0	215.0	246.0		
		OC%	0.34	0.37	0.40	0.39	0.47	0.42	0.38	0.40	0.40	0.40	0.40	0.41		
	Rabi	N	134.8	154.0	155.8	173.3	194.3	201.3	194.3	183.8	187.3	187.3	187.3	187.3		
		P	13.0	14.5	13.0	15.0	18.0	18.5	17.0	14.5	14.0	17.8	17.0	16.0		
Palampur	Kharif	K	217.2	237.1	263.1	283.2	296.3	297.7	291.5	282.5	281.0	289.7	281.9	277.9		
		OC%	0.34	0.40	0.46	0.45	0.47	0.50	0.49	0.45	0.43	0.45	0.43	0.40		
		N	143.5	166.3	171.5	192.5	211.8	215.3	210.0	192.5	192.5	199.5	201.3	194.3		
	Rabi	P	14.0	15.0	16.0	17.5	18.0	19.5	18.5	17.0	18.0	17.5	19.0	18.0		
		K	202.2	219.3	253.3	253.6	296.1	296.5	292.8	287.0	291.0	294.3	285.9	280.0		
Jammu	Kharif	OC%	0.63	0.66	0.69	0.73	0.77	1.11	0.82	0.84	0.79	0.79	0.73	0.76		
		N	203.2	212.0	224.5	230.2	266.3	284.4	260.0	248.1	247.1	273.8	249.9	241.8		
		P	17.9	35.8	52.1	62.2	61.6	75.0	67.2	62.2	58.8	65.0	61.6	54.9		
	Rabi	K	115.9	120.1	120.3	121.9	127.6	137.7	129.9	128.5	126.6	130.3	127.4	127.2		
		OC%	0.62	0.68	0.67	0.69	0.75	0.89	0.84	0.87	0.77	0.84	0.76	0.73		
Ranchi	Kharif	N	209.2	219.5	224.9	249.3	265.3	287.9	279.4	283.2	267.5	275.0	263.1	242.1		
		P	19.6	38.1	53.2	57.1	65.0	82.3	65.5	74.5	54.3	62.2	60.5	53.8		
		K	112.5	116.3	123.5	123.8	126.6	136.3	128.1	126.3	122.9	130.5	132.1	126.3		
	Rabi	OC%	0.54	0.56	0.64	0.54	0.59	0.86	0.67	0.80	0.66	0.55	0.56	0.52		
		N	143.9	197.4	173.8	208.4	200.8	249.1	185.1	200.5	228.7	247.1	185.2	194.3		
Jabalpur	Kharif	P	8.2	12.3	15.8	17.2	24.5	36.4	28.2	22.6	25.4	23.3	19.2	13.4		
		K	90.2	105.9	110.9	97.5	116.5	123.5	117.3	128.4	111.3	108.2	105.9	99.7		
		OC%	0.39	0.45	0.45	0.49	0.52	0.64	0.54	0.54	0.48	0.51	0.48	0.39		
	Rabi	N	203.7	225.3	212.7	227.5	240.4	308.4	265.2	253.4	241.5	245.7	235.4	202.7		
		P	15.4	21.2	30.3	42.0	66.4	91.6	77.1	74.5	69.7	70.3	58.7	11.6		
Jabalpur	Kharif	K	136.2	150.3	157.3	159.4	168.5	180.2	171.5	166.7	162.7	165.4	160.2	131.4		
		OC%	0.60	0.64	0.63	0.64	0.66	0.75	0.73	0.74	0.73	0.77	0.76	0.68		
		N	234.0	247.0	260.0	264.0	267.0	282.0	277.0	279.0	274.0	287.0	284.0	264.0		
	Rabi	P	8.7	9.0	9.4	10.7	13.5	15.4	15.9	15.9	16.5	17.2	16.6	14.7		
		K	288.0	325.0	366.0	368.0	426.0	450.0	447.0	470.0	462.0	475.0	466.0	425.0		

Contd..../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄
Rahuri	Kharif	OC%	0.40	0.60	0.60	0.62	0.64	0.70	0.66	0.64	0.63	0.68	0.65	0.58		
		N	122.0	168.0	178.0	187.0	191.0	198.0	186.0	188.0	187.0	198.0	193.0	160.0		
		P	7.0	16.0	17.0	17.0	18.0	20.0	18.0	18.0	17.0	19.0	18.0	12.0		
	Rabi	K	538.0	641.0	644.0	649.0	671.0	680.0	668.0	653.0	651.0	672.0	650.0	617.0		
		OC%	0.43	0.60	0.60	0.64	0.64	0.68	0.66	0.66	0.65	0.68	0.64	0.57		
		N	120.0	164.0	188.0	184.0	195.0	200.0	188.0	188.0	183.0	194.0	191.0	158.0		
Akola	Kharif	P	7.0	17.0	18.0	18.0	20.0	21.0	19.0	18.0	19.0	20.0	19.0	13.0		
		K	533.0	621.0	643.0	645.0	673.0	684.0	672.0	651.0	645.0	673.0	651.0	624.0		
		OC%	0.38	0.50	0.57	0.60	0.61	0.69	0.64	0.66	0.63	0.65	0.62	0.5		
		N	157.0	229.0	229.0	232.0	239.0	266.0	255.0	252.0	239.0	246.0	236.0	210.0		
		P	8.0	14.9	17.0	18.5	24.1	30.4	22.6	22.2	18.7	18.9	18.3	14.9		
		K	229.0	287.0	303.0	309.0	343.0	384.0	337.0	354.0	326.0	348.0	318.0	286.0		
Karjat	Kharif	OC%	1.08	1.31	1.33	1.33	1.34	1.39	1.36	1.43	1.37	1.35	1.34	1.28		
		N	169.4	204.1	205.1	207.4	257.5	248.8	225.7	248.2	219.3	225.8	213.3	194.5		
		P	17.4	28.5	29.7	28.6	30.4	30.1	29.7	30.1	29.2	29.9	28.9	28.9		
	Rabi	K	25.6	285.3	288.4	312.1	325.8	318.3	312.2	320.7	319.5	317.4	312.2	282.3		
		OC%	1.04	1.23	1.23	1.27	1.27	1.35	1.28	1.29	1.28	1.29	1.28	1.21		
		N	165.4	211.3	225.7	212.5	245.3	239.7	221.3	229.4	217.7	229.4	218.6	224.0		
Ludhiana	Rabi	P	18.2	29.4	29.5	29.7	33.2	32.9	30.9	32.8	30.3	32.5	30.2	28.1		
		K	246.4	276.3	314.2	279.5	319.4	315.5	308.3	316.8	310.4	315.6	282.7	311.7		
		OC%	0.34	0.38	0.38	0.37	0.42	0.57	0.56	0.48	0.47	0.56	0.56	0.56		
		N	142.2	155.8	156.6	180.2	188.4	230.2	220.6	205.2	210.4	236.2	230.4	225.6		
		P	10.9	17.1	17.5	18.6	28.8	42.1	37.2	25.2	26.6	31.8	29.6	35.8		
		K	82.2	90.2	92.1	102.8	110.5	160.6	150.4	130.8	126.5	148.2	142.6	148.1		
Kanpur	Summer	Zn	1.4	1.4	1.5	1.4	1.5	1.8	1.7	1.6	1.6	1.7	1.7	1.8	1.4	1.4
		Cu	0.5	0.6	0.6	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6
		Fe	13.8	18.5	20.0	19.8	21.0	30.1	28.2	24.5	23.8	26.2	23.2	27.5	20.4	21.2
		Mn	5.6	6.2	5.8	6.8	7.0	8.5	8.1	7.5	7.2	8.2	7.7	8.5	6.7	6.7
		OC%	0.24	0.14	0.36	0.50	0.49	0.58	0.68	0.58	0.51	0.49	0.63	0.57	0.4	0.4
		P	10.4	9.0	15.2	17.9	22.2	26.9	25.3	23.4	22.0	29.5	25.1	24.8	19.8	19.8
Bichpuri	Summer	K	170.0	9.2	139.5	149.5	157.5	176.1	168.4	161.2	165.5	164.2	171.3	169.0	134.3	134.3
		OC%	0.20	0.24	0.28	0.28	0.30	0.50	0.46	0.42	0.40	0.45	0.41	0.22		
		N	86.0	93.0	110.0	115.0	174.0	230.0	180.0	185.0	176.0	200.0	190.0	90.0		
		P	6.0	9.1	11.7	11.8	13.4	18.2	13.6	15.1	13.4	17.9	17.5	6.3		
		K	140.0	180.0	207.0	190.0	252.0	275.0	240.0	225.0	220.0	242.0	231.0	160.0		
		OC%	0.24	0.34	0.38	0.42	0.52	0.66	0.60	0.57	0.55	0.63	0.61	0.39		
Faizabad	Rabi	N	104.0	138.0	144.0	152.0	188.0	212.0	204.0	196.0	183.0	218.0	205.0	159.0		
		P	5.6	15.4	18.6	17.3	23.4	25.1	22.6	19.8	18.3	25.8	23.3	17.0		
		K	198.0	226.0	240.0	245.0	262.0	253.0	247.0	277.0	260.0	250.0	238.0	228.0		

Contd..../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄
Kalyani	Kharif	OC%	0.40	0.61	0.61	0.67	0.74	0.75	0.60	0.55	0.73	0.85	0.90	0.43		
		N	88.1	101.2	99.4	116.4	152.4	149.9	129.9	130.6	131.1	120.5	122.4	110.8		
		P	16.1	62.3	61.3	52.6	72.9	79.4	78.4	62.7	68.4	65.3	74.4	45.6		
Karmana	Kharif	K	135.7	233.4	224.9	264.1	308.4	286.8	264.9	255.3	246.4	264.9	273.4	238.1		
		OC%	1.23	1.18	1.30	1.42	1.17	1.41	1.32	1.79	1.61	1.32	1.30	1.24		
		N	297.9	290.1	271.3	272.8	279.1	271.3	316.7	276.0	290.1	310.5	290.1	312.0		
	Rabi	P	8.6	9.9	15.2	15.1	10.7	12.6	13.7	15.3	9.8	10.9	13.2	13.5		
		K	122.1	161.6	136.9	147.6	133.6	87.4	178.9	82.6	164.4	133.0	131.9	151.8		
		OC%	1.13	1.09	1.22	1.42	1.29	1.45	1.50	1.72	1.63	1.40	1.35	1.34		
Parbhani	Rabi	N	279.1	288.5	279.1	276.0	294.8	307.3	316.7	286.9	305.8	310.5	305.8	343.4		
		P	18.6	20.5	23.2	21.3	20.6	24.8	22.5	21.6	20.3	23.8	23.8	21.6		
		K	122.1	161.6	136.9	136.1	167.4	115.9	171.9	110.6	164.4	163.8	182.3	179.8		
	Summer	N	108.4	148.6	165.3	162.5	198.2	244.2	184.7	182.2	179.7	221.5	216.8	138.9	194.6	199.5
		P	14.2	27.7	28.1	29.1	39.2	45.1	35.6	39.4	36.9	38.8	47.6	28.3	39.5	35.5
		K	315.2	392.28	435.5	468.4	556.8	587.38	519.72	498.15	494.39	547.82	566.8	415.18	487.6	532.5
Kathalgere	Summer	OC%	0.55	0.62	0.59	0.63	0.64	0.72	0.74	0.73	0.75	0.72	0.73	0.59		
		N	289.64	331.46	337.47	340.68	335.5	342.64	337.75	336.84	346.94	348.45	337.25	346.64		
		P	18.34	21.38	22.45	19.46	22.64	22.8	22.98	23.45	24.64	21.34	20.95	23.24		
		K	150.64	192.34	184.64	178.32	176.64	201.32	190.54	204.32	210.65	189.68	176.32	172.45		

Table D : Nutrient uptake (kg/ha) of different crop sequence in Exp. No 2 (a)

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄
Rajendra nagar	Kharif Rice	N	34.8	54.2	60.2	71.3	91.3	67.9	69.9	62.4	59.0	88.0	95.2	72.0		
		P	8.4	13.3	14.0	16.8	21.4	17.4	18.7	16.0	17.1	20.0	19.4	14.4		
		K	35.6	57.0	62.7	75.0	83.0	75.9	79.8	68.7	67.7	89.1	91.3	65.5		
	Rabi Rice	N	34.7	44.4	61.5	72.0	84.7	72.0	58.7	62.2	51.5	83.3	77.5	68.4		
		P	8.9	11.3	15.9	17.6	19.3	19.2	17.6	18.4	16.6	20.2	20.9	17.8		
		K	42.9	56.0	72.4	74.2	81.4	80.4	77.3	79.1	72.1	90.7	92.5	73.5		
Maruteru	Kharif Rice	N	70.6	96.6	94.1	110.7	130.3	132.2	129.3	120.5	123.7	126.4	134.6	97.7		
		P	15.8	20.7	20.5	21.1	22.5	24.1	22.3	22.0	19.4	22.1	24.2	17.3		
		K	54.5	73.5	75.4	85.3	102.4	101.2	92.4	89.7	94.1	93.1	99.4	79.7		
	Rabi Rice	N	28.1	72.3	78.9	73.5	82.7	88.9	79.9	76.8	80.3	81.3	81.2	70.8		
		P	5.8	14.1	14.1	14.9	17.2	18.6	17.7	16.8	16.5	17.0	17.1	14.9		
		K	24.2	55.0	59.7	64.7	69.3	76.4	61.5	64.2	62.9	68.7	66.1	62.8		
Rudrur	Kharif Rice	N	50.9	70.2	78.5	106.0	107.2	109.3	124.9	102.7	111.0	105.9	118.7	99.5		
		P	12.7	18.3	19.3	28.6	28.2	25.0	28.4	24.4	27.7	27.7	27.4	25.2		
		K	58.0	75.0	77.6	99.0	110.9	104.6	116.0	109.1	119.8	108.3	116.8	95.4		
	Mustard	N	23.9	32.6	39.3	35.4	49.9	46.6	51.0	53.0	49.0	51.8	57.7	41.0		
		P	2.5	3.6	3.9	4.2	5.5	5.0	5.3	6.0	5.6	5.3	5.7	4.3		
		K	9.8	15.8	19.3	17.2	25.5	24.2	25.6	26.1	24.3	26.5	26.5	20.4		
Sabour	Rice	N	17.4	45.5	48.8	64.8	89.3	98.6	89.4	93.5	86.0	95.5	88.8	57.4		
		P	5.2	13.0	13.6	17.6	25.2	27.2	25.0	26.2	23.8	26.9	25.2	15.8		
		K	22.1	54.3	57.0	74.7	98.0	113.2	101.6	105.9	98.8	108.3	102.4	68.1		
	Wheat	N	18.7	46.3	94.0	73.5	101.3	110.6	103.5	105.4	100.9	110.8	103.7	67.5		
		P	5.1	13.1	26.0	21.1	29.0	31.7	28.7	30.3	27.5	31.1	29.1	17.7		
		K	21.1	51.5	99.6	80.1	108.7	123.9	113.0	120.2	117.8	121.6	114.1	76.7		
SK Nagar	Pearl millet	N	4.3	20.9	23.9	28.0	36.6	71.7	68.7	59.0	56.7	64.2	63.1	21.6		
		P	1.04	5.23	5.89	6.82	9.61	19.84	19.51	16.14	16.35	18.58	18.33	6.46		
		K	6.1	21.7	24.2	27.8	34.5	73.8	70.8	60.3	59.2	66.4	67.1	23.2		
	Wheat	N	2.5	20.0	28.0	35.2	55.8	89.0	81.1	80.6	75.1	82.0	78.1	38.0		
		P	0.5	3.8	5.4	6.9	11.0	17.7	15.9	16.2	15.1	16.4	15.9	7.9		
		K	3.3	20.6	31.9	38.2	58.1	83.3	75.5	77.3	70.5	77.6	76.4	48.7		
Junagadh	Pearl millet with K	N	23.5	44.8	44.3	45.9	54.0	72.4	66.4	67.3	61.3	64.3	59.2	54.9		
		P	4.0	7.5	7.3	8.0	9.7	14.7	13.4	13.8	12.3	13.5	11.7	9.7		
		K	25.0	47.1	51.5	51.7	60.2	78.7	71.3	72.0	68.3	67.8	62.4	58.7		

Contd..../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄
Navsari	Wheat	N	19.0	35.4	41.0	42.8	51.8	69.5	58.7	60.0	55.6	59.6	49.8	42.9		
		P	3.3	6.3	7.5	7.3	8.6	13.3	10.6	11.0	10.5	10.9	8.7	6.3		
		K	24.7	43.5	46.7	45.6	51.9	67.4	57.6	61.6	56.5	54.3	50.4	45.1		
	Pearlmillet without K	N	41.2	67.0	64.7	79.2	84.7	111.1	100.2	102.9	93.9	97.3	96.9	84.7		
		P	13.4	21.5	19.8	22.4	26.9	35.5	31.5	31.7	29.5	32.2	30.8	25.9		
		K	39.6	61.6	60.3	67.4	75.3	94.1	89.0	87.0	82.5	85.4	84.6	78.8		
	Wheat	N	29.8	50.3	62.0	61.0	70.5	94.6	82.0	79.6	73.3	75.4	71.2	59.0		
		P	4.9	9.0	11.2	10.7	13.7	20.0	17.4	17.0	15.7	15.6	15.1	11.1		
		K	37.6	58.5	68.6	65.9	72.6	94.9	81.0	81.6	74.7	75.9	73.7	64.7		
	Rice	N	21.3	35.8	36.3	40.8	49.2	58.5	54.2	45.7	49.2	54.3	55.6	44.1		
		P	4.3	8.1	8.8	8.5	10.1	12.4	11.9	10.0	9.9	10.5	10.4	8.7		
		K	30.9	59.3	54.8	62.7	71.9	80.0	73.4	66.8	63.7	73.1	74.0	65.2		
Hisar	Wheat	N	31.7	51.1	62.2	60.4	64.9	72.5	68.0	62.0	62.6	64.5	52.9	55.0		
		P	4.8	8.3	10.1	10.6	11.0	12.7	11.5	10.6	10.3	10.6	9.3	7.9		
		K	25.8	38.5	49.0	48.1	49.6	56.6	52.9	47.8	47.2	49.0	42.7	42.8		
	Pearlmillet	N	20.7	40.8	44.4	61.7	74.9	79.1	69.6	54.6	61.5	66.1	66.3	67.2		
		P	4.7	9.8	10.4	14.2	18.7	20.6	17.2	14.6	16.2	17.9	18.0	15.5		
		K	53.2	101.4	106.0	142.7	170.3	167.2	163.8	138.2	150.2	172.0	168.8	160.2		
	Wheat	N	22.5	74.0	109.3	100.3	126.0	137.5	109.7	116.9	105.0	127.7	107.9	116.8		
		P	3.7	13.6	19.5	18.8	23.1	24.9	19.6	21.0	19.1	23.6	20.1	19.5		
		K	22.7	76.9	118.1	108.2	131.4	158.3	127.9	121.5	110.9	147.6	58.4	120.6		
	Rice	N	12.6	50.4	57.3	58.0	83.0	83.5	76.0	71.4	69.0	78.7	74.3	42.1		
		P	1.4	7.6	9.7	10.5	19.3	20.2	16.4	15.5	14.4	18.1	16.3	6.8		
		K	14.3	53.9	60.0	59.9	86.9	87.5	80.2	75.4	69.3	81.6	78.1	45.4		
Kanpur	Wheat	N	12.4	72.6	90.7	86.8	124.4	128.7	118.1	113.6	111.1	121.1	120.2	66.3		
		P	1.1	10.5	14.1	12.7	21.2	22.6	19.1	17.3	16.1	20.4	18.5	8.4		
		K	10.6	62.6	73.6	70.5	97.0	100.9	91.2	88.7	86.5	94.3	90.4	52.4		
	Rice	N	19.4	48.7	54.7	78.0	111.3	116.9	111.8	87.9	96.2	107.0	114.0	74.0		
		P	4.0	9.1	10.2	14.9	21.5	22.5	23.3	16.2	18.0	20.2	23.1	13.7		
		K	33.0	72.9	80.7	106.4	138.4	140.8	138.5	126.4	133.6	130.4	142.8	95.3		
	Wheat	N	10.2	39.2	66.0	51.7	79.3	86.9	71.2	77.0	61.6	87.7	72.3	45.9		
		P	2.1	7.3	11.6	8.8	15.6	17.5	13.8	15.1	11.5	16.7	13.5	8.5		
		K	15.1	47.0	75.5	59.3	86.5	96.7	81.2	92.1	75.3	94.6	78.2	49.7		

Contd..../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄
Palampur	Rice	N	44.1	53.2	59.4	57.5	60.9	71.8	61.3	55.3	59.9	74.7	64.4	58.1		
		P	18.2	19.9	20.7	18.0	19.8	26.5	20.8	19.4	21.7	26.1	23.2	19.3		
	Wheat	K	42.8	46.0	50.8	43.9	48.8	59.0	48.8	43.5	51.2	60.9	52.5	45.2		
		N	15.3	27.6	29.3	29.5	35.5	32.1	22.6	29.6	27.9	28.3	29.0	23.6		
		P	2.7	3.6	3.9	4.2	5.0	5.4	3.7	4.3	4.5	4.6	4.8	3.7		
		K	15.7	29.7	23.7	28.3	40.8	34.2	18.8	31.4	31.2	33.0	28.2	27.0		
Kathalgere	Summer	N	59.2	84.1	146.4	127.3	164.1	164.2	186.9	203.5	179.9	163.8	152.2	96.9		
	Maize	P	14.5	26.9	36.8	29.8	49.7	43.2	33.7	49.5	51.2	45.8	42.2	23.3		
		K	47.3	60.0	100.2	97.2	106.9	115.9	121.2	123.9	132.2	112.2	105.7	57.1		
Jammu	Rice	N	30.8	59.8	64.7	68.9	80.8	90.0	84.6	115.6	74.2	77.1	71.8	54.9		
		P	5.8	12.5	14.9	18.5	22.3	24.3	20.1	18.1	19.8	20.7	19.2	12.3		
	Wheat	K	40.3	90.4	110.4	114.5	131.2	149.9	135.3	125.6	132.7	116.7	128.8	74.9		
		N	19.8	52.5	57.2	53.2	64.0	72.1	59.5	53.5	53.5	57.1	56.3	47.3		
		P	4.4	14.4	15.6	14.4	28.0	20.6	14.6	15.3	14.5	16.9	15.8	12.0		
		K	29.1	64.2	64.3	61.7	74.0	79.3	69.7	67.6	62.5	68.8	71.2	60.5		
Ludhiana	Rice	N	40.2	76.3	82.3	106.0	150.5	164.4	164.9	121.6	123.6	163.5	175.3	164.7	144.7	142.2
		P	7.5	13.6	16.7	23.7	32.2	39.8	33.5	24.9	27.7	34.9	32.3	33.4	29.0	32.0
	Wheat	K	44.4	73.7	83.3	98.0	141.4	154.4	150.9	114.1	111.8	156.8	155.9	144.0	144.3	134.1
		N	43.4	99.6	130.9	126.9	152.7	162.2	153.7	139.5	135.5	157.0	150.7	160.3	162.0	152.0
		P	8.5	18.1	22.0	23.7	28.9	33.7	33.1	29.3	32.8	35.0	30.7	40.3	33.0	33.3
		K	49.5	94.5	106.5	118.6	139.0	160.5	144.6	129.9	131.2	137.6	119.0	158.7	141.5	133.1
Rahuri	Sorghum	N	9.2	76.0	104.9	112.0	124.1	129.6	120.7	94.1	123.5	125.8	116.3	75.5		
		P	0.9	11.1	18.0	18.0	24.2	23.5	21.4	15.4	20.8	20.9	19.2	11.8		
	Wheat	K	13.7	107.9	117.7	124.2	139.5	140.1	134.5	109.7	131.3	131.5	124.4	87.2		
		N	9.3	59.8	71.9	65.5	78.7	86.6	75.9	70.7	69.1	75.7	73.6	50.5		
		P	2.0	14.0	15.7	14.3	18.1	19.5	17.1	15.6	15.1	15.8	16.5	11.5		
		K	8.0	45.9	55.6	51.6	62.7	68.5	58.1	53.2	52.7	57.2	56.2	39.2		
Akola	Sorghum	N	24.0	68.1	84.5	81.7	99.7	97.4	92.7	86.4	84.6	88.0	89.3	64.4		
		P	8.1	23.3	26.1	29.1	35.1	35.7	32.9	29.5	29.2	31.8	32.3	22.3		
	Wheat	K	38.6	93.4	102.0	118.2	134.9	134.4	126.6	119.2	115.3	123.8	126.6	91.8		
		N	10.7	47.8	65.1	60.3	73.6	75.2	72.5	67.8	64.8	73.3	68.4	40.4		
		P	2.9	14.4	19.1	18.2	22.3	24.5	22.9	21.8	20.6	24.3	22.2	11.2		
		K	9.9	40.5	54.7	52.0	62.4	67.3	63.3	69.1	56.2	66.7	59.9	33.9		

Contd..../-

Name of CSR Centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈	T ₉	T ₁₀	T ₁₁	T ₁₂	T ₁₃	T ₁₄
Kalyani	Rice	N	26.3	52.2	71.1	53.3	72.2	102.2	69.3	90.3	73.2	87.2	75.1	55.5		
		P	7.2	11.4	16.4	16.3	18.4	27.1	17.1	23.3	17.7	24.9	16.1	14.0		
		K	22.2	30.9	52.2	62.3	72.1	86.7	57.7	84.5	65.4	82.7	53.4	44.1		
	Wheat	N	41.5	51.3	83.7	72.4	96.4	105.0	82.4	88.5	76.7	108.1	73.9	65.5		
		P	36.0	37.1	35.7	31.3	38.0	48.4	38.8	34.0	25.2	33.0	33.3	17.2		
Karmana	Rice	K	26.2	35.5	54.4	64.4	70.3	96.3	69.0	91.3	62.4	88.2	59.3	51.2		
		N	36.5	40.6	64.0	75.4	64.4	38.9	47.5	46.1	52.2	45.5	52.1	49.9		
		P	16.2	18.8	22.0	33.2	21.6	14.5	24.2	17.7	21.6	19.6	21.2	21.5		
	Rice	K	24.9	37.5	53.5	43.4	54.0	31.7	41.9	36.9	41.9	38.6	52.9	53.5		
		N	48.0	77.7	89.3	70.0	75.6	87.6	84.4	89.9	79.5	93.9	77.8	65.2		
Parbhani	Sorghum	P	25.1	29.4	46.3	35.8	33.1	44.6	59.9	44.2	64.0	42.8	33.4	33.8		
		K	31.4	47.8	55.0	56.3	48.1	72.2	54.1	58.0	59.4	66.0	48.4	35.5		
		N	7.0	30.9	32.7	34.7	39.6	36.4	38.5	35.5	48.8	37.5	36.5	38.4	35.7	35.6
	Wheat	P	0.5	3.1	3.3	4.4	4.5	4.6	4.5	4.1	4.2	4.5	4.7	4.1	4.1	4.2
		K	3.6	34.6	45.8	39.4	43.2	47.3	44.1	34.8	34.5	38.8	38.6	34.8	34.8	36.9
Maize	Wheat	N	12.1	22.4	24.6	34.2	34.9	25.5	38.5	38.8	30.8	38.1	29.6	28.2	25.7	34.7
		P	3.2	5.4	6.6	7.8	6.8	7.8	8.6	9.8	8.2	10.0	9.9	5.9	6.9	10.0
		K	11.1	26.2	27.2	34.6	28.3	29.2	38.6	39.5	33.5	35.5	33.5	19.6	30.6	38.8
	Maize	N	15.8	47.3	49.2	54.1	86.3	94.0	87.1	75.2	72.4	68.3	55.3	20.0		
		P	2.4	8.2	9.0	9.9	16.3	19.1	16.4	13.8	12.3	12.8	10.1	3.0		
Wheat	Wheat	K	12.3	38.0	40.0	44.6	72.2	77.6	66.5	57.0	58.7	54.0	43.1	15.3		
		N	28.5	81.9	83.3	93.1	146.9	161.5	144.2	129.0	120.5	116.6	92.7	35.9		
		P	4.6	14.6	15.3	16.6	27.7	31.2	29.2	26.3	20.6	21.8	17.6	5.6		
	Wheat	K	15.2	43.5	47.2	51.7	83.2	89.7	78.5	68.8	67.6	62.6	51.2	17.1		

Table E : Soil fertility Status (kg/ha) in Organic farming

Name of CSR centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Rajendra nagar	Kharif	OC%	0.7	0.7	0.7	0.7	0.6	0.8	0.5	0.7
		N	144.3	147.4	112.9	144.3	166.2	181.9	159.9	153.7
		P	42.8	50.0	39.1	56.4	39.4	57.9	33.9	48.3
		K	408.1	373.8	256.1	352.1	343.5	335.3	287.5	371.1
	Rabi	OC%	0.6	0.7	0.8	0.8	0.7	0.8	0.4	0.7
		N	185.0	197.6	166.2	185.0	172.5	188.2	178.8	197.6
		P	52.9	64.4	55.9	68.5	34.0	65.1	33.5	69.1
Maruteru	Kharif	K	400.2	396.5	342.0	458.8	421.9	343.8	319.9	438.3
		OC%	1.3	1.6	1.5	1.6	1.3	1.3	1.4	1.5
		N	156.8	200.7	163.0	150.5	175.6	213.2	150.5	181.7
		P	45.0	55.7	51.3	43.0	54.9	27.9	37.1	36.3
	Rabi	K	210.6	276.6	320.3	313.6	259.8	258.7	172.5	303.5
		OC%	1.5	1.6	1.7	1.2	1.3	1.2	1.3	1.6
		N	169.3	181.8	156.8	156.8	163.0	156.8	150.5	170.5
Rudrur	Kharif	P	72.5	52.5	49.0	46.3	64.4	158.3	65.9	32.8
		K	293.4	294.6	337.1	327.0	329.3	323.8	252.0	347.2
	Rabi	OC%	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.6
		N	119.0	188.1	175.6	169.3	156.8	200.7	169.3	188.1
		P	49.5	42.1	57.4	50.3	51.1	53.7	57.8	51.1
	Kharif	K	246.4	259.8	247.5	254.2	281.1	242.4	304.6	293.4
		OC%	0.6	0.8	0.7	0.7	0.7	0.8	0.7	0.6
Sabour	Summer	P	56.4	42.7	52.6	49.6	43.6	61.8	60.6	55.1
		K	166.9	196.0	211.7	180.3	161.3	250.9	180.3	154.6
		OC%	0.7	0.8	0.8	0.7	0.7	0.8	0.6	0.7
		N	201.7	206.0	198.5	207.8	207.8	216.8	180.5	203.8
Raipur	Rabi	P	44.2	46.8	44.1	48.3	49.7	50.8	41.2	45.9
		K	164.8	170.0	166.0	172.7	168.6	172.2	135.7	166.9
		OC%	0.6	0.6	0.6	0.5	0.5	0.6	0.5	
		N	256.0	242.0	262.0	241.0	238.0	251.0	273.0	
SK Nagar	Summer	P	20.3	18.4	21.7	19.3	17.8	19.3	24.2	
		K	274.0	261.0	266.0	261.0	253.0	263.0	302.0	
		OC%	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		N	242.0	236.0	237.0	234.0	225.0	237.0	229.0	232.0
		P	31.1	26.9	29.7	30.0	31.6	32.2	25.8	23.5
		K	327.0	264.0	277.0	268.0	299.0	301.0	271.0	252.0

Contd..../-

Name of CSR centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Navsari	<i>Rabi</i>	OC%	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7
		N	262.0	252.0	254.0	248.0	257.0	249.0	244.0	249.0
		P	28.0	27.4	28.3	26.9	32.5	24.6	26.0	26.3
		K	304.0	293.0	280.0	231.0	222.0	260.0	233.0	297.0
Hisar	<i>Kharif</i>	OC%	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5
		N	183.4	177.8	182.0	182.0	168.0	184.8	184.8	177.8
		P	15.2	14.8	14.4	14.0	14.4	16.4	14.0	14.4
		K	218.8	214.3	216.4	219.0	220.2	227.4	230.7	217.1
	<i>Rabi</i>	OC%	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		N	168.0	156.8	161.0	159.6	154.0	162.4	165.2	159.6
		P	14.8	14.0	15.6	14.0	16.4	16.8	16.0	14.8
		K	218.7	212.2	217.0	215.6	206.7	224.2	230.4	217.2
Palampur	<i>Kharif</i>	OC%	3.1	2.7	3.0	2.7	3.1	2.7	0.9	2.7
		N	352.5	348.7	388.9	334.9	376.3	328.7	267.2	326.1
		P	313.6	206.1	268.8	233.0	300.2	246.4	116.5	224.0
		K	977.5	793.6	921.5	859.3	921.5	957.6	283.8	770.6
	<i>Rabi</i>	OC%	2.9	2.5	2.8	2.5	2.9	2.6	1.0	2.6
		N	376.3	319.9	353.7	362.5	396.4	360.0	282.2	357.5
		P	286.7	188.2	259.8	219.5	291.2	237.4	107.5	210.6
		K	818.3	817.2	924.5	829.5	892.4	920.2	307.3	831.5
	Summer	OC%	2.8	2.6	2.8	2.6	2.7	2.3	0.9	2.6
		N	352.5	296.0	345.0	328.7	357.5	341.2	283.5	304.8
		P	259.8	192.6	250.9	210.6	277.8	228.5	112.0	192.6
		K	874.7	854.6	921.8	882.6	889.3	917.3	328.2	853.4
Jammu	Summer	OC%	0.6	0.8	0.8	0.8	0.7	0.9	0.6	0.8
		N	257.7	194.9	314.3	201.2	314.3	220.0	276.6	238.6
		P	12.9	13.8	14.7	14.1	16.2	15.5	15.0	14.9
		K	116.2	122.0	118.0	120.0	110.0	117.0	116.0	113.0
Kathalagere	Summer	OC%	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
		N	368.5	358.6	362.6	341.5	356.3	371.6	362.5	
		P	18.6	19.2	21.6	17.3	18.9	22.6	18.6	
		K	219.7	228.6	232.6	235.5	241.6	236.7	28.3	
Siruguppa	<i>Kharif</i>	OC%	0.8	0.9	0.9	0.9	0.7	0.8	0.7	
		N	212.0	232.0	232.0	242.0	209.0	232.0	212.0	
		P	25.0	27.0	22.0	26.0	20.0	24.0	19.0	
		K	384.0	389.0	348.0	362.0	378.0	372.0	345.0	
		S	28.0	35.0	34.0	36.0	30.0	30.0	29.0	

Contd..../-

Name of CSR centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Karmana	Summer	OC%	1.1	1.1	1.1	1.5	1.1	1.2	0.7	
		N	150.5	156.8	138.0	138.0	169.3	150.5	150.5	
		P	7.0	6.7	5.8	6.3	4.9	6.1	4.9	
		K	93.0	96.3	90.7	97.4	90.7	85.1	96.3	
Jabalpur	Rabi	OC%	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
		N	228.0	225.0	215.0	218.0	215.0	215.0	220.0	225.0
		P	9.3	8.9	8.7	8.7	9.6	8.9	9.6	8.9
		K	342.0	330.0	323.0	323.0	331.0	328.0	362.0	330.0
Rewa	Rabi	OC%	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		N	227.0	230.0	230.0	227.0	237.0	235.0	242.0	230.0
		P	8.8	8.6	8.6	8.6	9.2	8.6	8.6	8.6
		K	293.0	289.0	290.0	290.0	296.0	295.0	311.0	290.0
Powarkheda	Rabi	OC%	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
		N	268.0	256.0	256.0	256.0	260.0	258.0	263.0	253.0
		P	10.3	9.5	9.5	9.5	9.8	9.8	10.6	9.8
		K	296.0	286.0	286.0	286.0	288.0	288.0	297.0	286.0
Rahuri	Kharif	OC%	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.5
		N	197.0	196.0	197.0	195.0	181.0	198.0	192.0	158.0
		P	18.0	17.0	16.0	17.0	17.0	19.0	16.0	8.0
		K	563.0	561.0	561.0	558.0	551.0	563.0	564.0	433.0
	Rabi	OC%	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.5
		N	198.0	200.0	200.0	198.0	187.0	200.0	192.0	158.0
		P	18.0	17.0	18.0	17.0	18.0	20.0	18.0	8.0
		K	565.0	559.0	561.0	559.0	553.0	565.0	566.0	431.0
Parbhani	Rabi	N	178.7	170.9	150.8	158.8	165.9	176.7	180.8	168.1
		P	13.6	13.0	12.9	13.3	12.8	13.5	14.0	13.5
		K	365.2	345.3	350.8	360.5	360.3	362.6	366.2	347.8
Akola	Kharif	N	272.0	251.0	258.0	220.0	235.0	240.0	280.0	168.0
		P	20.2	26.3	25.4	25.2	24.9	23.6	28.3	17.4
		K	380.0	338.0	380.0	345.0	330.0	380.0	418.0	280.0
	Rabi	N	260.0	238.0	243.0	210.0	220.0	231.0	271.0	172.0
		P	19.0	25.2	24.1	24.0	23.7	22.3	27.1	16.1
		K	365.0	324.0	363.0	332.0	312.0	367.0	402.0	267.0
	Summer	N	266.0	245.0	251.0	215.0	228.0	236.0	276.0	170.0
		P	19.6	25.8	24.8	24.6	24.3	23.0	27.7	16.8
		K	373.0	331.0	372.0	339.0	321.0	374.0	410.0	274.0

Contd..../-

Name of CSR centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Ludhiana	Summer	OC%	0.5	0.6	0.6	0.6	0.5	0.5	0.4	0.6
		N	218.6	230.8	236.4	240.1	225.6	242.8	220.4	238.2
		P	25.6	28.8	30.1	30.8	26.8	32.4	26.8	31.5
		K	150.2	158.6	160.5	164.8	165.2	156.2	154.2	162.8
		Zn	1.4	1.5	1.4	1.4	1.4	1.4	1.4	1.4
		Cu	0.7	0.8	0.9	0.7	0.8	0.9	0.8	0.8
		Fe	19.8	20.6	22.5	20.2	21.2	24.3	22.4	24.1
		Mn	7.9	8.0	8.6	9.1	7.8	8.6	8.2	9.0
Bichpuri	Summer	OC%	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
		N	153.0	150.0	149.0	151.0	124.0	150.0	156.0	
		P	12.5	12.1	11.9	11.8	11.5	12.5	12.6	
		K	296.0	290.2	285.3	285.0	280.4	287.2	298.5	
Faizabad	Summer	OC%	0.6	0.7	0.7	0.7	0.6	0.7	0.5	0.7
		N	178.0	172.0	176.0	182.0	163.0	170.0	189.0	174.0
		P	22.3	23.6	24.1	23.0	20.1	25.2	24.6	23.0
		K	272.0	266.0	276.0	271.0	261.0	274.0	284.0	270.0
Coimbatore	Summer	OC%	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6
		N	295.0	287.0	286.0	271.0	258.0	279.0	282.0	277.0
		P	23.1	24.2	22.7	23.4	21.8	24.8	21.7	23.8
		K	483.0	495.0	445.0	452.0	429.0	435.0	449.0	459.0
Kanpur	Summer	OC%	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.6
		P	17.5	16.9	17.0	16.7	16.8	17.2	18.1	16.8
		K	135.0	131.5	130.8	130.0	131.0	129.9	135.9	129.6
Bichpuri	Summer	OC%	0.40	0.44	0.43	0.44	0.42	0.43	0.36	
		N	153.0	150.0	149.0	151.0	124.0	150.0	156.0	
		P	12.5	12.1	11.9	11.8	11.5	12.5	12.6	
		K	296.0	290.2	285.3	285.0	280.0	287.2	298.5	
Durgapura, Jaipura	Summer	OC%	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
		P	33.8	35.8	36.9	35.1	36.5	39.4	34.5	35.7
		K	192.0	204.0	240.5	209.6	225.0	213.2	243.5	202.9
Kalyani	Summer	OC%	0.7	0.8	0.6	0.8	0.8	0.5	0.6	0.7
		N	124.2	148.5	136.5	138.5	148.6	114.5	159.1	121.4
		P	65.6	70.5	68.8	67.6	68.9	59.7	63.6	64.0
		K	143.9	169.5	152.0	133.9	146.7	130.8	198.8	189.8

Table F : Nutrient uptake (kg/ha) in Organic Farming

Name of CSR centre	Season	Nut./ Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Rajendra nagar	Kharif	N	98.8	94.1	84.1 +37	89.8	90.6	92.9	102.7	99.1
		P	33.0	35.1	31.7 +3.1	38.6	30.9	33.1	38.4	39.8
		K	80.4	59.0	54.1+38.7	72.6	71.0	75.8	68.5	67.9
	Rabi	N	155.1	154.2	144.3+307.7	167.5	162.1	176.8	177.7	170.0
		P	32.6	43.0	37.5+37.3	31.3	29.7	26.4	37.5	36.3
		K	197.4	205.8	176.3+212.7	196.5	198.1	197.2	199.3	201.5
Rudrur	Kharif	N	245.4	210.5	124.8	189.6	177.7	202.6	222.1	201.6
		P	82.0	69.0	39.5	68.7	68.0	75.3	89.6	81.8
		K	507.6	430.0	245.1	384.7	380.2	439.3	493.3	407.7
	Rabi	N	41.6	38.0	33.7	18.8	33.6	34.6	42.5	38.0
		P	5.9	5.1	5.2	3.9	4.1	4.5	5.6	4.9
		K	16.4	15.2	14.7	10.5	14.8	14.9	16.6	16.6
Maruteru	Kharif	N	77.5	63.9	63.4	68.9	64.8	67.2	82.3	67.3
		P	15.0	13.0	15.1	16.1	16.1	14.8	17.7	13.6
		K	67.1	66.7	67.0	64.8	68.1	71.2	72.3	64.5
	Rabi	N	84.1	69.5	65.8	76.9	65.4	71.3	95.0	65.8
		P	19.3	15.3	17.9	16.9	22.1	18.1	23.5	16.9
		K	77.0	78.9	81.8	80.0	76.7	81.0	82.3	74.2
S K Nagar	Rabi	N	158.7	146.4	140.6	145.6	104.8	156.8	167.3	149.1
		P	26.3	23.5	21.9	24.3	20.9	27.9	28.6	23.9
		K	185.2	172.3	167.2	167.2	123.5	181.4	196.6	175.0
	Summer	N	148.1	146.0	139.3	135.7	101.0	148.5	116.7	142.2
		P	16.5	16.7	17.0	15.5	13.8	19.4	14.5	17.4
		K	57.1	54.3	51.0	49.4	36.1	53.9	42.4	50.8
Junagadh	Kharif	N	90.7	76.6	81.5	77.1	94.0	85.4	89.7	81.2
		P	8.9	6.6	6.7	6.8	8.3	9.2	9.6	8.0
		K	33.0	27.6	28.6	27.2	32.5	30.3	32.3	29.3
	Rabi	N	191.3	169.1	159.8	158.6	183.0	170.9	173.7	162.1
		P	29.2	21.6	22.7	23.1	25.4	25.2	22.2	21.2
		K	89.0	80.4	73.5	73.4	83.7	79.0	79.9	76.3
Navsari	Kharif	N	43.4	39.1	39.0	38.1	30.8	45.4	52.6	34.5
		P	14.5	13.5	12.2	11.8	9.9	14.4	17.4	9.5
		K	67.5	63.3	61.2	62.1	53.5	73.5	86.8	56.6
	Summer	N	106.2	93.7	92.1	90.5	81.9	108.0	95.0	96.8
		P	13.4	11.0	12.1	10.5	9.2	13.8	9.2	9.9
		K	37.3	32.5	31.5	31.1	29.0	37.9	33.5	35.0

Contd..../-

Name of CSR centre	Season	Nut./ Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Hisar	Kharif	N	138.3	115.4	90.9	113.6	65.0	121.2	164.6	120.5
		P	23.7	19.7	15.9	19.7	12.3	19.9	28.1	20.2
		K	82.0	67.6	64.2	67.1	40.0	69.4	96.4	68.7
	Rabi	N	69.9	58.6	57.3	59.2	36.4	59.5	80.9	57.3
		P	13.5	11.7	12.4	11.9	8.5	11.5	16.6	18.5
		K	132.0	47.7	107.0	113.3	71.6	118.0	147.4	111.7
Sabour	Kharif	N	87.2	89.3	85.4	89.7	80.8	90.9	85.6	88.2
		P	26.1	26.8	25.6	26.9	24.4	27.3	24.7	26.5
		K	101.2	104.6	99.8	104.1	96.6	107.0	99.8	103.1
	Rabi	N	101.9	103.2	98.6	102.4	82.1	104.4	95.1	102.9
		P	42.4	42.9	41.0	42.6	34.2	43.4	39.6	42.8
		K	139.5	141.3	135.0	140.3	112.5	143.0	130.2	141.0
	Summer	N	45.6	46.9	97.0	47.4	37.0	49.1	42.2	46.7
		P	18.8	19.3	36.7	19.6	15.5	20.3	17.6	19.3
		K	66.1	68.0	111.3	66.4	52.3	68.9	59.4	65.3
Palampur	Kharif	N	37.2	43.2	20.4	25.9	34.8	30.9	46.3	21.2
		P	9.6	19.0	6.2	9.7	14.7	11.5	13.1	10.8
		K	77.5	93.3	31.0	55.7	62.8	52.4	93.2	63.4
	Rabi	N	75.1	45.7	56.5	37.7	51.4	35.7	38.9	46.9
		P	11.6	7.4	9.5	5.8	8.8	6.3	5.8	7.7
		K	57.6	19.4	53.8	30.8	41.1	33.4	24.0	26.8
	Summer	N	55.4	47.8	46.0	45.3	51.5	43.2	16.2	48.7
		P	57.6	19.4	53.8	30.8	41.1	33.4	24.0	6.8
		K	71.5	56.9	50.0	47.1	56.0	47.6	17.5	48.0
Ludhiana	Kharif	N	209.0	199.8	225.0	192.8	245.6	196.2	227.5	193.0
		P	39.1	41.8	49.3	38.1	46.6	49.4	45.5	42.3
		K	183.7	186.6	167.6	176.9	175.5	184.7	207.2	146.0
	Rabi	N	82.6	86.3	94.9	87.9	84.8	85.0	81.9	97.1
		P	6.3	6.3	6.9	6.1	8.5	6.8	6.4	6.3
		K	102.0	91.1	100.7	98.1	93.8	90.8	92.6	103.2
	Summer	N	64.0	77.6	85.3	74.0	70.6	82.7	82.9	89.6
		P	43.9	44.9	47.8	41.8	41.2	32.9	41.8	40.6
		K	69.5	72.5	75.6	83.0	67.1	86.2	74.9	77.2
Karmana	Kharif	N	117.8	108.5	112.7	117.2	105.9	110.1	95.2	
		P	117.8	108.5	112.7	117.2	105.9	110.1	95.2	
		K	83.2	80.9	76.3	69.6	69.8	65.3	57.3	
	Rabi	N	17.9	17.1	11.4	11.0	10.4	11.3	8.5	
		P	5.6	4.3	3.4	3.7	3.3	3.0	2.4	
		K	14.3	11.4	8.0	7.8	8.7	9.6	8.5	

Contd..../-

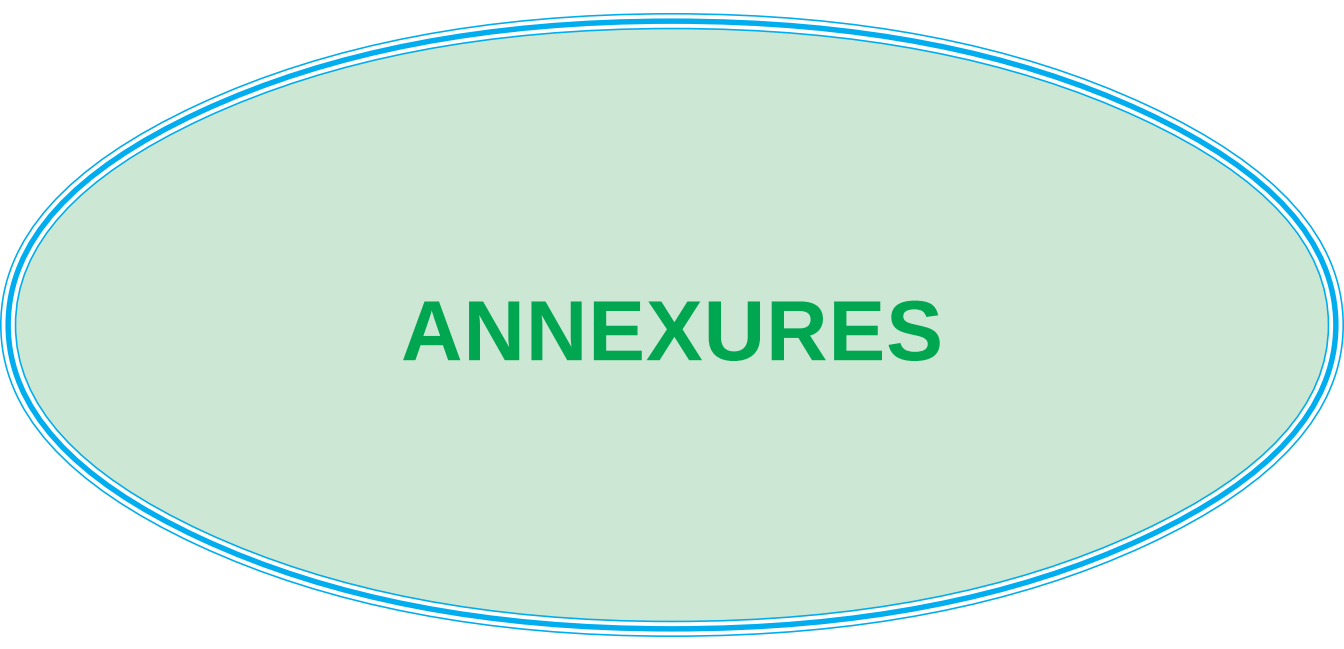
Name of CSR centre	Season	Nut./ Treat.	T ₁	T ₂	T ₃	T ₄	T ₅	T ₆	T ₇	T ₈
Rahuri	Kharif	N	179.5	184.1	190.6	186.3	186.5	205.8	182.5	92.8
		P	27.6	28.6	29.3	30.2	30.0	32.6	29.3	17.9
		K	67.3	68.6	70.9	71.3	70.3	78.3	69.7	34.0
	Rabi	N	73.1	74.5	75.9	74.1	67.7	84.8	89.6	39.1
		P	25.3	27.2	27.8	28.5	24.2	29.7	33.0	13.2
		K	91.5	93.7	91.0	96.6	81.3	98.0	108.2	54.7
Kalyani	Kharif	N	56.3	40.6	82.2	66.0	50.3	33.1	39.3	50.2
		P	25.4	15.2	26.3	21.0	26.1	19.2	17.1	24.4
		K	187.2	135.5	117.4	199.4	210.3	126.3	140.4	166.2
	Rabi	N	216.3	156.2	86.3	179.4	110.4	170.2	392.3	129.3
		P	31.9	19.3	14.3	24.3	18.1	26.4	26.2	19.2
		K	299.0	187.2	78.2	190.7	120.2	190.3	402.2	130.1
	Summer	N	121.9	89.1	84.2	131.0	83.3	84.1	80.3	88.2
		P	25.2	11.2	12.5	19.2	12.2	11.3	26.7	11.3
		K	10.2	7.1	7.2	11.2	12.2	7.1	9.0	8.1
Kathalagere	Summer	N	152.9	129.9	128.1	122.6	129.6	269.4	179.9	
		P	15.1	19.0	16.1	16.9	16.9	24.3	15.8	
		K	76.0	72.0	76.2	72.2	70.7	86.9	69.2	
Coimbatore	Kharif	N	91.1	74.2	77.9	74.1	64.4	74.5	81.1	75.2
		P	16.4	13.4	14.0	13.3	11.6	13.3	14.6	13.5
		K	168.8	137.5	144.3	137.2	119.2	138.0	150.3	139.3
	Rabi	N	49.3	41.7	49.2	45.4	40.3	48.3	49.1	48.7
		P	9.3	9.0	9.1	9.0	7.7	8.5	9.2	9.1
		K	62.8	59.9	60.5	59.5	51.3	56.0	60.7	60.0
Jabalpur	Rabi	N	162.0	135.0	130.0	132.0	141.0	131.0	182.0	134.0
		P	25.8	18.9	18.0	20.0	21.1	22.0	27.0	19.2
		K	198.0	181.0	183.0	180.0	187.0	197.0	232.0	196.0
Rewa	Rabi	N	170.0	120.0	142.0	134.0	127.0	125.0	178.0	148.0
		P	24.8	19.8	21.8	20.6	19.5	20.4	27.2	21.3
		K	200.0	150.0	179.0	173.0	148.0	150.0	211.0	182.0
Powarkheda	Rabi	N	174.0	110.0	136.0	147.0	120.0	115.0	202.0	134.0
		P	18.5	12.3	14.6	13.9	13.6	12.5	18.8	13.6
		K	176.0	125.0	161.0	160.0	127.0	118.0	212.0	131.0
Siruguppa	Rabi	N	66.0	48.0	44.0	56.0	52.0	72.0	63.0	
		P	14.0	12.0	13.0	13	13	20	19.0	
		K	90.0	55.0	56.0	60	59	92	79.0	

Table G : Fertility status kg/ha of sustainable production management system

Name of CSR centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅
Powarkheda	Rabi	OC%	0.62	0.69	0.63	0.62	
		N	268	290	268	264	
		P	9.7	10.4	9.5	9.7	
		K	317	350	330	282	
SABOUR	Rice-Wheat	OC%	0.55	0.57	0.61	0.59	0.53
		N	215.4	210.7	284.6	224.4	212.8
		P	30.7	29.4	34.6	32.6	28.7
		K	154.6	146.7	162.4	178.5	150.1
Ludhaina	Rice	OC%	0.45	0.56	0.54	0.47	0.43
		N	157	173	164	150	148
		P	24.2	26.4	25.2	24.6	23.8
		K	160	173	165	163	155
	Wheat	OC%	1.58	1.78	1.68	1.6	1.52
		N	0.9	0.98	0.92	0.8	0.75
		P	19.4	25.2	24.8	21.2	18.4
		K	7.6	8.2	7.95	8.01	7.92

Table H : Nutrient uptake kg/ha of sustainable production management system

Name of CSR centre	Season	Nut./Treat.	T ₁	T ₂	T ₃	T ₄	T ₅
Powarkheda	Rabi	N	172	188	199	208	
		P	20.1	22.8	20.9	23.5	
		K	168	209	205	214	
Sabour	Kharif	N	120.8	130.5	127.8	118.8	107.2
		P	36.7	39.8	39.1	35.9	32.4
		K	133	142.8	139	131	120.1
	Rabi	N	105.5	107.1	114.6	117.7	91.4
		P	30.9	31.7	34.3	32.0	26.1
		K	110.6	112.9	118.5	114.2	94.4
Hisar	Kharif	N	67	71.6	80.7	68.6	
		P	19	20.7	23.8	20.3	
		K	179.1	188.7	205.1	180.3	
	Rabi	N	91.7	104.6	115.2	93.3	
		P	18.1	20.3	25.4	19.3	
		K	102.8	117.8	127.9	104.1	
Ludhiana	Kharif	N	131.7	152.5	154.0	137.8	131.7
		P	35.7	38.2	44.0	33.2	26.8
		K	167.4	190.7	198	171	158.5
	Rabi	N	117.7	126.3	137.1	119.9	96.0
		P	25.4	30.6	30.8	28.8	20.4
		K	126.2	935.5	132.6	128.0	102.9



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Annexure-II

BOTANICAL AND HINDI NAMES OF DIFFERENT CROPS BEING GROWN AT AICRP-IFS CENTRES IN DIFFERENT EXPERIMENTS

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

S.N.	Common name	Botanical name	Hindi Name
30	Indian Mustard	<i>Brassica juncea</i> Coss.	Sarson/ Raya
31	Indian rape	<i>Brassica campestris</i> L. var. Toria	Toria
32	Lady's finger/ Okra	<i>Abelmoschus esculantus</i> Moench.	Bhindi
33	Lentil	<i>Lens culinaris</i> Medikus	masoor
34	Linseed/ Flax/ Flax seed	<i>Linum usitatissimum</i> L.	Alsi
35	Maize/ Corn	<i>Zea mays</i> L.	Makka
36	Marigold	<i>Calendula officinalis</i> L.	Gainda
37	Mustard	<i>Brassica campestris</i> L. var. Yellow sarson/ Brown sarson	Sarson
38	Oat	<i>Avena sativa</i> L.	Jaee
39	Onion	<i>Allium cepa</i> L.	Pyaz
40	Pearl millet	<i>Pennisetum americanum</i> L.	Bajra
41	Pea/ Vegetable Pea	<i>Pisum sativum</i> L.	Matar
42	Pigeon pea	<i>Cajanus cajan</i> (L) Milsp.	Arhar/ Tuar
43	Potato	<i>Solanum tuberosum</i> L.	Aloo
44	Psyllium	<i>Plantago ovata</i> Forssk.	Isabgol
45	Pumpkin	<i>Cucurbita pepo</i> Duch.	Kaddu
46	Radish	<i>Raphanus sativus</i> L.	Mooli
47	Rape/ Oilseed rape	<i>Brassica napus</i> var. napus	Gobhi Sarson
48	Red/ Purple Amaranth	<i>Amaranthus cruentus</i> L.	Chaulai/ Ramdana/ Rajgira
49	Rice/ Paddy	<i>Oryza sativa</i> L.	Dhan
50	Ridge gourd/ Sponge gourd	<i>Lufa acutangula</i> / <i>L. aegyptica</i> / <i>L. cylindrica</i>	Torai
51	Sesame	<i>Sesamum indicum</i> L.	Til
52	Sorghum	<i>Sorghum bicolor</i> (L.) Moench.	Jowar
53	Soybean	<i>Glycine max</i> L. (Merr.)	Soybean
54	Spinach	<i>Spinacia oleracea</i> L.	Palak
55	Sugar beet	<i>Beta vulgaris</i> L.	Chukander
56	Sugarcane	<i>Saccharum officinarum</i> L.	Ganna
57	Sunflower	<i>Helianthus annuus</i> L.	Surajmukhi
58	Sunhemp	<i>Crotalaria juncea</i> L.	Sanai
59	Sweet potato	<i>Ipomoea batatas</i> (L.) Lam.	Sakarkand
60	Tomato	<i>Solanum lycopersicum</i> L./ <i>Lycopersicon esculentum</i> / <i>L. lycopersicum</i>	Tamatar
61	Turmeric	<i>Curcuma longa</i> L.	Haldi
62	Wheat	<i>Triticum aestivum</i> L. emend. Fiori & Paol.	Gehun

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