भाकृअनुप
ICAR

AICRP-IFS

annual report
2011-12

कृषि प्रणाली अनुसंधान परियोजना निदेशालय
मोदीपुरम, मेरठ–250 110 (उ.प्र.), भारत

ABOUT PDFSR

Project Directorate for Farming Systems Research (PDFSR) (formerly Project Directorate for Cropping Systems Research -PDCSR), was established by Indian Council of Agricultural Research, New Delhi in April, 1989 at Modipuram, Meerut (Uttar Pradesh). The specific (revised) mandate of PDFSR is, 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 and viii) to develop capacity building of stakeholders in Integrated Farming Systems through training. All India Coordinated Research Project on Integrated Farming Systems is an integral part of PDFSR with 31 on-station IFSR centers, 11 on station CSR centers and 25 'on-farm' research centers; spread throughout the country in five ecosystems, i.e., arid, semi-arid, sub-humid, humid and coastal; to develop location specific system based technologies. In addition, a net work Project on Organic Farming was initiated during 2004 with 13 cooperating centers.

ALL INDIA CO-ORDINATED RESEARCH PROJECT ON
INTEGRATED FARMING SYSTEMS

Annual Progress Report
2011–12

Project Directorate for 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 PDFSR Modipuram (report writing, compilation, editing and printing).
- The report is based on experimental data generated during *kharif, rabi* and summer seasons of 2010-11 (period ending June 2011), under 'on-station' and 'on-farm' research programmes of AICRP on Integrated Farming Systems. The other details are relevant to 31st March 2012.
- The report includes both processed and semi-processed data, generated in different sub-projects under AICRP on Integrated Farming Systems, and as such no material/ data should be reproduced in any form without prior written permission of the Project Director, Project Directorate for Farming Systems Research and due credit to the concerned scientists.

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Project Director, PDFSR
&
PC, AICRP-IFS

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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 crops 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 centre. Prompted by these suggestions, "Simple Fertilizer Trial at cultivators' Fields" 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-climate 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 manorial 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

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 manurial 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. 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 foe 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. The objectives of the scheme for 'on-station' and 'on-farm' research were as follows:

On-Station Research

i. To identify profitable and efficient cropping systems for different agro-climatic regions with special emphasis on diversification / intensification through inclusion of oilseed, pulses and fodder crops.

ii. To develop integrated nutrient management technique for major cropping systems with emphasis on locally available resources.

iii. To improve fertilizer use efficiency in cropping systems through the use of efficient carriers, amendments and residues.

iv. To develop system-based crop management practices for maximizing yield in each ecosystem.

On-Farm Research

i. To in undertake socio-economic and agronomic surveys for identification of production constraints and problem prioritization.

ii. To develop and /or refine system-based agronomic practices, to increase cropping intensity, in farmers' participatory mode.

iii. To develop farm system/prototypes for enhancing crop productivity through optimizing farm inputs.

iv. To integrate farm enterprises to maximize the land use system and increase income and employment opportunities.

However, within two decades of existence of PDFSR, 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.

Accordingly, the name of AICRP on Cropping Systems was changed as '**AICRP on Integrated Farming Systems**' and objectives modified as given hereunder.

2. OBJECTIVES

On-Station Research

i. To identify profitable and efficient cropping/ Farming systems for different Agro-climatic regions.

ii. To develop integrated nutrient management techniques for major cropping systems with emphasis on locally available resources.

iii. To develop system-based crop establishment and tillage management techniques for each ecosystem.

On-Farm Research

i. To undertake socio-economic and agronomic surveys for identification of production constraints and problem prioritization.

ii. To develop and / or refine system-based agronomic practices to increase cropping intensity.

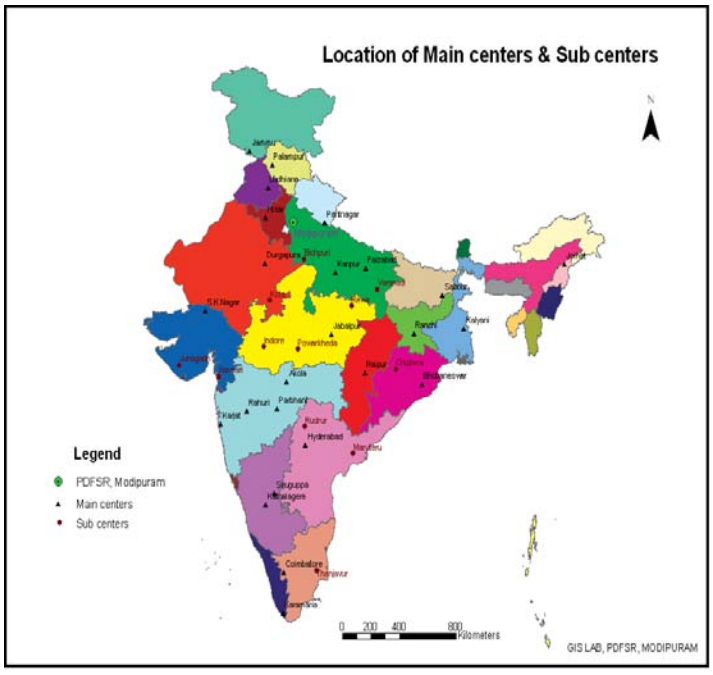
iii. To develop farm system/ proto-types for enhancing crop productivity through optimizing farm inputs.

iv. To integrate farm enterprises to maximize the land use system and increase income and employment opportunities.

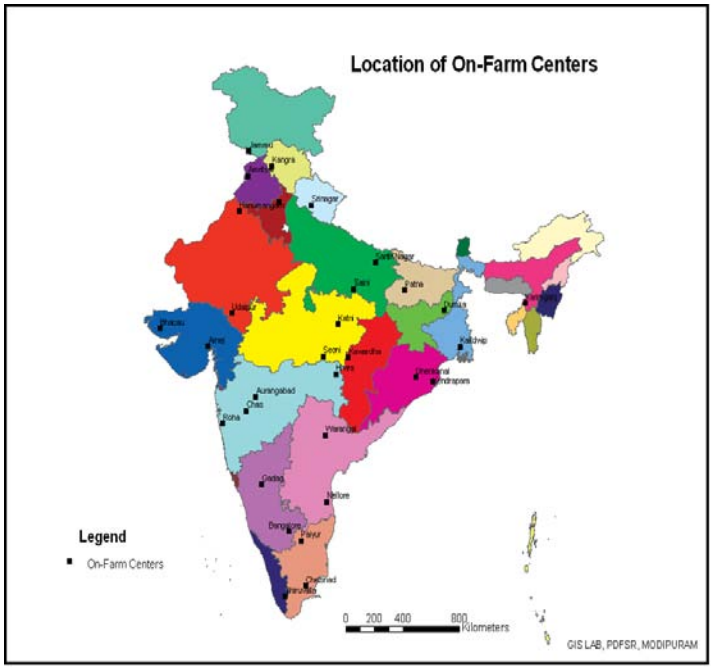
However, component of Integrated Farming Systems Research (On-Station) could be taken up only during financial year 2010-11, in accordance with the recommendations of 'Brain Storming Session – cum – Launching Workshop of Integrated Farming Systems Programme', organized at KAU Cropping Systems Research Centre, Karamana, Thiruvananthapuram (Kerala) on 6-7 March, 2010.

3. LOCATION

During the year 2010-11 the research under AICRP-IFS continued at 25 main centers, 12 sub centers, 32 on-farm research centres and 5 voluntary centers. 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' Field or 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 3-4 years. The location of different IFS/CSR centers during the year under report (2010-11) are depicted in Map-1and details are given in Table-3/1. Agro-climatic zone-wise location of different centres is given in Table-3/2.



Map 1. Locations of on-station research centres of AICRP-IFS during 2010-11



Map 2. Locations of on-farm research centres of AICRP-IFS during 2010-11

Table-3/1: Location of different AICRP-IFS centres during the year under report (2010-11)

State	University/ Institute	On-Station Research		On-Farm Research	
		Main Centre	Sub-Centre	Headquarters	Operational District(s)
A.P.	ANGRAU, Hyderabad	Rajendranagar, (Dist.Rangareddy)	Maruteru (Dist. W. Godavari)	Warangal	Nalgonda
			Rudrur (Dist. Nizamabad)	Nellore	Nellore
Assam	AAU, Jorhat	Jorhat		Karimganj	Golaghat, Jorhat, Sibsagar, Dibrugarh & Tinsukia
Bihar	BAU, Sabour	Sabour (Dist. Bhagalpur)		Patna	Patna & Nalanda
Chhattisgarh	IGKV, Raipur	Raipur		Kawardha (Dist. Kabirdham)	Kabirdham
Gujarat	SDAU, S.K. Nagar	S.K. Nagar (Dist. Banaskantha)		Deesa (Dist. Banas-Kanthal)	Banas-Kanthal
	AAU, Anand			Thasra (Dist. Kheda)	Kheda
	NAU, Navasari		Navasari		
	JAU, Junagadh		Junagadh		
Haryana	CCS HAU Hisar	Hisar		Kurukshetra	Kurukshetra, Kaithal
H.P.	CSK HPKV, Palampur	Palampur		Kangra	Una, Kangra, Hamirpur
J & K	SKUAST, Jammu	Chatha (Dist. Jammu)		Dhiansar (Dist. Jammu)	Jammu, Kathua, Poonch, Udhampur, Rajori, Doda

State	University/ Institute	On-Station Research		On-Farm Research	
		Main Centre	Sub-Centre	Headquarters	Operational District(s)
Jharkhand	BAU, Ranchi	Kanke (Ranchi)		Dumka	Jamtara
Karnataka	UAS, Bangalore	Kathalgere (Dist. Davangere)		Bangalore	Ramanagara
	UAS, Dharwad			Gadag	Gadag
	UAS, Raichur	Siruguppa, (Dist. Bellary)			
Kerala	KAU,Thrissur	Karamana (Dist. Thiruvananthapuram)		Thiruvalla, (Dist. Pathanamthitta)	Pathanamthitta
M.P.	JNKVV, Jabalpur	Jabalpur	Powarkheda (Dist. Hoshangabad)	Seoni	Seoni
			Rewa	Katni	Katni
	RVS KVV, Gwaliar	Indore			
Maharashtra	MPKV, Rahuri	Rahuri		Chas (Dist. Ahemadnagar)	Ahemadnagar
	MAU, Parbhani	Parbhani		Aurangabad	Usmanabad, Beed and Latur
	DPDKV, Akola	Akola		Hiwra (Dist. Gondia)	Gondia
	DBS KKV, Dapoli	Karjat (Dist.Raigadh)		Roha (Dist. Raigadh)	Raigadh
Odisha	OUAT, Bhubaneshwar	Bhubaneshwar	Chiplima (Dist. Sambalpur)	Mahisapat (Dist. Dhenkanal)	Dhenkanal and Angul
				Jajanga (Dist. Kendrapara)	Kendrapara
Punjab	PAU, Ludhiana	Ludhiana		Amritsar	Amritsar & Tarantaran
Rajasthan	SK RAU, Bikaner	Durgapura (Jaipur)		Hanumangarh	Hanumangarh
	MPUAT, Udaipur		Kota	Udaipur	Bhilwara, Dungarpur, and part of Chittortgarh, Udaipur and Sirohi
Tamil Nadu	TNAU, Coimbatore	Coimbatore	Thanjavur	Paiyur (Dist. Krishnagiri)	Krishnagiri
				Chettinad (Dist. Sivaganga)	Kanyakumari and thiruniveli
Uttar Pradesh	CSAUAT, Kanpur	Kanpur		Jaini (Dist. Kaushambi)	Kaushambi
	NDUAT, Kumarganj (Dist. Faizabad)	Faizabad	Kumarganj (Dist. Faizabad)	Sant Kabir Nagar	Sant Kabir Nagar
	BHU, Varanasi		Varanasi		
	RBS College, Bichpuri		Bichpuri (Agra)		
	SVPUAT, Meerut			——	——
Uttarakhand	GBPUAT, Pantnagar	Pantnagar (Dist. U.S. Nagar)		Jechi Kota (Dist. Nainital)	Nainital
West Bengal	BCKV, Kalyani	Kalyani (Dist. Nadia)		Kakdwip (Dist. 24-Parganas South)	24-Parganas (South)
TOTAL		**25**	**12**	**32**	

Table-3/2: State-wise/ Agro-Climatic Region-wise location of different centres of AICRP-IFS during the year 2010-11

S.No.	State	Centre	Status	Ecosystem	Agro-Climatie Region/Sub-Region of Planning	NARP Zone
1.	Andhra Pradesh	Rajendranagar (Dist. Rangareddy)	Main centre	Semi-Arid	Southern Plateau and Hills Region/ South Telangana Sub-Region	Southern Telangana Zone (AP-5)
2.		Maruteru (Dist. W. Godavari)	Sub Centre	Coastal	East Coast Plains and Hills Region/ South Coastal Andhra Sub-Region	Krishna Godavari Delta Zone (AP-1)
3.		Rudrur (Dist. Nizamabad)	Sub Centre	Semi-Arid	Southern Plateau and Hills Region/ North Telangana Sub-Region	Northern Telangana Zone (AP-4)
4.		Warangal	OFR Centre	Semi-Arid	Southern Plateau and Hills Region/ North Telangana Sub-Region	Central Telangana Zone
5.		Nellore	OFR Centre	Sub-Humid	East Coast Plains and Hills Region/ North Coastal Sub-Region	Southern Zone (AP-3)
6.	Assam	Jorhat	Main Centre	Humid	Eastern Himalayan Region/Upper Brahmaputra Valley Sub-Region	Upper Brahmaputra Valley Zone (AS-2)
7.		Karimganj	OFR Centre	Humid	Eastern Himalayan Region	Barak Valley Zone (AS-5)
8.	Bihar	Sabour (Dist. Bhagalpur)	Main Centre	Sub-Humid	Middle Gangetic Plains Region/ South Bihar Plains Sub-Region	South Bihar Alluvial Plain Zone (B1-3)
9		Patna	OFR Centre	Sub-Humid	Middle Gangetic Plains Region/ South Bihar Plains	South Bihar Alluvial Plain Zone (B1-3)
10.	Chhattisgarh	Raipur	Main Centre	Sub-Humid	Eastern Plateau & Hills Region/ Wainganga Sub-Region	Chhattisgarh Plain Zone (MP-1)
11.		Kawardha (Dist. Kabirdham)	OFR Centre	Sub-Humid	Eastern Plateau & Hills Region	Chhattisgarh Plain Zone (MP-1)
12.	Gujarat	S.K. Nagar (Dist. Banaskantha	Main Centre	Arid	Gujarat Plains and Hills Region/North Gujarat Sub-Region	North Gujarat Zone (GJ-4)
13.		Junagadh	Sub-Centre	Semi-Arid	Gujarat Plains and Hills Region/ South Saurashtra Sub-Region	South Saurashtra Zone (GJ-7)
14.		Navsari	Sub-Centre	Coastal	Gujarat Plains and Hills Region/ Southern Hills Sub-Region	South Gujarat Heavy Rainfall Zone (GJ-1)
15.		Deesa	OFR Centre	Semi-Arid	Gujarat Plains and Hills Region/ North Gujarat Sub-Region	North Gujarat Zone (GJ-4)
16.		Thasra	OFR Centre	Arid	Gujarat Plains and Hills Region/ North West Arid Sub-Region	Middle Gujarat Zone (GJ-3)

S.No.	State	Centre	Status	Ecosystem	Agro-Climatie Region/Sub-Region of Planning	NARP Zone
17.	Haryana	Hisar	Main Centre	Arid	Trans –Gangetic Plains Region/ Arid Sub-Region	Western Zone (HR-2)
18.		Kurukshetra	OFR Centre	Semi-Arid	Trans –Gangetic Plains Region/ Plains Sub-Region	Eastern Alluvial and Plain Zone (HR-1)
19.	Himachal Pradesh	Palampur (Dist. Kangra)	Main Centre	Humid	Western Himalayan Region/ High Altitude Temperature Sub-Region	Mid-Hill Sub-Humid Zone (HP-2)
20.		Kangra	OFR Centre	Humid	Western Himalayan Region/ High Altitude Temperature Sub-Region	Mid-Hill Sub-Humid Zone (HP-2)
21.	J & K	Chatha (Jammu)	Main Centre	Humid	Western Himalayan Region/High Altitude Temperature Sub-Region	Mid to High Altitude Plain Zone
22.		Dhainser (Dist. Jammu)	OFR Centre	Humid	Western Himalayan Region/High Altitude Temperature Sub-Region	Mid to High Altitude Plain Zone
23.	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)
24.		Jamtara	OFR Centre	Sub-Humid	Eastern Plateau & Hills Region/ Chhota Nagpur, North and Western Hills & Plateau Sub-Region	Central and North Eastern Plateau Zone (B1-4)
25.	Karnataka	Kathalgere (Dist. Davangere)	Main Centre	Semi-Arid	Southern Plateau and Hills Region	Southern Transition Zone (KA-7)
26.		Ramanagara	OFR Centre	Semi-Arid	Southern Plateau and Hills Region	Eastern Dry Zone (KA-5)
27.		Siruguppa (Dist. Bellary)	Main Centre	Arid	Southern Plateau and Hills Region/ Northern Dry Region of Karnataka	Northern Dry Zone (KA-3)
28.		Gadag	OFR Centre	Arid	Southern Plateau and Hills Region/ Central Dry Region of Karnataka	Northern Transition Zone (KA-3)
29.	Kerala	Karamana (Dist. Thiruvanthapuram)	Main Centre	Coastal	Western Plains & Ghat Regions/ Midland Sub-Region	Coastal Southern Zone (KE-2)
30.		Thiruvalla	OFR Centre	Coastal	Western Plains & Ghat Regions/ Midland Sub-Region	Problem Areas Zone (KE-5)
31.	Madhya Pradesh	Jabalpur	Main Centre	Sub-Humid	Central Plateau & Hills Region/Kymore Plateau and Satpura Hills Sub-Region	Kymore Plateau and Satpura Hills Zone (MP-4)
32.		Indore	Sub-Centre	Semi-Arid	Western Plateau &Hills Region/ Central Plateau Sub-Region	Malwa Plateau Zone (MP-10)

S.No.	State	Centre	Status	Ecosystem	Agro-Climatie Region/Sub-Region of Planning	NARP Zone
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.		Seoni	OFR Centre	Semi-Arid	Central Plateau & Hills Region/ Kymore Plateau and Satpura Hills Sub-Region	Satpura Plateau Zone (MP-9)
36.		Katni	OFR Centre	Semi-Arid	Central Plateau & Hills Region/ Kymore Plateau and Satpura Hills Sub-Region	Kymore Plateau and Satpura Hills Zone (MP-4)
37.	Maharashtra	Akola	Main Centre	Semi-Arid	Western Plateau &Hills Region/ Central Plateau Sub-Region	Western Vidarbha Zone(MH-8)
38.		Hiwra (Dist. Gondia)	OFR Centre	Semi-Arid	Western Plateau &Hills Region/ Central Plateau Sub-Region	High Rainfall Eastern Vidarbha Zone (MH-9)
39.		Karjat (Dist. Raigad)	Main Centre	Coastal	Western Plains & Ghat Regions/ Coastal Hilly Sub-Region	North Konkan Coastal Zone (MH-2)
40.		Roha (Dist. Raigad)	OFR Centre	Coastal	Western Plains & Ghat Regions/ Coastal Hilly Sub-Region	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 Plateau Sub-Region	Central Maharashtra Plateau Zone (MH-7)
43.		Rahuri (Dist. Ahemadnagar)	Main Centre	Semi-Arid	Western Plateau & Hills Region/ Scarcity Sub-Region	Scarcity Zone (MH-6)
44.		Chas (Dist. Ahemadnagar)	OFR Centre	Semi-Arid	Western Plateau & Hills Region/ Scarcity Sub-Region	Scarcity Zone (MH-6)
45.	Orissa	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.		Mahisapat(Dist. Dhenkanal)	OFR Centre	Sub-Humid	Eastern Plateau & Hills Region/ Wainganga Sub-Region	West-Central Table Land Zone (OR-10)
48.		Kendrapara	OFR Centre	Coastal	East Coast Plains and Hills Region/ Orissa Coastal Sub-Region	East and South –Eastern Coastal Plain Zone (OR-4)
49.	Punjab	Ludhiana	Main Centre	Semi-Arid	Trans-Gangetic Plains Region/ Plains Sub-Region	Central Plain Zone (PB-3)

Contd..

S.No.	State	Centre	Status	Ecosystem	Agro-Climatie Region/Sub-Region of Planning	NARP Zone
50.		Amritsar	OFR Centre	Semi-Arid	Trans-Gangetic Plains Region/ Plains Sub-Region	Central Plain Zone (PB-3)
51.	Rajasthan	Durgapura (Jaipur)	Main Centre	Semi-Arid	Central Plateau & Hills Region/ Eastern Plains of Rajasthan	Semi-Arid Eastern Plain Zone (RJ-5)
52.		Hanumangarh	OFR Centre	Semi-Arid	Central Plateau & Hills Region/ Eastern Plains of Rajasthan	Irrigated Northwestern Plain Zone (RJ-2)
53.		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)
54.		Udaipur	OFR	Semi-Arid	Central Plateau & Hills Region/ Southern Plains of Rajasthan	Sub-Humid Southern Plain & Aravali Hills Zone (RJ-7)
55.	Tamil Nadu	Coimbatore	Main Centre	Semi-Arid	Southern Plateau and Hills Region/ Central Plateau of Tamil Nadu Sub-Region	Western Zone (TN-3)
56.		Thanjavur	Sub Centre	Coastal	East Coast Plains and Hills Region/ Thanjavur Sub-Region	Cauvery Delta Zone (TN-4)
57.		Paiyur (Dist. Krishnagiri)	OFR Centre	Semi-Arid	Southern Plateau and Hills Region	Northwestern Zone (TN-2)
58.		Chettinad (Dist. Sivagangai)	OFR Centre	Semi-Arid	Southern Plateau and Hills Region	Sothern Zone (TN-5)
59.	Uttar Pradesh	Kanpur	Main Centre	Semi-Arid	Upper Gangetic Plains Region/South Western Plains Sub-Region	Central Plain Zone (UP-6)
60.		Jaini (Dist. Kaushambi)	OFR Centre	Semi-Arid	Upper Gangetic Plains Region/South Western Plains Sub-Region	Central Plain Zone (UP-6)
61.		Faizabad	Main Centre	Sub-Humid	Middle Gangetic Plains Region/ Eastern Plains Sub-Region	Eastern Plain Zone (UP-9)
62.		Sant Kabir Nagar	OFR Centre	Sub-Humid	Middle Gangetic Plains Region/ Eastern Plains Sub-Region	Eastern Plain Zone (UP-9)
63.		Bichpuri (Dist. Agra)	Sub Centre	Semi-Arid	Upper Gangetic Plains Region/ Western Plains Sub-Region	South-Western Semi-Arid Zone (UP-5)
64.		Varanasi	Sub Centre	Sub-Humid	Middle Gangetic Plains Region/ Eastern Plains	Eastern Plain Zone (UP-9)
65.	Uttarakhand	Pantnagar (Dist. US Nagar)	Main Centre	Sub-Humid	Western Himalayan Region/ Valley Temperate Sub-Region	Bhawar and Tarai Zone (UP-2)
66.		Jechi Kota (Dist. Nainital)	OFR Centre	Sub-Humid	Western Himalayan Region/ High Hill Temperate Sub-Region	Hill Zone (UP-1)
67.	West Bengal	Kalyani (Dist. Nadia)	Main Centre	Humid	Lower Gangetic Plains Region/ Central Alluvial Plains Sub-Region	New Alluvial Zone (WB-3)
68.		Kakdwip (Dist. 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 2010-11, 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	Chrmusterts clayey, medium black soils	I6°38'N	81°44'E
3.	Rudrur	Chrmusterts 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 land clay soils	25°23'N	87°07'E
6.	Raipur	Ochraquals association,deep black soils	2I°I6'N	81°36'E
7.	S.K. Nagar	Haplaquepts, deep medium black soils	24°19'N	72°19'E
8.	Junagadh	Ustochrepts, deep medium black soils	2I°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 Paleustalfs, 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	Typic Chromusterts, very deep (90 cm) black soils	15°0'38"N	76°0'54"E
16.	Karamana	Typic Tropofluvents, very deep (90 cm depth) alluvial soils	11°N	77ºE
17.	Jabalpur	Chromusterts, very deep (90 cm depth), medium to deep black soils	23° 10' N	79° 57' E
18.	Indore	–	22° 04' N	76°Oo'H
19.	Powerkheda	–	23°25'N	73°98'E
20.	Rewa	Ustochrepts-Vertic Ustochrepts association, fine loamy soils	24°41'N	81°15'E
21.	Akola	–	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

S.No.	Centre	Soil Type	Latitude	Longitude
24.	Rahuri	Chromusterts, fine clayey soils	19°47'N	74°18'E
25.	Bhubaneshwar	Haplustalfs, very deep (90 cm depth), medium textured lateritic soils	20°l5'N	85°52'E
26.	Chiplima	Haplaquents, very deep (90 cm depth), clay, ill-drained soils	20°2l'N	80°55'E
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-FIuvents 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 Chraquals very deep (90 cm depth) alluvial clayey soils	25°18'N	83° 03'E
36.	Pantnagar	Hapludolls, very deep (90 em 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

Weather Conditions at different Cropping System Research Centers during 2010-11

The annual conditions of important weather parameters e.g., rainfall, monthly average maximum temperature and minimum temperature prevailed during the reporting period (2010-11) at the various farming systems research centers of the AICRP on IFS are given in Appendix-II, and described below.

Akola: During the reporting period, 1010.0 mm rainfall was received out of this 92% rainfall was contributed by the S-W monsoon. With normal onset of monsoon, a heavy rain i.e. 345.0 mm was recorded during the month of July as was in previous year. The distribution of rainfall was fairly good. The highest (37.5°C) and lowest (31.4 °C) monthly average maximum temperature were recorded during June and September respectively whereas, December was observed as coldest (10.7 °C) month of the year.

Bichpuri: A fairly good rain (742.0 mm) was received than the previous crop year with 87% contribution from the S-W monsoon which was well distributed during the *kharif* season. The highest monthly average maximum temperature

(41.5°C) was recorded during the May whereas; lowest monthly average maximum temperature (21.1°C) was recorded in December. December and January were reported as the coldest months where mercury dropped down to 5.9 °C.

Coimbatore: The total rainfall received during the reporting year was 934.0 mm out of which a meager amount (144.0 mm) was added through the S-W monsoon. A sizable amount of rainfall (126.0mm) was precipitated during February month whereas; distribution of rain was fairly good during N-E monsoon season. The summer season i.e., March, April and May were remained hot and dry where monthly average maximum temperature ranged between 33.4-33.8°C. The winter season was also moderately warm where monthly average minimum temperature remained above 18.7°C.

Durgapur: A well distributed rainfall (780.0 mm) was received during the reporting year at this Centre. Highest monthly average maximum temperature (41.7°C) was recorded during June whereas; lowest average monthly maximum temperature (21.7 °C) and minimum temperature (7.3 °C) was recorded during January.

Faizabad: The total rainfall received during 2010-11 was 716.0 mm which was too lower than the preceding year. S-W monsoon contributed 89% to the annual rainfall of this year. Distribution of the rainfall was also satisfactory during the *kharif* season while rainfall occurred during all the months except December and January. The summer season was hot and dry, the highest monthly average maximum temperature (38.6°C) was recorded during June whereas winter was cool and dry and mercury dropped down to 4.9 °C during January.

Hisar: S-W monsoon contributed 76% rainfall to the total (869 mm) rainfall during the report period at this center which was far better than the preceding year. July and August received very heavy rain during monsoon season; however distribution was fairly good, only October and November were deprived of the rainy days. Summer season was very hot and monthly maximum temperature (40.1°C) was reported highest during the May and winter was severe during which average monthly minimum temperature dropped below 4.2°C.

Jabalpur: The total rainfall recorded during the crop season 2010-11 was 1969.0 mm out of which 92% was contributed by the S-W monsoon with 1532.0 mm rain. July itself poured 1/3rd rain to the annual precipitation at this center. The distribution of the rainfall was all most smooth throughout the crop season with exception of October and November where no any rainy day was observed. Summer season was moderate and maximum temperature reached up to 40.1°C during June whereas, winter was severe and monthly mean minimum temperature was dropped to 8.5°C.

Kalyani: The crop season 2010-11 received 1022.0 mm rainfall with 71.0% contribution from the S-W monsoon. Every months of the report period observed rainy days except November, January and February months. The highest monthly mean maximum temperature (38.7°C) was observed during June whereas; lowest monthly mean minimum temperature (9.9°C) was recorded during January.

Kanpur: The total rainfall of 957.0 mm was recorded during the crop season out of which 862.0 mm (90%) was added by S-W monsoon. The rainfall was evenly distributed during the crop season while December, January and March were deprived of the rains. The highest (40.0°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 6.7°C during January.

Karjat: The rainfall received during reporting period was higher than the preceding year. A very high percentage (93%) rainfall was contributed to the total precipitation (4433.0 mm) by the S-W monsoon and it can be deduced that all the rain was poured only during early half period of the crop year. The highest monthly average maximum

temperature (39.4°C) was recorded in the month of March however, average minimum night temperature (12.4°C) was observed during the month of January.

Karmana: During the report period, the total rainfall (232.0 mm) was received at this center which was drastically lower than the preceding year but the contribution of the S-W monsoon was better (42%) than the previous year. The distribution of rain was fairly good throughout the *kharif* season. The monthly mean minimum and maximum temperature recorded during the report period was 22.2°C and 30.8°C respectively.

Kathalagere: Total rainfall received during the reporting period was 885.0 mm. A very meager amount of rain (144.0 mm) was contributed by the S-W monsoon. Each and every months of the crop year observed rainy days except January. The highest monthly average maximum temperature (33.8°C) was recorded during March whereas; lowest monthly average minimum temperature was reported during January and February months.

Kota: A fairly higher rainfall (665.0 mm) was received during the report year than the preceding year at this center but the S-W monsoon contribution to the total precipitation was remained same (87%). The distribution of rain was also reverse of the previous crop year and it was equally distributed throughout the *kharif* season. Lowest monthly average minimum temperature (5.9°C) was recorded during January.

Ludhiana: The total rainfall recorded during the crop season was lower (752.0 mm) than the preceding year. However there was no distinct change was reported in distribution of the rainfall. Lower rainfall was due to lesser contribution of S-W monsoon (80%) than the preceding year. Summer season was moderately hot and maximum temperature reached up to 38.0°C during the May while winter was severely cold and monthly mean minimum temperature dropped to 4.8 °C during January.

Maruteru: The total rainfall received during this crop year was 1906.0 mm which was higher than double of the preceding year. Higher precipitation was also due to higher contribution of the S-W monsoon (59%) than the previous crop year. Onset of monsoon was normal and rain was evenly distributed throughout the *kharif* season. Highest average monthly maximum temperature (39.2°C) was recorded during the month of May while minimum temperature (10.4 °C) was recorded during the month of January.

Navsari: The rainfall received during reporting period was 2186.0 mm and 97% rain was added to the total precipitation by S-W monsoon. July was observed as wettest month and 743.0 mm rain was precipitated in this month. The highest monthly average maximum temperature (35.7°C) was observed during March whereas; lowest minimum temperature (12.4°C) was recorded during January.

Palampur: Total rainfall recorded during the reporting year was 2738.0 and 75% rainfall was added by the S-W monsoon. August was found as wettest month of the crop season and 1048.0 mm rain was precipitated during this month. Total contribution of the S-W monsoon was 78%. May was reported as the warmest month where maximum temperature recorded was 31.4°C whereas, January was observed as coldest month and monthly mean minimum temperature dropped to 3.5°C.

Powarkheda: The total rainfall received during the crop year was nearly closer to the previous year. The S-W monsoon was contributed up to 95% to the total rainfall (1188.0 mm) and September was reported as the wettest month of this crop season during which 493.0 mm rain water was poured. The distribution of the rainfall during the *kharif* season was good. The highest average monthly maximum temperature (42.5°C) was recorded during May whereas lowest minimum temperature (6.6°C) was recorded during January.

Rahuri: Higher rainfall than the preceding crop year was recorded during reporting year and it was

1014.0 mm out of which 852.0 mm (84%) rain was from the S-W monsoon. The distribution of rain was good throughput the *kharif* season but no rainy days were observed during December to May.

Raipur: The crop season 2010-11 received 898.0 mm rainfall with onset of monsoon in July. Distribution of rainfall was good during the *kharif* season but September was observed as very wet month and 327.0 mm rain was precipitated in this month whereas, 81% rain was added by the S-W monsoon to the annual rainfall. The highest monthly mean maximum temperature (41.9°C) was observed during July whereas; lowest minimum temperature (10.7°C) was recorded during January.

Rajendra Nagar: Nearly double rainfall to the preceding year was reported in the report period i.e., 1012.0 mm out of which 840.0 mm (83%) rain was recorded in S-W monsoon. The distribution of rain was fairly good during the *kharif* season. The maximum temperature recorded was 39.2°C during May whereas; minimum temperature was 10.4°C during January.

Ranchi: Agro-climatic sub-zone of Jharkhand received 1361.0 mm rainfall during the reporting year which is normal average rainfall for this zone and contribution of S-W monsoon was also exactly the same to the normal contribution (80%) to the annual average rainfall of this zone. The distribution of the rain was fairly good during the *kharif* season. The highest monthly average maximum temperature (36.°C) was observed during May whereas; lowest minimum temperature (4.7°C) was recorded during January.

Rudrur: The mean annual rainfall of this region ranges from 900-1200 mm in normal monsoon years. The total rainfall (800.0 mm) recorded during the reporting period was lower than normal rainfall. The distribution of rainfall was good and 86% of total rainfall was precipitated during *kharif* season. The highest average monthly maximum temperature (41.2°C) was recorded during May whereas lowest minimum temperature (11.2°C) was recorded during January.

S.K.Nagar: More than the double rainfall (1210.0 mm) during the reporting period was observed than the preceding year, out of which 1067.0 mm (88%) rain was received from S-W monsoon. Distribution of rain was fairly good but July was reported as wettest month during which 588.0 mm rain water was added to the total precipitation. The highest average monthly maximum temperature (440.1°C) was observed during July whereas; lowest minimum temperature (8.5°C) was recorded during January.

Sabour: During the crop years 2010-11, the total rainfall received was 871.0 mm out of which 629.0 mm (72%) rain was from the S-W monsoon. The distribution of rain was good throughput the *kharif* season. May was observed as hottest (35.5°C) during the year whereas, January was very cool and dry with 6.0 °C monthly minimum temperature.

Sirugappa: The rainfall received during the reporting year was 803.0 mm where S-W monsoon contributed up to 97% to the total precipitation. August was reported as the wettest month of this crop season during which 478.0 mm rain water was poured. The distribution of rain was good throughout the *kharif* season.

Thanjavur: The total rainfall received during this crop year was too low than the preceding crop year and it was 840.0 mm. As usual contribution of the S-W monsoon is meager amount to the total annual rainfall at this center; only 15% rain water was added by the S-W monsoon season to the total precipitation. A good rain (363.0 mm)) was reported during the month of November. The lowest monthly average maximum and minimum temperature recorded during the crop year was 38.1°C and 21.5°C respectively.

Varanasi: A higher rainfall than the preceding year was observed during the reporting year i.e., 809.0 mm and it was due to sizable contribution (86%) of the S-W monsoon to the total precipitation. The highest average monthly maximum temperature (39.50°C) was observed during April whereas; lowest minimum temperature (8.1°C) was recorded during January.

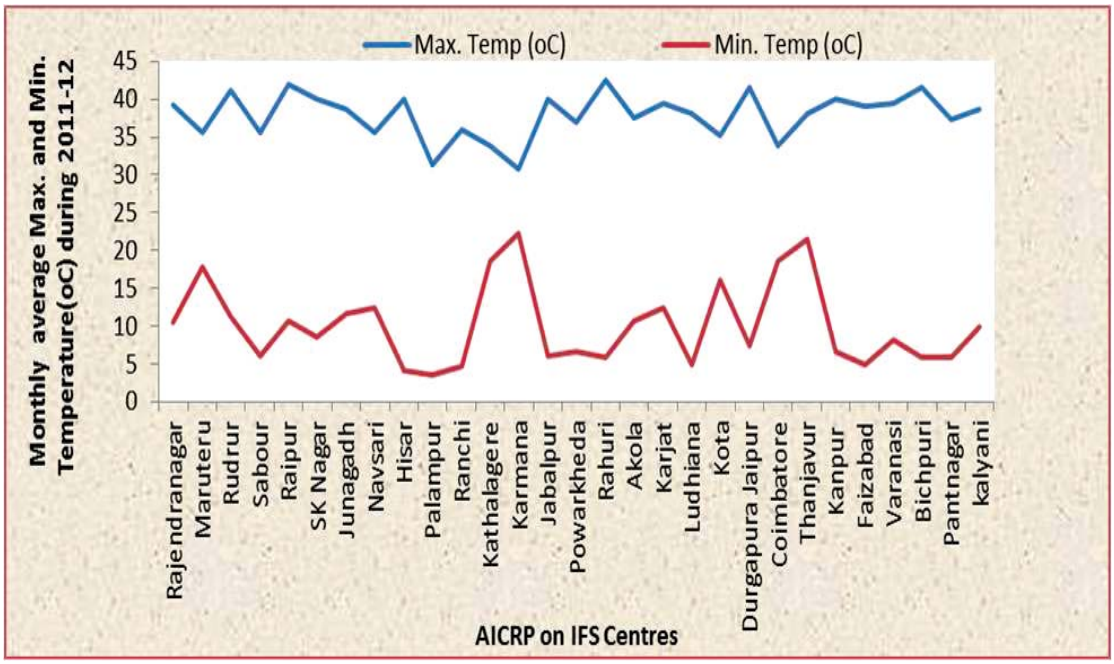


Fig. 1. Annual rainfall (mm) and contribution of the S-W monsoon to the total precipitation during the reporting year (2010-11) at various Cropping Systems Research Centers of the AICRP on IFS

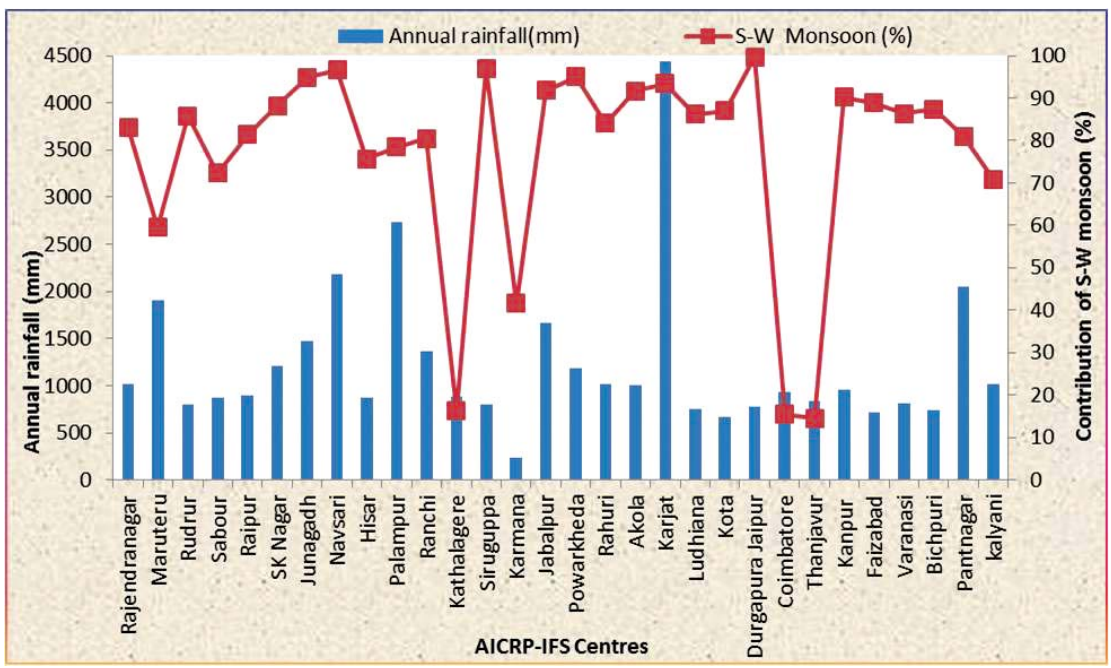


Fig. 2. Monthly average maximum and minimum (°C) temperature during the reporting year (2010-11) at various Cropping Systems Research Centers of the AICRP on IFS

5. STAFF POSITION

Out of 618 total staff sanctioned for different centers, 503 staff were actually in position as on 31st March 2012, suggesting that 18.6 per cent of total posts were vacant (Table 6/1 and Appendix III).

Table-5/1: Staff position under AICRP-IFS (university-wise) as on 31.03.2012

S.No.	Name of the University	Scientific		Technical		Administrative		Supporting	
		Sanctioned	Filled	Sanctioned	Filled	Sanctioned	Filled	Sanctioned	Filled
1.	ANGRAU, Hyderabad	8	8	24	17	5	0	3	1
2.	AAU, Jorhat	5	5	11	10	2	2	2	2
3.	BAU, Sabour	4	4	11	8	2	1	2	0
4.	IGKV, Raipur	5	5	11	6	2	2	2	1
5.	SDAU, S.K. Nagar	5	5	11	11	2	2	2	2
6.	JAU, Junagadh	1	1	3	3	1	1	-	-
7.	NAU, Navsari	1	1	3	3	1	1	-	-
8.	AAU, Anand	1	1	7	6	1	1	1	1
9.	CCSSHAU, Hisar	5	5	11	10	2	2	2	2
10.	CSKHPKVV, Palampur	4	4	11	11	2	2	2	2
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	5	11	3*8 SRF	2	2	2	2
14.	UAS, Dharwad	1	1	7	7	1	1	1	1
15.	UAS, Raichur	3	3	4	4	1	1	1	1
16.	KAU, Thrissur	5	5	11	10	2	2	2	2
17.	JNKVV, Jabalpur	8	8	24	18	5	5	3	1
18.	RVSKV, Gwalior	1	1	3	3	1	1	-	-
19.	MPKV, Rahuri	5	4	11	10	2	1	2	1
20.	MAU, Parbhani	4	4	11	11	2	2	2	1
21.	PDKV, Akola	4	4	11	8	2	1	2	2
22.	DBSKKV, Dapoli	4	4	11	11	2	2	2	2
23.	OUAT, Bhubaneswar	7	7	21	21	4	4	3	3
24.	PAU, Ludhiana	4	4	11	10	2	1	2	2
25.	RAU, Bikaner	4	2	11	8	2	2	2	2
26.	MPUA&T, Udaipur	3	3	10	9	2	2	1	1
27.	TNAU, Coimbatore	7	7	21	21	4	4	3	2
28.	CSAUAT, Kanpur	4	4	11	7 V*3	2	-	2	-
29.	NDUA&T, Faizabad	5	5	18*	12	3	3	3	3
30.	BHU, Varanasi	1	1	3	3	1	1	-	-
31.	RBS, College, Bichpuri	1	1	3	3	1	1	-	-
32.	GBPUAT, Pantnagar	5	5	11	9	2	2	2	2
33.	BCKVV, Kalyani	4	3	11*	10	2	2	2	-
	TOTAL	**132**	**128**	**360**	**305**	**69**	**57**	**57**	**43**

6. BUDGET

During 2010-11 and 2011-12 a total budget of Rs. 1400.00 lakhs and Rs. 3404.65 lakhs, respectively, was released as ICAR share to different centres. Sub-head wise allocation for different centres is given in Table 7/1.

Table-6/1. Funds (Rs. in lakhs) released during financial years 2010-11 and 2011-12 under AICRP on Integrated Farming Systems (ICAR share only)

S. No.	Name of the University/ ICAR Institute	Pay & Allowances	T.A.	Other Contingencies	Contractual services	Vehicle Hiring/ POL	NRC	Total
				Fin. Year 2010-11				
1	ANGRAU, Hyderabad	50.75	1.25	8.50	2.90	1.30	8.28	72.98
2	HPKVV, Palampur	27.65	0.70	5.30	2.90	0.75	7.78	45.08
3	GBPUA&T, Pantnagar	27.65	0.70	5.30	2.90	0.75	7.78	45.08
4	CSAU&T, Kanpur	27.65	0.48	5.30	2.90	0.38	7.78	44.49
5	NDUA&T, Faizabad	28.64	0.60	4.50	2.90	0.76	7.78	45.18
6	BHU, Varanasi	13.00	0.35	4.00	3.86	0.00	8.45	29.66
7	BAU, Ranchi	27.55	0.70	5.30	2.90	0.75	7.78	44.98
8	BAU, Sabour	27.55	0.65	5.30	2.90	0.75	7.78	44.93
9	BCKVV, Kalyani	27.55	0.70	5.30	2.90	0.75	7.78	44.98
10	AAU, Jorhat	28.77	0.95	7.00	2.90	0.18	7.78	47.58
11	PAU, Ludhiana	28.00	0.70	5.30	2.90	0.75	7.78	45.43
12	HAU, Hisar	28.00	0.70	5.30	2.90	0.75	7.78	45.43
13	RAU, Bikaner	28.00	0.70	5.30	2.90	0.38	7.78	45.06
14	SDAU, S.K. Nagar	29.40	0.85	5.30	2.90	0.50	7.78	46.73
15	NAU, Navsari	9.50	0.20	0.80	0.00	0.00	0.00	10.50
16	JAU, Junagadh	9.50	0.20	0.80	0.00	0.00	0.00	10.50
17	AAU, Anand	10.52	0.35	0.80	0.00	0.75	0.48	12.90
18	JNKVV,Jabalpur	41.08	1.30	8.50	2.90	1.50	8.28	63.56
19	RVSKVV, Gwalior	9.50	0.25	0.80	0.00	0.00	0.48	11.03
20	IGKV, Raipur	28.00	0.75	5.30	2.90	0.75	7.78	45.48
21	OUAT, Bhubaneswar	43.94	1.25	7.70	2.90	1.45	8.28	65.52
22	PDKV, Akola	28.00	0.70	5.30	2.90	0.38	7.78	45.06
23	MAU, Parbhani	28.00	0.70	5.30	2.90	0.38	7.78	45.06
24	MPKV, Rahuri	28.00	0.70	5.30	2.90	0.27	7.78	44.95
25	KKV, Dapoli	28.00	0.70	5.30	2.90	0.75	7.78	45.43
26	UAS, Raichur	15.50	0.40	4.40	2.90	0.00	7.78	30.98
27	UAS, Dharwad	9.24	0.35	0.80	0.00	0.38	0.48	11.25
28	UAS, Bangalore	28.05	0.70	5.30	2.90	0.75	7.78	45.48
29	TNAU, Coimbatore	44.50	1.47	7.70	2.90	1.50	8.28	66.35
30	SKUAST, Jammu	28.00	0.85	5.30	2.90	0.75	7.78	45.58
31	KAU, Thrissur	28.71	0.70	5.30	2.19	0.38	7.78	45.06
32	MPUAT, Udaipur	19.52	0.50	1.60	0.00	0.38	0.48	22.48
33	RBS College, Bichpuri	9.50	0.20	0.80	0.00	0.00	0.00	10.50
34	PDFSR, Modipuram	0.00	0.70	3.00	6.00	0.00	5.92	15.62
35	ICAR-RC, Patna	0.00	0.40	3.00	3.86	0.00	7.52	14.78
36	ICAR-RC, Umiam	0.00	0.40	3.00	3.86	0.00	7.52	14.78
37	ICAR-RC, Goa	0.00	0.40	3.00	3.86	0.00	7.52	14.78
38	CARI, Port Blair	0.00	0.40	3.00	3.86	0.00	7.52	14.78
	Total	**847.22**	**24.60**	**169.10**	**97.09**	**19.12**	**242.87**	**1400.00**

S. No.	Name of the University/ ICAR Institute	*Pay & Allow.	T.A.	Other Contingencies	Contr. services	Vehicle Hiring/ POL	NRC	TSP	Total
				Fin. Year 2011-12					
1	ANGRAU, Hyderabad	155.00	2.00	4.96	1.25	0.68	2.00	30.00	195.89
2	HPKVV, Palampur	92.06	0.75	4.74	2.25	1.00	4.20	12.00	117.00
3	GBPUA&T, Pantnagar	84.00	1.25	4.74	1.75	0.50	4.20	20.00	116.44
4	CSAU&T, Kanpur	68.57	1.05	5.75	3.00	1.00	4.20	2.00	85.57
5	NDUA&T, Faizabad	123.76	0.75	5.75	3.00	1.00	4.20	1.00	139.46
6	BHU, Varanasi	30.00	0.50	4.25	3.16	0.20	4.40	1.00	43.51
7	BAU, Ranchi	59.80	0.75	3.44	1.25	0.35	2.00	30.00	97.59
8	BAU, Sabour	90.24	0.75	5.50	3.00	1.00	1.00	4.00	105.49
9	BCKVV, Kalyani	55.30	0.75	3.94	2.00	0.50	2.00	13.50	77.99
10	AAU, Jorhat	128.93	1.00	50.50	3.00	1.00	4.20	1.50	190.13
11	PAU, Ludhiana	125.00	0.75	5.25	3.00	1.00	1.90	0.00	136.90
12	HAU, Hisar	100.00	1.00	5.25	3.00	1.00	4.20	2.00	116.45
13	RAU, Bikaner	93.00	1.05	5.25	2.50	0.65	4.20	14.40	121.05
14	SDAU, S.K. Nagar	102.13	1.35	5.25	2.50	0.80	3.30	13.90	129.23
15	NAU, Navsari	25.29	0.15	1.50	0.00	0.00	1.50	3.40	31.84
16	JAU, Junagadh	33.18	0.15	1.50	0.00	0.00	1.50	3.40	39.73
17	AAU, Anand	26.52	0.45	1.27	0.00	0.32	0.75	3.90	33.21
18	JNKVV,Jabalpur	115.00	2.00	9.46	2.50	1.03	4.20	14.40	148.59
19	RVSKVV, Gwalior	29.00	0.45	1.50	0.00	0.00	0.75	1.00	32.70
20	IGKV, Raipur	49.78	0.75	5.25	1.75	0.50	4.20	41.50	103.73
21	OUAT, Bhubaneswar	130.00	1.85	6.06	1.25	0.68	1.50	34.00	175.34
22	PDKV, Akola	53.71	0.75	5.25	1.75	0.55	4.20	13.00	79.21
23	MAU, Parbhani	90.00	0.75	5.25	2.50	0.55	4.20	12.00	115.25
24	MPKV, Rahuri	83.96	1.45	5.25	2.50	0.55	4.20	11.00	108.91
25	KKV, Dapoli	82.99	0.75	5.25	1.75	0.55	4.20	32.00	127.49
26	UAS, Raichur	29.57	0.30	3.56	2.50	0.26	4.20	6.40	46.79
27	UAS, Dharwad	26.34	0.45	2.25	0.00	0.44	0.50	6.40	36.38
28	UAS, Bangalore	106.63	0.75	5.25	2.50	0.60	4.20	10.00	129.93
29	TNAU, Coimbatore	127.58	1.70	9.00	3.00	1.78	4.80	4.00	151.86
30	SKUAST, Jammu	78.24	0.95	5.25	2.50	0.75	4.70	11.00	103.39
31	KAU, Thrissur	85.00	1.30	5.24	3.00	1.10	2.00	0.50	98.14
32	MPUAT, Udaipur	65.69	1.00	3.00	0.00	0.64	1.00	14.00	85.33
33	RBS College, Bichpuri	16.75	0.15	2.00	0.00	0.00	1.50	0.40	20.80
34	PDFSR, Modipuram	0.00	0.30	3.06	5.60	0.15	4.40	0.00	13.51
35	ICAR-RC, Patna	0.00	0.30	2.25	4.00	0.10	1.22	0.00	7.87
36	ICAR-RC, Umiam	0.00	0.30	2.25	4.00	0.10	1.22	2.00	9.87
37	ICAR-RC, Goa	0.00	0.30	2.93	4.00	0.15	4.40	0.40	12.18
38	CARI, Port Blair	0.00	0.30	2.93	2.07	0.20	4.40	10.00	19.90
	Total	**2563.02**	**31.30**	**211.08**	**81.83**	**21.68**	**115.74**	**380.00**	**3404.65**

*Including 6th CPC arrears.

Glimpses of IFS model development at different AICRP-IFS centres

Overview of IFS site at Pantnagar

Goat component at Rajendranagar

Horticulture block at Goa

Ensuring green fodder to cattle throughout the year under on-farm IFS research in Warrangal district

Poultry unit at Varanasi

Livestock component at Rahuri

7. RESEARCH RESULTS

7.1 CROPPING SYSTEMS MANAGEMENT

7.1.1 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, However, treatments are modified every 3-4 years.

***Treatments*:** There are no common treatments for all the centres but they vary from location to location. The number of cropping systems – tested at each location -– also ranges from 6 to 15. The details of treatments are given in table-7.1/1 along with experimental results.

***Locations*:**

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), Indore (M.P.), Akola (Maharashtra), Rudrur (A.P.), Rahuri (Maharashtra), Parbhani (Maharashtra) and Coimbatore (T.N.).
Sub-humid	Pantnagar (Uttarakhand),Varanasi (U.P.), Masodha (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.	Bhubaneshwar (Odisha), Maruteru (A.P.), Thanjavur (T.N.), Karmana (Kerala), Karjat (Maharashtra) and Navsari (Gujarat).

***Results*:**

The details of inputs used, crop sequences evaluated, crop yields, annual gross returns and annual energy output have been presented in table 7.1/1. A brief description of centre-wise results is given below.

Arid Ecosystem

At **Hisar,** among the seven cropping systems evaluated, cotton-wheat system was identified to be distinctly better than other systems with gross returns of Rs. 1,14,430/ha/year. The next best sequence in the order of merit was cotton-wheat, which gave gross returns of Rs. 1,14,430/ha/year. But in terms of energy production, existing pearl millet-wheat system was better which gave highest energy production of 30.12×10^6 K cal./ha/year. The other sequences were at par or inferior than existing pearlmillet-wheat system.

At **S.K. Nagar,** among 10 cropping systems evaluated, the cropping system involving castor-green gram was identified to be more remunerative with highest gross returns of Rs. 1,13,340/ha/year. It was closely followed by castor+greengram-pearlmillet sequence with gross returns of Rs. 1,11,319/ha/year. In terms of energy production, castor+greengram-pearlmillet sequence was better which gave highest energy output of 29.88×10^6 K cal./ha/year. The other sequences were at par or inferior than existing pearlmillet-mustard system.

At **Siruguppa**, 10 cropping systems were evaluated. Among those, rice-ridge gourd was identified to be more profitable and distinctly better than other systems with significantly higher gross returns of Rs. 1,10,561/ha/year, as compared to other systems tried, including existing rice-rice system. However, in terms of energy production, rice-fenugreek-green gram sequence gave highest energy production of 26.77 x 10^6 K cal./ha/year. But, in terms of energy production, soybean-kalonji sequence was the best which produced highest energy of 74.75x 10^6 K cal./ha/year.

Semi-Arid Ecosystem

At **Ludhiana,** among the 12 cropping sequences evaluated, maize+turmeric-wheat+linseed sequence was identified to be most suited with highest gross returns of Rs. 5,36,046/ ha/year and energy production of 108.67x10^6 K cal./ha/year. The next best sequence in the order of merit was maize+turmeric-barley+linseed, which gave gross returns of Rs. 5,05,961/ha/year. These two cropping systems were distinctly better than other systems, including rice-wheat or maize-wheat systems.

At **Kanpur,** among the ten cropping systems evaluated, maize-garlic-green gram system was identified to be distinctly better than other systems, with significantly highest gross returns of Rs. 2,71,482/ha/year and energy production of 24.97x 10^6 K cal./ha/year However, in terms of energy production, rice-wheat-green gram sequence gave highest energy production of 46.70 x 10^6 K cal./ha/ year. Some other sequences, like . maize+ black gram-potato-onion, rice-wheat-green gram and maize+ green gram-potato-wheat were also better than existing rice-wheat system, clearly showing the scope for improving the system-profitability with gross returns ranging from Rs.2,08,346 to Rs. 1,37,785/ha/year. The other sequences were at par or inferior than existing rice-wheat system.

At **Bichpuri (Agra),** among the 10 cropping systems studied, the sequence of sesbania-potato-lady's finger was found to be highly remunerative with highest gross returns of Rs. 1,74,955/ha/year and energy production of 32.75 x 10^6 K cal. /ha/year. It was followed by pearl millet-potato-cluster bean with gross returns of Rs. 1,44,345/ha/year and highest energy output of 34.22 x10^6 K cal./ha/year. The other sequences *viz.* pearl millet-wheat-green gram, sesame-barley-green gram, pigeon-pea-wheat were also better in the order of merit than existing pearl millet-wheat system.

At **Junagadh,** among 10 cropping sequences evaluated, groundnut-onion-sorghum (fodder) sequence was found to be distinctly better than others with highest gross returns of Rs. 2,20,166/ ha/year and energy production of 21.52 x 10^6 K cal. /ha/year. The next best sequences in the order of merit were onion-wheat- greengram and groundnut-potato-sesamum which gave gross returns of Rs. 2,09,928 and 1,68,344/ha/year and energy production of 26.66 and 38.58 x 10^6 K cal./ ha/year, respectively. The other sequences were at par or inferior than existing groundnut-wheat system.

At **Durgapura (Jaipur),** among the nine cropping systems evaluated, the system of pearlmillet-fenugreek (leaves) was identified to be distinctly better during the year with gross returns of Rs. 3,45,552/ha/year and energy production of 8.89 x 10^6 K cal. /ha/year. However, in terms of energy production, existing pearl millet-wheat system gave highest energy production of 26.77 x 106 K cal./ha/year. The next best sequences in the order of merit were ground nut-wheat and green gram-mustard which gave gross returns of Rs. 85,393/ha/year and energy production of 19.33x 10^6 K cal./ha/year. The other sequences were at par or inferior than existing pearl millet-wheat system.

At **Rajendranagar,** 10 cropping systems were evaluated and compared with existing rice-rice system. The performance of maize-sunflower system was distinctly better than other systems with highest gross returns of Rs. 1,07,582/ha/year and energy production of 37.15 x 10^6 K cal./ha/ year. Other systems were inferior or at par with exiting maize-groundnut system.

At **Kota,** among the eight cropping systems evaluated, maize-garlic system gave the highest gross returns of Rs. 2,07,974/ha/year with energy production of 63.12 x 10^6 K cal./ha/year. It was followed by soybean-garlic, maize-gram-cowpea and cotton-greengram systems in the order of merit with gross returns ranging from Rs. 1,54,448 to 86,704/ha/year. The remaining systems were at par or inferior to existing system of soybean–coriander

At **Indore,** among the 12 cropping systems evaluated, the sequence of soybean-onion-lady's finger was found to be distinctly better than other systems tried and gave highest gross returns (Rs. 2,19,301/ha/year) and energy production of 15.96 x 10^6 K cal./ha/year. The remaining systems were at par or slightly better than existing system.

At **Akola,** 10 cropping systems were evaluated. Among these, soybean-coriander+wheat was identified to be more profitable than other systems, with highest gross returns of Rs. 1,34,451/ha/year and energy production of 49.54 x10^6 K cal./ha/year. Other sequences, *viz*.; soybean-isabgul-groundnut, soybean-mustard-groundnut and soybean+pigeonpea-wheat were also better than existing sorghum-wheat system with gross returns ranging from Rs.1,21,641 to Rs. 93,117 /ha/year. The other sequences were at par or inferior to existing sorghum-wheat system.

At **Rudrur,** among the 12 cropping systems evaluated, the existing rice-rice system was better in terms of gross returns (Rs. 1,16,227/ha/year) as well as energy production (39.06x10^6 K cal./ha/year). Other systems were comparatively inferior. However, under limited water availability conditions, other systems like rice-maize, rice-sunflower, sunflower-maize and soybean-maize also appeared promising with respective gross returns of Rs. 1,08,584 and Rs.80,356/ha/year, respectively.

At **Rahuri,** among 15 cropping sequences evaluated, soybean-onion was found to be the best with highest gross returns of Rs. 2,50,196/ha/year and energy production of 24.91 x 10^6 K cal./ha/year as compared to other cropping systems. Some other systems like; pearl millet+soybean-wheat, pearl millet-onion and soybean-cabbage were also statistically better than the existing pearl millet-wheat system in the order of merit with gross returns of Rs. 2,20,335 to Rs.1,47,623/ha/year. But, in terms of energy production, soybean-potato sequence was the best which produced highest energy of 31.40 x 10^6 K cal./ha/year. The other sequences were at par or inferior than existing system.

At **Parbhani,** among the 12 sequences evaluated, turmeric-fallow system proved to be significantly better than other systems tried, by giving highest gross returns of Rs. 3,08,831/ha/year and energy production of 55.20 x 10^6 K cal./ha/year. Other cropping systems, namely; soybean-wheat-cowpea, soybean-onion and Bt. cotton-wheat-coriander were also better than existing sorghum-wheat system with gross returns ranging from Rs. 2,11,179 to 1,61,916 /ha/year. The other sequences were at par or inferior than existing system.

At **Coimbatore,** among nine cropping sequences evaluated, cotton+greengram-maize-sunflower sequence was more profitable, as compared to others, with gross returns of Rs.2,13,147 /ha/year and energy production 51.30 x 10^6 K cal./ha/year. The next best sequences in the order of merit were lablab bean-sesame-brinjal, sugar beet-maize-groundnut and sugarbeet-greengram-maize+cowpea(veg.) which gave gross returns ranging from Rs. 2,12,222 to 2,08,653/ha/year. The other sequences were at par or inferior than existing cotton- sorghum -finger millet system.

Sub-Humid Ecosystem

At **Varanasi,** 10 cropping sequences were evaluated. rice-veg. pea-lady's finger gave the highest gross returns (Rs. 2,86,645/ha/year) and energy production (26.81 x 10^6 K cal./ha/year). However, rice-potato-green gram system gave highest energy production of 42.97 x 10^6 K cal./ha/year. Other systems, namely, rice-toria-lady's

finger, rice-wheat-green gram and rice-potato-green gram were also significantly better which gave gross returns ranging from Rs. 2,04,750 to 1,69,098/ha/year. The remaining systems were at par or inferior to existing rice-wheat system.

At **Masodha (Faizabad),** eight cropping systems were evaluated and the performance of hybrid rice-potato-green gram was found to be distinctly better than others with highest returns of Rs. 1,69,062/ha/year and energy production of 48.62 x 10^6 K cal./ha/year. The other sequences, like; rice-lentil-green fodder, rice-berseem (fodder+seed), rice-wheat-dhaincha and hybrid rice-wheat were also found better in that order of merit with returns ranging from Rs. 1,49,179 to 1,23,665/ha/year while remaining systems were inferior to existing rice-wheat system.

At **Sabour,** 12 crop sequences were evaluated. Among them, sequence of rice-cabbage+radish-lady's finger+green gram was observed to be distinctly better than other systems by producing gross returns of Rs. 3,86,024/ha/year and energy output of 33.44 x 10^6 K cal./ha/year). However, rice-maize+potato-sorghum+cowpea (fodder) system gave highest energy production (62.34 x 10^6 K cal./ha/year). The other sequences, *viz*; rice-garlic+coriander-maize+cowpea(fodder), rice-potato+radish-onion+maize and rice-maize+potato-sorghum+cowpea(fodder) were also equally good or better than existing rice-wheat system, in that order of merit and produced gross returns ranging from Rs. 2,70,853 to 1,82,398/ha/year, while remaining systems were inferior to existing rice-wheat system.

At **Raipur,** eight crop sequences were compared. Among them, the sequence of rice-onion+coriander(seed)-cowpea(seed) was found distinctly better than others, with gross returns of Rs. 3,68,524/ha/year and energy production of 68.13 x 10^6 K cal./ha/year. The other systems, *viz*.; rice-sunflower+lentil-cowpea, rice-wheat+fenugreek(seed)-cowpea(veg) and rice-wheat+lentil-cowpea(veg) were also found to be remunerative with respective gross returns of Rs.1,94,785, Rs. 1,94,271 and Rs. 1,78,913/ha/year, while other systems were at par or inferior to existing rice-wheat system.

At **Rewa,** 10 crop sequences were evaluated. Among these, rice-garlic system performed distinctly better than others by giving highest gross returns of Rs. 3,15,922/ha/year and energy yield of 42.97 x 10^6 K cal/ha/year. However, rice- potato system gave highest energy production of 586.32 x 10^6 K cal./ha/year. The other systems were at par or inferior than existing rice-wheat system.

At **Jabalpur,** 12 crop sequences were evaluated. The sequence involving rice-gobhi sarson-groundnut+maize (green cobs) was identified significantly better than others with highest gross returns of Rs 1,77,566/ha/year and energy production of 63.01 x 10^6 K cal./ha/year. Other cropping systems, namely; rice-marigold (flowers)-maize (green cobs), rice- onion-green gram, rice-gobhi sarson+lady's finger and rice-potato-groundnut were also found to be significantly better than existing rice-wheat system, with gross returns ranging from Rs.1,54,028 to 1,34,121/ha/year, while other systems were at par or inferior to existing rice-wheat system.

At **Powarkheda,** 10 sequences were evaluated and the system of soybean-potato-lady's finger was found to be distinctly better than others with gross returns of Rs. 2,35,825/ha/year and energy production of 39.85x10^6 K cal/ha/year. Other systems, namely; soybean-sugarcane, soybean-potato-sesame and soybean-wheat-green gram were also found better than existing soybean-wheat system with gross returns ranging from Rs. 1,37,361 to Rs. 1,21,264/ha/year. The other systems were at par or inferior than existing soybean-wheat system.

At **Chiplima,** 10 cropping systems were evaluated. The performance of rice-groundnut - bottlegourd was found to be distinctly better than others with annual gross returns of Rs. 1,57,302 / ha and energy production of 29.84 x 10^6 K cal./ha/year. Other systems, namely; rice-groundnut-cowpea, rice-groundnut-green gram and rice-radish-green gram were also found better than

existing system with gross returns ranging from Rs. 1,46,594 and Rs.1,34,616 /ha/year. However, rice-maize(cob)-cowpea system gave highest energy production of 78.17 x 10^6 K cal./ha/year. The other systems were at par or inferior than existing rice-groundnut system.

At **Kathalgere,** among the twelve cropping sequences evaluated, the system of rice-lady's finger performed distinctly better than others with gross returns of Rs. 1,39,689 /ha/year and energy yield of 21.05 x 10^6 K cal/ha/year. The existing rice-rice system gave highest energy production of 39.00 x 10^6 K cal./ha/year. The rice-tomato and rice-groundnut were equally good and significantly better than other systems with respective gross returns of Rs. 1,25,953/ha/year and Rs. 1,21,804/ ha/year. The other systems were at par or inferior than existing rice-rice system.

Humid Ecosystem

At **Jammu,** 10 crop sequences were evaluated. Among these, rice-broccoli-black gram system performed distinctly better than others by giving highest gross returns of Rs. 3,25,827/ha/ year) and energy yield of 25.22 x 10^6 K cal/ha/year. However, in terms of energy production, rice-potato-maize(cobs)+green gram sequence gave highest energy production of 81.83 x 10^6 K cal./ha/ year. Other systems, *viz*; rice-marigold (flowers)-french bean, rice-spinach-lady's finger, rice-cabbage-onion and rice-potato-maize(cobs)+ green gram, were equally good with gross returns ranging from Rs. 3,21,687 to 2,21,799/ha/year, and energy production ranging from 18.23 to 81.83 x 10^6 K cal./ha/year, as compared to existing rice-wheat system.

At **Palampur,** nine cropping systems were evaluated. Among them systems of maize+ soybean-garlic was found to be significantly better than others with gross returns of Rs. 2,42,610/ha/ year and energy yields of 23.49 x 10^6 K cal./ha/ year. The existing rice-rice system gave highest energy production of 24.49 x 10^6 K cal./ha/year. The performance of the sequences of maize-radish-onion, maize(cob)-pea-summer squash, maize(cob)-cauliflower-french bean and maize (cob)-cauliflower-buckwheat were also better with gross returns ranging from Rs. 1,68,430 to 1,38,374/ha/year, while other sequences were inferior or at par with existing rice-wheat system.

At **Jorhat,** eight rice-based cropping systems were evaluated. Among them rice-radish+french bean-black gram system was significantly better than others with highest gross returns of Rs.1,71,616/ha/year and energy yields of 19.26 x 10^6 K cal./ha/year. The energy production was also significantly higher in the existing rice-rice system (21.80x10^6 K cal./ha/year). However, rice-knolkhol+french bean-black gram and rice-cabbage-green gram system were also good in terms of economics with respective gross returns of Rs.1,26,527 and Rs.1,21,854/ha/year and remaining systems were at par among or inferior to existing rice-rice system.

At **Kalyani,** 10 cropping systems were evaluated. Among them, safflower dolichos bean-ginger+turmeric sequence was significantly better than others with gross returns of Rs. 5,60,130 / ha/year and energy yields of 57.03 x 10^6 K cal./ha/ year. It was followed by rice-brinjal+coriander(leaf)-bitter gourd and rice-radish+amaranthus-lady's finger sequences with gross returns of Rs. 1,99,971 and 1,93,132/ha/year and energy yields of 15.65 and 10.35 x 10^6 K cal./ha/year and remaining systems were at par or inferior to existing rice-rice system.

Coastal Ecosystem

At **Bhubaneshwar,** 10 rice-based cropping systems were evaluated. Among them, rice-french bean-bitter guord was found to be distinctly better than others with highest gross returns of Rs. 2,18,835/ha/year and energy production of 14.28 x 10^6 K cal./ha/year. However, in terms of energy production, rice-maize(cob)-lady's finger sequence gave highest energy production of 74.47 x 10^6 K cal./ha/year. It was followed by rice-tomato-vegetable cowpea, rice-french bean-sesame and rice-maize(cob)-lady's finger with gross returns ranging from Rs. 2,08,409 to Rs. 1,38,538/ha/year

and energy production from 19.59 to 74.47 x 10^6 K cal./ha/year. Other systems were at par with existing rice-groundnut or inferior to this system.

At **Maruteru,** 6 crop sequences were evaluated. On comparison, the rice-rice- green fodder system was found to be better with highest net return of Rs 1,50,599/ha/year and energy production of 47.83 X 10^6 K cal./ha/year. Other systems were at par or inferior to existing rice-rice system.

At **Karamana,** eight crop sequences were evaluated. On comparison, the system of rice-coleus-dhaincha was found to be better than others with highest gross returns of Rs. 2,15,530/ha/year and energy production of 31.59 x 10^6 K cal./ha/year. However, in terms of energy production, rice-rice-sweet potato sequence gave highest energy production of 44.32 x 10^6 K cal./ha/year. Some other systems, like; rice-rice-amaranthus, rice-casava-dhaincha, rice-rice-sweet potato and rice-rice-pumpkin were found equally good and significantly better than existing rice-rice system with gross returns ranging from Rs.2,04,337 to 1,40,027/ha/year. Other systems were either at par or inferior to existing rice-rice system.

At **Karjat,** 11 rice-based cropping systems were compared. The sequence involving rice-brinjal was found to be more remunerative with highest gross returns of Rs. 1,92,495/ha/year. However, in terms of energy production, rice-groundnut was the highest producer (31.30x 10^6 K cal./ha/year). Other systems were either at par or inferior to existing rice-rice system.

At **Navsari,** ten alternative crop sequences were compared with existing rice-wheat system. Among them, the sequence of rice- maize (sweet corn)-black gram was found to be significantly and distinctly better than others with highest gross returns of Rs. 1,02,022/ha/year and energy production of 21.26 x 10^6 K cal./ha/year. However, in terms of energy production, rice-sorghum-soybean sequence gave highest energy production of 23.51 x 10^6 K cal./ha/year The other systems, which performed better than existing rice-wheat system were; rice-green gram-groundnut, rice-fenugreek-green gram, rice-chick pea+mustard-maize (sweet corn), rice-green gram-sorghum+ black gram with gross returns ranging from Rs. 96,926 to 81,726/ha./year. Other systems were at par or inferior to existing rice-wheat system.

Cotton+sunhemp-castor cropping system at S.K. Nagar

Sucessful crop of rice in rice-vegetable pea-summer green gram at Pantnagar

Table-7.1/1: Crop productivity, energy yield and gross returns under different crop sequences (2010-11).

Cropping system (variety; duration in days)/ Fertilizer ($N:P_2O_5:K_2O$, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
A. ARID ECOSYSTEM							
HISAR (Haryana)							
Pearl millet (HHB-197; 78) 125-62.5 -0	Wheat (PBW-343;140) 150-60-0	-	4139	7288	-	88,534	30.12
Cotton (H-1226; 168) 175-60-0	Wheat (PBW-343; 140) 150-60	-	2912	7123	-	1,14,430	25.73
Pearl millet (HHB-197; 72) 125-62	Barley (BG-75;127) 60-30	Green gram (Asha;80) 20-40	4303	4635	528	68,066	24.65
Clusterbean (Hg-365; 84) 20-40	Broccoli (Green head ;49) 100-50	Onion (Hisar-2;104) 125-50-25	1624	942	21300	11,743	0.30
Green gram (Asha; 74) 20-40	Mustard (RH-30;113) 80-30 + Kasni NR		1157	2357 + 276	-	63,851	12.53
Pearl millet (HHB-197; 78) 125-62.5	Wheat (C 306;129) 60-30	Cowpea(veg) (Pusa komal;72) 25-40	4261	3752	1152	67,133	21.69
Pearl millet (HHB-197; 78) 125-62 + Green gram (Asha;74) 20-40	Wheat (PBW-343;140) 150-60 + Mustard (RH-30;113) 150-60		2909 + 224	6448 + 153	-	80,809	25.79
S.E.±			-			2,563	0.86
CD at 5%						5,385	1.81
S K NAGAR (Gujarat)							
Pearl millet (GHB-558; 95) 80-40-0	Mustard (GM-3; 115) 50-50-0		1261	1441	-	37,758	12.35
Green gram (GM-4;74) 20-40-0	Mustard (GM-3;115) 50-50-0	Pearl millet (GHB-558;82) 80-40-0	1005	1566	2965	86,923	22.53

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Castor (GCH-7;222) 120-40-0	Castor (contd.)	Pearl millet (GHB-558;81) 120-60-0	-	3778	3355	91,858	28.73
Castor (GCH-7;222) 120-40-0	Castor (contd.) (GCH-7;222) 120-25-0	Green Gram (GM-4;76) 20-40-0	-	4124	1429	1,13,340	22.92
Green gram (GM-4;73) 20-40-0 + Castor (GCH-7;207) 120-50-0	Castor (contd.) (GCH-7;208) 120-40-0	Pearl millet (GHB-558;81) 120-60-0	838 + -	3237	3543	1,11,319	29.88
Green gram (GM-4;73) 20-40-0	Castor (GCH-7;211) 120-50-0	Castor (contd.) (GCH-7;211) 120-50-0	1146	-	3110	87,643	17.51
Groundnut (GG-2;112) 25-50-0	Amaranths (GA-2 ;105) 60-40-0	Cowpea (GHc-1 ;79) 20-40-0	1297	1418	1602	86,253	12.64
Cotton (RCH-2;228) 160-00-00	Cotton (contd.) (RCH-2;228) 160-00-00	Pearl millet (GHB-558;81) 120-60-0	-	1307	3632	64,637	17.45
Cotton (RCH-2;228) 160-00-00	Cotton (contd.) (RCH-2;228) 160-00-00	Groundnut (GG-2;105) 25-50-00	-	2663	1541	1,01,776	17.55
Cotton (RCH-2;228) 160-00-00 + Green gram (GM-4;73)	Cotton (contd.) (RCH-2;228) 20-40-00	Pearl millet (GHB-558;81) 120-60-0	- + 597	1998	3757	1,01,955	22.19
S.E.±						4,243	0.90
CD at 5%						8,915	1.89
		SIRUGUPPA (Karnataka)					
Rice (BPT-5204 ;166) 150-75-75	-	Rice (NR ;NR) 150-75-75	4081		3256	75,881	25.39
Rice (SIRI-1253 ;166) 150-75-75	-	Ridge gourd (Jaipur long ;NR) 50-50-00	5117		5785	1,10,561	18.69

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Rice (SIRI-1253 ;166) 150-75-75	-	Mustard (Varuna ; NR) 100-60-40	4895	-	215	54,396	18.10
Rice (SIRI-1253 ;166) 150-75-75	-	Indian beans (Local; 102) 60-20-20	4808	-	1156	66,857	16.94
Rice (SIRI-1253 ;166) 150-75-75	-	Siya zeera (Local; 114) 50-20-20	4893	-	315	59,847	18.05
Rice (SIRI-1253 ;166) 150-75-75	-	Ashwagandha (Jawahar; 114) 75-30-30	4839	-	375	79,845	16.91
Rice (Rasi ;106) 150-75-75	Spinach (Local ;99) 25-0-0	Black gram (T-9; NR) 75-30-30	3250	4150	NR	64,603	13.28
Rice (Rasi ;106) 150-75-75	Fenugreek (NR ;NR) 100-00-00	Green gram (NR; NR) NR	3250	4655	NR	75,373	26.75
Rice (Rasi ;106) 150-75-75	-	Rice (IET-16933 ;151) 150-75-75	3296	-	2575	60,471	20.31
Rice (Rasi ;106) 150-75-75	-	Rice (Amrut ;151) 150-75-75	2857	-	2350	53,642	18.02
S.E.±						2,285	0.72
CD at 5%						4,800	1.50
B. SEMI-ARID ECOSYSTEM							
LUDHIANA (PUNJAB)							
Rice (PR-116; 110) 275-188-50	Wheat (DBW-17; 146) 275-388-50	-	8417	7275	-	1,26,129	40.72
B. Rice (Super; 115) 90-188-50	Gobhi sarson (PAC-401; 137) 225-188-25	Green gram (NR; NR) NR	5637	2598	1578	1,50,441	29.12
B. Rice (Super; 115) 90-188-50	Radish (P.Chetki; 78) 138-188-0	Maize (PMH-1; 112) NR	5529	22250	8568	1,80,372	39.16
Maize (PHM-1; 112) 275-375-50	Potato (KCM; 105) 469-156-156	Maize (PMH-1; 112) NR	6858	28917	8632	1,73,803	60.77

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Maize (PHM-1; 112) 0-155-43 + Turmeric (NR; 189) 275-375-50	Barely (EC-4216; 120) 275-375-50 + Linseed (NR; NR) 00-155-43	-	6443 + 28250	5103 + 518	-	5,05,961	105.39
Maize (PHM-1; 112) 275-375-50 + Turmeric (NR; 0) 275-375-50	Wheat (PBW-3509; 146) 138-250-0 + Linseed (NR; 0) 138-250-0	-	6225 + 29250	5229 + 648	-	5,36,046	108.67
Maize (PHM-1; 112) 275-375-50 + Radish (NA;0) 275-375-50	Wheat (PBW-3509; 146) 275-388-50 + Linseed (NA; 0) 275-388-50	Green gram (NR; 0) NR	6648 + 12775	5043 + 681	1538	1,59,664	38.32
Groundnut (SG-99; 131) 33-125-43 + Pigeonpea (NR; 0) 33-125-43	Wheat (PBW-3509; 146) 275-388-50 + Mustard (EC-4216; 106) 275-388-50	-	3104 + 808	6278 + 312	-	1,29,820	32.79
Cotton (RCH-134; 200) 325-188-50 + Sesbenia	Radish (P.Chetki; 78) 138-188-0 + Gobhi sarson	-	1892 + -	2142 + 17238	-	2,33,406	74.92
Cotton (Bt-134; 200) 325-188-50 + Sesbania	Wheat (PBW-3509; 146) 275-388-50 + Linseed		2101 + -	4920 + 547	-	91,092	20.17
Maize (Cob) (PHM-1;112) 275-375-50 + Cowpea(F) (NR;0) 275-375-50	Mustard (4216;106) NR + Chickpea (NR;0) NR	Green gram (NR; 0) NR	29523 + 5408	2233 + 463	1500	1,57,655	41.29

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Sorghum (NR; 99) 220-125-50 + Cowpea (F) (NR; 0) 220-125-50	Wheat (PBW-3509; 146) 275-388-50 + Mustard (EC-4216; 0) 275-388-50	Cowpea(veg) (NR; 0) NR	21190	6403 + 311	8687	1,14,586	21.00
S.E. ±					3607	964	
CD at 5%					7344	3,067	
		KANPUR (U.P.)					
Rice (Pantdhan-12;74) (NR)	Wheat (PBW-343;152) (NR)	-	4833	4357	-	1,19,940	-
Hy. Rice (PHB-71;74) (NR)	Wheat (PBW-343;152) (NR)	-	7856	4535	-	1,55,470	-
Rice (Sugandha;82) (NR)	Wheat (PBW-343;152) (NR)	Green gram (K-851; 72) (NR)	8095	4667	761	1,84,300	-
Maize (Azad Uttam;82) NR	Wheat (PBW-343;152) (NR)	-	2999	4762	-	99,350	-
Maize (Azad Uttam;82) NR	Mustard (Kanti;131) (NR)	Onion (Nasik Red ;114) (NR)	3071	1750	12285	1,71,870	-
Maize (Azad Uttam;82) NR	Mustard (Kanti;131) (NR)	Green gram (K-851; 72) (NR)	2904	2012	868	1,04,170	-
Maize (Azad Uttam;82) NR + Green gram (K-851;84) NR	Potato (Type-3797;90) (NR) + Wheat (PBW-343;137) (NR)		2952 + 369	20237 + 2975	-	2,36,680	-
Maize (Azad Uttam;82) (NR) + Black gram (Ajad-1; 84) NR	Potato (Type-3797;90) (NR)	Onion (Nasik Red ;114) (NR)	2976 + 405	22690	12737	3,49,570	-

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Maize (Azad Uttam;82) (NR)	Garlic (Local-3797;170) (NR)	Green gram (Samrat; 84) (NR)	3143	7643	940	2,90,910	-
Rice (Sugandha;74) (NR)	Wheat (PBW-343;152) (NR)	Lady's finger (Azad Bhindi;62) (NR)	4572	4476	2374	1,41,190	-
S.E.±						2,367	0.55
CD at 5%						4,857	1.14
		BICHPURI (U.P.)					
Pearl millet (Shakti-7173,0) 80-40-40	Wheat (HD-2687,121) 120-60-40	-	3385	6111	-	73,673	25.02
Pearl millet (Shakit-7173,0) 80-40-40	Wheat (HD-2687,121) 120-60-40	Green gram (K-851; 0) 25-50-0	2901	5640	2022	1,14,596	27.56
Pearl millet (Shakit-7173,0) 80-40-40	Lentil (DPL-15,134) 25-50-00	-	3477	2165	-	59,486	14.98
Soybean (PK-1092,0) 20-80-40	Wheat (HD-2687,121) 120-60-40 + Mustard (Yamuna Safed,0) 120-60-40	-	1416	4630 + 658	-	63,314	19.27
Pigeonpea (UPAS-120,0) 30-60-30	Wheat (HD-2687,121) 120-60-40	-	2423	5300	-	1,02,122	19.84
Green gram (K851,0) 25-50-0	Mustard (Rohini,143) 80-40-40	-	2078	3147	-	93,065	17.97
Sesbania (GM) (Local ,0) NR	Potato (E-3797;143) 150-80-60	Lady's finger (Arka anamika; 0) 80-50-30	-	40370	9448	1,74,955	32.75
Pearl millet (Shakit-7173,NR) 80-40-40	Potato (E-3797;143) 150-80-60	Cluster bean (green pods) (Amul-51; 0) 20-40-0	3128	34380	6180	1,44,345	34.22
Sesame (Guj-1,0) 30-15-15	Barley (PL-172,135) 60-30-20	Green gram (K-851; 0) 25-50-0	958	5360	2037	1,00,621	22.65

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Sorghum (F) (Samrat,0) 30-30-0	Oat (F) (Local,143) 60-30-20	Cowpea (F) (EC-4216; 0) NR	29099	27380	17550	55,522	8.88
S.E. ±						6,722	1.19
CD at 5%						13,793	2.43
		JUNAGADH (Gujarat)					
Groundnut (GG-2;120) 12.5-25-0	Wheat (GW-273;110) 120-60-00	Fallow	1563	3117	-	70,851	19.64
Groundnut (GG-2;120) 12.5-25-0	Onion (Ag Dark red;135) 75-60-50	Sorghum (F) (Gundari;75) 80-40-0	1655	24280	61930	2,20,166	21.52
Groundnut (GG-2;120) 12.5-25-0	Potato (K.Badshah;120) NR	Sesame (GT-2;110) 25-25-0	1644	11893	3148	1,68,344	38.58
Sorghum (Gundari;107) 80-40-0	Cumin (GCH-7;110) 30-15-0	Green gram (GM-4;69) 20-50-0	1337	792	2325	1,09,508	15.25
Sorghum (F) (Gundari;90) 80-40-0	Castor (GCH-7;180) 75-50-0	Castor (contd.)	21708	-	2769	67,400	15.66
Onion (Ag Dark red;80) 75-60-50	Wheat (GW-366;110) 120-60-00	Green gram (GM-4;69) 20-50-0	13272	3683	2181	2,09,928	26.66
Onion (Ag Dark red;80) 75-60-50	Chickpea (GG-1;105) 25-50-0	Maize (F) (Ganga-5;61) NR	11739	1420	46650	1,13,028	10.98
Sesame (G-2;110) 25-25-0	Potato (NBadshah;120) NR	Maize (F) (Ganga-5;61) NR	1192	10535	36630	69,337	16.93
Cotton (Hy-12;175) 160-0	Cotton (contd.)	Groundnut (GG-20;120) 12.5-25-0	-	1938	2099	96,711	18.33
Pigeonpea (BDN-2;180) 25-50-0	Pigeonpea (contd.)	Pearl millet (GHB-558;82) 80-40-0		910	6597	86,918	26.87
S.E.±						5,232	1.30
(CD at 5%)						10,993	2.73

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
DURGAPURA (Rajasthan)							
Pearl millet (Raj-171; 89) 40-30-0	Wheat (Raj-3077; 130) 45-30-0	-	2994	5000	-	61,759	21.08
Pearl millet (Raj-171; 89) 45-30-0	Wheat (Raj-3077; 130) 45-30-0	-	3194	5029	-	63,330	21.70
Clusterbean (RGC-1003; 119) 20-40-0	Mustard (Bio-902; 148) 30-30-0	-	2052	3086	-	55,647	12.77
Green gram (RMG-492;60) 15-40-0	Mustard (Bio-902; 148) 30-30-0	-	1440	2855	-	73,844	15.19
Groundnut (Rg-382; 130) 15-60-0	Wheat (Raj-3765; 130) 45-30-0	-	2046	5093	-	78,076	21.92
Pearl millet (Raj-171;89) 45-30-0	Pea (RFP-19; 135) NR	-	2878	3071	-	60,454	15.05
Pearl millet (Raj-171;89) 45-30-0	Fenugreek (green leaves) (RMT-305; 135) 40-40-0	-	2986	2199	-	3,45,552	8.89
Groundnut (Rg-382; 130) 15-60-0	Garden Cress (Local; 131) 30-40-0	-	2199	1620	-	56,163	12.10
Cluster bean (RGC-1003;119) 20-40-0	Pea (RFP-19; 135) 40-40-0	-	2122	2824	-	51,382	6.93
S.E.±						3,221	0.80
CD at 5%						6,647	1.65
RAJENDERANAGAR (A.P.)							
Maize (DHM-117; 110) 180-60-40	Groundnut (K-6; 128) 30-40-50	-	8281	1370	-	1,04,385	36.01
Maize (DHM-117; 110) 180-60-40	Sunflower (Agsun; 106) 90-60-30	-	7986	1587	-	1,07,582	37.15
Maize (DHM-117; 110) 180-60-40	Castor (PCH-111; 141) 90-40-30	-	7795	1426	-	92,125	32.93

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Maize (DHM-117;110) 120-60-40	Wheat (Local; 100) 180-60-40	-	8004	2366	-	96,931	35.56
Soybean (JS-335; 90) 80-60-40	Maize (DHM-117;110) 180-60-40	-	2552	5530	-	85,121	29.94
Soybean (JS-335; 90) 80-60-40	Wheat (TMV-2; 110) 30-40-50	-	2413	2654	-	64,480	19.61
Soybean (JS-335; 90) 80-60-40	Castor (P. Jwala;150) 120-60-60	-	2586	1637	-	64,258	18.38
Soybean (JS-335; 90) 80-60-40	Sunflower (Local; 100) 20-40-60	-	2413	1431	-	68,396	19.30
S.E.±						3,547	1.30
CD at 5%						7,610	2.77
		KOTA (RAJASTHAN)					
Soybean (RKS-24; 97) 40-40-0	Wheat (Raj-3765;146) 120-40-0	-	1681	4079	-	69,896	21.38
Soybean (RKS-24; 1) 40-40-0 + Maize (F) (Local;0) 90-30-0	Garlic (Local;161) 120-40-100 + Wheat (Raj-3765;146) 120-40-100	-	1126 + 591	4562 + 885	-	1,54,448	14.64
Maize (PEHM-2;110) 90-30-0	Mustard (Pusa Bold;121) 80-40-0	Green gram (AKM-8802;65) 20-40-0	2611	1515	433	64,717	18.57
Maize (PEHM-2;80) 90-30-0 + Black gram (Ku-96-3;82) 90-30-0	Chickpea (Samrat;151) 80-40-0 + Mustard (Pusa Bold;142) 80-40-0	Green gram (AKM-8802;71) 20-40-0	1944 + 436	769 + 488	409	65,299 -	14.94 -
Maize (PEHM-2;80) 90-30-0	Chickpea (Samrat;151) 20-40-0	Cowpea (EC-4216;7) 20-40-0	3085	1208	4623	1,19,354	21.64

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Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
+ Black gram (Ku-96-3;74) 90-30-0	+ Linseed (Meera; 132) 20-40-0	-	+ 746	+ 366			
Maize (PEHM-2;110) 90-30-0	Garlic (NR) NR	-	2719	9948	-	2,07,974	63.12
Cotton (H-8;189) 100-50-0	Cotton (contd.)	Green gram (AKM-8802;71) 20-40-0	-	1842	665	86,705	10.68
+ Black gram (Ku-96-3;74) 100-40-0			+ 675				
Cotton (H-8;189) 100-50-0	Cotton (contd.)	Green gram (AKM-8802;65) 20-40-0	-	1886	795	78,696	9.04
+ Clusterbean (Pusa Bahar;42) 100-50-0			+ 760				
S.E.±						5,927	1.59
C.D. at 5%						12,713	3.41
		INDORE (M.P.)					
Soybean (JS 95-60; 92) 20-60-20	Wheat (HI-1418;112) 120-60-40	-	576	7819	-	71,896	22.15
Maize (JM-216;104) 90-50-30	Wheat (HI-1418;112) 120-60-40	-	3369	7298	-	83,537	27.58
Soybean (JS 95-60; 92) 20-60-20	Wheat (HI-1418;112) 120-60-40 + Mustard (Pusa Bold;114)	Maize (JM-216;59) 120-60-40	598	3783 + 622	1209	54,855	17.38
Soybean (JS 95-60;92) 20-60-20	Onion (AFLR;104) 100-50-100	Lady's finger (Vaisali; 55) 80-60-60	581	37037	694	2,19,301	15.95
Maize (JM-216; 104) 90-50-30	Potato (K. Loukar;105) 120-100-100	Lady's finger (Vaisali ;55) 80-60-60	3685	10185	819	55,056	17.08

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield (x10^6, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Soybean (JS 95-60 ;92) 20-60-20 + Maize (JM-216;104) 90-50-30	Potato (LoukarKufri;105) 120-100-100	Groundnut (JGN-3;78) 20-60-20	491 + 1693	10741	1183	63,467	18.78
Soybean (JS 95-60; 92) 20-60-20 + Maize (JM-216;104) 90-50-30	Potato (LoukarKufri;105) 120-100-100	Onion (AFLR; 53) 100-50-100	493 + 1826	11667	1250	53,277	15.24
Soybean (JS 95-60; 92) 20-60-20	Chickpea (JG-315;114) 20-60-20	Green gram (JM-721; 59) 20-60-40	511	467	165	43,051	12.98
Maize (JM-216;104) 90-50-30	Wheat (HI-1418;115) 120-60-40	Maize (JM-216; 65) 120-60-40	1550	1515	681		
Soybean (JS 95-60; 92) 20-60-20 + Maize (JM-216;104) 90-50-30	Wheat (JW-3020;112) 120-60-40 + Mustard (Pusa Bold;117) 60-30-20	Green gram (JM-721;59) 20-50-0	530 + 1337	3491 + 756	265	60,646	17.93
Soyabean (JS 95-60; 92) 20-60-20 + Maize (JM-216;104) 90-50-30	Chickpea (JG-315;114) 20-60 + Mustard (Pusa Bold;106) 60-30-20	Maize (F) (JM-216;59) 120-60-40	509 + 1706	272 + 544	1778	39,638	13.53
Soybean (JS-335; 99) 20-60-20 + Pigeon pea (JKM189;148) 20-60-20	Wheat (GW-173;112) 120-60-40	Maize (F) (JM-216; 68) 120-60-40	457 + 178	3646	NR	39,796	11.39
Soybean (JS 95-60; 92) 20-60-20	Chickpea (JG-315;114) 20-60-20	Maize (JM-216; 59) 120-60-40	474	239	1893	29,544	9.76

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
+ Sorghum (CSH-16;115) 20-60-20	+ Mustard (Pusa Bold;114) 60-30-20		+ 246	+ 513			
S.E.±						8,656	1.48
CD at 5%						17,623	4.72
		AKOLA (MAHARASHTRA)					
Sorghum (CSH-9;105) 80-40-40	Wheat (HDM 2189;98) 120-60-60	-	4030	2456	-	47,828	16.92
Soybean (TAMS 38;107) 30-75-0	Chickpea (AKG 46;103) 20-40-0	-	3097	2764	-	69,928	17.50
Soybean (TAMS 38;107) 30-75-0	Mustard (Pusa Bold;98) 50-40-0	-	2675	2829	-	68,146	20.15
Soybean (TAMS 38;107) 30-75-0	Safflower (AKG-46;134) 40-40-0	-	2744	2675	-	65,744	16.03
Soybean (TAMS 38;107) 30-75-0	Sorghum (PKV Kranti;NR) 50-25-25	Groundnut (TAG-24;116) 25-50-0	2932	2829	2178	88,332	26.17
Soybean (TAMS 38;107) 30-75-0	Mustard (Pusa Bold;98) 50-40-0	Groundnut (TAG-24;116) 25-50-0	2847	3009	2589	1,17,165	32.44
Soybean (TAMS 38;107) 30-75-0	Isabgul (GI-1;119) 50-25-0	Groundnut (TAG-24;116) 25-50-0	2993	1127	2263	1,21,641	20.37
Soybean (TAMS 38;107) 30-75-0	Coriander (CG-2;50) 25-50-0 + Wheat (HDM 2189;98) 25-50-00	-	2932	13717 + 4012	-	1,57,958	49.54
Soybean (TAMS 38;107) 30-75-0 + Pigeonpea (AKT811;176) 25-50-0	Wheat (HDM 2189;98) 120-60-60	-	2092 + 1955	2864	-	93,117	19.12

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield (x10^6, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Pigeonpea (AKT8811;176) 25-50-0	Chickpea (AKG 46;103) 20-40-0 + Mustard (Pusa Bold;98) 50-40-0	-	2778 + 542	957	-	86,183	11.76
S.E.±						6,428	1.73
CD at 5%						13,191	3.56
			RUDRUR (A.P.)				
Rice (MTU-1010;135) NR	Rice (MTU-1010;135) NR	-	5466	5822	-	1,16,277	39.06
Rice (MTU-1010;135) NR	Maize (Kaveri; 105) NR	-	5393	6026	-	1,08,584	39.27
Rice (MTU-1010;135) NR	Sunflower (DRSF-108;105) NR	-	5477	1822	-	99,244	30.25
Rice (MTU-1010;135) NR	Mustard (Kranthi; 98) NR	-	5390	938	-	7,372	23.97
Soybean (JS-335 ;95) NR	Sunflower (DRSF-108;105) NR	-	1863	1918	-	71,918	19.94
Soybean (JS-335 ;95) NR	Sesame (Sweta-T-11;85) NR	-	1967	810	-	51,828	13.06
Maize (Kaveri; 105) NR	Sunflower (DRSF-108;105) NR	-	3213	1866	-	69,613	22.56
Soybean (JS-335 ;95) NR	Maize (Kaveri; 105) NR	-	1903	6015	-	80,356	28.80
Maize (Kaveri; 105) NR	Chickpea (J-9-11;105) NR	-	3488	1799	-	62,371	18.41
Sunflower (Agsun-108;105) NR	Maize (30V92; 105) NR	-	1803	5627	-	89,457	30.42

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
S.E.±						1,008	0.29
CD at 5%						2,117	0.61
			RAHURI (MAHARASHTRA)				
Pearl millet (Sharddha;73) NR	Wheat (Trimbak;117) NR	-	2291	2943	-	53,128	18.45
Pearl millet (Sharddha;73) NR	Onion (N-2-4-1;115) NR	-	2224	24464	-	2,03,059	20.26
Pearl millet (Sharddha;73) NR	Potato (K Jyoti:100) NR	-	2414	2306	-	88,260	28.41
Pearl millet (Sharddha;73) NR	Chickpea (Virat; 115) NR	-	2375	2281	-	61,056	16.79
Pearl millet (Sharddha;73) NR	Cabbage (Kranthi; 95) NR	-	2377	21271	-	1,27,282	14.33
Soybean (JS-335;NR) NR	Wheat (Trimbak;117) NR	-	2325	3298	-	70,436	21.46
Soybean (JS-335: NR)	Onion (NR; NR) NR	-	2449	28656	-	2,50,196	24.91
Soybean (JS-335;NR) NR	Potato (NR; NR) NR	-	2379	21770	-	16,106	31.40
Soybean (JS-335;NR) NR	Chickpea (Virat; 115) NR	-	2419	2365	-	76,476	18.97
Soybean (JS-335 ;NR) NR	Cabbage (Kranthi; 95) NR	-	2397	22619	-	1,47,623	16.46
Pearl millet) (NR;NR) NR + Soybean (JS-335; NR)	Wheat (Trimbak;117) NR	-	1701 + 822	3098	-	61,517	20.41

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Pearl millet (Sharddha;73) NR + Soybean (NR;NR)	Onion (NR; NR) NR	-	1745 + 814	25765	-	2,20,335	22.70
Pearl millet (Sharddha;73) NR + Soybean (NR;NR)	Potato (NR; NR) NR	-	1721 + 837	21054		96,677	30.25
Pearl millet (NR;NR) NR + Soybean (NR;NR)	Chickpea (NR; NR) NR	-	1716 + 797	2481		70,260	18.57
Pearl millet (Sharddha;73) NR + Soybean (NR;NR)	Cabbage (NR; NR) NR + Cotton (contd.)	-	1681 + 847	20306		1,28,523	15.21
S.E.±						1,935	0.44
CD at 5%						3,964	0.91
PARBHANI (MAHARASHTRA)							
Sorghum (CSH-16 ;120) 80-40-40	Wheat (HD-2189 ;115) 100-50-50	-	4119	3897	-	80,722	27.86
Bt. Cotton (NCS-207;155) 125-62.5-62.5	Cotton (contd.)	Groundnut (TAG-24;120) 25-50-0	-	2225	2433	1,22,721	21.18
Soybean (MAUS-71;105) 30-60-30	Onion (AFLR;120) 100-50-50	-	2306	21047	-	1,91,055	20.48
Soybean (MAUS-71;105) 30-60-30	Wheat (HD-2189 ;115) 100-50-50	Cowpea (veg.) (HD-4216 ;66) 25-50-0	2259	3343	16287	2,11,179	29.14
Pigeonpea (BSMR-853;180) 25-60-30	Pigeonpea (contd.)	Groundnut (TAG-24;120) 25-50-0	-	1962	2333	1,15,860	19.80

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Maize (Maharaja;120) 30-60-30	Wheat (HD-2189 ;115) 100-50-50	Green gram (BPMR-145;68) 25-50-0	6259	4341	1470	1,50,300	41.33
Bt. Cotton (NCS-207;155) 125-62.5-62.5	Wheat (HD-2189 ;115) 100-50-50	Coriander (Lavender; 44) 50-50-50	2601	4269	4009	1,61,916	34.95
Maize (Maharaja;120) 120-60-60	Chickpea (Digvijay ;119) 25-50-0	Ladys'finger (Anamika; 85) 50-50-50	6140	2098	4229	1,29,016	30.03
Soybean (MAUS-71;105) 30-60-30	Chickpea (NR ;119) 25-50-0	Coriander (Lavender; 44) 50-50-50	2073	1952	4597	1,05,571	29.22
Turmeric (salem;234) 100-50-50 + Caster (NR;180) 100-50-50	- -		-	14729 + 863	-	3,08,831	55.20
Bt. Cotton (NCS-207;155) 125-62.5-62.5	Chickpea (NR ;119) 25-50-0		2374	2145	-	1,08,988	15.61
Soybean (MAUS-71;105) 30-60-30	Safflower	Maize (F) (African tall; 66) 100-50-50	2453	1851	17611	86,244	20.00
S.E.±						5,551	1.53
CD at 5%						11,513	3.18
		COIMBATORE (T.N.)					
Cotton (MCU-112; 150) 120-60-60	Sorghum (Co 28;100) 90-45-45	Finger millet (Co 11;100) 60-30-30	3657	3444	2266	1,44,311	31.60
Beetroot (Ooty 1;120) 60-160-100	Green gram (Co 5; 85) 25-50-25	Maize (Co 135;100) 135-62-50 + Cowpea(Veg) (CoCP 6;100) 135-62-50	8657	893	8257 + 437	2,08,653	35.15
Cowpea(Veg) (Co 6; 85) 25-50-25	Sesame (SVPR 1;90) 35-23-23	Maize (Co 135;100) 135-62-50	2838	657	7736	1,18,965	31.52

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Cotton (Bunny Bt.hybrid; 150) 150-75-75 + Soybean (Co 3;90)	G.M (Local; 45) NR	Sunflower (Co 4;90) 40-20-20	3443 + 290	10407	1298	141572	22399
Chilli (K 2;120) 120-60-30 + Onion (Local;120) 120-60-30	G.M. (NR; 45) NR	Lady's finger (A. Anamica;100) 60-50-30 + Coriander (Co 4;90) 60-50-30	7596 + 372	-	7534 + 295	198149	7627
Cotton (Bunny Bt.hybrid; 150) 150-75-75 + Green gram (Co 6;85)	Maize (NK-6240;100) 150-62.5-50	Sunflower (Co 4;90) 40-20-20	3627 + 475	8496	1389	213147	51300
Lablab bean (Co 13; 120) 25-50-25	Sesame (Co 1; 90) 35-23-23	Brinjal (Co 2;140) 100-50-30	8426	678	8271	212222	9848
Sugarbeet (Cauvery;120) 150-75-75	Maize (NK-6240;100) 150-62.5-50	Groundnut (Co 2;105) 17-34-54	30529	8172	650	208984	46289
Maize (Co 4;100) 135-60-50	Cowpea(Veg) (Co 6;85) 25-50-25	Tomato (PKM 1;90) 150-100-50	8036	904	9256	143346	30046
S.E.±						6406	1159
CD at 5%						13581	2457
ECOSYSTEM III: SUB-HUMID							
VARANASI (U.P.)							
Rice (NDR-359;133) 150-75-75	Wheat (HUW-468;133) 150-75-75	-	4456	4178	-	92693	29874
Rice (NDR-359;133) 150-75-75	Wheat (HUW-468;141) 150-75-75	Green gram (P.Vishal;NR) 25-60-25	4872	4537	2303	174016	40250
Rice (NDR-359;133) 150-75-75	Wheat (HUW-468;141) 150-75-75	Dhaincha	5115	4803	-	106488	34319

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Rice (NDR-359;133) 150-75-75	Wheat (HUW-468;141) 150-75-75 + Mustard (5:1) (S.Asesh;109) 40-20-20	Black gram (Azad-1;NR) 25-60-25	4629	3888 + 590	1018	1,31,697	36.20
Rice (NDR-359;133) 150-75-75	Wheat (HUW-468;141) 150-75-75 + Mustard (S.Asesh;109) 40-20-20	Cowpea(F) (CP4;NR) NR	4861	3888 + 659	4375	1,43,761	35.94
Rice (NDR-359;133) 150-75-75	Mustard (PRO-4001;118) 112-56-56	Green gram (P.Vishal;NR) 25-60-25	4976	2070	1342	1,32,129	32.91
Rice (NDR-359;133) 150-75-75	Toria (PT303;96) 90-45-0	Lady's finger (Mahyco-10;NR) 120-60-60	4722	1782	14375	2,04,750	31.01
Rice (NDR-359;133) 150-75-75	Veg.Pea (E.Apoorva;82) 25-60-25	Lady's finger (Mahyco-10;NR) 120-60-60	4791	4375	1761	2,86,645	26.81
Rice (NDR-359;133) 150-75-75	Maize(cob) (Bio-9681;158) 120-60-40 + Veg.pea (1:2) (yamuna Safed;82) 15-40-20	Cowpea (F) (Local;NR) 25-60-25	4826	10160 + 2679	24143	1,18,657	35.75
Rice (NDR-359;133) 150-75-75	Potato (K.Sinduri;121) 160-80-80	Green gram (Jyoti;NR) 25-60-25	4895	21730	1481	1,69,098	42.96
S.E.±						19,992	2.62
CD at 5%						42,004	5.50
		FAIZABAD (U.P.)					
Rice (S-52 ;102) 120-60-40	Wheat (PBW-343 ;137) 120-60-40	-	4833	3770	-	92,004	29.77
Rice (S-52 ;102) 120-60-40	Wheat (PBW-343 ;137) NR	G.M.	5257	4150	-	1,00,624	32.55

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer ($N:P_2O_5:K_2O$, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Rice (PHB-71;105) 120-60-40	Wheat (PBW-343 ;137) 120-60-40	G.M.	7033	4124	-	1,18,632	38.60
Rice (PHB-71;105) 120-60-40	Potato (K.Ashoka;103) 150-60-90	Green gram (NDM-1 ;64) 15-40-0	7330	21532	710	1,69,062	48.62
Rice (PHB-71 ;105) 120-60-40	Mustard (NDR-8501;113) 100-60-60	Black gram (NDU-1 ;87) 15-40-0	7150	1630	685	1,23,665	35.93
Rice (PusaBasmati;113) 120-60-40	Wheat (PBW-343 ;137) 120-60-60	G.M.	3960	4050	-	1,23,768	27.71
Rice (Pusa Basmati ;113) 120-60-40	Barseem(F) (Local ;0) 20-80-0	Barseem seed (NR ;172) NR	3870	59400	110	1,44,826	23.27
Rice (Pusa Basmati ;113) 120-60-40	Lentil (NDL-1 ;120) 15-40-0	Sorghum (Fodder) (NR ;49) 80-40-40	3780	1566	39100	1,49,179	24.71
S.E.±						5,335	1.47
CD at 5%						11,443	3.16
		SABOUR (BIHAR)					
Rice (Sita;136) 100-40-20	Wheat (HP-2733;137) 120-60-40	-	4678	4720	-	1,01,047	32.52
Rice (Sita;136) 100-40-20	Maize (Shaktiman-3;163) 60-37.5-25 + Potato (k.Ashoka;0) 60-37.5-25	Maize (Suwan; 44) 80-40-20 + Cowpea(F) (Pant Haritma;44) 80-40-20	4844	7305 + 11698	-	1,52,778	53.09
Rice (Sita;136) 100-40-20	Wheat (HP-2733;138) 120-60-40 + Fenugreek (R-Kranti;0) 120-60-40	Green gram (SmL-668;79) 20-50-0	4637	4616 + 310	703	1,31,051	35.40
Rice (Sita;136) 100-40-20	Potato (K. Ashoka;78) 150-90-100	Onion (N.Red;142) 100-80-80	4554	22382	12127	2,51,687	55.67

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
	+ Radish (P.Chetki;0)	+ Maize (Shaktiman-3;0)		+ 8062	+ 8613		
Rice (Sita;136) 100-40-20	Cabbage (P. Mukta;103) 120-80-80	Lady's finger (P. Kranti;124) 100-60-60	4617	42522	11113	3,86,024	33.37
	+ Radish (P.Chetki;0) 120-80-80	+ Green gram (SmL-668;0) 100-60-60		+ 7517	+ 222		
Rice (Sita;136) 100-40-20	Maize (Shaktiman-3;169) 120-75-50	Sorghum (SSG-99;45) 60-30-30	6148	7278	-	1,82,398	62.34
	+ Potato (k.Ashoka;0) 120-75-50	+ Cowpea(F) (P.Komal;0) 60-30-30		+ 16674	-		
Rice (Sita;136) 100-40-20	Maize (Shaktiman-3;169) 120-75-50	Maize (Suwan;44) 80-40-20	6210	7887	-	1,38,104	49.47
	+ Rajmash (PDR-14;0) 120-75-50			+ 291			
Rice (Sita;136) 100-40-20	Garlic (NR;140) 100-80-80	Maize (Suwan;44) 100-60-40	6086	4443	3536	2,70,853	56.44
	+ Coriander (Pant haritima;0) 100-80-80	+ Cowpea(F) (P.Komal;0) 100-60-40		+ 5851			
Rice (Sita;136) 100-40-20	Wheat (HP-2733;141) 120-60-40	Green gram (SmL-668;79) 20-50-0	5879	4451	714	1,33,032	38.12
Rice (Sita;136) 100-40-20	Maize (Shaktiman-3;168) 120-75-50	Cluster bean(F) (Golden early-36;56) 20-50-0	5672	7384	-	57,996	19.48
Rice (Sita;136) 100-40-20	Oat (JHO-882;141) 80-40-20	Pearl millet (GFB-1;68) 60-30-20	5631	-	-	57,996	19.48
Rice (Sita;136) 100-40-20	Chick pea (Vaibhav; 140) 20-50-0	Maize (Suwan;62) 100-60-40	5775	1535	3808	1,23,234	39.56

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield (x10^6, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
	+ Coriander (Pant Haritma;0) 20-50-0	+ Cowpea(F) (P.Komal;0) 100-60-40		+ 357			
S.E.±						8,248	2.22
CD at 5%						17,106	4.60
RAIPUR (CHHATTISGARH)							
Rice (MTU-1010,112) 80-60-40	Wheat (NR,125) 100-60-40	Cowpea (S) (NR,85) 20-50-0	5232	3813	1244	1,17,802	35.31
Rice (MTU-1010,112) 80-60-40	Castor (NR,138) 80-50-30 + Lentil (NR,0)	Cowpea (NR,85) 20-50-0	5327	290 + 786	9354	1,58,427	26.90
Rice (MTU-1010,112) 80-60-40	Mustard (NA,126) 80-50-30 + Lentil (NR,0)	Cowpea (Veg.) (NR,85) 20-50-0	5396	909 + 402	30730	1,12,171	29.88
Rice (MTU-1010,112) 80-60-40	Wheat (NR,125) 100-60-40	Green gram (NR; 76) 20-50-0	5219	3583	762	1,18,055	33.00
Rice (Mahamaya,127) 100-60-40	Sunflower (NR,126) 80-50-30 + Lentil (NR,0)	Cowpea (NR,85) 20-50-0	6125	2021 + 323	8873	1,94,785	39.09
Rice (Mahamaya,127) 100-60-40	Wheat (NR,125) 100-60-40 + Fenugreek(S) (NR,0) 100-60-40	Cowpea (Veg.) (NR,85) 20-50-0	6010	2061 + 492	30032	1,94,271	37.88
Rice (Indira Sona,128) 120-60-40	Wheat (NR,125) 100-60-40	Cowpea (Veg.) (NR,85) 20-50-0	6467	1948	9274	1,78,913	35.10

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield (x10^6, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
	+ Lentil (NR,NR)			+ 448			
Rice (Indira Sona,128) 120-60-40	Onion (NR,115) 80-60-30 + Coriander (S) (NR,0)	Cowpea (S) (NR,85) 20-50-0	6375	23938 + 405	1188	3,68,524	68.13
S.E.±						6,236	1.23
CD at 5%						13,376	2.64
		REWA (M.P.)					
Rice (Kranti;98) (NR)	Wheat (Kanchan;128) (NR)	-	10206	9217	-	1,56,267	50.40
Rice (Kranti;98) (NR)	Chickpea (JG-322;122) (NR)	-	11052	3396	-	1,30,212	37.85
Rice (Pro agro-6201;98) (NR)	Berseem (JB-1;156) (NR)	Berseem (S)	9939	85417	379	1,63,568	37.02
Rice (Pro agro-6201;98) (NR)	Potato (K.C.Mukhi;113) (NR)	-	10979	38258	-	1,79,497	56.32
Rice (Pro agro 6444;98) (NR)	Garlic (G-1;145) (NR)	-	12121	10585	-	3,15,922	42.97
Rice (PB-1;107) (NR)	Linseed (JM-232;136) (NR)	-	5821	1420	-	1,13,391	20.75
Rice (PB-1;107) (NR)	Lentil (JI-18;115) (NR)	-	6151	3445	-	1,49,476	24.82
Rice(hyb) (pro agro-6201);98) (NR)	Green pea (Arkel:105) (NR)	-	11305	10059	-	1,47,683	36.35
Rice(hyb) (pro agro- 6201);98) (NR)	Chickpea (JG-322;122) (NR) + Linseed (NR;0) (NR)	-	10027	2115 + 600	-	1,16,758	34.11

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield (x10^6, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Rice (PB-1;107) (NR)	Mustard (P. bold;132) (NR)	-	6366	3346	-	1,40,957	30.09
S.E.±						4,062	1.18
CD at 5%						8,335	2.41
		JABALPUR (M.P.)					
Rice (Kranti ;135) 120-60-40	Wheat (GW-273 ;130) 120-60-40	-	7713	7337	-	1,21,207	39.05
Rice (Kranti ;135) 120-60-40	Chickpea (JG-322 ;80) 20-60-20	-	7792	3279	-	1,03,481	29.07
Rice (Pro Agro-6444 ;128) 120-60-40	Onion (P. Red ;144) 100-60-20	Green gram (P. Vishal ;0) 20-60-20	9714	9363	592	1,41,789	30.20
Rice (P. Sudhandh-5;130) 120-60-40	Berseem (JB-5 ;191) 20-60-20	Berseem (S) (JB-5;0) (20-60-20)	5794	20063	827	1,09,423	19.58
Rice (JRH-5 ;106) 120-60-40	Potato (Kufri sinduri ;120) 120-60-40	Maize(Fodder) (JM-12 ;0) 120-60-40	7414	10738	26667	1,29,852	52.05
Rice (JRH-5 ;106) 120-60-40	Gobhi sarson (Terriuttam ;123) 60-30-30	Maize (Fodder) (JM-12 ;NR) 60-30-30	7714	1857	24033	1,21,943	50.08
Rice (JRH-5 ;106) 120-60-40	Veg pea (Arkel; NR) 20-60-20	Sesame (TKG-55; NR) 80-60-20	7905	3762	854	1,02,210	26.74
Rice (JRH-5 ;106) 120-60-40	Potato (Kufri sinduri ;120) 120-60-40	Groundnut (Jyoti; NR) 120-60-40	8108	10851	2587	1,34,121	39.94
Rice (JRH-5 ;106) 120-60-40	Gobhi sarson (Terriuttam ;123) 60-30-30	Groundnut (Jyoti; NR) 120-60-40 + Maize (green cob's)	7968	1908	879 + 12027	1,77,566	63.01
Rice (JRH-5 ;106) 120-60-40	Gobhi sarson (Terriuttam ;NR) 60-30-30	Lady's finger (P.Kranti ;0) 60-30-30	8032	2057	8000	1,39,188	31.29

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Rice (JRH-5 ;106) 120-60-40	French bean (Arka komal; NR) 20-60-40	Sorghum (F) (NR; NR) + Cowpea (NR; NR) 20-60-40	8133	359	35333 + 4725	1,24,429	27.12
Rice (Proagro-6444 ;128) 120-60-40	Marigold (A. Giant ;NR) 100-805-40	Maize(Fodder) (JM-12; 0) 100-80-40	9433	3411	24800	1,54,028	47.83
S.E.±						5,074	1.59
CD at 5%						10,330	5.05
POWARKHEDA (M.P.)							
Soybean (JS-97-52;91) 20-60-20	Wheat (GW-273;112) 120-60-40	-	2593	6926	-	86,178	26.37
Soybean (JS-97-52;91) 20-60-20	Chickpea (JG-130;108) 20-60-20	-	2463	1981	-	52,756	13.33
Soybean (JS-97-52;91) 20-60-20	Garlic (NR; 0) 300-80-60	-	1917	-	-	20,700	6.21
Soybean (JS-9-52;110) 20-60-20	Sugarcane (Co 86032:183) NR	Sugarcane (Co 86032:183) NR	-	144630	-	1,50,907	431.72
Rice (Pusa Sug-5;134) 100-40-25	Wheat (GW-273;112) 120-60-40	Green gram (PDM-54;65) 20-60-20	5370	6981	889	1,21,264	34.28
Soybean (JS-97-52;91) 20-60-20	Potato (Chip Sona;98) 120-100-75	Lady's finger (P.Kranti;0) 80-60-20	2796	36111	17222	2,35,825	39.85
Soybean (JS-9-52;91) 20-60-20 + Pigeonpea (NR; NR) 20-60-20	Maize(F) (African Tall;0) 120-60-40	-	1630 + 2370	50500	-	1,11,831	17.30
Rice (Pusa Sug-5;134) 100-40-25	Linseed (Kiran;108) 75-50-25	Green gram (PDM-54;65) 20-60-20	5130	1611	1065	95,513	22.38

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield (x10^6, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Rice (Pusa Sug-5;134) 100-40-25	Linseed (Kiran;108) 75-50-25	Sesame (TKG-55;85) 50-30-20	4963	1722	806	88,539	23.13
Soybean (JS-97-52;91) 20-60-20	Potato (Chipsona;98) 120-100-75	Sesame (TKG-55;85) 50-30-20	2685	36296	852	1,37,361	38.70
S.E.±						7,578	9.07
CD at 5%						15,551	18.61
		CHIPLIMA (ODISHA)					
Rice (Khandagiri;104) 80-40-40	Groundnut (Smruti;125) 20-40-40	-	4092	2425		97,927	27.91
Rice (Khandagiri;104) 80-40-40	Toria (Keshari ;133) 60-30-30	-	3941	1287		59,898	20.60
Rice (Khandagiri;104) 80-40-40	Groundnut (Smruti,125) 20-40-40	Green gram (K-851,61) 20-40-40	4349	2448	1155	1,37,737	32.79
Rice (Khandagiri;104) 80-40-40	Groundnut (Smruti;125) 20-40-40	Cowpea (EC-42416 ; NR) 25-50-50	4640	2713	4198	1,46,594	33.45
Rice (Khandagiri;104) 80-40-40	Groundnut (Smruti;125) 20-40-40	Bottle gourd (US-15; 107) 50-30-50	4084	2529	11414	1,57,302	29.84
Rice (Khandagiri;104) 80-40-40	Toria (Keshari ;133) 60-30-30	Green gram (K 851; 61) 20-40-40	4005	1356	1073	95,600	24.78
Rice (Khandagiri;104) 80-40-40	Radish (Pusa chetki;57) 50-50-75	Cowpea (EC-4216;107) 25-50-50	3951	24000	3911	1,34,616	19.63
Rice (Khandagiri;104) 80-40-40	Radish (pusa chetki;57) 50-50-75	Green gram (K 851; 61) 20-40-40	4317	22437	1007	1,32,472	22.11
Rice (Lalata;130) 80-40-40	French bean (Chitcobra;72) 50-80-80	Green gram (K 851; 61) 20-40-40	4425	2092	1105	1,14,590	26.24
Rice (Khandagiri;104) 80-40-40	Maize (green cob) (Kamal;95) 120-60-60	Cowpea (EC-42416 ;107) 25-50-50	4005	49965	3873	1,07,814	78.17
S.E.±						5,906	1.64
CD at 5%						12,408	3.45

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
KATHALGERE (KARNATAKA)							
Rice (IR-64 ;120) NR	-	Rice (JGL-1798 ;120) NR	4525	-	5325	101458	34082
Maize (Nityshri ;120) NR	-	Rice (JGL-1798 ;120) NR	3768	-	5082	85500	30469
Rice (IR-64 ;120) NR	-	Rice (JGL-1798 ;120) NR	5229	-	5936	115000	38631
Rice (IR-64 ;120) NR	-	Rice (JGL-1798 ;120) NR	4671	-	4525	94722	31819
Rice (IR-64 ;120) NR	-	Tomato (NR ;0) NR	5531	-	9854	125953	21405
Rice (IR-64 ;120) NR	-	Ladys'finger (Arka ;0) NR	5104	-	9679	139689	21049
Rice (IR-64 ;120) NR	-	Rice (JGL-1798 ;120) NR	4767	-	5586	106636	35821
Rice (IR-64 ;120) NR	-	Rice (JGL-1798 ;120) NR	5228	-	6044	116105	39002
Maize (Nityshri ;120) NR	-	Rice (JGL-1798 ;120) NR	4015	-	5012	86956	31073
Rice (IR-64 ;120) NR	-	Hybrid Maize (NR ;120) NR	4742	-	4549	88873	31965
Rice (IR-64 ;120) NR	-	Groundnut (TMV-2 ;120) NR	5313	-	2917	121804	34919
Maize (Nityshri ;120) NR	-	Green gram (KKM-3 ;60) NR	4089	-	937	65683	17113
S.E.±						3784	1292
CD at 5%						7849	2679

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield (x10^6, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
IV:HUMID ECOSYSTEM							
JAMMU (J&K)							
Rice (Jaya;139) NR	Wheat (PBW-343;146) 100-50-25	-	6527	4306	-	86,594	28.11
Rice (IET1410;119) NR	Berseem (F) (Mascavi;220) 50-50-0	-	5222	76388	-	97,634	22.72
Rice (IET1410;119) NR	Potato (K. Badshah;94) 120-60-120	Onion (N-53;120) 100-50-50	5027	24166	18889	2,04,901	37.71
Rice (PC19;129) NR	Fenugreek (Kasuri Methi;180) 60-20-20	Radish (Pusa Chetki;66) 80-30-50	5805	21666	14111	2,00,181	24.49
Rice (IET1410;119) NR	Garlic (Local; 194) 100-50-50	Cowpea (Pusa Komal;63) 50-60-50	5444	8083	NR	2,11,807	22.92
Rice (PC19;129) NR	Marigold (Pusa Narangi;120) 120-100-100	Frenchbean (Contender;81) 50-100-50	6000	11625	11861	3,21,687	18.23
Rice (PC19;136) NR	Spinach (Local;135) 50-60-50	Ladys'finger (Pusa sawni;128) 60-30-30	5972	18527	15639	2,55,915	26.41
Rice (IET1410;119) NR	Broccoli (Local;118) 75-0-0	Black gram (NUL-7;78) 75-0-0	5083	15277	2638	3,25,827	25.21
Rice (IET1410;119) NR	Cabbage (Golden acre;86) 120-60-60	Onion (N-53;117) 100-50-50	5305	24166	18055	2,33,174	25.43
Rice (PC19;129) NR	Potato (K.sinduri; 109) 120-60-120	Maize (green cobs) (NR;NR) 90-60-30 + Green gram (818;114) 90-60-30	5694	29166	45916 + 1111	2,21,799	81.83
S.E.±						9,794	1.14
CD at 5%						20,098	2.33

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
PALAMPUR (H.P.)							
Maize (KH-101;102) 120-30-40	Wheat (HPW-155;185) 40-60-30	-	4545	4944	-	71,532	24.49
Maize (green cob) (KH-101 ;89) 120-30-40 + Frenchbean (Laxmi ;89) 120-30-51	Pea (Palampriya;139) 25-60-60	Summer Squash (Aus. green;78) 92-50.4-54	6313 + NR	3662	18519	1,71,434	16.79
Maize (KH-101 ;102) 120-30-40 + Soybean (Harit Soya ;102) 120-30-40	Garlic (GHC-1;236) 125-75-60	-	4609 + 252	9975	-	2,42,610	23.49
Maize (green cobs) (KH-101 ;89) 120-30-40	Broccoli (P. Samridhi;112) 150-100-55	Potato (Kufri Jyoti;116) 120-80-60	6313	2727	18519	97,629	20.31
Maize (KH-101 ;102) 120-30-40 + Asparagus beans (DP ASB-1;99) 120-30-40	Radish (Early Minu;88) 100-50-35	Onion (Patna red;126) 125-75-60	4419 + NR	31092	14394	1,68,430	20.70
Maize (green cobs) (KH-101 ;89) 120-30-40 + Black gram (BRS-11;102) 120-30-40	Cauliflower (Pusa Uphar;162) 125-75-70	Frenchbean (Cotender;67) 50-100-50	6439 + NR	8548	7450	1,40,368	11.72
Maize (green cobs) (KH-101 ;89) 120-30-40 + Green gram (BRS-11;102) 120-30-40	Cauliflower (Pusa Uphar;162) 125-75-70	Buckwheat (Sangla B 1;36) 40-40-20	7071 + 190	7046	4798	1,38,374	23.04

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Maize (green cobs) (KH-101 ;89) 120-30-40 + Asparagus beans (DP ASB-1;99) 120-30-40	Broccoli (P. Samridhi;112) 150-100-55	Radish (Hy-11;56) 100-50-35	6692 +	2734	20454	90,900	9.80
S.E.±						8,225	1.53
CD at 5%						17,108	3.19
		JORHAT (ASSAM)					
Rice (Suwasini;132) 80-40-40	-	Rice (Disang;119) 80-40-40	5067	-	3333	64,890	21.80
Rice (Suwasini;132) 80-40-40	Toria (TS-38;95) NR	-	4167	1109	-	32,188	10.81
Rice (Suwasini;132) 80-40-40	Cabbage (Golden Acre;100) NR	Green gram (Pratap;75) 15-35-10	4600	19257	593	1,21,854	17.32
Rice (Suwasini;132) 80-40-40	Cauliflower (Pusa Snowball; 108) 15-35-10	Black gram (PU 31;64) 15-35-10	4700	8185	920	93,150	18.64
Rice (Suwasini;139) 80-40-40	Knol khol (White Viena;89) 15-35-10 + Frenchbean (Annapurna; 65) 15-35-10	Black gram (PU 31;64) 15-35-10	5000	7813 + 4808	-	1,26,527	16.43
Rice (Suwasini;132) 80-40-40	Capsicum (California wonder; 89) NR	Cowpea(F) (EC-4216;82) 20-40-20	5200	2010	-	62,783	13.86
Rice (Suwasini;132) 80-40-40	Green Chilli (Local; 100) NR	Cowpea(F) (EC-4216;82) 20-40-20	4167	4523	587	86,890	12.01
Rice (Suwasini;132) 80-40-40	Radish (Pusa Chetki;35) 15-35-10 + Frenchbean (Annapurna; 65) NR	Black gram (PU 31;64) 15-35-10	5500	19147 + 6817	467	1,71,616	19.26

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
S.E.±						7,851	1.28
CD at 5%						16,329	2.66
		KALYANI (W.B.)					
Rice (IET4786 ;122) NR	-	Rice (IET4786 ;121) NR	3073	-	2256	54,883	18.44
Rice (BCKV-1 ;118) NR	Rice (BCKV-1 ;118) NR	Rice (BCKV-1 ;121) NR	4354	3183	2776	1,06,228	35.68
Rice (BCKV-1 ;119) NR	Potato (Kufri Jyoti ;89) NR	Jute (JRO-524 ;108) NR	5020	16239	1920	1,35,533	39.84
Rice (BCKV-1 ;119) NR	Wheat (UP-262; 145) NR	Maize (Datta; 80) NR + Groundnut (TAG-24; 0) NR	3881	2725	1756 + 345	93,878	30.82
Rice (IET4786 ;122) NR	Rapeseed (B-9;98) NR	Green gram (sonali; 81) NR	3417	939	568	70,577	18.80
Rice (BCKV-1 ;119) NR	Lentil (B-67; 120) NR + Mustard (B-9 ;89) NR	Sesame (B – 76; 93) NR	4684	461 + 513	744	89,664	24.75
Amaranthus (Jabakusum:45) NR	Brinjal (Muktakeshi; 175) NR + Coriander (leaf) (Hybrid; 53) NR	Bitter gourd (Megna-2;108) NR	3787	11269 + 3589	3022	1,99,971	15.65
Cauliflower (Raj-171;108) NR	Radish (Kalpin; 63) NR + Amaranthus (Jabakushum;122) NR	Ladys'finger (Mahyco; 85) NR	4175	11768 + 2128	12730	1,93,132	10.35

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Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield (x10^6, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
	+ Frenchbean (Contendor;75) NR			+ 369			
EFY* (Bidhan kusum;180) NR	Dolichos bean (Hybrid;163) NR	Ginger (Garubathan;0) NR	26111	1502	756	5,60,130	57.03
		+ Turmeric (Suranjana;NR)			+ 10080		
Rice (BCKV-1 ;118) NR	Wheat (UP-262; 145) NR	Green gram (Sonali; 81) NR	5961	2481	619	1,08,814	31.28
*Elephant Foot Yam							
S.E.±						22,263	4.15
CD at 5%					46776	8,728	5.75
V: COASTAL ECOSYSTEM							
BHUBANESWAR (ODISHA)							
Rice (Lalat;128) 80-40-40	Groundnut (Smruti;118) 20-40-40	-	3230	2496		90,692	25.33
Rice (Lalat;128) 80-40-40	Maize (green cobs) (Navjyoti;91) 80-40-40	Cowpea (green manuring) (EC-42416:55) 30-30-30	3540	47257	5440	1,14,817	73.93
Rice (Lalat;128) 80-40-40	Maize (green cobs) (Navjyoti;79) 80-40-40	Lady's finger (BO-2;75) 80-40-40	3989	46461	7420	1,38,538	74.47
Rice (Lalat;128) 80-40-40	Mustard (Parbati;75) 60-30-30	Ladys'finger (BO-2;75) 80-40-40	3810	1250	7209	1,27,264	22.47
Rice (RGL-2538;124) 80-40-40	Mustard (Parbati;75) 60-30-30	Cowpea (Veg) (EC-42416:55) 30-30-30	3869	1299	6380	1,19,216	23.48
Rice (RGL-2538;140) 80-40-40	French bean (Selection-9;70) 80-40-40	Bitter gourd (N.Improved;65) 80-40-40	3300	6520	5259	2,18,835	14.43
Rice (RGL-2538;124) 80-40-40	Groundnut (Smruti;118) 20-40-40	Cucumber (S.Queen;65) 80-40-40	3539	2323	5970	1,37,655	26.20

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Rice (RGL-2538;124) 80-40-40	Tomato (BT-10;101) 80-40-40	Cowpea (Veg) (EC-42416:55) 30-30-30	3749	17666	5319	2,08,409	19.59
Rice (RGL-2538;124) 80-40-40	Radish (Chetki;53) 80-40-40	Sesame (Uma;85) 60-30-30	3300	25200	1200	1,31,790	22.46
Rice (RGL-2538;124) 80-40-40	French bean (Selection-9;70) 80-40-40	Sesame (Uma;77) 60-30-30	3400	6500	1000	1,69,648	19.08
S.E.±						6,265	1.18
CD at 5%						13,164	2.48
MARUTERU (A.P.)							
Rice (MTU-1075; 140) 60-40-40	Rice (MTU-1010; 120) 120-60-40	Green Fodder (Local; 90) NR	6221	6775	11593	1,45,455	46.82
Rice (MTU1075; 140) 60-40-40	Rice (MTU-1010; 120) 120-60-40	Green Fodder (Local; 90) NR	6106	6536	8346	1,38,562	45.08
Rice (MTU1001; 140) 60-40-40	Rice (MTU-1010; 120) 120-60-40	Green Fodder (Local; 90) NR	6209	6752	7193	1,40,695	46.10
Rice (MTU1001; 140) 60-40-40	Rice (MTU-1010; 120) 120-60-40	Green Fodder (Local; 90) NR	6029	6239	11352	1,37,712	44.26
Rice (MTU1001; 140) 60-40-40	Rice (MTU-1010; 120) 120-60-40	Green Fodder (Local; 90) NR	6313	6786	15680	1,50,599	47.83
Rice (MTU1001; 140) 60-40-40	Rice (MTU-1010; 120) 120-60-40	Green Fodder (Local; 90) NR	5956	6496	4930	1,33,185	43.87
S.E.±						2,419	0.82
CD at 5%						5,390	1.84
KARAMANA (KERALA)							
Rice (Aiswariya ;113) 90-45-45	Rice (Kanchana;113) 70-35-35	-	4413	2025	-	66,319	22.28
Rice (Aiswariya ;113) 90-45-45	Rice (Kanchana;113) 70-35-35	Sweet potato (Kanhangad Local;131) 75-50-75	4878	2711	15046	1,77,475	44.31

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Rice (Aiswariya ;113) 90-45-45	Rice (Kanchana;113) 70-35-35	Pumpkin (Ambili ;79) 70-20-25	5981	2646	8528	1,40,027	31.98
Rice (Aiswariya ;113) 90-45-45	Rice (Kanchana;113) 70-35-35	Seasamum (Thilarani ;77) 30-15-30	3616	2515	135	67,072	21.97
Rice (Aiswariya ;113) 90-45-45	Rice (NR;113) 70-35-35	Amaranthus (Arun ;45) 50-50-50	6330	3103	12609	2,04,337	38.82
Rice (Aiswariya ;113) 90-45-45	Rice (Kanchana;113) 70-35-35	Cowpea (Vellayani culture;107) 20-30-10	6504	2809	2986	1,21,819	33.66
Rice (Aiswariya ;113) 90-45-45	Coleus (Nidhi ;147) 30-60-50	Sesbania (Local ;71) 00-00-0	5923	4891	-	2,15,530	31.58
Rice (Aiswariya ;113) 90-45-45	Cassava (Vellayani Hraswa ;146) 50-50-100	Sesbania (Local ;71) 00-00-0	4849	6401	-	1,96,956	33.02
S.E.±						23,168	2.90
CD at 5%						49,696	6.21
		KARJAT (MAHARASHTRA)					
Rice (Palghar-1 ;130) 100-50-50	Groundnut (SB-XI ;110) 12-50-00	-	6730	3253	-	1,08,110	31.30
Rice (Palghar-1 ;130) 100-50-50	Mustard (Varuna;95) 90-50-00	-	6174	960	-	61,006	19.91
Rice (Palghar-1 ;130) 100-50-50	Sunflower (SH-3322;100) 60-30-30	-	5829	1763	-	76,113	23.33
Rice (Palghar-1 ;130) 100-50-50	Brinjal (Manjari Gota ;140) 150-50-50	-	6444	23786	-	1,92,495	21.00
Rice (Palghar-1 ;130) 100-50-50	Cabbage (Golden Acre ;80) 120-60-60	-	5964	11991	-	91,036	17.90
Rice (Palghar-1 ;130) 100-50-50	Maize(F) (African Tall ;85) 120-50-50	-	5846	56506	-	87,542	21.94

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Rice (Palghar-1 ;130) 100-50-50	Cowpea (Konkan sadabahar ;70) 25-50-00	-	6818	2102	-	66,336	18.45
Rice (Palghar-1 ;130) 100-50-50	Dolichos bean (Konkan Bhusan ;105) 90-60-30	-	6581	4186	-	97,932	18.58
Rice (Palghar-1 ;130) 100-50-50	Ladys'finger (Arka Anamika ;95) 150-50-00	-	6322	6679	-	93,925	18.16
Rice (Palghar-1 ;130) 100-50-50	Chilli (Pusa Jwala ;125) 60-40-40	-	5622	5511	-	1,05,428	15.78
Rice (Palghar-1 ;130) 100-50-50	Rice (NR-1 ;140) 120-50-50	-	5798	4598	-	80,306	26.98
S.E.						2,174	0.43
(CD 5%)						4,440	0.87
NAVSARI (GUJARAT)							
Rice (Jaya;135) 100-30-0	Wheat (NR;106) 120-60-0	-	3360	1863	-	55,484	18.07
Rice (Jaya;135) 100-30-0	Fenugreek (NR;112) NR	Green gram (NR;90) NR	4469	788	763	93,905	20.64
Rice (Jaya;135) 100-30-0	Green gram (NR;NR) NR	Groundnut (NR;120) NR	3955	783	1363	96,926	24.03
Rice (Jaya;135) 100-30-0	Indian bean (NR;132) NR	Sorghum(F)+ Cowpea (NR;75) NR	3738	891	9350+ 5840	51,875	13.16
Rice (Jaya;135) 100-30-0	Sorghum(F) (NR;86) NR	Groundnut (GG-2;120) NR	3875	27210	1246	68,572	20.47
Rice (Jaya;135) 100-30-0	Sorghum (NR;122) NR	Sorghum (NR;110) NR	3497	2120	1937	63,549	22.77
Rice (Jaya;135) 100-30-0	Maize (Sweet corn) (NR;89) NR	Black gram (NR;90) NR	3955	4606	525	1,0,2022	21.26

Contd..../-

Cropping system (variety; duration in days)/ Fertilizer (N:P_2O_5:K_2O, kg/ha)			Yield (kg/ha)			Annual gross returns (Rs/ha)	Energy yield ($x10^6$, K Cal)
Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Rice (Jaya;135) 100-30-0	Sorghum(G) (NR;122) NR	Soybean (NR;110) NR	3818	726	1263	68,132	23.51
Rice (Jaya;135) 100-30-0	Green gram (NR; NR) NR	Sorghum(G) (NR;110) (NR;110)NR + Black gram (NR;90) NR	3818	725	1263 + 276	81,726	21.00
Rice (Jaya;135) 100-30-0	Chickpea (NR;106) NR + Mustard (NR;106) NR	Maize sweet corn (NR ;80) NR	3509	480 + 605	3315	88,955	21.29
S.E.±						5,138	1.74
CD at 5%						10,795	3.67

General view of maize crop in bio intensive cropping system at Coimbatore

Garlic+lucern, a successful cropping system at Kota

7.1.2 RESOURCE CONSERVATION TECHNOLOGIES

Title of the Experiment: Tillage and planting management in different cropping systems

Objective: To study the effect of different tillage and planting management techniques in different cropping system to improve crop productivity and soil health.

Treatments: There are no common cropping systems and treatments for all the centers and they vary from center to center. The details of treatments evaluated are given in table 7.1/2 along with yield data.

Location, Year of Start and Cropping System

	Location	Ecosystem	Year of start	Cropping system
1	Kanpur	II-Semi Arid	2003-04	Rice - Wheat
2	Varanasi	III-Sub Humid	2003-04	Rice - Wheat
3	R.S. Pura	IV-Humid	2003-04	Rice - Wheat
4	Palampur	III-Sub Humid	2008-09	Rice - Wheat
5	Rahuri	II-Semi Arid	2006-07	Soybean based
6	Akola	II-Semi Arid	2007-08	Soybean based
7	Hisar	I-Arid	2008-09	Pearl millet based
8	Coimbatore	II-Semi Arid	2009-10	Cotton - Maize

Experimental design: Strip plot / split plot

Results: Centre-wise results are given in Table 7.1/2 and briefly discussed below:

Kanpur

In rice–wheat cropping system at Kanpur, during *kharif*, hand transplanting provided highest rice yield (4.21 t ha^{-1}) that was at par with transplanting by transplanter (4.12 t ha^{-1}) but 31.3 and 34.4 % higher than drum seeding and zero till drilling, respectively. During *rabi*, the conventional sowing provided maximum wheat yield (3.62 t ha^{-1}) which was 2.7, 7.5 and 10.5 % higher than strip till drilling, bed planting and zero till drilling, respectively. Both rice and wheat planting methods affected yields of wheat and rice. The highest system productivity (8.16 t ha^{-1}) was recorded with treatment combinations of hand / mechanical transplanting of rice and conventional sowing of wheat.

Varanasi

In rice-wheat cropping system at Varanasi, during *kharif*, hand transplanting provided highest rice (5.71 t ha^{-1}) that was at par with transplanting by transplanter (5.42 t ha^{-1}) but 25.0 and 44.5 % higher than drum seeding and zero till drilling, respectively. During *rabi*, zero till drilling provided highest wheat (3.41 t ha^{-1}) that was at par with rotavator till drilling and conventional sowing but 19.9 % higher than strip till drilling. Both rice and wheat planting methods did not affect the yields of wheat and rice. Mechanical transplanting of rice and zero till drilling of wheat was the best treatment combination for maximizing both rice (5.67 t ha^{-1}) and wheat (3.41t ha^{-1}) yields.

R. S. Pura (Jammu)

In rice-wheat cropping system at R.S. Pura, during *kharif*, hand transplanting provided highest rice (3.83 t ha^{-1}) that was at par with drum seeding and mechanical transplanting but 26.9 % higher than zero till drilling. During *rabi*, bed planting provided highest wheat (3.49 t ha^{-1}) that was 5.7, 12.3 and 12.3 % higher compared to zero and strip till drilling and conventional sowing, respectively. Both rice and wheat planting methods did not affect the yields of wheat and rice. Hand transplanting of rice and zero till drilling of wheat was the best treatment combination for maximizing both rice (3.83 t ha^{-1}) and wheat (3.41 t ha^{-1}) yields.

Palampur

In rice-wheat cropping system at Palampur, during *kharif*, all the treatments gave similar yields but manually operated seed drill provided numerically maximum rice yield (9.92 t ha^{-1}). During *rabi* also, all the treatments gave similar yields and

the manually operated seed drill provided highest wheat yield (3.34 t ha^{-1}). Both rice and wheat planting methods did not affect the yields of wheat and rice. Manually operated seed drill was best for maximizing both rice (10.95 t ha^{-1}) and wheat (3.26 t ha^{-1}) yields.

Rahuri

In soybean based cropping systems at Rahuri, during *kharif*, soybean – onion system gave maximum soybean yield (2.82 t ha^{-1}) that was at par with soybean – wheat and soybean – chick pea but 15.9 to 16.6 % higher than pearl millet – chick pea, pearl millet – onion and pearl millet - wheat systems. During *rabi*, soybean – onion system gave onion yield of 27.9 t ha^{-1} which was at par with pearl millet – onion system; whereas, wheat and chick pea yields, of both the systems with soybean and pearl millet as kharif crops, were at par. Soybean – onion system provided highest soybean equivalent system yield followed by pearl millet – onion. Among tillage methods, conventional tillage sowing gave maximum soybean yield (2.87 t ha^{-1}) that was, respectively, 6.2, 12.2 and 21.3 % higher than bed planting, minimum and zero tillage sowings. During *rabi* also, the similar trend was obtained. Also, the conventional tillage sowing gave maximum soybean equivalent system yield. Soybean – onion system and conventional tillage sowing was the best treatment combination for maximizing both the yields of soybean and *rabi* crops.

Akola

In soybean based cropping systems at Akola, during *kharif*, soybean – mustard, soybean – chick pea and soybean – safflower systems yields (2.17 to 2.09 t ha^{-1}) were at par but 6.5% more than soybean – rabi sorghum system. During *rabi,* soybean –rabi sorghum system gave maximum soybean equivalent yield (2.74 t ha^{-1}) that was 25.1, 27.7 and 35.7 % higher than soybean – chick pea, soybean – safflower and soybean – mustard systems. Among tillage treatments broad bed – furrow (BBF) method gave numerically maximum soybean yield (2.67 t ha^{-1}). Also during rabi, the BBF method gave maximum soybean equivalent yield (2.69 t ha^{-1}) that was, respectively, 12.6, 25.6 and 43.8% more than conventional tillage, minimum and zero tillage sowings. Soybean – rabi sorghum and broad bed furrow sowing system was the best treatment combination for maximizing both the yields of soybean and *rabi* crops.

Hisar

In pearl millet based cropping systems at Hisar, during kharif, conventional tillage gave maximum yield of pearl millet (3.41 t ha^{-1}) that was 8.2, 8.8 and 14.9% higher than minimum and zero tillage and bed planting, respectively. During rabi all the treatments were at par but conventional tillage gave numerically maximum wheat yield (3.60 t ha^{-1}). The cropping systems did not affect yields of pearl millet and rabi crops but pearl – millet – mustard system gave 1.6 % higher yields in kharif, while pearl – millet – wheat system gave 5.17 t ha^{-1} wheat equivalent yield which was 3.3 times that of pearl – millet – mustard system.

Coimbatore

In cotton-maize cropping system at Coimbatore, during *kharif*, minimum tillage (MT) once and planting on permanent FIRB gave maximum cotton yield (4.37 t ha^{-1}) that was at par with MT- FIRB but 11.7, 13.7, 13.7, 14.4 and 25.6 % higher than conventional tillage (CT)-FIRB, MT-flat, CT-flat, CT-permanent FIRB and zero tillage, respectively. During rabi also MT-FIRB gave maximum maize yield (9.05 t ha^{-1}) that was 6.5, 12.0, 15.2, 20.7, 33.2 and 35.5% more than MT-flat, MT-permanent FIRB, CT-FIRB, CT-permanent FIRB, CT-flat and zero tillage respectively. Minimum tillage and planting on FIRB gave maximum cotton – maize system yield.

Table 7.1/2: Grain yield (kg/ha) under different tillage and planting treatments at different locations.

Treatment	*Kharif*					*Rabi*				
	B_1	B_2	B_3	B_4	Mean	B_1	B_2	B_3	B_4	Mean
Kanpur										
Cropping system: Rice (cv. Pant-12)-wheat (cv. K-7903), Fertilizer (N, P_2O_5 & K_2O kg/ha): Rice – 120:60:60, Wheat – 120:60:60										
A_1	2733	2833	2767	2700	2758	3122	3422	3334	2933	3203
A_2	2867	3100	2967	2633	2892	3300	3500	3400	3233	3358
A_3	4167	4333	4265	4067	4208	3567	3833	3767	3444	3653
A_4	4033	4300	4167	3967	4117	3400	3733	3599	3367	3525
Mean	3450	3642	3541	3342		3347	3622	3525	3244	
S.Em±	A means = 35.33 (86.45), B means = 32.33 (79.12)					A means = 30.52 (74.69), B means = 30.26 (74.04)				
CD at 5%	B within A = 93.73 (NS), A within B = 94.81 (NS)					B within A = 90.18 (NS), A within B = 90.26 (NS)				
A_1=Direct dry sowing with zero-till drill						*B_1= Sowing with bed planter*				
A_2=Direct seeding of sprouted rice in puddle conditions						*B_2=Conventional sowing*				
A_3=Manual transplanting						*B_3=Strip-till drilling*				
A_4=Transplanting by self-propelled rice transplanter						*B_4=Zero-till drilling*				
Varanasi										
Cropping system: Rice (cv. PHB 71)-wheat (cv. HD 2428), Fertilizer (N, P_2O_5 & K_2O kg/ha): Rice – 150:75:75, Wheat – 120:60:60										
A_1	3418	3083	2902	3291	3173	3280	3033	2733	3703	3187
A_2	4160	4487	4317	4163	4282	3280	3133	2634	3330	3094
A_3	5837	5699	5507	5784	5707	2932	3057	2885	3206	2970
A_4	5177	5629	5215	5669	5422	2982	2932	2858	3405	3044
Mean	4648	4725	4485	4727		3139	3039	2728	3411	
S.Em±	A means = 225.8 (552.5), B means = 135.4 (NS),					A means = 189.6 (NS), B means = 165.7 (405.6)				
CD at 5%	B within A = 266.8 (NS), A within B = 322.3 (NS)					B within A = 296.69 (NS), A within B = 310.68 (NS)				
A_1=Direct dry sowing with zero-till drill						*B_1=Rotovator-till drilling*				
A_2=Direct seeding of sprouted rice in puddle conditions						*B_2=Conventional sowing*				
A_3=Manual transplanting						*B_3=Strip-till drilling*				
A_4=Transplanting by self-propelled rice transplanter						*B_4=Zero-till drilling*				
R. S. Pura (Jammu)										
Cropping system: Rice (cv. Jaya)-wheat (cv.Raj 3765), Fertilizer (N, P_2O_5 & K_2O kg/ha): Rice – 120:60:30, Wheat – 100:50:25										
A_1	2847	2745	2778	2833	2801	3509	3027	2972	3370	3220
A_2	3819	3736	3893	3810	3815	3567	2963	3129	3259	3222

Treatment	Kharif					Rabi				
	B_1	B_2	B_3	B_4	Mean	B_1	B_2	B_3	B_4	Mean
A_3	3815	3866	3953	3829	3866	3426	3125	3097	3407	3264
A_4	3528	3579	3574	3620	3575	3361	3115	3055	3134	3166
Mean	3502	3481	3549	3523		3485	3058	3063	3292	
S.Em±	A means = 33.91 (82.99), B means = 71.16 (NS),					A means = 50.39 (NS), B means = 75.60 (185)				
CD at 5%	B within A = 108.28 (NS), A within B = 88.38 (NS)					B within A = 101.85 (133.44), A within B = 84.85 (188.63)				

A_1=Direct dry sowing with zero-till drill
A_2=Direct seeding of sprouted rice in puddle conditions
A_3=Manual transplanting
A_4=Transplanting by self-propelled rice transplanter

B_1= Sowing with bed planter
B_2=Conventional sowing
B_3=Strip-till drilling
B_4=Zero-till drilling

Palampur

Cropping system: Rice (cv. Giriza)-wheat (cv. HPW 155),
Fertilizer (N, P_2O_5 & K_2O kg/ha): Rice – 120:60:40, Wheat – 120:60:30

A_1	8570	8722	8853	7656	8450	3059	3213	3400	3175	3212
A_2	9170	9149	8366	7660	8586	2549	3319	3271	2886	3006
A_3	9257	9493	10949	9972	9918	2589	3030	3261	3155	3004
A_4	8495	9766	10480	9016	9439	3155	3559	3444	3107	3316
Mean	8873	9282	9662	8576		2833	3280	3344	3081	
S.Em±	A means = 562.37 (NS), B means = 952.15 (NS),					A means = 118.86 (NS), B means = 183.42 (NS)				
CD at 5%	B within A = 1832.2 (NS), A within B = 1663.3 (NS)					B within A = 291.40 (NS), A within B = 255.73 (NS)				

A_1 / B_1= Sowing by power tiller operated zero-till drill, A_2 / B_2= Sowing by power tiller operated multi-crop planter, A_3 / B_3= Sowing by manually operated seed drill, A_4 / B_4= Sowing by conventional method (behind hand plow)

Akola

Cropping system: Soybean (cv. TAMS-38)- Chickpea (cv. Jaki-9218), Safflower (cv. AKS/207), Mustard (cv. Pusa Gold), Rabi Sorghum (cv. PKV Kranti); Fertilizer (N, P_2O_5 & K_2O kg/ha): Soybean- 30:75:0, Chickpea- 25:50:0, Safflower- 40:40:0, Mustard- 50:40:0, Sorghum – 50:25:25

Treatment	Kharif					Rabi				
	M_1	M_2	M_3	M	Mean	M_1	M_2	M_3	M_4	Mean
S_1	1758	1382	1610	1422	1543	1369	1262	1449	1946	1506
S_2	1932	2002	1865	1852	1912	1825	1771	1718	2684	1999
S_3	1959	2509	2429	2388	2321	2241	2348	1879	2926	2348
S_4	3711	2764	2764	2442	2670	4296	2831	2013	3408	2687
Mean	2090	2164	2167	2026		1983	2053	1765	2741	
S.Em±	M means = 67.26 (NS), S means = 129.24(361.48),					M means = 77.78 (288.38), S means = 126.88 (354.88), S within M = 253.77 (NS), M within S = 233.13 (NS)				
CD at 5%	S within M = 258.48 (NS), M within S = 233.74 (NS)									

M_1	*Soybean-Safflower*	S_1	*No tillage-Direct sowing, chemical weed control*
M_2	*Soybean-Chickpea*	S_2	*Minimum tillage- one hand weeding*
M_3	*Soybean-Mustard*	S_3	*Conventional tillage- two hand weeding*
M_4	*Soybean-rabi Sorghum*	S_4	*BBF sowing-one harrowing and two hand weeding*

Rahuri

Cropping system: Soyabean (cv. JS-335), Pearlmillet (cv. Shradha)- Wheat (cv. 2189, Chickpea (cv. Digvijay), Onion (cv. N-2-4-1),
Fertilizer (N, P_2O_5 & K_2O kg/ha): kharif - NR, rabi – NR

	Kharif					*Rabi*				
	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
S_1	2499	2749	3072	2891	2800	3183	3450	3841	3625	3525
S_2	2514	2720	3140	2946	2830	1650	1969	2525	2195	2085
S_3	2494	2771	3094	2916	2819	25220	26609	30940	28882	27913
S_4	2051	2290	2617	2494	2363	3193	3417	3862	3595	3530
S_5	2113	2278	2658	2455	2376	1506	1866	2504	2154	2007
S_6	2092	2298	2638	2463	2373	24189	26002	30076	28296	27141
Mean	2292	2518	2870	2694		9824	10561	12291	11458	

S.Em±	M means = 27.14 (100.62), S means = 24.95 (67.47)	M means = 75.74 (280.79), S means = 74.70 (202.02),
CD at 5%	M within S = 53.02 (NS), S within M = 49.89 (NS)	M within S = 156 (458.77), S within M = 149.4 (404.04)

Main Plot	***Sub Plot***
M_1 *Zero tillage*	S_1 *Soybean - Wheat*
M_2 *Minimum tillage (50 % of Conventional tillage)*	S_2 *Soybean - chickpea*
M_3 *Conventional tillage*	S_3 *Soybean - Onion*
M_4 *Bed planting*	S_4 *Pearl millet – Wheat*
	S_5 *Pearl millet - chickpea*
	S_6 *Pearl millet - Onion*

Hisar

Cropping system: Pearlmillet (cv. HHB-197)-wheat (cv. WH-711), Raya (cv. RH-30)
Fertilizer (N, P_2O_5 & K_2O kg/ha): Pearlmillet- 125:62.5:0, wheat -145:60:0, Raya – 80:30:0

	Kharif					*Rabi*				
	M_1	M_2	M_3	M_4	Mean	M_1	M_2	M_3	M_4	Mean
S_1	3062	3086	3424	2867	3110	5068	5246	5485	4870	5167
S_2	3153	3166	3395	2928	3160	1418	1585	1718	1346	1517
Mean	3107	3126	3410	2898		3243	3415	3602	3108	

S.Em±	M means = 68 (167), S means = 84 (NS)	M means = 145 (NS), S means = 114 (262.5),
CD at 5%	M within S = 137 (NS), S within M = 169 (NS)	M within S = 216.7 (NS), S within M = 227.6 (NS)

Main plot	Sub plot
M_1 Zero tillage	S_1 Pearl millet – wheat
M_2 Minimum tillage	S_2 Pearl millet - mustard
M_3 Conventional tillage	
M_4 Bed planting	

Coimbatore

Cropping system: Cotton (cv. MCU-5)- Maize (cv. NK-6240),
Fertilizer (N, P_2O_5 & K_2O kg/ha): Cotton – 80:40:40, Maize 35:62.5:50

	Kharif	Rabi
CT- flat	3772	6037
CT- FIRB	3858	7670
CT- Permanent FIRB	3743	7172
MT- flat	3772	8459
MT- FIRB	4078	9050
MT- Permanent FIRB	4367	7962
Zero tillage- planting	3253	5833
Mean	3835	7455
CD at 5%	409	778
C.V.(%)	6	6

Project Director monitoring the progress of experiments at Pantnagar (L) and Siruguppa (R)

7.2 SUSTAINABLE RESOURCE MANAGEMENT

7.2.1 INTEGRATED NUTRIENT MANAGEMENT (INM)

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

***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 productivity of cereal based crop sequences and on soil health.

***Treatments*:**

	Kharif	*Rabi*
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), Bichpuri (U.P.)
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 ($N:P_2O_5:K_2O$, kg/ha)		Farmers' practice ($N:P_2O_5:K_2O$, 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	Naveen	80:40:40	100:50:50	40:20:20 +4 .5	50:25:25
Jorhat	1987	Ranjit	Dishang	87:12.5:34	40:16:60	NR	NR
Maruteru	1989	MTU1075	MTU 1010	60:40:40	120:60:40	60:40:0	120:60:0
Bhubaneswar	1983	Pratiksha	Naveen	80:40:40	100:50:50	20:0:0 + 2.0	20:0:0 + 2 .0
Karjat	2007	Palghar-1	Karjat-3	100:50:50	120:50:50	45:45:45	45:45:45
Karamana	1985	Aiswarya	Aiswarya	90:45:45	90:45:45	90:22.5:22.5 +3.0	90:22.5: 22.5
Rice-Wheat Cropping System							
Ludhiana	1983	PR-116	PBW-343	NR	120:60:30	NR	NR
Kanpur	1983	P. Dhan-12	PBW-343	120:60:60	120:60:60	80:30:0	80:30:0
Jabalpur	1985	Kranti	GW 273	160:60:40	120:60:40	40:20:0	40:20:0
R.S. Pura	1985	Jaya	PBW-343	100:60:30	100:50:25	34:25:22	56:25:0
Palampur	1990	HPR-2143	HPW -184	90:40:40	120:90:30	36:16:16 +5.0	48:36:12 +5.0
Varanasi	1985	NDR-359	HUW 234	120:60:60	120:60:60	50:0:0	60:0:0
Pantnagar	1984	Sarju 52	HUW 234	120:60:60	120:60:60	90:40:0	90:40:0
Faizabad	1984	Sita	PBW-343	80:40:20	100:50:25	60:30:15	68:33:0
Sabour	1988	Mahamaya	GW-273	80:60:40	100:50:30	60:40:20	90:40:20
Raipur	1986	IET 4094	UP 262	80:40:40	100:60:40	50:30:20	60:20:20
Kalyani	1987	GR 3	GW 496	100:50:0	100:60:40	50:0:0+2.5	60:30:0
Navsari							
Rice-Maize Cropping System							
Kathalgere	1988	IR 64	Hy. Maize	46:16:60	46:16:60	NR	NR
Rice-Mustard Cropping System							
Rudrur	1984	RDR-763	GM-1	120:60:40	80:40:30	150:40:0	60:0:0
Maize-Wheat Cropping System							
Ranchi	1983	Suwan	K 9107	100:50:25	100:50:25	23:0:0	23:0:0
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 197	PBW 343	125:62.5:0	150:60:0	NR	NR
Junagadh (With K)	1987	GHB 558	GW366	80:40:25	120:60:25	80:40:0	120:60:0
Junagadh (Without K)	1987	GHB 558	GW366	80:40:0	120:60:0	80:40:0	120:60:0
Bichpuri	1990	Bio. 8510	UP 2338	80:40:40	120:60:40	40:0:0	40:0:0
Sorghum-Wheat Cropping System							
Akola	1984	CSH-14	AKW 3722	120:60:60	120:60:60	50:25:0	40:25:12.5
Parbhani	1983	CSH-9	Lok-1	80:40:40	120:60:60	40:20:20	60:30:30
Rahuri	1984	CSH-9	HD-2189	120:60:60	120:60:60	40:20:20	60:30:30

***Results*:**

Rice-Rice Cropping System

At **Rajendranagar,** the highest yield of rice was recorded under T_{11} (5.25 t/ha) during *kharif,* and under T_5 during *rabi* (4.08 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 6.77 percent, during *kharif.* It was statistically at par with T_{10}, and whereas during *rabi* T_5 it was at par with T_{10}.

At **Chiplima,** the highest grain yield of rice was achieved under T_{10} during *kharif* (5.43 t/ha) and *rabi* (6.00 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 16 and 11.77 percent, during *kharif* and *rabi*, respectively. It was statistically at par with T_9 and T_{11} during *kharif*, but statistically at par with T_9 during *rabi*.

At **Jorhat,** the highest yield of rice was recorded under T_9 (5.65 t/ha) during *kharif,* and during *rabi* (2.35 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 7.61 and 11.90 percent, during *kharif* and *rabi*, respectively. During *kharif* T_7, T_8, and T_{11} was statistically at par, whereas during *rabi* T_9 are at par with T_5, T_7 and T_8.

At **Maruteru,** the highest yield of rice was recorded under T_{11} (6.29 t/ha) during *kharif,* The increase in crop yield under highest yielding treatment over 100% RDF was 7.11 percent. under highest yielding treatment during *kharif* (i.e T_{11}) was at par with T_{10}. During *rabi* (6.93t/ha) under treatment T_6 gave tha maximum yield. The increase in crop yield under highest yielding treatment over 100% RDF was 6.50 percent. under highest yielding treatment during *rabi* T_6 was at par with T_{10}.

At **Bhubaneswar,** during both *kharif* (5.45 t/ha) and *rabi* (5.57 t/ha), seasons the highest grain yield of rice was recorded under treatment T_{10} being statistically at par with T_6, T_7 and T_{11} in *kharif* and during *rabi* at par with T_{11}. The corresponding highest yield increase in respective the seasons were 19.67 and 19.50 percent higher than 100% RDF.

At **Karjat,** during both *kharif* (4.74 t/ha) and *rabi* (5.65 t/ha), seasons the highest grain yield of rice was recorded under treatment T_5.

At **Karamana,** the highest yield of rice was recorded under T_8 (4.79 t/ha) during *kharif,* and under T_6 during *rabi* (4.91 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 20.26 and 20.06 percent, during *kharif* and *rabi*, respectively. The yield under highest yielding treatment during *kharif* T_8 was at par with T_7, T_{10} and T_{11} whereas during *rabi* T_6 it was at par with T_3, T_4, T_7, T_8, T_9, T_{10} and T_{11}.

Rice-Wheat cropping system

At **Varanasi,** in rice-wheat system the treatment T_6 gave the maximum yield of rice (5.34 t/ha) and wheat (4.42 t/ha) which was 7.22 and 7.15 per cent higher over recommended dose of fertilizer (T_5). The yield under highest yielding treatment during *kharif* T_6 was at par with T_7 and T_{11} whereas during *rabi* T_6 it was at par with T_7, T_9 and T_{10}.

At **Jammu**, in rice-wheat system the treatment T_6 gave the maximum yield of rice (5.03 t/ha) and wheat (3.62 t/ha) which was 3.85 and 4.19 per cent higher over recommended dose of fertilizer (T_5).

At **Kanpur**, the highest yield of rice was recorded under T_5 (4.42 t/ha) during *kharif,* and under T_6 gave the maximum yield (4.57 t/ha) of wheat, slightly higher 2.03 percent than recommended dose of fertilizer. The yield under highest yielding treatment during *kharif* T_5 was at par with T_7 and T_{10} whereas during *rabi* T_6 it was at par with T_{10}.

At **Kalyani**, the rice recorded maximum yield (3.99 t/ha) under T_8 which was 15.96 % higher over recommended dose of fertilizer and maximum yield of wheat (3.02 t/ha) was under T_6 which was 19.78% higher than recommended dose of fertilizer. The yield under highest yielding treatment during *kharif* T_8 was at par with T_6, T_7 and T_{10}.

Table 7.2/1(a): Grain yield (kg/ha) of rice-rice crop sequence under different integrated nutrient management treatments.

Treatment	Rajendranagar		Chiplima		Jorhat		Maruteru		Bhubaneswar		Karjat		Karmana	
	Kharif	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*
T_1	2083	1685	2142	2651	2800	1150	3223	1891	2819	2902	2642	3374	2216	2322
T_2	2552	2340	3982	4522	3500	1200	5625	3373	4027	4090	3588	4186	3372	3577
T_3	3389	3512	4075	5223	3875	1350	5629	5552	4791	4854	3825	4685	3275	4486
T_4	4209	3173	4392	4800	4050	1460	5659	5422	4340	4500	4165	4535	3609	4356
T_5	4918	4084	4670	5377	5250	2100	5875	6513	4555	4666	4742	5654	3986	4096
T_6	4320	3329	4742	5516	4500	1600	6033	6939	5166	5409	4615	5435	4404	4918
T_7	4098	2972	4875	5601	4800	1950	5956	6164	4972	5090	4304	5062	4446	4688
T_8	3549	3108	4771	5452	4600	1750	5867	6570	4667	4986	4243	5176	4794	4774
T_9	3547	2878	5065	5773	5650	2350	5820	5980	4194	4486	3961	5032	4292	4803
T_{10}	5144	3865	5439	6007	4350	1300	6003	6757	5451	5576	4458	5315	4557	4587
T_{11}	5251	3326	4829	5086	4700	1400	6293	6177	4889	5076	3844	4992	4655	4543
T_{12}	3714	3345	3748	4151	3300	1260	5769	5248	3861	4187	3792	4511	4083	3808
SEm±	259	161	276	294	504	319	56	128	264	257	107	115	170	288
CD at 5%	539	334	574	611	1026	649	117	267	537	523	219	234	347	587

Table 7.2/1(b): Grain yield (kg/ha) of rice-wheat crop sequence under different integrated nutrient management treatments

Treat-ment	Varanasi		R.S. Pura (Jammu)		Pura Farm (Kanpur)		Kalyani		Jabalpur		Kumarganj		Navsari		Palampur		Sabour		Ludhiana		Raipur	
	Kharif	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*
T_1	2670	1420	2076	1102	1078	672	1375	597	1232	913	1605	749	1817	1978	4629	1229	945	803	1556	1490	1362	531
T_2	4220	3250	4138	3151	3168	3062	2277	1236	2547	1707	3435	2248	2150	2645	5627	2143	2559	2016	3543	3765	3479	1989
T_3	4280	4040	4160	3261	3412	3490	2583	2138	2848	2107	3960	3272	2150	2760	5650	2512	2674	4000	3823	4895	3962	2377
T_4	4730	3955	4477	3007	3350	3390	2666	1888	4076	2532	4470	2788	2507	2944	5959	1893	3448	2835	4991	4454	4258	2166
T_5	4980	4125	4850	3481	4425	4481	3444	2527	5831	2928	5543	3535	2541	3151	6505	3191	4620	4249	6250	5270	5519	2719
T_6	5340	4420	5037	3627	4387	4572	3847	3027	5445	2746	5265	3655	2760	3381	6849	4238	5126	4875	6535	5491	5510	2517
T_7	5100	4180	4717	3269	4162	4369	3680	2708	4478	2327	5510	3250	3255	2726	7146	2291	4781	4449	6653	5325	5342	2240
T_8	4100	4070	4574	3312	4130	4278	3994	2597	5014	2430	4880	3945	2645	3634	6339	2340	4965	4606	5266	4840	5429	2364
T_9	4790	4190	4557	3126	3962	4194	3305	2375	4174	2243	5110	3403	3128	3255	6493	2734	4651	4297	5433	4714	5454	2364
T_{10}	4870	4280	4517	3422	4269	4414	3625	2750	6043	3058	5265	3900	3128	2967	8131	3009	5072	4815	7054	5222	5618	2816
T_{11}	5110	3900	4476	3280	4125	4319	3388	2583	4725	2467	5770	3585	3266	2990	7835	2665	4766	4409	7214	5170	5450	2489
T_{12}	4550	3590	3718	2667	2931	2919	2666	1638	2358	1661	3871	2230	2162	2795	7051	1917	2927	2855	7202	5598	3027	1984
T_{13}																			6875	5532		
T_{14}																			6293	5321		
SEm±	94	137	49	36	68	37	209	116	74	119	195	223	335	403	458	436	155	157	226	154	324	104
CD at 5%	272	278	101	74	138	77	425	237	151	242	398	455	681	820	933	887	316	320	465	318	673	217

At **Jabalpur,** the highest yield of rice was recorded under T_{10} in both the season (6.04 t/ha) during *kharif* and during *rabi* (3.05 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 3.63 and 4.43 percent, during *kharif* and *rabi*, respectively.

At **Kumarganj,** maximum yield of rice (5.77 t/ha) was recorded under T_{11} which was 4.09 % higher than recommended dose of fertilizer, while maximum wheat yield (3.94 t/ha) was recorded under T_8 which was 11.95 % higher than recommended dose of fertilizer. During *kharif* T_{11} was statistically at par with T_7 while during *rabi* it was statistically at par with T_6, T_{10} and T_{11}.

At **Navasari,** the highest yield of rice was recorded under T_{11} (3.26 t/ha) during *kharif,* and under T_8 during *rabi* (3.63 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 28.53 and 15.32 percent, during *kharif* and *rabi*, respectively. The yield under highest yielding treatment during *kharif* T_{11} was at par with T_6, T_7, T_8, T_9 and T_{10} whereas during *rabi* T_8 it was at par with T_4, T_6, T_9 and T_{10}.

At **Palampur,** rice yield was maximum (8.13 t/ha) under T_{10}, and 24.99 % higher than recommended dose of fertilizer and maximum yield of wheat (4.24 t/ha) was under T_6 which was 32.81 % higher than recommended dose of fertilizer. During *kharif*, T_7, T_{11} and T_{12} statistically at par wth high yielding treatment T_{10}.

At **Sabour,** the rice recorded maximum yield (5.12 t/ha) under T_6 which was 10.95 % higher over recommended dose of fertilizer and maximum yield of wheat (4.87 t/ha) was under T_6 which was 14.73 % higher than recommended dose of fertilizer. The yield under highest yielding treatment during *kharif* and *rabi* T_6 was at par with T_8 and T_{10} respectively.

At **Ludhiana,** the highest yield of rice was recorded under T_{11} (7.21 t/ha) during *kharif,* and under T_{12} during *rabi* (5.59 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 15.42 and 6.62 percent, during *kharif* and *rabi*, respectively. The yield under highest yielding treatment during *kharif* T_{13} was at par with T_{10}, T_{12} and T_{13} whereas during *rabi* T_{12} it was at par with T_6, T_7, T_{10}, T_{13} and T_{14}.

At **Raipur,** the highest yield of rice and wheat was recorded under T_{10} (5.61 t/ha) during *kharif,* and during *rabi* (2.81 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 1.79 and 3.56 percent, during *kharif* and *rabi*, respectively. The yield under highest yielding treatment during *kharif* T_{10} was at par with T_5, T_6, T_7, T_8, T_9 and T_{11} whereas during rabi it was statistically non significant.

Rice-maize cropping system

At **Kathalgere,** in rice-maize system the treatment T_9 yielded maximum (7.15 t/ha) of rice during *kharif*, which was 9.88 percent higher than RDF and during *summer* same treatment gave the highest (5.15 t/ha) yield of maize, which was

Table 7.2/1(c): Grain yield (kg/ha) of rice-maize crop sequence under different integrated nutrient management treatments

Treatment	Kathalgere	
	Kharif	*Summer*
T_1	4101	1243
T_2	6213	3754
T_3	6287	4616
T_4	6469	3830
T_5	6506	4576
T_6	6250	3779
T_7	6396	4572
T_8	6798	3951
T_9	7149	5157
T_{10}	6308	3615
T_{11}	6360	4028
T_{12}	5694	3286
SEm±	341	248
CD at 5%	981	714

12.69 percent higher than RDF. The yield under highest yielding treatment during *kharif* T_9 was at par with all the treatment except T_1 and T_{12} whereas during *rabi* T_9 it was at par with T_3 and T_7.

Rice-Mustard cropping system

At **Rudrur,** in rice-mustard system the treatment T_{11} yielded maximum (5.60 t/ha) of rice during *kharif*, which was 11.32 percent higher than RDF while in *rabi* also the same treatment gave the highest (0.864 t/ha) yield of mustard, which was 4.72 percent higher than RDF.

Table 7.2/1(d): Grain yield (kg/ha) of rice–mustard crop sequence under different integrated nutrient management treatments.

Treatment	Rudrur	
	Kharif	*Summer*
T_1	2862	279
T_2	3807	525
T_3	3827	645
T_4	4524	581
T_5	5034	825
T_6	4533	802
T_7	5398	857
T_8	4508	815
T_9	5443	826
T_{10}	4638	820
T_{11}	5604	864
T_{12}	4816	652
SEm±	33	13
CD at 5%	69	27

Maize-wheat cropping system

At **Kanke (Ranchi),** in maize-wheat system the treatment T_6 yielded maximum (4.48 t/ha) of maize during *kharif*, which was 9.63 percent higher than RDF while in *rabi* also the same treatment gave the highest (4.68 t/ha) yield of wheat, which was 16.67 percent higher than RDF.

Table 7.2/1(e): Grain yield (kg/ha) of maize–wheat crop sequence under different integrated nutrient management treatments.

Treatment	Ranchi	
	Kharif	*Rabi*
T_1	831	999
T_2	2311	2941
T_3	2458	3886
T_4	2690	3485
T_5	4090	4011
T_6	4484	4680
T_7	4214	4056
T_8	3605	3975
T_9	3459	3637
T_{10}	3360	3708
T_{11}	2690	3428
T_{12}	1044	1194
SEm±	176	278
CD at 5%	366	577

Pearl millet-wheat cropping system

At **S.K. Nagar,** the highest yield of pearlmillet was recorded under T_{11} (1.20 t/ha) during *kharif,* and under T_6 during *rabi* (3.06 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 70.45 and 52.66 percent, during *kharif* and *rabi*, respectively. The yield under highest yielding treatment during *kharif* T_{11} was at par with T_6 and T_7 whereas during *rabi* T_6 it was at par with T_7.

At **Junagadh,** (With Potash)the highest yield of crops were attained under T_6 during *kharif* pearl millet yield was (1.14 t/ha) and during *rabi* wheat in (2.65 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 24.20 and 17.65 percent, during *kharif* and *rabi*,

Table 7.2/1(f): 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	16	84	309	1647	286	1439	916	1458	1037	1405
T_2	413	768	632	2106	602	1744	2118	3618	1564	2717
T_3	433	971	679	2160	646	2056	2246	5091	1622	4363
T_4	510	1212	741	2222	714	2137	2662	4422	2006	3897
T_5	704	2007	917	2249	886	2102	2957	5308	2338	4680
T_6	1101	3064	1139	2646	1061	2565	3142	5452	2687	5114
T_7	1154	2812	1094	2511	1001	2469	2934	4576	2423	4223
T_8	875	2650	776	2391	748	1905	2368	5136	2168	4445
T_9	1071	2604	844	2500	814	1979	2696	4458	2091	4161
T_{10}	1075	2722	883	2295	849	2110	2940	5274	2423	4984
T_{11}	1200	2676	922	2457	889	2218	2878	4522	2355	4208
T_{12}	527	1186	680	2175	721	2010	2704	4932	1403	3128
SEm±	56	111	34	137	37	132	114	191	83	133
CD at 5%	114	227	69	280	76	269	233	388	169	271

respectively. During *kharif* the crop yield was statistically at par with T_7 while in *rabi* it was statistically at par T_7, T_8, T_9 and T_{11}.

At **Junagadh,** (Without Potash) the highest yield of crops were attained under pearl millet T_6 during *kharif* (1.06 t/ha) and wheat during *rabi* (2.57 t/ha). The increase in crop yield under highest yielding treatment over 100% RDF was 19.75 and 26.78 percent, during *kharif* and *rabi*, respectively. During *kharif* and *rabi* the crop yield was statistically at par with T_7.

At **Hisar,** in pearlmillet-wheat system the treatment T_6 gave the maximum yield of pearlmillet (3.14 t/ha) and wheat (5.45 t/ha) which was 6.25 and 2.71 per cent higher over recommended dose of fertilizer (T_5). The yield under highest yielding treatment during *rabi* T_6 was at par with T_5, T_7 and T_{10} whereas during *rabi* T_6 it was at par with T_3, T_8 and T_{10}.

At **Bichpuri,** in pearlmillet-wheat system the treatment T_6 gave the maximum yield of pearlmillet (2.69 t/ha) and wheat (5.11 t/ha) which was 1492 and 9.27 per cent higher over recommended dose of fertilizer (T_5). The yield under highest yielding treatment during *rabi* T_6 was at par with T_{10}. But during *kharif* various IPNS packages had significant effect on crop yield.

Sorghum-wheat cropping system

At **Akola,** in sorghum-wheat system the yield of sorghum in *kharif* was maximum (2.65 t/ha) under recommended dose of fertilizer T_5 while in *rabi* the yield of wheat was 12.77 % higher than RDF recorded under the treatment T_6 which yielded highest (2.62 t/ha).

At **Rahuri,** the maximum yield of sorghu(3.10 t/ha) m was under T_6 which was only 2.88 % higher than RDF. The same result was also obtained with wheat, maximum (4.07 t/ha) under T_6 which

Table 7.2/1(g): Grain yield (kg/ha) of sorghum-wheat crop sequence under different integrated nutrient management treatments.

Treatment	Akola		Rahuri		Parbhani	
	Kharif	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi*
T_1	254	457	151	674	169	401
T_2	1967	1328	2471	2734	1980	2289
T_3	2065	1917	2667	3255	2263	2273
T_4	2199	1778	2824	3196	2142	2654
T_5	2650	2325	3013	3719	3096	3158
T_6	2457	2622	3100	4076	2942	3472
T_7	2375	2103	2670	3527	2623	2746
T_8	2163	2147	2648	3619	2525	2644
T_9	2280	2012	2827	3408	2119	2669
T_{10}	2375	2206	2926	3707	2942	3086
T_{11}	2438	2030	2838	3414	2628	2803
T_{12}	1873	1189	2169	2617	1980	2345
T_{13}			2177	2627	2762	2885
T_{14}					2644	2561
SEm±	119	152	31	32	201	124
CD at 5%	242	310	64	64	415	255

was 9.59 % % higher than RDF. During *kharif* T_6 are at par with T_5 and T_{10} and in *rabi season*, various IPNS packages exerted distinct significant effect on crop yield.

At **Parbhani,** the yield of sorghum was maximum (3.9 t/ha) under the treatment T_5, and wheat yield was maximum (3.42 t/ha) under T_6, 9.94 % higher than RDF. During *kharif* T_5 was statistically at par with T_6 and T_{10}. But during *rabi*, various IPNS packages had significant effect on crop yield.

7.2.2 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*:**

i. 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 and120 kg ha^{-1}), 3 levels of P_2O_5 (0, 40 and 80 kg ha^{-1}) and 2 levels of K_2O (0 and 40 kg ha^{-1}) with one absolute control plot in each block.

***Locations*:**

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

Results

The centre-wise results are presented in table 7.2/2 and their brief description is given below.

Rice-Rice Cropping System

In a rice-rice system experiment was conducted at Karamana centre and the highest grain yield of rice was recorded at 80 kg N during *kharif* as well as *rabi* seasons with an yield level of 4.29 and 5.70 t/ha.

Rice-Wheat Cropping System

In rice-wheat system the graded dose of N up to 120 kg/ha gave significantly increased yields, the highest being 2.85 and 6.38 t/ha at Faizabad and Rewa, respectively. The same was also true with the highest dose of P and K where yield levels were 2.91 and 6.01 t/ha with 80 kg P_2O_5 at Faizabad and Rewa, respectively. The yield level with the application of K_2O (40 kg/ha) was 2.48 and 5.69 t/ha at Faizabad and Rewa, respectively. During *rabi* at Faizabad the highest dose of N, P, K gave yield level of wheat at 1.84, 2.45 and 1.77 t/ha, respectively and at rewa,4.04,3.68 and 3.53 t/ha respectively. At Faizabad, the interaction effects of NPK and NP were highly significant in kharif and in rabi NPK, NP NK, and PK are highely significant., whereas at Rewa, the effect of NPK was significantin in kharif and rabi both the season.

Maize-Wheat Cropping System

In maize-wheat systems the graded dose of NPK at the highest level gave the highest yields during both *kharif* and *rabi* at Siruguppa and Kanke. The yield levels were 3.95, 4.04 and 3.51 t/ha, respectively at Siruguppa in kharif season and in rabi season 1.22, 1.15 and 1.08 t/ha with NPK at highest level, whereas at Kanke the corresponding yield levels were 1.99, 2.53 and 1.86 t/ha, and in rabi season 2.65, 3.05 and 2.38 t/ha respectively. At Siruguppa during *kharif* the effects of N, P, K, NP, were highly significant whereas at Kanke the effects of NPK and NP were highly significant and that of PK was not significant.

Table 7.2.2 (a) : Average yield (kg/ha) of crops in different crop rotations as affected by different levels of N,P and K fertilizers during 2010-11.

Crop sequence / Centre	Variety	Av. yield of unfertilized plot	Av. yield with N (kg/ha) 40	80	120	S.E.(d) C.D.(5%)	Av.yield with P_2O_5 (kg/ha) 0	40	80	S.E.(d) C.D.(5%)	Av.yield with K_2O(kg/ha) 0	40	S.E.(d) C.D.(5%)	G.M.	C.V (%)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
RICE–RICE																
							Kharif - Rice(I)									
V/Karamana	Aishwarya	4237	3689	4293	4085	214 (430)	3925	4189	3953	214 (NS)	3975	4070	175 (NS)	4053	21	(N,NP)*
							Rabi - Rice(I)									
V/Karamana	Aishwarya	6333	5083	5704	5042	449 (NS)	5442	5533	5854	449 (NS)	5564	5656	366 (NS)	5713	26	NIL
RICE–WHEAT																
							Kharif - Rice(I)									
III/Faizabad	Sarjoo-52	876	1741	2415	2856	39 (79)	1609	2485	2917	39 (79)	2187	2487	32 (64)	2128	6	(N,P,K,NP)**
							Rabi - Wheat(I)									
III/Faizabad	HUW-234	458	1428	1522	1845	42 (85)	208	2042	2545	42 (85)	1426	1770	35 (69)	1435	10	(N,P,K,NP,NK, PK)**
							Kharif - Rice(I)									
III/Rewa	IR-36	2261	4702	5597	6385	64 (127)	5106	5559	6019	64 (127)	5430	5693	52 (105)	5090	4	(N,P,K,)**
							Rabi - Wheat(I)									
III/Rewa	WH-147	1145	2811	3267	4042	56 (113)	3017	3413	3689	56 (113)	3213	3534	46 (92)	3055	6	(N,P,K,)**
MAIZE–WHEAT																
							Kharif - Maize(I)									
I/Siruguppa	M-900	739	2696	3178	3965	72 (145)	2282	3511	4046	72 (145)	3045	3514	59 (118)	2917	8	(N,P,K,NP)**

Crop sequence / Centre	Variety	Av. yield of unfertilized plot	Av. yield with N (kg/ha) 40	80	120	S.E.(d) C.D.(5%)	Av.yield with P_2O_5 (kg/ha) 0	40	80	S.E.(d) C.D.(5%)	Av.yield with K_2O(kg/ha) 0	40	S.E.(d) C.D.(5%)	G.M.	C.V (%)	Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
							Rabi-Wheat(I)									
I/Siruguppa	DWR-162	323	747	1016	1266	33 (66)	807	1067	1155	33 (66)	932	1088	27 (54)	912	12	(N,P,K,NP)** NK*
							Kharif - Maize(R)									
III/Kanke	HQPM-1	809	1402	1808	1991	65 (130)	723	1947	2531	65 (130)	1598	1869	53 (106)	1601	13	(N,P,K,NP)**
							Rabi-Wheat(I)									
III/Kanke	K-9107	735	1757	2271	2635	91 (182)	920	2687	3057	74 (148)	2061	2382	74 (148)	2009	14	(N,P,K,NP)**

Summary: Following treatments are significant.

Karamana(Kharif)	(N,NP)**	Rewa (Kharif)	(N,P,K,)**	Siruguppa (Kharif)	(N,P,K,NP)**
Karamana(Rabi)	NIL	Rewa (Rabi)	(N,P,K,)**	Siruguppa (Rabi)	(N,P,K,NP)** ,NK*
Faizabad (Kharif)	(N,P,K,NP)**	Kanke (Kharif)	(N,P,K,NP)**		
Faizabad (Rabi)	(N,P,K,NP,NK,PK)**	Kanke	(N,P,K,NP)**		

Table 7.2.2 (b): Average yield (kg/ha) as affected by N and P interaction (2010-11)

Crop sequence/ Centre	Levels of P_2O_5(kg/ha)	Average yield with N (kg/ha) application			CD at 5%
		40	80	120	
1	2	3	4	5	6
RICE - RICE					
		Kharif -RICE (I)			
V/Karamana	0	3308	4253	4217	797
	40	3618	4336	4612	
	80	3957	4393	3508	
RICE-WHEAT					
		Kharif-Rice(I)			
III/Faizabad	0	1388	1756	1705	146
	40	1896	2448	3131	
	80	1917	3058	3735	
		Rabi-Wheat(I)			
III/Faizabad	0	253	161	190	157
	40	1684	2005	2424	
	80	2313	2416	2938	
MAIZE-WHEAT					
		Kharif-Maize(I)			
I/Siruguppa	0	1367	2372	3068	268
	40	3227	3261	4102	
	80	3486	3917	4718	
		Kharif-Maize(R)			
III/Kanke	0	808	815	561	241
	40	1450	1973	2454	
	80	1936	2694	2910	
		Rabi-Wheat (I)			
I/Siruguppa	0	429	932	1052	123
	40	927	1075	1206	

Table 7.2.2 (c): Average yield (kg/ha) as affected by N and K interaction (2010-11)

Crop sequence/ Centre	Levels of K_2O (kg/ha)	Average yield with N (kg/ha) application			CD at 5%
		40	80	120	
1	2	3	4	5	6
RICE-WHEAT					
		Rabi-Wheat(I)			
III/Faizabad	0	1274	1421	1585	120
40	1583	1622	2105		
MAIZE-WHEAT					
		Rabi-Wheat(I)			
I/Siruguppa	0	617	949	1229	94
	40	878	1084	1303	

7.2.3 DEVELOPMENT OF ORGANIC FARMING PACKAGE

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

***Objectives*:**

i. To develop organic nutrient management package 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.

***Treatments*:**

T_1: 50% recommended NPK + 50% N as FYM (INM).

T_2: Recommended N equivalent to 1/3 of total N requirement of crop as FYM, vermi-compost and neem cake.

T_3: T_2 + inter cropping/ trap cropping.

T_4: T_2 + agronomic practices for weed and pest control.

T_5: 50% N as FYM + seed treatment with *Azotobacter* and phosphate solubilizing bacteria (PSB) + rock phosphate.

T_6: T_2 + *Azotobacter* + PSB.

T_7: 100% NPK + micronutrients as per soil test (RDF).

T_8: Dummy plot (T2).

Year of start: 2003-04

Results:

The centre-wise results are presented in table 7.2/3 (a-c) and their brief description is given below.

Rice-Based Cropping Systems

Bhubaneswar

Highest grain yield of rice 4.35 (t ha^{-1}) was recorded under T_6 which was 22.53% higher than recommended dose of fertilizer (T_7) in rice-cabbage-lady's finger. The mean performance of this treatment was also highest (5.6 t ha^{-1}) during last three years and recorded 14.94% higher yield than RDF. During succeeding *rabi* and *summer* seasons also, the highest yields of potato (19.78 t ha^{-1}) and lady's finger (9.76 t ha^{-1}) were recorded under T_6 and the increase in yield of these crops was 21.49 and 19.46% respectively over RDF. However, the mean yield increase during last three years was 25.46 and 26.65% for potato and lady's finger, respectively over RDF.

Chiplima

At Chiplima, in rice-tomato-lady's finger cropping system, the highest yields of rice (4.56 t ha^{-1}) were recorded under T_6, whereas for tomato (14.80 t ha^{-1}) and lady's finger (7.07 t ha^{-1}) it was also under T_6. The yield increase in this treatment in respective crops over RDF was 13.61, 14.80 and 40.13%, respectively. However, the mean increase in yields, over the years, was noted to be the highest in T_6, which was 10.92, 6.74 and 12.16%, respectively over RDF.

Jabalpur

In rice-potato system at Jabalpur, the highest grain yield of rice (4.38 t ha^{-1}) was recorded under T_7. During *rabi* also, the highest yield of potato (16.63 t ha^{-1}) was recorded under T_7. The mean performance of kharif rice over years was highest under T3 with 277.13% yield increase over RDF.

Jorhat

At Jorhat, in rice-toria-black gram cropping system, highest grain yield of rice was recorded under T_3 (4.30 t ha^{-1}), closely followed by T_1 (4.20 t ha^{-1}), and T_2 (4.10 t ha^{-1}). The mean performance

Table 7.2/3(a): Development of organic package for high value crops under rice based cropping system during 2010-11.

Treatment	Season	Centre (yield t/ha)						
		Chiplima (Rice-Tomato-Lady's fingers)	Bhubaneshwar (Rice-Cabbage-Lady's fingers)	Jabalpur (Rice-Potato-Fallow)	Navasari (Rice-Fallow-Groundnut)	Jorhat (Rice-Toria-Black gram)	Kalyani (Rice-Potato-Groundnut)	Karmana (Rice - Cucumber - Okra)
T_1: 50%Rec. NPK+50%N as FYM	*Kharif*	3997	3680	4271	3585	4200	1854	5999
	Rabi	14618	16460	14816	0	480	11417	24630
	Summer	5579	8460		1700	440	1216.7	NR
T_2: FYM+Neem oil cake+VC	*Kharif*	4084	3550	3995	4501	4100	1390	5458
	Rabi	14764	16810	10723	0	400	7800	11873
	Summer	5662	8500		1900	370	1133	NR
T_3: T_2+ Inter crop	*Kharif*	4278	4280	4032	3874	4300	1510	4700•
	Rabi	15394	16980	10516+140	0	350+1320*	3689+1567*	7820
	Summer	5733	8960		1653	340+2000**	1233+1174*	NR
T_4: T_2+ Org. Pract.	*Kharif*	4210	3450	4185	3360	3900	1425	4632
	Rabi	15683	16630	11034	0	430	8819.4	7926
	Summer	4953	8360		1479	460	1583.3	NR
T_5: 50%N as FYM+R Phos+ BF	*Kharif*	4316	3950	3517	3649	3500	1851	4053
	Rabi	15309	16550	10786	0	260	5444.4	8767
	Summer	5483	8870		1463	300	1226.7	NR
T_6: T_2+BF	*Kharif*	4567	4350	3088	3745	3300	1344	3983
	Rabi	17213	19780	10822	0	310	7916.7	7033
	Summer	7075	9760		1651	320	1133.3	NR
T_7: 100%NPK+ Micronutrients as per soil test	*Kharif*	4020	3550	4381	3681	3200	1356	4666
	Rabi	14994	16280	16636	0	420	21880	3183
	Summer	5049	8170		1600	430	1550	NR

Table 7.2/3(a) contd.: Development of organic package for high value crops under rice based cropping system during 2010-11.

Treatment	Season	Centre (yield t/ha)				
		Karjat (Rice-Maize)	Rewa (Rice - Wheat)	Maruteru (Rice - Rice)	Raipur (Rice - Potato)	Siruguppa (Rice - Fallow - Sesame
T_1: 50% Rec.NPK+50%N as FYM	*Kharif*	3600	4077	5986	3917	3220
	Rabi	5686	3503	6746	10063	335
	Summer	3048	2814	5270	3625	3325
T_2:FYM+Neem oil cake+VC	*Rabi*	3985	2059	5565	8386	202
	Summer	-	-	-	-	201
T_3:T_2+ Intercrop	*Kharif*	3129	3038	4972	3902	2625
	Rabi	4272	1630+368*	5694	9463	211
	Summer					
T_4:T_2+ Org. Pract.	*Kharif*	3237	2808	4831	3656	2695
	Rabi	4325	2416	5317	8385	245
	Summer					
T_5:50%N as FYM+R Phos+ BF	*Kharif*	2816	3412	5192	3086	2485
	Rabi	3756	1751	5686	4209	279
	Summer					
T_6:T_2+BF	*Kharif*	3195	3370	5317	3658	2730
	Rabi	4115	1932	5765	8594	287
	Summer					
T_7:100%NPK+Micronutrients as per soil test	*Kharif*	4157	4197	5868	3967	3500
	Rabi	7025	3563	6524	9583	518
	Summer					

*Mustard as intercrop

of rice over the years was highest under T3 with 277.1% increase over RDF. During *rabi*, the highest grain yield of toria (0.48 t ha^{-1}) was recorded under T_1 followed by T_4 and same trend was observed over the years. During *summer* season highest grain yield was recorded under T_3 compared to integrated, organic and RDF treatments. The mean performance during summer is concerned,T7 recorded highest yield.

Kalyani

In rice-potato-groundnut cropping system at Kalyani, the highest grain yield of rice (1.85 t ha^{-1}) was recorded under T_1 but during *rabi,* the highest yield (21.88 t ha^{-1}) of potato was recorded with RDF, followed by T_1 (11.41 t ha^{-1}). The average yield of potato for last seven crop cycles was highest (17.25 t ha^{-1}) under RDF and under all the organic nutrient management packages yield was recorded to be lower. During *summer*, the highest groundnut yield (1.58 t ha^{-1}) was recorded under T_5 which was 24.94% higher than that recorded under RDF. However, the mean groundnut yield was highest (1.84 t ha^{-1}) under T_4.

Karamana

At Karamana in rice- cucumber- lady's finger system, during *kharif,* the highest yield in rice (5.99 t ha^{-1}) was recorded under RDF (T_7), whereas during *rabi,* it was highest in T_1 (24.63 t ha^{-1}) in cucumber. Data was not reported for *summer* crops 2010-11. The highest mean yield performance in rice-cucumber and lady's finger over seven crop cycles has also been recorded under T_7 being 5.57, 15.10 and 6.96 t ha^{-1} respectively).

Karjat

At Karjat, in rice-maize cropping system, the highest rice as well as maize yields was recorded to be highest under RDF, 4.15 and 7.02 t ha^{-1}, respectively. The same was also true for mean performance for last three years. It is also worth to be mentioned that the crop yields during 2010-11 as well as in previous years was appreciably lower in all the organic nutrient management packages over RDF.

Rewa

At Rewa, the highest grain yields of rice and wheat were recorded under T_7 (4.19 t ha^{-1}) and IPNS (4.07 t ha^{-1}), respectively in rice-wheat system. However, over seven years' mean basis, the highest yields of rice (3.05 t ha^{-1}) as well as wheat (3.65 t ha^{-1}) were recorded under RDF (T_7).

Navsari

At Navsari, in rice-fallow-groundnut system, highest yield of rice (4.50 t ha^{-1}) as well as groundnut (1.90 t ha^{-1}) was recorded under T_2, which were 22.27 and 18.75% higher over RDF, respectively. However, as mean crop yield performance is considered during *kharif* ,T_7 was on top with mean rice yield of 4.44 t ha^{-1} and during *summer* it was T_2 with mean groundnut yield of 1.90 t ha^{-1}.

Maruteru

At Maruteru in rice-rice system during *kharif* season, integrated nutrient management package (T_1) with a yield level of 5.98 t ha^{-1} out yielded RDF as well as all organic nutrient management packages. But the mean crop yield (for seven years) was highest under RDF (4.79 t ha^{-1}). However, during *rabi* season, the mean yield was the highest under T_1 (6.74 t ha^{-1}).

Raipur

At Raipur, in rice-potato cropping system, the highest rice yield was recorded under RDF (3.96 t ha^{-1}) followed by INM (T_1). This was also true for overall mean performance with the yield level of 5.44 t ha^{-1}. During *rabi* also, the highest grain yield of potato was recorded under RDF (10.06 t ha^{-1}).

Siruguppa

At Siruguppa, during *kharif*, the highest grain yield of rice was recorded under RDF (3.50 t ha^{-}

^{1}).All organic nutrient management packages recorded lower yields ranging between 2.48 to 3.32 t ha^{-1} during the reported period. The mean performance of crops during *Kh*arif and *summer* followed the same trend as in the reported year.

Maize-Based Cropping Systems

Indore

In maize potato-onion cropping system at Indore, the highest yield of maize was recorded under RDF (5.32 t ha^{-1}) followed by INM (3.33 t ha^{-1}) and T_4 (2.77 t ha^{-1}). The mean performance of these treatments was also in the same order, i.e., RDF (6.71 t ha^{-1}) >INM (4.79 t ha^{-1}). Data for *rabi* and *summer* crops was not reported.

Kanpur

At Kanpur, the highest maize cob yield was recorded under RDF (82.35 t ha^{-1}). Among organic nutrient management packages, T_5 recorded highest yield. During *rabi* ,highest potato yield was recorded under T_7 (28.6 t ha^{-1}). The mean performance of potato over the years was altogether different and followed the order of RDF (T_7) > INM (T_1) >T_5. The onion crop during *summer* 2010-11 failed.

Ludhiana

Highest maize yield was recorded under T_1 (6.05 t ha^{-1}) which out yielded RDF by 27.50%. The same was true over year's mean performance which recorded 22.42% higher yield over RDF. During *rabi*, highest potato yield (24.19 t ha^{-1}) was recorded under IPNS (T_1). The yield of onion during *summer* was lowest under T_5 followed by RDF and IPNS in increasing order.

Akola

At Akola, in sweet corn-onion cropping system, the highest cob yield of sweet corn was recorded under RDF. During *rabi*, T_3 recorded highest crop yield of Rajma (1.86 t ha^{-1}) with additional yield of fenugreek (2.53 t ha^{-1}) and the next best performer was under INM. However, over the years, intercropping of Rajma with fenugreek (T_3) proved superior. During *summer*, the highest onion yield (10.78 t ha^{-1}) was recorded under T_7 followed by T_1.

Rajendranagar

At Rajendranagar, in maize-potato-onion cropping system, the highest grain yield of maize was achieved under T_6 (6.37 t ha^{-1}) which was 15.5% higher over RDF. The mean performance of crop followed almost the same trend. During *rabi*, the highest tuber yield of potato was recorded under T_6 (15.23 t ha^{-1}), but as the yields of main crop and intercrop yield are taken into consideration, T3 recorded highest yield. The mean performance of T3 over years was however superior.

Thanjavur

At Thanjavaur, in maize-rice-green gram cropping system, the highest maize yield was recorded under T_7 (4.96 t ha^{-1}). Same trend was observed during *rabi* and *summer* and the highest rice and green gram yields were recorded under T_7 (5.51 t ha^{-1} and 0.71 t ha^{-1}) respectively.

Soybean-Based Cropping Systems

Parbhami

In soybean-onion cropping system, the highest soybean yield was recorded under RDF (2.46 t ha^{-1}) followed by INM, T_1 (2.04 t ha^{-1}) and T_6 (1.88 t ha^{-1}). However the mean performance of organics was inferior to RDF over the years with a mean yield (2.66 t ha^{-1}). During *rabi*, maximum onion yield (2.04 t ha^{-1}) was recorded under RDF with mean performance of 23.9 t ha^{-1}.

Powarkheda

At Powarkheda in soybeen-wheat cropping system, highest soybean yield was recorded under RDF (1.74 t ha^{-1}) and the mean yield under this treatment was 1.75 t ha^{-1}. Among organic treatments, T_6 recorded highest soybean yield (1.04 t ha^{-1}). Wheat yield was also highest under RDF (5.20 t ha^{-1}). Among organic treatments, best

Table 7.2/3(b): Development of organic package for high value crops under maize based cropping system during 2010-11.

Treatment	Season	Centre (yield t/ha)					
		Indore	Kanpur	Ludhiana	Akola	Rajendranagar	Thanjavur
		[(Maize (cob)-Potato-Onion)]	[(Maize (cob)-Potato-Onion)]	(Maize-Potato-Onion)	(Sweet corn-Rajma-Onion)	(Maize-Onion-Fallow)	(Maize-Rice-Greengram)
T_1:50%Rec. NPK+50%N as FYM	*Kharif*	3333	81191	6059	9010	6186	4889
	Rabi	NR	27497	24195	1093	14100	5404
	Summer	NR	Failed	25045	9130	0	687
T_2:FYM+Neem oil cake+VC	*Kharif*	2315	78125	5849	4784	5615	4122
	Rabi	NR	23664	22645	657	13800	4685
	Summer	NR	Failed	23995	7200	0	512
T_3:T_2+ Inter crop	*Kharif*	2731	77258	5499+315*	8596+204	5805+4122*	4625
	Rabi	NR	19498	20396 +23996**	741+1852	7633+11800**	5272
	Summer	NR	Failed	19646+ 280***+55****	6533+1310	0	621
T_4:T_2+ Org. Pract.	*Kharif*	2778	267*	5824	3814	5710	4530
	Rabi	NR	900*	21996	586	13833	5153
	Summer	NR	Failed	24545	7716	0	588
T_5:50%N as FYM+R Phos+ BF	*Kharif*	2639	79192	3999	5911	4378	3654
	Rabi	NR	23064	14697	722	11467	3930
	Summer	NR	Failed	12997	8407	0	379
T_6:T_2+BF	*Kharif*	2731	80358	5939	5571	5615	4290
	Rabi	NR	24797	23395	710	14000	4757
	Summer	NR	Failed	23645	9117	0	565
T_7:100%NPK +Micronutrients as per soil test	*Kharif*	5324	79792	4749	11514	6376	4961
	Rabi	NR	25264	19596	818	15233	5512
	Summer	NR	Failed	20396	10784	0	716

Table 7.2/3(c):Development of organic package for high value crops under different cropping system during 2010-11

Treatment	Season	Centre yield (kg/ha)			
		Rudrur (Turmeric-Sesame)	S.K.Nagar (G.M-Potato-Groundnut)	Sabour (Rice-Potato-Onion)	Parbhani (Soybean-Onion)
T_1: 50%Rec. NPK+50%N as FYM	*Kharif*	20212	0	4950	2047
	Rabi	586	27731	24560	22058
	Summer	0	2143	4950	0
T_2:FYM+Neem oil cake+VC	*Kharif*	18280	0	4875	1728
	Rabi	502	26117	25000	15885
	Summer	0	1967	4875	0
T_3:T_2+ Inter crop	*Kharif*	11600	0	4720	1687+1224*
	Rabi	482	25121+136	24050+7200*	16327
	Summer	0	1823+104	4720	0
T_4:T_2+ Org. Pract.	*Kharif*	15860	0	4870	1852
	Rabi	440	25175	24700	16965
	Summer	0	1998	4870	0
T_5:50%N as FYM+R Phos+ BF	*Kharif*	18240	0	4520	1461
	Rabi	460	17432	22300	15021
	Summer	0	1494	4520	0
T_6:T2+BF	*Kharif*	18630	0	4980	1883
	Rabi	432	26749	25300	18272
	Summer	0	2076	4980	0
T_7:100%NPK+ Micronutrients as per soil test	*Kharif*	20686	0	4760	2469
	Rabi	580	28756	23200	24846
	Summer	0	1614	4760	0

performance was recorded under T_2 (2.91 t ha^{-1}), which was 44 % lower than that under RDF. The same trend in yield was observed over the years during *kharif* and *rabi.*

Miscellaneous Cropping Systems

Bichpuri

In cluster bean (green pods)-potato-onion the highest cluster bean yield (7.42 t ha^{-1}) was recorded under INM (T_1) followed by RDF (T_7). Among organic treatments, T_4 recorded highest yield (7.02 t ha^{-1}) with 5.36 % yield reduction over RDF. Potato yield during *rabi* was also highest under INM (29.21 t ha^{-1}) followed by RDF. But, on mean performance basis, potato yield followed the order INM >Organics >RDF. However, the mean yield of onion over the years was in order of RDF (3.94 t ha^{-1}) >INM (3.82 t ha^{-1}) >Organics (3.59 t ha^{-1}). same data was reported during the year 2010-11.

Coimbatore

In chilies-chickpea-baby corm, system at Coimbatore the highest yield of chilies (9.06 t ha^{-1}) was recorded under INM followed by RDF. But the mean performance of chilies was highest (8.81 t ha^{-1}) under T_2 which increased 17.1% over RDF. During *rabi,* highest black gram yield (0.90 t ha^{-1}) was recorded under INM. During rabi mean performance of black gram was highest under T4 with 2.18 % increase over RDF. The data of *summer* crop not reported during the reported period.

Durgapura

In groundnut-onion cropping system at Durgapura, highest yields of groundnut (1.31 t ha^{-1}) was recorded under RDF. Among the organic treatments, T_3 was recorded higher crop yield (1.31 t ha^{-1}) with intercropped green gram (0.35 t ha^{-1}) which was superior over all organic treatments.

Table 7.2/3(c): Development of organic package for high value crops under different cropping system during 2010-11.

Treatment	Season	Centre (yield t/ha)						
		Powerkheda (Soybean-Wheat)	Bichpuri (Clusterbean-Potato-Onion)	Coimbatore (Chillies-Chick pea-Baby corn)	Durgapura (Groundnut-Onion)	Hisar (Green gram-Wheat)	Kota (Black gram-Corriander)	Palampur
T_1:50%Rec. NPK+50%N as FYM	*Kharif*	1458	7422	9067	1120	1144	2074	5180
	Rabi	4515	29216	900	13537	2316	1562	4819
	Summer	0	5433	0	0	0	4767	25368
T_2:FYM+Neem oil cake+VC	*Kharif*	1041	6783	7931	1194	896	2106	5889
	Rabi	2916	25161	750	13384	1864	1463	3685
	Summer	0	4580	0	0	0	4797	20550
T_3:T_2+ Inter crop	*Kharif*	1020	6041	8011	1278+389*	578+162	1200+1981	4514
	Rabi	2832	20538.0117+1422*	786	14843	1668+NR	1276+ 877	6803
	Summer	0	4574	0	0	0	4640+345	16298
T_4:T_2+ Org. Pract.	*Kharif*	983	7024	8319	1292	882	2285	3671
	Rabi	2707	25731	813	15352	1876	1505	4960
	Summer	0	5160	0	0	0	4977	23101
T_5:50%N as FYM+R Phos+ BF	*Kharif*	916	6278	6850	1102	498	1866	3756
	Rabi	2791	24515	600	14315	1362	1398	8645
	Summer	0	4392	0	0	0	4490	27069
T_6:T_2+BF	*Kharif*	1041	6602	7564	1294	942	1960	4748
	Rabi	2666	25450	825	15046	1936	1458	4677
	Summer	0	4981	0	0	0	4615	24943
T_7:100%NPK+ Micronutrients as per soil test	*Kharif*	1749	7146	8811	1319	1208	2015	2190
	Rabi	5207	28368	890	16611	2848	1533	1417
	Summer	0	5135	0	0	0	4681	1701

During *rabi*, the highest onion yield was recorded under RDF (16.61 t ha^{-1}) followed by T_4 (15.35 t ha^{-1}).

Hisar

At Hisar in green gram-wheat cropping system, highest grain yield of green gram was recorded under RDF(1.21t ha^{-1}) followed by INM and organic nutrient management practices. During *rabi* also, highest grain yield of wheat was recorded under RDF (2.84 t ha^{-1}) followed by INM and organic nutriment management packages. Among organic treatments, T_6 proved better and recorded highest crop yield (1.93 t ha^{-1}) compared to 2.84 t ha^{-1} under RDF.

Kota

In black gram-coriander cropping system at Kota, the highest grain yield (2.85 t ha^{-1}) of black gram was recorded under T_{-4} followed by $T_{-2,}$ and INM. During *rabi*, the highest coriander yield was recorded under T_{-4} (4.97 t ha^{-1}).

Palampur

Highest crop yield was recorded under T_2 (5.88 t ha^{-1}), which was 168.90% higher than the yield recorded under RDF, but over years, INM recorded the highest crop yield (2.84 t ha^{-1}) followed by T_6 (2.28 t ha^{-1}) and RDF (2.18 t ha^{-1}). During *rabi* season, T_5 recorded highest crop yield (8.64 t ha^{-1}) compared to 1.47 t ha^{-1} under RDF. The crop yield during *summer* was however highest (23.1 t ha^{-1}) under T_5.

Rudrur

In turmeric-sesame cropping system at Rudrur, the highest rhizome yield of turmeric was recorded under RDF (20.66 t ha^{-1}) followed by INM (20.21 t ha^{-1}) and T_2 (18.28 t ha^{-1}). The mean yield performance, over the years, was also the best under RDF (19.03 t ha^{-1}) followed by INM and organic treatment of T_6 (15.86 t ha^{-1}). During *rabi*, the performance of IPNS (T_1) was superior followed by RDF (T_7) and organic nutrient management packages. The yield reduction under T_2 (highest yielding treatment among organics) over RDF was 15.33 % during the current year and 40.99 % on the basis of mean over years.

S.K. Nagar

In green manure-potato-groundnut system at S.K. Nagar, the highest tuber yield of potato (28.75 t ha^{-1}) was recorded under RDF followed by INM and T_4. Compared to RDF, T_2 which is an organic nutrient management package recorded 10.10 % reduction in yield. The overall performance of treatments over years also followed the same trend in which T_2 recorded yield reduction of 29.06 %. During *summer* season, highest yield of groundnut (2.14 t ha^{-1}) was recorded under T_1 which was 32.97 % higher than the RDF.

Sabour

During *kharif*, the highest crop yield (4.95 t ha^{-1}) was recorded under (T_6) followed by INM and T_2. However, over years, RDF proved to be superior with a yield level of 4.91 t ha^{-1} followed by T_1 (4.83 t ha^{-1}). During *rabi*, the highest yield was recorded under T_6 which yielded 3.01% higher over RDF. The mean crop yield reduction under T_6 was 2.46% over RDF over years. The same trend was observed during *summer*.

7.2.4 SUSTAINABLE PRODUCTION MODEL(SPM)

Objectives: To identify the key non-sustainablity issues in important cropping systems and to enlarge agro-technologies capable of combining those issues.

Year of start: 1997-98

Locations & Cropping systems

(i) Soybean-wheat : Powarkheda

(ii) Pearlmillet-wheat : Bichpuri

(iii) Rice-wheat : Indoe, Ludhiana, Jammu, Pantnagar, Sabour.

Results:

Soybean-wheat system

Powarkheda: During the reported period highest yield of soybean yield 1.57 t ha^{-1} was recorded under T_3 and wheat yield 4.63 t ha^{-1} under T_4. The mean performance of soybean during *kharif* was highest under T_4 which recorded highest yield 1.36 t ha^{-1} and that of wheat 3.55 t ha^{-1} during *rabi* in wheat under the same treatment. The sustainable yield index was highest 0.33 under T_4 during *kharif* and 0.61 under T_1 during *rabi* .

Pearlmillet-wheat system

Bichpuri : During the reported period, highest yield of pearlmillet (2.68 t ha^{-1})was recorded under T_2 and wheat yield (5.04 t ha^{-1})under T_2 also. The mean performance of crops during *kharif* and *rabi* was highest under T_2 and the yield of pearlmillet and wheat were 2.65 and 4.93 t ha^{-1}. But the SYI was highest 0.93 under T_3 during *kharif* and 0.82 under T_1 and T_2 during *rabi*.

Rice-wheat system

Indore: During the reported period highest yield of rice yield (1.56 t ha^{-1})was recorded under T_3 and wheat yield (4.08 t ha^{-1})under T_4. In rice-wheat system, highest mean grain yield (1.43 t ha^{-1})of rice was recorded under T_3 and that of wheat (3.79 t ha^{-1})under T_4 during *rabi*. But the SYI was highest 0.60 under T_3 during *kharif* and 0.66 under T_2 during *rabi*.

Ludhiana: During the reported period highest yield of rice yield (6.74 t ha^{-1})was recorded under T_2 and wheat yield (5.38 t ha^{-1})under T_2. In rice-wheat system at Ludhiana mean crop yield were highest under T_2 at 6.66 and 5.35 t ha^{-1} during *kharif* and *rabi* respectively. SYI during *kharif* and *rabi* were also highest at 0.95 and 0.93 under this treatment.

During the reported period highest yield of maize yield (4.18 t ha^{-1})was recorded under T_5 and wheat yield (5.56 t ha^{-1})under T_5. In maize-wheat cropping system, highest mean maize yield (4.26 t ha^{-1})was recorded under T_3 during *kharif* but the highest SYI was recorded under T_4 and at per with T_5 during *rabi* season however, highest wheat yield 6.88 t ha^{-1} was recorded under T_5 but the SYI was highest under T_4 at 0.91.

During the reported period, the sustainable production model in rice-wheat system behaved differently at various centres.

Jammu: The crop yield during 2010-11 was highest under T_2 at 4.17 and 3.51 t ha^{-1} during *kharif* and *rabi* . The mean performance of crops was also highest under this treatment.

Pantnagar: T_2 recorded highest crop yield during both *kharif* and *rabi* in the reported period as well as over years, with mean yield of 6.14 and 5.66 t ha^{-1} of rice and wheat respectively.

Sabour: T_2 recorded highest rice yield during the reported period at 6.92 t ha^{-1} and also the mean yield over years. But during *rabi* T_3 recorded highest wheat yield.

Table 7.2/4 (a): Performance of crops over years under sustainable production model in various cropping systems

	Powerkheda (Soybean-wheat)											
	Kharif						*Rabi*					
	2010-11	Mean	Min	Max	STDV	SYI	2010-11	Mean	Min	Max	STDV	SYI
T_1	1456	1272	600	2266	523	0.33	3813	3178	2044	4049	713	0.61
T_2	1497	1173	476	2188	538	0.29	3787	2993	1667	4600	897	0.46
T_3	1574	1250	489	2199	540	0.32	4274	3211	1690	4419	1042	0.49
T_4	1677	1364	631	2385	572	0.33	4632	3552	2111	4846	933	0.54
	Bichpuri (Pearlmillet - Wheat)											
	Kharif						*Rabi*					
	2010-11	Mean	Min	Max	STDV	SYI	2010-11	Mean	Min	Max	STDV	SYI
T_1	2373	2340	1689	3133	404	0.62	4250	4199	3849	4807	259	0.82
T_2	2683	2651	2182	3239	320	0.72	5038	4928	4069	5444	444	0.82
T_3	2360	2283	2150	2377	77	0.93	4494	4511	3754	5916	563	0.67
T_4	2446	2369	2024	2699	172	0.81	4737	4621	3849	5351	469	0.78
	Indore (Rice - Wheat)											
	Kharif						*Rabi*					
	2010-11	Mean	Min	Max	STDV	SYI	2010-11	Mean	Min	Max	STDV	SYI
T_1	1423	1295	1230	1860	204	0.59	3838	3434	2679	4461	535	0.65
T_2	1412	1253	1129	1865	209	0.56	3869	3437	3043	4515	440	0.66
T_3	1565	1423	1400	2034	205	0.60	3949	3538	2724	4695	628	0.62
T_4	1491	1334	1362	1962	180	0.59	4077	3792	3012	5033	564	0.64
	Ludhiana (Rice - Wheat)											
	Kharif						*Rabi*					
	2010-11	Mean	Min	Max	STDV	SYI	2010-11	Mean	Min	Max	STDV	SYI
T_1	5954	6033	5800	6290	145	0.94	4935	4932	4380	5380	270	0.87
T_2	6740	6662	6500	6900	115	0.95	5380	5350	5000	5590	157	0.93
T_3	6617	6639	6100	7100	256	0.90	5293	5283	4940	5560	181	0.92
T_4	6435	6334	6140	6700	172	0.92	5223	5123	4200	5440	345	0.88
T_5	5837	5775	5430	6150	189	0.91	4868	4780	4300	5025	205	0.91
	Ludhiana (Maize - Wheat)											
	Kharif						*Rabi*					
	2010-11	Mean	Min	Max	STDV	SYI	2010-11	Mean	Min	Max	STDV	SYI
T_1	4130	3813	3210	4400	376	0.78	4905	4581	4040	4905	287	0.88
T_2	4005	3794	3100	4250	318	0.82	4792	4710	4300	5200	237	0.86
T_3	4470	4257	3800	4600	240	0.87	5146	5057	4520	5785	327	0.82
T_4	4156	3906	3495	4180	213	0.88	4966	4809	4550	5100	188	0.91
T_5	4182	3909	3520	4182	223	0.88	5563	6882	5563	8031	952	0.74

Table 7.2/4 (b): Crop performance under sustainable production model under rice - wheat system

Treatments	Crop yield kg/ha											
	Chatha (Rice - Wheat)				Pantnagar (Rice - Wheat)				Sabour (Rice - Wheat)			
	Kharif		Rabi		Kharif		Rabi		Kharif		Rabi	
	2010-11	Mean	2010-11	Mean	2010-11	Mean	2010-11	Mean	2010-11	Mean	2010-11	Mean
T_1	3741	3727	3312	3312	5540	5625	5009	5269.5	6156	6156	4490	4490
T_2	3977	3996	3384	3384	6036	6145	5317	5662.5	6921	6921	4567	4567
T_3	4169	4168	3509	3509	5594	5693	5212	5473.5	6571	6571	4608	4608
T_4	3898	3900	3398	3398	5560	5667	5333	5291.5	5139	5139	3747	3747
T_5	3369	3370	2903	2903	5697	5888	4993	5241.5	6330	6330	4844	4844

Good crop of wheat in sustainable production model experiment at Ludhiana

An overview of experiment at S.K. Nagar

Maize crop in tillage experiment at Coimbatore

Wheat+linseed, a successful cropping system at Ludhiana

7.3 TECHNOLOGY TRANSFER AND REFINEMENT

7.3.1 ON-FARM RESEARCH

7.3.1.1 On-farm crop response to application of nutrients

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

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

Year of Start: 1999-2000, Treatments are modified in 2010-11.

Treatments: There are five common treatments at various locations. They are control ($N_oP_oK_o$), N, N+P, N+K and N+P+K and all the nutrients are applied as per the recommended rates of crops/ cropping systems evaluated at particular location. Two more treatments namely, N+P+K+ Supplementation of deficient micronutrient based on soil test and farmers practice were added during 2010-11.

Locations:

Cropping system	OFR Centre (State)	No. of trials
Rice-rice	Warangal (A.P.), Nellore (A.P.), Karimganj (Assam), Thiruvalla (Kerala), Raigad (Maharashtra), Paiyur (T.N.), Chettinad (T.N.)	216
Rice-wheat	Patna (Bihar), Kawardha (Chattisgarh), Kurukshetra (Haryana), Jamtara (Jharkhand), Jammu (Jammu and Kashmir), Gondia (Maharashtra), Katni (Madhya Pradesh), Dhenkanal (Odisha), Amritsar (Punjab), Saini (Uttar Pradesh), Sant Kabir Nagar (Uttar Pradesh), Jeolikote (Uttarakhand)	217
Rice-ragi (s)	Bangalore (Karnataka)	14
Rice-chickpea	Gondia (Maharashtra)	12
Rice-greengram	Kendrapara (Odisha), Kakdwip (W.B.)	47
Rice-groundnut	Dhenkanal (Odisha)	16
Rice-brinjal (S)	Bangalore (Karnataka)	8
Pearlmillet-wheat	Thasra (Gujarat)	12
Pearlmillet-mustard	Deesa (Gujarat)	8
Maize-wheat	Kangra (Himachal Pradesh), Jamtara (Jharkhand), Jammu (Jammu and Kashmir), Udaipur (Rajasthan)	72
Maize-chickpea	Gadag (Karnataka), Aurangabad (Maharashtra)	19
Soybean-wheat	Seoni (Madhya Pradesh), Chas (Maharashtra)	29
Soybean-chickpea	Aurangabad (Maharashtra)	12
Groundnut-sorghum	Gadag (Karnataka)	6
Custerbean-wheat	Hanumangarh (Rajasthan)	20
Cotton-pearlmillet	Deesa (Gujarat)	8
Tobacco-pearlmillet	Thasra (Gujarat)	12
Castor	Deesa (Gujarat)	8
Chilli+onion-cotton	Gadag (Karnataka)	10

Results

The centre-wise details of varieties, nutrients used, crop yield and crop responses to NPK application in terms yield difference, are presented in Table 8.3/1. Brief descriptions of centre-wise results are given below.

Rice-rice: A total of 216 trials were conducted at six locations comprising of six NARP zones. In central telangana zone (Warangal) of Andhra Pradesh, application of 120:60:40 kg NPK ha^{-1} each to *kharif* and *rabi* along with 50 kg of Zn to both the crops in the system resulted in higher system yield (10124 kg ha^{-1}) which is 8% higher than the application of 120:60:40 kg NPK ha^{-1} alone. The yield gap between recommended fertilizers and control was found to be 5441 kg ha^{-1}. In the special zone (Thiruvalla) of Kerala, it was observed that application of Zinc @ 25 kg ha^{-1} to both the crops in the system did not add any additional yield significantly. However, application of recommended dose of 90:45:45 kg NPK ha^{-1} recorded 169% increase in grain yield of the system over control. Around 3243 kg ha^{-1} of yield gap exists between recommended fertilizer dose and farmers practice at North Konkan coastal zone (Raigad) of Maharashtra. Application of Zinc @ 12.5 kg ha^{-1} to both the crops resulted in additional yield of 944 kg ha^{-1} over and above the recommended fertilizer. The yield gap between recommended fertilizer vs farmers practice was lesser (3243 kg ha^{-1}) than that of recommended nutrients vs control (4665 kg ha^{-1}) implying farmers does apply nutrients to the crops but not up to the requirement of crops in this zone. In the southern zone (Chettinad) of Tamil Nadu, the yield gap between recommended nutrient and farmers practice was only 188 kg ha^{-1}, however, application of 25 kg of zinc to both the crops in the system resulted in additional yield of 1653 kg ha^{-1} in the system. There is a possibility to increase the yield by 17.5% in this zone by adopting recommended nutrient schedule of 150:50:50:25 kg NPK Zn ha^{-1} during *kharif* and 120:38:38:25 kg NPK Zn ha^{-1} during *rabi*. The yield gap observed in north western zone (Paiyur) of Tamil Nadu was 1350 kg ha^{-1}between farmers practice and recommended nutrients dose of NPK. Application of Zn along with recommended NPK recorded higher system yield (14941 kg ha^{-1}) thus implying 15% yield increase over farmer practice is possible in this particular zone. In barak valley zone (Karimganj) of Assam, it was found that, application of 80:40:40 kg NPK ha^{-1} to *kharif* rice and 40:20:20 kg NPK ha^{-1}to *rabi* rice resulted in system yield of 11491 kg ha^{-1} which is 125% higher than the control. In southern zone (Nellore) of Andhra Pradesh, it was found that application of 120:60: 40 kg NPK ha^{-1} to summer rice was more beneficial as it recorded an additional yield of 4061 kg ha^{-1} over control. In rice-rice system, across the NARP zones, it was found that mean yield gap of 797 kg ha^{-1} exists between farmers and recommended nutrient practice. Additional yield of 493 kg ha^{-1} is possible through application of required quantity of zinc to the system in addition to recommended level of NPK nutrients.

Rice-wheat: A total of 217 trials were conducted in 11 NARP zones at 12 locations. In central and north eastern plateau zone, experiments were conducted at Bihar and Jharkhand. At Patna, both rice and wheat recorded significantly higher grain yield with application of 80:40:20 and 120:60:40 kg NPK ha^{-1} respectively compared to control or combined application of only NP or NK or N alone. The yield increase over N alone was found to be 103 and 45.8% in rice and wheat respectively. In the same NARP zone, at Jharkhand, application of micronutrients and farmers practice treatments were evaluated along with other treatments and it was found that, yield gap of 1526 and 1743 kg ha^{-1} exists between farmers practice and recommended nutrient application in rice and wheat respectively. Further, a marginal increase in yield of rice (96 kg ha^{-1}) and wheat (46 kg ha^{-1}) was observed with addition of 5 kg of zinc to both the crops. In Chattisgarh plain zone (Kawardha), yield gap of 2317 and 913 kg ha^{-1}exists in rice and wheat respectively between farmers and recommended nutrient practice. Addition of micronutrient resulted in only marginal improvement in yield of both the crops in the system. The yield gap between farmers and recommended nutrient practice was only marginal (244 and 122 kg ha^{-1} in rice and wheat) in eastern

Andhra Pradesh	CT Zone / Warangal/ 24	BPT-5204/ 120- 60-40/ Zinc(50)	8.3	0.6	307	31	291	1899	2862	3980	3412	4586	4953		27	53	3.65	2687	367	-
		MTU-1010/ 120- 60-40/ Zinc(50)	—	—	—	—	-	2042	2879	3563	4110	4796	5171		88	174	11.4	2754	375	-
Kerala	Special Zone / Thiruvalla/ 72	Uma/ 90- 45 -45 / Zinc(25)	6.4	1.9	479	18	240	2040	2913	4124	4157	5356	5362		24	47	5.19	3316	6	-
		Uma/ 90- 45 -45 / Zinc(25)	—	—	—	—	-	1859	2801	3916	4021	5126	5115		30	59	6.64	3267	-11	-
Mahar-ashtra	North Konkan Coastal Zone / Raigad/ 24	Shyadri/ 100- 50-50/ Zinc(12.5) NA	—	—	—	—	—	3065	4083	4950	5220	6195	6703	4270	62	122	6.2	3130	508	1925
		KJT-3/ 120- 50-50/ Zinc(12.5) NA	—	—	—	—	-	2848	3067	3905	4070	4383	4819	3065	43	84	5.63	1535	436	1318
Tamil Nadu	South TN 5 & 6/ Chettinad/ 24	ADT-39/ 150- 50-50/ Zinc(25) 170- 70-70	6.6	0.5	224	10	236	2400	3619	4794	4020	5293	6115	5199	34	67	3.67	2893	822	94
		ADT-45/ 120- 38 -38 / Zinc(25) 150- 50-50	—	—	—	—	-	2502	3744	4898	4274	5401	6232	5307	12	24	1.32	2899	831	94

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State	NARP Zone/ Centre/ No. of trials	Variety/ Rec. nutrient/ M. Nutrient/ FP nutrient zone (kg/ha)	Initial Soil Status					Yield(kg/ha)							Response(kg/ha)					
			pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Control	N	NP	NK	NPK (RN)	NPK +M. Nut.	F.P.	SE (M)	CD (5%)	CV	Yield differ- ence 1 RN vs Control (kg/ha)	Yield differ- ence 2 RN + M.Nut. vs RN (kg/ha)	Yield differ- ence 3 RN vs FP (kg/ ha)
Tamil Nadu	North Western Zone/ Paiyur/ 24	White Ponni/ 150- 50-50/ Zinc(25) NA		7.7	0.5	265		39	276	3642	4687	6259	5867	7372	7600	6543	27	53	2.23	3730
		ADT-39/ 120- 40-40/ Zinc(25) NA	—	—	—	—	-	3491	4515	6031	5752	6965	7341	6444	34	67	2.91	3474	376	521
								Rice-rice(S)												
Assam	Barak Valley Zone(5)/ Karimganj/24 —	Ranjit/ 80- 40-40/ — —	—	—	—	—	-	3019	4106	5505	5768	7082			49	97	4.74	4063	-	-
		Disang/ 40- 20 -20 / — —	—	—	—	—	-	2096	2651	3145	4030	4409	-	-	34	67	5.14	2313	-	-
								Rice(S)												
Andhra Pradesh	Southern Zone V /Nellore/ 24	MTU-1010/ 120- 60-40/ — —	—	—	—	—	-	5061	6732	7641	7915	9122	-	-	67	133	4.47	4061	-	-
								Rice-wheat												
Bihar	Central and North Eastern Plateau /Patna/ 24	R-Sweta/ 80- 40-20 / —	6.8	0.8	233	14	171	1954	2703	3473	3156	3959	-	-	25	50	3.99	2005	-	-
		K-9107/ 120- 60-40/ — —	—	—	—	—	—	1455	2628	3338	3060	3834	-	-	32	63	5.5	2379	-	-

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State	NARP Zone/ Centre/ No. of trials	Variety/ Rec. nutrient/ M. Nutrient/ FP nutrient zone (kg/ha)	Initial Soil Status					Yield(kg/ha)							Response(kg/ha)					
			pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Control	N	NP	NK	NPK (RN)	NPK +M. Nut.	F.P.	SE (M)	CD (5%)	CV	Yield differ- ence 1 RN vs Control (kg/ha)	Yield differ- ence 2 RN + M.Nut. vs RN (kg/ha)	Yield differ- ence 3 RN vs FP (kg/ ha)
Chhatti- sgarh	CG Plain Zone / Kawardha/ 24	MTU-1010/ 100- 60-40/ Zinc(20) NA	7.7	0.8	334	14	220	2163	3160	5622	3386	6203	6468	3886	46	91	5.08	4040	265	2317
		GW-273/ 100- 60-40/ control NA	—	—	—	—	-	1206	2193	3110	2425	3611	3743	2698	27	53	4.96	2405	132	913
Haryana	Eastern Alluvail Plain / Kurukshetra/ 12	HKR127/ 150- 60-60/ Zinc(25) 144- 57.5-0	8.5	0.5	203	17	296	2012	5778	6251	5968	6423	6618	6179	43	86	2.66	4411	195	244
		WH-711/ 150- 60-60/ Zinc(25) 144- 57.5-0	—	—	—	—	-	1638	4449	4773	4624	4879	4959	4757	40	80	3.23	3241	80	122
Jhark- hand	Central and North Eastern Plateau /Jamtara/ 14	Lalat/ 100- 50-25/ Zn(5) 50- 25-0	5.4	0.6	247	5	141	730	1524	2888	1915	3363	3459	1837	80	160	13.3	2633	96	1526
		K-9107/ 100- 50-25/ Zn(5) 50- 25-0	—	—	—	—	-	601	1542	2691	1931	3074	3120	1331	53	106	9.75	2473	46	1743
J & K	Sub-Tropical / Zone Jammu/ 12	Pusa-1121/ 50- 30 -20 / Zinc(25) NA	7.1	0.5	214	17	127	1920	2548	3295	2829	3650	3873	-	25	50	2.85	1730	223	-
		DBW-17/ 100- 50-25/ Zinc(25) NA	—	—	—	—	-	1546	2151	2900	2441	3238	3394	-	17	34	2.3	1692	156	-

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State	NARP Zone/ Centre/ No. of trials	Variety/ Rec. nutrient/ M. Nutrient/ FP nutrient zone (kg/ha)	Initial Soil Status					Yield(kg/ha)							Response(kg/ha)					
			pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Control	N	NP	NK	NPK (RN)	NPK +M. Nut.	F.P.	SE (M)	CD (5%)	CV	Yield differ-ence 1 RN vs Control (kg/ha)	Yield differ-ence 2 RN + M.Nut. vs RN (kg/ha)	Yield differ-ence 3 RN vs FP (kg/ ha)
Mahar-55 ashtra	IX High Rainfall - EV2-Zone / Hiwara,Gondia/ 12	PKV-Khanang/ 100- 50-50/ Zinc(2.5) NA	—	—	—	—	—	—	-	2150	2400	2838	2628	3156	3211	-	29	58	3.7	1006
		AKW-3722/ 100- 50-50/ Zinc(2.5) NA	—	—	—	—	-	781	1137	1401	1356	1427	1545		25	50	6.88	646	118	
Madhya Pradesh	Keymore Platue Satpora hills / Katni/ 20	JRH-5/ 120- 60-40/ ZnSO4(12.5) —	—	—	—	—	-	1972	2651	3675	3261	4123	4405	2306	26	51	3.58	2151	282	1817
		GW-273/ 120- 60-40/ ZnSO4(2.5) —	—	—	—	—	-	2395	2985	3526	3352	3881	4220	2605	25	50	3.42	1486	339	1276
Odisha	Mid Central Table Land / Dhankanal/ 8	Swarna/ 80- 40-40/ Zinc(25) NA	5.7	0.6	268	12	129	2956	3761	3938	4044	4350	4546	-	88	180	6.34	1394	196	-
		Sonalika/ 80- 50-40/ Borax(10) NA	—	—	—	—	-	1531	1999	2091	2188	2371	2476	-	46	94	6.11	840	105	-
Punjab	Central Plain Zone-Ludhiana / Amritsar/ 24	PR-120/ 120- 30 -30 / ZnSO4(25) —	8.1	0.6	172	38	125	4620	5980	6840	6540	7365	7511	6777	74	147	5.53	2745	146	588
		DBW-17/ 120- 60-30 / MnSo4(5) —	—	—	—	—	-	2643	3776	4121	3948	4347	4372	4132	50	99	6.26	1704	25	215
Uttar Pradesh	Central Plain Zone - Kanpur/ Saini/ 12	Pant - 12/ 100- 50-50/ — —	8.1	0.4	0	10	175	1408	2573	3667	3021	4341	-	-	7	14	0.82	2933	-	-
		PBW-343/ 100- 60-40/ — —	—	—	—	—	-	1915	2942	3539	3052	3936	-	-	5	10	0.56	2021	-	-

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State	NARP Zone/ Centre/ No. of trials	Variety/ Rec. nutrient/ M. Nutrient/ FP nutrient zone (kg/ha)	Initial Soil Status					Yield(kg/ha)							Response(kg/ha)					
			pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Control	N	NP	NK	NPK (RN)	NPK +M. Nut.	F.P.	SE (M)	CD (5%)	CV	Yield differ- ence 1 RN vs Control (kg/ha)	Yield differ- ence 2 RN + M.Nut. vs RN (kg/ha)	Yield differ- ence 3 RN vs FP (kg/ ha)
Uttar Pradesh	Central Plain NA Zone - Kanpur/ Saini/ 11	Pant - 12/ 100- 50-50/ — —	8.1	0.3	0	10	171	1426	2570	3722	2919	4330	-	-	40	81	4.43	2904	-	-
		PBW-343/ 120- 60-40/ — —	—	—	—	—	-	1932	2963	3548	3067	3916	-	-	5	10	0.56	1984	-	-
Uttar Pradesh	Eastern Plain Zone- Kumarganj/ Sant Kabir Nagar/ 20	NDR-359/ 120- 60-40/ Zinc(25) 100- 50-0	7.5	0.4	212	28	220	1781	2671	3707	3067	4265	4637	3211	29	57	3.86	2484	372	1054
		NW-2036/ 120- 60-40/ Zinc(25) 100- 50-0	—	—	—	—	-	1489	2215	3166	2722	3502	3759	2710	32	63	5.07	2013	257	792
Uttara-khand	Hill Zone - Jeoli Kota/ Kalsi/ 24	PUSA-1401/ 100- 60-40/ Sulphar NA	6.9	0.8	190	14	174	1976	2786	3521	3329	3936	3978	-	27	53	4.1	1960	42	-
		PBW-550/ 150- 60-40/ Sulphar NA	—	—	—	—	-	2136	3133	3894	3639	4495	4590	-	26	51	3.53	2359	95	-
								Rice-finger millet(S)												
Karna-taka	Eastern Dry Zone - Hebbel/ Bangalore/ 14	IR-30864/ 100- 50-50/ Zinc(20) 150- 37.5 -37.5	—	—	—	—	-	1998	2700	3797	3389	4046	4269	3808	61	121	6.68	2048	223	238
		GPU-66/ 100- 50-50/ Zinc(20) 150- 37.5 -37.5	—	—	—	—	-	1143	2264	3411	2943	3714	4007	3100	55	109	6.95	2571	293	614

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State	NARP Zone/ Centre/ No. of trials	Variety/ Rec. nutrient/ M. Nutrient/ FP nutrient zone (kg/ha)	Initial Soil Status					Yield(kg/ha)							Response(kg/ha)					
			pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Control	N	NP	NK	NPK (RN)	NPK +M. Nut.	F.P.	SE (M)	CD (5%)	CV	Yield differ- ence 1 RN vs Control (kg/ha)	Yield differ- ence 2 RN + M.Nut. vs RN (kg/ha)	Yield differ- ence 3 RN vs FP (kg/ ha)
Rice-chickpea																				
Mahar- ashtra	IX High Rainfall EV2-Zone / Hiwara,Gondia/ 12	PKV-Khanang/ 100- 50-50/ Zinc(2.5) —	—	—	—	—	-	2048	2435	2896	2546	3116	3321	-	29	58	3.74	1068	205	-
		AKG-46/ 20 - 40-20 / Zinc(2.5) —	—	—	—	—	-	670	838	1009	1022	1432	1493	-	23	46	7.31	762	61	-
Rice-green gram																				
Odisha	East & South Eastern Coastal Plain /Kendrapara/ 24	Swarna/ 80- 40-40/ Zinc(25) —	5.6	0.6	274	19	149	2693	3516	3514	3617	3844	4136	-	88	174	12.2	1151	292	-
		Local/ 20 - 40-20 / Zinc(25) —	—	—	—	—	-	537	650	701	723	764	788	-	6	12	4.56	227	24	-
West Bengal	Coastal Saline Zone-Mathurapur/ Nadia/ 23	Pankaj/ 80- 40-40/ Zinc(25)	5.6	0.8	395	56	277	2738	3329	3724	3918	4325	4499	3959	28	55	3.5	1587	174	366
		50- 20 -20 Chait Moong/ 20 - 40-40/ Zinc(25) 7.5 - 25-25	—	—	—	—	-	598	691	804	804	944	990	833	8	16	4.94	346	46	111
Rice-groundnut																				
Odisha	Mid Central Table Land / Dhankanal/ 16	Swarna/ 80- 40-40/ Zinc(25) —	5.8	0.6	263	12	132	2942	3791	4066	4183	4508	4671	-	50	100	5	1566	163	-
		Smruti/ 20 - 40-40/ Zinc(10) —	—	—	—	—	-	1585	1833	2076	1990	2282	2441	-	30	60	5.81	697	159	-

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State	NARP Zone/ Centre/ No. of trials	Variety/ Rec. nutrient/ M. Nutrient/ FP nutrient zone (kg/ha)	Initial Soil Status					Yield(kg/ha)							Response(kg/ha)					
			pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Control	N	NP	NK	NPK (RN)	NPK +M. Nut.	F.P.	SE (M)	CD (5%)	CV	Yield differ-ence 1 RN vs Control (kg/ha)	Yield differ-ence 2 RN + M.Nut. vs RN (kg/ha)	Yield differ-ence 3 RN vs FP (kg/ ha)
Rice-brinjal (S)																				
Karna-taka	Eastern Dry Zone - Hebbel/ Bangalore/ 8	Thanu-KMP 101/ 100- 50-50/ Zinc(20) 150- 30 -35	—	—	—	—	-	2005	2847	3683	3747	4353	4515	4148	73	148	5.74	2348	162	205
		Green Long-BJL/ 125- 100-50/ Zinc(20) 125- 100-50	—	—	—	—	-	6523	8461	10446	12055	12010	14194	12803	330	667	8.55	5487	2184	-793
Pearlmillet-wheat																				
Gujarat	Middle Gujarat Zone - Anand/ Thasra/ 4	GBH-558/ 80- 40-40/ Zinc(12.5) —	8	0.3	181	18	192	1594	2129	2278	1980	2542	2775	-	78	166	7.05	948	233	-
		GW-496/ 120- 60-60/ Zinc(12.5) —	—	—	—	—	-	1846	2009	2226	2068	2695	2728	-	36	77	3.19	849	33	-
Gujarat	Middle Gujarat Zone - Anand/ Thasra/ 8	GBH-558/ 80- 40-40/ Zinc(12.5) —	7.7	0.5	247	25	221	1623	2032	2383	2443	2583	2795	-	68	139	8.32	960	212	-
		GW-496/ 120- 60-40/ Zinc(12.5) —	—	—	—	—	-	1716	1988	2537	2094	2808	2896	-	49	100	5.98	1092	88	-
Pearlmillet-mustard																				
Gujarat	North Gujarat Zone - Dantiwada/ Banaskantha/ 8	GBH-558/ 80- 40-40/ Zn(15) 45 - 55-0	7.7	0.3	191	18	235	1305	1895	2275	2477	2719	2812	2747	57	115	6.99	1414	93	-28
		GM-3/ 50- 50-25/ Zinc(25) 30 - 55-0	—	—	—	—	-	910	1456	1834	1957	2087	2237	2177	51	103	7.94	1177	150	-90

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State	NARP Zone/ Centre/ No. of trials	Variety/ Rec. nutrient/ M. Nutrient/ FP nutrient zone (kg/ha)	Initial Soil Status					Yield(kg/ha)							Response(kg/ha)					
			pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Control	N	NP	NK	NPK (RN)	NPK +M. Nut.	F.P.	SE (M)	CD (5%)	CV	Yield differ-ence 1 RN vs Control (kg/ha)	Yield differ-ence 2 RN + M.Nut. vs RN (kg/ha)	Yield differ-ence 3 RN vs FP (kg/ ha)
Maize-wheat																				
Himachal Pradesh	Sub-mountain and low hills sub-tropical zone /Kangra/ 20	KH-101/ 90- 45 -30 / Zinc(25) —	6.1	0.5	217	23	151	1762	2046	2537	2322	3274	3438	-	21	42	3.7	1512	164	-
		HPW-184/ 80- 40-40/ Zinc(25) —	—	—	—	—	-	1991	2377	2965	2749	3602	3762	-	28	55	4.32	1611	160	-
Jhark-hand	Central and North Eastern Plateau / Jamtara/ 16	HQPM-1/ 100- 50-25/ Borax(10) 50- 25-0	5.3	0.6	282	8	155	766	1469	2621	1797	3074	3062	1771	82	162	15.8	2308	-12	1303
		K-9107/ 100- 50-25/ Borax(10) 50- 50-0	—	—	—	—	-	660	1486	2850	1999	3459	3480	2141	130	257	22.7	2799	21	1318
J & K	Sub-Tropical Zone/ Jammu/ 12	HQPM-1/ 90- 60-30 / Zinc(25) —	7.1	0.5	214	14	131	1414	1978	2654	2249	3009	3138	-	23	46	3.27	1595	129	-
		DBW-17/ 100- 50-25/ Zinc(25) —	—	—	—	—	-	1648	2206	2920	2446	3209	3385	-	25	50	3.33	1561	176	-
Rajas-than	Humid Southern Plain Zone / Udaipur/ 12	Pratap Makka 5/ 90- 40-30 / Zinc(25) 60- 15-0	8.1	0	340	31	321	817	1988	2579	2329	2792	2853	1808	33	66	5.26	1975	61	984
		RAJ-4037/ 120- 40-30 / NA 90- 20 -0	—	—	—	—	-	1675	3517	4533	4292	4971	5071	3229	51	102	4.55	3296	100	1742

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State	NARP Zone/ Centre/ No. of trials	Variety/ Rec. nutrient/ M. Nutrient/ FP nutrient zone (kg/ha)	Initial Soil Status					Yield(kg/ha)							Response(kg/ha)					
			pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Control	N	NP	NK	NPK (RN)	NPK +M. Nut.	F.P.	SE (M)	CD (5%)	CV	Yield differ- ence 1 RN vs Control (kg/ha)	Yield differ- ence 2 RN + M.Nut. vs RN (kg/ha)	Yield differ- ence 3 RN vs FP (kg/ ha)
Rajas- than	Sub-Humid Southern Plain and Aravalli Hill Zone - Udaipur/ Udaipur/ 12	Pratap Makka 5/ 90- 35 -30 / Zinc(25)	8.4	0	344	31	312	896	1988	2658	2300	2942	3071	1579	48	96	7.58	2046	129	1363
		70- 20 -0 RAJ-4037/ 120- 40-30 / control	—	—	—	—	-	1742	3146	4454	3504	4850	5021	2921	64	128	6.01	3108	171	1929
		90- 25-0																		
								Maize -chickpea												
Karna- taka	Northern Dry Zone - Bijapur/ Gadag/ 7	M900/ 150- 75-37.5 / Zinc(25)	21.3	0.5	88	33	373	2553	2970	3754	3462	4151	4703	-	139	284	10.2	1598	552	-
		— BGD-103/ 25- 50-0/	—	—	—	—	-	560	634	766	777	959	1346	-	34	69	10.8	399	387	-
		Zinc(12.5) —																		
Mahara- shtra	Central Maharashtra Plateau Zone - Aurangabad/ Aurangabad/ 12	Maharaja/ 100- 75-75/ —	—	—	—	—	-	2200	2691	3300	3700	3970	-	-	58	117	6.31	1770	-	-
		— BDNG-797/ 25- 50-25/	—	—	—	—	-	972	1580	1700	1850	1900	-	-	11	22	2.34	928	-	-
		— —																		
								Soybean-wheat												
Madhya Pradesh	Keymore Platue Satpora hills / Seoni/ 5	JS-9305/ 20 - 60-20 / ZnSO4(12.5)	—	—	—	—	-	1010	1266	1410	1340	1786	1930	1216	32	66	5.02	776	144	570
		NA JW-117/ 120- 60-40/ ZnSO4(2.5)	—	—	—	—	-	2120	2640	3810	2960	3870	4240	2700	123	254	8.59	1750	370	1170
		NA																		

Contd..../-

State	NARP Zone/ Centre/ No. of trials	Variety/ Rec. nutrient/ M. Nutrient/ FP nutrient zone (kg/ha)	Initial Soil Status					Yield(kg/ha)							Response(kg/ha)					
			pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Control	N	NP	NK	NPK (RN)	NPK +M. Nut.	F.P.	SE (M)	CD (5%)	CV	Yield differ- ence 1 RN vs Control (kg/ha)	Yield differ- ence 2 RN + M.Nut. vs RN (kg/ha)	Yield differ- ence 3 RN vs FP (kg/ ha)
Mahara- shtra	Scarcity Zone - Sholapur/ Chas/ 24	Ds-228/ 50- 75-25/ Fe(20)+Zn(20) 46- 0-0	7.9	0.6	208	11	569	1555	1818	1973	2115	2373	2534	1556	17	34	4.24	818	161	817
		NIAW-301/ 120- 60-40/ Fe(20)+Zn(20) NA	—	—	—	—	-	2480	3113	3447	3865	4287	4413	2772	18	36	2.5	1807	126	1515
								Soybean-chickpea												
Mahara- shtra	Central Maharashtra Plateau Zone -	MAUS-71/ 30 - 60-30 / —	—	—	—	—	-	881	1131	1239	1228	1317	-	-	14	28	4.31	436	-	-
	Aurangabad/ Aurangabad/ 12	— BDNG-797/ 25- 50-25/ — —	—	—	—	—	-	1176	1418	1551	1563	1687	-	-	17	34	3.88	511	-	-
								Groundnut-sorghum												
Karna- taka	Northern Dry Zone - Bijapur/ Gadag/ 6	TMV-2/ 25- 50-25/ Zinc(20) —	8.5	0.7	112	36	440	533	641	946	728	1089	1449	-	26	54	7.22	556	360	-
		M35-1/ 100- 60-40/ Zinc(12.5) —	—	—	—	—	-	875	1190	1542	1442	1717	1885	-	35	72	5.97	842	168	-
								Clusterbean-wheat												
Rajas -than	Irrigated North Western Plain Zone - Sriganganagar/ Hanumangarh/ 20	RGC-936/ 20 - 40-20 / Zn(5) 20 - 40-20	8.6	0.2	0	32	299	948	1192	1305	1253	1419	1431	1332	4	8	1.58	471	12	87
		RAJ-3077/ 120- 40-20 / Zinc(25) 120- 40-20	—	—	—	—	-	3584	4278	4599	4455	4869	4923	4606	19	38	1.95	1285	54	263

Contd..../-

State	NARP Zone/ Centre/ No. of trials	Variety/ Rec. nutrient/ M. Nutrient/ FP nutrient zone (kg/ha)	Initial Soil Status					Yield(kg/ha)							Response(kg/ha)					
			pH	OC (%)	N (kg/ ha)	P (kg/ ha)	K (kg/ ha)	Control	N	NP	NK	NPK (RN)	NPK +M. Nut.	F.P.	SE (M)	CD (5%)	CV	Yield differ- ence 1 RN vs Control (kg/ha)	Yield differ- ence 2 RN + M.Nut. vs RN (kg/ha)	Yield differ- ence 3 RN vs FP (kg/ ha)
Cotton-pearl millet (S)																				
Gujarat	North Gujarat Zone - Dantiwada/ Banaskantha/ 8	Krushi Dhan-2/ 200 - 40-40/ Zinc(25) 140- 65-0	7.7	0.4	246	33	347	1074	2284	2653	2881	3189	3345	3223	101	204	10.7	2115	156	-34
		86 M 52/ 120- 60-50/ Zn(15) 85- 60-0	—	—	—	—	-	1161	2065	2361	2647	2853	3018	2798	87	176	10.2	1692	165	55
Tobacco-pearl millet																				
Gujarat	Middle Gujarat Zone - Anand/ Thasra/ 12	GTH-1/ 220- 45 -45 / Zinc(25)	7.7	0.5	245	19	314	1548	2608	2872	2958	3221	3009	-	95	190	12.2	1673	-212	-
		—	—	—	—	—	-	1476	1596	1693	1777	1881	1966	-	14	28	2.89	405	85	-
		GBH-558/ 80- 40-40/ Zinc(25)																		
Castor																				
Gujarat	North Gujarat Zone - Dantiwada/ Banaskantha/ 8	GCH-7/ 120- 25-25/ Zinc(25) 90- 40-0	7.8	0.3	225	22	323	1723	2531	2829	3073	3459	3581	3494	107	216	10.3	1736	122	-35
Chilles-onion-cotton																				
Karna- taka	Northern Transition Zone /Gadag/	Byadegi dabbi/ 100- 50-50/ ZnSO4(25)	8.9	0.5	82	50	412	370	483	619	450	772	848	-	30	61	13.2	402	76	-
		— NA/ 62.5 - 25-62.5 / ZnSO4(12.5)	—	—	—	—	-	1971	3629	5300	4329	6071	6371	-	134	274	7.69	4100	300	-
		— Jayadhar/ 7.5 - 3.75 -3.75 / control	—	—	—	—	-	329	372	514	460	628	656	-	15	31	7.86	299	28	-
		—																		

alluvial plain zone of Haryana. Application of Zn @ 25 kg ha^{-1} in rice significantly influenced the yield of rice but not in wheat. In sub-tropical zone of Jammu and Kashmir, application of 25 kg Zn ha^{-1} to both rice and wheat resulted in additional yield of 223 kg ha^{-1} in rice and 156 kg ha^{-1} in wheat. Balanced application of recommended nutrient dose of NPK along with 2.5 kg Zn to both rice and wheat resulted in higher grain yield (3211 and 1545 kg ha^{-1}in rice and wheat respectively) compared to all other treatments in high rainfall zone of Maharashtra. In Keymore plateau satpura hills of Madhya Pradesh, higher yield gap of 1817 and 1276 kg ha^{-1} in rice and wheat was observed between farmers and recommended nutrient practice. Addition of 12.5 kg $ZnSO_4$ ha^{-1} to both the crops in this zone contributed for additional yield of 282 and 339 kg ha^{-1} in rice and wheat respectively. In mid central table land of Odisha, application of zinc @ 25 kg ha^{-1} to rice contributed additional yield of 196 kg ha^{-1}while 10 kg borax ha^{-1} to wheat resulted in additional yield of 105 kg ha^{-1}. The yield levels can be increased to the tune of 20.8 and 23.8% in rice and wheat by practicing application of recommended NPK + micronutrient to both the crops in this zone. Comparison of yield obtained in farmers practice with other treatments in central plain zone (Amiritsar) of Punjab reveals that farmers practice yield level are on par with that of NP or NK only. A yield gap of 588 kg ha^{-1} in rice and 215 kg ha^{-1} in wheat was observed in this zone between farmers and recommended nutrient practices. Application of $ZnSO_4$ to rice and $MnSO_4$ to wheat did not significantly influence the yield of both the crops. In central plain zone (Kanpur) of Uttar Pradesh, application of recommended quantity of NPK to rice and wheat recorded increase in yield to the tune of 68.5 and 41.9% in rice and wheat respectively over application of N alone to these crops. In eastern plain zone (Santkabirnagar) of Uttar Pradesh, it was observed that, an additional yield of 1426 and 1049 kg ha^{-1} can be obtained by application of recommended quantity of NPK + 25 kg zinc to rice and wheat. Additional yield in rice was found to be higher as yield level in farmers practice was found to be at the level of application of N alone. In the hill zone (Jeolikota) of Uttarakhand, though application of recommended quantity of NPK + sulphur to rice and wheat registered higher yield (3978 and 4590 kg ha^{-1}), it was on par with that of recommended NPK alone in both the crops.

Analysis of yield gap between farmers and recommended nutrient practice along with contribution of micronutrient application to rice-wheat system across the NARP zones indicates that, additional yield of 1445 and 979 kg ha^{-1} in rice and wheat over farmers practice is possible with application of recommended quantity of NPK and micronutrients.

Rice-ragi: In eastern dry zone (Bangalore) of Karnataka, 14 trials were conducted and it was found that significantly higher additional yield of 461 kg ha^{-1} can be obtained from rice through application of 100:50:50 kg NPK + 20 kg zinc ha^{-1}. In ragi, the additional yield obtained over farmers practice was found to be 987 kg ha^{-1} due to application of 150:37.5:37.5:20 kg NPK Zn ha^{-1}.

Rice-chickpea: Addition of 2.5 kg Zn ha^{-1} each to rice and chickpea in high rainfall zone (Gondia) of Maharashtra recorded additional yield of 205 and 61 kg ha^{-1} which is significantly higher than the application of recommended quantity of NPK alone. The yield gap between control and recommended NPK was found to be higher in rice (1068 kg ha^{-1}) followed by gram (762 kg ha^{-1}) in this zone.

Rice-greengram: A total of 47 trials were conducted in two NARP zones. In east and south eastern coastal plain zone (Kendrapara) of Odisha, addition of 25 kg zinc to rice recorded additional yield of 292 kg ha^{-1} which is 7.5% higher than application of only recommended NPK nutrient. However, zinc application to greengram did not influence on the yield. In the coastal saline zone (Nadia) of West Bengal, it was observed that yield gap of 366 kg ha^{-1} in rice and 111 kg ha^{-1} in greengram exists between farmers and recommended nutrient practice. Through addition of zinc and recommended quantity of NPK, an additional yield of 540 and 157 kg ha^{-1} can be realized over farmers practice in rice and green gram respectively in this zone.

Rice-groundnut: Significantly higher increase in yield of rice and groundnut was observed due to addition of zinc @ 25 and 10 kgha^{-1} to these crops respectively in mid central table land (Dhenkanal) of Odisha. The increase was observed to be 3.6 and 58.7% in rice and 7 and 54% in ground nut, over recommended nutrient application and control respectively.

Rice-brinjal (s): Yield gain due to application of recommended NPK + zinc @20 kg ha^{-1} was found to be 367 kg ha^{-1} in rice over farmers practice. In case of brinjal, application of 20 kg zinc ha^{-1} resulted in additional yield of 2184 kg ha^{-1}, however, the yield obtained in farmers practice and with 125-100-50 kg NPK ha^{-1} was on par in eastern dry zone (Bangalore) of Karnataka.

Pearlmillet-wheat: A total of 12 trials were conducted in middle Gujarat plain zone (Thasra) of Gujarat. Addition of 12.5 kg ha^{-1} of Zn along with recommended NPK to pearlmillet recorded significantly higher grain yield (additional yield of 222 kg ha^{-1}), however, the effect was not significantly reflected in wheat crop even with subsequent addition of 12.5 kg ha^{-1}of zinc.

Pearlmillet-mustard: In the north Gujarat (Banaskantha) zone of Gujarat, there is no significant difference in yield obtained from farmers and recommended nutrients practice in both pearlmillet and mustard crops. However, application of 25 kg ha^{-1} of zinc in addition to recommended NPK to mustard resulted in additional yield of 150 kg ha^{-1}.

Maize-wheat: A total of 72 trials were conducted in 4 NARP zones. In sub mountain and low hills sub-tropical zone (Kangra) of Himachal Pradesh, application of 25 kg zinc ha^{-1}in addition to recommended NPK recorded additional yield of 164 and 160 kg ha^{-1}in maize and wheat. The yield difference observed between farmers and recommended NPK nutrient practice was observed to be 1303 and 1318 kg ha^{-1}in maize and wheat respectively at central and north eastern plateau (Jamtara) zone in Jharkhand. However, application of micronutrient did not significantly influence on yield of both the crops in this zone. Sub-tropical zone (Jammu) of Jammu and Kashmir recorded significantly higher increase in yield due to application of 25 kg of zinc in addition to recommended NPK to both the crops. The additional yield obtained was found to be 129 and 176 kg ha^{-1} due to micronutrient application. Extremely higher yield difference (1174 kg ha^{-1}maize and 1836 kg ha^{-1} in wheat) between farmers and recommended NPK application to maize and wheat was observed in southern plain and aravali hill (Udaipur) zone of Rajasthan. Micronutrient application @ 25 kg zinc ha^{-1} had only marginal effect on wheat and maize.

Maize-chickpea: A total of 19 trials were conducted in 2 NARP zones. In northern dry (Gadag) zone of Karnakata, the yield improvement in maize and chickpea due to addition of 25 and 12.5 kg zinc ha^{-1}respectively resulted in additional yield of 552 and 387 kg ha^{-1}as compared to recommended NPK application. Maize and chickpea registered significantly higher grain yield of 3970 and 1900 kg ha^{-1}respectively with application of recommended quantity of nutrients.

Soybean-wheat: A total of 29 trials were conducted in 2 NARP zones. In keymore plateau satpura hills (Seoni) zone of Madhya Pradesh, yield difference between farmers and recommended NPK practice was found to be 570 kg ha^{-1}in soybean and 1170 kg ha^{-1} in wheat. Application of micronutrient @ 12.5 kg ha^{-1} to soybean and 2.5 kg ha^{-1} to wheat in the form of $ZnSO_4$ resulted in significantly higher yield (1930 and 4240 kg ha^{-1} respectively) than application of recommended quantity of NPK alone. In the scarcity (Chas) zone of Maharashtra, it was observed that farmer practice of nutrient management resulted in lower yield (817 and 1515 kg ha^{-1}) of soybean and wheat compared to application of recommended NPK to both the crops. Application of 20 kg each of Fe and Zn ha^{-1}in addition to recommended NPK to both the crops recorded significantly higher yield (2534 and 4413 kg ha^{-1}of soybean and wheat) than recommended NPK alone.

Soybean-chickpea: In the central Maharashtra plateau (Aurangabad) zone, application of recommended quantity of NPK together to both the crops have resulted in significantly higher grain yield of both the crops (1317 kg ha^{-1}in soybean and 1687 kg ha^{-1}in chickpea).

Groundnut-sorghum: Significantly higher yield of groundnut and sorghum (1089 and 1885 kg ha^{-1}respectively) was observed in northern dry zone of Karnataka with application of 20 kg Zn ha^{-1} to groundnut and 12.5 kg Zn ha^{-1} to sorghum.

Clusterbean-wheat: The yield difference between farmers and recommended nutrient management practice was found to be 87 kg ha^{-1}in clusterbean and 263 kg ha^{-1}in wheat grown in irrigated north western plain zone (Sriganganagar) of Rajasthan. Application of micronutrient did not significantly influence the yield of both the crops. The yield difference between control and recommended NPK application was found to be higher in wheat (1285 kg ha^{-1}).

Cotton-pearlmillet: Though the yield difference between farmers and recommended NPK application to cotton and pearlmillet was marginal in north Gujarat (Banaskantha) zone, application of 25 and 15 kg Zn ha^{-1} to cotton and pearlmillet respectively in addition to recommended NPK resulted in additional yield of 156 and 165 kg ha^{-1} respectively.

Tobacco-pearlmillet: In middle Gujarat (Thasra) zone, application of 220:45:45 kg NPK $ha^{-1}$to tobacco and 80:40:40 kg ha^{-1} to pearlmillet resulted in higher yield (3221 and 1881 kg ha^{-1}). However, application of 25 kg Zn ha^{-1} to pearlmillet gave additional yield of 85 kg ha^{-1} only.

Castor: In north Gujarat (Dantiwada) zone, application of 120:25:25 kg NPK $ha^{-1}$with 25 kg ha^{-1} zinc resulted in additional yield of 122 kg ha^{-1} than NPK alone.

Chillies-onion-cotton: In northern transition zone (Gadag) of Karnataka, application of 100:50:50 kg NPK $ha^{-1}$with 25 kg $ZnSO_4$ resulted in 848 kg $ha^{-1}$of dry chilli yield which is only 76 kg ha^{-1} higher than 100% NPK alone. In case of onion, addition of 12.5 kg $ha^{-1}$of $ZnSo_4$ resulted in 300 kg ha^{-1}as additional yield. Addition of micronutrient, did not contribute significantly in the yield of cotton.

Summary of results on response of prevalent cropping systems to applied nutrients in various NARP zones are:

- The yield difference between farmer's and recommended practice of nutrient application are very high in rice, wheat, maize, pearlmillet, sorghum, greengram and chickpea in selected locations.
- Application of micronutrient based on soil test is highly beneficial for rice, maize ragi, pearlmillet, groundnut and sorghum in many places. The response of wheat to micronutrient application was low compared to other crops.
- In all the NARP zones, the prevalent cropping systems have recorded higher grain yield with either 100% NPK alone or NPK + micronutrients. Suboptimal application interms of number of nutrients led to lower yield in all the systems.

Panoramic view of on-farm nutrient response trial at Chettinad

Bumper crop of tomato in farmers field at Kolar

On-farm nutrient response trial in rice-rice system at Thiruvalla

Monitoring of on-farm experiment at Jeolikote by Project Director

A good crop of cotton in farmers field at Aurangabad

Difference in growth of rice in control (L) and NPK+Zn (R)

7.3.1.2 On-farm evaluation of diversified cropping systems

Title of experiment: On-Farm evaluation of new diversified cropping systems 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 or fodder crops) suited for specific requirement of different regions have been evaluated at all the centres. The cropping systems evaluated and crop cultivars used are given in Table 7.3/2.

Results

Performance of various cropping systems in terms 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 12015 kg ha^{-1} of rice equivalent yield besides 18.2 and 39.9% increase in total calories and net returns respectively over existing system. Rice-rajmah recorded higher rice equivalent yield of 13828 kg ha^{-1} compared to existing rice-potato system (10713 kg ha^{-1}) at Karimganj. The increase in calories and net returns of rice-rajmah was found to be 2.3 and 42.5% respectively over existing system. All the other system evaluated did not perform better than existing system. At Patna, rice-wheat-greengram system can replace the existing rice-wheat systems as addition of greengram in rice-wheat resulted in rice equivalent yield of 11448 kg ha^{-1} compared to only 8528 kg ha^{-1} in rice-wheat. Besides yield, the rice-wheat-greengram system resulted in 9.6 and 59.8% increase in total calories and net returns over existing system. Among the other system evaluated, rice-chickpea was found to be better in terms of net returns only as it recorded decrease of 22.8% in total calories compared to rice-wheat system. At Kawardha, soybean-tomato-cowpea and soybean-potato-cowpea recorded soybean equivalent yield of 15829 and 15683 kg ha^{-1} which is 222 and 219% higher respectively than the existing soybean-gram system (4913 kg ha^{-1}). The same was reflected in total calories and net returns also as soybean-potato-cowpea system had 103.3 and 208.7% increase in total calories and net returns while soybean-tomato-cowpea resulted in higher increase in net returns (244%) and only marginal increase in total calories (18.8%) over existing system.

Tobacco-pearlmillet system resulted in higher tobacco equivalent yield of 5084 kg ha^{-1} compared to existing sole tobacco (3079 kg ha^{-1}) at Thasara.

Ecosystem	OFR Centre (State)	No. of trials
Arid	Deesa (Gujarat)	24
Semi-arid	Warangal (A.P.), Kawardha (Chattisgarh), Thasra, (Gujarat), Gadag, Banglore (Karnataka), Katni (MP), Aurangabad, Ahmednagar, Roha , Gondia (Maharashtra), Amritsar (Punjab), Hanumangarh, Udaipur (Rajasthan), Chettinad, Paiyur (T.N.)	314
Sub-humid	Patna (Bihar), Kurukshetra (Haryana), Dhansaur (J&K), Jamtara (Jharkhand), Dhan Kanal, Kendrapara (Odisha), Saini, Sant Kabir Nagar (UP), Pantnagar (Uttrakhand)	183
Humid	Karimganj (Assam), Solan (HP), Kakdwip (W.B.)	76
Coastal	Thiruvalla (Kerala)	22

Table 7.3/2: Productivity, calorific value and net return of different crop sequences (2010-2011)

State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Andhra Pradesh	Rice (BPT-5204)	Rice (MTU-1010)		4148	4979		34946	69770
CT/Warangal	120-60-40	120-60-40		(6159)	(6183)			
(24)	Rice (BPT-5204)	Maize (Hybrid)		4148	6896		41302	97630
	120-60-40	120-60-50		(6159)	(8228)			
	Rice (BPT-5204)	Sunhemp (local)		4148	1712		25253	68151
	120-60-40	30-60-60		(6159)	(2241)			
	Rice (BPT-5204)	Sesame (Swetha)		4148	627		21250	14035
	120-60-40	40-40-60		(6159)	(1555)			
	Rice (BPT-5204)	Green gram (WGG-37)		4148	803		20401	50398
	120-60-40	20-50-20		(6159)	(2169)			
						S.E.(m)	790	4256
						C.D.(5%)	1581	8512
						C.V.	13.52	34.75
Assam	Rice(Suwasini)	Potato(Kufri Jyoti)		4077	13852		27544	146772
Barak Valley /	80-40-40	60-50-50		(4231)	(14222)			
Karimganj	Rice(Suwasini)	Rajmah (Uday)		4072	4073		28180	209135
(24)	80-40-40	30-40-20		(4258)	(4258)			
	Rice(Suwasini)	Chilli(Pusa Jawala)		4064	4087		15245	165705
	80-40-40	40-70-40		(4253)	(4249)			
	Rice(Suwasini)	Knolkhol (Challenger)		4067	10484		16272	140877
	80-40-40	70-40-60		(4271)	(10785)			
						S.E.(m)	243	2579
						C.D.(5%)	486	5158
						C.V.	5.46	7.63
Bihar	Rice(R. Shweta)	Wheat(K-9107)		4072	3646		26704	46912
Central & North	80-40-20	120-60-40		(5837)	(5295)			
Eastern Plateau/	Rice(R. Shweta)	Wheat(K-9107)	Greengram (Samrat)	4078	3663	744	29266	74944
Patna	80-40-20	120-60-40	15-40-0	(5835)	(5234)	(1859)		
(24)	Rice(R. Shweta)	Linseed(Subhra)		4052	975		19188	40310
	80-40-20	60-30-20		(5724)				
	Rice(R. Shweta)	Lentil (DPL-15)		4094	1384		18913	50390
	80-40-20	20-40-0		(6012)				
	Rice(R. Shweta)	Chickpea(Pusa-256)		4067	1820		20625	65417
	80-40-20	20-45-00		(5877)				
						S.E.(m)	126	664
						C.D.(5%)	249	1314
						C.V.	2.69	5.85
Chattisgarh	Soybean(JS-335)	Chickpea(JG-315)		2490	2077		18233	62579
Plain zone of MP-1/	20-50-20	20-50-20		;(2745)	(2302)			
Kawardha/	Soybean(JS-335)	Wheat(GW-273)	Cowpea(Ujjala)	2432	3867	10858	29097	158588
(24)	20-50-20	100-60-40	20-50-20	(2672)	(5074)			
	Soybean(JS-335)	Fieldpea(KMPR-400)	Okra(JKDH-7315)	2395	2123	9579	15672	139119
	20-50-20	20-50-20	100-60-40	(2627)	(2376)			

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State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
	Soybean(JS-335) 20-50-20	Brinjal(VNR-218(F)) 120-60-40	Cowpea(Ujjala) 20-50-20	2407 (2654)	14575	10688	19025	134550
	Soybean(JS-335) 20-50-20	Tomato(5005(F1) 120-60-40	Cowpea(Ujjala) 20-50-20	2386 (2621)	26962	10717	21654	215292
	Soybean(JS-335) 20-50-20	Potato(Malwa-3797) 150-100-100	Cowpea(Ujjala) 20-50-20	2418 (2631)	22232	10538	37066	193196
						S.E.(m)	246	2791
						C.D.(5%)	487	5527
						C.V.	5.13	9.08
Gujarat MGAC/ Thasra (12)	Tabacco(GTH-1) 220-45-00		-	3079				12869
	Tabacco(GTH-1) 220-45-00		Pearlmillet S(GHB-558) 80-40-00	3003		3121 (1992)		23675
	Tabacco(GTH-1) 220-45-00		F. Sorghum(Multicut) 80-40-00	2959		(28503)		29443
	Tabacco(GTH-1) 220-45-00		F. Rajka Bajri(Multicut) 80-40-00	2972		(27681)		34700
						S.E.(m)		1236
						C.D.(5%)		2536
						C.V.		17.01
Gujarat MGAC/ Thasra (12)	Pearlmillet (GHB-558) 80-40-00	Wheat(GW-496) 120-60-00		1435 (2156)	2185 (1328)			22014
	Pearlmillet S(GHB-558) 80-40-00	Lucerne+Pearlmillet F(Anand 2) 20-80-00		1462 (2186)	- (29014)			30762
	Pearlmillet S(GHB-558) 80-40-00	Lucerne (Seed purpose) (Anand 2) 20-80-00		1544 (2261)	818 (22186)			50532
	Pearlmillet S(GHB-558) 80-40-00	Lucerne F(Anand 2) 20-80-00		1530 (2259)	- (29959)			32669
						S.E.(m)		957
						C.D.(5%)		1964
						C.V.		9.75
Gujarat NGAC/ Deesa (8)	Pearl millet(GHB-558) 80-40-25	Mustard(GM-3) 50-50-25	-	2378 (6533)	1686 (2399)	-	17706	35860
	Pearl millet(GHB-558) 80-40-25	Fennel (GF-11) 90-45-30	-	2316 (6403)	1010 (2671)		8472	42987
	Greengram (GM-4) 20-50-50	Fennel (GF-11) 90-45-30		1004 (1499)	1116 (2692)		3477	55763
	Greengram (GM-4) 20-50-50	Mustard(GM-3) 50-50-25	-	1103 (1608)	1721 (2492)	-	12993	47093
						S.E.(m)	117	991
						C.D.(5%)	246	2083
						C.V.	3.11	6.17

Contd..../-

State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Gujarat	Bt.Cotton(Krushi Dhan 2)		Pearlmillet(86M52)	2418		3394		76744
NGAC/	240-40-40		120-60-50	(4379)		;'6515)		
Deesa	Bt.Cotton(Krushi Dhan 2)		Pearlmillet(86M52)	2528		3411		91025
(8)	240-40-40		120-60-50	(4306)		(6545)		
	;+			+				
	Cowpea (G-4)			706				
	20-40-00			(1450)				
	Bt.Cotton(Krushi Dhan 2)		F Pearl millet(Local)	2534				80623
	240-40-40		100-00-00	(4277)		(35226)		
	;+			+				
	Cowpea (G-4)			714				
	20-40-00			(1595)				
	Castor (GCH-7)		F Pearl millet(Local)	2328				73389
	120-25-25		100-00-00	(4648)		(34375)		
						S.E.(m)		2966
						C.D.(5%)		6231
						C.V.		10.43
Gujarat	Castor (GCH-7)	-		2097	-			71223
NGAC/	120-25-25			(4135)				
Deesa	Fennel (GF-2)		F Pearl millet(Local)	2011		24523		100492
(8)	90-45-0		150-60-0	(3585)				
	Castor (GCH-7)	Lucerne (Anand 2)		2086				85550
	120-25-25	20-40-00		(4196)	(18880)			
	Castor (GCH-7)	Chicory (Local)		2124				82094
	120-25-25			(4235)	(22005)			
						S.E.(m)		3059
						C.D.(5%)		6428
						C.V.		10.2
Haryana	Rice (HKR-127)	Wheat (WH-711)		6044	4769		37414	77292
Eastern Alluvial Plain/	150-60-60	150-60-60		(6308)	(4950)			
Kurukshetra	Maize (Kanchan-25)	Wheat (WH-711)		2774	4856		26287	50977
(12)	150-62.5-60	150-60-60		(3256)	(5016)			
	Rice (HKR-127)	Wheat (WH-711)	Greengram (SML-668)	6307	4927	389	40173	91874
	150-60-60	150-60-60	15-40-00	(6576)	(5115)	-		
	Rice (HKR-127)	Chickpea(HC-1)	Greengram (SML-668)	6293	1830	387	29652	73872
	150-60-60	15-40-00	15-40-00	(6553)	(2093)	-		
	Rice (HKR-127)	Raya (RH-30)	Greengram (SML-668)	6313	1903	391	32138	71626
	150-60-60	80-30-00	15-40-00	(6605)	(3858)	-		
						S.E.(m)	186	782
						C.D.(5%)	376	1581
						C.V.	1.94	3.70

Contd..../-

State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
H.P.	Rice(Kasturi Basmati)	Wheat (HPW-211)	-	2684	3786		22388	75489
Sub Mountain and	90-40-40	120-60-30		(4006)	(4964)			
Low Hills Sub-Tropical/	Rice(Kasturi Basmati)	Radish (J. White)	Potato (Kufri Jyoti)	2805	13633	9837	21566	82325
Solan	90-40-40	100-50-40	120-80-60	(4221)	-	(3042)		
(12)	Rice(Kasturi Basmati)	Potato (Kufri Jyoti)	Frenchbean (Cont-	2828	8542	4604	19270	126044
	90-40-40	120-80-60	ender)	(4169)	(2712)	(1615)		
			50-100-50					
	Rice(Kasturi Basmati)	Potato (Kufri Jyoti)	Onion (AFDR)	2789	8542	11254	23564	91799
	90-40-40	120-80-60	120-75-60	(4247)	(2760)	-		
	Rice(Kasturi Basmati)	Berseem+Oat(Local)	-	2779	-		9615	101669
	90-40-40	30-50-00		(4313)	(50824)			
						S.E.(m)	408	3989
						C.D.(5%)	824	8062
						C.V.	7.33	14.47
H.P.	Maize (KH-101)	Wheat (HPW-211)	-	2981	3344		21764	48879
Sub Mountain and	90-45-30	80-40-40		(5866)	(4292)			
Low Hills Sub-Tropical/	Maize (KH-101)	Wheat (HPW-211)		2741	3405		24320	60355
Solan	90-45-30	80-40-40	-	(5552)	(4429)			
(16)	+			+				
	Soybean (Harit Soya)			732				
	20-60-40	-		(970)				
	Maize (KH-101)	Chickpea (HC-I)	-	2947	1045		13841	52913
	90-45-30	30-60-30		(5945)	(1366)			
	Maize (KH-101)	G.Sarson (Sheetal)		3020	1201		20455	37326
	90-45-30	120-60-40	-	(6036)	(1936)			
		+			+			
		Toria (Bhawani)			671			
		-			(1046)			
	Maize (KH-101)	Potato (Kufri Jyoti)		3037	15943		32372	185463
	90-45-30	120-80-60		(6155)	(3429)			
		+			+			
		Onion (AFDR)			13039			
		125-75-60						
						S.E.(m)	288	2166
						C.D.(5%)	583	4377
						C.V.	5.12	11.25
J & K	Rice (Pusa-1121)	Wheat (DBW-17)	-	3623	3173	-	23514	90764
Sub Tropical/	50-30-20	100-50-25		(4360)	(4717)			
Dhansaur	Rice (IET-1410)	Garlic (Local)	-	3994	6710	-	23549	206865
(12)	50-30-20	100-50-50		(4794)				
	Rice (IET-1410)	Potato(Kufri Sundar)	Onion(N-53)	3981	22310	23387	47108	300139
	50-30-20	120-60-120	100-50-50	(4774)				
	Rice (IET-1410)	Peas (Arkal)	Okra(Hissar unnat)	4063	7185	6063	22860	83674
	50-30-20	50-60-50	60-30-30	(4871)				
						S.E.(m)	469	5983
						C.D.(5%)	962	12277
						C.V.	5.55	12.17

Contd..../-

State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
J & K	Maize (HQPM-1)	Wheat (DBW-17)	-	3110	3189	-	21671	56698
Sub Tropical/	90-60-30	100-50-25		(5810)	(4892)			
Dhansaur	Maize (HQPM-1)	Garlic (Local)	-	2915	5937	-	19120	167722
(12)	90-60-30	100-50-50		(5459)				
	+			+				
	Cowpea (Local)			168				
	Maize (HQPM-1)	Potato(Kufri Sindhuri)	Onion(N-53)	2888	22458	21583	43119	248636
	90-60-30	120-60-120	100-50-50	(5415)				
	+			+				
	Okra(Arka Anamica)			1898				
	Maize (HQPM-1)	Peas (Arkal)	Okra(Hissar unnat)	3014	5639	6017	18275	99435
	90-60-30	50-60-50	60-30-30	(5653)				
	+			+				
	Mash (PU-19)			178				
						S.E.(m)	301	3225
						C.D.(5%)	618	6618
						C.V.	4.08	7.81
Jharkhand	Rice (Lalat)	Wheat ((K9107)		2923	3059		20699	52605
Central and North	100-50-25	100-50-25		(4331)	(4718)			
Eastern Plateau/	Rice (Lalat)	Potato(Kanchan)		2927	14031		23736	57856
JamTara(13)	100-50-25	120-90-100		(4422)				
	Rice (Lalat)	Maize (H.Q.P.M.-I.)		3003	2094		17550	29804
	100-50-25	100-50-25		(4475)	(3740)			
	Rice (Lalat)	Chickpea (KWR-108)		3089	1197		14696	37309
	100-50-25	20-40-20		(4785)				
	Rice (Lalat)	Mustrad (Shivani)		3189	715		14900	27954
	100-50-25	80-40-20		(4734)	(1355)			
						S.E.(m)	273	1096
						C.D.(5%)	569	2286
						C.V.	4.94	8.84
Karnataka	Chilli (Bayadagi dabi)			457				102105
Nortrern Dry/	100-50-50							
Gadag	+			*				
(7)	Onion (N-53)			4443				
	62.5-25-62.5							
	+ (1:3:2)			*				
	Cotton (Jayadhar local)			695				
	7.5-8.75-3.75							
	Sunflower(Laxmi-999)	Chickpea (BGD-103)		1549	1150			50544
	35-50-35	25-50-00						
	Hybrid Cotton (Raasi)			1369				46857
	30-15-15							
	Groundnut(TMV-2)	Sorghum(M35-1)		1686	1310			56680
	25-50-25	100-62-37.5						
						S.E.(m)		2709
						C.D.(5%)		5692
						C.V.		11.19

Contd..../-

State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Karnataka	Hybrid Maize (M-900)	Chickpea (BGD-103)		4129	1300			25422
Nortrern Dry/	150-75-37.5	25-50-00						
Gadag	Sunflower(Sunbreed-207)	Chickpea (BGD-103)		1055	1243			17878
(7)	60-75-60	25-50-00						
	Hybrid Cotton(BT-Rasi)			2468				68458
	150-75-75							
	Chilli (Badagi dabbi)			1185				39785
	150-75-75							
						S.E.(m)		3642
						C.D.(5%)		7653
						C.V.		25.44
Karnataka	Groundnut (GPBD-4)	Sorghum(M35-1)		1242	1350			68830
Nortrern Dry/	25-50-25	100-60-40		(1863)	;(2058			
Gadag	Hybrid Maize (M-900)	Chickpea (BGD-103)		2750	983			17967
(6)	100-50-25	25-50-00						
	Sunflower(Sunbreedi-207)	Wheat (DWR-2006)		1167	1283			21582
	35-50-35	100-75-50						
	Chilli (Badagi dabbi)			525				59060
	100-50-50							
	+			*		S.E.(m)		2218
	Onion (N-53)			2258		C.D.(5%)		4726
	62.5-25-62.5					C.V.		12.98
	+(1:3:2)			*				
	Cotton (Jayadhar)			475				
	75-3.75-3.75							
Karnataka	Rice(IR-30864)		F.Millet (GPU-66)	4516		3681	27700	49247
Eastern Dry /	100-50-50		100-50-50	(5686)		(6800)		
Banglore	Rice(IR-30864)		Tomato (US-6-1-8)	4559		12881	18738	106953
(14)	100-50-50		250-250-250	(5227)				
	Rice(IR-30864)		Brinjal (Green long)	4553		15343	19435	172693
	100-50-50		125-100-50	(5156)				
	Rice(IR-30864)		Okra (Arka Anamica)	4509		7718	18303	80641
	100-50-50		125-75-63	(5129)				
	Rice(IR-30864)		Veg Cowpea(PKB-66)	4615		3857	17819	47975
	100-50-50		25-75-60	(5227)				
						S.E.(m)	119	1833
						C.D.(5%)	239	3666
						C.V.	2.19	7.5
Kerala	Rice (Uma)	Rice (Uma)	Fallow	4824	4634	-	32725	74350
Special/	90-45-45	90-45-45		(5798)	(5618)	-		
Thiruvalla	Rice (Uma)	Rice (Uma)	Cowpea (Veg.)	4939	4815	9305	38231	212436
(22)	90-45-45	90-45-45	(Jyothika)	(6009)	(5952)			
			20-30-10			-		

Contd..../-

State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
	Rice (Uma) 90-45-45	Rice (Uma) 90-45-45	Okra (Arka Anamica) 50-08-25	5085 (6110)	4962 (6032)	11547 -	38772	255378
	Rice (Uma) 90-45-45	Rice (Uma) 90-45-45	Cucumber (Soubhagya) 70-25-25	5134 (6158)	5047 (6124)	24951 -	38468	191402
	Rice (Uma) 90-45-45	Rice (Uma) 90-45-45	Amaranthus (Local) 100-50-50	5261 (6347)	5121 (6244)	15162 -	76709	182661
						S.E.(m)	552	4107
						C.D.(5%)	1092	8131
						C.V.	5.75	10.51
M.P.								
Kymore Plateau & Satpura Hills / .Katni (20)	Rice(JRH-5) 120-60-40	Wheat(GW-273) 120-60-40		3910	3584 (4970)		25930	67635
	Soybean(JS-9752) 20-60-20	Wheat(GW-273) 120-60-40	-	1795	3740 (5292)		20691	76678
	Maize(MQPM-1) 60-40-30	Chickpea (JG-14) 20-60-20		1694	1571		11451	32623
	Greengram(TM-37) 20-60-20	Wheat(GW-273) 120-60-40		742	3722 (5285)		15359	78234
						S.E.(m)	166	790
						C.D.(5%)	333	1580
			-			C.V.	4.06	5.54
Maharashtra	Soybean (MAUS-71)	-		1225			7866	31394
Cent Mah Plateau/ Aurangabad (12)	30-60-0 + (4:2) Pigeonpea(BSMR-853) (25-50-0)	-		(1739) + 768 (1067)				
	Maize (Maharaja) 100-75-75 + (1:1) Black Gram (TAU-1) 25-50-0	Chickpea (BDNG-797) 25-50-25		2100 (2892) + 512 (725)	1807 (2556)		15532	41528
	Maize (Maharaja) 100-75-75	Chickpea (BDNG-797) 25-50-25	Greengram (BPMR-145) 25-50-0	3399 (4790)	1550 (2229)	624 (984)	19289	50331
						S.E.(m)	339	1979
						C.D.(5%)	712	4158
						C.V.	8.25	16.69
Maharashtra	Soybean(MAUS-71)	Wheat (HD 2189)		1108	2904		14834	34905
Cent Mah Plateau/ Aurangabad (12)	25-50-0 Soybean(MAUS-71) 30-60-30	90-30-30 Wheat (HD 2189) 100-50-50		(1614) 1231 (1756)	(4006) 3003 (4146)		15706	37772
	Soybean(MAUS-71)	Safflower (PBNS-12)	F.Maize(African tall)	1302	728		8217	83219

Contd..../-

State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
	Soybean(MAUS-71) 30-60-30	Chickpea (BDNG-797) 25-50-25	F.Maize(African tall) 100-50-50	1337 (1856)	1665 (2400)	 (42518)	11767	107643
						S.E.(m)	154	1744
						C.D.(5%)	316	3579
						C.V.	4.22	9.17
Maharashtra Scaracity/ Ahmednagar (24)	Soybean(DS-228) 50-75-25	Wheat (NIAW-301) 120-60-40	-	2401 (2900)	4264 (6344)		25124	68421
	Soybean(DS-228) 50-75-25	Chickpea(Digvijay) 25-50-00		2403 (2894)	2649 (4452)		19916	60907
	Soybean(DS-228) 50-75-25	Onion (N-2-4-1) 100-50-50	-	2430 (2928)	27067		24029	231907
	Soybean(DS-228) 50-75-25	-	Okra (Ph. Utkarsha) 100-50-50	2452 (2921)		14550	15685	160768
						S.E.(m)	117	2626
						C.D.(5%)	234	5252
						C.V.	2.71	9.86
Maharashtra North Konkan/ Roha (24)	Rice (Sahyadri) 100-50-50	Cowpea(Konkan Safed) 25-50-00		5786 (9110)	1347 (2020)		20665	58786
	Rice (Sahyadri) 100-50-50	Groundnut (TAG 24) 25-50-00		5860 (9056)	2008 (3088)		31662	62982
	Rice (Sahyadri) 100-50-50	Maize(Ganga Safed) 100-50-50		5917 (9293)	6443 (6193)		42509	72481
	Rice (Sahyadri) 100-50-50	Marigold(Indica Orange) 150-75-50		5916 (9367)	4693 (4112)		20470	22937
	Rice (Sahyadri) 100-50-50	Chilli (Sitara) 150-50-50		5836 (9189)	7970 (5239)		22503	67114
	Rice (Sahyadri) 100-50-50	Groundnut (TAG 24) 25-50-00 '+ Sweet Corn (Sugar-75) 100-50-50		5930 (9394)	3858 (3625) '+ 1998 (2938)		35163	73815
	Rice (Sahyadri) 100-50-50	Cowpea(Konkan Safed) 25-50-00	Okra (Mahiko-10) 100-50-50	5947 (9361)	1334 (2023)	10582 (3857)	24920	153208
						S.E.(m)	391	2548
						C.D.(5%)	767	4994
						C.V.	6.78	17/09
Maharashtra Eastern Vidharbha High rainfall/Gondia (12)	Rice (PKV-Khamang) 100-50-50	Wheat(AKW-3722) 100-50-50		3744 (5616)	2475 (3713)		21517	53702
	Rice (PKV-Khamang) 100-50-50	Mustard(Pusa Bold) 50-40-00		3825 (5738)	846		17810	51631
	Rice (PKV-Khamang) 100-50-50	Wheat(AKW-3722) 100-50-50	Cowpea(Pusa dofa -sali) 25-50-0	3875 (5812)	2454 (3681)	4954	24277	94698
	Rice (PKV-Khamang) 100-50-50	Mustard(Pusa Bold) 50-40-00	Cowpea(Pusa dofa -sali) 25-50-0	3842 (5763)	850	4929	20833	93423
						S.E.(m)	338	1233
						C.D.(5%)	694	2530
						C.V.	5.55	5.82

Contd..../-

State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
Maharashtra	Rice (PKV-Khamang)	Chickpea(AKG-46)		3721	1577		18552	54719
Eastern Vidharbha	100-50-50	20-40-00		(5573)	(1427)			
High rainfall/Gondia	Rice (PKV-Khamang)	Mustard(Pusa Bold)		3827	815		17649	50920
(12)	100-50-50	50-40-00		(5738)				
	Rice (PKV-Khamang)	Chickpea(AKG-46)	Cowpea(Pusa dofa -sali)	3898	1638	4738	21656	96005
	100-50-50	20-40-00	25-50-0	(5855)	(1482)			
	Rice (PKV-Khamang)	Mustard(Pusa Bold)	Cowpea(Pusa dofa -sali)	3792	802	4671	19700	87477
	100-50-50	50-40-00	25-50-0	(5688)				
						S.E.(m)	172	986
						C.D.(5%)	354	2023
						C.V.	3.08	4.73
Odisha		-						
Mid central table land	Rice(Swarna)	Greengram(PDM-139)		4425	832		18088	34703
Dhan Kanal	80-40-40	20-40-0		(5512)				
(24)	Rice(Swarna)	Cowpea(U Manik)		4434	4168		17343	38082
	80-40-40	25-50-60		(5567)				
	Rice(Swarna)	Okra(UGaurav)		4484	7421		18113	44635
	80-40-40	60-50-40		(5610)				
	Rice(Swarna)	Tomato(U Raja)		4596	14798		19305	75273
	80-40-40	75-50-50		(5753)				
						S.E.(m)	131	1070
						C.D.(5%)	261	2140
						C.V.	3.51	10.88
Odisha	Rice(Swarna)	Greengram(Local)		4267	779		17363	31656
East & South Eastern	80-40-40	20-40-20		(5556)				
Coastal Plain/	Rice(Swarna)	Sunflower(KHSB-1)		4221	1376		23135	34579
Kendrapara/	80-40-40	60-80-60		(5569)				
(24)	Rice(Swarna)	Groundnut (Smurti)		4286	2182		27198	46627
	80-40-40	20-40-40		(5534)				
	Rice(Swarna)	Bittergourd(HB-1)		4270	6869		15940	59790
	80-40-40	50-30-50		(5584)				
						S.E.(m)	150	718
						C.D.(5%)	300	1437
						C.V.	3.51	8.15
Punjab								
Central Plain/	Rice (PR-120)	Wheat (DBW-17)	-	7160	4778		41304	93254
Amritsar	120-00-00	120-60-30		(8729)	(6511)			
(24)	Rice (PAU-201)	G.Sarson (GSL-1)	-	7065	1545		32804	69647
	120-00-00	100-30-00		(8690)	(3209)			
	Rice (PAU-201)	G.Sarson (GSL-1)	Greengram (SML-668)	6969	1572	1080	36228	91356
	120-00-00	100-30-00	12.5-40-00	(8567)	(3235)	(2143)		

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State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
	Rice (PAU-201)	Gr.Peas (P-89)	Greengram (SML-668)	7050	4939	1121	32728	52181
	120-00-00	50-62,50-00	12.5-40-00	(8550)	(9145)	(2238)		
	Rice (PAU-201)	Gr.Peas (P-89)	-	7113	4861		29130	76971
	120-00-00	50-62,50-00		(8611)	(8774)			
	Rice (PR-120)	Gr.Peas (P-89)	Mash (1008)	7114	4846	1077	32848	94905
	120-00-00	50-62,50-00	12,5-24-00	(8745)	(8900)	(2152)		
						S.E.(m)	307	1410
						C.D.(5%)	609	2791
						C.V.	4.41	8.66
Rajasthan	Greengram(S.M.L.668)	Wheat (Raj.3077)	-	921	4749	-	19507	91117
Irrigated North Western	20-40-20	120-40-20		(1182)	(6096)			
Plain/ Hanumangarh	Guar (RGC 936)	Wheat (Raj.3077)	-	1397	4787	-	17387	96887
(20)	20-40-20	120-40-20		(2015)	(6156)			
	Guar (RGC 936)	Mustard (Laxmi)	-	1404	2139	-	12401	81461
	20-40-20	60-32-20		(2034)	(2681)			
	Guar (RGC 936)	Barley (RD 2035)	-	1413	4509	-	15983	89652
	20-40-20	80-40-20		(2042)	(5627)			
						S.E.(m)	100	517
						C.D.(5%)	200	1035
						C.V.	2.74	2.58
Rajasthan	Maize (PM-5)	Wheat (Raj 4037)		2646	4392		24244	60584
Humid Southern	90-40-30	120-40-30		(4000)	(7500)			
Plain /	Maize (PM-5)	Wheat (Raj 4037)	Greengram (SML668)	2691	4496	1167	28655	98290
Udaipur(12)	90-40-30	120-40-30	20-40-30	(4033)	(7663)	(1750)		
	Maize (PM-5)	Wheat (Raj 4037)	Okra(Arka Anamika)	1633	4813	8083	25066	278472
	90-40-30	120-40-30	60-30-30	(2438)	(7817)			
	+ (2:2)			+				
	Blackgram (Barkha)			442				
	20-40-30			(675)				
	Clusterbean (RGC 1003)	Wheat (Raj 4037)	Greengram (SML668)	1092	4975	1200	21396	111020
	20-40-00	120-40-30	20-40-30	(1646)	(8129)	(1783)		
	Clusterbean (RGC 1003)	Wheat (Raj 4037)	Okra(Arka Anamika)	1100	5029	8400	20517	298907
	20-40-00	120-40-30	60-30-30	(1646)	(8192)			
						S.E.(m)	188	3728
						C.D.(5%)	381	7535
						C.V.	2.72	7.62
Rajasthan	Maize (PM-5)	Wheat (Raj 4037)		2450	3225		19538	41757
Sub Humid Southern	90-35-30	120-40-30		(3708)	(4758)			
Plain and Aravali Hills/	Maize (PM-5)	Barley (RD-2035)		2621	3558		20919	37337
Udaipur(12)	90-35-30	60-30-30		(3933)	(5092)			
	Maize (PM-5)	Wheat (Raj 4037)		1688	3175		18072	40002
	90-35-30	120-40-30		(2558)	(4621)			
	+ (2:2)			+				

Contd..../-

State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
	Blackgram (Barkha)			379				
	20-40-30			(629)				
	Sorghum (SPV 1616)	Wheat (Raj 4037)		1767	2658		16574	37387
	80-40-40	120-40-30		(2633)	(3921)			
	+(2:1)			+			14103	49907
	Greengram (SML 668)			363		-		
	20-40-30			(563)				
	Clusterbean(RGC936)	Wheat (Raj 4037)		742	4042			
	20-40-0	120-40-30		(1129)	(6033)			
						S.E.(m)	288	1675
						C.D.(5%)	582	3385
						C.V.	5.59	14.06
T.N.	Rice (ADT-39)	Rice (ADT-45)		4309	4417		30191	54437
Southern/	150-50-50	120-38-38		(4960)	(5102)			
Chettinad	Rice (ADT-39)	Black gram (VBN-5)		4306	930		18125	59051
(24)	150-50-50	25-50-25		(4958)	(2043)			
	Rice (ADT-39)	Green gram(VBN-3)		4288	947		18002	55956
	150-50-50	25-50-25		(4934)	(2122)			
	Rice (ADT-39)	Sesame (SVPR-1)		4308	677		18716	54149
	150-50-50	35-25-25		(4955)	(3462)			
						S.E.(m)	50	234
						C.D.(5%)	99	467
						C.V.	1.14	2.05
T.N.	Rice (Sona masuri)	Rice (ADT-39)		7237	6994		49241	107819
North West/	150-50-50	120-40-40		(9274)	(9180)			
Paiyur	Rice (Sona masuri)	Tomato (US 618)		7242	69129		40958	153352
(24)	150-50-50	200-300-200		(9313)				
	Rice (Sona masuri)	Cabbage(Hari Rani)		7213	29818		33008	104543
	150-50-50	50-125-25		(9337)_				
	Rice (Sona masuri)	Cauliflower(Namdhari)		7306	21465		39446	107961
	150-50-50	50-100-100		(9499)				
						S.E.(m)	104	1131
						C.D.(5%)	208	2262
						C.V.	1.25	4.68
U.P.	Sorghum (CSV-15)	Wheat(PBW-343)		890	3309		14552	34309
Central Plain/	80-40-20	120-60-40		(3458)	(3611)			
Saini	Blackgram (Shekhar-2	Wheat(PBW-343)		422	3570		13817	44198
(24)	15-40-0	120-60-40		(239)	(4045)			
	Sesame (Shekhar)	Wheat(PBW-343)		416	3369		14001	48079
	30-15-15	120-60-40			(3558)			
	Sesame (Shekhar)	Pea(KPMR-400)		417	2197		4393	67856
	30-15-15	20-40-20			(1098)			
						S.E.(m)	46	326
						C.D.(5%)	90	646
						C.V.	1.91	3.29
U.P.	Rice(Narendra-359)	Wheat(NW-2036)		4672	3774		29223	48753
Eastern Plain/	120-60-40	120-60-40		(5609)	(4798)			
Sant Kabir Nagar	Rice(Narendra-359)	Lentil (NDL-1)		4692	1399		23343	42124
(20)	120-60-40	18-46-00		(5557)				

Contd..../-

State/ NARP Zone/ Centre/No. of trials	Crop sequences/Variety/N-P-K (kg/ha)			Mean grain (straw) yield (kg/ha)			Total Calories (Kcal x1000)	Net return (Rs/ha)
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer		
	Rice(Narendra-359) 120-60-40	Mustard(Nrndra-8501) 80-40-0		4694 (5622)	1660		22553	39058
	Rice(Narendra-359) 120-60-40	Pea(HUDP-15) 18-46-0		4673 (5630)	1618		21264	33178
						S.E.(m)	115	509
						C.D.(5%)	231	1017
						C.V.	2.14	5.58
Uttrakhand Hills/ Pantnagar (12)	Rice(Pusa-1401) 100-60-40	Wheat (PBW-550) 150-60-40	-	3550 (4429)	4639 (5395)		28334	74918
	Rice(Pusa-1401) 100-60-40	Wheat (PBW-550) 150-60-40 + Mustard(P Tarak)		3571 (4495)	4403 (5147) +146		28376	74825
	Rice(Pusa-1401) 100-60-40	Potato(Kufri Pukhraj) 160-100-120	Veg. cowpea(Pant Lobia-1) 15-45-00	3563 (4496)	20525 -	1394 -	36741	167317
	Rice(Pusa-1401) 100-60-40	Potato(Kufri Pukhraj) 160-100-120	Greengram(PGreengram-5) 15-45-00	3597 (4510)	20875 -	1333 -	37148	150098
	Rice(Pusa-1401) 100-60-40	Pea .(Arkil) 30-70-50	F.Bean(Anupma) 120-70-50	3645 (4585)	5695 -	4078 -	18968	157399
						S.E.(m)	250	3792
						C.D.(5%)	506	7664
						C.V.	2.90	10.62
Uttrakhand Hills/ Pantnagar (8)	Rice(Pusa-1401) 100-60-40	Wheat (PBW-550) 150-60-40	-	4214 (5340)	4451 (6214)		29980	78648
	Rice(Pusa-1401) 100-60-40	Wheat (PBW-550) 150-60-40 + Mustard(PVS-1)		4195 (5250)	4314 (5955) +224		30652	83238
	Rice(Pusa-1401) 100-60-40	Mustard(PYS-1) 100-40-40	Veg. cowpea (PL -1) 15-45-00	4147 (5299)	1241 (913)	2336 -	21672	138901
	Rice(Pusa-1401) 100-60-40	Mustard(PYS-1) 100-40-40	Greengram.(Pant-5) 15-45-00	4318 (5282)	1215 (860)	1212 -	25562	78496
	Rice(Pusa-1401) 100-60-40	Veg. Pea .(Arkil) 30-70-50	F.Bean(Anupma) 120-70-50	4380 (5573)	7094 -	3665 -	33592	159031
						S.E.(m)	291	2101
						C.D.(5%)	601	4337
						C.V.	2.91	5.52
W. B. Coastal Saline/ Kakdwip (24)	Rice (IET-5656) 80-40-40		Greengram(Chait Greengram) 20-40-40	4671 (6561)		957	19358	37422
	Rice (IET-5656) 80-40-40		Bhindi(SG-016) 80-40-40 + (2:3) Greengram(Chait Greengram) 20-40-40	4605 (6387)		5882 (1572) '+ 489	19567	60614
	Rice (IET-5656) 80-40-40		Sunflower(Abinash) 80-40-40 + (2:4) Greengram(Chait Greengram) 20-40-40	4617 (6535)	-	627 (1360) '+ 466	21582	38639
	Rice (IET-5656) 80-40-40		Bhindi(SG-016) 80-40-40	4661 (6506)		11098 (3145)	20013	77414
						S.E.(m)	75	1231
						C.D.(5%)	149	2461
						C.V.	1.82	11.26

However, the increase in net returns was found to be higher in tobacco-multicut fodder rajka bajri as it registered 169.6% increase over existing system. This was closely followed by tobacco-pearlmillet system resulted in only 84% increase in net returns. The other existing system of pearlmillet-wheat at Thasara can be replaced by pearlmillet-lucerne (seed purpose) as it recorded 129.5% increase in net returns over existing system. This was followed by pearlmillet-lucerne (fodder). At Deesa, it was found that greengram-fennel can replace the existing system of pearlmillet-mustard as greengram-fennel recorded pearlmillet equivalent yield of 10210 kg ha^{-1} compared to only 6424 kg ha^{-1} in pearlmillet-mustard. The increase in net returns with the same system was found to be 55.5%. The other existing system of Bt cotton-pearlmillet at Deesa can be replaced with Bt cotton+ cowpea-pearlmillet as it recorded 18.6% increase in net returns over the existing system. Fennel-pearlmillet (fodder) recorded 41.1% higher net returns compared to the other existing system of castor alone at Deesa.

At Kurukshetra, maize-wheat recorded rice equivalent yield of 13364 kg ha^{-1} which is 19% higher than the existing rice-wheat (11230 kg ha^{-1}). The same system also recorded 18.9% increase in net calories compared to the existing system. All the other system evaluated gave lesser yield than existing system. Rice-potato-frenchbean recorded 67% increase in net returns at Solan compared to rice-wheat which is the existing system. However, the same system recorded 13.9% decrease in total calories. In terms of calories, only rice-potato-onion had 5.3% increase. In the other set of experiments at Solan, among the four alternative system evaluated with existing maize-wheat system, maize-potato+ onion recorded maize equivalent yield of 15437 kg ha^{-1}, 279.4% increase in net returns and 48.7% increase in total calories compared to maize-wheat system. All the other systems resulted in either decrease in yield or calories. Rice-potato-onion at Dhinsaur of Jammu and Kashmir recorded rice equivalent yield of 19353 kg ha^{-1}, 230.7 and 100.3% increase in net returns and total calories respectively over rice-wheat system. Rice-garlic was found to be the next best attentive in terms of net returns and calories. Similarly the maize-potato-onion was found to be the alternative to maize-wheat system as it recorded maize equivalent yield of 32876 kg ha^{-1}, 338.5 and 99% increase in net returns and total calories. Maize + cowpea-garlic also found to increase the returns by 195.8%.

Among the various alternative systems evaluated for rice-wheat at Jamtara, it was found that only rice-potato recorded higher rice equivalent yield (11346 kg ha^{-1}) compared to existing system. The increase in net returns and total calories was found to be 10 and 14.7% respectively. All the other systems recorded lower yield, returns and calories. At Gadag, three set of experiments were conducted to find the alternative system to existing chilli + (onion + cotton), hybrid maize- bengal gram and groundnut-sorghum systems. The results revealed that the existing systems of chilli + (onion + cotton) and groundnut – sorghum recorded net returns of Rs. 102105 ha^{-1} and 68830 ha^{-1} which is higher than all the other alternative system evaluated. However, the other existing system hybrid maize-bengalgram can be replaced with hybrid cotton as it recorded maize equivalent yield of 14808 kg ha^{-1} with 169.3% increase in net returns over existing system. Chilli also recorded 9217 kg ha^{-1} of equivalent yield and 56.5% increase in net returns. At Bangalore, the results revealed that rice equivalent yield of 22965 and 17440 kg ha^{-1} can be obtained from by replacing existing summer finger millet by brinjal and tomato respectively. However, in terms of calories, both rice-brinjal and rice-tomato recorded 29.8 and 32.4% decrease over rice-finger millet system mainly due to replacement of cereal crop with vegetables. In terms of rice equivalent yield, rice-rice-cowpea was found to be better (30368 kg ha^{-1}) compared to existing rice-rice system (9458 kg ha^{-1}) at Thiruvalla. However, in terms of net returns, rice-rice-okra recorded 243.5% increase over existing system. Rice-rice amaranthus recorded 134.4% increase in total calories compared to rice-rice system. Greengram-wheat recorded rice equivalent yield of 8920 kg ha^{-1} which was on par with soybean-wheat system (8811 kg ha^{-1}). Both the systems recorded an increase of 13.4 to 15.7% in net returns

over existing rice-wheat system. In terms of calories, all the attentive systems had lower values than existing systems.

The alternative systems evaluated at Aurangabad for existing systems of soybean + pigeon pea and soybean-wheat revealed that maize-chickpea-greengram can be alternative to soybean + pigeon pea while soybean-gram-fodder maize can replace soybean-wheat system. The increase in net returns was found to be 60.3% in the earlier one while the same was 208.4% in the later. In terms of calories, maize-chickpea-greengram recorded 145.2% higher energy than existing system. Similarly soybean-onion was found to be better against soybean-wheat at Ahmednagar as soybean-onion recorded soybean equivalent yield of 17317 kg ha^{-1} with 238.9% increase in net returns over existing system. At Roha, rice-cowpea-okra recorded rice equivalent yield of 24273 kg ha^{-1} which is 165% higher than existing rice-cowpea system (9154 kg ha^{-1}). The same system registered higher increase in net returns (160.6%) compared to other systems. However, in terms of total calories, rice-maize registered 105.7% increase over existing system. Introduction of cowpea during summer in rice-wheat sequence at Gondia recorded system yield of 10245 kg ha^{-1} with 76.3 and 12.8% increase in net returns and total calories over existing rice-wheat system.

In the other set of experiments at Gondia, rice-chickpea-cowpea was found to be better against rice-chickpea as it recorded 10333 kg ha^{-1} of system yield in terms of rice with 75.5% and 16.7% increase in net returns and total calories. Rice-mustard-cowpea was also found to be better than the existing system. Rice-tomato at Dhankamal performed better in terms of system yield (REY: 13475 kg ha^{-1}), net returns (Rs.75273 ha^{-1}) and total calories (19305x1000 kcal) compared to rice-greengram system. Rice-bitter gourd was found to be better in terms of rice equivalent yield (11139 kg ha^{-1}) and net returns (88.9% increase) compared to existing rice-greengram system. In terms of energy, rice-groundnut registered 56.6% increase over rice-greengram. At Amritsar, though rice-green peas-mash recorded higher rice equivalent yield of 15269 kg ha^{-1}, the net returns (Rs.93254 ha^{-1}) and total calories (41304x1000 kcal) was found to be higher in the existing rice-wheat system compared to all the other alternative systems evaluated. At Hanumangarh, guar-wheat recorded marginal increase in greengram equivalent yield (2799 kg ha^{-1}) compared to greengram-wheat (2702 kg ha^{-1}) system. The net returns was found to increase by 6.3% in guar-wheat compared to greengram-wheat.

Alternative systems for the existing system of maize-wheat were evaluated at Udaipur in two different set of experiments. Clusterbean-wheat-okra recorded higher maize equivalent yield of 35015 kg ha^{-1} with 399.9% increase in net returns over existing system. However, clusterbean-wheat-greengrm recorded higher increase in total calories (34.2%) compared to other systems. In the other set of experiments, though clusterbean-wheat recorded maize equivalent yield of 6739 kg ha^{-1}, maize-wheat registered higher net returns and calorific values. At Chettinad in Tamil Nadu, only rice-blackgram was found to be better in terms of rice equivalent yield (9201 kg ha^{-1}) and increase in net returns (8.5%). In terms of calorific values, all the alternative systems resulted in lower energy. Similarly at Paiyur, rice-tomato recorded higher rice equivalent yield of 26095 kg ha^{-1} with 42.2% increase in net returns over existing rice-rice system. Though the other alternative system *viz.* rice-cabbage and rice-cauliflower recorded higher equivalent yield than rice-rice system, net returns was lower. At Saini, sesame-pea and sesame-wheat was found to be the best alternative to existing sorghum-wheat system as these systems recorded 97.8 and 40.1% increase in net returns over existing system. In terms of calories, all the alternate systems evaluated led to lower energy content. At Santkabirnagar, the existing system of rice-wheat resulted in higher rice equivalent yield (9012 kg ha^{-1}), net returns (Rs.48753 ha^{-1}) and total calories (29223x1000 kcal) compared to all the other alternative systems evaluated. Two set of experiments were conducted at Pantnagar to find out the alternative system to rice-wheat. In the first set of experiments, it was found that rice-potato-

greengram was better in terms of rice equivalent yield (26155 kg ha^{-1}), increase in net returns (100.3%) and total calories (31.1%). Rice-potato-veg. cowpea was also found to be better. In the other set of experiments, rice-vegetable pea-french bean, the rice equivalent yield was found of be 17297 kg ha^{-1} against 7997 kg ha^{-1} in rice-wheat system. The net returns and total calories in the system was increased by 102.2 and 12% over existing system. Rice-okra was found to be better to existing rice-greengram system at Kakdwip. Higher rice equivalent yield of 16857 kg ha^{-1} was recorded with rice-okra followed by rice-okra + greengram. The increase in net returns in both the systems was found to be 106.9 and 62% respectively over existing system. Only marginal increase of 3.4 and 1.1% in total calories was observed with alternative systems.

Across the locations and systems, the diversified system registered net returns and total calories of Rs.1,17,156 ha^{-1} and 29158 x1000 kcal ha^{-1} compared to the existing system (Rs.60634 ha^{-1} and 24498 x1000 kcal ha^{-1}). On an average, it was found that, the net return and total calories can be increased by 93.2 and 19 % through diversification of existing cropping systems with location specific identified alternative systems.

7.3.1.3 On-farm agronomic management practices for sustaining the production

Title of the experiment: On-Farm agronomic management practices for sustaining the production of cropping systems.

Objectives: To increase and sustain the productivity of the cropping systems by addressing the most important factor responsible for lowering down the production potential of the systems.

Year of start: 1999-2000 (Concluded in 2010-11)

Treatments: The treatments are not common to all centres. However, general pattern is as follows.

T1 : Farmers practice (FP)

T2, T3 : FP + corrective measures for the most important constraint(s)/factor(s) affecting the crop productivity one or at the most two.

T4 : Recommended package of practices.

Locations and constraints addressed

Cropping system	Centre (State)	Constraints addressed	Number of trials
Rice-rice	Warangal(AP)	Weed	20
	Thiruvalla (Kerala)	Weed, nutrient and plant population	72
	Paiyur (T.N.)	Variety	24
	Chettinad (T.N.)	Weed	24
Rice-wheat	Patna (Bihar)	Plant population	24
	Karnal (Haryana)	Plant population and weed	12
	Jammu (J&K)	Weed	12
	Katni (MP)	Weed and nutrient	20
	Gondia (Maharashtra)	Nutrient	12
	Dhankanal (Odisha)	Plant population, macro & micronutrient	8
	Ludhiana (Punjab)	Plant population, weed & nutrient	24
	Palampur (HP)	Weed & nutrient	12
	Pantnagar(Uttrakhand)	Weed	24
	Sant Kabir Nagar (UP)	Nutrient	20

Cropping system	Centre (State)	Constraints addressed	Number of trials
Rice - groundnut	Raigad (Maharashtra)	Variety & nutrient	24
	Dhankanal (Odisha)	Plant population & micronutrient	16
Rice-pumkin-cowpea	Karimganj (Assam)	Variety	24
Rice-greengram	Kendrapara (Odisha)	Plant population & micronutrient	24
	Kakdwip (WB)	Plant population, macro & micronutrient	24
Rice-chickpea	Kawardha (Chhattisgarh)	Variety & nutrient	24
	Gondia (Maharashtra)	Nutrient	12
Rice-fingermillet (summer)	Banglore (Karnataka)	Variety, macro and micronutrient along with disease	15
Rice- brinjal (summer)	Banglore (Karnataka)	Variety, macro and micronutrient	8
Pearlmillet - wheat	Thasara (Gujarat)	Weed	12
Maize – wheat	Udaipur (Rajasthan)	Variety & nutrient	24
	Jammu (J&K)	Weed	12
	Palampur (HP)	Weed & nutrient management	12
Pearlmillet – mustard	Deesa(Gujarat)	Macro and micro nutrient	8
Maize – mustard	Dumka (Jharkhand)	Nutrient, pest and disease	12
Maize-bengal gram	Gadag(Karnataka)	Weed & micronutrient	7
	Aurangabad (Maharashtra)	Water	12
Cotton-pearlmillet (summer)	Deesa(Gujarat)	Micronutrient	8
Groundnut – sorghum	Gadag(Karnataka)	Micronutrient & cultural practice	7
Soybean-wheat	Seoni (MP)	Nutrient	5
	Ahmednagar(Maharashtra)	Variety, nutrient and cultural practice	24
Soybean-gram	Aurangabad (Maharashtra)	Water	12
Guar-wheat	Hanumangarh (Rajasthan)	Variety & nutrient	20
Chilli+(onion +cotton)	Gadag (Karnataka)	Weed	7
Tobacco-pearlmillet (Summer)	Thasara (Gujarat)	Nutrient & weed	12
Castor	Deesa(Gujarat)	Micronutrient	8
Rice	Nellore (AP)	Plant population & micronutrient	24

The result obtained for 2010-2011 along with treatment details are given in Table 8.3/3. Cropping system wise results are briefly summarised below:

Rice –rice: Recommended package along with application of 2,4-D Na salt 80% WP@ 1kg a.i. ha^{-1} at 15-20 DAT during *kharif* and *rabi* resulted in higher grain field of 4766 and 4348 kg ha^{-1} respectively which is 66 and 127% higher than farmers practice at Warangal in *kharif* and *rabi.* Similarly at Thiruvalla, recommended package along with optimum plant density recorded an increase in yield to the tune of 22.7 and 21.5% over farmers practice in *kharif* and *rabi* respectively. The yield increase by application of 5t of organic manure over farmers practice was only 7% in both the seasons. At Paiyur, replacement of CORH 3 hybrid with BPT 5204 during *kharif* and ADT39 during *rabi* resulted in decrease in yield to the level of 12% over farmers practice. Recommended package to CORH 3 hybrid rice led to only marginal increase in net return (3.7%) over farmers practice in *kharif* while in *rabi,* it reduced the yield to the tune of 2.4%. Yield increase to the tune of 41 and 40% was recorded with recommended package in *kharif* and *rabi* respectively at Chettinad. Addressing of weed problem in rice-rice system through application of Pretilachlor @1litre ha^{-1} as pre emergence +2,4-D Na salt @1.25 kg ha^{-1}at 25 DAT as post emergence recorded yield increase of 17% in rice-rice system over farmers practice. Irrespective of seasons and locations, recommended package in rice-rice system registered 34.9% increase in yield over farmers practice. Among the different constraints addressed in the system, weed management resulted in on an average of 51% increase in yield over farmers practice.

Rice-wheat: A total of 191 trials were conducted in 11 locations addressing the five important constrains such as variety, plant population, weed, macro and micro nutrient deficiency in rice-wheat system. The results revealed that at Patna, recommended package resulted in 37.7 and 33.6% increase in yield over farmers practice in rice and wheat respectively. Addressing of plant population constraints through line sowing of rice at 15x15 cm spacing and line sowing of wheat at 23 cm apart resulted in grain yield of 3647 and 3216 kg $ha^{-1}$for rice and wheat respectively which are 13.3 and 5.8% higher than farmers practice. At Karnal, adoption of recommended package resulted in 8.5% and 7.6% increase in yield of rice and wheat over farmers practice. Maintaining the plant population by treated seed of rice @ 25 kg ha^{-1} at 30-32 hills m^{-2} in rice and treated seed @ 125 kg ha^{-1} with drill sowing for wheat resulted in 5% increase in yield of rice and 4.5% in wheat crop over farmers practice. Addressing of weed constraint over farmers practice resulted in only marginal increase (2.5%) in yield of rice-wheat system. Recommended package to rice-wheat system at Jammu recorded 34.2% increase in yield over farmers practice. Application of Butachlor SG@30kg ha^{-1} after 24 hours of transplanting rice and Mutabuzine @ 250 g ha^{-1} at 35 DAS to wheat recorded increase in yield to the tune of 12.8 and 14.6% for rice and wheat respectively indicating effective weed control through these treatments over farmers practice. At Katni, recommended package resulted in 81.5 and 29.3% increase in yield of rice and wheat respectively compared to farmers practice. The contribution of recommended fertilizer (120:60:40 kg NPK ha^{-1} applied as ½ N in chemical and ½ N in FYM) with herbicide for weed control in increasing the yield of rice and wheat was found to be 68.4% and 20.4% respectively. At Gondia, application of recommended package resulted in 58 and 79.5% increase in yield of rice and wheat respectively over farmers practice. The yield obtained with application of 100:50:50 kg NPK ha^{-1} to rice and wheat and 65:46:40 kg NPK ha^{-1} to rice and 70:40 kg NP ha^{-1} to wheat were on par and on an average it resulted in 31.4% increase in yield of rice-wheat system. Application of 50% of recommended fertilizer dose and 5t of FYM ha^{-1} to both rice and wheat recorded higher increase (25.6 and 51.3% for rice and wheat respectively) in yield compared to farmers practice at Dhenkanal. The yield obtained from recommended package and alteration in population of rice and micro nutrient application to wheat were on par indicating the importance of balanced application of chemical and organic manures. In Ludhiana, the results

Table 7.3/3: Influence of yield of crops due to addressing of constraints through agronomic management practices for sustainable production (2010-11)

State/ NARP Zone/ Center/No. of trials	Treatment			Yield (kg/ha)			% increase in yield over F.P.			Constraints addressed
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	
				Rice-rice						
Andhra Pradesh	T1=F.P.	T1= F.P.		2868	1913					
CT/	T2= T1+Pritilachlor 50%	T2= T1+Pritilachlor 50%		4230	2908		47.49	52.01		Weed
Warangal(24)	EC @ 1.25 Lit/ha at 5 DAT	EC @ 1,25 Lit/ha at 5 DAT								
(BPT-5204_MTU-1010)	T3=R.P.	T3=R.P.		4384	3426		52.86	79.09		
	T4=T2+ Bispyrebac sodium 10%EC@ 200 ml/ha at 15-20 DAT	T4=T2+ Bispyrebac sodium 10%EC@ 200 ml/ha at 15-20 DAT		4709	3929		64.19	105.38		
	T5=T3+ 2,4-D Na salt 80% WP@ 1kg/ha at 15-20 DAT	T5=T3+ 2,4-D Na salt 80% WP@ 1kg/ha at 15-20 DAT		4766	4348		66.179	127.29		
			S.E(m).	34	70					
			C.D. at 5%	67	140					
			C.V.	3.93	10.40					
Kerala	T1=F.P.	T1= F.P.		4921	4779					Weed
Special /	T2= T1+Organic	T2= T1+Organic		5276	5114		7.21	7.01		Nutrient
Thiruvalla(72)	Manure 5T/ha	Manure 5T/ha								and
(Uma_Uma)	T3= R.P.	T3= R.P.		5617	5395		14.14	12.89		plant population
	T4=T1+(POP+OPD)	T4=T1+(POP+OPD)		6040	5807		22.74	21.51		
			S.E(m).	20	17					
			C.D. at 5%	39	33					
			C.V.	3.06	2.67					
T.N.	T1=F.P.	T1= F.P.		8270	8214					
North Western /	T2= T1+Imp. Var. (BPT 5204)	T2= T1+Imp. Var. (ADT-39)		7263	7217		-12.18	-12.14		Variety
Paiyur(24)	T3= R.P.	T3= R.P.		8583	8019		3.78	-2.37		
(CORH-3_ARIZE)										
			S.E(m).	36	34					
			C.D. at 5%	72	69					
			C.V.	2.18	2.15					
T.N.	T1= F.P.	T1= F.P.		4618	4787					
Southern/	T2=T1+ Pretilachlore @1L/ha	T2=T1+ Pretilachlor @1L/ha		5431	5610		17.61	17.19		Weed
Chettinad(24)	as Pre E+2,4-D Na salt@1.25	as Pre E+2,4-D Na salt@1.25								
(ADT-39_ ADT-36)	kg/ha at 25DAT as Post Emer	kg/ha at 25DAT as Post Emer								
	T3= R.P.	T3= R.P		6511	6714		40.99	40.25		
			S.E(m).	19	18					
			C.D. at 5%	38	36					
			C.V.	1.65	1.53					

Contd..../-

State/ NARP Zone/ Center/No. of trials	Treatment			Yield (kg/ha)			% increase in yield over F.P.			Constraints addressed
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	
			Rice-wheat							
Bihar	T1= F.P.	T1= F.P.		3219	3039					
Central & North East /	T2=T1+ Line sowing	T2=T1+Line sowing		3647	3216		13.30	5.82		Plant population
Plateau Patna (24)	at 15cmX15 cm spacing	at 23 cm apart								
(R-Shweta_ K-9107)	T3=R.P.	T3=R.P.		4433	4061		37.71	33.63		
			S.E(m).	30	26					
			C.D. at 5%	60	53					
			C.V.	3.85	3.72					
Haryana	T1=F.P.	T1=F.P.		5995	4639					
Eastern Alluvial Plain/	T2=T1 +Treated seed @25Kg	T2=T1 +Treated seed		6295	4849		5.00	4.53		
Karnal(12)	/ha &30-32 hill/mt. Sq.	@125Kg/ha & Drill sowing								Plant population
(HKR-127_WH-711)	T3=R.P.	T3=R.P.		6502	4992		8.46	7.61		&
	T4=T1+Butachlor 3L/ha	T4=T1+Topik 400gm/ha		6151	4758		2.60	2.57		Weed
	through sand application	'+Algrip 20gm/ha								
	broadcast 2 DAP	sprayed at 35 DAS								
			S.E(m).	17	9					
			C.D. at 5%	36	18					
			C.V.	0.97	0.64					
Jammu & Kashmir	T1=F.P.	T1=F.P.		2656	2432					Weed
Sub-Tropical/	T2=T1+ Appl. of Butachlor SG	T2=T1+ Mutabuzine		2998	2787		12.88	14.60		
Jammu(12)	'@ 30 kg/ha after 24 hour	'@250 gm/ha at								
(Pusa-1121_DBW-17)	after transplanting	35 DAS								
	T3=R.P	T3=R.P		3504	3322		31.93	36.60		
			S.E(m).	11	12					
			C.D. at 5%	24	26					
			C.V.	1.28	1.52					
Madhya Pradesh	T1=F.P.	T1=F.P.		2232	3019					
Keymore Plateau	T2=T1+ Herbicide+RF(120+	T2=T1+ Herbicide+RF(120+		3759	3636		68.41	20.44		Weed
Satpura/ hills/	60+40)as1/2 N from chemical	60+40)as1/2 N from chemical								&
Katni (20)	fertilizer + 1/2N fromFYM	fertilizer + 1/2N fromFYM								Nutrient
(JRH-5_GW-273)	T3=R.P	T3=R.P		4051	3903		81.50	29.28		
			S.E(m).	32	16					
			C.D. at 5%	65	33					
			C.V.	4.30	2.08					
Maharashtra	T1=F.P.	T1=F.P.		2454	1116					
Eastern High Rainfall	T2=T1 +RF(100-50-50)	T2=T1 +RF(100-50-50)		3294	1425		34.23	27.69		Nutrient
Vidharbha/Gondia(12)	T3=R.P.	T3=R.P.		3881	2004		58.15	79.57		
(Local_HD-2189)	T4=T1+65N+46P+25K	T4=T1+70N+40P		3267	1458		33.13	30.65		
			S.E(m).	24	17					
			C.D. at 5%	50	35					
			C.V.	2.63	3.89					

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State/ NARP Zone/ Center/No. of trials	Treatment			Yield (kg/ha)			% increase in yield over F.P.			Constraints addressed
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	
Orissa	T1=F.P.	T1=F.P.		3777	1738					Plant population
Mid -Central Table	T2=T1+20cmx10 cm spacing	T2=T1 +'ZnSO4@25kg/ha		3925	1901		3.92	9.38		macro
Land/	T3=R.P.	T3=R.P.		3926	2346		3.94	34.98		&
Dhankanal(8)	T4=T1+'50% RFD + 5 ton/ha FYM	T4=T1+'50% RFD + 5 ton/ha FYM		4744	2629		25.60	51.27		micronutrient
			S.E(m).	35	43					
			C.D. at 5%	73	90					
			C.V.	2.39	5.63					
Punjab	T1=F.P.	T1=F.P.		6720	4181					Plant population
Central Plain/	T2=T1+20 cmx15 cm spacing	T2=T1 +Herbicide Topik		7415	4534		10.34	8.44		weed
Ludhiana (24)	T3=R.P.	T3=R.P.		7102	4749		5.68	13.59		&
(PR-120_DBW-17)	T4=T1+R.F.(120-0-0)+ green manuring before transplanting	T4=T1+R.F.(120-60-30) +Herbicide Topik		7447	4707		10.82	12.58		nutrient
			S.E(m).	74	51					
			C.D. at 5%	147	102					
			C.V.	5.04	5.48					
H.P.	T1=F.P.	T1=F.P.		2226	2430					
Sub mountain and low	T2=T1 +RF(90-40-40)	T2=T1 +NPK(120-60-30)		2489	2833		11.81	16.58		Weed
hills sub-tropical /	T3=R.P.	T3=R.P.		2660	3079		19.50	26.71		&
Palampur (12)	T4=T2'+ 10 ton/ha FYM	T4=T2'+ 10 ton/ha FYM		3000	3489		34.77	43.58		nutrient
(Kasturi Basmati_HPW -211)	+ Herbicide use	+ Herbicide use								
			S.E(m).	52	22					
			C.D. at 5%	109	47					
			C.V.	6.92	2.61					
Uttrakhand	T1=F.P.	T1=F.P.		3401	4221					
Hill zone/	T2=T1 +2-4-D @ 1.25 kg/ha	T2=T1 +2-4-D @ 1.25 kg/ha		3649	4382		7.29	3.81		Weed
Pantnagar (24)	T3=R.P.	T3=R.P.		3917	4637		15.17	9.86		
(Pusa Sugandha_	T4=T1+Metsulphurane	T4=T1+Metsulphurane		3789	4450		11.41	5.43		
PBW-550)	Methyl'@ 20 gm/ha	Methyl'@ 20 gm/ha	S.E(m).	24	19					
			C.D. at 5%	49	38					
			C.V.	3.25	2.09					
Uttar Pradesh	T1=F.P.	T1=F.P.		3130	2633					Nutrient
Eastern Plain/	T2=T1+ RF(120-60-40)	T2=T1+ RF(120-60-40)		4126	3400		31.82	29.13		
Sant Kabir Nagar(20)	T3=R.P	T3=R.P		4726	3858		50.99	46.52		
(NDR-359_NDRW-2036)			S.E(m).	24	24					
			C.D. at 5%	49	48					
			C.V.	2.66	3.21					
Uttar Pradesh	T1=F.P.	T1=F.P.		2380	2822					
Central Plain/	T2=T1+ Impr. Var.(Pant-12)	T2=T1+ Impr. Var.(PBW 343)		3128	3481		31.43	23.35		Variety
Kaushambi(23)	T3=R.P	T3=R.P		4153	4078		74.50	44.51		
(Local_Local)			S.E(m).	21	19					
			C.D. at 5%	42	38					
			C.V.	3.10	2.63					

Contd..../-

State/ NARP Zone/ Center/No. of trials	Treatment			Yield (kg/ha)			% increase in yield over F.P.			Constraints addressed
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	
				Rice-groundnut						
Maharashtra	T1=F.P.	T1=F.P.		3894	1395					Variety
North Konkan/	T2=T1 + RF(100-50-50)	T2=T1+RF(25-50-0)		4595	1612		18.00	15.56		&
Raigarh (24)	T3=R.P.	T3= R.P.		5245	1802		34.69	29.18		Nutrient
(Jaya_Konkan Gaurav)	T4=T2+Improved Variety (Shyadri)	T4=T2+Improved Variety (TAG-24)		6269	2103		60.99	50.75		
			S.E(m).	110	34					
			C.D. at 5%	217	67					
			C.V.	10.76	9.64					
Odisha	T1=F.P.	T1=F.P.		3751	2000					Plant population
Mid -Central Table	T2=T1 +20cmX10cm spacing	T2=T1 +30cmX10cm spacing		3933	2117		4.85	5.85		&
Dhankanal(16)	T3=R.P.	T3= R.P.		4712	2546		25.62	27.30		Micronutrient
(Swarna_Smruti)	T4=T2+ZnSO4 @ 25kg/ha	T4=T2'+Gypsum ' @ 250kg/ha		4487	2379		19.62	18.95		
			S.E(m).	46	24					
			C.D. at 5%	94	48					
			C.V.	4.39	4.23					
				Rice-pumkin-cowpea						
Assam	T1= F.P.	T1= F.P.	T1= F.P.	2921	6605	1185				
Barak Valley/	T2= T1+ Improved Variety	T2= T1+ Improved	T2= T1+ Imp-	4047	10063	1812	38.55	52.35	52.91	Variety
Karimganj(24)	(Knj-3-1-3)	Variety	roved Variety							
(Malati_Baidya Batl_Ram		(Arka Chandan)	(Pusa Barsati)							
aish)	T3=R.P.	T3= R.P.	T3= R.P.	4874	15353	2514	66.86	132.45	112.15	
			S.E(m).	41	482	35				
			C.D. at 5%	83	974	71				
			C.V.	5.10	22.11	9.34				
				Rice-greengram						
Odisha	T1=F.P.	T1=F.P.		2982	583					Plant population
East & South Eastern	T2=T1+20cmx10cm spacing	T2=T1+30cmx10cm spacing		3594	665		20.52	14.07		& Micronutrient
Coastal/Kendrapara(24)	T3=R.P.	T3= R.P.		4143	823		38.93	41.17		
(Swarna_Local)	T4=T2'+ZnSO4@25kg/ha	T4=T2"+Gypsum@250kg/ha		3761	782		26.12	34.13		
			S.E(m).	25	6					
			C.D. at 5%	51	12					
			C.V.	3.44	4.03					
West Bengal	T1=F.P.		T1=F.P.	4266		806				Plant population
Coastal Saline/	T2=T1+20cmx15cm spacing		T2=T1 + 30cm	4542		895	6.47		11.04	macro
Kakdwip(24)			x10cm spacing							& Micronutrient
(Pankaj_Chait moong)	T3=R.P.		T3=R.P.	5018		1060	17.63		31.51	
	T4=T2+ZnSO4 @20 kg/ha +Green mannuring		T4=T2+ mulching	4751		969	11.37		20.22	
			S.E(m).	16		5				
			C.D. at 5%	32		11				
			C.V.	1.69		2.77				

Contd..../-

State/ NARP Zone/ Center/No. of trials	Treatment			Yield (kg/ha)			% increase in yield over F.P.			Constraints addressed
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	
				Rice-chickpea						
Chhattisgarh	T1= F.P.	T1= F.P.		3492	1325					Variety
CG Plain/	T2= T1+ RF(100-60-40)	T2= T1+ RF(20-50-20)		5680	1930		62.66	45.66		&
Kawardha(24)	T3= R.P	T3= R.P		6791	2218		94.47	67.40		Nutrient
(MTU-1010._Local)	T4= T1+ Improved variety (KRH-2)	T4= T1+ Improved variety (JG-315)		4295	1681		23.00	26.87		
			S.E(m).	31	16					
			C.D. at 5%	62	31					
			C.V.	3.00	4.27					
Maharashtra	T1=F.P.	T1=F.P.		2537	775					
Eastern High Rainfall	T2=T1 +RF(100-50-50)	T2=T1 +RF(20-40-0)		3122	995		23.06	28.39		Nutrient
Vidharbha/Gondia(12)	T3=R.P.	T3=R.P.		3725	1395		46.83	80.00		
(Local_Local)	T4=T1+73 N+57.5 P	T4=T1+18 N+46 P		3179	925		25.31	19.35		
			S.E(m).	18	20					
			C.D. at 5%	37	42					
			C.V.	1.98	6.90					
				Rice-fingermillet (Summer)						
Karnataka	T1=F.P.		T1=F.P.	4291		3073				
Eastren Dry /	T2=T1+N use efftctency		T2=T1+ Imp.	4618		3693	7.62		20.18	Seed treatment
Bengaluru (15)	through LCC		Var. ML-365+seed treatment with							variety
(Thanu_GPU-48)			azospirullum.+RF (100-50-50)							macro
	T3=R.P		T3=R.P	4192		3533	-2.31		14.97	& micro nutrient
	T4=T1+Aerobic Paddy var. MAS 946-1 + FeSO4@12kg/ha+Saathi'@250gm/ha		T4=T1+Imp. var. GPU-66+ RF(100-50-30)	4394		3867	2.40		25.84	
			S.E(m).	18		55				
			C.D. at 5%	36		110				
			C.V.	1.59		5.97				
				Rice-brinjal (Summer)						
Karnataka	T1=F.P.		T1=F.P.	4036		8539				Variety
Eastren Dry /	T2=T1+Fertilizer through LCC		T2=T1+Green long+RF(125-100-50)	4285		10656	6.17		24.79	Macro
Bengaluru (8)			Biofertilizers and neem based PP chemicals							& micro nutrient
(Thanu_Black round)										
	T3=R.P		T3=R.P	4050		10836	0.35		26.90	
	T4=Aerobic Paddy var. MAS 946-1 +RF(100+50=50)+ZnSO4@20Kg'/ha + FeSO4@12Kg/ha'+Saathi @250gm/ha		T4=Imp. Var, Green long +RF(125-100-50) use of Biofertilizer and adopted IPM	4270		10899	5.80		27.64	
			S.E(m).	12		243				
			C.D. at 5%	25		505				
			C.V.	0.83		6.71				

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State/ NARP Zone/ Center/No. of trials	Treatment			Yield (kg/ha)			% increase in yield over F.P.			Constraints addressed
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	
				Pearlmillet-wheat						
Gujarat	T1=F.P.	T1=F.P.		1614	1549					Weed
MGAC/	T2=T1+ Chemical weed	T2=T1+ Chemical weed		2499	2349		54.83	51.65		
Thasara (12)	control Atrazine	control 2-4-D								
(GHB-558_GW-496)	T3=R.P.	T3=R.P		2874	2156		78.07	39.19		
			S.E(m).	51	36					
			C.D. at 5%	107	76					
			C.V.	7.60	6.24					
				Maize-wheat						
Rajasthan	T1= F.P.	T1= F.P.		1613	2988					
Sub humid SoutrernPlain	T2=T1+Impr. Var.	T2=T1+Impr. Var. (Raj-4037)		2092	3538		29.70	18.41		Variety
&Aravalli Hills/Udaipur(12)	(Pratap Makka 5)									&
(Local _Lok-1)	T3= R.P.	T3= R.P.		2704	5008		67.64	67.60		nutrient
	T4=T1+RF(90-35-30) +	T4=T1+RF(120-40-30)+		2421	4417		50.09	47.82		
	Impr. Var. (Pratap Makka 5)	Impr. Var. (Raj-4037)								
			S.E(m).	46	60					
			C.D. at 5%	94	123					
			C.V.	7.19	5.19					
Rajasthan	T1= F.P.	T1= F.P.		1642	2896					
Humid Southern Plain	T2=T1+Impr. Var.	T2=T1+Impr. Var. (Raj-4037)		2104	3608		28.14	24.59		Variety
Udaipur(12)	(Pratap Makka 5)									&
(Local _Lok-1)	T3= R.P.	T3= R.P.		2633	4908		60.35	69.48		nutrient
	T4=T1+RF(90-40-30) +	T4=T1+RF(120-40-30)+		2421	4629		47.44	59.84		
	Impr. Var. (Pratap Makka 5)	Impr. Var. (Raj-4037)								
			S.E(m).	34	44					
			C.D. at 5%	69	89					
			C.V.	5.31	3.77					
Jammu & Kashmir	T1=F.P.	T1=F.P.		2178	2468					Weed
Sub-Tropical/	T2=T1+ Appl. of Atrazine	T2=T1+ Sencor		2385	2732		9.50	10.70		
Jammu(12)	'@ 1 kgai/ha pre emergence	'@250 gm/ha post emergence								
(HQPM-1_DBW-17)	T3=R.P	T3=R.P		3038	3271		39.49	32.54		
			S.E(m).	17	23					
			C.D. at 5%	36	49					
			C.V.	2.34	2.86					
H.P.	T1= F.P.	T1= F.P.		1886	2288					Weed
Sub mountain and low	T2=T1+RF(90-45-30)	T2=T1+RF(80-40-40)		2386	2703		26.51	18.14		&
hills sub-tropical /	T3= R.P.	T3= R.P.		2924	3011		55.04	31.60		nutrient
Palampur (12)	T4=T2+10 ton/ha FYM+	T4=T2+Chemical Weed		3340	3487		77.09	52.40		
(KH-101_HPW-211	Chemical Weed	control'+10 ton/ha FYM								
			S.E(m).	26	28					
			C.D. at 5%	55	59					
			C.V.	3.42	3.40					

Contd..../-

State/ NARP Zone/ Center/No. of trials	Treatment			Yield (kg/ha)			% increase in yield over F.P.			Constraints addressed
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	
				Pearlmillet-mustard						
Gujarat	T1= F.P.	T1= F.P.		1234	1348					
NGAC/	T2=T1+40 kg/ha P2O5 &	T2=T1+25Kg/ha Sulphur		1710	1710		38.57	26.85		Macro
Deesa(8)	Azotobacter	as basal dose								and micronutrient
(GHB-558_GM-2)	T3=R.P.	T3=R.P.		2075	1985		68.15	47.26		
			S.E(m).	25	59					
			C.D. at 5%	56	128					
			C.V.	4.31	9.90					
				Maize-mustard						
Jharkhand	T1= F.P.	T1= F.P.		1334	388					
Central & North	T2=T1+NPK(100-50-25)	T2=T1+RF(80-40-20)		1779	588		33.36	51.55		Plant protection
Eastern Plateau /	T3=R.P.	T3=R.P.		2244	768		68.22	97.94		& nutrient
Dumka (12)	T4=T2	T4=T2+		2919	1045		118.82	169.33		
(HQPM-1 _Local)	'+Plant protection measures	Plant protection measures								
			S.E(m).	77	28					
			C.D. at 5%	159	58					
			C.V.	12.84	13.87					
				Maize-bengalgram						
Karnataka	T1= F.P.	T1= F.P.		3086	806					Weed
Northern Dry/	T2= T1+ ZnSo4 @ 25 Kg/ha	T2= T1'+Rizobium@1.25Kg/ha		4051	979		31.27	21.46		&
Gadag (7)	T3=R.P.	T3=R.P.		4824	1269		56.32	-96.03		Micronutrient
(M-900_BGD-103)			S.E(m).	73	32					
			C.D. at 5%	160	69					
			C.V.	4.88	8.21					
Maharashtra	T1= F.P.	T1= F.P.		3061	1373					
CMP/	T2=R.P.	T2=RF		3610	1745		17.94	27.09		
Aurangabad(12)	T3=T2+Rain water manageme	T3=T2+Rain water manageme		3750	1864		22.51	35.76		Water
(Maharaja_Local)	'-nt furrows in alternate row	'-nt furrows in alternate row								
	T4=T2+Rain water managem	T4=T2+Rain water managem		3950	1923		29.04	40.06		
	'-ent by furrows in each row	'-ent by furrows in each row								
			S.E(m).	44	32					
			C.D.(5%)	90	67					
			C.V.	4.22	6.51					
				Cotton-pearlmillet (S)						
Gujarat										
NGAC/	T1=F.P.		T1=F.P.	1991		3890				
Deesa(8)	T2= T1+25kg/ha MgSO4		T2=T1+25kg/ha	2593		4780	30.24		14.98	Micronutrient
(Local-86M52)			ZnSO4							
	T3=R.P		T3=R.P	3016		5496	51.48		41.29	
			S.E(m).	92		115				
			C.D. at 5%	201		250				
			C.V.	10.32		6.88				

Contd..../-

State/ NARP Zone/ Center/No. of trials	Treatment			Yield (kg/ha)			% increase in yield over F.P.			Constraints addressed
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	
				Groundnut-sorghum						
Karnataka	T1=F.P.	T1=F.P.		547		1000				
Northern Dry/	T2=T1+ZnSO4 @25Kg/ha	T2=T1+Azoprillum@		683		1240	24.86		24.00	Micronutrient
Gadag(7)	'+Sulphur @20 Kg/ha	500gm/ha+Trichoderona								&
(GPBD-4_M-35-1)		'@30gm/ha seed treatment							69.40	cultural practices
		+ZnSO4@ 12.5kg/ha								
	T3=R.P	T3=R.P		979		1694	78.98			
			S.E(m).	20		27				
			C.D. at 5%	43		58				
			C.V.	7.01		5.38				
				Soybean-wheat						
M.P.	T1= F.P.	T1= F.P.		1180	2450					Nutrient
Kymore Plateau /	T2=T1+RF(20-60-20) as 1/2 N	T2=T1+RF(120-60-40) as 1/2 N		1760	3470		49.15	41.63		
Satpura hill/	from FYM +1/2 N from chemi	from FYM +1/2 N from chemi								
Seoni(5)	-cal Fertilizer+Targa 2 ml/L	-cal Fertilizer								
(JS-9305 _ JW-117)	at 20 DAS									
	T3= R.P.	T3= R.P.		1660	3150		40.68	28.57		
			S.E(m).	51	173					
			C.D. at 5%	118	398					
			C.V.	7.48	12.78					
Maharashtra	T1= F.P.	T1= F.P.		1648	2878					Variety
Scarcity/	T2=T1+RF(50-75-25)	T2=T1+RF(120-60-40)		1973	3561		19.72	23.73		cultural practices
Ahmednagar(24)	T3= R.P.	T3= R.P.		2505	4308		52.00	49.69		&
(JS-335_HD-2189)	T4=T1+Imp. Var.(DS-228)	T4=T1+Imp. Var.(NIWA-301)		2396	4145		45.39	44.02		nutrient
	'+RF(50-75-25) as 1/2 N from	'+RF(120-60-40) as 1/2N from								
	Chemical Fertilizer + 1/2N	Chemical Fertilizer+1/2N from FYM +								
	from 'FYM +Spacing 30cmx	Spacing 22.5cm								
	10 cm		S.E(m).	26	30					
			C.D. at 5%	52	60					
			C.V.	5.98	3.95					
				Soybean-chickpea						
Maharashtra	T1= F.P.	T1= F.P.		1115	1468					
CMP/	T2=R.P.	T2=R. P.		1236	1571		10.85	7.02		Water
Aurangabad(12)	T3=T2+Rain water manageme	T3=T2+Rain water manageme		1291	1683		15.78	14.65		
(MAUS-71_BDMG-797)	-nt through furrows in	-nt through furrows in alternate								
	alternate rows	rows								
	T4=T2+Rain water managem	T4=T2+Rain water managem		1287	1745		15.43	18.87		
	'-ent by furrows in each row	'-ent by furrows in each row								
			S.E(m).	20	14					
			C.D. at 5%	41	29					
			C.V.	5.60	3.04					

Contd..../-

State/ NARP Zone/ Center/No. of trials	Treatment			Yield (kg/ha)			% increase in yield over F.P.			Constraints addressed
	Kharif	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	*Kharif*	*Rabi*	Summer	
				Guar-wheat						
Rajasthan	T1= F.P.	T1= F.P.		1269	4527					Variety
Irrigated North Western Plain/Hanuman Garh(20)	T2=T1+Impr. Var. (HG 365)	T2=T1+Fert. (100-40-0) 1/2N+full P2O5 at sowing+1/2 N topdressing		1350	4959		6.38	9.54		& nutrient
(RGC-936_ Raj-3077)		Improved Var.(Raj. 4037)								
	T3= R.P.	T3= R.P.		1399	5045		10.24	11.44		
			S.E(m).	5	10					
			C.D. at 5%	9	21					
			C.V.	1.55	0.97					
				Chilli+(Onion+Cotton)						
Karnataka	T1= F.P.			337	+5286	+539				
Northern Dry/ Gadag (7)	T2=T1+Pendimithalon '@1Kg/ha			387	+5800	+638	14.84	9.72	18.37	Weed
(Byadagi dabba_Arka Kalyan_Jayadhar)	T3= R.P.			470	+6471	+739	39.47	22.42	37.11	
			S.E(m).	7	71	4				
			C.D. at 5%	16	159	8				
			C.V.	4.97	3.23	1.54				
				Rice						
Andhra Pradesh		T1= F.P.			7348					Plant population
Southern / Nellore(24)		T2= T1+15cmx15cm spacing			7997			8.83		& Micronutrient
(MTU-1010)		T3= R.P.			8574			16.68		
		T4=ZnSo4@50Kg/ha as basal			7963			8.37		
			S.E(m).		38					
			C.D. at 5%		75					
			C.V.		2.32					
				Tobacco-pearlmillet(S)						
Gujarat	T1=F.P.		T1=F.P.	2538		2091				Nutrient &
MGAC/ Thasara (12)	T2= T1+Chemical desuckering pendimethalin		T2= T1+Chemi -cal Weed	3206		2187	26.32		6.45	Weed
(GTH-1_GHB-558)	T3=R.P		T3=R.P	3528		2328	39.01		11.33	
			S.E(m).	55		16				
			C.D. at 5%	116		33				
			C.V.	6.18		2.44				
				Castor						
Gujarat		T1= F.P.			5707					
NGAC/ Deesa(8)		T2= T1+25 kg/ha Sulphur +25 kg/ha ZnSo4			6782			18.84		Micronutrient
(GCH-7)		T3= R.P.			7598			33.13		
			S.E(m).		207					
			C.D. at 5%		451					
			C.V.		8.74					

revealed that recommended fertilizers @ 120:0:0 kg NPK ha^{-1} + green manuring before transplanting of rice and 120:60:30 kg NPK ha^{-1} with topik herbicide to wheat recorded higher yield in both the crops and it was on par with 20x15cm spacing in rice and application of topik herbicide alone to wheat. On an average, recommended package resulted in 9.6% increase in yield over farmer's package. At Palampur, among the various treatments tested, application of recommended nutrient (90:40:40 kg NPK ha^{-1} to rice and 120:60:30 kg NPK $ha^{-1}$to wheat) with 10 t of FYM application+herbicide use in both the crops resulted in higher yield increase of 34.8 and 43.6% in rice and wheat respectively over farmers practice. Application of recommended package resulted in 15.2 and 9.9% increase in yield of rice and wheat respectively over farmers practice at Pantnagar. In SantKabirnagar, recommended package resulted in 51 and 46.5% increase in yield of rice and wheat respectively followed by application of recommended nutrient dose of 120:60:40 kg NPK ha^{-1} each to rice and wheat (31.8 and 29.1%respectively). In Kaushambi, recommended package resulted in 74.5 and 44.5% yield increase. The replacement of local variety of both the crops by improved variety (Pant12 in rice and PBW343 in wheat) resulted in 31.4 and 23.3% increase in yield of rice and wheat respectively.

On an average, application of recommended package to rice and wheat resulted in 35 and 33% increase in yield respectively across the locations. Among the different constrains addressed in rice-wheat system, introduction of improved variety of rice and wheat recorded higher yield increase of 74.5 and 44.5% respectively followed by nutrient management (32.4 and 28.2% respectively) for rice and wheat.

Rice-groundnut: A total of 40 trials were conducted in two locations for addressing the constraints of variety, population, macro and micro nutrient management. At Raigad, changing the Jaya variety of rice with Shyadri and 100:50:50 NPK ha^{-1} and Konkan Gaurav variety of groundnut with TAG24 and 25:50:0 kg NPK ha^{-1} resulted in 60.9 and 50.8% increase in yield of rice and groundnut respectively compared to farmers practice. Application of recommended nutrient dose of 100:50:50 kg NPK ha^{-1} to rice and 25:50:0 kg NPK ha^{-1} to groundnut recorded 18 and 15.5% higher yield over farmers practice. Combined effect of recommended nutrient and improved variety was much higher than the recommended package for both the crops indicating the need to promote the Shyadri variety of rice and TAG 24 of groundnut with recommended nutrient application. At Dhenkanal, maintaining the optimum plant population of rice and ground nut by adopting the spacing of 20x10cm and 30x10cm respectively resulted in marginal increase in yield (4.9 and 5.9% respectively) while application of $ZnSo_4$ @ 25kg ha^{-1} to rice and gypsum @ 250 kg ha^{-1} to groundnut recorded yield increase of 19.6 and 18.9% respectively over farmers practice. However, the yield increase due to addressing of plant population and micro nutrient deficiency constraints was lesser than the adopting recommended package for both crops as it recorded 25.6 and 27.3% higher yield than farmers practice.

Rice-pumpkin-cowpea: Varietal constraint of rice, pumpkin and cowpea was addressed through 24 trials at Karimganj in Assam. The results revealed that changing of present variety such as Malati of rice, BaidyaBati of pumpkin and Ramaish of cowpea with KNJ 3-1-3, Arkachandan and Pusabarsati respectively resulted in 38.5, 52.4 and 52.9% yield increase. However, adoption of recommended package to the crops resulted in 66.9, 132.5 and 112.2% increase in yield of rice, pumpkin and cowpea respectively over farmers practice.

Rice-greengram: A total of 48 trials were conducted in two locations to address the constraints of population and micro nutrient management. Recommended package to both the crops recorded yield increase of 38.9 and 41.2% respectively followed by adopting 20x10cm spacing with $ZnSO_4$ @ 25 kg ha^{-1} to rice and 30x10 cm spacing with gypsum @ 250 kg ha^{-1} to greengram (26 and 34% respectively) at Kendrapara. Maintaining the optimum plant population alone through the spacing resulted in only 20.5 and 14.1%

increase in yield over farmers practice. Similarly at Kakdwip, recommended package resulted in 17.6 and 31.5% yield increase followed by spacing of 20x15cm with $ZnSO_4$ @ 20 kg ha^{-1} + green manuring to rice and 30x10cm spacing with mulching to greengram (11.4 and 20.2% respectively). Plant population management had resulted in only 6.5 and 11% increase in yield of rice and green gram. On an average, across the locations recommended package had resulted in 32.3% increase in yield over farmers practice.

Rice-chickpea: A total of 36 trials were conducted in two locations namely Kawardha and Gondia to address the constraints of variety and nutrient management. The change of variety from MTU1010 to KRH-2 in rice and local to JG 315 had resulted in yield increase of only 23 and 26.9% respectively while recommended nutrient dose of 100:60:40 kg NPK ha^{-1} to rice and 20:50:20 kg NPK ha^{-1} to chickpea had increased the yield to the tune of 62.7 and 45.7% respectively at Kawardha. However, the recommended package resulted in higher increase in yield over farmers practice. Similarly at Gondia, recommended package resulted in 46.8 and 80% increase in rice and chickpea yield followed by application of 73:57.5 kg NP ha^{-1} to rice (25.3%) and 20:40 kg NP to chickpea (28.4%). The potential of recommended package in increasing the yield of rice-chickpea system was found to be 72% across the locations.

Rice-fingermillet: Around 15 trials were conducted at Bangalore in which , it was found that in *kharif,* using of leaf colour chart (LCC) for N management resulted in 7.6% yield increase which is higher than the recommended package as well as aerobic paddy (MAS 946-1)+ $FeSO_4$@ 12 kg ha^{-1} + saathi @ 250 g ha^{-1}. In finger millet, changing the variety from GPU 48 to GPU-66 along with recommended nutrient dose of 100:50:30 kg ha^{-1} resulted in 25.8% increase in yield over farmers practice and it is followed by ML365 variety + seed treatment with *azospirillum* + recommended nutrient close of 100:50:50 kg NPK ha^{-1} (20.2%). The yield increase in recommended package was found to be 14.9% only in finger millet.

Rice-brinjal: A total of 8 trials were conducted at Bangalore to address the constraint of improved variety, macro and micro nutrient deficiencies. Among the practices evaluated, nutrient management in rice with leaf colour chart recorded 6.1% increase in yield compared to farmers practice. The yield increase in rice with aerobic paddy (MAS946-1) with recommended nutrient of 100:50:50 kg NPK ha^{-1} + $ZnSO_4$ @ 20kg ha^{-1} +$FeSO_4$ @ 12kg ha^{-1} + saathi @ 250g ha^{-1} resulted in only 5.8% increase in yield of rice. In case of brinjal, it was found that yield obtained with recommended package (10836 kg ha^{-1}) and changing variety from black round to green long + recommended nutrient (125:100:50 kg NPK ha^{-1}) + use of bio fertilizer + IPM (10899 kg ha^{-1}) resulted in on par yield.

Pearlmillet-wheat: The results of 12 trials conducted at Thasara revealed that recommended package of practices resulted in 78 and 39% increase in yield of pearl millet and wheat respectively compared to farmers practice. The contribution of chemical weed control through application of Atrazine in pearlmillet and 2,4-D in wheat was found to be 54.8 and 51.6% in improving the grain yield of both the crops respectively.

Maize-wheat: Constraints such as variety, nutrient and weed was addressed through 48 trials in 3 locations. At Udaipur, recommended package had resulted in 63.9% and 68.5% increase in yield of maize and wheat over farmers practice. The increase in yield due to Pratapmakka 5 with recommended nutrient of 90:35:30 kg NPK ha^{-1} to maize was found to be 50% while Raj 4037 with 120:40:30 kg NPK ha^{-1} to wheat recorded yield increase of 47.8%. Similarly results were recorded in the second set of trials conducted at Udaipur where in slight change in nutrient doses were adopted. Recommended package at Jammu resulted in 39.5 and 32.5% increase in yield over farmers practice for maize and wheat respectively. However, application of Atrazine @ 1 kg ai ha^{-1} as pre emergence herbicide to maize and Sencor @ 250 g ha^{-1} as post emergence herbicide to wheat recorded marginal yield increase of only 9.50 and

10:7% respectively. Similarly at Palampur, recommended nutrient of 90:45:30 kg NPK to maize and 80:40:40 kg NPK ha^{-1} to wheat along with 10 t of FYM ha^{-1} + chemical weed control to both the crops resulted in higher increase in yield (77.1 and 52.4% respectively) followed by recommended package (55 and 31.6%). The contribution of recommended dose of nutrient was to the tune of 26.5 and 18.1% over farmers practice. On an average across the locations, recommended package had recorded 55.6 and 50.3% increase in yield of maize and wheat respectively over farmers practice. Among the constraints addressed, combination of improved variety + recommended nutrient to both the crops recorded higher yield increase.

Pearlmillet-mustard: Eight trials were conducted at Deesa for addressing the constraint of macro nutrient in Pearlmillet and micro nutrient in mustard. The results revealed that recommended package of practices to both the crops registered an increase in yield to the tune of 68.1 and 47.2% in Pearlmillet and mustard respectively. Application of 40 kg ha^{-1} of P_2O_5 and *azotobacter* to pearlmillet and 25 kg sulphur ha^{-1} as basal dose to mustard resulted in 38.5 and 26.9% increase in yield over farmers practice.

Maize-mustard: Two constraints namely nutrient management and plant protection measures were addressed in the system at Dumka through 12 trials. It was found that recommended nutrient dose of 100:50:25 kg NPK ha^{-1} to maize and 80:40:20kg NPKha^{-1} to mustard along with plant protection measures to both the crops resulted in 118.8 and 169.3% increase in yield over famers practice. This was followed by recommended package which recorded a yield of 2244 and 768 kg ha^{-1} of maize and mustard respectively.

Maize-bengalgram: Weed control, micro nutrient and water constraints were addressed through 19 trials at Gadag and Aurangabad. At Gadag, it was found that application of $ZnSO_4$ @ 25kg ha^{-1} to maize and *rhizobium* @1.25 kg ha^{-1} to bengal gram was found to increase the yield by 31.2 and 21.5% respectively. The recommended package to these crops resulted in 56.3 and 57.4% increase in yield. Recommended practice along with rain water management by furrows in each row to both the crops resulted in higher yield increase of 29 and 40% than with rain water management by furrows in alternate rows at Aurangabad. Conserving the rain water through furrows in each row plays critical role in improving the yield of maize- bengal gram system.

Cotton-pearlmillet: The constraint of micro nutrient was addressed at Deesa through 8 trials. Application of 25kg $MgSO_4$ ha^{-1} to cotton and 25kg $ZnSO_4$ ha^{-1} to pearlmillet resulted in 30.2 and 15% increase in yield over farmers practice. Recommended package had resulted in 3016 kg ha^{-1} of cotton and 5496 kg ha^{-1} of pearlmillet which is 51.4 and 41.2% higher than farmers practice (1991 and 3890 kg ha^{-1}).

Groundnut-sorghum: At Gadag, adopton of recommended package to groundnut and sorghum had resulted in 78.9 and 69.4% increase in yield compared to farmers practice, while application of 25 kg ha^{-1} of $ZnSO_4$+ 20kg ha^{-1} of sulphur to groundnut and *Azospirillum* @ 500g ha^{-1} + *Trichodema*@ 30g ha^{-1} as seed treatment and 12.5 kg ha^{-1} of $ZnSO_4$ to sorghum resulted in 24.8 and 24% increase in yield respectively.

Soybean-wheat: Improved variety, cultural and nutrient management practices were evaluated at Ahmednagar and Seoni through 29 trials. The result reveals that application of 20:60:20 kg NPK $ha^{-1}$by each 50% through FYM and chemical fertilizers + Targa @2ml/l to soybean and 120:40:60 kg NPK ha^{-1} by 50% through FYM and chemical fertilizers each + Targa @ 2 ml l^{-1} to soybean and 120:60:40 kg NPK ha^{-1} by 50 % through FYM and chemical fertilizers each to wheat recorded 49 and 41.6% higher yield than farmers practice at Seoni. The yield increase in these treatments were higher than the recommended package also for both the crops. At Ahmednagar, it was found that recommended package had higher yield increase (52 and 49.6%) for both soybean and wheat which was followed by improved variety of DS 228+ recommended nutrient @50:75:25 kg N ha^{-1} by 50% through FYM

and chemical fertilizers each with 30x10cm spacing of soybean and NIWA 301 variety with recommended nutrient of 120:60:40 kg NPK ha^{-1} by 50% through FYM and chemical fertilizers each with spacing of 22.5cm to wheat.

Soybean-chickpea: At Aurangabad, combining the recommended package with rain water management by furrows in either through each row or alternate row to soybean-gram recorded higher increase in yield of both the crops (15.4 and 18.8%) compared to either recommended package or farmers practice alone. The effect of rain water management was more pronounced in chickpea compared to soybean.

Guar-wheat: At Hanumangarh, recommended package to guar and wheat resulted in10.2 and 11.4% increase in yield compared to changing the variety from RGC 936 to HG 365 alone in guar and Raj 3077 to Raj 4037 with 100:40 kg NP ha^{-1} to wheat and farmers practice.

Chilli + (onion+ cotton): At Gadag, recommended package resulted in yield increase to the tune of 39.5, 22.4 and 37.1% in chilli, onion and cotton respectively over farmers practice. Application of pendimethalin @ 1 kg a.i. ha^{-1} led to only 14.8, 9.7 and 18.4% increase in yield respectively.

Tobacco-pearl millet: At Thasara, recommended package resulted in 39 and 11% increase in yield of Tobacco and pearl millet compared to farmers practice. Chemical desuckering in tobacco with chemical weed control in both the crops led to increase in yield of only 26.3 and 6.5% which is less than the recommended package.

Castor: At Deesa, recommended package to castor resulted in 33.1% increase in yield over farmers practice followed by 18.8% increase through application of 25 kg each of sulphur and $ZnSO_4$ ha^{-1}. Farmers practice registered yield of only 5707 kg ha^{-1}.

Rice: At Nellore, 16.7% increase in yield of *kharif* rice was recorded with recommended package of practices while application of 50 kg $ZnSO_4$ ha^{-1} as basal or planting at 15x15 cm spacing registered an increase of only 8.4 and 8.8% respectively.

Across the locations and crops, the yield increase with adoption of recommended scientific package was found to be 38.8% over farmer's method indicating the yield gap due to production constraints at farmer's field. The yield gap between recommended package and farmer's method was found to be 40.4, 36.6 and 39.3% in *kharif*, *rabi* and summer respectively.

7.3.2 FRONTLINE DEMONSTRATIONS

Cropping Systems involving Oilseeds

Oilseed crops needs to be fitted in the existing cropping systems of the country in various regions with improved management practices. The Department of Agriculture and Cooperation (DAC) initiated Technology Mission on Oilseeds (TMO) during 1986 to meet the challenge of huge edible oil demands. The scheme was re oriented as Integrated Scheme on Oilseeds, Pulses, Oil Palm and Maize (ISOPOM) from 2003-04 onwards to have focussed approach for development of oilseed production in the country. Front Line Demonstrations (FLDs) have been the major mode of transfer of technology in both the schemes in which researchers themselves are closely involved in supervision, evaluation, popularization and reporting the results of FLDs under real farm conditions with active participation and cooperation of the oilseed farmers as technology demonstrators. Accordingly, Directorate of Oilseeds Research (DOR) assigned the responsibility of conducting FLDs on oilseed based cropping system to PDFSR, Modipuram for conducting FLDs through its On-Farm Research (OFR) units. The results of the FLD's conducted in farmers field by OFR units of PDFSR, Modipuram during 2010-11 are briefly given.

Objectives

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

Technical Programme

The programme was conducted in 8 OFR units of All India Coordinated Research Project on Integrated Farming Systems (AICRP on IFS) in four agro ecosystems *viz.,* Arid, Semi Arid, Sub Humd and Coastal covering 8 states. Cropping systems tested in various places are given in Table 7.3/4. In Semi Arid ecosystem, three OFR centres namely Amritsar, Aurangabad and Modipuram have conducted 21 demonstrations in total while in Sub humid region, 15 demonstrations have been conducted by Jamtara, Kawardha and Jeolikote centres. Deesa centre in Gujarat conducted 5 demonstrations in arid region while Thiruvalla centre also conducted 5 demonstrations in coastal ecosystem. The major cropping systems in which oilseed crops were tested are rice-rice-sesame in coastal area, rice-mustard in sub humid, rice-gobhi sarson-green gram in semi arid and pearl millet – mustard, castor+ cowpea, castor + greengram in arid regions. Each of the centres has conducted five demonstrations in separate farmer's field except Amritsar and Modipuram as these centres have conducted 6 and 10 demonstrations respectively. Only two treatments were 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.

Crop varieties along with other management practices adopted in farmers and improved practice under various cropping systems are presented in Table 7.3/5 and rate of nutrient application are given in Table 7.3/6. Amritsar, Aurangabad and Kawardha centres have made alteration in spacing and planting technique for improved practice while Modipuram, Jamtara and Thiruvalla centres have tested improved varieties of oilseed crops. Jeolikote centre tested both improved variety and method of planting under improved practice. In terms of nutrient management, Amritsar centre replaced DAP with SSP application for Gobhi sarson in improved practice while Aurgangabad and Jeolikote centres have altered the nutrient dose for soybean and mustard crops respectively.

Salient findings

Out of 46 demonstrations on oilseed based cropping systems, 28 were on cropping system involving mustard at 5 centres, 2 on castor based intercropping system, 6 on cropping system involving gobhi sarson, 5 on sesame and 5 on soybean crops. Except mustard, other systems were evaluated in one centre each.

Table 7.3/4: List of centres of Front Line Demonstrations (FLD) on oilseed based cropping systems (2010-11)

Agro Ecosystem	Name of Centre (State)	Cropping system (s)
1. Arid	Deesa (Gujarat)	Pearl millet – mustardCastor + GreengramCastor + Cow Pea
2. Semi-Arid	Amritsar (Punjab) Aurangabad (Maharashtra) Modipuram (Uttar Pradesh)	Rice - gobhi sarson – green gram Soybean-gram Mustard
3. Sub humid	Jamtara (Jharkhand) Kawardha (Chattisgarh) Jeolikote (Uttarakhand)	Mustard Mustard Rice-mustard
4. Coastal	Thiruvalla (Kerala)	Rice –rice-sesame

Table 7.3/5: Details of interventions in FLD (2010-11)

Agro ecosystem	Cropping system			Particulars of package	Farmers Practice			Improved Practice		
	Kharif	*Rabi*	*Summer*		*Kharif*	*Rabi*	*Summer*	*Kharif*	*Rabi*	*Summer*
2. Semi Arid										
Amritsar	Rice	Gobhi sarson	Greengram	Variety	-	GSL 1	-	-	GSL 1	-
				Spacing	-	Broad casting and no thinning for plant to plant distance	-	-	45 X 10 cm maintained by thinning	-
				No. of irrigations	-	4	-	-	4	-
				Weed control	-	Hoeing	-	-	Hoeing	-
				Plant protection	-	Two sprays: roger 30 EC @ 1.25 l and Malathion 50 EC @ 0.625 l/ha	-	-	Two sprays: roger 30 EC and Malathion 50 EC @ 1.0 l/ha each	-
Aurangabad	Soybean	Gram	-	Variety	MAUS-71	Local	-	MAUS-71	BDNG-797	-
				Spacing	40 X 10 cm	30 X 10 cm	-	45 x 5 cm	30 X 10 cm	-
Modipuram	-	Mustard	-	Variety	-	Local	-	-	Pusa bold	-
3. Sub humid										
Jamtara	-	**Mustard**	-	Variety	-	Local	-	-	Shivani	-
Kawardha	-	**Mustard**	-	Variety	-	JM-2	-	-	JM-2	-
				Spacing	-	Broad cast sowing	-	-	Line sowing at row to row distance of 45 cm followed by thinning at 15 DAS to maintain row to row distance of 10 cm (22 plants/m^2)	-
Jeolikote	Rice	Mustard	-	Variety	-	BK 1008	-	-	Plant Yellow Sarson 1	-
				Spacing	-	Broad cast	-	-	Line sowing with 30 X 20 cm spacing	-
4. Coastal										
Thiruvalla	Rice	Rice	Sesame	Variety	-	-	Kayam kulam	-	-	Tilak

Table 7.3/6: Fertilizer management of crops in FLD (2010-11)

Agro ecosystem	Cropping system			Farmers Practice			Improved Practice		
	Kharif	*Rabi*	*Summer*	*Kharif*	*Rabi*	*Summer*	*Kharif*	*Rabi*	*Summer*
2. Semi Arid									
Amritsar	Rice	Gobhi sarson	Greengram	-	100:30:0 through Urea and DAP (50 % N and 100 % P_2O_5 at sowing and 50 % N at first irrigation	-	-	100:30:0 through Urea and SSP (50 % N and 100 % P_2O_5 at sowing and 50 % N at first irrigation	-
Aurangabad	Soybean	Gram	-	NPK @ 25:50:25 kg /ha	NPK @ 20:50:20 kg/ha	-	NPK @ 30:60:30 kg/ha	NPK @ 20:50:25 kg/ha	-
3. Sub humid									
Jeolikote	Rice	Mustard	-	-	NPK @ 80: 20:0 kg /ha	-	-	NPK @ 100: 40:40 kg /ha	-

Yield

The yield increase in mustard due to improved package under FLD was found to be 66.6 % higher at Modipuram followed by Jamtara (35 %) (Table 7.3/7). At Modipuram, Pusa bold variety was tested against the local variety while at Jamtara, improved variety Shivani was tested against local. Across all the centres, on an average, the yield increase in mustard was found to be 29.7 %. The management practices such as spacing, method of planting (line sowing) and nutrient level have resulted in yield increase to the tune of 15.3 to 15.9 % only in mustard. Similarly, at Deesa, improved package for Castor + greengram resulted in 12.3 % higher yield of castor. Application of Single Super Phosphate in place of Di Ammonium Phosphate along with maintaining spacing of 45 X 10 cm resulted in 10.8 % increase in yield of gobhi sarson at Amritsar. Reducing the intra row spacing by 5 cm with additional application of 5 kg N, 10 kg P_2O_5 and 5 kg K_2O recorded 15.9 % higher yield in soybean at Aurangabad. In sesame, change of Kayamkulam variety practiced by farmers with Tilak recorded 53.9 % yield increase at Thiruvalla in Kerala. Among the various agro ecosystems, across the location and crops, coastal ecosystem registered yield increase of 53.9 % with improved practice followed by 28.2 % in semi arid while sub humid and arid regions have recorded 22 and 13.6 % higher yield respectively with improved package.

Gross and Net returns

On an average, mustard recorded Rs 7739 ha^{-1} (Table 7.3/8) as additional gross returns due to improved practice across the locations and consequently, the net returns were also higher to the tune of 43.3 % (Table 7.3/9) thus giving scope to increase the farmers' profitability by adopting improved varieties, spacing and application of recommended nutrient levels. In castor + greengram system at Deesa, gross return of Rs 86050 ha^{-1} was recorded with improved practice as against only Rs 62061 ha^{-1} in farmers practice. The increase in net return was found to be 38.6 %. Similarly, an additional net return of Rs 20655 ha^{-1} can be obtained with castor + cow pea system which can give 29.3 % higher net returns with improved than farmers practice. At Amritsar, increase in net return was found to be 14.8 % for gobhi sarson. The additional gross return of Rs

Table 7.3/7: Influence of farmers and improved practices on grain or pod yield (kg/ha) of various crops under FLD (2010-11)

Agro Eco system/Centre	Cropping system			No. of demonstrations	Farmers Practice (FP)			Improved Practice (IP)			% increase over FP		
	Kharif	*Rabi*	*Summer*		*Kharif*	*Rabi*	*Summer*	*Kharif*	*Rabi*	*Summer*	*Kharif*	*Rabi*	*Summer*
1. Arid													
Deesa	Pearl millet	Mustard	-	3	2068	2060	-	2545	2383	-	23.0	15.7	-
	Castor +Green gram	-	-	1	2560	-	-	2875 (320)	-	-	12.3	-	-
	Castor + Cow pea	-	-	1	2690	-	-	2780 (735)	-	-	3.3	-	-
2. Semi Arid													
Amritsar	Rice	Gobhi sarson	G.gram	6	-	1457	-	-	1613	-	-	10.8	-
Aurangabad	Soy-bean	Gram	-	5	1171	1230	-	1357	1470	-	15.9	19.5	-
Modipuram	-	Mustard	-	10	-	1775	-	-	2957	-	-	66.6	-
3. Sub Humid													
Jamtara	-	Mustard	-	5	-	1200	-	-	1620	-	-	35.0	-
Kawardha	-	Mustard	-	5	-	1442	-	-	1662	-	-	15.3	-
Jeolikote	Rice	Mustard	-	5	-	1405	-	-	1628	-	-	15.9	-
4. Coastal													
Thiruvalla	Rice	Rice	Sesame	5	-	-	657	-	-	1011	-	-	53.9

Table 7.3/8: Influence of farmers and improved practices on gross returns (Rs/ha) of various crops under FLD (2010-11)

Agro eco-system/ center	Cropping system			No. of demonstrations	Farmers Practice			Improved Practice		
	Kharif	*Rabi*	*Summer*		*Kharif*	*Rabi*	*Summer*	*Kharif*	*Rabi*	*Summer*
1. Arid										
Deesa	Pearl millet	Mustard	-	3	17795	18000	-	23672	24296	-
	Castor + Green gram	-	-	1	62061	-	-	86050	-	-
	Castor + Cow pea	-	-	1	70580	-	-	91235	-	-
2. Semi Arid										
Amritsar	Rice	Gobhi sarson	Green gram	6	-	33503	-	-	36762	-
Aurangabad	Soybean	Gram	-	5	24142	24171	-	28159	29240	-
Modipuram	-	Mustard	-	10	-	39050	-	-	50490	-
3. Sub Humid										
Kawardha	-	Mustard	-	5	-	36050	-	-	41530	-
4. Coastal										
Thiruvalla	Rice	Rice	Sesame	5	-	-	32850	-	-	50550

4017 ha^{-1} in soybean at Aurangabad resulted in 32.6 % higher net returns under improved practice. In sesame, additional gross return of Rs 17700 ha^{-1} resulted in 109.1 % higher net return under improved than farmer practice at Thiruvalla.

Awareness through field days, training and kisan gosthi

Around 65 farmers participated in the training programme organized at Amritsar (Table 7.3/10) on gobhi sarson demonstration. A kisan gosthi was organized at Kawardha in which 100 farmers were exposed to improved package for mustard for increasing the yield and net returns.

Results for large scale exploitation

Oilseed based cropping system has promise to increase the production of oilseeds on the one hand and improved profitability for farmers in 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 given in Table 7.3/11 can be taken for large scale adoption.

Table 7.3/9: Influence of farmers and improved practices on net returns (Rs/ha) of various crops under FLD (2010-11)

Agro Eco system/Centre	Cropping system			No. of demonstrations	Farmers Practice (FP)			Improved Practice (IP)			% increase over FP		
	Kharif	*Rabi*	*Summer*		*Kharif*	*Rabi*	*Summer*	*Kharif*	*Rabi*	*Summer*	*Kharif*	*Rabi*	*Summer*
1. Arid													
Deesa	Pearl millet	Mustard	-	3	35795	-	-	47967	-	-	34.0	-	-
	Castor + Green gram	-	-	1	62061	-	-	86050	-	-	38.6	-	-
	Castor + Cow pea	-	-	1	70580	-	-	91235	-	-	29.3	-	-
2. Semi Arid													
Amritsar	Rice	Gobhi sarson	Green gram	6	-	15425	-	-	17711	-	-	14.8	-
Aurangabad	Soy-bean	Gram	-	5	11335	12680	-	15029	17416	-	32.6	37.4	-
Modipuram	-	Mustard	-	10	-	12938	-	-	23033	-	-	78.0	-
3.Sub Humid													
Jamtara	-	Mustard	-	5	-		-	-	-	-	-	81.6	-
Kawardha	-	Mustard	-	5	-	21068	-	-	23068	-	-	9.5	-
Jeolikote	Rice	Mustard	-	5	-	26592	-	-	30184	-	-	13.5	-
4. Coastal													
Thiruvalla	Rice	Rice	**Sesame**	5	-	-	13865	-	-	28997	-	-	109.1

Table 7.3/10: Field days and other activities conducted under FLD during 2010-11

Agro Eco system (Centre)	Cropping system			No. of demonstrations	Training programmes		Kisan Gosthi	
	Kharif	*Rabi*	Summer		No's	No' of beneficiary	No's	No' of beneficiary
Semi Arid (Amritsar)	Rice	Gobhi sarson	Green gram	6	1	65	-	-
Sub Humid (Kawardha)	-	Mustard	-	5	-	-	1	100

Table 7.3/11: Package of practices recommended for large scale adoption

Sl. No.	Crop	Location (ecosystem)	Improved Package	Increase in yield (%)	Increase in net returns (%)
1.	Gobhi sarson	Amritsar (Semi Arid)	45 X 10 cm spacing maintained through thinning + phosphorus through SSP	10.8	14.8
2.	Soybean	Aurangabad (Semi Arid)	45 X 5 cm spacing with 30:60:30 kg N, P_2O_5 & K_2O ha^{-1}	15.9	32.6
3.	Mustard	Modipuram (Semi Arid)	Pusa bold variety	66.6	78.0
		Jamtara (Sub humid)	Shivani variety	35.0	81.6
		Kawardha (Sub humid)	Line sowing at row to row distance of 45 cm followed by thinning at 15 DAS to maintain row to row distance of 10 cm (22 plants/m^2)	15.3	9.5
		Jeolikote (Sub humid)	Plant Yellow Sarson 1 + Line sowing with 30 X 20 cm spacing + 100: 40:40 N, P_2O_5 & K_2O ha^{-1}	15.9	13.5
		Deesa	Improved scientific package	15.7	34.0
4.	Sesame	Thiruvalla	Tilak variety	53.9	109.1
5.	Castor	Deesa	Castor + greengram intercropping system	12.3	38.6
			Castor + cowpea intercropping system	3.3	29.3

On-farm crop diversification experiment at Thiruvalla

Diversification of cotton-wheat system at Sirsa

Diversification of rice-rice system with rice-rice-pulse at Chettinad

Progress of on-farm crop diversification experiment at Aurangabad

Diversification of rice-rice system with rice-cucumber at Warangal

FLD on sesamum at Thiruvalla

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., Ramana, Venkata M and Swarupa, Rani S. 2011.Soil enzyme activity and nutrient availability as influenced by different nutrient management practices in maize-onion cropping system. *The Journal of Research ANGRAU*, **39**(3):32-37.

BAU, Sabour (Bihar)

Sharma, R.P., Pathak, S. K., Chattopadhayaya N., Jha, R.N., and.Lal. M .2011. Effect of integrated nutrient management on productivity, nutrient uptake and changes in soil fertility in rice (*Oryza sativa*) -wheat (*Triticum aestivum*) cropping system. *Journal of Farming System Research & Development,* **14** (2):251-58.

Sharma, R.P., Pathak, S.K., Raman, K.R., and Haque, M. 2011. Effect of phosphorus, potassium and sulphur fertization on growth, yield and nutrient uptake of wheat (*Triticum aestivum*) *Journal of Farming Systems Research & Development*, **14**(2):347-52.

IGKVV Raipur (Chhattisgarh)

Urkurkar, J.S., Tiwari, A., Chitale, S., and Bajpai, R.K. 2010. Influence of long-term use of organic and inorganic manures on soil fertility and sustainability of rice (*Oryza sativa*) and wheat (*Triticum aestivum*) in Inceptisols. *Indian Journal of Agricultural Sciences*, **80**(3): 208-212.

Urkurkar, J.S., Chitale, S. and Tiwari, A. 2010. Effect of organic v/s chemical nutrient packages on productivity, economics and physical status of soil in rice (*Oryza sativa*) –potato (*Solanum tuberosum*) cropping system in Chhattisgarh. *Indian Journal of Agronomy,* **55**(1): 6-10.

SDAU SK Nagar (Gujarat)

Mehta, R.S., Patel, B.S. and Meena, S.S.2010. Yield economics and water use of fenugreek (*Trigonella foenum-graecum*) as influenced by irrigation and weed management practices. *Indian Journal of Agronomy,* **55**(3): 235-239.

Mehta, R.S., Patel, B.S., Meena S.S.,and Meena R.S.2010.Influence of nitrogen phosphorus and bio-fertilizers on groth characters and yield of fenugreek. *Journal of Spices and Aromatic Crop,* **19** (1&2):14-22.

CCS HAU Hisar (Haryana)

Kumar, Pawan, Yadav, S.K., Kumar, Manoj, Kumar, Suresh and Hasija, R.C. 2011. Effect of FYM and higher plant population on yield and water use efficiency in pearl millet-wheat cropping system. *Environment and Ecology,* **20**: 190-93.

CSK HPKVV Palampur (HP)

Rana, S.S., Sharma, J.J., Sharma H.L., Sharma, S.K., Saroch, Kapil and Bhargava, M. 2010. Production potential, sustainability and economic viability of rice based crop sequences under mid hills of Himachal Pradesh. *Himachal Journal of Agricultural Research,* **36**(1): 7-12.

SKUAST Jammu (J&K)

Bharat, Rajeev and Kachroo, Dileep 2010. Bio-efficacy of herbicides on weeds in wheat (*Triticum aestivum.L*) and its residual effect on succeeding cucumber (*Cucumis sativus*).*Indian Journal of Agronomy,* **56**(1): 46-50.

BAU Ranchi(Jharkhand)

Prasad, J., Karmakari, S., Kumar, R. and Misra, B. 2010. Influence of Integrated Nutrient Management on Yield and Soil Properties in Maize-Wheat Cropping System in an Alfisol of Jharkhand. *Journal of the Indian Society of Soil Science,* **58**(2): 2000-4.

UAS Bangalore (Karnatka)

Satish, A., Nagaraj, Kusagur, Sanna Thimmappa, H.G., Hugar, A.Y., Chandrappa, H. and Mallikarjun, G.B. 2011, Effect of integrated nutrient management on some soil chemical properties, yield and uptake on nutrient in rice-maize cropping system. *Environment and Ecology*, **28**(2A): 1156-62.

Satish, A., Hugar, A.Y., Nagaraj, Kusagur, Chandrappa, H., Mallikarjun, G.B. and Sanna Thimmappa, H.G. 2011. Effect of integrated use of inorganic and organic sources of nutrients on yield, nutrient on yield, nutrient uptake response and nutrient use efficiency of rice-maize cropping system. *Crop Research*, **40**(1,2&3): 1-6.

JNKVV Jabalpur (MP)

Upadhyay, V.B., Vishwakarma, S.K and Jain, Vikas (2010) Evaluation of site specific nutrient management on productivity and economics of rice- wheat crop sequence. *JNKVV Research Journal,* **44**(1): 45-48.

Upadhyay, V.B., Vishwakarma S.K and Jain, V. (2010) Evaluation of site specific nutrient management on productivity and economics of rice- wheat crop sequence. *JNKVV Research Journal,* **44**(1): 45-48.

PAU Ludhiana (Punjab)

Dhaliwal, S.S., Sadhana, U.S., Sidhu, S. S., Walia, S. S., Dhadi, H.S and Watts, V.D. 2010. Sequential extraction and chemical fractions of Zn and Cu as influenced by manures and fertilizers under long term rice-wheat cropping system in North West India. *Environment and Ecology,* **28**(4A): 2600-2608.

Dhaliwal, S.S., Sidhu, S.S., Walia, S.S. and Singh, Gurpreet. 2011. Effect of different cropping systems on distribution of DTPA-extractable and total Zn, Cu, Fe and Mn fractions in alluvial soils of Punjab. *Environment and Ecology,* **29**(1A): 293-300.

Walia, M.K. and Walia, S.S. 2011. Long term effect of integrated nutrient management on rice productivity after 22 cycles of rice-wheat cropping system. *Indian Journal of Ecology,* **38**(1): 30-34.

Walia, S.S., Gill, M.S., Bharat, Bhushan, Phutela, R.P. and Aulakh, C.S. (2011) Alternate cropping systems to rice-wheat for Punjab. *Indian Journal of Agronomy,* **56**(1): 20-27.

MPUAT Udaipur (Rajasthan)

Dashora, L.N. and Solanki, N.S. (2010) Effect of integrated nutrient management on productivity of black gram (Vigna mungo L.) under rainfed conditions. *Journal of Food Legumes* **23** (3&4); 249-250.

Jain, N K., Besarwal, H. S and Dashora, L. N 2011. Production potential, profitability, sustainability and energetic of different wheat (*Triticum aestivum*) based cropping systems. *Archives of Agronomy and Soil Science*, pp 1- 11.

TNAU Coimbatore (TN)

Shanmugam, P.M., Siddeswaran, K. and Senthikumar, G. 2010. Alternate cropping system for increasing productivity and profitability in irrigated uplands of Tamilnadu. *Green Farming International Journal,* **5**(1):474-476.

Shanmugam, P.M. and Senthikumar, G. 2010. Technology transfer in rice. *International Journal of Agricultural Science,* **6**(1): 337-339.

CSAUAT Kanpur (UP)

Yadav, M.P.,Tiwari, U.S., Rai, J. and Kushwaha, S.P.2010. Enhancing productivity and profitability through site specific nutrient management approach in rice (*Oryza sativa* L.)-wheat (*Triticum aestivum* L.) cropping system. *Research on crops*, **11** (1) : 53-58.

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Aslam Mohd., Yadav M.P.2010. Production potential and economics of different cropping system in Bundelkhand zone of Uttar Pradesh. *Current advance in Agriculture Science*, **2**(1): 40-50.

BHU Varanasi (UP)

Singh, Ravi Kant, Singh, Jitendra Bohra, Triyugi, Nath, Singh, Yeshwant and Singh, Kalyan. 2011.Integrated Assesment of diversification of rice-wheat cropping system in Indo-Gangetic plain. *Archives of Agronomy and Soil Science*, **57**(50): 489-506.

GBPUAT Pantnagar (Uttarakhand)

Kumar, P. and Singh, D.K. 2010: Influence of agronomic management on productivity and economics of rice-wheat system. *Indian Journal of Agriculture Science,* **80**(5): 69-71.

8.1.2 Papers presented in seminar/symposia

BAU Sabour (Bihar)

Sharma, R.P., Haque, M., and Singh, A.K. 2010.Effect of cereals and Legumes intercropping on production potential, economics and quality of fodder during summer season. Presented in National Congress

on Emerging Trends in Agricultural Research held at Project Directorate for Farming System Research, Modipuram, Meerut (U.P.) during 11-12 September 2010, pp 37.

IGKV Raipur (Chhattisgarh)

Tiwari, A., Sarawgi, S.K., Chitale, S. Sengar, S.S. and Urkurkar, J.S. 2010. Integrated plant nutrient supply for yield sustainability in rice-wheat system of Chhattisgarh. Souvenir & Abstracts. National Symposium on Emerging Trends in Agricultural Research, 11-12 September 2010 organized by Hi-Tech Horticultural Society, Meerut held at PDFSR, Modipuram, Meerut, pp 19-20.

Chitale, S., Sarawgi, S.K., Tiwari, A. and Urkurkar, J.S. 2010. Performance evaluation of different soybean based cropping sequences under full organic, integrated and inorganic nutrient supply system. Souvenir & Abstracts. National Symposium on Emerging Trends in Agricultural Research, 11-12 September 2010 organized by Hi-Tech Horticultural Society, Meerut held at PDFSR, Modipuram, Meerut. pp 23-24.

Sarawgi, S.K., Chitale, S., Tiwari, A., and Urkurkar, J.S. 2010. Management of soil fertility using farm derived organic inputs and its effects on productivity of basmati rice-wheat /chickpea cropping system. Souvenir & Abstracts. National Symposium on Emerging Trends in Agricultural Research, 11-12 September 2010 organized by Hi-Tech Horticultural Society, Meerut held at PDFSR, Modipuram, Meerut. pp 24-25.

Tiwari, A., Sarawgi, S.K., Chitale, S., Sengar, S.S. and Urkurkar, J.S. 2010. Integrated plant nutrient supply for yield sustainability in rice-wheat system of Chhattisgarh. Souvenir & Abstracts. National Symposium on Emerging Trends in Agricultural Research, 11-12 September 2010 organized by Hi-Tech Horticultural Society, Meerut held at PDFSR, Modipuram, Meerut, pp 19-20.

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CCS HAU Hisar (Haryana)

Hari Om, Yadav, S.K., Kumar, Manoj., Kumar, Pawan and Dilbagh Singh. 2010. Impact of nutrient management on productivity and economics in rice-wheat system. Abst. Published in : National Symposium on Emerging Trends in Agricultural Research, 11-12 September 2010 at PDFSR, Modipuram, Meerut, pp 31.

Hari Om, Yadav, S.K., Singh, Dilbagh, Saini, R.S. and Pannu, R.S. 2010. Diversification of rice-wheat system in north-western Indian conditions. Abst. Published in : National Symposium on Emerging Trends in Agricultural Research, 11-12 September 2010 at PDFSR, Modipuram, Meerut, pp 29-30.

Kumar, Manoj, Hari Om, Yadav, S.K., Singh, Dilbagh and Lathwal, O.P. 2010. Response and uptake of nutrients under different nutrient combinations in rice-wheat system. Abst. Published in : National Symposium on Emerging Trends in Agricultural Research, 11-12 September 2010 at PDFSR, Modipuram, Meerut, pp 30-31.

Kumar, Manoj, Yadav, S.K. and Kumar, Pawan. 2010. Cropping systems influence on nutrients utilization in semi arid Haryana. Abst. Published in: Symposium on Emerging Trends in Agricultural Research, 11-12 September 2010 at PDFSR, Modipuram, Meerut, pp 32.

Kumar, Pawan, Kadian, V.S., Yadav, S.K. and Kumar, Manoj. 2011. Effect of various organic sources of nutrients on yield of cotton (Desi)-wheat cropping system. Abst. Published in National Symposium-cum-Brain Storming Workshop on Organic Agriculture, held at CSK HPKVV Palampur during 19-20 April 2011, pp 81-82.

Yadav, S.K., Kumar, Pawan and Kumar, Manoj. 2010. Integrated nutrient management for enhanced productivity and profitability of pearl millet-wheat cropping system. Abst. Published in : National Symposium on Emerging Trends in Agricultural Research, 11-12 September 2010 at PDFSR, Modipuram, Meerut, pp 33.

CSK HPKVV Palampur (HP)

Rana, S.S., Negi, S.C., Subehia, S.K and Sharma, S.K. 2011. Organic nutrient management in babycorn – Chinese sarson – onion cropping system. National symposium cum brain storming workshop on organic agriculture, April 19-20. Organic Agriculture Society of India, Department of Organic Agriculture, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur, pp 114.

UAS Bangalore (Karnataka)

Hugar, A.Y., Chandrappa, H., Sathish, A., Nagaraj, Kusagur and Sanna, Thimmappa, H.G. 2010. Integrated nutrient management Paddy-maize sequence. In International Symposium on System intensification towards food and Livelihood security in crop and weed science society. 24-27 February 2011, BCKV, Mohanpur (WB), pp 195.

Hugar.A.Y., Chandrappa H., Sathish.A., Nagaraj Kusagur and P.Chandravansi, 2011. Effect of organic on total crop productivity and economics of maize-groudnut cropping system sequence in International Symposium on System intensification towards food and Livelihood security in crop and weed science society. 24-27 February 2011 BCKV, Mohanpur (WB), pp 194.

OUAT Bhubaneswar (Odisha)

Garnayak, L.M., Nanda, S.S. Mishra, P.J., Mohapatra, B.K. and Mohanty, M.2010.Productivity enhancement of rice (*Oryza sativa*) - green gram (*Vigna radiata*) system through agronomic management practices. *Proceedings of XIX National Symposium on resource Management Approaches towards Livelihood Security*, 2-4 December, 2010, organized by the Indian Society of Agronomy, Bengaluru, Karnataka, pp 133.

PAU Ludhiana (Punjab)

Aulakh, C.S., Gill, M.S., Mahey, R.K and Walia, S.S., 2011 Productivity of different fodder cropping systems under organic, integrated and chemical management. *Proc. National symposium –cum-brain storming workshop on organic agriculture organized by organic agriculture society of India. Department of organic Agriculture. College of Agriculture, CSK HPKV, Palampur*, pp 99-100.

Saini, K.S., Walia, S.S and Aulakh, C.S. 2011. Long term impact of organic and chemical farming on the productivity of soybean-wheat sequence. *Proc. National symposium –cum-brain storming workshop on organic agriculture organized by organic agriculture society of India. Department of organic Agriculture. College of Agriculture, CSK HPKV, Palampur*, pp 116.

Singh, Satpal, Walia, S.S and Bhushan, Bharat 2010.Enhancing farmers' income with the adoption of alternate farm enterprises. Proc. 13th Punjab Science Congress organized by Panjab University, Chandigarh during 7-9 February, pp 61.

Walia, S.S., Aulakh, C.S and Singh, Roopinder 2010. Sustainable production system model in maize-wheat system in Punjab. *Proc. National Conference on Recent Advances in Agriculture organized by Department of Agriculture, Baba Farid College, Baba Farid Group of Institutions, Mukatsar Road, Bathinda*, pp 43.

MPUAT Udaipur (Rajasthan)

Bhatnagar, G.S. and Meghwal, H.P. 2010. Decline in coriander yield due to continuous cropping in organic farming. *National Seminar on Precision Farming in Horticulture* held at College of Horticulture and Forestry, Jhalawar during 28-29 December 2010, pp 415-418.

TNAU Coimbatore (TN)

Shanmugam. P.M., Siddeswaran, K., Devsenapathy, P. S.Jeyaraman.2010. Maximization of yield and profit in rice based cropping system through site specific nutrient management (SSNM). National Symposium on Resource Management Approaches Towards Livehihood Security, 2-4 December 2010. Organized by Indian Society of Agronomy, ICAR, UAS, Bengaluru, pp 52,

Siddeswaran, K., Shanmugam., Devsenapathy, P. and Jeyaraman, S.2010. Organic nutrient management practicses for chillies-bengal gram-babycorn cropping system. National Symposium on Resource Management Approaches Towards Livehihood Security, 2-4 December 2010, organized by Indian Society of Agronomy, ICAR, UAS, Bengaluru, pp 31.

Thiyageshwari, S., Siddeswaran, K., Devsenapathy, P., Shanmugam, P.M. and Jeyaraman, S. 2010.Crop productivity and nutrient dynamics under intensive cropping system of irrigated uplands in vertic ustropept. National Symposium on emerging trends in Agricultural research held on 11-12 September 2010 at PDFSR, Modipuram U.P. pp 22.

CSAUAT Kanpur (UP)

Tiwari, U.S., Yadav, M.P. and Rai, J., 2010. Effect of Inorganic organic and integrated nutrients on crop productivity and soil properties in high value crops. National Symposium on Food Security in context of Changing Climate, organized by, The Society of Agricultural Professionals, Kanpur during 30 October to 01 November 2010 at Kanpur, pp 151.

Yadav, M.P., Tiwari, U.S., and Rai, J., 2010.Effect of tillage and planting management on crop productivity and soil properties in rice-wheat Cropping System. National Symposium on Food Security in context of Changing Climate, Organized by, The Society of Agricultural Professionals, Kanpur during 30 October to 01 November 2010 at Kanpur, pp 151.

Aslam, M.D., and M.P., 2010. Response of nutrient in predominant rice-wheat cropping system on farmers'fields. National Symposium on Food Security in context of Changing Climate, Organized by, The Society of Agricultural Professionals, Kanpur during 30 October to 01 November 2010 at Kanpur, pp 172.

NDUAT Faizabad (UP)

Yadav, R.A., Tripathi, H.P., Singh, S.P., Kumar, Alok, Tripathi, R.N. and Singh, I. N. 2010. Diversification of rice-wheat cropping system for systaiability in Eastern UttarPradesh. Extended summaries: XIX National Symposium on "Resource Management approach towards livelihood security". *Indian Society of Agronomy* on 2-4 December 2010, pp 350.

ICAR Research Complex for Goa

Singh, N.P. and Manjunath, B.L.2010. Sustainable agricultural through integrated farming systems for better livelihood security and ecology of west coast region, In abstracts of Naional Sympossium on Recent Outlook on Sustainable Agricultural, Livelihood Security and Ecology of Coastal Region organized by BSKKV,Dapoli and Society of Coastal Agricultural Research, CSSRI, Karnal during 27-30 October 2010 at Goa, pp 88-90.

Singh, N.P. and Manjunath, B.L.2010.Resource Management Strategies through integrated farming systems for sustainable agricultural production in West coast region , In Extended Summaries of XIX National Sympossuim on "Resource Management Approaches Towards Livelihood Security "organized by Indian Society of Agronomy and U.A.S. Bangalore during 2-4 December 2010 at Bangalore, pp 168-170.

8.1.3 Popular Articles

BAU Sabour (Bihar)

डा0 आर0 पी0 शर्मा एवं डा0 एस0 के0 पाठक (2011), समेकित कृषि प्रणाली, स्मारिका, किसान मेला, 2011 पृष्ठ सं0 04–09.

डा0 एस0 के0 पाठक (2011), गेहूँ फसल की पैकेज प्रणाली, रबी फसलों की वैज्ञानिक खेती – प्रशिक्षण पुस्तिका पृष्ठ सं0 17–23.

डा0 आर0 पी0 शर्मा (2010), एकीकृत फसल प्रणाली द्वारा जल प्रबंधन स्मारिका, पृष्ठ सं0 01–05.

IGKV Raipur (Chhattisgarh)

Singh, Manish and Chitale, shrikant, 2010.Chane ki fasal ketu samanvit nashi jeev prabandhan, *Krisak Utthan* **1**(6): 15.

Singh, Manish and Chitale, Shrikant, 2010. Surajmukhi ki unnat sasya takneek. *Krisak Utthan* **1**(6): 15.

CCS HAU, Hisar (Haryana)

Kumar, Satyajit Pawan and Nanwal, R.K. 2011. Jaivik Khad:Aadhunik Krishi Mein Tikau Utpadan Ke Liye nai Dishain. *Khad Patrika*,.

SKUAST Jammu (J&K)

Thakur, N.P., Kour, Manpreet, Kachroo, Dileep, Sharma, Rohit, Kumar, P. and Khajuria, V. 2010. *Barani avastha main nami sanchit kassiay karain*(In Hindi) *FSR extension bulletin 07/10.*

Kour, Manpreet, Kachroo, Dileep, Thakur, N.P., Gupta, Ashok, Sharma, Rohit, Kumar, P. and Khajuria, V. 2010. *Sukhein main kheti kai viganik tarekai*. (In Hindi) *FSR extension bulletin 08/10.*

Thakur, N.P., Kachroo, Dileep, Kour, Manpreet, Sharma, Rohit, Gupta, Ashok and Kumar, P. 2010. *Sinchit khetron mein sarson ki udphadan taqneeq*. (In Hindi) *FSR extension bulletin 09/10.*

Khajuria, V., Thakur, N.P., Kachroo, Dileep, Sharma, Rohit, Kumar, P. and Kour, Manpreet. 2010. *Jaiv urvarak (Azotobacter and PSB)ko khet mein pryog karnai ki vidhiaan thatha lab*. (In Hindi) *FSR extension bulletin 10/10.*

Kachroo, Dileep, Kour, Manpreet, Thakur, N.P., Khajuria, V., Sharma, Rohit and Kumar, P. 2010. *Sukhe ilaqon mein isbagol ki kheti*. (In Hindi) *FSR extension bulletin 13/10.*

JNKVV Jabalpur (MP)

के. आर. नाईक (2010) मुंग की भरपूर उपज कैसे लें "कृषि विश्व" खरीफ दलहनी एवं तिलहनी विशेंषाक पेज नं. 31–34.

के. आर. नाईक (2010) उड़द की उन्नत काष्त, "कृषि विश्व" खरीफ दलहनी एवं तिलहनी विशेंषाक पेज नं. 20–24.

के. आर. नाईक (2010) अधिक उत्पादन के लिये ग्रीष्म ऋतु में मूंग–उड़द की उन्नत खेती। "कृषक चेतना" मार्च –अप्रैल, 2010 अकं 1 पेज 12–13.

MAU Parbhani (Maharashtra)

Narkhede, W.N. and Deshmukh, M.S. 2010. Integrated farming system for sustainable and higher economic returns. (In Monthly magazine *Sheti-bhati* during May-June, 2010) pp 51-54.

Narkhede, W.N. and Deshmukh, M.S. 2010. Integrated farming systems, (In Monthly magazine *Godwa,* June-2010) pp 98-101.

8.1.4 Books/Book chapters

CCS HAU Hisar (Haryana)

Rana, V.S.; Rathore, B.S.; Nanwal, R.K. and Kumar, Pawan. 2010. Influence of plant density and nutrient management on pearl millet in semi arid environment, In: Resource management towards sustainable agriculture and development (Eds: Behl et al.). Published by Agrobios (International), pp 49-63.

SKUAST Jammu (J&K)

Kachroo, Dileep, Kachroo, Jyoti and Thakur, N. P. (2011). Farming System approach for entrepreneurship. Extension methology for sustainable entrepreneurship (Eds, S. K. Kher. Agrotech Publishing Academy), Udaipur, pp 238-253.

PAU Ludhiana (Punjab)

Walia, S.S. 2010. Suitable cropping systems for higher water and crop productivity in south-western districts. In: Efficient water management for sustainable agriculture. Eds B S, Sekhon K S and Singh Avtar. Published by Punjab Agricultural University, Regional Station, Bathinda, pp 77-83.

MPUAT Udaipur (Rajasthan)

Dashora, L.N. and Solanki, N.S. 2010 . "Karbnik Kheti ki Pramukh Jankariya." (In Karbanik Kheti ke Siddhant avem Prabandhan, Edited by Tiwari, Joshi and Khandelwal, Himanshu Publications) pp 164-174.

TNAU Coimbatore (TN)

K.Siddeswaran and P.M.Shanmugam.2010.Strategies for efficient management of crop residues in conservation agriculture. In conservation agriculture.Edited by Muthukrishanan, R. Published Sri Sakthi Promotional Litho Press, Coimbatore, TamilNadu, pp. 61-67.

Vallal Kannan, S. 2010. Weed management In: Book on sustainable agricultural technologies for higher pulses productivity. (Ed. chandrasekaran, Rengaraju, G., Vallal Kannan, S. B S.Suganya, and. K Parameswari)

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

SKUAT Jammu (J&K)

Dr.Vijay Khajuria attended 21 days winter School on System base INM for sustained productivity and soil health at PDFSR during 1-21 Oct.2010.

Dr. N.P. Thakur attended"National seminar on Development in soil science, 2010.75th Annual convention of ISSS New Delhi during 14-17th Nov.2010.

Dr. Dileep Kachroo attended Workshop cum Consultation Meet of NPOF at PDFSR Modipuram during 21-23 Feb, 2011.

KAU Karmana (Kerala)

Dr. Jocob John attended the Plantation Crops Symposium (PLACROSYM XIX) at Rubber Research Institute of India Kottayam during 7-9 December 2010.

Dr. Jocob John and Dr. Kuruvilla Varughese attended National Workshop on "Natural Resource Management and human development paradigms in climate change perspective-adaptive strategy option for

Kerla"organised by Environment Management Agency Kerla and Kerla state planning Board,during 14-16 Dec,2011.

Dr. Jocob John and Dr. Kuruvilla Varughese attended First Indian Biodiversity Congress and Present Paper on Adaptability of Scented rice suitable to kerla on 28th to 30th December 2010.

MPKV Rahuri (Maharastra)

Dr. A.V. Solanke Chief Agronomist, Dr.V.S.Patil, Jr. Soil Chemist attended Biennial Workshop of AICRP on Integrated Farming System, at ANGARAU, Rajendranagar, Hyderabad during 10-13 December 2010

Dr. A.V. Solanke Chief Agronomist, Dr.V.S.Patil, Jr. Soil Chemist attended Workshop of NPOF held at PDFSR, Modipuram, during 22-23, February 2011

MPUAT Udaipur (Rajasthan)

Dr. L.N. Dasora Attended meeting of agronomists to finalization the technical programme of farming system at PDFSR, Modipuram date 4-5 May, 2011.

Dr. G.S. Bhatnagar, Dr.L.N. Dasora and Sh Hari Singh Attended 29th Biennial Workshop of AICRP on Integrated Farming Systems held at ANGRAU, Rajendranagar, Hyderabad during 10-13 December, 2010.

Dr. L.N. Dasora Attended Training Data Analysis using SAS of the NAIP on "Strenghening Statistical Computing for NARS" at RCA Udaipur 22-27 Nov,2010.

Dr. L.N. Dasora Attended Characterization & Conservation of Biodiversity for Sustainable Agriculture at MPUAT, Udaipur, 12-13 Nov, 2010.

Sh. Hari Singh Attended Training Programme on "Commodity Futures Market Training of Trainers" at Udaipur, 29th-31st March 2010

MPUAT Bikaner (Rajasthan)

Dr. N. K. Jain, Associate Professor & Shri Hari Singh, Asstt. Professor attended Training cum Awareness Programme on Protection of Plant Varieties and Farmers' Rights Act" held at Udaipur on 20th March, 2010

RBS College, Bichpuri, Agra (UP)

Dr S.B.Singh, Chief Agronomist Attended "National seminar on improving water productivity limits and opportunities" at RVSKVV,Gwalior(M.P.) on dated 25-26 Feb.2011.

CSAUAT Kanpur (UP)

Dr.M.P.Yadav, Dr.U.S.Tiwari and Dr.Mohd Aslam attended a National Symposium on "Food Security in context of changing climate"held at CSAUT, Kanpur during October 30 to November 01,2010

Dr. Mohd Aslam attended National workshop cum Group meeting on solving the pulse crises through crop diversification held at Agricultural Research Station Durgapura, Jaipur during October 25-26,201

BCKV Kalyani (WB)

Dr. M Ray attended the National Conference on Horticulture for rural development – biotechnological and biochemical aspects held at Kolkata, September 25, 2010.

Dr. M Ray attended the National Seminar on Emerging challenges and steps for mitigation of productivity constraints in food legumes held at, BCKV Kalyani, November 20, 2010.

Dr. M Ray attended the International Conference Tropical Island Ecosystem: issues related to livelihood, sustainable development and climate change held at CARI, Port Blair, Andaman, 23-26 March, 2011.

8.3 GROUP MEETINGS/ WORKSHOPS ORGANIZED

8.3.1 Quinquennial Review Team of PDFSR (Including AICRP-IFS) Constituted

Quinquennial Review Team of PDFSR (Including AICRP-IFS) was constituted vide Council's Office Order no. 17(8)/2011-IA-II dated 6th October 2011, under the chairmanship of learned agriculturist Dr Panjab Singh ji, former Secretary DARE & DG ICAR and former Vice Chancellor of BHU Varanasi and JNKVV Jabalpur. The other learned members of the committee were; Dr K. Pradhan, Ex-Vice Chancellor OUAT Bhubaneswar; Dr Gyanendra Singh, Ex-Vice Chancellor MGGU Chitrakoot; Dr C.L. Acharya, Ex-Director (Extn.) HPKVV Palampur; Dr D.M. Hegde, Ex-Project Director DOR; Dr W.S. Dhillon, Director, Punjab Horticulture Post-Harvest Technology Centre, PAU Campus, Ludhiana (Punjab); and Dr Anjani Kumar, Pr Scientist (Agri. Economics), NCAP New Delhi. Dr Kamta Prasad, Pr. Scientist and Programme Facilitator (Coordination Unit), PDFSR was nominated as Member Secretary of QRT. The review panel has been assigned had been assigned the progress with reference to research achievements and their impact, research relevance and budget allocation and offer comments with respect to policies, priorities and strategies, relationship/ collaboration with SAUs and other stakeholders, linkages with clients/ end-users. The panel is also mandated to suggest ICAR about desired changes in organization, programmes and budget, and identify constraints, if any.

Planning meeting of QRT at PDFSR, Modipuram

Visit of QRT to field experiments at Modipuram

To review the progress of PDFSR headquarters, AICRP-IFS and NPOF, the review panel during its planning meeting held at PDFSR Modipuram on 9-10 Feb 2012, decided to convene region-wise review meetings/ field visits. However, research progress of PDFSR (including lead research as well as in respect of voluntary centres

of AICRP-IFS and NPOF at Modipuram) was reviewed during planning meeting itself. The dates, location and centres covered in other two review meetings, organized during the period under report (up to 31st March 2012), are as follows.

1. 22-23 March, 2012 (SKUAST, Jammu)

Main Centres – Hisar, Ludhiana, Palampur, Jammu

OFR Centres – Kurukshetra/ Sirsa, Amritsar, Kangra, Dhainser

2. 28-29 March, 2012 (BHU, Varanasi)

Main Centres – Kanpur, Faizabad, Pantnagar, Sabour, Ranchi

Sub-Centres – Varanasi, Bichpuri

OFR Centres – Kaushambi, Varanasi, Sant Kabir Nagar, Srinagar/ Nainital, Patna, Jamtara

Group meeting organized at CARI, Port Blair (A & N Islands) on 27-29 December, 2011

The meeting was inaugurated by Prof. Panjab Singh, former Secretary DARE and DG, ICAR and Chairman QRT of PDFSR (including AICRP-IFS and Dr A.K. Singh, DDG (NRM), ICAR and. The function started with the invocation of ICAR song and lighting of the lamp by the dignitaries. Dr S.K. Ambast, Director (CARI), welcomed the delegates of group meeting of AICRP on IFS. In his introductory remarks, Dr. B. Gangwar, Project Director, PDFSR, highlighted that the income from cropping alone is hardly sufficient to sustain the farmers' needs, especially in case of small and marginal farmers, who constitute about 84 percent of total farm households in the country. In rural areas also, farmers' requirements for cash have increased to improve their standard of living. Therefore, farmers' income and food requirements would have to be augmented and supplemented by adoption of efficient secondary/ tertiary enterprises like animal husbandry, horticulture (vegetables/ fruits/ flowers/ medicinal and aromatic plants), apiary, mushroom cultivation, fisheries etc. However, these integrated farming systems will be required to be tailor-made and designed in such a manner that they lead to substantial improvement in energy efficiencies at the farm and help in maximum exploitation of synergies through adoption of close cycles. These systems also need to be socially acceptable, environment friendly and economically viable. He further mentioned that agricultural research in farming system mode by judiciously integrating more than one enterprise, with crop being the nucleus of the system, certainly leads to greater dividends than single enterprise based farming, especially for small and marginal farmers. Dr Gangwar made a brief mention of significant achievements made during past one year under the aegis of AICRP on Integrated Farming Systems, which included; the documentation of zone-wise efficient alternative cropping systems, along with their package of practices, in the form of a book entitled, "Efficient Alternative Cropping Systems", publication of AICRP-IFS Annual Reports of 2009-10 and 2010-11, streamlining of data submission and processing, starting of on-station IFS programme at all the 31 locations, initiation of IFSR in farmers' participatory mode in 31 districts through OFR programme during June, 2011, development of IFS Observation schedule for proper data recording, monitoring the progress of on-going programme at different centres by the team of scientists from PDFSR and selected centres, except in the states of A.P., Bihar, Chhattisgarh and Kerala. full utilization of funds provided by the Council, facilitation of all the OFR centres with GPS, Laptop and Internet connectivity for smooth functioning and

Release of publications by chief guests in the Group Meeting

communication, imparting need-based trainings for characterization and evaluation of existing farming systems, organization of one reorientation programme for OFR Agronomists on methodology for farmers' participatory IFS research,and completion of farming systems characterization in the states of Maharashtra and Tamil Nadu.

Dr A.K. Singh, in his presidential address emphasized on the importance of integrated farming systems in agriculture as theyare the potential tools to address the core issues of providing regular income to the farmer, sustainability of the system, enhancing input/ resource use efficiencies and finally adequate resilience to agriculture against climate change. He also mentioned that agriculture throughout country is in the grip of water stress and we have to seek, through our research efforts, green technologies which leave smaller footprint for water and carbon. He mentioned that there is a need to develop Decision Support Systems for IFS research, which should be compliant to Indian agriculture. Prof.Panjab Singh, in his inaugural address, was highly appreciativeof IFS research under AICRP-IFS. He mentioned that this project has become much more important than what it used to be earlier. He further highlighted that IFS approach of research has an answer to all the issues of 'Farm Profitability – Diversity – Sustainable Agriculture – Livelihood Security – Climate Resilient Agriculture' but, at the same time it is a great challenge to multiply the successful model on farmers' fields. Moreover, we have to consider farmer's resources and suggest technologies according to his resource for higher adaptability. For desired success he suggested three things, namely; (a) don't do what has been done earlier, (b) try to multiply what has been achieved, and (c) decide precisely what you are going to do in future by infusing science into it. After three days' deliberations following important recommendations emerged out:

1. Long-term nutrient management experiments should be reviewed for their continuation in future by constitution of a high level experts committee and the treatment of 25% substitution of N through wheat straw in rice in rice-wheat system need critical review as recommendation.
2. Economics should be worked out on the basis of MSP (wherever applicable) and farm gate price in place of prevailing retail market prices.
3. Fruits like papaya and other similar species should be intercropped for early returns and higher profits in IFS models.
4. Despite of the fact that AICRP-IFS has been mandated to undertake IFS research, research on cropping systems should be taken up as one of the components of IFS.
5. The present strength is grossly inadequate and Divisions/ scientific strength should be decided according to assigned mandate, programmes and activities of the Directorate, and ICAR authorities should enhance staff accordingly.
6. To show its impact in mandated area of IFS, PDFSR may identify the major breakthroughs in farming systems in the form of success stories, upscale them and multiply them. If need be, refine them.
7. Due emphasis be given for low cost mechanization/ primary value addition (e.g., zero energy cool chambers) in the research programmes.
8. HRD component should be planned properly with well-defined areas of training, persons to be trained and where training is to be provided.
9. Very clear guidelines for each and every experiment have to be framed by PDFSR in consultation with IASRI. This should be documented and communicated to all centres in a compendium form before next workshop.
10. The layout of the climate change experiment needs a correction at the centres, who have not followed instructions properly. It may be again emphasized that all possible combinations of tillage treatments (2) X cropping systems (4) should be assigned randomly to 8 main plots, whereas all possible combinations of fertilizer (2) X mulch (2) treatments should be assigned randomly to 4 sub-plots within each main plot. The minimum sub plot size shall not beless than 15 m^2.
11. It was considered appropriate to close down 2(a) experiment at Karjat centre immediately as no useful results have been obtained so far due to its location in the research farm.
12. Separate group meeting is required to be organized with focus on "Conservation Agriculture: Mitigation and Adoption in Farming Systems Perspective".

8.4 RADIO AND TELEVISION TALKS DELIVERED BY PROJECT STAFF

Centre/ Date	Title of the talk	Name of Doordarshan/ Akashwani Kendra	Name of Staff
Rajendranagar			
22.09.2010	Production technology in Rabi Groundnut	AIR, Nizamabad	Dr.G.E.Ch.Vidyasagar
22.09.2010	Production technology in Rabi Bengalgram	AIR, Nizamabad	Dr.G.E.Ch.Vidyasagar
28.10.2010	Production technology of Blackgram in Rice fallow	AIR, Nizamabad	Dr.G.E.Ch.Vidyasagar
28.10.2010	Production technology in Rabi Sunflower	AIR, Nizamabad	Dr.G.E.Ch.Vidyasagar
14.12.2010	Production technology of Blackgram in Rice fallows	AIR, Nizamabad	Dr.G.E.Ch.Vidyasagar
09.12.2010	Production technology of Blackgram in Rice fallows	AIR, Nizamabad	Dr.G.E.Ch.Vidyasagar
Sabour			
17.10.2010	Zero Technique vidhi se gahu ki kheti	AIR	Dr.R.P.Sharma
01 .01.2011	Is mah ki kheti bari	AIR	Dr.R.P.Sharma
01 .01.2011	Is mah ki kheti bari	AIR	Dr.R.P.Sharma
09.05.2011	Ganna fasal, ki dekhbhal	AIR	Dr.R.P.Sharma
SK Nagar			
27.07.2010	Weed management in kharif crops.	Akashwani, Rajkot.	Dr.B.K. Sagarka,
03.11.2010	Weed management in rabi crops.	DDK, Rajkot	Dr.B.K. Sagarka,
03.04.2011	Importance and use of biofertilizers	Akashwani, Rajkot	Dr.B.K. Sagarka,
Rahuri			
26.04.2010	Soil testing is important before kharif season	AIR	Dr. V. S.Patil
10.06.2011	Green manuring for soil fertility	AIR	Dr. V. S.Patil
19.07.2011	Cultivation of green manuring crops	AIR	Dr. V. S. Patil
19.07.2011	Information of improved sugarcane varieties	AIR	Prof.A.D. Tambe
Ludhiana			
21.12.2010	Kanak de dekhbhal	AIR,Jalandhar	Dr S S Walia
12.05.2011	Jhonne de vadhiya	AIR,Patiala	Dr S S Walia
Karjat			
06.01.2010	Traditional '*Rab*' practice for raising rice nursery is hazardous to environment, besides being costlier and laborious	AIR, Mumbai	Dr. L.G. Pawar

Centre/ Date	Title of the talk	Name of Doordarshan/ Akashwani Kendra	Name of Staff
22.06.2010	Ever increasing danger of alien invasive weeds for agriculture, aquaculture, orchards, animal husbandry and biodiversity"	AIR, Mumbai	Dr. L.G. Pawar
18.06.2010	Hints for sustainable ways of increasing rice productivity and thus profitability".	AIR, Mumbai	Dr. L.G. Pawar
05.02.2010	Green manuring for sustainable agriculture	AIR, Mumbai	Prof.D.G.Jondhale
18.02.2011	Mango and Cashew fruit crop rejuvenation	AIR, Mumbai	Khamkar M.B. S.R.F
July, 2010	Dibbling rice is profitable in Konkan'	'Star Maza' (Marathi)	Dr. L.G. Pawar
Coimbatore			
09.08.2010	Integrated crop management practices in sesamum	AIR Trichirapalli	Dr. P.Kathirvelan
14.04.2010	Research on alfasols-Radio talk	AIR Trichirapalli	Dr. P.Kathirvelan
30-04.2010	Mechanization in summer cultivation	AIR Trichirapalli	Dr.S.Vallal Kannan
Sirruguppa			
14.06.2010	Bt cotton improved Agronomic practices	DoorDarshan Kendra Gulbarga	
28.05.2011	Paddy and Bt cotton cultivation practices phone programme	AIR,Hospet	
17.09.2010	Bengal gram improved agronomic practices	AIR,Hospet	
17.09.2010	Bt cotton improved Agronomic practices	AIR,Hospet	
Jabalpur			
08.02.2010	Gresam kalin moong avam urd ki adhik upaj kaise le	AIR, Jabalpur	Dr.K.R.Naik
June,2011	Kharif me hari khad ki tayari	AIR, Jabalpur	Dr.K.R.Naik
01.01.2011	Pacheti gahu ki fasal me khad avm pani ka sahi upyog	AIR, Jabalpur	Dr.V.B.Upadhyay
Ranchi			
18.08.2010	Cultivation of Pigeon pea & Black gram	TV Talk	Dr.R.P. Manjhi
25.07.2010	Cultivation of rainy season potato	Radio Programme	Dr.R.P. Manjhi
27.07.2010	Cultivation of Integrated Maize	Radio Programme	Dr.R.P. Manjhi
24.01.2011	Threshing and storage of paddy	Radio Programme	Dr.R.P. Manjhi
Bhubneswar			
03.03.2010	Jaibasara prastuti o pryoga	AIRBhubaneswar	Dr.L.M.Garnayak
21.07.2010	Transplanted rice-Question	AIRBhubaneswar	Dr.L.M.Garnayak

Centre/ Date	Title of the talk	Name of Doordarshan/ Akashwani Kendra	Name of Staff
11.01.2011	Package & practices of dalua paddy	AIRBhubaneswar	Dr.L.M.Garnayak
30.05.2011	Sharad Dhana Pain Agua Prastuti	AIRBhubaneswar	Dr.L.M.Garnayak
27.07.2011	Cultivation of pulses and oilseeds in canal command	AIRBhubaneswar	Dr.L.M.Garnayak
04.08.2011	After care of transplanted rice	AIRBhubaneswar	Dr.L.M.Garnayak
21.05.2010	Preparedness for *kharif* season	TV	Dr.L.M.Garnayak
03.09.2010	Rice transplanting and after care	TV	Dr.L.M.Garnayak
07.02 to 11.02.11	Package of practices of maize	TV	Dr.L.M.Garnayak
06.04 & 20.04.11	Question answer	TV Krishi Darsan	Dr.L.M.Garnayak
23.05 to 27.05.11	Sesame cultivation	TV Krishi Darsan	Dr.L.M.Garnayak
01.08 to 05.08.11	After care of kharif groundnut and maize	TV	Dr.L.M.Garnayak
21.10.2011	Crop planning for *rabi* season	TV	Dr.L.M.Garnayak
09.12.2011	Groundnut cultivation	TV	Dr.L.M.Garnayak
15.11.2010	Sita dine dali o tailabija fasalara paira chasa	AIR	Dr.B.K.Mahapatra
18.09.2011	Cultivation of mustard in rainfed areas	AIR	Dr.B.K.Mahapatra

9. APPENDICES

APPENDIX I: INITIAL SOIL PARAMETERS FOR ON-STATION EXPERIMENTAL SITES DURING 2010-11

Name of FSR centre	Expernment no	PH	EC (m mhos/ cm)	O.C.%/ g/kg	Available nutrient (kg/ha)		
					N	P	K
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
Raipur	1(a)			0.49	248	18.6	262
	2(a)			0.51	234	11.5	232
	SPM				197	11.8	278
	OF				226	19.6	268
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
	SPM	8.1		0.52	200	24.0	115
	TPM	NR		NR	NR	NR	NR
	OF	8.1		0.51	210	14.7	114
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
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	5.2	0.09	0.60		22.0	197
	OF	5.3	0.14	0.52	203	12.0	234
Siruguppa	OF	8.1	0.34	0.39	285	13.0	395
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	NR	NR	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
Rahuri	1(a)	8.0	0.26	0.62	220	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
	OF(C-W)	8.5	0.28	0.52	183	9.0	503

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Name of FSR centre	Expernment no	PH	EC (m mhos/ cm)	O.C.%/ g/kg	Available nutrient (kg/ha)		
					N	P	K
Akola	1(a)				250	13.0	281
	2(a)			0.40	209	11.0	350
	TPM				205	15.4	306
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
	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	2(a)	7.9	0.22	0.44	192	12.0	216
Bichpuri	2(a)	NR	NR	0.31	124	10.6	204
	OF	7.8	1.80	0.31	123	10.6	284
Pantnagar	1(a)	7.2	0.18	0.81	172	28.4	195
	SPM	7.7	NR	1.23	230	32.0	143

APPENDIX II: WEATHER PARAMETERS (MONTHLY AVERAGES) AT DIFFERENT CROPPING SYSTEM CENTRES DURING 2010-11

A: Monthly Rainfall (mm)

FSR Centre	Rainfall received during the month (mm)											
	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Rajendranagar	113.7	278.9	203.1	243.8	108.0	30.2	18.2	0.0	6.0	0.0	3.0	7.5
Maruteru	108.6	327.4	306.6	390.8	337.0	234.6	107.0	0.0	32.1	0.0	35.6	26.2
Rudrur	78.2	160.0	241.8	206.2	58.6	18.7	0.0	0.0	10.7	0.0	23.6	2.5
Sabour	106.2	240.9	162.0	120.3	21.4	9.4	0.6	0.8	2.8	36.8	84.5	85.5
Raipur	0.0	217.2	187.1	327.0	65.3	6.5	57.2	0.0	0.0	0.0	0.0	38.0
SK Nagar	17.8	588.3	311.7	149.1	0.0	142.1	0.0	0.0	0.0	0.0	0.0	0.8
Junagadh	163.0	589.6	402.1	240.4	0.0	76.5	0.0	0.0	0.0	0.0	0.0	0.0
Navsari	269.4	742.9	562.0	536.3	33.0	37.0	0.0	0.0	0.0	0.0	0.0	5.2
Hisar	NR	300.0	209.9	147.6	0.0	0.0	43.6	0.0	34.8	12.5	35.2	84.9
Palampur	217.0	561.1	1047.9	322.0	32.9	5.2	91.2	65.0	139.4	45.3	90.7	120.4
Ranchi	177.1	140.7	87.6	689.1	139.9	10.2	86.0	23.8	0.0	6.3	NR	NR
Kathalagere	40.6	9.5	68.2	25.6	261.0	195.9	4.9	0.0	125.6	23.6	72.6	57.4
Siruguppa	100.8	107.2	477.6	93.6	23.8	0.0	0.0	0.0	0.0	0.0	NR	NR
Karmana	36.8	28.62	10.5	20.7	76.7	36.8	22.03	NR	NR	NR	NR	NR
Jabalpur	107.3	563.6	349.5	511.2	79.8	1.4	7.6	0.0	5.6	0.0	34.6	8.8
Powarkheda	45.2	371.4	219.1	492.8	5.4	54.4	0.0	0.0	0.0	0.0	0.0	0.0
Rewa	NR	NR	NR	NR	NR	43.0	0.0	0.0	0.0	0.0	0.0	0.0
Rahuri	150.4	121.2	265.2	315.6	58.0	103.2	0.0	0.0	0.0	0.0	NR	NR
Akola	173.2	345.3	279.2	128.1	41.2	39.5	0.0	0.0	3.7	0.0	NR	NR
Karjat	752.5	1994.2	972.5	427.3	85.0	205.1	0.0	0.0	0.0	0.0	0.0	0.0
Ludhiana	37.7	379.6	112.2	118.5	8.8	0.0	17.6	0.0	50.7	0.0	26.5	0.0
Kota	23.2	218.2	265.4	71.6	0.4	85.4	0.0	0.5	0.0	0.0	0.0	NR
Durgapura Jaipur	19.5	475.9	168.6	113.5	0.0	2.4	0.0	0.0	0.0	NR	NR	NR

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FSR Centre	Rainfall received during the month (mm)											
	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Coimbatore	40.6	9.5	68.2	25.6	172.8	312.9	24.8	0.4	125.6	23.6	72.6	57.4
Thanjavur	64.0	10.7	31.2	16.0	65.2	363.4	175.0	57.4	4.21	0.0	53.2	0.0
Kanpur	NR	386.2	271.3	204.7	18.0	41.9	1.2	0.1	8.0	0.0	8.0	17.2
Faizabad	37.3	251.2	194.5	153.2	31.7	2.4	0.0	0.0	8.9	5.0	4.2	27.2
Varanasi	3.6	249.2	213.6	232.2	17.2	5.6	0.0	3.5	5.2	33.8	33.9	11.4
Bichpuri	17.7	218.9	166.4	245.7	0.0	36.0	0.0	0.0	31.3	7.4	18.5	0.0
Pantnagar	72.2	625.6	389.6	574.6	294.8	0.0	0.4	28.1	30.2	7.2	15.0	15.2
Kalyani	135.9	213.2	202.3	171.9	27.7	0.0	19.5	0.0	1.0	62.5	105.1	83.0

B: Maximum and Minimum Temperature (^{0}C) (June 2009 to May 2010)

FSR Centres	Temperature (^{0}C)																							
	Jun		Jul		Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May	
	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.
Rajendranagar	35.2	24.7	29.4	22.4	30.3	22.6	29.4	22.2	30.1	20.6	28.7	19.4	27.8	13.2	29.5	10.4	31.2	15.3	35.6	17.7	36.7	21.9	39.2	25.4
Maruteru	34.1	26.2	29.3	29.1	30.4	24.9	30.0	23.7	29.6	23.8	28.9	22.4	27.2	18.4	28.3	17.8	29.8	19.4	31.3	21.4	31.5	23.7	35.5	26.7
Rudrur	37.3	25.4	30.6	23.7	30.9	22.8	30.8	22.9	31.5	21.3	31.2	20.7	27.5	14.2	29.2	11.2	32.2	16.2	35.0	20.2	38.3	23.2	41.2	26.0
Sabour	35.5	25.9	32.5	25.8	33.2	26.1	32.2	25.5	31.2	22.2	28.5	17.1	23.7	9.0	19.8	6.0	25.8	9.9	31.9	14.7	33.9	20.5	34.2	22.8
Raipur	41.9	29.8	32.7	25.4	31.4	25.3	31.3	24.6	30.4	21.4	31.3	19.2	26.3	13.2	27.7	10.7	33.3	15.5	37.2	19.1	39.0	23.1	39.7	27.4
SK Nagar	40.1	28.1	33.8	26.2	32.4	25.9	33.0	23.7	36.1	20.3	29.4	18.3	26.3	9.6	26.6	8.5	29.5	13.1	36.0	16.2	36.9	20.5	39.5	24.5
Junagadh	37.0	26.8	31.0	25.2	30.5	24.9	31.6	23.7	35.14	22.2	31.5	20.3	28.6	11.6	29.0	11.7	31.1	15.1	37.0	18.9	38.7	24.4	37.7	26.9
Navsari	32.6	26.7	29.4	25.4	29.8	25.5	30.8	24.6	33.6	23.3	31.6	21.9	29.1	13.7	30.5	12.4	32.4	14.7	35.7	17.6	35.5	23.2	34.2	26.9
Hisar	NR	Nr	35.3	26.4	33.8	26.0	32.2	23.3	33.2	18.1	27.7	11.5	21.3	4.6	16.9	4.2	22.7	8.1	28.6	11.4	34.4	16.7	40.1	23.9
Palampur	30.8	19.1	26.9	20.1	26.0	19.8	25.4	17.5	25.6	13.3	22.9	9.4	18.3	4.8	15.2	3.5	16.9	6.6	22.6	10.2	25.2	13.1	31.4	19.2
Ranchi	35.4	24.7	30.5	23.1	30.5	22.7	29.5	20.7	27.9	16.4	27.0	12.5	21.9	7.0	22.0	4.7	27.3	9.9	33.9	17.2	33.7	18.9	36.0	22.4
Kathalagere	31.9	23.9	31.0	23.4	30.5	22.6	31.3	22.9	30.8	22.2	27.8	21.8	28.5	19.2	30.1	18.7	31.7	18.7	33.8	21.0	33.4	23.0	33.6	23.0
Karmana	30.4	22.8	30.6	22.8	30.4	22.7	30.8	22.6	30.6	23.0	30.4	22.2	30.0	22.7	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Jabalpur	40.1	26.1	32.1	24.4	32.9	23.4	31.8	22.5	31.4	18.7	30.2	16.6	25.05	8.5	24.4	5.98	28.6	11.3	34.3	14.6	NR	NR	NR	NR
Powarkheda	41.3	25.5	33.6	24.4	31.5	24.0	31.5	22.8	32.6	19.2	31.3	16.8	27.5	15.6	24.4	6.6	29.3	11.5	35.5	12.3	40.6	20.6	42.5	19.0
Rewa	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	30.2	17.9	26.1	9.2	23.8	4.7	30.4	9.8	34.4	13.8	30.3	12.8	NR	NR
Rahuri	34.1	23.5	30.7	22.8	30.6	21.9	30.8	21.7	31.0	19.6	30.0	19.4	28.0	10.5	31.3	5.9	33.7	10.4	36.9	12.6	NR	NR	NR	NR
Akola	37.5	25.1	31.2	23.7	30.1	22.8	31.8	22.3	33.0	18.3	31.3	13.5	28.1	10.7	28.9	11.4	32.5	13.5	36.5	17.1	NR	NR	NR	NR
Karjat	32.8	25.5	29.2	24.5	29.1	24.3	31.0	24.2	33.1	22.8	33.2	22.2	31.4	15.0	33.7	12.4	34.9	15.2	39.4	17.8	38.5	23.2	37.3	25.9
Ludhiana	38.0	26.0	32.9	27.0	34.1	25.8	31.5	23.2	31.4	18.0	26.6	10.8	20.4	5.5	17.1	4.8	20.8	10.9	29.1	13.6	34.7	18.5	NR	NR
Kota	NR	NR	34.9	27.0	33.2	26.3	33.2	24.7	35.2	20.6	28.0	15.9	23.8	7.9	22.2	5.9	26.0	10.7	31.0	14.9	0.0	0.0	NR	NR
Durgapura (Jaipur)	41.7	25.0	34.8	25.3	31.9	24.6	31.8	22.5	33.6	20.7	25.8	15.7	23.6	9.2	21.7	7.3	25.2	12.6	32.4	17.4	NR	NR	NR	NR
Coimbatore	31.9	23.9	31.0	23.4	30.5	22.6	31.6	22.9	30.3	22.2	27.6	21.8	28.7	19.2	30.1	18.7	31.7	18.7	33.8	21.0	33.4	23.0	33.6	23.0

Contd...

FSR Centres	Temperature (°C)																							
	Jun		Jul		Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May	
	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.
Thanjavur	36.3	26.5	34.1	24.7	32.3	24.0	33.0	23.6	32.2	23.2	28.7	22.7	29.6	23.3	29.8	21.5	31.0	21.7	33.5	21.9	36.0	26.5	38.1	27.2
Kanpur	NR	NR	34.3	27.2	33.0	26.8	34.4	25.4	32.3	20.7	27.5	16.3	24.0	8.9	19.4	6.7	25.1	11.3	31.9	16.1	36.9	20.2	40.0	26.3
Faizabad	38.6	26.9	98.5	26.4	32.5	26.3	32.1	24.8	31.8	19.8	28.0	14.3	25.4	7.1	23.3	4.9	25.9	9.4	32.5	13.5	37.7	19.5	38.5	24.5
Varanasi	38.2	29.2	34.6	27.5	32.9	26.7	32.2	25.4	31.2	21.4	28.5	17.5	24.1	10.4	20.0	8.1	26.5	12.5	32.8	16.9	37.7	22.2	39.5	26.9
Bichpuri	40.7	28.1	34.9	26.5	33.7	26.8	32.4	24.8	33.5	20.7	26.4	13.7	21.1	5.9	22.1	5.9	26.1	11.6	34.4	15.0	38.0	21.1	41.5	25.8
Pantnagar	37.4	25.4	32.2	25.9	31.4	25.6	30.4	23.6	31.5	18.2	26.7	13.3	17.7	8.5	17.7	5.8	23.4	9.6	30.3	12.8	35.5	18.2	36.0	22.6
Kalyani	38.7	27.6	32.9	26.5	33.3	26.8	32.7	25.9	32.0	23.9	31.0	19.2	25.2	12.3	24.9	9.9	30.2	14.4	33.8	21.4	34.2	23.6	34.6	25.5

APPENDIX III: CENTRE-WISE STAFF POSITION

1. ANGRAU, HYDERABAD (A.P.)

Main Centre, Rajendranagar

Chief Agronomist	Vacant
Jr. Agronomist	Dr M.Venkata Ramana
Jr. Soil Scientist	Dr S.Sridevi
Technical Asstt.	Filled with 2 SRFs
Field assistant	Mr. K.Sugunanandam
Field assistant	Mr.K.Venugopalan
Jr. Steno/UDC	Mrs S.M.Hasina
Messenger	Mr. G.Saibaba

Sub Centre, Maruteru

Agronomist	Dr C.Venkata Reddy
Technical Asstt.	Vacant
Field assistant	Mr. K.Viswanadham
Field assistant	Mr.V. Kondala Rao
LDC/Typist	Vacant

Sub Centre, Rudrur

Agronomist	Dr. G.E.Ch. Vidya Sagar
Technical Asstt.	Vacant
Field assistant	Vacant
Field assistant	Mr.M Narsinga rao
LDC/Typist	Mr.K.Sankar

On-Farm Centre, Nellore

Agronomist	Dr. M.Narayanamma
Field assistant	Mr. D.Vajravelu
Field assistant	Mr. P.Mohan Rao
Field assistant	Mr. S. Lakshminarayana
Field assistant	Mr.K.Praveen Kumar
Field assistant	Mr.V.Subbaramaih
Field assistant	Vacant
Jr.Stenographer	Mr.Shaik Safia
Driver	Vacant
Watchman	Mr. J. Venkata Ramanaiah

On-Farm Centre, Warrangal

Agronomist	Dr M.Malla Reddy
Asst.Jr.Economist	Mr. V.Rajendra Prasad
Field assistant	Mr. K.Simhachalam
Field assistant	Mr.Ratna Sree
Field assistant	Mr. M.A.Hafeez
Field assistant	Mr. K.V.Subramanyan
Field assistant	Mrs A.Prameela
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	Vacant
Asst.Jr.Economist	Dr.J.P.Hazarika
Technical Asstt.	Mr.I.Gogoi
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	Vacant
Driver	Mr.B.Boruah
Watchman	Mr.D.P.Gohani

3. BAU, Sabour (BIHAR)

Main Centre, Sabour

Chief Agronomist	Dr. R P Sharma
Jr. Soil Scientist	Dr. N Chattopadhyaya
Jr. Agronomist	Dr. S K Pathak
Technical Asstt.	Mr.K.R.Raman
Field assistant	Mr. C B Prasad
Field assistant	Mr.S R Singh
Jr. Steno/UDC	Mr.Ram Kumar Sharma

Watchman	Mr. Ganesh Ram

On-Farm Centre, Patna

Agronomist	Dr. N.K. Choudhary Dr. S.P. Sinha (From 01.09.2010)
Technical Asstt.	Vacant
Field assistant	Mr. S.K. Sharma
Field assistant	Mr. S.N. Thakur
Field assistant	Mr. Hardeo Mahto
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Jr. Steno/UDC	Vacant
Driver	Vacant
Watchman	Vacant

4. AAU, ANAND (GUJARAT)

On-Farm Centre, Thasra

Agronomist	Dr. R.P. Kacha
Field assistant	Mr. V.h.Rathava
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
Jr.Stenographer	Vacant
Driver	Vacant
Watchman	Vacant

5. JAU, JUNAGADH (GUJARAT)

Sub Centre, Junagadh

Chief Agronomist	Dr. A.K. Sagaraka
Technical Asstt.	Mr. A.K. Padaliya
Field assistant	Mr. C.T. Dalwadi
Field assistant	Mr. K.G. Rabadia
Jr. Steno/UDC	Mr. J. B. Sodha

6. NAU, NAVSARI (GUJARAT)

Sub Centre, Navsari

Agronomist	Dr. R.A. Dungrani
Technical Asstt.	Vacant
Field assistant	Shri M.B. Patel
Field assistant	Shri M.B. Solanki
Jr. Steno/UDC	Vacant

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

Main Centre, S.K. Nagar

Chief Agronomist	Dr. B.S. Patel
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. H.D. Patel
Jr. Steno/UDC	Mr. R.A.Sindhi
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. S.S. Chaudhary
Field Assistant	Mr. A.G. Patel
Field Assistant	Mr B.B.Jat
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	Mr. V.A. Goswami
Watchman	Mr. G.K. Chaudhary

On-Farm Centre, Thasra

Agronomist	Dr.R.P.Kacha
Field assistant	Mr. V.h.Rathava
Field assistant	Mr. R. S. Rana
Field assistant	Mr. S.S. Rathava
Field assistant	Mr. K.B. Raval
Field assistant	Mr. D.J.Gohil
Field assistant	Mr.M.M.Mori
Jr.Stenographer	Vacant
Driver	Vacant
Watchman	Vacant

8. CCS HAU, HISAR (HARYANA)

Main Centre, Hisar

Chief Agronomist	Dr. S K Yadav
Jr. Soil Scientist	Dr. Manoj Kumar Sharma
Jr. Agronomist	Dr. Pawan Kumar
Technical Asstt.	Mr.S.K.Sharma
Technical Asstt.	Vacant

Field assistant	Mr.Tara Chand
Field assistant	Mr.Ved Prakash
Jr. Steno/UDC	Mrs.Veena Grover
Messenger	Vacant

On-Farm Centre, Kurukshetra

Agronomist	Dr.Anil Mehta
Jr. Agronomist	Dr.Mahesh Kumar
Field assistant	Mr.Sube Singh
Field assistant	Mr.Santosh Kumar
Field assistant	Mr.Pritam Singh
Field assistant	Mr. Churia Ram
Field assistant	Mr.Satnarain
Field assistant	Vacant
Jr.Stenographer	Vacant
Driver	Mr. Dharam Pal
Watchman	Vacant

9. CSK HPKVV, PALAMPUR (HP)

Main Centre, Palampur

Chief Agronomist	Dr.S.C Negi
Jr. Soil Scientist	Dr.S.K.Subehia
Jr. Agronomist	Dr.S.S Rana
Technical Asstt.	Mrs.Anuradha
Field assistant	Mr.R.K.Sharma
Field assistant	Mr.Pratap Chand
Field assistant	Mr.Sadhu Ram
Jr. Steno/UDC	Mr.Mehar Chand
Jr. Steno/UDC	Mr.Ramesh Kumar
Watchman	Babu Ram
Messenger	Mr.Dilip Singh

On-Farm Centre, Kangra

Agronomist	Dr.S.K.Sharma
Field assistant	Mr.Rakesh Kumar
Field assistant	Mr.Balak Ram
Field assistant	Mr.Rajesh Kumar
Field assistant	Mr.Bihari Lal
Field assistant	Mr.Anirudh
Field assistant	Mr.Pradeep Kumar
Driver	Kartar Chand

10. SKUAST, Jammu (J &K)

Main Centre, Chata, Jammu

Chief Agronomist	Dr. Dileep Kachroo
Jr. Soil Scientist	Dr. N.P. Thakur
Jr. Agronomist	Dr. Vijay khajuria
Technical Asstt.	Miss.Manpreet kour
Technical Asstt.	Mr.Parshotam kumar
Field assistant	Mr. Bishan Lal
Field assistant	Mr. Romesh Lal
Jr. Steno/UDC	Mrs. Rajni Bharti
Messenger	Mr. Mohammad yaqoob

On-farm Centre, Dhiansar, Jammu

Agronomist	Dr. A.K. Gupta
Field assistant	S.Khazan Singh
Field assistant	Mr. Babu Ram
Field assistant	Ab. W. Katoch
Field assistant	Mr.Baba Ditta
Field assistant	Mr.Ghulam Mohd.
Field assistant	Mr.Jai Krishan
Jr. Steno/UDC	Vacant
Driver	Mohd.Saleem
Watchman	Tarsem Singh

11. BAU, RANCHI (JHARKHAND)

Chief Agronomist	Dr.M.S.Yadava/ Dr.R.Thakur
Jr. Soil Scientist	Dr.J.Prasad
Jr. Agronomist	Mr.R.P.Manjhi
Technical Asstt.	Mr.Rakesh Mitra
Field assistant	Mr.M.Munda
Field assistant	Mr.Raju Gari
Jr. Steno/UDC	Vacant
Messenger	Mrs.Deomani Devi

On-Farm Centre,Jamtara

Agronomist	Mr.W.Aind
Technical Asstt.	Mr. Rakesh Kumar Sinha
Field assistant	Mr.S.K.Soy
Field assistant	Mr.S.N.Baitha
Field assistant	Mr.K.Dom
Field assistant	Mr.Saikullah
Field assistant	Mr.Karjru Oraon
Field assistant	Mr.B.L. Singh
Jr.Stenographer	Mr.Dinesh Toppo
Driver	Mr.Krishun Kujar
Watchman	Mr.Sarif Ansari

12. UAS, Bangalore (KARNATAKA)

Main Centre, Kathalelgere

Chief Agronomist	Mr.H.Chandrappa
Jr. Soil Scientist	Mr.P.Chandravanshi
Jr. Agronomist	Mr.A.Y. Hugar
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
Jr. Soil Scientist	Mr.M.N.Venkatamana
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

13. UAS, Dharwad (KARNATAKA)

On-Farm Centre, Gadag

Agronomist	Dr.M.H.Hosmani
Jr. Soil Scientist	Mr.C.B.Koujalagi
Field assistant	Mr.B.Y.Bhajantri
Field assistant	Mr.Channabasappa
Field assistant	Mr.M.S.Tal;akeri
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

14. UAS, Raichur (KARNATAKA)

Main Centre, Siruguppa

Chief Agronomist	Mr.Basavarajappa M.A
Jr. Soil Scientist	Dr.Ashok Kumar Gaddi
Jr. Economist	Dr.Prabhuling Tewari
Technical Asstt.	Mr.Erappa Yankannvar
Technical Asstt.	Mr.Bhimanna Hugar
Field assistant	Mr.Somanagouda
Field assistant	Mr.S.V.Angadi
Jr. Steno/UDC	Mr.Mallesh Yankappa
Watchman/Messenger	Mr.Onkareppa

15. KAU, THRISSUR (KERALA)

Main Centre, Karmana (Trivandrum)

Chief Agronomist	Dr.Kuruvilla Varughese
Jr. Soil Scientist	Dr.B.Rani
Jr. Agronomist	Dr.B.Jacob john
Technical Asstt.	Mrs.Suja abraham
Field assistant	Mr.Tony 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.Agronomist	Dr.D.Jocob
Field assistant	Mrs.S.Naseema
Field assistant	Mr.T.J.Mathew
Field assistant	Mr.P.C.Girijavallaban
Field assistant	Mr.P.S.Sonal Kumar
Field assistant	Mr.Mathew Thomas.C
Jr. Steno/UDC	Mr.Aneesh Kumar.M
Driver	Vacant
Messenger	Mrs. K.G. Pushpa kumari

16. IGKV, RAIPUR (CHHATISGARH)

Main Centre, Raipur

Chief Agronomist	Dr.S K Sarawgi
Jr. Soil Scientist	Dr.Alok Tiwari
Jr. Agronomist	Dr.Shrikant Chitale
Technical Asstt.	Mr. B.K.Chandrakar
Field assistant	Mr. G P Yadav
Field assistant	Vacant
Jr. Steno/UDC	Vacant
Messenger	Mrs. S Mishra

On-Farm Centre, Kawardha

Agronomist	Dr. V K Singh
Jr. Soil Scientist	Vacant

Technical Asstt.	Vacant
Field assistant	Mr. J.L Soni
Field assistant	Mr. D D Singh
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Field assistant	Vacant
Jr. Steno/UDC	Vacant
Driver	Vacant
Watchman	Mr. C B Dwivedi

17. JNKVV, Jabalpur (M.P.)

Main Centre, Jabalpur

Chief Agronomist	Dr. V.B. Upadhyay
	Dr. K.R. Naik
Jr. Soil Scientist	Dr.B.S.Dwivedi
Jr. Agronomist	Dr. (Mrs) Nisha Mehra
Technical Asstt.	Dr.S.K.Vishwakarma
Field assistant	Mr.S.P,Dubey
Field assistant	Mr.A.N.Goutam
Jr. Steno/UDC	Mr.T.P.Verma
Messenger	Mr.N.L.Bhumiya

Sub Centre, Rewa

Agronomist	Dr.B.M.Mouya
Tech.Assistant	Vacant
Field assistant	Vacant
Field assistant	Miss.Richa Singh
Jr. Steno/UDC	Mr.S.S.Dwivedi

On Farm Centre, Powerkheda

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

On Farm Centre, Seoni

Agronomist	Dr.Rajesh Meshram
Jr. Soil Scientist	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	Mrs.Abha Shrivashtava
Driver	Vacant
Watchman	Vacant

On Farm Centre, Katni

Agronomist	Dr.R.P.Sahu
Technical Asstt.	Dr.R.K.Sharma
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	Mr.M.K.Shrivastva
Driver	Vacant
Watchman	Vacant

18. RVS KKV, GWALIOR

Sub Centre, Indore

Agronomist	Dr.A.K.Sharma
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. DPDKV, AKOLA (MAHARASHTRA)

Main Centre,Akola

Chief Agronomist	Mr.B.V.Saoji
Jr. Agronomist	Mr.B.S.Morwal
Jr.Soil Scientist	Mr.R.J.Nikesar
Tech. Assistant	Vacant
Field Assistant	Mr.S.D.Panzade
Field Assistant	Mr.T.L.Pawar
Jr.Stenographer	Mr.S,T.Girhe
Messenger	Vacant

On-farm Centre, Hiwara

Agronomist	Dr.G.V.Thakre
Technical Assistant	Mr.F.F.Khan
Field Assistant	Mr.K.B.Kukade
Field Assistant	Mr.K.G.Lanjewar
Field Assistant	Mr.S.D.Kadam
Field Assistant	Vacant
Field Assistant	Vacant
Field Assistant	Vacant

Jr.Stenographer	Vacant
Watchman	Mr.Y.S.Ghonmode

20. DBS KKV, DAPOLI (MAHARASHTRA)

Main Centre, Karjat

Chief Agronomist	Dr.L.G.Pawar
Jr. Soil Scientist	Mr.D.G.Jondhale
Jr. Agronomist	Dr.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, Roha

Agronomist	Mr. M.S.I. Shaikh/ Dr. S.B. Bhagat
Field Assistant	Mr.S.V.Kamble
Field Assistant	Mr.B.L.Shanwar
Field Assistant	Mr.D.R.Kasalkar
Field Assistant	Mr.S.D.Phale
Field Assistant	Mr.V.S.Daphal
Field Assistant	Mr.R.P.Gorivale
Jr.Stenographer	Vacant
Driver	Mr.S.J.Jadhav
Messenger	Mr.V.D.Zagade

21. MAU, PARBHANI (MAHARASHTRA)

Main Centre, Parbhani

Chief Agronomist	Dr.W.N.Narkhede
Jr.Soil Scientist	Dr.M.S.Deshmukh
Jr.Soil Scientist	Dr.G.R.Hanwate
Jr.Soil Scientist	Dr.S.T.Shuirale
Jr.Economist	Mr.J.K.Katkade
Jr.Stenographer	Vacant
Tech. Assistant	Vacant
Field Assistant	Mr.G.Y.Sonwane
Field Assistant	Vacant
Messenger	Vacant

On Farm Centre, Aurangabad

Agronomist	Mr. R. S. Raut
Tech. Assistant	Dr. D. P. Deshpande
Field Assistant	Shri M. K. Shinde
Field Assistant	Shri. S. K. Choudhari
Field Assistant	Shri. B. N. Ambad
Field Assistant	Shri. R. P. Kerai
Field Assistant	Shri. B. S. Kakade
Field Assistant	Vacant
Jr.Stenographer	Shri. S. S. Mundhe

22. MPKV, RAHURI (MAHARASHTRA)

Main Centre, Rahuri

Chief Agronomist	Dr. B.S. Raskar/ Dr. S.V. Solanke/ Dr. A.G. Wani
Jr. Agronomist	Mr.A.D.Tambe
Jr.Soil Scientist	Dr.V.S.Patil
Tech. Assistant	Mr,N.S.Ugale
Field Assistant	Mr.M.L.Kuldharan
Field Assistant	Mr.J.A.Rajnur
Jr.Stenographer	Mr.R.R.Gore
Messenger	Vacant

On Farm Centre, Chas (Ahmednagar)

Agronomist	Dr. M.M.Desai
Jr.Scientist	Prof.Y.C.Sale
Tech. Assistant	Mr. S.M.Todmal
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	Mr. V.P.Ghegde

23. OUAT, BHUBANESWAR (ODISHA)

Main Centre, Bhubaneswar

Chief Agronomist	Dr.L.M.Garnayak
Jr. Agronomist	Mr.A.K.Mohanty
Jr. Soil Scientist	Dr.K.C.Pradhan
Tech. Assistant	Mrs.M.Mohanty
Tech. Assistant	Mr.D.K.Raut
Field Assistant	Mr.Trinath Routray
Field Assistant	Mr.B.Biswal
Jr.Stenographer	Mrs. N.Kanungo
Messenger	Mr.G.Mahabhoi

Sub Centre, Chiplima

Agronomist	Mr.J.Haldar
Tech. Assistant	Mr.B.Danta
Field Assistant	Mr.N.K.Sahoo
Field Assistant	Mr.J.K.Behera
Jr.Stenographer	Mr.N.K.Parida

On Farm Centre, Dhenkanal

Agronomist	Dr.B.K.Mohapatra
Jr.Economist	Dr S.N.Mishra
Field Assistant	Mr.S.Baral
Field Assistant	Mr.M.K.Acharya
Driver	Mr.B.Behra
Watchman	Mr.K.C.Bhujabal

On Farm Centre, Kendrapara

Agronomist	Dr.B.R.Rath
Field Assistant	Mr.T.Sahoo
Field Assistant	Mr.S.Bisal
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	Mr.Roopinder Singh
Tech. Assistant	Mr.Surender Singh
Field Assistant	Mr.Khandu Ram
Field Assistant	Mr.Baljit Singh
Field Assistant	Mr.Prem Prakash
Jr.Stenographer	Mr.Rakesh Yadav
Watchman	Mr.Jagmohan Singh

On Farm Centre, Amritsar

Agronomist	Dr. Sat Pal Singh
Field Assistant(6)	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	Mr.Ashwani Kumar
Jr.Stenographer	Mrs.Nirmala Rani
Driver	Mr.Gurudev Singh
Watchman	Mr.Danial

25. SKRAU, BIKANER (RAJASTHAN)

Main Centre, Durgapura

Chief Agronomist	Dr. O.P. Gill
Jr. Soil Scientist	Dr. D.K. Pareek
Jr. Agronomist	Vacant
Tech. Assistant	Mr. Mangal Ram Sharma
Field Assistant	Mr. Nonand Singh
Field Assistant	Mr. M.L. Kumawat
Jr. Steno/UDC	Mr. Ashok Sharma
Messenger	Mr. Kana Ram

Main Centre, Durgapura

Agronomist	Vacant
Tech. Assistant	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

26. MPUAT, UDAIPUR (RAJASTAHN)

Sub Centre, Kota

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

On Farm Centre, Udaipur

Agronomist	Dr. L.N. Dashora
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 Chandra Damani

Messenger	Mr.Shankar Lal Nagda

27. TNAU, COIMBATORE (TN)

Main Centre, Coimbatore

Chief Agronomist	Dr.K.Siddeswaran
Jr.Soil Scientist	Dr.S.Thiyageshwari
Jr. Agronomist	Dr.P.M.Shanmugam
Jr.Economist	Vacant
Tech. Assistant	Dr. S.P. Sangeetha (RA) Agronomy
Tech.Assistant	M. Keerthana Priya (JRF)
Field Assistant	Mr.A.Gowthaman
Field Assistant	Vacant
Jr.Stenographer	Mrs.R.Vennila
Messenger	M.Vijayalakshmi

Sub Centre, Thanjavur

Agronomist	Dr.S.Vallal Kannan
Tech. Assistant	P.Amutha
Field Assistant	Mr.S.Palanisamy
Field Assistant	M.Periasamy
Jr.Stenographer	S.Rajendran

Sub Centre, Chettinad

Agronomist	Mr. P. Kathirvelan
Tech. Assistant	Vacant
Field Assistant	A.Rajeshwari
Field Assistant	V.Krishnan
Field Assistant	S.Selvi
Field Assistant	M.Baskarandian
Field Assistant	Mr.M.K.Rajendran
Field Assistant	Mr.C.Shanmugam
Jr.Stenographer	Mr.Paramasivam
Driver	Mr.M.Radha
Messenger	Mr.M.Annadurai

Sub Centre, Paiyur

Agronomist	Dr.S.Vijayabaskaran
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.N.Chandrasekaran
Jr.Stenographer	Mr.R.Chitra
Driver	Mr.V.Sekar
Messenger	Mr.C.Murugesan

28. RBS COLLEGE, BICHPURI (AGRA)

Agronomist	Dr.Ranjeet Singh
Tech. Assistant	Dr.Rahul Pundir
Field Assistant	Mr.Ramdhari
Field Assistant	Mr. Susheel Kumar Singh
Jr.Stenographer	Dr.Bhumi Raj Singh

29. NDUAT, FAIZABAD (UP)

Main Centre, Faizabad

Chief Agronomist	Dr.H.P.Tripathi
Jr. Soil Scientist	Dr.Alok Kumar
Jr. Agronomist	Dr.R.A.Yadav
Technical Asstt.	Dr.R.P.Dwivedi
Technical Asstt.	Mr.A.K.Singh
Field assistant	Mr.Iswar Nath
Field assistant	Mr.R.A.Pandey
Jr. Steno/UDC	Mr.S.A.R.Zaidi
Messenger	Mr.Daya Ram

On Farm Centre, Sant Kabir Nagar

Agronomist	Dr.S.P.Singh
Field Assistant	Mr.Tilak Ram
Field Assistant	Mr.A.N.Pandey
Field Assistant	Mr.P.C.Tripathi
Field Assistant	Mr.V.B.Singh
Field Assistant	Vacant
Field Assistant	Vacant
Jr.Stenographer	Mr.Ram Lal
Driver	Mr.Jai Prakash Yadav
Watchman	Vacant

30. CSAUAT, KANPUR

Main Centre, Kanpur

Chief Agronomist	Dr.M.P.Yadav
Jr. Soil Scientist	Dr.U.S.Tiwari
Jr.Economist	Mr.Birendra Kumar
Technical Asstt.	Mr.U.S.Yadav
Technical Asstt.	Mr.R.P.Dubey
Field assistant	Dr.A.K.Mishra
Field assistant	Vacant

Jr. Steno/UDC	Mr.S.T.Siddiqui
Messenger	Mr.Vijay Bhadur

On Farm Centre, Saini (Kaushambi)

Agronomist	Dr.Mohd Aslam
Field Assistant	Mr.Jagdish Chandra
Field Assistant	Mr.Ram Babu
Field Assistant	Mr.Virendra Singh
Field Assistant	Mr.Pratap Singh
Field Assistant	Mr.Sudhir
Field Assistant	Mr.Dinesh Kumar
Jr.Stenographer	Mr.K.S.Mishra
Driver	Mr.Mahendra Singh
Messenger	Mr.Ashok Kumar

31. BHU, VARANASI (UP)

Sub Centre,Varanasi

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

32. GBPUAT, PANTNAGAR (UTTARAKHAND)

Main Centre, Pantnagar

Chief Agronomist	Dr. A.K. Bharadwaj
Jr. Agronomist	Dr.Dinesh Kumar Singh
Jr.Soil Scientist	Dr.Ajeet Pratap Singh
Tech. Assistant	Mr.Y.S.Khokar
Tech. Assistant	Vacant
Field Assistant	Mr.A.K.Tiwari
Field Assistant	Mr.M.P.Singh
Jr.Stenographer	Mr.D.R.Sharma
Messenger	Mr.Lalloo Singh

On Farm Centre, Srinagar (Garhwal)

Agronomist	Dr.Purushottam Kumar
Tech. Assistant	Vacant
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	Mr.Panjabi Mahto

33. BCKV, Kalyani

Main Centre, Kalyani

Chief Agronomist	Dr. Manabendra Ray (Officiating)
Jr. Soil Scientist	Dr.P.K.Mani
Jr. Economist	Dr.S.Chatterjee
Technical Asstt.	Dr.Dilip Saha
Technical Asstt.	Mr.Basudev Datta
Jr. Steno/UDC	Miss.Sonali Rakshit
Field assistant	Mr.Bipul Chandra Pal
Field assistant	Mr.Amar Chakrabarty
Jr. Steno/UDC	Mrs.Sonali Rakshit
Messenger	Mrs. Kanak Prabha Biswas

On-Farm Centre, Kakdwip

Agronomist	Dr.Manabendra Ray
Field assistant	Mr.A.K.Bhaumik
Field assistant	Mr.K.Maiti
Field assistant	Mr. Md.F.Haque
Field assistant	Mr.S.K.Dutta
Field assistant	Mr.N.C.Ghosh
Field assistant	Mr.N.Das
Driver	Mr.Nilanjan Mukherjee
Jr. Steno/UDC	Mr.Nilanjan Mukherjee
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 Expt. 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	Kharif	OC%	0.52	0.51	0.57	0.56	0.54	0.51	0.56	0.56							
		N	176.0	181.0	197.0	188.0	181.0	172.0	190.0	190.0							
		P	33.7	32.1	32.3	35.9	38.4	37.0	33.9	33.7							
		K	288.0	222.0	237.0	273.0	284.0	275.0	285.0	291.0							
	Rabi	OC%	0.56	0.53	0.59	0.56	0.57	0.56	0.57	0.60							
		N	192.0	175.0	181.0	201.0	195.0	192.0	191.0	201.0							
		P	32.7	36.1	34.3	36.2	33.6	38.9	30.5	36.3							
		K	283.0	235.0	271.0	307.0	327.0	303.0	286.0	229.0							
Maruteru	Kharif	OC%	1.18	1.12	1.10	1.16	1.80	1.80									
		P	33.4	36.9	33.6	31.2	33.5	39.3									
		K	271.0	264.0	290.0	274.0	263.0	248.0									
	Rabi	OC%	0.96	0.94	0.85	0.92	0.96	0.92									
		P	28.4	26.2	27.2	29.4	30.6	30.1									
		K	217.0	177.0	231.0	196.0	219.0	252.0									
Rudrur	Rabi	OC%	0.48	0.56	0.50	0.58	0.56	0.57	0.44	0.53	0.47	0.45					
		P	38.6	33.0	36.4	40.5	38.5	36.1	34.4	37.0	37.1	35.6					
		K	253.0	262.0	246.0	259.0	288.0	275.0	263.0	247.0	259.0	274.0					
Sabour	Summer	OC%	0.55	0.56	0.58	0.54	0.57	0.56	0.56	0.58	0.58	0.56	0.54	0.56			
		N	206.7	1983.0	214.6	196.4	210.4	193.6	191.6	196.3	208.2	209.3	199.1	200.1			
		P	25.5	26.4	27.2	25.6	27.4	25.1	25.7	27.5	28.6	28.1	27.2	28.3			
		K	218.3	212.3	225.1	215.3	218.5	208.6	213.2	216.2	218.5	216.5	217.3	219.2			
Raipur	Summer	OC%	0.52	0.54	0.50	0.55	0.53	0.53	0.55	0.54							
		N	259.0	255.0	251.0	260.0	262.0	255.0	264.0	258.0							
		P	19.8	20.9	19.3	2.3	20.4	18.6	20.9	19.1							
		K	255.0	267.0	256.0	247.0	257.0	255.0	269.0	261.0							
SK Nagar	Summer	OC%	0.36	0.34	0.37	0.37	0.40	0.38	0.42	0.43	0.46	0.42					
		N	196.0	192.0	202.0	200.0	216.0	207.0	22.0	223.0	229.0	217.0					
		P	16.4	15.9	16.4	16.3	16.6	15.9	16.5	17.8	18.1	17.4					
		K	203.0	195.0	183.0	195.0	203.0	195.0	23.0	215.0	226.0	211.0					
Junagadh	Summer	OC%	0.72	0.79	0.76	0.72	0.68	0.71	0.68	0.68	0.8	0.73					
		N	229.0	22.0	248.0	226.0	217.0	226.0	232.0	245.0	248.0	232.0					
		P	16.8	14.6	24.7	13.8	12.6	16.1	16.4	24.2	18.4	15.6					
		K	172.0	179.0	287.0	172.0	214.0	182.0	196.0	266.0	193.0	175.0					

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}
Navsari	Summer	OC%	0.60	0.61	0.65	0.65	0.58	0.63	0.60	0.64	0.63	0.62					
		N	214.0	217.0	220.0	201.0	204.0	201.0	207.0	207.0	214.0	210.0					
		P	22.0	23.7	19.9	22.7	19.9	19.9	20.6	20.8	22.5	23.3					
		K	168.0	175.0	172.0	165.0	175.0	175.0	172.0	175.0	161.0	172.0					
Hisar	Kharif	OC%	0.45	0.45	0.45	0.46	0.47	0.47	0.47								
		N	145.3	147.0	143.5	145.3	162.8	147.0	154.0								
		P	10.5	12.5	10.5	13.5	14.0	11.0	13.5								
		K	275.0	300.0	292.5	288.8	295.0	291.3	303.8								
	Rabi	OC%	0.50	0.50	0.50	0.50	0.50	0.50	0.50								
		N	168.0	166.3	168.3	166.3	173.8	176.8	169.8								
		P	13.5	13.0	13.5	12.5	11.0	12.0	13.5								
		K	298.8	288.8	287.5	287.5	301.3	285.0	292.5								
	Summer	OC%			0.46	0.47		0.45									
		N			152.3	154.0		162.8									
		P			12.5	13.0		13.0									
		K			267.5	272.5		285.0									
Palampur	Kharif	OC%	1.00	1.00	0.95	0.98	1.00	1.00	1.00	0.98							
		N	285.8	292.0	282.5	282.5	298.3	260.0	272.8	285.3							
		P	54.9	82.9	79.5	69.9	88.5	83.4	79.0	75.6							
		K	98.1	110.2	112.8	108.3	107.4	141.4	108.8	106.8							
	Rabi	OC%	0.98	0.96	0.95	0.95	1.01	1.04	0.98	0.96							
		N	307.5	304.5	310.5	34.3	310.5	298.3	298.0	307.5							
		P	49.8	80.1	76.1	92.4	74.5	86.1	84.5	84.5							
		K	112	126.2	112.2	122.1	112.2	133.1	112.7	109.0							
Jammu	Summer	OC%	0.53	0.62	0.55	0.57	0.54	0.56	0.54	0.56	0.56	0.60	0.60				
		N	205.7	235.3	206.0	201.2	233.5	214.2	204.7	218.2	219.5	212.8					
		P	20.4	24.9	20.6	20.1	21.7	21.5	20.8	20.3	21.5	21.2					
		K	109.1	117.8	117.5	121.6	122.2	121.8	124.7	120.7	115	123.6					
Ranchi	Summer	OC%	0.40	0.42	0.43	0.44	0.42	0.42	0.43								
		N	253.0	270.0	273.0	28.0	263.0	260.0	263.0								
		P	33.7	30.3	31.7	23.7	24.7	3.7	26.0								
		K	109.0	111.0	114.0	109.0	106.0	114.0	109.0								
Kathal-agere	Summer	OC%	0.62	0.61	0.61	0.62	0.63	0.73	0.7	0.71	0.67	0.66	0.68	0.66			
		N	304.8	313.3	318.6	319.7	314.8	323.4	315.6	321.1	312.7	391.6	290.5	319.9			
		P	15.4	18.0	19.9	2.1	19.8	21.8	19.4	20.8	20.8	2.9	20.7	19.9			
		K	138.0	169.2	184.2	179.9	180.7	189.4	184.8	185.9	184.9	188.3	185.1	147.6			

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}
Siruguppa	Kharif	OC%	0.72	0.75	0.79	0.69	0.73	0.67	0.72	0.72	0.72	0.73					
		N	201.0	215.0	201.0	224.0	224.0	211.0	247.0	232.0	219.0	219.0					
		P	24.0	22.0	22.0	21.0	19.0	21.0	20.0	24.0	21.0	21.0					
		K	386.0	379.0	392.0	373.0	387.0	37.0	381.0	372.0	381.0	375.0					
		S	34.0	34.0	36.0	35.0	35.0	34.0	34.0	35.0	35.0	35.0					
	Rabi	OC%	0.70	0.69	0.72	0.77	0.69	0.74	0.71	0.77	0.71	0.74					
		N	196.0	177.0	187.0	173.0	168.0	187.0	196.0	191.0	182.0	177.0					
		P	20.0	23.0	19.0	21.0	19.0	18.0	24.0	19.0	18.0	22.0					
		K	387.0	353.0	372.0	367.0	389.0	358.0	365.0	385.0	372.0	367.0					
		S	31.0	31.0	32.0	33.0	34.0	31.0	32.0	35.0	31.0	33.0					
Karmana	Kharif	OC%	0.94	99.00	0.90	1.30	0.95	0.95	0.90	0.76							
		N	236.2	181.9	188.2	183.9	192.3	194.4	198.6	183.9							
		P	19.0	19.3	32.9	17.0	46.5	29.0	17.0	16.3							
		K	77.3	70.6	97.4	78.4	85.1	58.9	72.0	84.4							
	Rabi	OC%	0.94	0.97	0.82	0.71	0.99	0.72	0.72	0.83							
		N	181.8	163	167.2	163.0	156.8	188.1	211.1	169.3							
		P	16.3	13.6	16.6	14.3	22.0	18.4	22.9	19.0							
		K	89.6	82.5	81.7	89.9	81.7	114.6	181.0	214.6							
	Summer	OC%	1.10	1.09	0.88	1.00	1.30	0.99	1.07	1.10							
		N	183.9	188.1	158.9	192.3	186.0	179.8	169.3	173.5							
		P	16.2	18.7	16.3	11.3	48.6	16.4	15.4	14.7							
		K	82.5	86.2	143.7	86.6	233.7	113.1	107.5	152.3							
Jabalpur	Rabi	OC%	0.66	0.69	0.67	0.67	0.71	0.68	0.66	0.68	0.69	0.67	0.66	0.68			
		N	231.0	240.0	256.0	239.0	242.0	253.0	251.0	248.0	245.0	247.0	236.0	259.0			
		P	9.1	9.5	9.4	9.0	8.9	9.5	9.1	9.1	9.7	9.3	9.0	8.9			
		K	295.0	303.0	310.0	28.0	265.0	313.0	270.0	259.0	26.0	285.0	267.0	278.0			
Indore		**NR**															
Powar kheda	Rabi	OC%	0.67	0.69	0.67	0.68	0.68	0.69	0.66	0.67	0.68	0.68					
		N	265.0	26.0	270.0	262.0	266.0	270.0	262.0	270.0	260.0	276.0					
		P	9.8	9.6	9.8	9.6	9.6	9.9	10.1	9.4	9.4	9.5					
		K	300.0	320.0	325.0	325.0	35.0	325.0	310.0	315.0	318.0	310.0					
Rewa	Rabi	OC%	0.55	0.63	0.65	0.63	0.6	0.61	0.66	0.62	0.65	0.63					
		N	240.0	25.0	255.0	230.0	225.0	230.0	235.0	22.0	240.0	242.0					
		P	9.7	9.9	102.0	9.6	9.2	10.2	9.8	9.9	9.5	9.4					
		K	30.0	280.0	33.0	305.0	309.0	315.0	311.0	290.0	285.0	278.0					

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}
Rahuri	Kharif	OC%	0.56	0.57	0.58	0.57	0.56	0.61	0.63	0.62	0.63	0.63	0.61	0.63	0.6	0.62	0.61
		N	163.0	191.0	185.0	184.0	185.0	193.0	178.0	192.0	182.0	183.0	20.0	199.0	194.0	18.0	191.0
		P	12.0	14.0	14.0	12.0	11.0	12.0	15.0	12.0	13.0	14.0	15.0	11.0	12.0	13.0	13.0
		K	669.0	661.0	668.0	663.0	654.0	643.0	637.0	670.0	624.0	657.0	628.0	662.0	635.0	658.0	661.0
	Rabi	OC%	0.58	0.60	0.61	0.60	0.60	0.63	0.62	0.63	0.63	0.62	0.62	0.64	0.63	0.64	0.63
		N	167.0	195.0	189.0	192.0	190.0	199.0	185.0	196.0	203.0	188.0	185.0	193.0	190.0	201.0	196.0
		P	13.0	12.0	13.0	14.0	14.0	14.0	15.0	16.0	16.0	14.0	14.0	13.0	16.0	16.0	16.0
		K	614.0	650.0	652.0	646.0	638.0	628.0	622.0	654.0	61.0	640.0	608.0	645.0	618.0	64.0	639.0
Parbhani	Rabi	N	142.3	180.4	198.0	165.2	188.1	138.5	158.5	158.9	165.2	195.2	179.8	142.0	170.2		
		P	10.8	11.9	14.2	11.6	11.9	12.5	11.6	12.4	12.6	12.8	12.9	10.8.0	12.6		
		K	345.9	378.9	369.8	365.1	385.4	345.2	352.8	335.8	3757.0	395.4	382.5	360.8	364.7		
Akola	Rabi	N	260.0	309.0	298.0	303.0	272.0	229.0	276.0	227.0	289.0	294.0					
		P	13.5	2.7	17.5	17.1	17.0	16.0	16.3	13.2	14.1	18.7					
		K	324.0	388.0	376.0	38.0	385.0	362.0	370.0	36.0	369.0	382.0					
Karjat	Kharif	OC%	1.05	0.96	0.74	1.04	1.08	1.16	1.09	0.96	1.00	0.81	0.9				
		N	272.8	241.4	219.5	191.3	238.3	203.8	260.3	244.6	228.9	235.2	197.6				
		P	40.7	22.3	24.6	26.9	35.8	32.2	39.4	37.2	33.3	36.1	24.0				
		K	242.8	223.7	203.9	201.7	210.6	190.4	235.8	230.5	202.5	209.1	193.6				
	Rabi	OC%	1.32	1.27	1.22	1.12	1.26	1.28	1.32	1.29	1.23	1.24	1.14				
		N	250.8	203.8	181.8	153.6	200.7	174.0	222.7	206.9	191.3	197.6	159.9				
		P	38.2	29.3	31.5	20.1	22.7	20.3	34.5	36.5	26.7	23.8	32.6				
		K	247.6	203.8	148.0	177.8	147.9	178.3	223.3	212.7	163.5	209.2	170.2				
Bhuba-neswar	Rabi	OC%	0.71	0.69	0.74	0.77	0.76	0.79	0.77	0.7	0.77	0.76					
		N	346.0	368.0	326.0	301.0	298.0	315.0	308.0	324.0	327.0	319.0					
		P	13.2	14.2	13.1	13.6	15.1	14.3	13.4	14.6	13.5	13.9					
		K	124.0	141.0	126.0	132.0	145.0	137.0	129.0	142.0	128.0	135.0					
Chiplima	Rabi	OC%	0.71	0.70	0.79	0.78	0.72	0.77	0.75	0.78	0.78	0.74					
		N	368.0	356.0	348.0	336.0	359.0	349.0	345.0	365.0	347.0	344.0					
		P	11.8	12.0	13.9	13.5	12.4	13.2	12.8	12.7	13.3	12.2					
		K	128.0	125.0	148.0	143.0	131.0	141.0	136.0	132.0	139.0	129.0					
Coimb-atore	Summer	N	258.0	278.0	258.0	285.0	290.0	266.0	268.0	258.0	276.0						
		P	24.1	27.8	25.9	28.0	28.4	26.0	26.8	24.7	27.0						
		K	488.0	522.0	496.0	545.0	560.0	500.0	506.0	490.0	512.0						
Thanjavur		NR															

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}
Kanpur	Rabi	OC%	0.45	0.47	0.48	0.51	0.48	0.47	0.50	0.48	0.49	0.51	0.48				
		P	11.5	12.0	12.7	13.2.0	12.5	123.0	12.8	12.6	12.9	13.4	12.4				
		K	205.0	207.0	208.0	210.0	26.0	26.0	28.0	28.0	29.0	211.0	206.0				
Faizabad	Summer	OC%	0.52	0.63	0.6	0.59	0.63	0.62	0.66	0.57							
		N	158.0	169.0	172.0	176.0	168.0	163.0	179.0	166.0							
		P	2.8	23.5	22.6	24.2	22.8	21.5	23.8	22.4							
		K	156.0	163.0	155.0	178.0	168.0	158.0	166.0	160.0							
Pantnagar	Rabi	OC%	0.73	1.06	1.09	0.78	0.76	0.85	0.76	0.75							
		N	170.3	197.3	204.5	169.0	180.0	193.7	183.3	176.2							
		P	26.3	29.4	34.7	25.6	25.8	30.7	26.1	27.8							
		K	18.5	202.2	212.7	180.2	179.7	201.7	172.2	169.5							
Kalyani	Rabi	OC%	0.84	0.81	0.87	0.75	0.72	0.99	0.72	0.84	0.75	0.78					
		N	136.0	148.0	172.0	178.0	166.0	154.0	169.0	160.0	154.0	168.0					
		P	56.5	57.5	68.6	56.5	76.7	71.7	53.0	54.0	35.3	58.0					
		K	167.0	194.0	211.0	176.0	220.0	224.0	220.0	233.0	216	240.0					

Table B: Nutrient uptake (lk/ha) N, P, K Expt. 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	Kharif	N	163.0	168.5	157.6	186.8	174.4	175.9	174.0	164.1							
		P	52.3	55.9	56.0	59.7	19.3	20.0	21.7	18.3							
		K	170.8	165.5	160.2	213.3	62.4	64.1	64.9	61.0							
	Rabi	N	246.5	246.4	222.8	246.1	304.2	226.3	250.2	241.3							
		P	62.9	69.4	66.1	72.2	49.9	35.8	30.0	33.4							
		K	206.2	220.0	195.4	276.3	190.3	135.9	99.4	103.0							
Maruteru	Kharif	N	99.3	104.9	109.7	101.2	108.1	103.4									
		P	25.3	28.1	29.3	29.8	29.5	23.2									
		K	112.5	109.1	108.4	111.4	105.8	102.3									
	Rabi	N	115.9	110.6	116.8	111.5	120.2	105.8									
		P	23.3	22.0	24.8	22.7	24.8	23.5									
		K	1042	112.0	105.2	102.3	110.5	99.6									
Sabour	Kharif	N	85.6	88.1	85.6	83.4	82.2	113.0	112.8	111.6	108.1	105.0	104.2	106.4			
		P	23.4	24.2	22.9	22.3	21.9	30.6	30.4	30.3	29.1	28.4	28.1	28.6			
		K	98.5	102.3	96.7	93.1	92.8	130.4	128.7	127.4	123.6	121.1	120.1	121.9			
	Rabi	N	106.0	233.3	116.1	153.4	171.7	232.0	172.9	143.1	99.5	153.5	137.9	65.4			
		P	27.2	70.9	28.4	54.4	71.4	72.4	46.3	25.2	25.9	42.7	24.2	10.0			
		K	117.2	242.5	121.7	191.4	224.2	250.7	137.5	46.2	108.5	130.0	11.3	25.6			
	Summer	N		98.6	29.7	134.1	50.6	92.5	87.5	73.7	29.0	76.9	117.1	79.3			
		P		16.4	4.6	44.8	16.5	28.2	16.2	19.9	4.6	19.2	28.5	21.5			
		K		65.7	13.1	163.4	54.3	71.2	64.8	62.3	12.9	48.0	72.6	67.1			
S.K.Nagar	Kharif	N	63.0	62.9	155.8	174.9	165.7	84.2	79.3	70.9	138.9	138.3					
		P	13.7	8.8	24.1	24.9	27.6	24.1	10.4	9.7	19.7	23.4					
		K	51.6	409.0	67.4	77.5	91.1	22.7	3.8	28.4	56.6	91.4					
	Rabi	N	85.1	94.4				141.1	51.2								
		P	25.7	30.1				19.0	14.2								
		K	32.9	37.7				56.3	47.2								
	Summer	N		110.6	123.2	72.9	122.0		89.0	139.5	122.7	130.4					
		P		29.6	36.9	15.5	32.2		22.5	42.0	20.2	39.5					
		K		102.8	122.5	44.2	114.0		59.9	122.7	37.3	116.4					
Junagadh	Kharif	N	123.8	13.5	132.9	66.7	84.9	128.1	112.8	55.2	143.1	105.2					
		P	13.0	13.7	15.2	20.3	13.9	18.9	16.4	17.3	20.4	19.3					
		K	42.8	46.0	49.4	57.0	58.8	58.4	49.9	44.2	57.3	54.2					

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}
	Rabi	N	108.0	97.3	50.6	268.0	221.5	127.2	98.7	44.4							
		P	19.1	25.0	7.3	3.5	34.8	22.3	7.8	5.8							
		K	89.2	80.9	46.6	17.7	125.7	93.8	28.5	35.3							
	Summer	N		89.9	64.2	68.5		62.1	93.8	135.7	90.5	154.2					
		P		26.0	19.2	15.7		13.8	13.6	12.6	10.8	39.7					
		K		128.7	51.9	47.4		43.1	109.8	163.3	35.7	112.8					
Navsari	Kharif	N	62.7	70.8	71.9	68.7	76.2	62.2	63.7	62.7	72.7	64.8					
		P	15.1	14.5	13.2	15.4	18.7	13.4	12.6	12.5	17.7	14.7					
		K	63.7	71.5	69.5	69.7	75.7	85.8	91.2	89.2	98.4	88.0					
	Rabi	N	54.9	44.4	58.1	67.3	59.6	37.8	98.6	63.3	64.3	75.9					
		P	7.0	4.5	8.0	8.6	13.3	8.6	20.2	12.9	9.1	4.4					
		K	41.2	18.5	42.6	44.3	65.8	44.1	58.2	61.0	51.0	18.8					
	Summer	N		50.3	128.1	80.5	126.1	58.6	37.5	52.1	54.5	71.3					
		P		7.3	13.5	11.5	12.6	11.7	4.5	4.5	10.0	13.4					
		K		33.3	39.5	42.3	69.6	68.6	23.4	19.6	47.7	41.9					
Ranchi	Kharif	N	71.8	76.6	75.6	82.5	76.5	81.6	85.6								
		P	14.7	16.0	16.0	17.6	15.9	17.3	17.5								
		K	85.0	86.8	83.6	92.8	82.9	97.6	97.4								
	Rabi	N	75.1	52.2	41.7	48.0	83.8	81.3	75.8								
		P	13.2	3.7	4.0	21.7	10.8	12.1	31.4								
		K	58.4	25.6	2.9	57.1	61.5	60.1	99.7								
	Summer	N		21.4	23.7	28.9	21.4	21.9	30.2								
		P		21.0	2.5	2.8	2	2.4	2.9								
		K		1.7	1.9	2.1	1.7	1.7	2.1								
Kathalagere	Kharif	N	186.8	200.6	28.7	197.5	172.5	201.5	182	192.2	211.8	174.4	206.5	188.7			
		P	27.8	26.6	35.9	29.1	37.8	66.7	31.0	33.3	28.7	17.7	32.8	13.3			
		K	161.7	182.7	170.1	184.7	176.6	158.7	167	182	176.4	171.1	184.1	51.7			
Siruguppa	Kharif	N	81.0	103.0	93.0	100.0	101.0	95.0	59.0	64.0	64.0	59.0					
		P	22.0	23.0	23.0	22.0	22.0	25.0	15.0	16.0	16.0	15.0					
		K	87.0	103.0	102.0	103.0	99.0	104.0	71.0	71.0	67.0	61.0					
Karmana	Kharif	N	78.15	82.1	83.6	68.7	109.2	97.5	86.4	77.1							
		P	61.61	70.9	85.4	69.9	94.3	77.2	94.8	73.4							
		K	102.7	106.7	123.1	100.2	138.5	123.8	130.0	108.4							
	Rabi	N	36.8	53.4	51.0	43.1	62.9	58.3	10.5	23.6							
		P	10.3	14.8	15.4	13.7	18.6	14.9	3.9	42.4							
		K	38.5	47.0	50.1	49.5	62.8	60.7	10.3	27.2							

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}
	Summer	N	NR	156.6	9.2	17.5	29.9	47.5	304.8	390.4							
		P	NR	26.5	2.3	3.9	3.4	11.5	28.3	42.3							
		K	NR	153.5	13.5	18.8	35.5	73.3	127.6	148.5							
Jabalpur	KH+Rb	N	335.0	267.0	369.0	218.0	215.0	213.0	219.0	352.0	330.0	358.0	304.0	311			
		P	46.9	28.7	51.3	23.2	22.9	24.5	23.5	53.0	55.2	54.5	52.7	53.1			
		K	396.0	388.0	440.0	230.0	233.0	320.0	313.0	412.0	434.0	444.0	322.0	329.0			
Powar kheda	KH+Rb	N	338.0	281.0	372.0	264.0	232.0	279.0	285.0	260.0	334.0	382.0					
		P	45.6	31.8	52.5	22.8	22.6	24.7	25.8	58.6	60.1	59.2					
		K	401.0	392.0	434.0	237.0	243.0	338.0	317.0	414.0	440.0	448.0					
Rewa	KH+Rb	N	336.0	268.0	338.0	326.0	331.0	284.0	265.0	276.0	271.0	276.0					
		P	51.2	28.7	50.6	41.3	42.1	31.9	29.6	40.3	38.7	41.8					
		K	346.0	284.0	254.0	296.0	293.0	249.0	239.0	294.0	306.0	311.0					
Palampur Crop sequence		N	197.6	183.9	168.7	204.3	155.4	166.3	136.4	136.9							
		P	41.3	46.9	43.4	40.5	43.4	28.7	27.7	36.6							
		K	140.6	124.8	137.5	164.0	145.1	131.1	114.4	119.9							
Rahuri	Kharif	N	61.1	57.8	62.3	62.1	60.4	145.3	155.9	151.6	155.0	154.4	43.9	46.8	44.2	43.7	44.3
		P	10.1	10.9	10.3	10.2	10.5	21.9	23.8	21.9	23.7	24.5	7.9	7.9	7.4	7.5	7.9
		K	116.0	113.4	12.7	115.4	114.3	56.9	64.1	62.2	65.1	63.5	83.6	89.2	88.5	85.6	84.6
	Rabi	N	64.4	46.6	159.2	136.5	107.9	73.3	53.6	177.9	149.0	120.5	71.2	48.5	170.2	155.0	106.4
		P	14.4	17.1	35.6	20.6	28.7	14.9	20.9	37.2	22.8	31.8	14.9	19.3	35.1	23.6	26.6
		K	55.2	55.8	31.9	82.4	114.8	57.9	54.2	35.5	89.1	120.5	59.0	60.6	31.7	95.4	109.7
Varanasi	Kharif	N	85.5	94.0	94.5	89.1	90.1	95.3	89.8	90.2	96.7	94.0					
		P	18.1	18.7	21.8	21.2	20.7	21.1	17.8	19.5	19.6	21.0					
		K	104.1	104.3	111.7	114.9	106.6	118.8	111.3	103.4	105.1	114.1					
	Rabi	N	96.2	104.9	112.7	119.7	127.0	106.4	89.1	50.8	126.9	81.9					
		P	13.4	13.8	14.4	16.9	16.9	11.7	9.7	8.2	16.2	12.3					
		K	89.6	89.9	95.4	82.1	91.7	66.1	50.9	41.7	134.6	56.9					
	Summer	N	0.0	39.1	0.0	72.2	21.6	46.4	41.5	48.4	67.6	51.1					
		P	0.0	4.1	0.0	7.1	2.3	5.2	3.7	3.5	8.0	5.5					
		K	0.0	10.1	0.0	29.7	14.2	12.4	33.7	38.3	47.0	14.2					
Karjat	Kharif	N	73.5	64.3	56.1	68.4	55.3	54.9	69.2	69.2	63.6	54.7	60.35				
		P	29.9	21.6	19.2	23.3	19.2	18.9	23.3	23.1	21.7	18.9	20.24				
		K	83.7	69.8	61.3	73.2	60.0	60.5	74.6	74.9	69.6	60.1	65.07				
Ludhiana	Kharif	N	178.5	135.0	135.0	104.2	129.0	141.7	143.8	202.5	58.8	69.5	124.6	37.9			
		P	37.8	26.0	25.8	30.2	41.4	40.2	31.9	33.8	15.0	18.8	32.3	3.7			
		K	125.0	102.6	103.6	111.9	171.7	179.7	180.9	105.9	39.0	45.6	123.9	26.8			

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}
	Rabi	N	120.0	150.4	63.4	94.7	108.5	107.9	112.7	122.3	159.2	95.3	37.6	140.2			
		P	34.5	47.9	3.7	7.2	27.8	29.8	24.1	31	36.8	28.3	8.8	38.5			
		K	74.8	168.0	80.1	107.2	64.8	89.9	86.3	83.3	175.1	57.6	37.4	80.3			
	Summer	N	148.3	165.9	99.7	0.0	0.0	46.8	0.0	0.0	0.0	14.1	78.3				
		P	17.3	28.9	32.2			15.3				9.2					
		K	60.6	124.1	123.4			61.1				31.1					
Coimbatore	Summer	N	265.0	357.0	264.0	295.0	315.0	370.0	275.0	371.0	319.0						
		P	112.0	101.0	95.0	106.0	119.0	122.0	113.0	114.0	101.0						
		K	286.0	348.0	240	274.0	311.0	347.0	261.0	362.0	283.0						
Thanjavur	Kharif	N	88.2	93.6	85.7	91.2	128.7	55.3	90.4	44.9							
		P	34.6	35.3	33.2	53.1	29.1	9.07	15.4	3.5							
		K	114.7	118.2	37.3	67.2	115.6	25.9	67.4	17.5							
	Rabi	N	71.3	78.3	76.8	80.1	77.2	78.9	82.0	78.4							
		P	33.4	33.9	31.5	35.2	33.1	33.4	33.2	33.1							
		K	109.9	108.1	106.6	108.5	104.7	102.7	105.9	104.9							
	Summer	N	46.1	61.0	200.7	140.6	50.8	55.5	87.9	80.2							
		P	17.5	4.9	69.0	37.5	3.9	3.8	32.9	13.8							
		K	62.0	24.5	131.6	142.8	21.0	21.5	78.1	38.9							
Kalyani	Kharif	N	72.7	10.8	113.4	91.4	85.0	107.9									
		P	17.9	24.8	27.9	22.5	20.9	26.6									
		K	89.5	122.2	134.8	112.1	108.5	130.1									
	Rabi	N	63.5	59.9	304.7	75.2	88.8	65.2									
		P	15.7	14.8	39.7	21.7	14.3	9.6									
		K	63.8	59.8	358.2	9.3	9.2	5.6									

Table C: Soil fertility status (kg/ha) of different crop sequence in Expt. 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%	0.54	0.55	0.56	0.55	0.57	0.56	0.62	0.66	0.60	0.62	0.61	0.61		
		N	177.0	188.0	191.0	234.0	187.0	192.0	199.0	209.0	200.0	191.0	222.0	209.0		
		P	29.6	33.3	34.3	39.9	36.8	38.3	40.1	36.1	39.1	34.0	36.8	39.9		
		K	106.0	103.0	129.0	107.0	126.0	99.0	109.0	124.0	124.0	118.0	127.0	112.0		
	Rabi	OC%	0.54	0.55	0.54	0.52	0.53	0.62	0.60	0.64	0.68	0.61	0.60	0.54		
		N	176.0	183.0	176.0	173.0	168.0	186.0	183.0	188.0	194.0	171.0	183.0	176.0		
		P	30.1	31.2	33.5	38.5	35.6	40.0	43.1	32.7	33.1	32.1	30.5	32.9		
		K	161.0	160.0	141.0	182.0	155.0	177.0	184.0	197.0	202.0	170.0	161.0	154.0		
Maruteru	Kharif	OC%	0.90	1.00	0.10	1.10	1.20	1.10	1.20	1.20	1.20	1.20	1.2	1.2		
		P	38.0	27.0	33.0	30.0	32.0	35.0	34.0	34.0	32.0	33.0	30.0	37.0		
		K	344.0	220.0	261.0	250.0	231.0	258.0	287.0	249.0	281.0	224.0	245.0	275.0		
Rudrur	Rabi	OC%	0.56	0.49	0.54	0.67	0.69	0.69	0.66	0.66	0.65	0.66	0.63	0.57		
		P	18.0	25.0	25.0	31.0	28.0	22.0	33.0	21.0	35.0	28.0	33.0	24.0		
		K	304.0	302.0	306.0	312.0	334.0	323.0	327.0	335.0	296.0	348.0	312.0	293.0		
Sabour	Rabi	OC%	0.55	0.56	0.58	0.54	0.57	0.56	0.56	0.58	0.58	0.56	0.54	0.56		
		N	207.0	198.0	215.0	196.0	210.0	194.0	192.0	196.0	208.0	209.0	199.0	200.0		
		P	26.0	26.0	27.0	26.0	27.0	25.0	26.0	28.0	29.0	28.0	27.0	28.0		
		K	218	212.0	222.0	215.0	219.0	209.0	213.0	216.0	218.0	217.0	217.0	219.0		
Raipur	Rabi	OC%	0.50	0.53	0.59	0.62	0.68	0.66	0.65	0.60	0.59	0.69	0.68	0.58		
		N	168.0	201.0	228.0	245.0	261.0	259.0	251.0	251.0	244.0	272.0	268.0	231.0		
		P	11.0	19.0	20.0	21.0	30.0	26.0	27.0	23.0	21.0	29.0	26.0	22.0		
		K	169.0	224.0	237.0	250.0	278.0	287.0	290.0	270.0	261.0	294.0	283.0	247.0		
SK Nagar	Rabi	OC%	0.12	0.18	0.21	0.20	0.23	0.32	0.27	0.29	0.27	0.30	0.26	0.19		
		N	119.0	166.0	176.0	170.0	188.0	210.0	201.0	207.0	201.0	204.0	195.0	176.0		
		P	16.0	30.0	31.0	33.0	34.0	41.0	38.0	40.0	36.0	40.0	38.0	22.0		
		K	143.0	153.0	151.0	146.0	156.0	185.0	174.0	179.0	174.0	182.0	169.0	153.0		
Junagadh	Rabi With P Potash	OC%	0.56	0.63	0.61	0.66	0.67	0.76	0.71	0.73	0.71	0.71	0.68	0.66		
		N	182.0	214.0	217.0	214.0	232.0	257.0	248.0	254.0	242.0	248.0	239.0	207.0		
		P	8.0	22.0	24.0	24.0	25.0	32.0	29.0	31.0	29.0	31.0	28.0	21.0		
		K	158.0	196.0	200.0	200.0	203.0	214.0	203.0	207.0	207.0	210.0	203.0	161.0		

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}
	Rabi With-	OC%	0.59	0.66	0.65	0.7	0.71	0.78	0.73	0.76	0.71	0.73	0.69	0.7		
	out Potash	N	157.0	207.0	210.0	214.0	218.0	232.0	220.0	229.0	223.0	226.0	220.0	195.0		
		P	8.0	20.0	25.0	26.0	27.0	33.0	29.0	31.0	29.0	31.0	29.0	16.0		
		K	144.0	158.0	154.0	158.0	158.0	168.0	165.0	165.0	168.0	165.0	161.0	147.0		
Navsari	Rabi	OC%	0.48	0.54	0.57	0.58	0.57	0.64	0.60	0.65	0.62	0.63	0.59	0.57		
		N	179.0	236.0	239.0	239.0	242.0	261.0	254.0	261.0	251.0	257.0	254.0	232.0		
		P	22.0	29.0	29.0	27.0	31.0	36.0	33.0	35.0	32.0	34.0	31.0	29.0		
		K	175.0	182.0	193.0	196.0	193.0	217.0	207.0	214.0	207.0	210.0	203.0	182.0		
Hisar	Kharif	OC%	0.35	0.39	0.42	0.43	0.46	0.48	0.46	0.42	0.42	0.44	0.43	0.42		
		N	127.8	150.5	157.5	169.8	192.5	201.3	185.5	178.5	182.0	183.8	182.0	175.0		
		P	13.0	14.0	14.5	15.0	19.3	20.5	17.0	17.5	15.0	18.0	16.5	15.0		
		K	227.5	250.0	277.5	297.5	315.0	323.8	311.3	305.0	298.8	312.5	301.3	300.0		
	Rabi	OC%	0.34	0.39	0.44	0.45	0.47	0.50	0.47	0.44	0.43	0.45	0.42	0.41		
		N	143.5	164.5	171.5	187.0	211.8	220.5	206.5	192.5	197.8	203.0	201.3	196.0		
		P	12.0	14.5	15.0	16.0	19.5	21.0	17.0	15.5	17.0	16.5	17.5	15.5		
		K	216.3	236.3	265.0	287.5	311.3	333.3	318.8	307.5	305.0	315.0	305.0	298.8		
Palampur	Kharif	OC%	0.57	0.66	0.65	0.72	0.72	0.85	0.80	0.80	0.80	0.82	0.70	0.72		
		N	187.0	204.0	213.0	227.0	255.0	284.0	256.0	240.0	234.0	257.0	243.0	221.0		
		P	19.0	35.0	53.0	63.0	70.0	81.0	64.0	68.0	54.0	66.0	71.0	66.0		
		K	124.0	144.0	148.0	138.0	153.0	166.0	157.0	162.0	154.0	150.0	147.0	158.0		
	Rabi	OC%	5.61	6.58	6.61	7.15	7.35	8.62	8.20	8.42	7.63	8.33	7.11	7.24		
		N	189.0	205.0	224.0	231.0	259.0	314.0	285.0	277.0	267.0	297.0	262.0	241.0		
		P	18.0	34.0	62.0	65.0	73.0	90.0	68.0	69.0	58.0	78.0	68.0	61.0		
		K	126.0	142.0	150.0	147.0	158.0	171.0	161.0	169.0	169.0	159.0	167.0	150.0		
Jammu	Rabi	OC%	0.48	0.58	0.54	0.55	0.45	0.80	0.69	0.82	0.72	0.70	0.65	0.48		
		N	157.4	162.6	152.7	166.8	203.1	252.6	228.4	214.2	212.4	242.2	187.5	163.0		
		P	8.2	12.3	15.7	17.2	24.5	36.4	28.2	22.6	25.4	23.2	19.1	13.4		
		K	90.1	105.8	110.9	97.5	116.5	123.5	117.3	128.3	111.2	108.2	105.8	99.6		
Ranchi	Rabi	OC%	0.37	0.38	0.40	0.40	0.41	0.55	0.49	0.48	0.44	0.46	0.44	0.32		
		N	191.0	207.0	219.0	222.0	225.0	304.0	271.0	275.0	244.0	255.0	241.0	173.0		
		P	15.0	44.3	52.0	59.3	92.3	99.7	85.7	68.3	59.3	57.1	55.7	12.7		
		K	143.0	131.0	144.0	137.0	142.0	177.0	148.0	153.0	137.0	142.0	131.0	120.0		

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}
Kathalagere	Summer	OC%	0.59	0.62	0.62	0.60	0.64	0.70	0.71	0.71	0.75	0.72	0.72	0.62		
		N	289.0	321.0	323.0	316.0	316.0	320.0	311.0	320.0	332.0	318.0	315.0	311.0		
		P	17.7	20.6	20.6	19.3	21.2	21.5	22.5	21.9	23.1	22.9	21.5	21.1		
		K	157.0	188.0	175.0	166.0	164.0	195.0	182.0	193.0	185.0	185.0	185.0	167.0		
Jabalpur	Rabi	OC%	0.61	0.63	0.65	0.66	0.68	0.76	0.74	0.74	0.75	0.78	0.76	0.73		
		N	244.0	257.0	270.0	271.0	273.0	290.0	283.0	285.0	284.0	296.0	285.0	278.0		
		P	8.0	9.0	9.0	11.0	14.0	16.0	16.0	16.0	16.0	18.0	17.0	15.0		
		K	289.0	340.0	364.0	375.0	420.0	440.0	432.0	470.0	460.0	478.0	475.0	431.0		
		Zn	0.22	0.23	0.29	0.30	0.30	0.40	0.40	0.40	0.30	0.50	0.40	0.40		
Rahuri	Kharif	OC%	0.53	0.59	0.57	0.58	0.56	0.71	0.68	0.69	0.67	0.67	0.68	0.57		
		N	119.0	162.0	179.0	183.0	188.0	194.0	179.0	185.0	184.0	188.0	187.0	175.0		
		P	9.0	14.0	15.0	17.0	18.0	19.0	19.0	17.0	17.0	17.0	18.0	15.0		
		K	538.0	618.0	629.0	648.0	6620.0	678.0	672.0	617.0	618.0	669.0	640.0	653.0		
	Rabi	OC%	0.54	0.63	0.61	0.60	0.73	0.75	0.69	0.75	0.66	0.63	0.64	0.63		
		N	174.0	217.0	209.0	201.0	204.0	215.0	217.0	210.0	218.0	209.0	200.0	204.0		
		P	7.0	14.0	16.0	20.0	21.0	21.0	19.0	14.0	16.0	18.0	17.0	15.0		
		K	532.0	614.0	632.0	646.0	656.0	679.0	675.0	617.0	615.0	667.0	637.0	647.0		
Akola	Kharif	OC%	0.19	0.43	0.48	0.49	0.57	0.65	0.58	0.56	0.55	0.58	0.55	0.41		
		N	97.0	193.0	218.0	238.0	263.0	321.0	255.0	231.0	239.0	252.0	235.0	164.0		
		P	7.42	14.3	16.5	23.0	35.6	39.3	24.0	22.0	20.8	20.9	19.5	11.2		
		K	209.0	293.0	328.0	356.0	436.0	470.0	370.0	375.0	414.0	329.0	312.0	262.0		
	Rabi	OC%	0.36	0.51	0.53	0.55	0.64	0.68	0.63	0.65	0.63	0.66	0.61	0.48		
		N	148.0	230.0	241.0	277.0	316.0	339.0	315.0	324.0	309.0	327.0	311.0	224.0		
		P	8.0	17.0	20.0	21.0	28.0	31.0	26.0	26.0	24.0	26.0	25.0	14.0		
		K	238.0	302.0	309.0	314.0	352.0	398.0	373.0	355.0	349.0	360.0	343.0	290.0		
Karjat	Kharif	OC%	1.09	1.22	1.25	1.27	1.36	1.37	1.31	1.33	1.27	1.36	1.30	1.18		
		N	169.0	190.0	201.0	213.0	229.0	267.0	254.0	241.0	231.0	254.0	232.0	182.0		
		P	19.7	25.9	26.6	30.5	31.1	34.1	31.41	33.1	31.2	33.3	29.6	25.2		
		K	260.0	279.0	283.0	292.0	300.0	321.0	302.0	320.0	301.0	319.0	299.0	269.0		
	Rabi	OC%	1.01	1.14	1.17	1.19	1.28	1.30	1.24	1.25	1.20	1.28	1.23	1.10		
		N	179.0	182.0	191.0	164.0	204.0	215.0	208.0	213.0	207.0	210.0	204.0	183.0		
		P	19.1	23.8	26.2	28.0	30.6	36.3	33.62	35.3	33.4	35.8	32.2	24.1		
		K	255.0	257.0	263.0	268.0	271.0	299.0	283.0	296.0	283.0	296.0	284.0	256.0		

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
Bhuban-	Rabi	OC%	0.50	0.61	0.62	0.69	0.55	0.81	0.70	0.75	0.77	0.87	0.77	0.61		
eswar		N	156.0	256.0	271.0	284.0	281.0	278.0	297.0	289.0	276.0	301.0	288.0	232.0		
		P	8.1	14.2	15.0	14.6	14.2	20.5	13.9	20.5	14.8	22.6	14.7	13.2		
		K	68.0	102.0	111.0	109.0	114.0	147.0	137.0	166.0	139.0	152.0	133.0	110.0		
Chiplima	Rabi	OC%	0.71	0.69	0.74	0.77	0.76	0.79	0.77	0.70	0.77	0.75				
		N	346.0	368.0	326.0	301.0	298.0	315.0	308.0	324.0	327.0	319.0				
		P	13.2	14.2	13.1	13.6	15.1	14.3	13.4	14.6	13.5	13.9				
		K	124.0	141.0	126.0	132.0	145.0	137.0	129.0	142.0	128.0	135.0				
Ludhiana	Rice-Wheat	OC%	0.35	0.38	0.39	0.35	0.41	0.58	0.56	0.48	0.47	0.57	0.56	0.56		
		N	155.0	161.0	178.0	180.0	193.0	241.0	230.0	215.0	211.0	242.0	239.0	225.0		
		P	11.0	15.0	15.0	21.0	30.0	38.0	40.0	28.0	28.0	36.0	34.0	41.0		
		K	82.0	93.0	97.0	103.0	113.0	170.0	160.0	140.0	133.0	149.0	139.0	156.0		
Kanpur	Rabi	OC%	0.24	0.15	0.35	0.48	0.49	0.57	0.66	0.56	0.50	0.48	0.62	0.55	0.41	
		P	10.4	9.3	15.4	17.7	22.1	26.8	24.5	23.1	21.9	22.9	24.9	24.7	19.7	
		K	170.0	9.5	140.2	149.3	157.1	175.2	165.5	160.3	165.0	163.5	17.0	168.5	134.6	
Faizabad	Rabi	OC%	0.22	0.31	0.39	0.44	0.54	0.64	0.58	0.56	0.57	0.60	0.58	0.36	0.37	
		P	5.9	14.8	18.1	18.9	21.4	23.8	22.9	19.6	20.4	24.1	23.0	18.1	13.8	
		K	212.0	223.0	236.0	241.0	258.0	253.0	261.0	266.0	255.0	244.0	256.0	220.0	355.0	
Kalyani	Kharif	OC%	0.42	0.63	0.60	0.66	0.75	0.75	0.60	0.57	0.78	0.87	0.90	0.45		
		N	83.0	99.0	99.0	117.0	154.0	148.0	129.0	129.0	129.0	117.0	120.0	111.0		
		P	15.2	64.2	64.2	50.6	80.9	83.4	78.4	61.7	66.3	64.2	73.3	45.5		
		K	132.0	233.0	224.0	264.0	308.0	286.0	264.0	255.0	246.0	264.0	273.0	238.0		

Table D: Nutrient uptake (kg/ha) of different crop sequence in Expt. 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}
Rajendra nagar	Kharif Rice	N	47.5	55.5	65.8	88.2	96.5	88.4	84.0	73.3	70.6	102.7	109.2	84.5
		P	11.3	13.4	15.4	21.0	22.7	22.6	22.4	18.8	20.3	23.2	22.1	16.8
		K	55.7	69.2	68.2	84.9	84.5	97.9	97.5	85.6	90.0	102.5	104.2	81.0
	Rabi Rice	N	36.9	46.5	72.6	74.7	93.6	76.0	62.6	64.8	56.2	86.3	76.5	77.9
		P	8.3	9.7	16.2	13.6	17.9	18.1	16.1	15.3	17.5	17.5	15.8	15.8
		K	38.2	51.8	72.3	61.6	73.5	74.0	76.2	69.4	78.9	79.8	71.3	66.6
Maruteru	Rice+Rice	N	77.0	133.9	134.5	132.1	137.4	144.5	142.2	145.4	141.6	147.0	149.2	134.3
		P	15.6	26.5	27.3	25.1	23.8	25.5	23.1	24.1	22.0	24.1	25.2	25.8
		K	60.5	104.5	105.8	107.1	112.6	113.2	103.2	108.3	110.6	110.0	112.1	102.1
Rudrur	Kharif Rice	N	46.3	62.4	72.0	87.8	93.3	92.6	104.4	85.9	100.1	84.9	105.9	96.6
		P	11.6	16.2	17.4	23.8	24.2	21.0	23.4	20.6	24.8	22.1	23.8	24.3
		K	52.1	69.8	80.7	95.2	109.9	101.5	105.0	101.3	121.0	95.3	116.5	110.4
	Mustard	N	8.7	17.5	21.3	18.2	26.7	25.5	26.7	25.6	26.7	27.4	30.6	21.5
		P	0.9	2.0	2.2	2.0	3.0	2.8	2.6	2.7	2.7	2.8	2.7	2.2
		K	1.3	2.6	3.5	2.8	4.2	4.2	4.1	4.1	4.5	4.3	4.6	3.3
Sabour	Rice	N	17.8	47.2	50.3	65.7	91.5	100.1	92.6	96.1	89.4	98.0	90.7	55.3
		P	5.1	13.2	13.6	17.2	25.1	27.0	25.1	25.8	24.1	26.5	25.0	14.6
		K	23.6	59.2	61.8	78.9	107.7	118.7	111.0	115.4	106.2	115.8	109.2	67.6
	Wheat	N	19.5	48.9	95.8	68.9	104.6	117.5	109.0	110.2	105.2	118.8	108.8	69.9
		P	5.3	13.8	26.6	19.8	30.3	33.7	30.3	31.7	28.7	33.3	30.7	18.4
		K	22.5	55.2	106.9	76.9	116.0	136.0	122.6	131.8	127.1	136.0	123.8	82.5
SK Nagar	Pearlmillet	N	1.9	13.9	15.9	18.6	24.5	41.7	45.4	33.8	39.7	45.8	50.6	19.8
		P	0.4	3.4	3.4	4.4	6.2	10.4	11.5	8.4	10.1	12.2	13.0	4.6
		K	2.8	13.4	14.9	17.1	21.4	35.0	37.6	29.0	33.4	38.2	39.6	18.5
	Wheat	N	2.1	16.5	23.2	30.0	50.5	83.0	75.0	72.9	68.0	75.7	71.4	33.1
		P	0.4	2.7	3.8	5.4	9.9	14.9	14.2	13.9	12.4	14.5	13.2	6.0
		K	2.8	17.7	27.5	32.9	50.5	68.8	67.6	68.2	61.7	68.7	66.7	44.7
Junagadh	Pearlmillet with K	N	11.8	22.1	22.6	28.6	33.7	44.8	42.3	26.8	30.9	33.4	35.6	26.1
		P	4.4	8.0	7.9	9.0	11.8	15.7	13.6	10.2	10.7	12.4	12.1	8.9
		K	14.5	25.6	26.1	32.0	35.5	44.1	41.1	30.0	32.5	34.7	35.4	29.9

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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
	Wheat	N	44.8	56.8	59.9	63.9	67.8	90.5	72.7	77.1	74.2	75.2	75.7	60.0
		P	7.4	8.7	11.5	10.7	13.3	19.5	14.0	15.6	14.1	15.6	16.8	10.3
		K	57.6	71.2	80.6	82.5	87.6	102.5	92.4	90.0	90.4	90.9	93.6	79.9
	Pearlmillet	N	9.4	18.8	18.8	21.4	26.5	32.9	31.6	23.0	24.8	26.0	26.2	22.2
	without K	P	1.8	3.3	3.1	3.6	4.8	6.9	6.4	4.7	5.0	5.1	5.2	4.1
		K	13.7	24.7	25.5	28.7	32.8	37.9	35.1	28.2	29.7	29.8	31.9	27.5
	Wheat	N	28.1	33.9	43.9	43.0	48.2	66.1	59.2	48.9	49.7	55.3	50.2	42.7
		P	4.6	5.2	8.0	6.4	8.3	12.3	10.7	8.7	9.1	10.5	8.0	6.4
		K	29.7	45.1	51.8	50.9	55.9	65.6	60.6	56.2	60.3	56.4	59.2	49.7
Navsari	Rice	N	32.2	37.3	39.0	44.0	46.0	51.4	63.0	51.2	60.7	61.7	68.3	43.3
		P	6.8	9.9	11.0	9.7	9.8	11.1	13.3	12.0	12.4	12.5	12.7	8.8
		K	49.5	75.0	74.5	81.7	83.7	87.9	108.4	89.4	99.2	96.6	106.3	79.3
	Wheat	N	47.7	69.3	87.3	75.9	84.9	90.0	78.0	107.2	92.8	85.5	75.9	71.2
		P	6.7	10.4	15.2	11.5	13.1	14.9	14.3	17.7	15.4	14.7	10.3	10.2
		K	37.6	47.4	70.9	55.4	66.2	61.4	68.5	79.3	66.7	64.2	59.2	57.3
Hisar	Pearlmillet	N	20.1	48.3	53.2	67.0	77.2	86.7	70.5	54.5	64.0	77.7	72.7	68.1
		P	4.7	11.5	13.3	16.9	20.7	23.6	18.9	15.8	18.3	20.7	21.0	17.1
		K	51.7	121.9	132.0	162.3	186.8	207.0	171.2	143.1	164.1	186.3	178.8	162.9
	Wheat	N	29.7	76.2	113.3	99.8	125.3	130.3	104.0	116.2	98.6	124.2	102.7	115.6
		P	5.1	13.5	20.1	16.9	22.9	25.1	20.1	23.0	18.3	23.5	19.0	20.1
		K	32.3	85.1	132.1	103.7	142.9	149.7	116.1	125.3	108.5	141.4	113.4	127.5
Kanpur	Rice	N	14.2	49.9	56.0	57.3	80.6	81.2	73.9	60.0	66.8	77.1	72.2	44.3
		P	1.7	7.2	9.2	10.2	18.6	19.4	15.6	12.4	13.2	17.5	15.6	7.4
		K	15.7	54.8	60.2	61.4	86.8	87.6	79.8	38.0	72.5	82.8	78.1	49.4
	Wheat	N	13.7	71.9	90.2	86.1	122.7	127.2	117.6	113.7	110.5	119.9	115.3	69.9
		P	1.2	10.2	13.9	12.4	19.7	21.6	18.2	16.5	15.2	19.0	17.6	9.0
		K	12.2	63.2	74.9	71.6	98.5	101.8	93.4	91.7	87.2	95.9	91.8	56.0
Faizabad	Rice	N	21.3	55.9	67.4	82.0	123.8	117.3	125.3	94.3	102.8	113.2	127.6	69.7
		P	4.4	10.5	12.6	15.7	24.2	22.6	27.1	17.4	19.3	21.5	26.7	13.0
		K	36.3	87.3	103.3	116.4	167.1	147.2	166.9	137.6	146.7	143.8	162.5	89.3
	Wheat	N	11.4	40.9	68.1	53.3	80.1	77.5	75.7	80.9	75.5	86.6	80.2	44.6
		P	2.3	7.7	12.0	9.1	16.1	16.5	16.2	15.8	14.7	17.8	17.2	8.3
		K	15.4	50.3	78.4	62.0	86.9	88.9	88.0	98.4	92.6	96.6	89.5	47.4

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}
Karjat	Rice	N	51.6	76.5	87.9	94.7	108.5	106.6	102.6	88.7	77.9	96.3	82.5	72.5
		P	12.9	22.3	26.2	25.9	35.8	34.5	29.4	26.4	27.1	34.8	19.0	17.9
		K	51.7	67.5	89.8	87.1	106.8	105.1	93.0	94.3	79.4	98.2	71.8	76.4
	Rice	N	59.6	78.6	91.4	89.5	113.4	107.7	96.7	99.0	92.31	101.5	96.6	80.2
		P	21.6	24.6	30.3	27.0	37.3	36.4	32.8	32.7	32.6	32.3	30.6	26.7
		K	82.4	91.9	96.4	96.1	124.5	108.6	112.7	118.6	107.1	114.1	97.2	112.8
Palampur	Rice	N	59.4	72.7	76.2	81.6	95.5	108.5	107.4	88.8	90.6	127.4	114.8	106.0
		P	15.4	20.5	22.3	23.5	27.8	32.0	31.2	25.6	26.3	37.0	34.1	31.5
		K	43.3	56.3	62.9	67.5	77.2	92.4	84.4	72.5	74.7	105.9	93.0	86.9
	Wheat	N	31.5	56.5	65.4	48.4	84.5	108.3	62.3	62.9	73.5	77.7	69.4	53.2
		P	9.9	16.8	19.8	14.9	25.3	32.8	17.4	18.9	22.7	23.8	20.7	15.8
		K	27.1	48.6	50.2	40.0	74.1	90.0	51.7	52.4	63.6	65.6	56.4	49.5
Kathalgere	Summer	N	58.8	81.5	140.8	128.7	156.8	186.9	174.5	154.9	165.8	150.6	145.0	92.0
	Maize	P	14.8	19.9	30.7	27.6	39.2	43.4	38.5	32.6	34.6	34.2	31.1	17.4
		K	40.6	56.9	97.0	84.2	105.7	119.9	115.2	109.2	111.4	105.9	84.0	56.7
Jammu	Rice	N	27.5	52.2	54.4	59.0	69.5	94.2	66.6	76.0	66.8	68.5	64.6	46.6
		P	5.6	11.7	12.3	15.3	18.6	22.8	16.3	18.7	16.6	17.9	16.2	9.6
		K	41.6	88.7	94.9	103.0	138.9	183.6	119.7	161.9	131.9	111.7	118.4	78.2
	Wheat	N	17.6	59.5	64.1	57.8	72.0	76.5	68.2	69.2	67.1	70.2	66.5	48.4
		P	4.9	15.5	17.1	16.6	22.2	22.9	19.5	19.3	19.3	20.5	21.1	12.5
		K	25.1	74.9	67.1	62.8	91.4	98.3	81.3	89.0	87.8	90.4	84.3	62.5
Bhubneswar	Kharif Rice	N	44.2	65.7	79.4	72.8	77.3	77.3	89.3	85.9	78.0	71.2	98.7	83.1
		P	10.1	14.7	18.1	16.7	19.4	23.6	24.0	20.5	18.3	27.4	21.2	15.6
		K	50.3	69.1	84.0	78.9	84.9	99.0	97.1	94.1	79.7	113.1	89.5	74.5
	Rabi Rice	N	48.4	67.6	82.2	75.4	83.6	96.1	90.3	87.6	77.6	103.3	86.4	68.8
		P	12.9	18.7	21.7	21.1	23.7	28.1	27.0	25.3	21.9	31.3	25.4	18.2
		K	54.8	75.8	93.7	85.9	93.0	106.7	100.2	97.4	82.4	116.0	94.8	74.6
Chiplima	Kharif Rice	N	34.2	63.0	67.3	72.2	77.8	80.6	81.0	75.2	81.2	94.5	82.0	61.4
		P	10.1	17.7	20.6	22.0	26.1	25.5	28.3	24.7	27.4	32.1	28.2	19.2
		K	46.6	78.1	83.3	88.7	97.2	101.5	99.9	97.3	98.1	117.0	103.7	75.1
	Rabi Rice	N	42.6	68.7	80.1	74.4	87.8	90.2	89.8	87.4	90.8	99.7	82.5	63.7
		P	11.2	18.4	20.2	20.7	23.9	25.7	25.3	24.3	24.6	29.0	23.6	16.4
		K	52.8	78.0	89.7	86.6	96.7	101.2	97.6	96.6	95.3	109.7	97.0	71.9

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%	0.62	0.65	0.65	0.64	0.62	0.59	0.45	0.62
		N	183.0	190.0	190.0	188.0	186.0	183.0	165.0	186
		P	32.3	37.8	39.7	40.4	36.9	41.6	31.9	38.1
		K	333.0	385.0	345.0	390.0	317.0	358.0	315.0	341
	Rabi	OC%	0.70	0.78	0.76	0.66	0.67	0.81	0.54	0.79
		N	191.0	205.0	186.0	233.0	180.0	195.0	179.0	199
		P	36.1	42.6	36.6	41.6	30.0	38.9	34.5	41.2
		K	335.0	377.0	302.0	397.0	345.0	320.0	288.0	381
Maruteru	Kharif	OC%	0.94	1.06	0.94	0.88	0.94	1.13	0.81	1.13
		P	38.4	37.2	36.1	33.1	33.8	41.2	32.6	37.1
		K	321.0	318.0	315.0	312.0	362.0	330.0	312.0	371
	Rabi	OC%	0.95	1.07	1.07	1.24	1.24	1.29	1.02	1.07
		P	41.0	37.6	32.9	33.6	42.1	39.2	32.3	36.1
		K	221.0	293.0	317.0	309.0	330.0	337.0	304.0	314
Rudrur	Rabi	OC%	0.50	0.57	0.66	0.77	0.70	0.69	0.55	0.55
		P	35.5	39.8	41.5	46.7	37.1	39.3	40.4	44.3
		K	296.0	245.0	244.0	262.0	215.0	269.0	312.0	284
Sabour	Summer	OC%	0.65	0.72	0.73	0.70	0.67	0.74	0.58	0.65
		N	195.8	197.3	195.2	203.7	205.2	210.8	178.4	195.2
		P	42.5	44.8	42.2	46.1	47.8	48.2	39.1	44.0
		K	160.3	163.6	161.4	165.3	161.4	166.8	136.2	159.7
Raipur	Kharif	OC%	0.51	0.51	0.53	0.51	0.51	0.54	0.50	
		N	248.0	235.0	251.0	223.0	220.0	231.0	261.0	
		P	19.7	17.7	19.8	18.0	17.1	19.8	23.1	
		K	263.0	252.0	256.0	252.0	240.0	252.0	285.0	
	Rabi	OC%	0.53	0.54	0.54	0.51	0.51	0.55	0.52	
		N	246.0	232.0	252.0	224.0	229.0	236.0	272.0	
		P	20.2	18.3	21.8	17.7	19.2	19.2	24.1	
		K	265.0	251.0	255.0	251.0	241.0	255.0	291.0	
SK Nagar	Summer	OC%	0.33	0.35	0.32	0.30	0.31	0.30	0.27	0.31
		N	236.0	232.0	236.0	232.0	223.0	232.0	229.0	232.0
		P	34.2	31.9	32.7	32.5	36.9	31.9	33.0	34.1
		K	333.0	301.0	305.0	294.0	287.0	301.0	312.0	305.0
Junagadh	Rabi	OC%	0.91	0.89	0.87	0.88	0.82	0.86	0.75	0.78
		N	245.0	239.0	236.0	242.0	232.0	239.0	236.0	239.0
		P	24.6	23.8	24.4	24.1	29.7	29.1	24.6	23.0
		K	198.0	191.0	187.0	184.0	187.0	184.0	194.0	187.0
Navsari	Rabi	OC%	0.62	0.61	0.62	0.62	0.63	0.62	0.59	0.60
		N	229.0	239.0	242.0	242.0	229.0	248.0	236.0	242.0
		P	17.4	15.3	16.0	16.5	20.2	19.3	17.1	15.4
		K	217.0	207.0	196.0	203.0	207.0	203.0	210.0	200.0

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	OC%	0.50	0.48	0.49	0.49	0.47	0.5	0.51	0.5
		N	183.4	176.4	182.0	184.8	166.6	184.8	187.6	176.4
		P	16.8	16.4	15.2	15.2	15.6	17.6	19.0	16.8
		K	238.0	233.0	236.0	238.0	202.0	238.0	254.0	236.0
	Rabi	OC%	0.48	0.49	0.50	0.50	0.47	0.49	0.51	0.49
		N	165.2	158.2	158.2	162.4	161.0	163.8	169.4	159.6
		P	14.4	14.0	15.2	15.2	16.8	16.4	17.2	14.4
		K	238.0	236.0	233.0	236.0	227.0	243.0	250.0	238.0
Palampur	Kharif	OC%	2.85	2.52	2.85	2.49	2.85	2.55	0.66	2.49
		N	339.0	326.0	376.0	339.0	351.0	339.0	301.0	351.0
		P	302.0	235.0	280.0	224.0	302.0	190.0	56.0	202.0
		K	1164.0	1061.0	1074.0	1040.0	1066.0	1049.0	251.0	849.0
	Rabi	OC%	2.82	2.61	2.88	2.73	2.97	2.49	0.96	2.73
		N	376.0	301.0	376.0	351.0	389.0	339.0	301.0	364.0
		P	347.0	246.0	302.0	235.0	324.0	246.0	67.0	235.0
		K	1058.0	1028.0	1058.0	1036.0	1084.0	1073.0	263.0	961.0
	Summer	OC%	2.79	2.46	2.76	2.43	2.97	2.40	2.07	3.52
		N	364.0	339.0	389.0	351.0	389.0	339.0	314.0	326.0
		P	347.0	258.0	291.0	246.0	381.0	246.0	78.0	235.0
		K	1120.0	1064.0	1129.0	1026.0	1120.0	1145.0	317.0	1024.0
Jammu	Summer	N	220.0	205.0	198.0	200.0	187.0	192.0	200.0	210.0
		P	13.9	14.2	14.7	15.0	14.2	14.0	15.9	14.4
		K	120.0	122.0	110.0	120.0	117.0	122.0	110.0	115.0
Kathalagere	Summer	OC%	0.69	0.70	0.70	0.64	0.70	0.72	0.69	
		N	362.2	342.1	358.2	325.2	342.2	360.2	341.2	
		P	16.0	16.9	16.2	15.8	17.9	19.5	18.8	
		K	215.2	225.1	225.1	229.3	224.5	232.2	224.5	
Siruguppa	Kharif	OC%	0.80	0.96	0.92	0.92	0.79	0.83	0.68	0.92
		N	224.0	218.0	224.0	230.0	224.0	224.0	218.0	224.0
		P	25.0	29.0	24.0	27.0	27.0	30.0	23.0	30.0
		K	364.0	384.0	318.0	352.0	368.0	340.0	328.0	368.0
		S	30.7	28.3	28.6	35.5	34.3	29.7	28.2	35.1
	Rabi	OC%	0.84	1.00	0.94	0.90	0.84	0.80	0.70	0.94
		N	218.0	218.0	230.0	242.0	224.0	230.0	218.0	218.0
		P	30.4	26.8	20.9	24.5	30.3	27.3	20.3	25.8
		K	358.0	346.0	332.0	340.0	380.0	321.0	343.0	323.0
		S	27.3	35.9	34.5	30.6	28.7	33.4	24.3	32.8
Karmana	Summer	OC%	1.10	1.09	0.88	1.00	1.03	0.99	1.07	1.10
		N	184.0	188.1	158.9	192.3	186.1	179.8	169.3	173.5
		P	16.2	18.8	16.2	11.3	48.6	16.4	15.4	14.5
		K	82.5	86.2	143.7	86.6	233.7	113.1	107.5	152.3
Jabalpur	Rabi	OC%	0.68	0.69	0.68	0.68	0.80	0.64	0.64	0.67
		N	240.0	230.0	227.0	231.0	225.0	230.0	219.0	223.0
		P	9.2	8.7	8.6	8.6	9.6	9.3	9.4	9.0
		K	344.0	333.0	332.0	320.0	325.0	327.0	385.0	320.0

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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
Rewa	Rabi	OC%	0.59	0.61	0.59	0.58	0.60	0.58	0.57	0.59
		N	261.0	251.0	248.0	240.0	249.0	254.0	256.0	245.0
		P	8.6	8.7	8.6	8.6	8.9	8.6	9.1	8.6
		K	328.0	332.0	335.0	334.0	330.0	330.0	350.0	327.0
Powarkheda	Rabi	OC%	0.75	0.76	0.71	0.74	0.76	0.75	0.70	0.74
		N	282.0	277.0	274.0	271.0	273.0	280.0	272.0	275.0
		P	10.0	10.3	10.1	10.1	10.1	10.0	10.1	10.4
		K	321.0	302.0	309.0	296.0	307.0	315.0	281.0	306.0
Rahuri	Kharif	OC%	0.66	0.65	0.62	0.64	0.68	0.65	0.59	0.57
		N	190.0	190.0	180.0	180.0	192.0	166.0	201.0	176.0
		P	14.0	10.0	15.0	13.0	13.0	17.0	10.0	7.0
		K	640.0	657.0	639.0	640.0	647.0	636.0	610.0	500.0
	Rabi	OC%	0.64	0.63	0.6	0.63	0.66	0.63	0.58	0.55
		N	182.0	182.0	175.0	175.0	184.0	162.0	189.0	164.0
		P	16.0	13.0	13.0	14.0	16.0	19.0	12.0	7.0
		K	625.0	646.0	623.0	630.0	634.0	621.0	595.0	484.0
Parbhani	Rabi	N	174.2	154.1	134.8	148.6	154.6	160.2	170.4	151.3
		P	12.3	11.8	11.9	11.7	12.2	13.0	13.8	11.8
		K	351.0	330.5	330.1	345.8	352.5	330.5	360.4	340.3
Akola	Kharif	N	281.0	244.0	272.0	230.0	217.0	234.0	309.0	190.0
		P	20.2	19.0	16.2	14.6	17.9	16.8	24.6	12.3
		K	484.0	470.0	417.0	390.0	336.0	363.0	501.0	282.0
	Rabi	N	307.0	290.0	295.0	264.0	236.0	278.0	311.0	197.0
		P	23.52	25.71	16.8	15.7	19.0	20.2	28.0	11.2
		K	511.0	501.0	436.0	495.0	430.0	470.0	525.0	301.0
	Summer	N	240.0	244.0	224.0	210.0	191.0	235.0	278.0	154.0
		P	15.0	13.86	16.0	14.2	16.4	17.3	23.8	7.12
		K	421.0	418.0	430.0	410.0	360.0	468.0	480.0	272.0
Karjat	Kharif	OC%	1.26	1.11	1.11	1.19	1.18	1.10	1.28	0.04
		N	196.5	150.5	175.0	202.3	192.3	146.3	238.3	8.4
		P	34.9	34.2	29.1	28.2	34.7	32.4	40.2	2.0
		K	223.1	219.5	195.3	190.8	211.5	188.6	243.3	8.0
	Rabi	OC%	1.15	1.06	1.07	1.04	1.14	1.02	1.20	0.04
		N	183.9	121.3	154.7	167.3	179.8	138.0	217.4	8.0
		P	27.7	28.3	24.7	21.9	28.6	27.1	32.6	1.9
		K	268.8	263.8	253.1	248.6	258.5	235.6	280.4	9.0
Bhubaneswar	Kharif	OC%	0.63	0.74	0.71	0.70	0.76	0.78	0.54	0.69
		N	285.0	294.0	298.0	304.0	319.0	322.0	288.0	277.0
		P	18.4	18.8	16.1	15.9.0	14.9.0	19.4.0	15.7.0	16.9.0
		K	162.0	169.0	154.0	155.0	149.0	174.0	149.0	159.0
Chiplima	Rabi	OC%	0.53	0.62	0.60	0.57	0.59	0.65	0.42	0.57
		N	266.0	274.0	269.0	275.0	268.0	284.0	277.0	269.0
		P	11.8	13.2	8.9	9.1	9.0	13.7	9.7	10.5
		K	164.0	176.0	141.0	138.0	144.0	181.0	129.0	155.0

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%	0.54	0.60	0.58	0.56	0.60	0.48	0.41	0.56
		N	230.1	250.2	254.5	260.2	245.0	230.5	225	250.2
		P	30.2	32.2	31.8	38.5	37.5	32.0	30.6	33.1
		K	158.2	165.3	172.0	165.2	171.2	163.5	161.5	170.2
		Zn	1.52	1.50	1.51	1.48	1.45	1.55	1.30	1.40
		Cu	0.88	0.8	1.35	0.76	0.96	1.15	0.75	0.92
		Fe	19.6	24.6	28.5	21.5	22.4	34.2	28.5	31.6
		Mn	9.8	8.9	11.2	10.0	9.9	11.5	10.2	10.4
Varansi	Summer	OC%	0.42	0.39	0.37	0.36	0.37	0.36	0.33	0.37
		N	150.0	140.0	138.0	135.0	135.0	130.0	141.0	137.0
		P	12.3	11.9	11.8	11.8	11.8	12.3	12.0	11.8.0
		K	298.0	280.1	280.2	285.0	286.1	278.2	289.4	278.5
Faizabad	Summer	OC%	0.56	0.68	0.66	0.72	0.62	0.69	0.48	0.65
		N	155.0	169.0	172.0	163.0	154.0	170.0	158.0	166.0
		P	21.7	22.4	23.2	23.4	20.6	25.6	23.1	24.7
		K	269.0	272.0	266.0	276.0	264.0	270.0	278.0	267.0
Coimbatore	Summer	OC%	0.69	0.67	0.66	0.62	0.60	0.60	0.62	0.64
		N	292.0	290.0	286.0	274.0	256.0	270.0	273.0	285.0
		P	21.8	22.7	21.4	21.6	20.8	23.8	20.7	22.1
		K	478.0	466.0	458.0	435.0	412.0	418.0	422.0	442.0
Thanjavur	Summer	N	300.0	305.0	292.0	291.0	277.0	290.0	228	238
		P	22.5	22.9	20.9	22.0	19.4	22.0	18.8	19
		K	285.0	309.0	289.0	293.0	255.0	289.0	248	242
Kanpur	Summer	OC%	0.51	0.58	0.56	0.53	0.56	0.6	0.46	0.54
		P	17.1	16.7	16.7	16.5	16.7	16.9	18.85	16.6
		K	133.5	130.0	129.8	129.7	130.0	129.7	135.1	129.4

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	127.9	124.4	259.3	111.7	95.5	115.4	130.1	116.3
		P	43.6	46.0	54.1	47.9	32.7	41.0	48.0	46.3
		K	97.5	74.9	217.9	111.0	71.1	88.9	79.1	75.4
	Rabi	N	171.2	199.6	586.0	217.4	177.1	255.9	236.9	247.1
		P	42.5	56.0	97.2	40.8	38.7	34.4	48.8	47.2
		K	193.7	293.8	513.7	191.0	256.2	390.2	299.3	288.0
Rudrur	Kharif	N	159.9	145.7	92.4	127.6	117.5	135.0	156.1	137.9
		P	50.5	46.0	28.9	46.6	46.7	53.7	66.5	58.7
		K	310.5	282.9	176.8	259.7	253.7	291.5	351.3	277.7
	Rabi	N	11.8	11.1	9.6	9.2	9.8	9.2	12.1	10.8
		P	1.7	1.7	1.5	1.3	1.3	1.3	1.8	1.5
		K	2.3	1.9	1.7	1.7	1.7	1.7	2.4	1.8
Maruteru	Kharif	N	111.3	90.9	82.8	90.7	89.2	90.1	107.7	92.5
		P	21.5	18.5	19.7	21.2	22.2	19.6	22.9	18.6
		K	96.9	96.1	93.9	91.3	97.2	100.7	101.4	91.9
	Rabi	N	126.1	109.2	101.1	116.7	96.7	109.6	119.6	100.6
		P	28.8	24.1	27.5	25.6	32.7	27.9	29.1	25.8
		K	109.9	118.0	119.1	116.3	105.7	117.7	111.7	109.6
S K Nagar	Rabi	N	168.3	160.7	155.6	158.9	121.8	15.7	180.9	167.9
		P	26.0	22.7	20.1	23.7	15.7	23.9	26.7	24.6
		K	182.0	172.7	167.0	168.9	133.7	163.7	184.6	182.5
	Summer	N	183.5	170.8	162.8	171.2	128.8	183.2	152.5	172.7
		P	20.7	19.2	16.3	17.4	12.1	18.7	14.2	18.5
		K	60.8	55.0	51.4	54.4	37.1	57.8	46.1	53.3
Junagadh	Kharif	N	113.3	97.4	95.1	106.0	90.3	105.1	100.6	93.4
		P	11.3	7.8	7.5	8.8	7.7	11.2	10.3	6.6
		K	40.0	34.6	33.0	37.3	30.6	36.6	36.2	32.5
	Rabi	N	181.6	152.7	148.6	152.2	121.7	165.7	141.7	143.8
		P	29.6	21.7	21.1	22.1	16.9	24.8	19.7	20.9
		K	82.6	70.2	68.3	70.4	55.6	75.4	62.6	68.8
Navsari	Kharif	N	56.7	63.9	57.2	49.8	48.2	54.7	56.5	51.5
		P	16.6	19.6	15.8	13.6	13.9	15.4	16.9	12.7
		K	72.1	87.4	74.5	72.4	66.3	74.6	75.4	72.0
	Summer	N	155.7	166.1	147.3	135.6	126.6	152.0	133.2	145.8
		P	19.4	19.4	19.3	16.4	14.4	19.0	12.9	15.0
		K	56.3	61.0	52.0	48.4	45.3	54.5	49.3	53.7
Bhubaneswar	Kharif	N	63.3	60.2	74.5	60.5	65.1	78.6	60.7	54.9
		P	15.8	13.5	20.0	17.1	16.2	21.9	15.4	13.9
		K	109.2	105.1	128.0	104.2	120.4	137.3	109.4	94.6

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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
	Rabi	N	78.6	80.3	85.4	82.3	83.3	103.2	77.6	71.0
		P	16.8	15.7	16.2	16.8	15.3	23.4	16.2	14.7
		K	228.5	212.3	227.9	215.1	224.9	307.8	215.6	208.5
	Summer	N	145.3	131.6	134.5	136.3	136.9	160.5	151.1	128.4
		P	30.0	26.4	28.3	25.2	28.6	33.1	29.7	24.4
		K	195.0	184.0	186.0	183.0	191.0	211.0	199.0	177.0
Chiplima	Kharif	N	63.4	63.9	72.4	71.3	65.5	79.9	65.3	64.3
		P	14.1	14.3	16.8	15.9	15.6	17.3	14.1	13.9
		K	77.5	77.6	86.4	83.1	79.1	94.5	82.9	76.8
	Rabi	N	43.8	40.7	41.7	42.8	42.1	51.6	50.4	44.6
		P	4.9	4.5	4.9	4.7	4.8	6.4	4.9	4.4
		K	68.5	67.1	70.1	71.4	70.2	82.2	74.4	65.6
	Summer	N	82.3	74.4	77.0	68.1	79.2	102.9	82.1	65.5
		P	16.8	15.4	16.2	13.1	16.3	20.9	16.0	12.6
		K	112.2	103.2	104.5	90.5	108.9	131.9	106.5	89.4
Sabour	Kharif	N	86.6	86.0	83.5	85.9	79.5	87.6	83.5	86.0
		P	26.8	26.7	25.9	26.6	24.6	27.1	25.8	26.6
		K	105.1	104.8	102.2	104.7	96.5	106.3	101.0	104.4
	Rabi	N	110.1	113.0	108.0	111.6	100.8	114.4	104.0	112.6
		P	45.8	47.0	44.9	46.4	41.9	47.6	43.3	46.8
		K	150.8	154.7	147.9	152.9	138.1	156.6	142.4	154.1
	Summer	N	54.2	56.0	105.8	57.6	47.4	57.6	53.3	55.7
		P	22.4	23.1	44.8	23.8	19.6	23.8	22.0	23.0
		K	77.0	79.6	119.7	81.6	67.2	81.8	75.6	79.1
Hisar	Kharif	N	158.7	125.0	78.3	126.2	68.0	138.5	181.1	117.2
		P	27.1	20.7	13.0	21.3	12.6	23.5	30.1	20.3
		K	94.0	71.9	54.6	71.6	40.7	78.3	101.3	70.3
	Rabi	N	64.6	50.5	44.4	51.2	34.9	51.6	81.8	48.1
		P	13.3	10.0	9.0	10.1	7.7	10.6	16.7	9.4
		K	119.7	98.8	88.9	95.2	69.2	101.3	142.7	97.1
Palampur	Kharif	N	94.6	112.8	104.6	96.6	101.5	115.7	71.2	110.9
		P	38.2	34.7	39.5	36.8	32.3	39.5	31.4	46.7
		K	175.4	162.1	178.8	145.6	129.8	196.3	133.5	126.3
	Rabi	N	31.2	26.4	51.1	32.4	63.0	32.6	10.1	40.6
		P	3.0	2.1	3.2	2.7	4.1	3.2	0.1	2.9
		K	20.7	15.1	26.6	20.2	37.3	21.1	5.7	24.4
	Summer	N	37.7	29.2	33.1	38.2	57.5	43.0	2.5	37.6
		P	19.6	17.4	14.0	16.2	21.8	16.5	1.0	13.7
		K	63.9	65.7	46.7	63.8	82.2	66.7	3.3	64.8
Ludhiana	Kharif	N	222.9	216.2	221.2	195.1	214.6	218.1	158.8	211.9
		P	38.2	48.3	49.9	35.2	41.1	44.8	38.7	39.3
		K	202.1	194.5	168.5	178.0	171.5	184.2	184.3	152.0

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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
	Rabi	N	99.2	97.1	91.0	94.9	84.3	101.0	81.2	86.7
		P	6.7	6.5	6.8	6.6	7.6	6.5	6.0	6.6
		K	102.0	107.5	100.3	84.3	87.3	97.7	100.4	98.5
	Summer	N	85.2	89.8	94.7	81.1	70.9	91.1	101.7	112.4
		P	60.2	58.6	59.3	51.7	42.3	46.1	54.8	60.0
		K	92.8	85.9	82.4	111.5	70.6	100.9	88.3	92.0
Karmana	Kharif	N	117.0	118.1	111.4	87.4	85.4	78.2	99.4	
		P	70.7	64.5	61.5	54.8	59.8	42.0	63.6	
		K	172.6	171.2	148.9	99.7	116.8	106.6	99.9	
	Rabi	N	124.6	89.2	69.6	67.3	105.2	97.9	129.2	
		P	13.2	7.4	6.9	4.4	11.6	16.1	10.2	
		K	107.0	56.1	46.6	35.9	49.8	63.2	62.8	
Rahuri	Kharif	N	145.2	111.9	135.8	132.8	119.7	137.8	172.6	72.4
		P	22.6	18.1	21.1	21.8	19.5	22.2	28.1	11.7
		K	56.7	47.2	53.0	53.2	47.7	55.2	79.4	27.6
	Rabi	N	44.2	42.1	43.2	42.2	40.8	44.8	58.0	25.0
		P	15.8	15.8	16.0	16.7	15.5	15.9	21.8	9.1
		K	54.0	50.4	50.0	53.5	49.0	49.5	68.0	34.9
Kalyani	Kharif	N	56.2	37.3	50.5	42.6	61.4	28.6	42.2	42.2
		P	20.1	13.9	13.7	13.5	13.6	14.1	15.9	19.2
		K	173.8	122.1	143.1	133.9	145.3	92.4	181.9	138.6
Kathalagere	Summer	N	141.6	137.2	132.1	119.4	123.9	184.0	173.3	
		P	12.4	15.8	14.5	12.7	15.5	17.9	16.2	
		K	75.4	61.0	73.0	67.1	65.5	63.8	68.3	
Siruguppa	Kharif	N	57.6	58.6	39.9	47.1	41.6	50.9	67.5	49.9
		P	10.1	13.8	9.9	12.7	11.5	12.8	14.2	13.6
		K	81.3	79.3	57.0	66.4	52.4	74.3	96.7	74.6
Coimbatore	Kharif	N	137.0	116.0	117.0	127.0	85.0	102.0	138.0	129.0
		P	48.0	41.0	43.0	42.0	35.0	40.0	44.0	41.0
		K	179.0	142.0	147.0	156.0	121.0	135.0	172.0	160.0
	Rabi	N	47.0	39.0	41.0	43.0	37.0	38.0	45.0	44.0
		P	12.0	9.0	11.0	11.0	9.0	9.0	12.0	11.0
		K	29.0	28.0	28.0	29.0	27.0	27.0	30.0	29.0
Thanjavur	Kharif	N	112.3	86.7	100.1	91.4	69.6	88.9	116.3	100.1
		P	27.6	21.0	24.7	25.5	15.8	21.9	31.1	25.5
		K	117.8	84.7	111.3	107.9	59.5	98.8	130.2	109.2
	Rabi	N	86.5	75.9	81.4	82.3	63.9	80.7	89.3	78.5
		P	33.1	30.8	32.1	32.0	25.8	31.8	34.8	31.3
		K	119.8	109.4	119.2	118.2	90.4	110.3	117.7	110.2
	Summer	N	51.4	34.3	43.0	40.6	26.4	38.6	47.3	39.0
		P	3.9	2.7	3.5	3.3	1.9	3.0	3.6	3.2
		K	21.1	14.2	17.4	18.1	10.7	16.3	19.0	15.6

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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
Jabalpur	Rabi	N	187.0	145.0	140.0	143.0	146.0	137.0	197.0	139.0
		P	23.7	17.6	16.9	17.9	18.6	18.0	24.5	17.5
		K	231.0	213.0	223.0	224.0	216.0	221.0	293.0	228.0
Rewa	Rabi	N	103.0	97.0	91.0	94.0	93.0	101.0	105.0	94.0
		P	22.9	16.8	14.2	17.0	16.8	18.6	30.3	17.3
		K	172.0	123.0	117.0	135.0	127.0	151.0	211.0	125.0
Powarkheda	Rabi	N	201.0	156.0	163.0	151.0	126.0	151.0	211.0	143.0
		P	51.4	44.9	48.4	45.1	43.7	40.1	44.1	42.1
		K	271.0	224.0	217.0	245.0	177.0	229.0	295.0	202.0
Karjat	Kharif	N	89.6	63.1	74.8	85.6	65.0	63.8	108.5	
		P	28.5	20.7	20.3	22.8	19.8	22.1	34.8	
		K	125.5	87.2	85.7	93.3	81.0	85.3	144.8	
	Rabi	N	155.2	100.9	99.3	103.5	95.1	100.5	197.8	
		P	36.0	19.7	19.5	20.5	19.7	21.3	54.5	
		K	225.3	121.9	120.4	128.7	125.2	126.2	278.9	

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
Jabalpur	Rabi	OC%	0.62	0.68	0.63	0.62	
		N	272	295.0	274.0	265.0	
		P	9.6	10.3	9.3	9.8	
		K	340.0	361.0	345.0	290.0	
Hisar	Kharif	OC%	0.46	0.50	0.50	0.47	
		N	144.2	149.8	152.6	148.4	
		P	11.2	12.0	14.0	12.8	
		K	218.0	237.0	238.0	223.0	
	Rabi	OC%	0.42	0.46	0.47	0.43	
		N	138.6	142.8	144.2	141.4	
		P	11.6	12.0	12.4.0	12.0	
		K	196.0	228.0	230.0	215.0	
Sabour	Rice/ Wheat	OC%	0.54	0.55	0.57	0.56	0.52
		N	222.6	218.9	242.1	230.9	216.8
		P	29.6	29.3	30.8	30.2	28.8
		K	196.8	192.6	212.4	215.4	198.2
Ludhaina	Rabi	OC%	0.48	0.56	0.60	0.58	0.57
		N	170.2	180.5	184.6	172.6	176.2
		P	29.2	35.2	31.5	32.2	30.1
		K	160.2	175.8	188.6	178.5	168.5
Jammu	Rabi	OC%	0.55	0.58	0.61	0.56	0.55
		N	225.0	232.0	210.0	245.0	187.0
		P	23.0	23.1	24.2.0	25.1	23.2
		K	115.0	122.0	120.0	124.0	119.0

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	T_6
Jabalpur	Rabi	N	197.0	212.0	206.0	198.0		
		P	29.7	32.6	31.1	28.9		
		K	242.0	261.0	250.0	239.0		
Hisar	Kharif	N	88.8	99.3	106.1	93.6		
		P	23.8	27.1	30.0	26.9		
		K	188.8	208.8	225.8	197.2		
	Rabi	N	112.4	123.3	131.2	118.8		
		P	21.9	25.4	26.3	22.1		
		K	139.3	161.4	166.6	150.6		
Sabour	Kharif	N	113.5	122.9	117.7	115.6	94.8	
		P	33.5	36.3	34.5	34.1	28.0	
		K	137.0	145.5	141.5	138.5	114.4	
	Rabi	N	106.5	111.1	115.0	111.3	89.3	
		P	29.7	31.5	33.0	31.8	24.9	
		K	114.0	118.9	122.1	119.3	95.9	
Hisar	Kharif	N	88.8	99.3	106.1	93.6		
		P	23.8	27.1	30.0	26.9		
		K	188.8	208.8	225.8	197.2		
	Rabi	N	112.4	123.3	131.2	118.8		
		P	21.9	25.4	26.3	22.1		
		K	139.3	161.4	166.6	150.6		
Sabour	Rabi	N	113.5	122.9	117.7	115.6	94.8	
Siruguppa	Kharif	N	65.0	62.0	58.0	65.0		
		P	10.2	10.8	10.3	12.5		
		K	72.0	65.0	63.0	69.0		
	Rabi	N	77.0	76.0	61.0	67.0		
		P	5.5	5.1	4.1	4.1		
		K	38.0	37.0	32.0	39.0		
Jammu	Kharif	N	52.5	66.8	68.2	67.5	48.2	
		P	16.8	19.3	23.1	18.5	15.1	
		K	69.1	80.4	89.0	76.3	61.9	
	Rabi	N	58.7	64.0	67.5	65.5	49.7	
		P	13.1	15.9	18.6	18.1	11.7	
		K	62.9	68.8	69.2	71.9	54.3	

ANNEXURES

Annexure I

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Annexure-II

PRICES (RS./100 KG) ASSUMED FOR DETERMINING GROSS RETURNS & CALORIFIC VALUE PER 100 G FOR 2010-11*

Crops	Price (Rs./q) 2010-11
All Fodders	100
All green manuring	200
Amaranthus	850
Arhar/Pigeonpea/Redgram	3170
Ashwagandha)	8000
Baby Corn	90paise/cob or 6000
Barley	780
Berseem (seed)	8000
Beetroot	1200
Blackgram/Urad/mash	2900
Bottle gourd (Lauki)	500
Brinjal	800
Broccoli	2000
Bittergourd	1500
Bt. cotton	3000
Buck Wheat	2500
Cabbage	500
Capcicum	1500
Carrot	500
Cassava	800
Castor	1650
Cauliflower	600
Chandrasur	1500
Chillies(green)	1500
Clusterbean	833
Coleus	1400
Coriander(S)	3000
Coriander(L)	900
Cotton(F-4/1180)	2500
Cotton (H-1380)	3000
Cowpea (Lobia)(S)	1705
Cowpea (Veg.)pod	867
Cucumber	800
Cumin/SiyaZeera	3000
Dolichosbean (pod)/LabLab	1500
Elephant foot yam(Kalyani)	1200
Fennugreek (seed)	3000
Fennugreek leaves/spinach	900
Field bean	1625
Fieldpeas/Veg.peas	800
Frenchbeans	1625
Garlic	2800
Ginger	3000
Gram/Chickpea/Bengalgram	1760
Greengram/Moongbean	3170
Groundnut	2300
Horsegram	2100

Crops	Price (Rs./q) 2010-11
Indian bean	1500
Jute stalk**	1575
Knolkhol	500
Ladyfinger	900
lablab	1500
Isabgol	5950
Lentil	2250
Linseed	2530
Maize(Grain)	880
Maize (green cobs)	0.66/cob or 230/q
Maize Sweet Corn grain	1000
Marigold	1500
Rapeseed & Mustard	1850
Gobhi sarson/Hayola	1500
Niger Seed	2450
Oat	900
Onion (big)	750
Pea	1800
Pea (veg.)	800
Pearlmillet/Bajra	880
Potato	330
Pumpkin	600
Palak/Spinach	750
Papaya	1000
Radish (White)	250
Ragi/Fingermillet	965
Rajgira	3000
Rice(coarse)*	1030
Ricebean fodder	100
Ridge gourd/Round gourd	1000
Safflower	1800
Sesamum/Gingely/Til	2900
Sesamum-white	4000
Sorghum/Jowar	900
Soyabean (b)	1400
Soyabean (y)	1440
Summer Squash	800
Sugar beat	400
Sunflower	2350
Rice Basmati	1980
Sweet Potato	660
Tomato (green)	700
Toria	1500
Turmeric	2000
Yam	1200
Yard long bean	1200
Wheat	1120

Remarks : * Prices are indicative only. Fluctuates region to region and area to area

Annexure-III

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

S.N.	Common name	Botanical name	Hindi Name
30	Indian Mustard	*Brassica juncea Coss.*	Sarson/ Raya
31	Indian rape	*Brassica campestris* L. var. Toria	Toria
32	Lady's finger/ Okra	*Abelmoschus esculantus*Moench.	Bhindi
33	Lentil	*Lens culinaris*Medikus	masoor
34	Linseed/ Flax/ Flax seed	*Linum usitatissinum L.*	Alsi
35	Maize/ Corn	*Zea mays* L.	Makka
36	Marigold	*Calendula officinalis* L.	Gainda
37	Mustard	*Brassica campestris* L. var. Yellow sarson/ Brown sarson	Sarson
38	Oat	*Avena sativa* L.	Jaee
39	Onion	*Allium cepa* L.	Pyaz
40	Pearl millet	*Pennisetum americanum L.*	Bajra
41	Pea/ Vegetable Pea	*Pisum sativum* L.	Matar
42	Pigeon pea	*Cajanus cajan* (L) Milsp.	Arhar/ Tuar
43	Potato	*Solonum tuberosum* L.	Aloo
44	Psyllium	*Plantago ovata* Forssk.	Isabgol
45	Pumpkin	*Cucurbita pepo* Duch.	Kaddu
46	Radish	*Raphanus sativus* L.	Mooli
47	Rape/ Oilseed rape	*Brassica napus* var. napus	Gobhi Sarson
48	Red/ Purple Amaranth	*Amaranthus cruentus* L.	Chaulai/ Ramdana/ Rajgira
49	Rice/ Paddy	*Oryza sativa* L.	Dhan
50	Ridge gourd/ Sponge gourd	*Lufa acutangula/ L. aegyptica/ L. cylindrica*	Torai
51	Sesame	*Sesamum indicum* L.	Til
52	Sorghum	*Sorghum bicolor* (L.) Moench.	Jowar
53	Soybean	*Glycine max* L. (Merr.)	Soybean
54	Spinach	*Spinacia oleracea* L.	Palak
55	Sugar beet	*Beta vulgaris* L.	Chukander
56	Sugarcane	*Saccharum officinarum* L.	Ganna
57	Sunflower	*Helianthus annus* L.	Surajmukhi
58	Sunhemp	*Crotolaria juncea* L.	Sanai
59	Sweet potato	*Ipomoea batatas* (L.) Lam.	Sakarkand
60	Tomato	*Solanum lycopersicum L./ Lycopersicon esculantum/ L. lycopersicum*	Tamatar
61	Turmeric	*Curcuma longa* L.	Haldi
62	Wheat	*Triticum aestivum* L.emend. Fiori & Paol.	Gehun

NOTES

NOTES

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