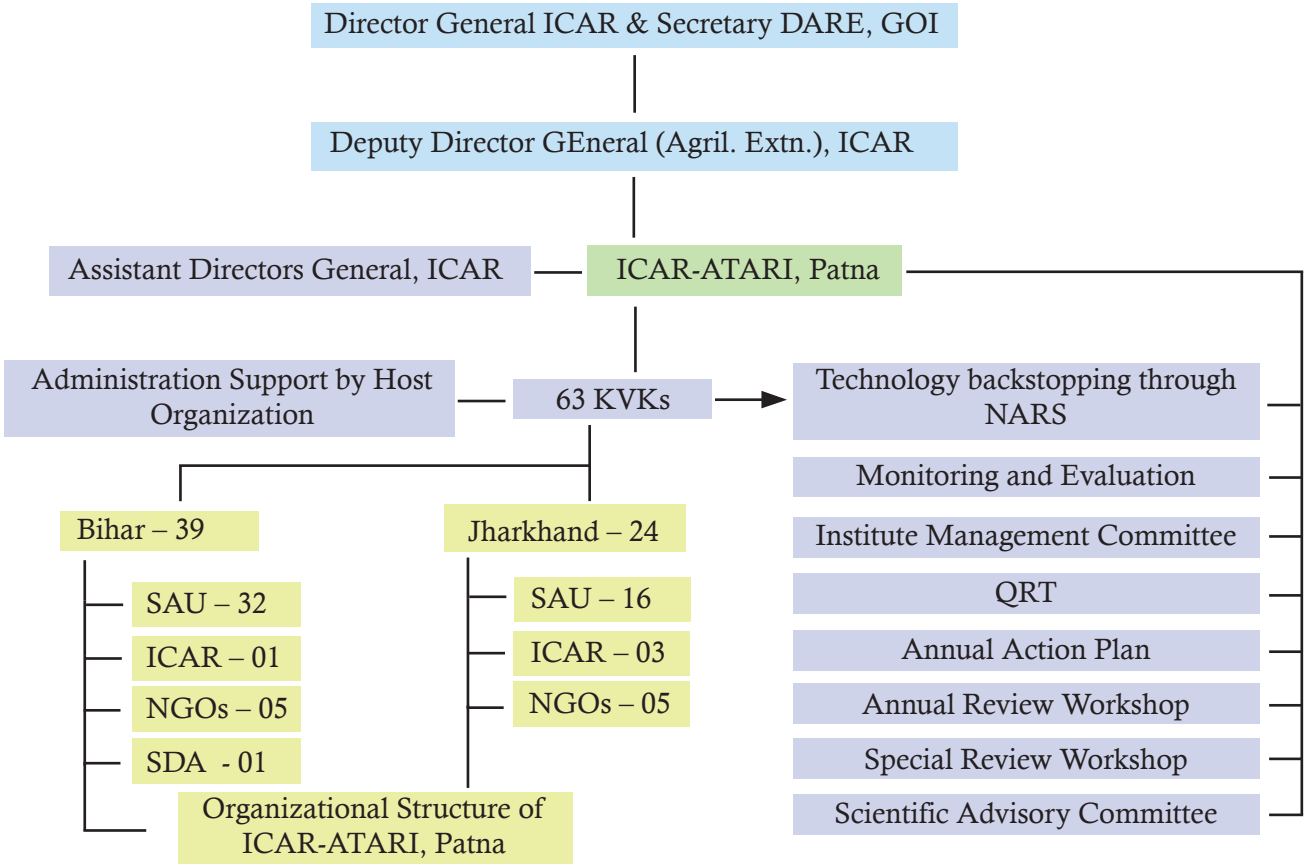
1. Organizational structure and staff position

Division of Agricultural Extension of Indian Council of Agricultural Research (ICAR) is monitoring the activities of 692 Krishi Vigyan Kendras spread across the country. Deputy Director General (AE) who looks after the administrative, financial and overall functioning of KVK. The Division of Agricultural Extension of ICAR is supported by eleven erstwhile Agricultural Technology Application Research Institutes (ATARIs), previously called as Zonal Project Directorates (ZPDs). ATARIs are looking after the activities of KVKs in the State and District level. ICAR–ATARI Patna is among the eleven (11) ATARIs of the country. ICAR-ATARI Patna has been newly established during 2017- 18, after bifurcation from ICAR-ATARI Kolkata, for monitoring activities of 63 Krishi Vigyan Kendras (KVKs) of Bihar and Jharkhand. ICAR-ATARI Patna falls under Zone-IV. The office of ICAR-ATARI Patna is now located at the campus of Central Potato Research Station, P.O. Sahaynagar, Patna- 801506, Bihar.

1.1 Profile:

The Division of Agricultural Extension is headed by Deputy Director General (AE) under Director General, DARE, ICAR, New Delhi and has ICAR-ATARIs and KVKs at Zonal and district level, respectively.



1.2 Budget Provision

Among the most important activities of ICAR-ATARI Patna, decision on financial matters was taken based on assessing the submitted budget requirement, placing demand for fund, receiving funds and subsequent releasing of fund. Funds allocated for running 63 KVKs and 3 Directorates of Extension Education (DEE) of the SAUs of this Zone were successfully managed. During the year 2017-18, a sum of Rs 8336.60 Lakh has been provided to the KVKs including DEEs in different as per detailed below.

Table 1: Budget in respect of ICAR-Agricultural Technology Application Research Institute & KVKs under Zone- IV during 2017-18

(Rs. in lakh)

DEE/KVK	Recurring							Non-Recurring					Revol. Fund	Grand total
	P & A	Total	T.A.	H.R.D	Cont.	TSP Cont.	Total	Equip.&furn	Works	Lib.	Vehicle	Total		
BAU Ranchi	85532000	85532000	1135000	630000	8945500	15343000	26053500	0	0	0	0	0	0	111585500
RAU Pusa	82476000	82476000	1580000	870000	16250000	0	18700000	0	0	0	0	0	0	101176000
BAU Sabour	158214000	158214000	2225000	813000	31597000	0	34635000	0	5900000	0	0	5900000	0	198749000
NGO Bihar	58730000	58730000	620000	370000	4945000	5080000	11015000	0	0	0	0	0	0	69745000
NGO Jharkhand	54966000	54966000	590000	380000	5780000	3687000	10437000	0	0	0	0	0	0	65403000
RCER Patna	15668000	15668000	260000	150000	2363000	0	2773000	0	3000000	0	0	3000000	0	21441000
Koderma	8000000	8000000	130000	70000	1300000	0	1500000	0	0	0	0	0	0	9500000
Khunti	1935000	1935000	30000	10000	40000	1320000	1400000	0	0	0	0	0	0	3335000
DEE Sabour	0	0	200000	600000	1375000	0	2175000	0	3000000	0	0	3000000	0	5175000
DEE Ranchi	0	0	175000	500000	1300000	0	1975000	0	0	0	0	0	0	1975000
DEE Pusa	0	0	175000	500000	1300000	0	1975000	0	0	0	0	0	0	1975000
GRAND TOTAL	**465521000**	**465521000**	**7120000**	**4893000**	**75195500**	**25430000**	**112638500**	**0**	**11900000**	**0**	**0**	**11900000**	**0**	**590059500**
ATARI BE 17-18	153379000						18636500	0		0		71585000	0	243600500
Budget 2017-18	61,89,00,000					2,54,30,000	10,58,45,000					8,34,85,000		83,36,60,000
	61,89,00,000						13,12,75,000					8,34,85,000		83,36,60,000

2. Krishi Vigyan Kendra

KVK, which is spreading over 692 districts of the country, is an organization at district level to organize frontline extension activities. It aims at technology assessment and refinement system, dissemination of technology generated by the Universities/ Research Institutes, supply of critical inputs and reaching out to the farmers with different solutions of their farming problems. KVK also provides technological expertise to different State and Central Government Agencies involved in Agricultural Research and Extension. In addition, it implements several schemes of Central and State Government at district level. Recently, KVKs have been entrusted with implementation of several National Flagship Programmes, viz., Cluster Front Line Demonstration (CFLD) on Pulses and Oilseeds, Seed Hub, Soil Health Card, Attracting and Retaining Youth in Agriculture (ARYA), National Innovations in Climate Resilient Agriculture- Technology Demonstration Component (NICRA-TDC), Pradhan Mantri FasalBimaYojna, Swachh Bharat Abhiyan, Tribal Sub Plan (TSP), Sankalp se Siddhi, Skill Development in Agriculture and many others.

State-wise distribution of KVK:

During 2017-18, under ICAR-ATARI, Patna a total 63 KVKs of Bihar and Jharkhand was working in two states of eastern India. Host organization-wise distribution showed 48 KVKs under SAU, 4 under ICAR, 9 under NGOs, 2 under State Government undertaking, as detailed below in the following table.

Table 2: State wise status of KrishiVigyanKendras

Name of the State	No. of Districts	No. of KVKs under						TOTAL
		SAU	ICAR	DU	CU	NGO	SDA	
Bihar	38	20	1	-	12	5	1	39
Jharkhand	24	16	3	-	-	4	1	24
Total		**36**	**4**	**-**	**12**	**9**	**2**	**63**

ICAR – Indian Council of Agricultural Research, SAU – State Agricultural University, CU- Central University, NGO – Non-Governmental Organization, SDA- State Department of Agriculture

Table 3: Host organization wise status of KrishiVigyanKendras

Sl. No.	State/UT	Host Institution	Total
2.	**Bihar (39)**	Dr Rajendra Prasad Central Agricultural University, Pusa, Samastipur	12
		Bihar Agricultural University, Bhagalpur	20
		ICAR Research Complex for Eastern Region, Patna (Buxar)	1
		Sone Command Area Development Agency, (SDA) Bhojpur	1
		Shrama Bharti, Khadigram, Jamui (NGO)	1
		Vanavasi Seva Kendra, Bhabhua, Kaimur (NGO)	1
		S.K. Chaudhary Educational Trust, Madhubani (NGO)	1
		Gram Nirman Mandal, Nawada (NGO)	1
		Samata Seva Kendra, Sitamarhi (NGO)	1
3.	**Jharkhand (24)**	Birsa Agricultural University, Kanke, Ranchi	16
		Central Rice Research Institute, (ICAR) Cuttack, Koderma	1
		Ram Krishna Mission Ashram, Ranchi (NGO)	1
		Holy Cross, Hazaribag (NGO)	1
		Vikas Bharati, Gumla (NGO)	1
		Santhal Paharia, Deoghar (NGO)*	1
		Garmin Vikas Trust, Godda (NGO)	1
		Indian Institute of Resins and Gum, Namkum, Ranchi	1
		ICAR Research Complex for Eastern Region, Patna, Ramgarh	1
	Total		**63**

* Presently under state administration

Genesis of Krishi Vigyan Kendra:

Establishment of KVK started in the year 1974 at Pondicherry under Tamil Nadu Agricultural University as a result of recommendation of Dr. Mohan Singh Mehta Committee appointed by ICAR in 1973. Then Planning Commission approved establishment of KVK during different plans leading to number of KVKs to 692 at present. During Vth Five Year Plan 18 KVKs were established, 12 KVKs opened during 1979, 14 during 1981, 44 during VIth Five Year Plan were also started. Thus at the end of VIth Plan 89 KVKs including KVKs of Bihar and Jharkhand started functioning under Zone II, Kolkata. Further, in 2017 reshuffling of zones were done by ICAR and the new zone (Zone IV, ICAR-ATARI Patna) comprising Bihar and Jharkhand was established with 63 KVKs of Bihar and Jharkhand. Success of the KVKs in the field of Technology

Assessment, Demonstration and its Application resulted in declaration of one or more KVK in each district by the Prime Minister's Independence Day Speech on 15th August 2015. Indian Council of Agricultural Research established 692 KVKs across the country till the end of year 2017.

Under ICAR- ATARI Patna with its jurisdiction of Bihar and Jharkhand,63KVKs has been established up to March 2017. There are also proposal for opening new KVKs in Bihar and Jharkhand.

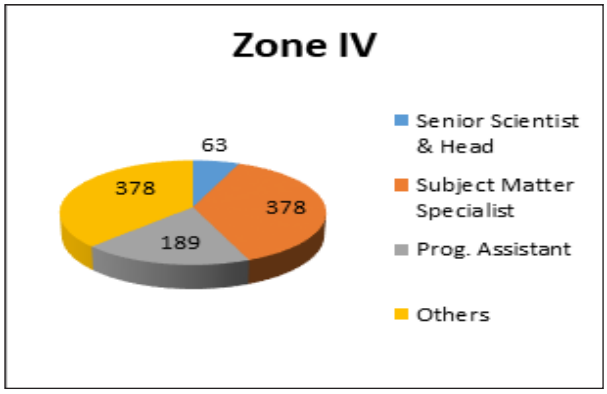
Mandate: The mandate of KVK is to assess, demonstrate and apply technologies/products to cater the needs of farming community, extension personnel and other stakeholders in the district. In order to accomplish the aim, KVKs carry out the following activities:

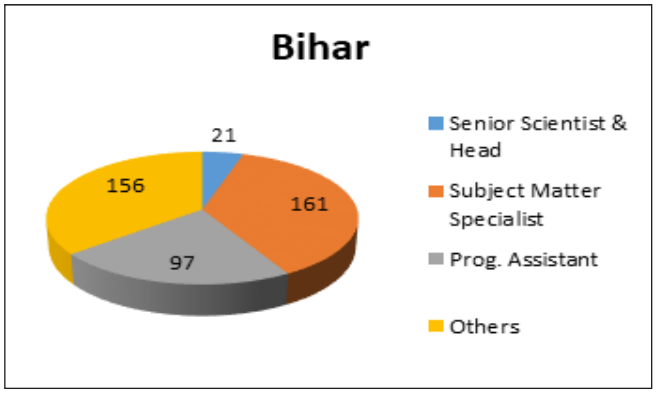
- Conduct on-farm trials to identify the location specific agricultural technologies under various farming systems.
- Organize frontline demonstrations to establish production potential of various crops and enterprises in the farmers' fields.
- Organize need based training for farmers to update their knowledge and skills on modern agricultural technologies and provide training to extension personnel to orient them in the frontier areas of technology development.
- Create awareness about improved agricultural technologies among various clientele groups through appropriate extension programmes.
- Produce quality seeds, planting materials, livestock breeds, animal products, bio-products etc. as per the demand and supply the same to different clienteles.
- Work as knowledge and resource centre of agricultural technologies to support the initiatives of public, private and voluntary sectors for improving the agricultural economy of the district.

Manpower: Staff strength provided to each KVK is 16 which include one Senior Scientist and Head, six Subject Matter Specialists, three Programme Assistants, two administrative staff, two drivers and two supporting staff. Accordingly, the total sanctioned staff for 63 KVKs of Zone IV is 1008, out of which 636 (63 per cent) are in position. Details of state wise and category wise staff strength of KVKs are furnished in the following table:

Table 4: Staff position in KVK

Staff Position	Bihar	Jharkhand	Zone IV
Senior Scientist & Head	21	09	63
Subject Matter Specialist	161	89	378
Prog. Assistant	97	39	189
Others	156	64	378
TOTAL	**435**	**201**	**1008**





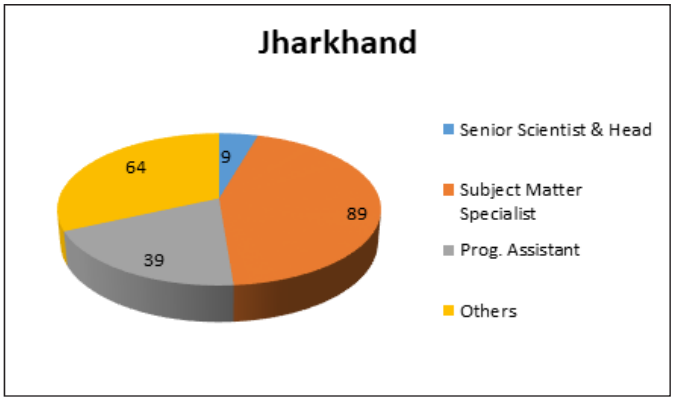


Fig 1: Filled up position in different staff categories in zone IV

Name of State	Sr. Scientist & Head			SMS			Farm Manager			P.A. (Computer)			P.A. (Lab. Tech.)			Others			TOTAL		
	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V
Bihar	39	21	18	234	161	73	39	36	03	39	29	10	39	32	07	234	156	78	624	435	189
Jharkhand	24	09	15	144	89	55	24	16	08	24	11	13	24	12	12	144	64	80	384	201	183
Total	63	30	33	378	250	128	63	52	11	63	40	23	63	44	19	378	220	158	1008	636	372

Table 5: Category-wise staff position

Name of State	Sr. Scientist & Head			SMS			Farm Manager			PA (Computer)			PA (Lab. Tech)			Assistant			Steno. Grade-3			Driver			Skilled supporing staff			TOTAL		
	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V
Bihar	39	21	18	234	161	73	39	36	03	39	29	10	39	32	07	39	39	0	39	33	06	78	54	24	78	30	48	624	435	189
Jharkhand	24	09	15	144	89	55	24	16	08	24	11	13	24	12	12	24	09	15	24	09	15	48	24	24	48	22	26	384	201	183
Total	63	30	33	378	250	128	63	52	11	63	40	23	63	44	19	63	48	15	63	42	21	126	78	48	126	52	74	1008	636	372

Revolving Fund:

Since the KVKs has been provided revolving fund as one time seed money for making KVK farm self sufficient in terms of resources through seed/ sapling production, use of ponds for fish production and establishment of horticulture orchards. Income generated was used for improvement of the farm. Revolving fund reported by 63 KVKs of Zone-IV where revolving fund scheme is operating accumulated a net balance was Rs. 8.08crore as on 1st April, 2018. In the year 2017-18, a substantial amount of fund i.e. 3.01crore was generated by the KVKs of Zone IV through revolving fund scheme. As per state is concerned, Bihar KVKs earned the amount of Rs. 220.9 Lakh and Jharkhand of Rs. 80.9 Lakh through this scheme in the year 2017-18. The detail status of revolving fund of KVKs under Zone IV has been presented in table:-

Table 6: Status of operating revolving scheme by the KVKs

State	Year	Opening Balance on 1st April	Income during the year	Expenditure during the year	Net balance in hand as on 1st April of each year
Bihar	2015-16	4,89,72,387.61	3,40,15,132.52	2,61,97,338.94	5,67,90,181.19
	2016-17	5,67,90,181.19	3,59,16,235.23	2,80,87,093.19	6,46,19,323.23
	2017-18	6,49,19,323.23	2,20,90,280.30	2,27,36,605.00	6,42,72,998.53
Jharkhand	2015-16	1,01,71,244.48	1,38,09,736.00	1,24,40,028.00	1,15,40,952.48
	2016-17	1,15,40,952.48	1,46,80,654.25	1,03,64,610.02	1,58,56,996.71
	2017-18	1,58,56,996.71	80,90,718.00	73,77,599.75	1,65,70,114.96
Total	2015-16	5,91,43,632.09	4,78,24,868.52	3,86,37,366.94	6,83,31,133.67
	2016-17	6,83,31,133.67	5,05,96,889.48	3,84,51,703.21	8,04,76,319.94
	2017-18	8,07,76,319.94	3,01,80,998.30	3,01,14,204.75	8,08,43,113.49

Infrastructure facilities: In order to enable the KVKs to accomplish its set objectives, KVKs have been provided with number of infrastructure facilities like administrative building, farmers' hostel, staff quarter, demonstration unit, soil and water testing laboratories, rain water harvesting structure with micro-irrigation facilities, portable carp hatchery, IFS model, E-connectivity, technology information unit vehicles etc. In most of the cases, KVKs utilize the facilities for the cause of the farmers to demonstrate the benefit of proper management practices. The details of infrastructure facilities available with the KVKs are given in Table.

Table 7: State-wise details of infrastructure available with KVKs

Name of the state	Admn. Bldg.	Farmer Hostel	Demo. Unit	Staff Qtrs	Rain Water Harvesting Structures	Soil and Water Testing Lab	Minimal Processing Facility	Carp Hatchery	Integrated Farming System Units	e-linkage Facility	Technology Information Unit	Micro Nutrient Analysis Facilities	Solar Panel
Bihar	33	33	196	32	4	24	11	2	9	14	10	10	9
Jharkhand	18	19	126	11	17	16	4	0	8	9	5	9	2
Total	51	52	223	43	21	40	15	2	17	23	15	19	11

Thrust area: Thrust areas are identified based on the prevailing agro-ecological situation, existing cropping pattern and farming systems and expectation of the district economy on agriculture. Accordingly, KVKs are working on the following thrust areas:

1) Productivity enhancement of cereals, pulses and oilseeds
2) Production of quality inputs like seed of major crops, planting materials etc. and breeds of livestock
3) Capacity building among rural youths towards self-employment
4) Integrated nutrient, pest and disease management
5) Establishment of farming system in the region
6) Crop diversification
7) Empowerment of women in terms of improved nutrition, income and drudgery reduction through technological literacy
8) Value addition, processing and market facilitation of household and commercial enterprises
9) Use of resource conservation technology
10) Major initiative to combat climate change in the region
11) Contingency planning for monsoon/drought
12) Initiative for growth of fodder technology
13) Water harvesting and watershed management
14) Small scale mechanization for reducing cost and drudgery
15) Doubling the farmers income in agriculture and allied fields

3. About agricultural technology application research institute (atari), patna

ICAR-ATARI Patna, Zone-IV began its journey from the office premises located within the CPRS (ICAR) Campus Sahay Nagar, Patna with the specific objective to plan, monitor and evaluate the Programmes of KVKs working in Bihar and Jharkhand. Alongside, it is entrusted with the responsibility to monitor and guide the activities of KVKs which are gradually coming up with great future promises as District Level First Line Agricultural Institutions. The initial operational jurisdiction of the Zone IV is spread over Bihar and Jharkhand since April 2017 after bifurcation of ICAR-ATARI Kolkata. The Unit goes on widening its service domains creditably in the form of successful implementation of different programmes like Cluster Front Line Demonstrations (CFLD) under National Pulse Production Programme (NPPP), Cluster Front Line Demonstrations (CFLD) under National Oilseed Production Programme (NOPP), Seed Hub, Cereal Systems Initiative for South Asia (CSISA), Soil Health Card, Attracting and Retaining Youth in Agriculture (ARYA), National Innovations in Climate Resilient Agriculture- Technology Demonstration Component (NICRA-TDC), Pradhan Mantri Fasal BimaYojna, Swachh Bharat Abhiyan, Tribal Sub Plan (TSP), Sankalp se Siddhi, Skill Development in Agriculture and allied fieldsunder Agriculture Skill Council of India (ASCI) and Farmers' FIRST programme were also carried out.

Mandate: The mandates of ICAR-ATARI are as follows:-

1. Coordination and monitoring of technology assessment, demonstration and its application through KVKs.
2. Strengthening Agricultural Extension Research and Knowledge Management Centre.

The ICAR-ATARI, Patna has executed the following functions to achieve the above mandates.

- Formulate, implement, monitor, guide and evaluate the programmes and activities of KVKs.
- Coordinate the work relating to KVKs and ATICs implemented through various agencies such as SAUs, ICAR institutes, voluntary agencies and development departments.
- Coordinate with State/Central Government organizations, financial institutions and other organizations for successful implementation of programmes.
- Partnering with Directorates of Extension Education of SAUs in assured technological backstopping to KVKs and appropriate overseeing of KVK activities.
- Strengthening the Directorates of Extension Education of SAUs with financial support.
- Serve as feedback mechanism from the projects to research and extension systems.
- Implementing projects of ICAR like CFLD, Seed Hub, CSISA, NICRA- TDC, ARYA, TSP, ASCI, PPV &FRA,NIFTD, Farmers' FIRST programme and others.
- Maintain close liaison with ICAR headquarter particularly with Division of Agricultural Extension for preparing reports, write ups and other important documents.

Staff: ICAR-ATARI, Patna is having total sanctioned staff strength of 2, out of which only one post has been filled up to March 2018.

Table 8: Staff strength of Agricultural Technology Application Research Institute, Patna

Category	Sanctioned	Filled
Director (RMP)	1	1

Institute Management Committee

Institute Management Committee meeting for ATARI, Patna was held on 27thFebruary, 2018. The members were apprised of the functioning of ATARI, Patna, achievements and various initiatives taken to monitor the activities of the KVK. In the course of discussion initiative taken in the field of research and technological backstopping was also discussed. Suggestions of the members were taken for th e effective functioning of the Institute. Approval for the proposed agenda items was also taken.

New Initiatives of Atari, Patna

ICAR-ATARI, Patna, besides performing its regular monitoring activities, also encouraged the KVKs of this zone to get them involved in a number of programmes depending on the farmers need in the district and technical capability of the KVKs to better contribute towards growth of agriculture and allied sectors. Some of the flagship programmes which were undertaken by KVKs during 2017-18and some newly conceived programmes are enlisted as under:-

- Skill Development in Agriculture and allied fields under Agriculture Skill Council of India (ASCI)
- Seed Hub
- Attracting and Retaining Youth in Agriculture (ARYA)
- Farmer FIRST Programme
- CSISA-ICAR Collaborative Project Phase-III
- NFDB funded Capacity Building Training Programme
- KVK Knowledge Network/ KVK Portal
- KRISHI Portal
- Management Information System including Financial Management System (MIS-FMS) under ICAR-ERP
- Online reporting by KVKs
- Climate Resilient Agriculture- Technology Demonstration Component (NICRA-TDC
- Cluster Front Line Demonstration (CFLD)
- Integrated Farming System (IFS)
- Tribal Sub Plan (TSP)
- Protection of Plant Varieties & Farmers Right Act (PPV&FRA)
- Pradhan Mantri FasalBimaYojna

- Celebration of Swachhta Pakhwada 2017
- Sankalp se Siddhiprogramme
- Celebration of MahilaKishanDiwas 2017
- Celebration of World Soil Health Day 2017

4. Achievements

4.1Technology Assessment and Refinement

4.1.1 On-Farm Trial

In fulfilling the most important part of the mandate, 63 KVKs of this Zone worked towards successful application of implementable technologies in the field of agriculture and allied sectors. In technology application front, the KVKs assessed and demonstrated various agricultural technologies and imparted training on various crop, livestock, fishery related technologies extending their practical aspects for betterment of the farming community and other stakeholders. During 2017-18, a total of 63 KVKs of Zone-IV conducted 489 on-farm trials with an objective to assess the technologies developed by different institutions in agriculture and allied sectors. The technologies, which were assessed, included those in the areas of crop production, insect-pest and disease management, nutrient management, feed and fodder management, livestock production and health management, drudgery reduction, value addition and other areas. About 22 thematic areas were identified for assessment and refinement of technologies and presented in Table 9.

Improved technologies related to crop production, livestock production, fish production, drudgery reduction and value addition etc. have been assessed to provide technological solution to the farming community pertaining to various aspects of agriculture and allied areas. **During the year 2017-18, the KVKs conducted 489 on-farm trials in 3865 locations to assess a total of 305 technologies**. Among various thematic areas, technologies were tested in integrated nutrient management through 83 on-farm trials, followed by integrated crop production (63 on-farm trials), integrated disease management (55 on-farm trials), Integrated crop management (46 OFT), integrated pest management (42 on-farm trials), varietal evaluation (25 on-farm trials), weed management (26 on-farm trials) and Farm Implement and machineries (19 OFT). In livestock sector, the highest number (21) of on-farm trial was conducted in the area of livestock nutritional management followed by disease management (14 on-farm trials). In fishery, 6 on-farm trials were conducted during this year.

State-wise analysis of on-farm trials conducted showed that **KVKs of Bihar carried out a total of 321 on-farm trials distributed in 2552 locations, the corresponding values for Jharkhand were 168 and 1313**. A total of 51 on-farm trials were conducted by KVKs of Bihar in integrated nutrient management and32 by KVKs of Jharkhand in the same thematic area. The other important areas for the KVKs of Bihar were integrated crop management (34 on-farm trials), integrated disease management (38 on-farm trials), weed management (19 on-farm trials) and integrated pest management (27 on-farm trials) etc. In Jharkhand, integrated nutrient management was the most important thematic area with 32 number of on-farm trials followed by crop production (24 on-farm trials), integrated pest management (15 on-farm trials) and livestock management (31 on-farm trials). The feedback on the performance of the technologies has also been brought to the notice of research and extension wing for their effective dissemination in the entire zone. Some of the on-farm trials conducted by the KVKs are presented below with table, photographs and relevant information.

Table 9: State wise details of on Farm Trial conducted by the KVKs Zone-IV

Thematic Area	Bihar		Jharkhand	
	No. of Location	No. of OFT	No. of Location	No. of OFT
Integrated Crop management (ICM)	238	34	84	12
Integrated Disease management (IDM)	304	38	119	17
Integrated Pest management (IPM)	189	27	105	15
Integrated Nutrient management (INM)	409	51	256	32

Thematic Area	Bihar		Jharkhand	
	No. of Location	No. of OFT	No. of Location	No. of OFT
Varietal Evaluation (VE)	114	14	90	11
Weed management (WM)	157	19	57	7
Water management	42	5	29	3
Storage Technology (ST)	18	2	51	6
Resource Conservation Technology (RCT)	57	7	28	3
Farm implements & machineries (FIM)	114	14	38	5
Crop production	320	39	192	24
Nursery Raising	38	5	10	1
Total	**2001**	**255**	**1059**	**136**
Live Stock sector				
Production & Management (P&M)	19	2	19	4
Nutrient Management (NM)	24	3	9	1
Fishery	31	4	17	2
Feed & Fodder	113	13	65	8
Breed Evaluation (BE)	8	1	17	2
Disease management	86	11	24	3
Food & Nutrition (F&N)	81	10	31	4
Value Addition (VA)	114	13	44	5
Drudgery Reduction (DR)	47	6	17	2
Total	523	63	243	31
Enterprise	28	3	11	1
Grand Total	**2552**	**321**	**1313**	**168**

Bihar

KVK Purnea

Thematic Area: Integrated Crop Management (ICM)

Evaluation of Rabi maize productivity under high fertilizer level and high plant density

An on farm trial was conducted in Purnea district to refine fertility level and plant population of Rabi hybrid maize. There were three technology options. Isobilaeral leaf type maize hybrid with fertility level of 180:112.5:75 kg ($N:P_2O_5:K_2O$) per ha at 50x20 cm spacing has been found the best among all the options.

Table 10: Rabi maize productivity under high fertilizer level and high plant density

Technology option	No. of trials	Yield component			Disease/ insect pest incidence (%)	Yield (q/ ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
		No. of Grains/ Cob	No. of spikelet per panicle (1 m^2 Area)	Test wt. (100 grain wt.) (1 m^2 Area)						
Farmers Practice (State Recommendation) General cultivation at 60x 20 cm spacing with 120:75:50 kg ($N:P_2O_5:K_2O$)	07	123	-	22.0	-	68.65	29400.00	75515.00	46115.00	2.56
Tech. Option 1: Isobilateral leaf type maize hybrid with fertilizerlevel of 150:93.75:62.5 kg ($N:P_2O_5:K_2O$) per ha at 50x20 cm spacing		137	-	26.5	-	73.76	28825.00	81136.00	52311.00	2.81
Tech. Option 2:Isobilateral leaf type maize hybrid with fertilizer level of 180:112.5:75 kg ($N:P_2O_5:K_2O$) per ha at 50x20 cm spacing		**142**	**-**	**28.6**	**-**	**76.48**	**29300.00**	**84128.00**	**54828.00**	**2.87**
Tech. Option 3: Isobilateral leaf type maize hybrid with fertilizer level of 180:112.5:75 kg ($N:P_2O_5:K_2O$) per ha at 40x20 cm spacing		132	-	24.3	-	72.25	29000.00	79475.00	56475.00	2.74

OFT on Evaluation of Rabi maize productivity under high fertility level & high plant density in Bihar.

KVK Buxar

Thematic Area: Resource Conservation Technology (RCT)

Evaluation of Conservation Agricultural practices under rice-fallow system of eastern region

Poor yield of direct seeded rice due to high infestation of weed flora has been noticed in Buxar. Accordingly, a trial was conducted on 'Evaluation of conservation agricultural practices under rice-fallow system of eastern region'. As shown in Table 12, direct seeded rice followed by lathyrus produced the higher grain yield, rice equivalent yield with maximum net return and BC ratio, out of three technology options. Rice equivalent yield was recorded maximum under DRS-Lathyrsu followed by DSR chickpea. Maximum net return of Rs 79621 and BCR of 3.05 was recorded with DSR-Lathyrus. In limited moisture condition, crop performed well and lathyrus produced higher yield. By adoption of this practice, some rice-fallow area can be converted under cultivation.

Technology Option	No of trials	Actual yield (kg/ha)	Rabi season crop yield (kg/ha)	REY (kg/ha)	Cost of cultivation (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	BC ratio
		Rice						
Farmers Practice (Transplanted rice-fallow)	10	4480.0	-	4480	30200.0	65856	35656	2.18
Tech Option 1: Direct seeded rice-Gram		4230.0	1380	7985.1	45600.0	117381	71781	2.57
Tech Option 2: Direct seeded rice –Lentil		4230.0	1130	7266.4	40800.0	106816	66016	2.62
Tech Option 3: Direct seeded rice-Lathyrus		4230.0	1480	8055.9	38800.0	118421	79621	3.05

Table 11: Effect of conservation agricultural practices on yield and economics under rice-fallow system of eastern region

Technology option	No. of trials	Rice yield (kg/ha)	Rabi season crop yield (kg/ha)	Rice equivalent yield (kg/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
Farmers Practice (Transplanted rice-fallow)	10	4480	-	4480	30200	65856	35656	2.18
Tech. Option 1: Direct seeded rice- Gram		4230	1380	7985.1	45600	117381	71781	2.57
Tech. Option 2: Direct seeded rice-Lentil		4230	1130	7266.4	40800	106816	66016	2.62
Tech. Option 3:Direct seeded rice-Lathyrus		**4230**	**1480**	**8055.9**	**38800**	**118421**	**79621**	**3.05**

KVK Samastipur

Thematic Area: Resource Conservation Technology (RCT)

Study on DSR technology on different seedbed condition

Under traditional paddy cultivation of transplanting of root-washed seedlings resulted in lower production which is attributed to delay in transplanting due to absence of regular monsoon, receding water table and lack of sufficient farm laborers. The DSR cultivation undertaken in tilled and no-tilled seedbed conditions provide insignificant difference in yield. However, under no-tilled condition, the cost of saving due to elimination of seedbed preparation and saving of irrigation water required for irrigation provide better BC ratio at 1.99.

Table 12: Yield and economics of DSR Technology in Samastipur

Technology option	Grain yield (q/ha)	COC (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	BC ratio
Farmer's practice (Transplanting of root-washed seedlings)	37.54	38000	45048	7048	1.18
Tech. Option 1: DSR on tilled seedbed	40.45	29050	48540	19490	1.67
Tech. Option 2: DSR on no-tilled seedbed	**39.60**	**23800**	**47520**	**23720**	**1.99**

DSR on tilled seedbed

DSR on no-tilled seedbed

KVK Kishanganj

Thematic Area: Resource Conservation Technology (RCT)

Effect of mulching on soil moisture, plant growth and yield of pineapple

The pineapples crops suffer from weed infestation during early stage and problem of water stress during peak growth resulting poor growth, yield and quality of crops. Manual weeding is costly. The black mulched pineapple plot reflected favorable effect on higher yield and reduced weed infestation thereby increase the yield and minimize to labour cost. The result showed that the significant higher pineapple fruit yield (482.5 q/ha) was recorded under black polyethylene mulching practice in comparison to others methods of mulching and minimum fruit yield (392.8 q/ha) was recorded in farmer practice under no mulching condition. The black mulched pineapple reflected favorable effect on yield components and reduced weed infestation thereby increased the yield. Theblack poly-ethylene mulching might have improved soil water distribution at a particular stage of development and increased the fruit yield. This technology option minimized labour cost for cultivation and thus recorded higher BC ratio (2.34) as compared to others practices of mulching. Farmers were convinced to use this technology for pineapple cultivation.

Table 13: Effect of mulching on plant growth and yield of pineapple

Technology option	No of Leaf at Flowering	Plant Height at Flowering (cm)	50 % flowering days	First Fruit Harvest Days	Fruit Length (cm)	Fruit Weight (kg)	Total fruit weight (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC Ratio
Farmers practice: Traditional cultivation.	47	111.38	426	543.2	21.8	1.44	392.8	271000	510640	239640	1.88
Tech. Option 1:Dry grasses mulching	50.2	113.31	421.6	538.9	22.53	1.62	428.3	270000	556790	286790	2.06
Tech. Option 2:Straw mulching	51.7	114.55	420.6	538.3	22.81	1.64	446.6	275000	580580	305580	2.11
Tech. Option 3:Black poly-ethylene mulching	**53.6**	**116.19**	**410**	**515**	**25.36**	**1.84**	**482.5**	**268000**	**627250**	**359250**	**2.34**
CD at 5%	1.59	1.73	2.76	14.62	0.1	0.08	**12.38**				

KVK Supaul

Thematic area: Integrated Nutrient Management (INM)

Assessment of Rice crop manager based nutrient recommendation in Paddy

Yield of paddy is much lower than the reported potential, attainable yield of different varieties due to unbalanced, inadequate along with without right time application of fertilizer in different farming situations. KVK Supaul conducted on farm trial during Kharif 2017 among ten farmers for the assessment of crop manager-based nutrients recommendation in paddy under irrigated medium land situation. The results showed that the maximum grain yield (33.3 Q/ha) was obtained by the application of 39.77 kg N: 28.75 kg P_2O_5 and 12 kg NPK/ha and minimum yield recorded in the case of farmer's practice.

Table 14: Effect of rice crop manager based nutrient recommendation of growth, yield attributes, yield and economics on paddy

Technology option	No. of trials	Yield component			Disease/ insect pest incidence (%)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ ha)	Net return (Rs./ ha)	BC ratio
		No. of effective tillers/ m^2	No. of panicle cm	Test wt. (1000 grain wt.)						
Farmers practice: Injudicious dose of chemical fertilizers i.e 150:40:0	10	390	25	26	35	22.4	25,000	50,000	25,000	2.0
Tech. Option 1:State recommendation of 150:60:40 kg NPK/ha		495	29	30	25	27.0	28,000	60,000	28,000	2.14
Tech. Option 2:Crop manager-based nutrients recommendation of 39.77:28.75:12 kg NPK/ha along with 25 kg Zinc Sulphate/ ha		**540**	**31**	**31**	**10**	**33.3**	**22,000**	**65,000**	**22,000**	**2.95**

KVK Bhojpur

Thematic area: Integrated Nutrient Management (INM)

Evaluation of nitrogen application in Lentil

Existing nutrient management in lentil is not sufficient to meet the nitrogen requirement. Since rhizobium is not frequently applied and regular deficiency of nitrogen is detrimental for growth of Lentil. It was assumed that use of nitrogen as foliar and basal in lentil crop could solve the problem. Hence, KVK, Bhojpur conducted one On-farm Trial on 'Evaluation of nitrogen application in Lentil'. There were 20 replications and 2 technology options along with farmer practices as control during Rabi 2017. There was an increase in lentil yield of 11.91 % and 11.49 % in Tech. Option 1 and Tech. Option 2, respectively. The result of such OFT was appreciated by the farmers. Thus, application of nitrogen could be recommended for lentil production.

Table 15: Effect of nitrogen application Performance of lentil

Technology option	No. of trials	Yield component			Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
		No. of plan/sq.m	Grain/ plant	Test wt. (100 grain wt.)					
Farmers Practice (FP): use of only DAP	20	89	1.46	18.5	9.4	18600	32900	14300	1.77
Tech. Option 1: FP + 30 Kg/ha N as basal		90	1..57	18.7	11.2	19000	39200	20200	2.06
Tech. Option 2: FP + Spray of 10 gram Urea/lt water		88	1.48	18.8	10.8	18850	37800	18950	2.01

Farmers Practice (FP): use of only DAP

Tech. Option 1:Use of Boron @ 10 Kg./ha

Tech. Option 2:Use of Boron @ 10 Kg./ ha + 1 Kg./ha Molybdate

KVK Banka

Thematic Area: Weed Management

Performance of different herbicides to control weed flora in wheat (Triticumaestivum L.)

Wheat covers maximum area in rabi season in Banka district. On farm trial was conducted at farmer's field in Banka district with 10 replications. The result showed that the remarkable variation was recorded on yield and yield attributes as well as weed dry weight of wheat crop. The highest grain yield, net return and BC ratio were recorded in Tech. Option 4: Sulfosulfuron 75% WG @ 25gm ai/ha + Metsulfuron methyl 20% WP @ 10gm ai/ha at 30 days after sowing as compared to other three Tech. Options as well as farmer practices. So, the farmers became interested in the above Tech. Option 4 to control weeds in wheat crop as compared to other Tech. Options.

Details of technologies	Farmers practice- No weeding Tech. Option 1–Isoproturon 75% WP@1.0kg ai/ha at 30 days after sowing Tech. Option 2– Sulfosulfuron 75% WG @ 50gm ai/ha at 30 days after sowing Tech. Option 3 – Metsulfuron methyl 20% WP @ 20gm ai/ha at 30 days after sowing Tech. Option 4 – Sulfosulfuron 75% WG @ 25gm ai/ha+ Metsulfuron methyl 20% WP @ 10gm ai/ha at 30 days after sowing

Table 16: Performance of different herbicides to control weed flora on yield, yield attributed and economics in wheat

Technology option	No. of trials	No. of effective tillers/m row length		No. of grains/ spike	Spike/ m^2	Test Wt.	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ ha)	Net return (Rs./ha)	BC ratio
		60 DAS	90 DAS								
Farmer Practices	10	44	40	26.4	275	39.2	20.00	23200.00	36000.00	12800.00	1.55
Tech. Option 1	10	50	46	34.20	320	39.3	28.10	25400.00	50580.00	25180.00	1.99
Tech. Option 2	10	61	57	39.80	336	39.9	35.74	26700.00	64332.00	37632.00	2.40
Tech. Option 3	10	66	61	42.60	339	39.8	36.97	27100.00	66546.00	39446.00	2.45
Tech. Option 4	10	70	66	49.9	342	40.6	38.10	27900.00	73080.00	40680.00	2.61

KVK Bhagalpur

Thematic Area: Integrated Disease Management (IDM)

Assessment of management strategies against important insect-pest of chilli

Chilli is a major crop of Bhagalpur, but due to attack of thrips and mites, 40 % loss occurs. To address such issue, an OFT was conducted with three technology options along with farmer practice keeping 20 replications in each option. Result indicated that Technology option –I worked well as compared to other technology options. Insect pest incidence was lowest (35 %) in the plants under Technology option –I and the farmers received highest BC ratio (3.07) following Technology option –I.

Technology Options: 3

Farmers practice: Use of FYM @ 3 q/ha + RDF (120:60:60) + indiscriminate use of pesticides with no seedling treatment and training-pruning.

Technology option -I: 300gm Vermicompost per plant + seed treatment with 5ml Imidachloprid + 2 ml Thiomithexen after 35 days of transplanting + 5 ml Adaratin after 20 days + 2 ml Omyte after 15 days + 2 ml Carbendazim + spraying of Varmiwash

Technology option -II: 100 gm Poultry manure per plant + seed treatment with 5ml Imidachloprid + 2 ml Thiomithexen after 35 days of transplanting + 5 ml Adaratin after 20 days + 2 ml Omyte after 15 days + 2 ml Carbendazim + spraying of Varmiwash

Technology option -III: 300gm Compost in full life spawn of plant + seed treatment with 5ml Imidachloprid + 2 ml Thiomithexen after 35 days of transplanting + 5 ml Adaratin after 20 days + 2 ml Omyte after 15 days + 2 ml Carbendazim + spraying of Varmiwash

Table 17: Performance of the Technology with performance indicators

Technology option	No. of trials	No. of effective-fruits/ plant	Disease/ insect-pest incidence (%)	Yield (q/ ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ ha)	Net return (Rs./ha)	BC ratio
Farmer Practices	20	30	95	88.0	95000.00	164000.00	69000.00	1.72
Tech. Option 1	**20**	**70**	**35**	**82.0**	**95000.00**	**292000.00**	**197000.00**	**3.07**
Tech. Option 2	20	48	50	109.0	95000.00	218000.00	123000.00	2.29
Tech. Option 3	20	55	44	140.0	95000.00	280000.00	185000.00	2.94

Sale price of green chillies @ Rs. 30/Kg

KVK East Champaran

Thematic Area: Integrated Disease Management (IDM)

Management of Sheath Rot disease of Rice caused by Sarocladiumoryzae

Low yield of Rice due to high disease pressure has been recorded. An OFT was conducted at 10 different locations in East Champaran district during Kharif, 2017 keeping three technology options.

Technology Options	Technology details
Farmer Practice	One spray of Carbendazim50%wp @1 g/lit water after appearance of the disease.
Tech. Option 1	Two sprays of Tricyclazole75%wp@0.6g/lit water (1st spray at boot leaf stage and 2nd at 10 days after 1st spray)
Tech. Option 2	Two sprays of Mancozeb 63% + Carbendazim12%wp @1.5g/lit water(1st spray at boot leaf stage and 2nd at 10 days after 1st spray)
Tech. Option 3	Two sprays of Tricyclazole18%wp+Mancozeb62%wp @2 g/lit water (1st spray at boot leaf stage and 2nd at 10 days after 1st spray)

Tech. Option 3: Two sprays of Tricyclazole18%wp + Mancozeb62%wp @2 g/lit water was found to be most effective treatment in regards to minimum disease severity (9.05 %) with maximum grain yield (39.50 q/ha).

Table 18: Effect of different treatments on Sheath Rot disease of Rice

Technology option	No. of trials	Disease severity (%)	Yield(q/ha)	Cost of cultivation(Rs./ha)	Gross return (Rs/ ha)	Net return(Rs./ ha)	BC ratio
Farmer Practices	10	18.78	35.74	29900.00	53610.00	23710.00	1.79
Tech. Option 1		14.64	36.45	30400.00	54675.00	24275.00	1.79
Tech. Option 2		12.11	38.50	30700.00	57750.00	27050.00	1.88
Tech. Option 3		**9.05**	**39.50**	**30800.00**	**59250.00**	**28450.00**	**1.92**
CD at 5%		3.15	2.96				

KVK Gopalganj

Thematic Area: Integrated Pest Management (IPM)

Effect of different insecticides on management of brinjal shoot and fruit borer

Shoot and fruit borer is the dominant pest of brinjal in Gopalganj district and attack the shoot and fruit of brinjal crops that cause as high as 70-90 percent loss in marketable yield. Besides, excessive and indiscriminate use of insecticides leads to resistance in pests resulting detrimental effects on beneficial inset health and also causing environmental pollution. Thus an OFT was conducted on timely application of selective insecticides with recommended dose with three technology options along with farmer practice. All three technology options managed the brinjal shoot and fruit borer effectively. Tech. Option 2 was found to be the most effective treatment for managing the incidence of shoot (11.26%) and fruit (12.53%) incidences in brinjal with maximum BC ratio (2.37).

Table 19: Effect of different insecticides on management of brinjal shoot and fruit borer

Technology option	No. of trials	Mean shoot damage (%)	Mean fruit damage (%)	Yield q/ ha	Cost of cultivation (Rs/ha)	Gross return (Rs/ha)	Net return	BC Ratio
Farmers Practice: Foliar application of chlorpyriphos 20 EC @1.5 ml/L water.	10	16.73 (24.12)*	19.62 (26.28)	144.58	85672	144580	58908	1.68
Tech. Option 1: Foliar application of Nimbicidine 0.15 % @ 4.0 ml/L water followed by Indoxacarb 14.5 SC @ 1.0 g/L of water at 15 days interval		13.13 (21.22)	14.75 (22.63)	151.65	70635	151650	81015	2.15
Tech. Option 2: Removal of infested shoots and fruits followed by foliar application of Spinosad 45 EC @ 0.5 ml/L water at 15 days interval		**11.26 (19.64)**	**12.53 (20.70)**	**162.37**	**68435**	**162370**	**93935**	**2.37**
Tech. Option 3 Removal of infested shoots and fruits followed by Emamectin benzoate 5 SG @ 0.25 ml/L water at 15 days interval.		12.17 (20.44)	13.86 (21.89)	153.41	67342	153410	86068	2.28
Sem(±)		0.254	0.397	2.127				
CD (P=0.05)		0.762	1.189	6.382				

KVK Jehanabad

Thematic area: Integrated Pest Management

Management of Leaf folder (LF) Cnaphalocrocismedinalis (Guenee) in paddy

Cultivation of high yielding varieties and application of high level of nitrogenous fertilizers has result in emergence of leaf folder as a major pest in most rice tracts. In case of severe infestation, the leaf margin and tips are totally dried up and the crop gives a whitish appearance. There were two technology options. Tech. Option 2: Paddy field treated with spray of Fipronil 5 SC @800 ml/ha (Ist spray at Panicle initiation stage and IInd at Flowering stage) registered highest yield (44.60 q/ha) and cost benefit ratio (2.06) followed by Tech. Option 1: Plots treated by Nitrogen @100kg/ha and application of Cartap 4G @25 kg/ha (Ist application at Panicle initiation stage and IInd at Flowering stage) gave yield of 43.50 q/ha and cost benefit ratio (2.01). Whereas the plots treated by farmer practices recorded lowest yield (40.30 q/ha) and cost benefit ratio (1.89). The infestation of leaf folder was recorded lowest (1.5%) in treated plots with Fipronil followed by Cartap (1.7%) and farmer practices (8.2%).Therefore, insecticide Fipronil 5 SC @800 ml/ha and Cartap 4G @25 kg/ha along with application of Nitrogen @100kg/ha can be recommended to manage leaf folder insect pests in paddy.

Table 20: Effect and economics of different insecticides on leaf folder in paddy

Technology option	No. of trials	Infestation (%)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
Farmer Practices : Chalorpyrifos 20 EC @ 500ml/ha and 150 Kg/ha Nitrogen	10	8.2	40.30	33,000	62,465	29,465	1.89
Tech. Option 1: Nitrogen @100kg/ha and application of Cartap 4G @25 kg/ha (Ist application at Panicle initiation stage and IInd at Flowering stage)	10	1.7	43.50	33,500	67,425	33,925	2.01
Tech. Option 2: Fipronil 5 SC @800 ml/ha (Ist spray at Panicle initiation stage and IInd at Flowering stage)	10	1.5	44.60	33,500	69,130	35,630	2.06

KVK Nalanda

Thematic Area: Post harvest technology

Assessment of the effect of preservatives on to enhance the shelf life of Neera

Toddy plants are found large in number in Nalanda, especially in Block Harnaut, Silao, Rahui, Ben and Giriyak in the villages of Basaniyawan, Brandi, Jawafardih, Bhadwa, Nirpur, Jagdishpur etc. The OFT conducted in Basaniyawan and Sonsa village of Harnaut Block. The tappers of different blocks of Nalanda district are involved in tapping as their main occupation. Viewing this, Neera preservation and processing plant has been established in Biharsharif near Bajar Samiti by the Govt. of Bihar. Simultaneously, the toddy sap (Tadi) as alcohol beverage is also banned by Bihar Govt. So, shelf life of Neera has to be increased as fresh beverage in rural condition. So, the OFT has been undertaken as per the farmers' need for preservation and income

generation by selling fresh beverage. Neera may to be consumed as a healthy drink or value added product. An on farm trial has been performed to assess the effect of preservatives on to enhance the shelf life of Neera.

The result shows that maximum return and preservation duration was recorded in Tech. Option 2 (Lime powder + KMS @ 0.2gm/litre) as compared to farmer practices (without use of preservative). Lime powder only maintain the pH of sap for very short period , however high amount of lime develops off taste and off flavour of neera sap. Application of KMS (Potassium meta bisulphite) lowers down the activity of microorganism (Bacteria, fungus) and also maintain the pH of neera sap. But high dose of KMS is also hazardous for health issues. So, the combination of (application of lime powder @ 2.0gm/litre sap + KMS @ 0.2gm/litre sap) could enhance shelf life of 5-6 hr and give better result.

Table 21: Effect of preservatives for enhancing the shelf life of Neera

Technology option	No. of trials	Taste of scale (9 point hedonic scale)	Preservation hr. (5-6 hr for 35-38^{0}c temperature)	Cost of processing	Gross return (Rs/ ha)	Net return (Rs./ha)	BC ratio
Farmer Practices: Without use of preservative	08	3.0	-	290	360	70	1.24
Tech. Option 1: Lime powder @ 2.0gm/lit sap		3.8	2.45 hr	340	460	120	1.35
Tech. Option 2: Lime powder + KMS @ 0.2gm/ litre		7.0	5.47 hr	390	600	210	1.54
Tech. Option 3: KMS @ 0.5gm/litre sap)		5.0	2.45 hr	340	460	120	1.35
$SE_m \pm$		1.931	-	-	-	-	-

KVK Khagaria

Thematic area: Feed and Fodder of Livestock

Effects of probiotics supplementation on growth performance of broilers

Poor growth rate has been obtained with generally applied feed by the farmers. The supplementation of probiotics to broiler chickens @ 1gm, 2gm and 3gm per 10 liter of water per day resulted 1328 gm, 1572 gm and 1340 gm net body weight gain per bird, respectively. The highest growth rate was obtained in Tech. Option 2 (probiotics @ 2gm/10 liter water).

Table 22: Performance of different doses of pobiotics on body weight of broiler chicken

Technology option	No. of trials	Initial by wt. per bird (gm)	Final by wt. per birds(gm)	Net by wt. per bird (gm)	Gross cost (Rs/ bird)	Gross return (Rs/bird)	Net return (Rs/ bird)	BC ratio
Farmer practices: No use of Probiotics	250	40	1293	1253	111.75	129	17.25	1.15
Tech. Option 1: Probiotics 1gm/10 lit of water	250	40	1368	1328	114.39	137	22.61	1.20
Tech. Option 2: Probiotics 2gm/10 lit of water	**250**	**40**	**1612**	**1572**	**118.91**	**161**	**42.09**	**1.35**
Tech. Option 3: Probiotics 3gm/10 lit of water	250	40	1380	1340	110.26	138	27.74	1.25

KVK Vaishali

Thematic area: Disease Management of Livestock

Assessment of impact of dry cow therapy an intervention for prevention of Mastitis

A survey was conducted in the villages and sub -clinical mastitis test was done. Out of 50 crossbred cows, 18 animals showed sub clinical mastitis (36%). In view of 36% incidence of sub -clinical mastitis, an OFT was conducted to prevent sub-clinical mastitis by the application of dry cow therapy. Twenty one (21) dry crossbred cows were selected and divided in three groups heaving 7 cows in each group. Two Technology Options were followed along with farmer practice. Milk was tested weekly for 60 days after calving for subclinical mastitis.

Technology Option	Technology
Farmer practice	Farmer practice only washing of udder occasionally and application of ointment and no any therapy
Tech. Option 1	Dry cow therapy with spectramast DC at last day of milking and proper care of teat after milking
Tech. Option 2	Dry cow therapy with spectramast DC in all teats with Intavita H at last day of milking and proper care of teat after milking

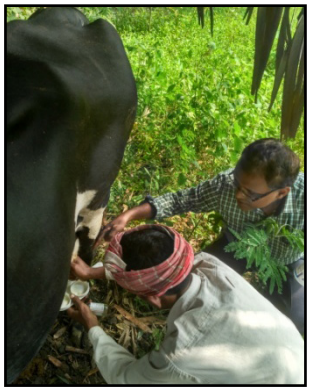
Under Tech. Option 1 as well as Tech. Option 2, cows did not have any symptom of subclinical mastitis up to 2 month. In farmer practices group, 2 cows exhibited subclinical mastitis after 30 days of calving. There was no significant difference between cows under Tech. Option 1 and Tech. Option 2, but overall health performance was better in cows under Tech. Option 2. Hence, dry cow therapy may be recommended to prevent subclinical mastitis in dairy cow in Vaishali district. Dry cow therapy with spectramast DC in all teats with Intavita H (I/M injection) on last day of milking is suggested.

Table 23: Effect of dry cow therapy on milk yield and Incidence of sub clinical mastitis in dairy cows

Tech. Option	Yield per animal/ day	Total milk yield after calving (Up to 60 days)	Incidence of sub clinical mastitis after dry cow therapy	Percent of mastitis incidence	Average feeding cost and + treatment cost for sub clinical mastitis	Gross return (Rs/ ha)	Net Return (Rs/ ha)	BC Ratio
Farmer practices	11.76 liter	4940 liter	3 (No therapy)	3/7=43	Rs. 210/day /Animal+5000=93200	172900	79700	1:85
Tech. Option 1	13.92 liter	5880 liter	0	0	88200+5488=93688	205800	112112	2:19
Tech. Option 2	14.1 liter	5922 liter	0	0	88200+5488+360=94048	207270	113222	2:20

Collection of milk for test

Milk test for sub-clinical mastitis



Dry cow therapy with spectramast DC in all teats with Intavita H at last day of milking

KVK Patna

Thematic area: Drudgery Reduction

Assessment of working efficiency in harvesting

After the implementation of MANREGA, crisis of labour in farming operations is quite significant as reported by the farmers of different block of Patna district during field visit, training program and Kisan Chaupal conducted by the KVK. Small plot size of the farmers is the second major constraints limits the use of harvesting machinery like combine harvester, walking type reaper/ tractor mounted reaper and also the availability of such type of machinery is very limited in the district. Keeping in view of the above facts, an OFT on the use of brush cutter for harvesting purposes has been planned.

Use of different harvesting tools clearly indicates that the field capacity is more (0.30ha/h) in case of walking type reaper as compared to less (0.010 ha/h) in case of local sickle. But for small area, the field capacity of hand held brush cutter with modification is 0.041 ha/h in case of paddy as well as 0.044 ha/h in case of wheat harvesting which are higher than harvesting by sickle.

Table 24: Ergonomic & Economics of different type of harvesting tool

Technology Option	Wt. of tool (Kg)		Resting Heart Beat /Min		Working Heart Beat /Min		Field Capacity (ha/h)		Cost of use (Rs/ha)	
	Paddy	Wheat	Paddy	Wheat	Paddy	Wheat	Paddy	Wheat	Paddy	Wheat
Farmer practice 1: Local Sickle	0.26	0.26	80±4	85±4	132±3	132±4	0.0026	0.0024	11300	11850
Farmer practice 2: Naveen Sickle	0.23	0.23	80±3	84±3	127±3	127±3	0.00295	0.0029	10000	10300

Technology Option	Wt. of tool (Kg)		Resting Heart Beat /Min		Working Heart Beat /Min		Field Capacity (ha/h)		Cost of use (Rs/ha)	
	Paddy	Wheat	Paddy	Wheat	Paddy	Wheat	Paddy	Wheat	Paddy	Wheat
Tech. Option 1: Walking type Reaper	230.0	230.0	80±3	85±3	120±4	120±4	0.27	0.30	2550	2200
Tech. Option 2: Hand held Brush Cutter	11.4	11.4	80±4	86±4	128±3	128±3	0.041	0.044	5700	5500

Jharkhand

KVK Dumka

Thematic Area: Crop Production

Assessment of suitable intercropping in upland soils

The farmers in Dumka district generally follow mixed cropping of pigeon pea and thus experience low profitability of pigeon pea in upland areas. Hence, an OFT was undertaken to assess the performances of different intercrops along with pigeon pea in upland soils. There were three technology options. Intercropping of pigeon pea and ground nut under Tech. Option 3 was found to be best intercropping with respect to yield equivalent and benefit cost ratio at par with pigeon pea and maize. Thus, pigeon pea and ground nut may be recommended as intercropping.

Table 25: Yield and economics of pigeon pea based inter cropping in uplands

Technology option	No. of trials	Pigeon pea grain equivalent (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BC ratio
Farmer practice: Mixed cropping of pigeon pea	10	12	28200	60000	31800	2.12
Tech. Option 1: Pigeon pea + Maize (1:1)	10	14.8**	29100	74000	44900	2.54
Tech. Option 2: Pigeon pea + Soyabean (1:2)	10	13.2	29700	66000	36300	2.22
Tech. Option 3: Pigeon pea + Ground Nut (1:2)	**10**	**17.6****	**30250**	**88000**	**57750**	**2.90**
CD 5%		3.1				

KVK West Singhbhum

Thematic Area: Integrated Crop Management (ICM)

Performance evaluation of zero till drill for direct seeding of rice

Low profit of direct sown rice has been observed due to higher seed rate and high plant population. An OFT was conducted in West Sighbhum of Jharkhand. Results indicated that cost of sowing by broadcasting method was found highest (Rs 3240/ha) due to high seed rate (100 kg/ha), followed by zero till seed drill (Rs 2250/ha) due to hiring charges of tractor and machine. Cost of sowing behind the plough was very economic, but it was time taking practice (15 hr/ha). Best time saving method was zero till seed drill (2.5 hr/ha) which was 6 times faster than behind the plough method and 3.2 times faster than broadcasting method. Highest no. of tillers was found in zero till seed drill (16.2tillers/hill) due to proper spacing. Hence, yield was found best (38.7 q/ha) followed by behind the plough method (37.5 q/ha) which was comparatively good than broadcasting method (26.5 q/ha). BC ratio was observed best in zero till seed drill method (3.96) followed by behind the plough method (3.83) which was also good in compare to broadcasting method (2.05). Hence, zero till drill for direct seeding of rice may be recommended.

Table 26: Performance of different methods of seed sowing

Technology option	Cost of sowing	Time of sowing (hr/ha)	No. of tillers (60 DAS)	Grain yield (q/ha)	BC ratio
Farmer practice: Broadcasting with 100 kg seed rate per hectare	3240	8	3.8	26.5	2.05
Tech. Option 1: Zero till seed drill	**2250**	**2.5**	**16.2**	**38.7**	**3.96**
Tech. Option 2: Behind the plough at 20 cm row spacing and seed rate of 40 kg per hectare.	1650	15	15.6	37.5	3.83

Rice field by zero till seed drill method

Rice field developed by behind the plough method

KVK East Singhbhum

Thematic Area: Varietal Evaluation (VE)

Assessment of wilt resistant hybrid variety of tomato to increase productivity and profitability

Low productivity and profitability of hybrid Tomato due to wilting during flowering and fruiting have been noticed. Based on the information generated by ICAR Research Complex for Eastern Region, Plandu, Ranchi Center, an OFT was undertaken at the farmer's field for evaluation of wilt resistant hybrid varieties of tomato in East Singhbhum district. Different hybrid varieties of tomato, namely, Arka Rakshak, Swarna Anmol and Swarna Sampada along with farmer's choice hybrid variety, Kapila were evaluated. Out of three Tech. Options, variety Swarn Anmol had significant yield of 832.20 q/ha followed by Swarna Sampada (806.60q/ha) and Arka Rakshak (736.60 q/ha). The benefit cost ratio was also recorded maximum in Swarn Anmol. The farmers participated actively during the whole growing seasons and showed their interest in moderate skin and medium size tomato like Swarn Anmol variety. Hence, the hybrid variety Swarn Anmol may be recommended for higher productivity and profitability of tomato in East Singhbhum district.

Table 27: Yield and yield attributing characters

Technology option	No. of trials	Plant height (cm)	No branch/ plant	Per plant yield (Kg)	Yield (q/ ha)	Wilt %	Cost of cultivation (Rs./ha)	Gross return (Rs/ ha)	Net return (Rs./ha)	BC ratio
Farmer practice: Hybrid variety Kapila.	10	70.40	11.80	3.90	736.6	15%	125100.00	368300.00	243200	2.94
Tech. Option 1: Farmer's wilt tolerant hybrid Variety Arka Rakshak.		65.00	9.40	4.57	773.8	Nil	125100.00	386900.00	261800.00	3.09
Tech. Option 2: Wilt resistant hybrid variety, Swarna Anmol		**69.80**	**11.40**	**4.90**	**832.2**	**Nil**	**125100.00**	**540930.00**	**415830.00**	**4.32**

Technology option	No. of trials	Plant height (cm)	No branch/ plant	Per plant yield (Kg)	Yield (q/ ha)	Wilt %	Cost of cultivation (Rs./ha)	Gross return (Rs/ ha)	Net return (Rs./ha)	BC ratio
Tech. Option 3: Wilt Resistant hybrid variety, Swarna Sampada		61.60	11.00	4.80	806.6	Nil	125100.00	443630.00	318530.00	3.55
CD @ 5%		12.24	2.77	0.29	110					
SEM±		3.93	0.89	0.09	35.60					
CV%		17.42	23.22	6.15	13.41					

KVK Pakur

Thematic Area: Integrated Nutrient Management (INM)

Effect of balance fertilizer application for boosting lentil productivity

In Pakur, low productivity of lentil was recorded at farmer's field in rice-lentil cropping system. Thus, KVK, Pakur attempted to evaluate different fertilizer dose applications in lentil for augmenting productivity according to state and test based fertilizer recommendations. Out of two technology options, technology option 2: State recommendation (20:40:20Kg NPK/ha) + 5kg/ha R culture was found to be superior than technology option 1 as well as farmer practice in terms of yield, gross return, net return and BC ratio. Hence, 20:40:20Kg NPK/ha + 5kg/ha R culture may be recommended for boosting lentil productivity in rice-lentil cropping system.

Table 28: Effect of different fertilizer dose in boosting Lentil Productivity

Technology option	No. of trials	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
Farmer practice: No use of fertilizer	10	**4.5**	18,100	27000	8900	1.49
Tech. Option 1: State recommendation (20:40:20KgNPK/ha)		**6.3**	20,500	37800	17300	1.84
Tech. Option 2: 20:40:20:20:5 kg NPKSR Culture/ha.		**7.9**	**19,900**	**47400**	**27500**	**2.38**

KVK Gumla

Thematic Area: Water Management

Evaluation of different irrigation methods on pea

The farmers did not have any knowledge on water budgeting. Thus, the trial was conducted in three villages, namely Karamtoli, Belgara and Burhu of Gumla among 10 farmers with an objective to find out the appropriate cost effective irrigation method in cultivation of pea. The data collected during the trial clearly revealed that the minimum no of irrigation (8.70) by sprinkler irrigation under Tech. Option 1 was better in regards to crop yield (82.89 q/ha), cost of irrigation (Rs.64866/ha), net return (Rs.59484/ ha) and BC ratio (1.92) when compared to those with the farmer practice and Tech. Option 2 as well. The lowest mortality percentage (11.13) was also recorded under Tech. Option 1. Hence Tech. Option 1 (Sprinkler irrigation) is being recommended for cost effective irrigation method for pea cultivation.

Table 29: Evaluation of different irrigation methods on pea

Technology option	No. of replication	Yield components					Cost of cultivation (Rs./ha)	Gross income (Rs./ ha)	Net income (Rs / ha)	BC Ratio
		Plant population/ m^2	No. of pod /plant	Mortality (%)	No. of irrigation	Yield (q/ha)				
Farmer practice: Check basin (1m X 1.5m)	10	53.43	16.03	15.76	9.19	73.42	65966	110130	44164	1.67
Tech. Option 1: Sprinkler irrigation (6m X 6m)		**57.50**	**18.73**	**11.13**	**8.70**	**82.89**	**64866**	**124350**	**59484**	**1.92**
Tech. Option 2: Check basin method (1.5m X 3m)		56.03	17.76	12.79	8.96	81.10	66806	121650	54844	1.82
SEM ±			0.78	0.99	0.12	2.90				
CD (P=0.05)			2.32	2.95	0.52	8.62				

KVK Hazaribag

Thematic Area: Weed Management (WM)

Assessment of weed control methods in garden pea

The problem has been diagnosed as high weed infestation in garden pea. Drudgery in picking is the constraint identified. Since soil application of pendimethalin followed by manual weeding has been reported elsewhere to control weed in garden pea, the available weed control methods were tested in garden pea at the farmer's plots in Hazaribag. Based on the results depicted in Table 32, soil application of pendimethalin (immediately after sowing) and one manual weeding 30 days after sowing may be recommended for weed control in garden pea.

Table 30: Observation on yield & yield attributes; cost of cultivation, gross return & (BC ratio)

Technology option	Av. plant height	Av. pod wt/g	Av. yield (q/ha)	Cost of cultivation (Rs./ ha)	Gross return (Rs./ ha)	BC Ratio
Farmers Practice (FP): weeding 2 - 3 times after sowing	49.5	10.5	68.5	72500.00	109600.00	1.51
Tech. Option-1: Soil application of pendimethalin (immediately after sowing and 30 days after sowing)	60.5	14.5	86.5	62500.00	138400.00	2.21
Tech. Option-2: Soil application of pendimethalin (immediately after sowing) and one manual weeding 30 days after sowing	**64.5**	**16.8**	**102.5**	**67500.00**	**164000.00**	**2.43**

Weed control methods in garden pea

KVK Ranchi

Thematic Area: Integrated Disease Management (IDM)

Assessment of performance of different chemicals against late blight of potato

Severe incidence of late blight of potato caused very low yield per unit area in Ranchi district. Thus, an OFT was conducted to address late blight of potato. There were two technology options along with farmer practice.

Farmer practice: - Spray of Mancozeb @ 2.5gm/lit of water.

Technology Option 1:

Spray of Copper Oxychloride @3.0gm/liter of water starting from 30 DAP alternating with Metalaxyl-Mancozeb @2.5 gm/liter of water at 10 days interval

Technology Option 2:

Soil application with Trichoderma Spp. @ 5.0 kg/ha, seed treatment with Trichoderma Spp. @ 5.0gm/kg of seed and spray of Propineb 70%@2.5 gm/liter of water starting from 30 DAP alternating with Iprovalicarb + Propineb 6675 WP (5.5% +61.25% w/w)@2.5 gm/liter of water at 10 days interval

Result indicated that tuber yield under Tech. Option 2 was significantly higher than Tech. Option 1 as well as farmer practice. Disease severity was lowest in case of Tech. Option 2. In terms of economics parameters, the maximum value of gross return, net return and BC ratio under Tech. Option 2 were higher as compared to Tech. Option 1 and farmer practice. Thus, Tech. Option 2 could be recommended for controlling late blight of potato.

Table 31: Performance of different treatments against late blight of potato

Technology	Disease severity (%)	Yield (q/ha)	Gross return (Rs/ha)	Net Return Rs/ha	BC Ratio
Farmer practice	33.58	163.10	163100	103100	2.58
Tech. Option 1	29.04	170.59	180590	110590	2.72
Tech. Option 2	**19.36**	**242.12**	**242120**	**234120**	**3.03**
SEM	0.03	0.34			
CD	0.08	1.66			
$CV_{5\%}$	11	12.7			

KVK Godda

Thematic Area: Integrated Pest Management

Management of leaf curl disease in chilli

Low yield of chilli due to leaf curl disease has been observed in Godda district. Results indicated that the minimum leaf curl disease (19.5%) and maximum yield (135.4 q/ha) were observed in the plots in which seedlings was treated with imidacloprid and need based spraying was also done with imidacloprid.

Table 32: Effect of pest management modules on the incidence of leaf curl disease

Technology option	No. of trials	Yield component	Disease (%)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
		No. of fruits/ plant						
Farmers' practice (Injudicious use of pesticides)	10	60.9	41.0	110.5	58500	221000	162500	3.77
Tech. Option 1 : Boom tet (1 ml/l) + Diafenthiuron 50 WP (0.5g/l)		69.7	32.5	117.8	59000	235600	176600	3.99

Technology option	No. of trials	Yield component	Disease (%)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
		No. of fruits/ plant						
Tech. Option 2: Seed treatment with Imidacloprid (10g/Kg) + spraying of acephate 50 WP (1g/l)		78.5	20.5	126.0	59700	252000	192300	4.22
Tech. Option 3: Seedling treatment Imidacloprid (0.3 ml/l) + spraying of Imidacloprid 50 WP (1g/l)		**80.3**	**19.5**	**135.4**	**59845**	**270800**	**210955**	**4.52**
CD (P = 0.05)		3.59	2.72	4.86				

KVK Sahibganj

Thematic Area: Integrated Pest Management

Effect of control measures of fruit and shoot borer in brinjal in rabi season

Low productivity and profitability in brinjal due to attack of fruit and shoot borer has been reported by the farmers. Application of Flubendamide 480 SC @ 1 ml per 5 lit water at 30 DAT followed by Cartap hydrochloride @ 1 g per lit at 50 DAT under Tech. Option 1 resulted in reduced incidence of fruit and shoot borer as well as higher yield and higher BC ratio as compared to farmers practice and other technological options.

Table 33: Effect of pesticides on fruit and shoot borer in brinjal in rabi season

Technology option	No. of trials	Disease/ insect pest incidence (%)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
Farmer practice	7	41	89	43,200/-	97,900/-	54,700/-	2.2
Tech. Option 1	**7**	**18**	**135**	**45,000/-**	**1,48,000/-**	**1,03,000/-**	**3.2**
Tech. Option 2	7	29	115	44,000/-	1,26,500/-	82,500/-	2.8
Tech. Option 3	7	25	120	47,600/-	1,32,000/-	84,400/-	2.7

KVK Chatra

Thematic Area: Feed and Fodder of Livestock

Performance of Azolla based concentrate feed on growth in Black Bengal goats

Goat rearing is the most important enterprises among landless farmers of Chatra district. However, the goats fail to reach at the optimum growth and body weight due to lack of proper feeding management resulting deprivation of getting remunerative price out of selling goats. Hence, KVK Chatra conducted On Farm Trail on feeding of Azolla based concentrate feed in goats to explore the alternative source of concentrate feed. The trial was conducted on 40 Black Bengal Goats divided into 4 groups having 10 goats in each group. The result indicated that feeding of sun dried Azolla by either 25% or 15% replacement of concentrate feeds (Maize 35% + Groundnut oil cake 20% + Wheat bran 22% + Pulse chunni 20% + Salt 2% + Mineral mixture 1%) @ 200 gram/ goat/ day could be helpful for increasing average daily weight gain and thus body weight gain at 6 month

and 9 month of age and thereby net income and BC ratio, while compared those with Tech. Option 1 as well as farmer practices. Therefore, replacement of either 25% or 15% concentrate feeds by sun dried Azolla could be recommended for better body growth of goats.

Table 34: Effect of replacement of concentrate feeds by sun dried Azolla

Technology Options	Technical Parameters					Economic Parameters		
	Body Weight (kg)			Mortaity (%)	Average daily gain (gm/day)	Gross Income (Rs)	Net Income (Rs)	BC Ratio
	3 months age	6 months age	9 months age					
Farmers practices: Open grazing + feeding of available feed items like maize, rice bran etc	5.30 (53.00)	7.60 (60.80)	11.30 (90.40)	20%	207.78	36160	23160	2.78
Tech. Option 1: Feeding of Concentrate (Maize 35% + Groundnut oil cake 20% + Wheat bran 22% + Pulse chunni 20% + Salt 2% + Mineral mixture 1%) @ 200 gram/ goat/ day.	5.50 (55.00)	8.20 (73.80)	13.50 (121.50)	10%	369.44	48600	33600	3.24
Tech. Option 2: Feeding of sun dried Azolla by 15% replacement of the above mentioned concentrate feeds @ 200 gram/ goat/ day.	**5.60 (56.00)**	**8.80 (79.20)**	**14.60 (131.40)**	**10%**	**418.89**	**52560**	**38560**	**3.75**
Tech. Option 3: Feeding of sun dried Azolla by 25% replacement of the above mentioned concentrate feeds @ 200 gram/ goat/ day.	**5.40 (54.00)**	**8.90 (80.10)**	**14.10 (126.90)**	**10%**	**405.00**	**50760**	**37760**	**3.91**

KVK Deogarh

Thematic Area: Feed and Fodder of Livestock

Feed management in Pig

Poor growth rate of pigs maintained by the tribal people has been noticed in villages of Deogarh. Hence, KVK, Deogarh conducted an OFT to establish the fact that supplement feeding could enhance body weight gain of pigs and thereby fetch more income out of selling pigs. 30 pigs (all were the desi breeds opted from the tribal village named Sujani that is around 2-3 Km away from KVK Deoghar) at age of 3- 6 months were selected and then divided equally into 3 groups having 10 pigs in each group.

The trial was run for 3 months. There were 2 technology options along with the farmer practice. Results showed that both Tech. Option 1 as well as Tech. Option 2 could be beneficial for body weight gain in pigs while compared with the pigs reared under farmer practice.

Table 35: Effect of supplement feeding on body weight gain of pigs

Technology Option	No. of pigs	Body weight gain (Kg)			
		0 days	1st month	2nd month	3rd month
Farmer practice (FP): Household food waste	10	9.64	11.85	15.71	20.27
Tech. Option 1: FP with Azolla @ 500 g/day/pig for 3 months	10	9.87	12.64	24.15	34.73
Tech. Option 2: FP with Nutramix @ 10 g in 1 Kg feed for 3 months	10	9.49	12.23	25.27	36.23

4.2 Frontline Demonstrations (FLD)

Frontline Demonstration (FLD) is a unique approach to provide a direct interface between technology developers and end users of the technology. It is a form of applied research on latest notified/ released varieties along with component or full package of practices on identified farmers' fields to exhibit the potentiality of the technology to comparatively large number of farmers with the involvement of research scientists, extension personnel and other agencies. It also provides the opportunity to analyze the production performance of the technologies with scientific feedback. In the process of such demonstration, the KVKs of Zone-IV took up the programme to enhance the production and productivity of major cereal, vegetable, cash crops and other enterprises like farm mechanization, mushroom production, organic inputs etc through planning and executing frontline demonstration programme across the zone consisting of the states of Bihar and Jharkhand. Frontline demonstrations were conducted both during Kharif 2017 and Rabi 2017-18 by the KVKs for an area of 5076.21 ha to involve 14566 numbers of farmers of this zone.

Table 36: State Wise Front Line Demonstration on Pulses and Oilseeds

State	Rabi Oilseed		Kharif Oilseed		Rabi Pulses		Kharif Pulses		Other than Oilseed and Pulse		Total	
	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)
Bihar	503	187.50	32	11.10	750	254.35	261	87.22	4198	1407.52	5744	1947.69
Jharkhand	989	353.00	1034	463.00	769	239.08	1340	414.40	4690	1659.04	8822	3128.52
Total	**1492**	**540.50**	**1066**	**474.10**	**1519**	**493.43**	**1601**	**501.62**	**8888**	**3066.56**	**14566**	**5076.21**

Table 37: Details of Front Line Demonstration on Kharif Oilseeds

Sl. No.	Crop	State	No. of farmers	Area (ha)	Yield (q/ha)		In-crease (%)	Economics of Demonstration (Rs/ha)				Economics of Check (Rs/ha)			
					Demo	Check		Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
1	Ground Nut	Bihar	4	1.00	14.15	8.36	64.25	25800.00	70750.00	44950.00	2.74	22500.00	41800.00	14300.00	1.85
		Jharkhand	500	221.00	14.84	10.59	45.32	24737.50	74415.63	48884.38	2.89	21956.25	50416.25	27710.00	2.23
		Total	**504**	**222.00**											
2	Niger	Jharkhand	241	99.00	5.24	3.65	40.28	11537.33	22162.92	10625.58	1.90	10173.83	16948.50	6774.67	1.65
		Total	**241**	**99.00**											

Sl. No.	Crop	State	No. of farmers	Area (ha)	Yield (q/ha)		In-crease (%)	Economics of Demonstration (Rs/ha)				Economics of Check (Rs/ha)			
					Demo	Check		Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
3	Sesame	Jharkhand	205	100.00	5.31	3.53	40.11	15675.00	33425.00	17750.00	2.41	14125.00	21950.00	7825.00	1.79
		Total	**205**	**100.00**											
4	Soybean	Bihar	28	10.10	22.48	17.25	26.20	23870.00	68805.00	44935.00	3.37	24345.00	34350.00	27780.00	2.12
		Jharkhand	80	41.00	16.00	9.00	115.05	27850.00	82750.00	29550.00	3.25	27150.00	276250.50	13475.00	1.55
		Total	**108**	**51.10**											
5	Sun-flower	Jharkhand	8	2.00	9.10	6.20	46.00	27140.00	71650.00	44510.00	2.64	19660.00	31150.00	11490.00	1.58
		Total	**8**	**2.00**											
		G. Total	**1066**	**474.10**											

FLD on Ground Nut

FLD on Niger

FLD on Sesame

FLD on Sunflower

Table 38: Details of Front Line Demonstration on Rabi Pulses

Sl. No.	Crop	State	No. of farmers	Area (ha)	Yield (q/ha)		Increase (%)	Economics of Demonstration (Rs/ha)				Economics of Check (Rs/ha)			
					Demo	Check		Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
1	Lentil	Bihar	338	133.27	15.19	11.01	32.46	20407.46	60006.85	39599.38	2.98	18988.00	44204.62	25215.38	2.31
		Jharkhand	122	39.20	10.25	7.66	30.27	21100.00	49259.27	28659.27	2.54	18900.00	35804.73	16871.40	1.84
		Total	**460**	**172.47**											
2	Chick Pea	Bihar	42	20.00	18.40	12.10	40.70	24160.00	80320.00	56160.00	3.32	20230.00	57240.00	37010.00	2.83
		Jharkhand	388	119.00	13.94	10.73	33.39	25348.64	76761.82	51485.91	3.05	23656.36	59770.00	36086.36	2.53
		Total	**430**	**139.00**											
3	Green Gram	Bihar	95	23.60	9.20	6.49	36.32	17238.75	44456.25	27217.50	2.58	16437.50	37526.25	21088.75	2.33
		Jharkhand	125	50.00	9.49	6.65	43.04	22304.00	48109.75	25805.75	2.34	21114.00	37429.50	21565.50	1.91
		Total	**220**	**73.60**											
4	Pea	Bihar	136	16.00	64.34	51.78	26.79	37020.00	130498.00	80838.00	3.12	34380.00	86369.00	52389.00	2.46
		Jharkhand	49	5.48	54.45	40.10	46.49	57000.00	121940.00	59940.00	2.46	54000.00	91420.00	27420.00	1.72
		Total	**185**	**21.48**											
4	Gram	Bihar	132	57.00	22.26	15.67	35.89	21654.67	78840.83	48852.83	3.78	20966.67	56762.17	35862.17	2.25
		Jharkhand	33	10.00	15.50	9.00	41.93	22000.00	69750.00	47750.00	3.17	22000.00	40500.00	18500.00	1.84
		Total	**165**	**67.00**											

Sl. No.	Crop	State	No. of farmers	Area (ha)	Yield (q/ha)		Increase (%)	Economics of Demonstration (Rs/ha)				Economics of Check (Rs/ha)			
					Demo	Check		Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
5	Horse Gram	Jharkhand	65	20.00	7.50	4.90	34.40	15150.00	33900.00	18750.00	2.29	14300.00	21850.00	7550.00	1.60
		Total	**65**	**20.00**											
7	Field Pea	Bihar	10	5.50	130.00	95.00	36.80	78870.00	260000.00	181130.00	3.29	66980.00	190000.00	123020.00	2.83
		Jharkhand	52	10.40	42.70	28.46	41.90	30500.00	101205.00	70705.00	3.30	27500.00	69045.00	41545.00	2.59
		Total	**62**	**15.90**											
		G. Total	**1587**	**509.45**											

FLD on Lentil

FLD on Chick Pea

FLD on Green Gram

FLD on Field Pea

4.2.1 Other Crops:

In addition to pulse and oilseed crops, demonstrations were conducted by the KVKs of Bihar and Jharkhand on cereals, vegetables, cash crops, flowers, spices and other enterprises for an area of 3066.56 ha. In paddy, an area of 1933.37 ha was brought under demonstration by the KVKs of Bihar and Jharkhand. The increase in yield in demonstration over local check was higher (30.6%) recorded.

In wheat, KVKs of Bihar and Jharkhand brought 507.68 ha under demonstration programme. Advantage in yield in the demonstration over local check was between 22-23 per cent with highest benefit-cost ratio of 1.65.

In maize, demonstration was conducted in an area of 123 ha by the KVKs of Bihar and Jharkhand. Average demonstration yield over local check was highest (37.97%) in Jharkhand followed by 20.44 per cent in Bihar and benefit-cost ratio was 1.65.

Other crops included okra, onion, ragi, bittergourd, marigold and cauliflower demonstrated by the KVKs. All these crops produced higher yield by 35 per cent in demonstration over local checkThe benefit-cost ratio of crops like brinjal, cabbage, broccoli, bitter gourd, okra and sponge gourd was 3.0. The details are given in the following Table.

Table 39: Details of Front Line Demonstration on Other Crops

Sl. No.	Crop	State	No. of farmers	Area (ha)	Yield (q/ha)		Increase (%)	Economics of Demonstration (Rs/ha)				Economics of Check (Rs/ha)			
					Demo	Check		Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
1	Paddy	Bihar	1833	747.47	41.55	34.68	21.13	28423.58	62348.34	35514.28	2.21	28169.41	50967.35	22768.84	1.76
		Jharkhand	2920	1185.90	39.83	29.53	39.52	28958.00	62925.89	35711.14	2.25	27559.32	44316.48	18878.11	1.60
		Total	**4753**	**1933.37**											
2	Wheat	Bihar	971	359.76	37.19	30.85	20.15	28805.43	60292.52	31262.50	2.06	28770.02	50320.98	21491.57	1.67
		Jharkhand	445	147.92	32.18	25.61	25.90	28350.33	57105.17	28754.83	2.03	26543.27	70003.33	17690.07	1.64
		Total	**1416**	**507.68**											
3	Tomato	Bihar	127	14.77	399.44	279.31	28.96	76856.25	274163.75	266057.50	3.45	67279.25	191631.88	127288.71	2.41
		Jharkhand	297	77.80	510.18	315.18	55.11	76425.85	321954.38	245913.15	4.03	51114.08	163791.15	99525.17	2.13
		Total	**424**	**92.57**											

Sl. No.	Crop	State	No. of farmers	Area (ha)	Yield (q/ha)		Increase (%)	Economics of Demonstration (Rs/ha)				Economics of Check (Rs/ha)			
					Demo	Check		Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
4	Maize	Bihar	114	35.00	463.52	367.74	20.44	30586.60	80763.80	50167.20	2.61	18016.40	46366.40	28170.00	1.54
		Jharkhand	226	88.00	41.28	34.73	37.97	25485.71	62852.00	37366.29	2.60	19450.00	38802.21	19352.21	1.77
		Total	**340**	**123**											
5	Brinjal	Bihar	56	5.00	365.75	227.23	14.44	75803.75	288337.50	212533.75	3.50	58602.75	186790.00	128187.25	2.10
		Jharkhand	147	25.00	308.88	317.26	23.89	71487.00	325700.00	254213.00	4.35	58697.50	215291.25	152968.38	2.75
		Total	**203**	**30**											
6	Ragi	Jharkhand	188	60.60	21.89	16.75	32.86	16828.00	41782.00	24954.00	2.82	15370.00	31259.20	15889.20	2.32
		Total	**188**	**60.6**											
7	Cauli-flower	Bihar	161	20.06	251.54	207.40	23.22	51126.25	195766.13	143389.88	4.01	49955.63	162746.50	112978.38	3.37
		Total	**161**	**20.06**											
8	Jute	Bihar	148	60.00	24.99	18.44	36.35	26750.00	65675.00	38925.00	2.34	25150.00	48206.25	23056.25	1.88
		Total	**148**	**60**											
9	Onion	Bihar	100	5.00	281.29	226.38	24.05	101512.69	267017.81	165505.19	2.36	96845.06	220722.73	123877.63	2.00
		Jharkhand	6	0.12	178.73	113.92	56.90	50583.33	178736.66	128403.33	3.52	47916.66	113928.33	66011.66	2.37
		Total	**106**	**5.12**											
10	Potato	Bihar	88	9.50	334.17	266.46	26.46	108355.50	243352.00	134796.50	1.63	108212.50	194824.50	87112.00	1.25
		Total	**88**	**9.5**											
11	Bhindi	Bihar	40	2.00	132.00	115.16	14.62	108900.50	353119.80	244219.30	3.24	105886.07	308070.24	202204.17	2.91
		Jharkhand	35	20.00	235.00	142.00	65.00	72000.00	141000.00	69000.00	1.95	55000.00	85200.00	30200.00	1.54
		Total	**75**	**22**											
12	Turmeric	Bihar	59	1.25	266.88	214.75	24.75	103626.25	309700.00	205698.75	2.92	95501.25	237350.00	141848.75	2.48
		Total	**59**	**1.25**											
13	Cabbage	Bihar	47	3.00	210.29	166.35	28.96	49549.23	197770.90	148321.68	3.36	44876.85	162487.30	66268.85	3.85
		Jharkhand	10	5.00	398.00	355.00	12.00	141000.00	477600.00	336600.00	2.38	156000.00	426000.00	270000.00	1.73
		Total	**57**	**8**											
14	Fodder	Bihar	35	3.00	660.00	555.00	18.94	37500.00	131000.00	93500.00	3.29	37000.00	111500.00	74500.00	2.83
		Jharkhand	15	1.40	440.00	290.00	42.25	2307.00	21500.00	19193.00	7.03	5876.00	71000.00	65124.00	7.51
		Total	**50**	**4.4**											
15	Gibber-ellin	Bihar	50	50.00	719.93	200.00	259.97	69440.00	244420.00	174980.00	3.50	44440.00	111100.00	88880.00	2.50
		Total	**50**	**50**											
16	Papaya	Bihar	44	0.30	980.00	832.00	17.78	90580.00	686000.00	595420.00	7.57	80490.00	582400.00	511910.00	7.23
		Total	**44**	**0.3**											
17	Broccoli	Bihar	24	1.00	110.30	82.30	34.46	35900.00	189000.00	153100.00	5.26	31900.00	152800.00	120900.00	4.78
		Jharkhand	20	0.90	190.50	148.00	28.70	98975.00	541500.00	442325.00	5.47	91500.00	384000.00	292500.00	4.19
		Total	**44**	**1.9**											
18	Bottle Gourd	Bihar	30	16.00	98.00	70.90	27.11	25680.00	127300.00	101620.00	4.83	28000.00	100200.00	72200.00	3.64
		Jharkhand	12	1.00	450.00	321.00	40.19	28500.00	225000.00	196500.00	7.89	28100.00	160500.00	132400.00	5.71
		Total	**42**	**17**											
19	Cucurbits	Bihar	36	10.16	185.00	169.00	9.46	175000.00	370000.00	195000.00	2.10	170000.00	338000.00	168000.00	1.98

Sl. No.	Crop	State	No. of farmers	Area (ha)	Yield (q/ha)		Increase (%)	Economics of Demonstration (Rs/ha)				Economics of Check (Rs/ha)			
					Demo	Check		Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
		Total	**36**	**10.16**											
20	Litchi	Bihar	33	15.00	387.90	247.30	52.07	107932.50	301880.00	193949.50	2.81	97176.00	210225.00	113049.00	2.17
		Total	**33**	**15**											
21	Chilli	Bihar	20	5.00	209.80	179.70	16.74	143280.00	513300.00	370020.00	2.97	145855.00	453950.00	313095.00	2.46
		Jharkhand	12	3.00	254.00	172.00	47.67	62500.00	152400.00	89900.00	2.26	60000.00	103200.00	43200.00	1.72
		Total	**32**	**8**											
22	Okra	Bihar	26	1.75	128.33	98.59	32.84	46856.67	158533.33	111676.67	3.22	41193.33	120626.67	79433.33	2.62
		Total	**26**	**1.75**											
23	Pointed Gourd	Bihar	25	2.00	106.00	74.00	43.20	102500.00	159000.00	56500.00	1.55	100000.00	111000.00	11000.00	1.11
		Total	**25**	**2**											
24	Mango	Bihar	25	10.00	161.00	125.00	28.80	122150.00	402500.00	280000.00	3.28	128500.00	311250.00	183750.00	2.42
		Total	**25**	**10**											
25	Oats	Bihar	23	7.00	275.00	232.30	28.84	17287.50	41500.00	24250.00	2.33	17037.50	33450.00	16412.50	1.90
		Total	**23**	**7**											
26	Banana	Bihar	22	2.50	396.00	320.00	23.75	60000.00	277200.00	211200.00	4.62	58000.00	224000.00	176000.00	3.86
		Total	**22**	**2.5**											
27	Marigold	Bihar	10	3.00	80.00	72.00	11.11	35000.00	120000.00	85000.00	3.42	34000.00	108000.00	77000.00	3.18
		Jharkhand	11	0.80	158.13	95.13	66.24	56750.00	177125.00	120375.00	3.13	47500.00	105625.00	58125.00	2.25
		Total	**21**	**3.8**											
28	Makhana	Bihar	19	6.00	26.07	22.53	25.01	50750.00	184291.50	133541.50	3.59	48750.00	151312.50	77562.50	3.08
		Total	**19**	**6**											
29	Sponge Gourd	Bihar	15	1.00	155.00	113.50	36.56	25500.00	155000.00	129500.00	6.07	25500.00	113500.00	88000.00	4.45
		Total	**15**	**1**											
30	Sweet Potato	Jharkhand	15	2.00	145.00	60.70	138.00	40000.00	174000.00	134000.00	4.35	26000.00	72840.00	46840.00	2.80
		Total	**15**	**2**											
31	Capsi-cum	Jharkhand	13	2.40	308.50	155.50	15.11	66671.00	263000.00	196329.00	3.14	41500.00	155500.00	114000.00	1.88
		Total	**13**	**2.4**											
32	Jowar	Jharkhand	12	3.00	32.30	26.80	20.52	19800.00	54910.00	35110.00	2.77	16200.00	45560.00	29360.00	2.81
		Total	**12**	**3**											
33	Bitter gourd	Jharkhand	10	5.00	318.00	250.00	27.20	110500.00	381600.00	271100.00	2.45	101150.00	300000.00	198850.00	1.96
		Total	**10**	**5**											
34	Garlic	Jharkhand	10	0.20	145.40	120.80	20.36	85000.00	290800.00	205800.00	3.42	75000.00	241600.00	166600.00	3.22
		Total	**10**	**0.2**											
35	Nigella	Bihar	10	0.50	11.02	8.66	26.21	33560.00	120120.00	86560.00	3.58	34000.00	95260.00	61260.00	2.80
		Total	**10**	**0.5**											
36	Ridge Gourd	Jharkhand	8	1.00	175.00	123.00	42.28	21200.00	87500.00	66300.00	4.13	21000.00	61500.00	40500.00	2.93
		Total	**8**	**1**											

Sl. No.	Crop	State	No. of farmers	Area (ha)	Yield (q/ha)		Increase (%)	Economics of Demonstration (Rs/ha)				Economics of Check (Rs/ha)			
					Demo	Check		Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
37	Cluster bean	Jharkhand	6	0.40	52.75	34.90	51.26	31083.33	94959.00	63875.66	3.04	28416.66	62835.00	33391.00	2.20
		Total	**6**	**0.4**											
38	Spinach	Jharkhand	4	0.10	78.57	51.35	53.01	34520.00	117862.50	83362.50	3.41	31875.00	770325.00	45157.50	2.41
		Total	**4**	**0.1**											
39	Straw-berry	Bihar	3	0.50	80.00	63.00	26.98	130000.00	336000.00	260000.00	2.00	110000.00	250000.00	140000.00	1.20
		Total	**3**	**0.5**											
40	Other Crops	Bihar	4	10.00											
		Jharkhand	268	27.50											
		Total	**272**	**37.5**											
		G. Total	**8888**	**3066.56**											

FLD on Brinjal

FLD on Strawberry

KVKs of this zone have proved the superiority of improved varieties/ technologies in the farmers' field which need to upscale for the benefit of the farming community.

Water conservation

Mulching

4.2.2 Livestock and Fishery:

Frontline demonstration was also conducted in livestock and fishery related breed, feed, vaccination, deworming, pond management, stoking density, fish fingerling production and other areas by the KVKs of Bihar and Jharkhand. In livestock, 2580 number of farmers was involved in such demonstration for the benefit of 3808 livestock. Out of the total number of farmers, 1975 number of farmers was involved in Bihar and 605 in Jharkhand. However, in terms of livestock, 1334 number of livestock was brought under improved rearing practices in Jharkhand followed by 415 in Bihar. In fishery, 129 numbers of demonstrations were taken up by the KVKs to cover a water area of 88.50 ha in respect of both the involvement of farmers and water area brought under demonstration.

Table 40: Details of Front Line Demonstration on Livestock and Fishery

Sl. No.	Category	State	No. of Farmers	Area (ha)/No
1	Livestock	Bihar	1975	2407
		Jharkhand	605	1401
		Total	**2580**	**3808**
2	Fishery	Bihar	90	61.50
		Jharkhand	39	27.00
		Total	**129**	**88.50**

FLD on vaccination

FLD on feeding of animals

4.2.3 Other Enterprises:

Apart from conducting demonstration on crops, livestock and fishery, the KVKs also demonstrated various enterprises in the farmers' fields to exhibit its relative advantage over conventional practices and/or introduce newer enterprises. In the process, altogether 1108 enterprises like vermicompost, bee keeping, value addition, mushroom production, backyard poultry rearing, homestead vegetable cultivation, feed production, azolla cultivation and many more. KVKs of Bihar demonstrated 759 enterprises involving 802 farmers and KVKs of Jharkhand demonstrated 593 enterprises covering 306 farmers.

Table 41: Details of Front Line Demonstration on Other Enterprises

Sl. No.	Category	State	No. of Farmers	Area (ha)/No
1	Enterprise	Bihar	802	759.06
		Jharkhand	306	593.00
		Total	**1108**	**1352.06**

FLD on vermicompost

FLD on bee keeping

4.2.4 Farm Implements:

Various farm tools and implements were also demonstrated in this zone for the benefit of 5202 number of farmers. The tools and implements were demonstrated in 1568.3 ha area. The KVKs of Jharkhand brought 552 ha area for such demonstrations involving 2628 number of farmers and 2574 farmers to cover 1016.3 ha in the case of KVKs of Bihar. The implements saved the labour requirement, seed rate, enhanced water use efficiency and reduced drudgery to certain extent.

Table 42: Details of Front Line Demonstration on Farm Implement

Sl. No.	Category	State	No. of Farmers	Area (ha)/No
1	Implement	Bihar	2574	1016.30
		Jharkhand	2628	552.00
		Total	**5202**	**1568.30**

Twin wheel hoe

Drum Seeder

4.3 Clustered Frontline Demonstration (CFLD)

With a view to bring large areas of rice fallow under frontline demonstrations and enhance the production as well as productivity of pulse and oilseed crops, the ambitious programme of Department of Agriculture & Cooperation and Farmers Welfare (DAC & FW), Govt. of India has been implemented during Kharif 2017 and Rabi 2017-18 through the KVKs of Bihar and Jharkhand. In order to achieve the total target earmarked by DAC & FW, a series of workshop was conducted by ICAR-ATARI, Patna to enable the KVKs to cover as much area as possible both in pulse and oilseed crops.

4.3.1 Pulses

In CFLD on pulse crops during Kharif 2017, pigeon pea, black gram, green gram and horse gram were selected for demonstration as per the communication received from DAC & FW. Altogether 3575 ha was allotted for kharif pulses of which 4592 ha was finally brought under demonstration programme. All the crops were demonstrated in Bihar and Jharkhand. Performance analysis of individual pulse crop indicated that in pigeon pea, 41 to 42 percent increase in average yield under demonstration was recorded in the two states. In black gram, 33-34 percent increase in average yield in the KVKs of Bihar and Jharkhand under CFLD programme was recorded. In respect of yield enhancement, the KVKs of Jharkhand reported as an average increase of demonstration yield to the extent of 45.42 per cent. In horse gram, an area of 140 ha was brought under the CFLD programme by the KVKs of Bihar and Jharkhand. The details are given in Table.

Table 43: Cluster Frontline Demonstration on Kharif Pulses during 2017-18

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD Approved		Average yield (q/ha)		Yield Increase (%)	Difference of yield between demo and local (q/ha)
			No. of Demonstration	Area (ha)	No. of Demonstration	Area (ha)	Demo	Local		
1	Pigeon Pea	Bihar	1075	430	1199	430	15.85	11.41	38.92	4.44
		Jharkhand	1100	440	1644	440	12.57	8.67	44.94	3.90
		Total	2175	870	2843	870				

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD Approved		Average yield (q/ha)		Yield Increase (%)	Difference of yield between demo and local (q/ha)
			No. of Demonstration	Area (ha)	No. of Demonstration	Area (ha)	Demo	Local		
2	Black Gram	Bihar	75	30	59	30	7.68	6.35	20.87	1.33
		Jharkhand	575	230	680	230	9.15	6.30	45.42	2.86
		Total	650	260	739	260				
3	Green Gram	Bihar	50	20	54	20	0.00	0.00	0.00	0.00
		Jharkhand	350	140	424	140	9.40	6.74	39.37	2.66
		Total	400	160	478	160				
4	Horse Gram	Bihar	25	10	32	10	11.00	7.60	44.74	3.40
		Jharkhand	325	130	500	130	6.46	4.84	33.65	1.63
		Total	350	140	532	140				
		G. Total	3575	1430	4592	1430				

In Rabi 2017-18, lentil, chick pea and field pea were brought under clustered demonstration programme by the KVKs of Bihar and Jharkhand to cover an area of 2100 ha. The performance of demonstration in lentil showed that 38.97per cent average increase was recorded in Bihar and 44.45 percent in Jharkhand. In chick pea, the KVKs of Bihar and Jharkhand reported an average increase in yield to the extent of 35.67 per cent in Jharkhand and 35.44 per cent in Bihar. Another pulse crop, field pea taken up for demonstration produced 38.2 per cent higher yield in both the states. The details are given in Table.

Table 44: Cluster Frontline Demonstration on Rabi Pulses during 2017-18

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD Approved		Average yield (q/ha)		Yield Increase (%)	Difference of yield between demo and local (q/ha)
			No. of Demonstration	Area (ha)	No. of Demonstration	Area (ha)	Demo	Local		
1	Lentil	Bihar	2225	890	2383	890	14.18	10.21	38.97	3.98
		Jharkhand	300	120	323	120	9.12	6.31	44.45	2.81
		Total	**2525**	**1010**	**2706**	**1010**				
2	Chick Pea	Bihar	1100	440	1205	440	15.44	11.40	35.44	4.04
		Jharkhand	950	380	1259	380	13.82	10.18	35.67	3.63
		Total	**2050**	**820**	**2464**	**820**				
3	Field Pea	Bihar	425	170	592	170	15.82	12.08	30.96	3.74
		Jharkhand	250	100	330	100	14.23	9.73	46.36	4.51
		Total	**675**	**270**	**922**	**270**				
		G. Total	**5250**	**2100**	**6092**	**2100**				

Summer Pulse:

Clustered frontline demonstration was also taken by the KVKs of Bihar and Jharkhand on green gram and black gram to cover an area of 830 ha against the target of 830 ha. In green gram, highest area was covered by KVKs of Bihar (500 ha) whereas in Jharkhand, 250 ha was brought under demonstration. In black gram, 80 ha was brought under demonstration programme in this zone of which 40 ha in Jharkhand and 40 ha in Bihar. However, the details of target and achievement in terms of area allotment and crop-wise/state-wise distribution of area are given in the following Table.

Table 45: Cluster Frontline Demonstration on Summer Pulse during 2017-18

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD Approved	
			No. of Demonstration	Area (ha)	No. of Demonstration	Area (ha)
1	Green Gram	Bihar	1250	500	1382	500
		Jharkhand	625	250	732	250
		Total	**1875**	**750**	**2114**	**750**
2	Black Gram	Bihar	100	40	100	40
		Jharkhand	100	40	100	40
		Total	**200**	**80**	**200**	**80**
		G. Total	**2075**	**830**	**2314**	**830**

CFLD on Kharif Pulse

CFLD on Rabi Pulses

4.3.2 Oilseeds

Clustered frontline demonstration was also conducted in oilseed crops both in Kharif 2017, rabi and summer 2017-18 by the KVKs of this zones. In kharif, ground nut, sesame, niger and soybean were demonstrated in 1040 ha against the allotted target of 1050 ha. Ground nut, which was demonstrated in Bihar and Jharkhand for an area of 350 ha produced 36 per cent more yield over local check but it was only 9 per cent. Sesame covered an area of 340 ha in both the states and the increase in yield was in the range of 40-41 per cent, highest increase being recorded in Jharkhand (47.19 per cent). Another oilseed crop, niger was demonstrated in Bihar and Jharkhand to cover an area of 260 ha. The increase in average demonstration yield was in the range of 37.5 per cent. The KVKs of Bihar and Jharkahnd conducted clustered frontline demonstration programme in soybean for an area of 90 ha. The details are given in the following Table.

Table 46: Cluster Frontline Demonstration on Kharif Oilseed during 2017-18

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD Approved		Average yield (q/ha)		Yield Increase (%)	Difference of yield between demo and local (q/ha)
			No. of Demonstration	Area (ha)	No. of Demonstration	Area (ha)	Demo	Local		
1	Ground Nut	Bihar	25	10	40	10	9.27	6.70	38.36	2.57
		Jharkhand	850	340	877	340	15.47	11.54	34.00	3.93
		Total	**875**	**350**	**917**	**350**				
2	Sesame	Bihar	275	110	218	110	5.66	4.20	34.78	1.46
		Jharkhand	575	230	527	230	4.84	3.29	47.19	1.55
		Total	**850**	**340**	**745**	**340**				
3	Niger	Bihar	50	20	56	20	4.10	3.32	23.49	0.78
		Jharkhand	625	250	561	240	5.52	3.65	51.16	1.87
		Total	**675**	**270**	**617**	**260**				

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD Approved		Average yield (q/ha)		Yield Increase (%)	Difference of yield between demo and local (q/ha)
			No. of Demonstration	Area (ha)	No. of Demonstration	Area (ha)	Demo	Local		
4	Soybean	Bihar	100	40	105	40	21.24	8.25	157.45	12.99
		Jharkhand	125	50	132	50	14.10	6.50	116.92	7.60
		Total	**225**	**90**	**237**	**90**				
		G. Total	**2625**	**1050**	**2516**	**1040**				

In rabi 2017-18, rapeseed -mustard and linseed were demonstrated by the KVKs of Bihar and Jharkahnd for an area of 1935 ha. In rapeseed -mustard, the KVKs of Bihar reported 40.64 per cent increase in demonstration yield over local check, while in Jharkhand it was 49.17 per cent. In linseed, the demonstration programme in clustered mode produced 45.1 per cent higher yield over the local check. The KVKs of Jharkhand recorded the highest increase of 43.6 per cent, whereas it was 46.48 per cent in Bihar.

Table 47: Cluster Frontline Demonstration on Rabi Oilseed during 2017-18

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD Approved		Average yield (q/ha)		Yield Increase (%)	Difference of yield between demo and local (q/ha)
			No. of Demonstration	Area (ha)	No. of Demonstration	Area (ha)	Demo	Local		
1	Mustard	Bihar	3100	1240	2799	1085	13.98	9.94	40.64	4.04
		Jharkhand	2125	850	2268	850	10.16	6.81	49.17	3.35
		Total	**5225**	**2090**	**5067**	**1935**				
2	Linseed	Bihar	350	140	358	100	10.95	7.48	46.48	3.48
		Jharkhand	425	170	459	160	7.15	4.98	43.68	2.17
		Total	**775**	**310**	**817**	**260**				
		G. Total	**6000**	**2400**	**5884**	**2195**				

Clustered frontline demonstration was also conducted during summer 2018 for an area of 380 ha against the allotted area of 380 ha. The crops identified were sesame and sunflower. The state-wise target and actual conduct of demonstration are given in the following Table.

Table 48: Cluster Frontline Demonstration on Summer Oilseed during 2017-18

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD Approved	
			No. of Demonstration	Area (ha)	No. of Demonstration	Area (ha)
1	Sunflower	Bihar	525	210	466	210
		Jharkhand	25	10	25	10
		Total	**550**	**220**	**491**	**220**
2	Sesame	Bihar	250	100	267	100
		Jharkhand	150	60	200	60
		Total	**400**	**160**	**467**	**160**
		G. Total	**950**	**380**	**958**	**380**

CFLD on Kharif Oilseed

CFLD on Summer Oilseed

CFLD Oilseed

CFLD Pulses

CFLD Pulses

CFLD Oilseed

4.4 Training Achievements

4.4.1 Practicing farmers:

The sustainable development of agriculture and allied sectors needs adequate knowledge and skill for its application in the actual field condition. Hence, providing knowledge and skill to the practicing farmers is pre-requisite in developing agriculture through adoption/ application of advanced agricultural technologies. The farmers and farm-women registered their names in large number to acquire improved knowledge and skill in different areas of crop production, horticulture, fruit management, ornamental plant cultivation, plantation crop management, livestock production and management, home science and women empowerment, agricultural engineering, plant protection, fisheries development, production of inputs at site, capacity building and group dynamics, agro-forestry and other areas. Rural youths, on the other hand enrolled their name to obtain training in more specific areas which are considered to have potentiality for enterprise development in the respective districts. In respect of extension functionaries, the assessment of training need was made by the concerned departments/ organizations. KVKs helped them to refresh their knowledge mainly in the areas of frontier technology generation and application. In imparting training to farmers, rural youths and extension functionaries, the KVKs resorted to on campus and off-campus condition as per the requirement of training course curriculum. As the farmers need field application of newly generated technologies/ practices, emphasis was given by the KVKs concentrated on providing more number of on-campus training programmes.

A total of 5,601 numbers of training programmes was organized by the KVKs during 2017-18 covering 1,68,670 farmers. Participation of farm women in these training programmes was 44,831, whereas number of farm men was 1,23,545.

Table 49: Training conducted for farmers and farm women during 2017- 18

State	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Bihar	4078	77290	16234	94060	15078	7051	22393	3429	2210	5973	95736	25500	121530
Jharkhand	1523	11918	6236	18154	2919	2039	4958	12972	11056	24028	27809	19331	47140
Total	**5601**	89208	22470	112214	17997	9090	27351	16401	13266	30001	123545	44831	**168670**

Training in Bihar

Training in Jharkhand

Detailed analysis of category-wise training programmes organized by the KVKs of Zone-IV indicated that out of total 5,601 programmes,1,334 courses were conducted in crop production related areas, 840 in horticulture, 650 in livestock production and management, 871 in plant protection, 616 in home science and women empowerment, 434 in soil health and fertility management, 438 in agricultural engineering, 110 in fisheries, 59 in production of inputs, 212 in capacity building and group dynamics and 18 in agro-forestry.

A further classification of thematic area-wise training programmes organized by the KVKs revealed that 1,334 number of courses were conducted by the KVKs for 33,742 farmers and 7,507 farm women in crop production thematic area. Among various sub-thematic areas, highest number of courses offered in cultivation of vegetables (546) followed by integrated crop management (325) and integrated disease management (221). Other sub-thematic areas in order of courses organized were poultry farming (81), seed production (257), disease management in livestock (171), integrated nutrient management (138), feed management (137), dairy management (140), weed management (122), value addition (142), repair and maintenance of farm machinery and implements (159), soil and water testing (05), cropping system (145), soil fertility management (67), nursery raising (40), income generation activities for empowerment of rural women (73), integrated farming (100), crop diversification (37), off-season vegetable cultivation (57), installation and maintenance of micro irrigation systems (73) and others as shown in the following Table.

In horticulture as a whole, 840 numbers of courses were organized for 37,442 farmers of which 9,558 were women (25.53%). Among seven sub-thematic areas, highest number of courses was offered in cultivation of vegetable crops (546) followed by cultivation of fruit (210), ornamental plants (33), 25 for tuber crop, 15 for medicinal and 18 for spices.

Livestock production and management was the third-most important area of training both in respect of number of courses offered and participation of farmers took place. In this thematic area, 650 numbers of training programmes was organized for 21,097 farmers. Disease management and Dairy management were the two major areas where 171 and 140 numbers of training programmes were conducted by the KVKs for 4,989 and 5,353 numbers of farmers, respectively.

Plant protection was another important thematic area both in terms of training programmes organized and participation of farmers. The KVKs organized 871 number of courses for the benefit of 27,333 farmers of which 4,613 (16.87%) participants was farm-women. In terms of courses offered and participation took place, home science/ women empowerment was the next important thematic area, where 616 courses were conducted for 17,607 farmers. However, nearly 70.43 per cent of the participants were women. In the areas of value addition and kitchen and nutritional gardening, participation of farmers was more as compared to other thematic areas. Soil health and fertility management was one of the important thematic areas of the training programme conducted where 434 numbers of courses covered for 13,371 numbers of farmers. Repair and maintenance of farm machinery and implements was the most important sub-thematic area under agricultural engineering thematic area both in terms of courses conducted and farmers participated. In this thematic area, 438 numbers of courses were offered to 13,168 farmers out of which 159 courses were in repair and maintenance of farm machinery. The participation of farmers in this sub-thematic area was to the extent of 4,568 numbers (34.69 %). Installation and maintenance of micro-irrigation systems was the second-most important area where 73 courses were offered to 2,611 farmers. The overall participation of farm-women was to the tune of 20 per cent. In fisheries, 110 numbers of courses were conducted by the KVKs for the involvement of 2,945 farmers and farm women.

KVKs also conducted 212 numbers of courses for 5,463 farmers and farm-women in capacity building and group dynamics. Major areas covered in this thematic

area included formation and management of SHGs (36 number), entrepreneurial development of farmers/ youths (46 number of courses), group dynamics (33 courses), leadership development (09 number) and others. However, highest number of participation was recorded in entrepreneurial development of farmers (1,235) followed by formation and management of SHGs (875), group dynamics (867) and others. Training programme under the thematic area of production of inputs was conducted for 1,566 participants. Seed production and vermicompost production were two major areas of training. The KVKs also organized 24 numbers of courses on agro-forestry covering IFS, production technologies etc. The overall analysis of the training programmes organized by the KVKs of Zone-IV indicated that KVKs have tried to provide required skill and knowledge to the farmers and farm women in various aspects to enable them to enhance the production and productivity of crops, livestock, fishery and all other areas. Moreover, concentration on certain areas like group dynamics, women empowerment, production of inputs at site etc. has helped the farm women in improving their socio-economic condition through SHG/group formation.

Table 50: Training programme for farmers and farm women during 2017- 18

Thematic Area	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
I. Crop Production													
Crop Diversification	37	507	80	587	99	40	139	167	175	342	777	291	1068
Cropping Systems	145	2995	463	3458	736	102	838	467	326	793	4200	937	5092
Integrated Crop Management	325	5569	575	6144	937	182	1051	1090	734	1824	7607	1491	9100
Integrated Farming System	100	1180	194	1374	202	71	273	798	789	1587	2180	1054	3234
Integrated Nutrient Management	21	121	43	164	46	24	70	258	79	337	425	146	571
Nursery management	40	660	56	716	144	34	179	267	105	372	1071	195	1266
Production of organic inputs	59	1317	103	1420	272	50	322	82	55	137	1671	208	1879
Resource Conservation Technologies	87	2286	131	2417	405	96	501	97	113	210	2793	283	3076
Seed production	257	5163	786	5949	798	272	1070	712	697	1741	6675	1753	8760
Water management	50	932	145	1077	157	18	175	216	96	312	1305	259	1564
Weed Management	122	2106	207	2313	380	89	469	422	180	602	2908	476	3384
Others, (cultivation of crops)	91	1659	236	1895	173	47	220	298	131	429	2130	414	2544
	1334										**33742**	**7507**	**41538**
II. Horticulture													
a) Vegetable Crops													
Crop geometry	60	724	175	899	197	80	277	394	305	699	1315	560	1875
Export potential vegetables	22	199	88	287	41	19	60	103	39	142	343	146	489
Grading and standardization	77	1332	174	1506	253	133	386	159	45	206	1746	352	2095
Nursery raising	107	1843	389	2232	405	90	495	267	260	527	2490	752	3242
Off-season vegetables	57	809	180	989	114	54	168	261	132	393	1190	366	1556
Production of low volume and high value crops	33	360	97	457	111	41	152	163	83	246	634	221	855
	546										**11605**	**3869**	**15471**
b) Fruits													

Thematic Area	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Cultivation of fruit	24	245	147	392	85	22	107	101	121	222	431	290	721
Export potential vegetables	45	651	73	724	191	34	225	177	120	297	1019	227	1246
Layout and Management of Orchards	52	818	86	904	191	34	225	115	159	274	1124	279	1403
Management of young plants/orchards	18	215	10	225	42	7	49	140	50	190	400	67	467
Plant propagation techniques	23	301	50	351	58	3	61	60	44	104	419	97	516
Production and management technology	4	0	0	0	0	0	0	75	26	101	75	26	101
Rejuvenation of old orchards	19	248	76	324	66	25	91	104	40	144	418	141	559
Training and pruning	17	358	0	358	130	7	137	0	0	0	488	7	495
Others, if any (INM)	8	40	40	80	4	17	21	56	80	136	100	137	237
	210										**4474**	**1271**	**5745**
c) Ornamental Plants													
Export potential Ornamental	3	45	23	68	12	3	15	21	0	21	78	26	104
Management of potted plants	2	13	7	20	2	0	2	14	8	22	29	15	44
Nursery Management	20	196	48	249	55	46	101	111	44	155	362	138	500
Production and management technology	2	1	0	1	0	0	0	53	4	57	54	4	58
Propagation techniques of Ornamental Plants	2	3	49	52	0	38	38	30	25	55	33	112	145
Others, if any	4	17	1	18	7	22	29	10	48	58	34	71	105
	33										**590**	**366**	**956**
d) Plantation crops													
Processing and value addition	4	53	22	75	12	2	14	25	13	38	90	37	127
Production and management technology	4	41	6	47	12	0	12	12	0	12	65	6	71
Others, if any	1	5	0	5	0	0	0	15	0	15	20	0	20
	9										**175**	**43**	**218**
e) Tuber crops													
Processing and value addition	10	168	11	179	28	12	40	23	50	73	219	73	292
Production and management technology	15	177	19	196	22	38	60	85	36	121	284	93	377
	25										**503**	**166**	**669**
f) Spices													
Processing and value addition	7	61	11	72	10	4	14	64	26	90	135	41	176
Production and management technology	11	169	33	202	24	1	25	17	16	33	210	50	260
	18										**345**	**91**	**436**
g) Medicinal and Aromatic Plants													
Nursery Management	3	49	6	55	18	6	24	2	0	2	69	12	81

Thematic Area	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Post harvest technology and value addition	6	75	23	98	40	0	40	0	9	9	115	32	147
Production and management technology	5	80	13	93	18	0	18	25	0	25	123	13	136
Others, if any	1	33	0	33	1	0	1	0	0	0	34	0	34
	15										**341**	**57**	**398**
III. Soil Health and Fertility Management													
Integrated Nutrient Management	138	2570	464	3034	392	119	511	428	181	609	3393	764	4157
Management of Problematic soils	16	215	17	232	62	19	81	78	92	170	355	128	483
Micro nutrient deficiency in crops	35	509	162	787	141	49	190	125	116	241	775	327	1102
Nutrient Use Efficiency	17	226	38	264	61	7	68	32	56	88	323	101	424
Production and use of organic inputs	36	534	119	653	112	48	160	134	102	236	780	269	1049
Soil and Water Conservation	107	1814	427	2241	418	185	542	469	220	689	2650	832	3482
Soil and Water Testing	5	63	5	68	7	0	7	49	33	82	119	38	157
Soil fertility management	67	1228	129	1816	206	61	267	247	131	378	1753	321	2074
Others, if any	13	143	59	202	42	14	56	141	44	185	326	117	443
	434										**10474**	**2897**	**13371**
IV. Livestock Production and Management													
Dairy Management	140	3427	683	4110	538	215	753	288	202	490	4253	1100	5353
Disease Management	171	2709	549	3258	592	250	842	580	309	889	3880	1109	4989
Feed management	137	1917	1038	2955	421	355	776	214	305	519	2552	1698	4250
Integrated fish farming	4	16	8	24	13	0	13	101	43	144	130	51	181
Piggery Management	35	140	55	195	95	32	127	412	274	686	647	361	1008
Poultry Management	81	928	284	1212	222	180	402	368	337	705	1518	801	2319
Production of quality animal products	17	228	103	331	47	48	95	3	0	3	278	151	429
Others, if any	65	1075	404	1479	208	240	448	258	383	641	1539	1029	2568
	650										**14797**	**6300**	**21097**
V. Home Science/Women empowerment													
Design and development of low/minimum cost diet	33	117	515	632	54	204	258	17	84	101	188	803	991
Designing and development for high nutrient efficiency diet	13	56	311	367	9	95	104	0	0	0	65	406	471
Enterprise development	47	370	445	815	55	168	223	133	300	433	587	924	1511
Gender mainstreaming through SHGs	21	107	221	328	54	140	194	0	129	129	161	490	651
Household food security by kitchen gardening and nutrition gardening	68	442	656	1098	65	297	362	139	294	433	646	1247	1893
Income generation activities for empowerment of rural Women	73	426	780	1206	206	272	478	215	389	604	837	1441	2278

Thematic Area	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Location specific drudgery reduction technologies	28	149	296	445	32	149	181	18	65	83	199	510	709
Minimization of nutrient loss in processing	43	185	620	805	33	175	209	19	60	79	238	855	1093
Rural Crafts	20	178	217	395	34	100	134	38	201	239	250	528	778
Storage loss minimization techniques	46	360	543	903	75	145	220	54	106	160	489	794	1283
Value addition	142	823	1458	2281	236	622	858	114	295	409	1173	2375	3548
Women and child care	54	96	931	1027	40	359	750	8	207	215	144	1497	1641
Others, if any	28	159	330	489	72	175	247	6	26	32	237	531	760
	616										**5214**	**12401**	**17607**
VI. Agril. Engineering													
Installation and maintenance of micro irrigation systems	73	1149	220	1369	537	185	722	350	153	503	2036	575	2611
Post Harvest Technology	62	764	247	1010	253	65	318	152	156	308	1164	473	1637
Production of small tools and implements	31	472	63	535	152	64	216	76	36	112	700	163	863
Repair and maintenance of farm machinery and implements	159	2592	335	2927	628	197	825	496	320	816	3716	852	4568
Small scale processing and value addition	24	364	76	440	137	59	196	56	15	71	557	150	707
Use of Plastics in farming practices	30	610	56	661	108	38	146	72	53	125	785	128	927
Others, if any	59	1165	184	1349	283	73	356	93	57	150	1541	314	1855
	438										**10499**	**2655**	**13168**
VII. Plant Protection													
Bio-control of pests and diseases	71	2008	191	2199	342	316	658	185	63	248	2567	551	3118
Integrated Disease Management	221	4232	553	4758	711	254	1037	389	273	662	5327	1083	6410
Integrated Pest Management	478	9582	1176	10760	1746	452	2198	1011	513	1524	12348	2143	14491
Production of bio control agents and bio pesticides	33	681	145	823	180	68	243	62	39	101	928	247	1175
Others, if any	68	1286	260	1546	300	211	467	91	146	237	1550	589	2139
	871										**22720**	**4613**	**27333**
VIII. Fisheries													
Breeding and culture of ornamental fishes	1	18	5	23	2	0	2	0	0	0	20	5	25
Carp breeding and hatch-ery management	5	74	3	77	9	1	10	9	24	33	92	28	120
Carp fry and fingerling rearing	6	132	11	143	13	1	14	2	19	21	147	31	178
Composite fish culture & fish disease	64	1285	80	1365	193	11	204	28	0	28	1506	91	1597
Edible oyster farming	1	23	2	25	2	1	3	0	0	0	25	3	28
Fish farming	1	7		7	4	1	5			0	11	1	12

Thematic Area	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Fish feed preparation & its application to fish pond, like nursery, rearing & stocking pond	7	130	13	143	20	5	25	46	15	61	196	33	229
Fish processing and value addition	2	48	0	48	3	0	3	0	0	0	51	0	51
Hatchery management and culture of freshwater prawn	3	56	1	57	1	1	2	17	11	28	74	13	87
Integrated fish farming	17	338	49	387	55	4	59	40	27	67	433	80	513
Portable plastic carp hatchery	2	79	1	80	2	1	3	0	0	0	81	2	83
Others, if any	1	20	0	20	2	0	2	0	0	0	22	0	22
	110										**2658**	**287**	**2945**
IX. Production of Inputs at site													
Bio-fertilizer production	2	43	0	43	13	0	13	0	0	0	56	0	56
Bio-pesticides production	1	28	3	21	2	2	4	0	0	0	30	5	35
Organic manures production	4	74	4	78	12	2	14	4	25	29	90	31	121
Planting material production	8	128	6	134	36	1	37	58	32	90	222	39	261
Production of Fish feed	2	48	4	52	2	3	5	0	0	0	50	7	57
Production of livestock feed and fodder	2	45	4	49	3	3	6	0	0	0	48	7	55
Seed production	24	382	21	403	56	38	94	42	37	79	480	96	576
Small tools and implements	1	28	1	29	1	1	2	0	0	0	29	2	31
Vermi-compost production	15	209	28	237	38	13	51	41	45	86	288	86	374
	59										**1293**	**273**	**1566**
X. Capacity Building and Group Dynamics													
Entrepreneurial development of farmers/ youths	46	587	172	759	106	132	241	122	116	238	815	420	1235
Formation and Management of SHGs	36	574	112	686	90	23	113	23	53	76	687	188	875
Group dynamics	33	523	100	623	101	85	186	37	21	58	661	206	867
Leadership development	9	246	64	310	33	18	51	26	12	38	305	94	399
Mobilization of social capital	50	106	592	698	47	61	122	47	128	175	185	810	997
Nursery Management	2	16	4	20	9	4	13	8	9	17	33	17	50
WTO and IPR issues	2	98	4	102	24	2	26	18	0	18	140	6	146
WTO and IPR issues PMFBY	2	52	8	60	7	0	7	6	9	15	65	17	82
Others, if any	32	680	47	727	40	13	53	29	3	32	749	63	812
	212										**3640**	**1821**	**5463**
XI. Agro forestry													
Integrated Farming Systems	7	216	41	257	31	17	48	13	19	32	260	77	337

Thematic Area	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Nursery Management	5	72	6	78	7	2	9	24	7	31	103	15	118
Production technologies	6	85	13	98	4	1	5	7	32	39	96	46	142
Total	**5601**	**89208**	**22470**	**112214**	**17997**	**9090**	**27351**	**16401**	**13266**	**30001**	**123545**	**44831**	**168670**

4.4.2 Rural youth:

The KVKs of Zone-IV with an aim to boost the youths' future in a planned way conducted enterprise-potential training programmes for a large number of rural youths to make them self-employed through their own efforts and acquired managerial and related skill. In the course of inculcating knowledge and skill, the KVKs conducted 1,406 numbers of training programmes for benefit of 39,358 rural youths and girls covering 27,706 rural boys and 11679 rural girls during 2017- 18. Among the participants 16.54% were in the category of Schedule Caste and 18.92% in Schedule Tribe. In terms of preferred courses, mushroom production was mostly preferred by trainees. A total of 192 courses were offered for 4,887 rural youths, while training on seed production attracted 3,093 people from the rural youths for 111 courses. Sheep and goat farming was taken by 1,270 people in 54 courses. Dairying was chosen by 1,709 participants in 68 courses, value addition in 84 courses for 1,848 trainees, poultry production in 51 courses for 1,164 trainees, integrated farming in 72 courses for 1,751 trainees, vermin culture in 55 courses for 1,459 trainees and post harvest technology in 25 courses for 742 trainees. Overall trend showed that rural youths and girls have relied on the training from the KVKs for self employment generation and additional income.

Table 51: Training conducted for rural youths during 2017- 18

State	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Bihar	994	13159	5914	19262	2721	1899	4685	699	517	1205	16595	8399	24967
Jharkhand	412	5190	1133	6323	1504	322	1826	4417	1825	6242	11111	3280	14391
Total	**1406**	**18349**	**7047**	**25585**	**4225**	**2221**	**6511**	**5116**	**2342**	**7447**	**27706**	**11679**	**39358**

Training on Dairying for Rural Youth in Bihar

Training on Mushroom Production for Rural Youth in Jharkhand

Table 52: Training programme for rural youth during 2017- 18

Thematic Area	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Bee-keeping	40	557	94	651	125	28	153	161	15	176	843	137	980
Commercial fruit production	26	533	62	595	103	57	160	89	24	113	725	143	868
Composite fish culture	15	237	19	243	27	0	27	48	28	76	312	34	346
Dairying	68	1010	326	1336	172	76	248	79	46	125	1261	448	1709
Enterprise development	53	678	482	1160	116	81	197	106	34	140	900	597	1497
Fish harvest and processing technology	3	62	9	71	3	2	5	0	0	0	65	11	76
Fry and fingerling rearing	4	91	8	99	14	2	16	0	0	0	105	10	115
Integrated farming	72	997	144	1144	190	43	233	283	95	378	1470	284	1751
Mushroom Production	192	1827	1556	3283	333	471	804	424	345	769	2594	2282	4887
Nursery Management of Horticulture crops	88	917	313	1230	188	50	238	364	255	619	1465	618	2083
Ornamental fisheries	2	42	8	50	4	2	6	0	0	0	46	10	56
Para extension workers / enterprenuer development	2	0	0	0	30	0	30	25	0	25	55	0	55
Para vets	7	63	6	69	10	2	12	36	37	73	109	45	154
Pesticide & fertilizer applicator	4	25	1	26	3	1	4	0	0	0	28	2	30
Piggery	15	51	13	64	31	29	60	211	96	307	285	146	431
Planting material production	22	446	37	483	82	38	120	11	1	12	539	76	615
Post Harvest Technology	25	312	98	410	155	52	207	79	46	125	546	296	742
Poultry production	51	515	159	674	110	89	199	205	101	306	830	334	1164
Production of organic inputs	77	950	194	1144	148	105	253	494	129	620	1592	428	2020
Production of quality animal products	16	244	61	305	39	13	52	2	0	2	287	72	359
Protected cultivation of vegetable crops	37	487	106	593	138	86	224	39	12	51	664	204	1011
Quail farming	6	58	11	69	16	0	16	0	0	0	74	11	85
Repair and maintenance of farm machinery and implements	64	958	116	1074	195	39	234	139	46	182	1293	200	1493
Rural Crafts	33	7	396	403	6	160	166	60	68	128	73	624	697
Seed production	111	1783	200	2263	225	61	288	631	193	819	2639	534	3093
Sericulture	5	79	6	85	19	4	23	21	3	24	119	13	132
Sheep and goat rearing	54	563	269	832	128	114	305	118	78	196	809	461	1270
Small scale processing	15	114	101	215	78	52	130	47	12	59	239	165	404
Soil Fertility	2	43	0	43	6	1	7	0	0	0	49	1	50
Tailoring and Stitching	27	8	430	444	5	138	143	0	117	117	13	685	698
Techniques of soil testing & its importance.	1	16	2	18	2	0	2	0	0	0	18	2	20
Training and pruning of orchards	16	161	42	203	25	11	36	135	56	191	321	109	430
Value addition	84	365	870	1235	123	237	360	84	167	251	589	1259	1848
Vermi-culture	55	822	125	957	120	64	184	121	197	318	1073	386	1459
Others if any	114	3328	783	4114	1256	113	1369	1104	141	1245	5676	1052	6730
Grand Total	**1406**	**18349**	**7047**	**25585**	**4225**	**2221**	**6511**	**5116**	**2342**	**7447**	**27706**	**11679**	**39358**

4.4.3 Extension functionaries

Extension functionaries of State Government Departments play key role in disseminating agricultural technologies among the larger farming communities. But majority of the extension functionaries do not have adequate knowledge of upgraded technologies. In this context, KVKs play an important role in updating technological knowledge and skill in the frontier areas of the agriculture and allied sectors. A total of 782 courses were conducted for 30,137extension functionaries. In these training programmes, 4,830 female and 25,247 male participated. Group-wise trend of participation in the entire zone in respect of training organized for farmers' depicted that nearly 33 per cent of the total participants was women in Bihar and 23 percent in Jharkhand. In respect of extension functionaries, only 16 per cent women contributed the total participants in the zone though it was as low as 15.38 per cent in the case of Bihar and 17.6 per cent in Jharkhand only. The functionaries trained were 14.84% from schedule caste and 15.47% were from schedule tribe category. Training programmes on productivity enhancement in field crops, integrated pest management, integrated nutrient management and livestock feed and fodder production were in the priority list. As much as 133 courses were organized for 5,722 extension functionaries in the field of productivity enhancement in field crops. At the same time 103 courses in integrated pest management for 4558 persons, 93 courses in integrated nutrient management for 3207 persons and 77 courses in livestock feed and fodder production for 3066 persons were conducted by the KVKs. Rejuvenation of old orchards, protected cultivation technology, formation and management of SHGs, management in farm animals and livestock feed and fodder production were other important thematic areas. The details were given in the following Table. In order to extend the benefit to large number of extension worker, these categories of training included line department officials, teachers, NGO staff and other agricultural related workers of the particular district of Bihar and Jharkhand.

Table 53: Training conducted for extension functionaries during 2017- 18

State	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Bihar	558	14926	2419	17343	2896	651	3496	462	227	689	18139	3308	21507
Jharkhand	224	3878	598	4476	495	130	625	2735	794	3529	7108	1522	8630
Total	**782**	**18804**	**3017**	**21819**	**3391**	**781**	**4121**	**3197**	**1021**	**4218**	**25247**	**4830**	**30137**

Training on Integrated Pest Management for Extension Functionaries in Bihar

Training on Productivity Enhancement in Field Crops for Extension Functionaries in Jharkhand

Table 54: Training programme for extension functionaries during 2017- 18

Thematic Area	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Capacity building for ICT application	26	369	231	600	44	63	107	71	9	80	484	303	787
Care and maintenance of farm machinery and implements	46	1223	79	1302	266	27	213	176	21	197	1586	123	1709
Gender mainstreaming through SHGs	30	393	114	507	75	58	133	93	16	109	548	209	757

Thematic Area	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Group Dynamics and farmers organization	12	164	25	189	16	4	20	196	15	211	376	44	420
Household food security	10	149	103	252	24	49	73	10	25	35	183	177	360
Information networking among farmers	9	214	60	274	20	9	32	5	4	9	242	70	312
Integrated Nutrient management	93	2016	195	2211	310	25	335	546	115	661	2870	337	3207
Integrated Pest Management	103	3371	306	3678	513	92	628	225	48	273	4115	446	4558
Livestock feed and fodder production	77	1972	572	2544	237	63	300	196	25	221	2378	661	3066
Production and use of organic inputs	36	816	81	897	112	17	129	176	22	198	1104	120	1224
Productivity enhancement in field crops	133	4084	376	4457	629	113	742	456	67	523	5169	553	5722
Protected cultivation technology	48	938	109	1047	217	41	258	209	68	277	1328	218	1582
Rejuvenation of old orchards	33	483	90	573	170	13	183	145	81	226	798	184	982
Value addition	21	648	111	759	194	41	235	3	2	5	845	154	999
Women and Child care	17	65	300	365	14	70	84	3	123	126	82	493	575
WTO and IPR issues	6	82	49	131	18	10	28	0	1	1	100	60	160
Others, if any	82	1817	216	2033	532	86	621	687	379	1066	3039	678	3717
Grand Total	**782**	**18804**	**3017**	**21819**	**3391**	**781**	**4121**	**3197**	**1021**	**4218**	**25247**	**4830**	**30137**

4.4.4 Sponsored training programme

The KVKs of Zone-IV have reached in almost every corner of the districts of Bihar and Jharkhand. Thus, it has not only helped the farming community in receiving need-based support and information back-up but also attracted different organizations engaged in agricultural development activities to come in close contact with KVKs. Visit and interaction with KVKs and farming community convinced them to solicit help and guidance from KVKs in better implementation of their plan of action. At the same time, the organizations felt it appropriate to utilize the expertise of KVKs in upbringing the knowledge and skill of their target beneficiary through HRD programmes of KVKs. KVKs of Zone-IV towards agricultural development in general and capacity building of farmers in particulars, a number of govt. and other organizations have approached the KVKs to get their clienteles trained in various aspects of agricultural development, livestock rearing, fishery, post-harvest technology and value addition, farm machinery, women empowerment/ home science, capacity building etc. The KVKs, on the other hands, have tried to fulfil the expectations of those organizations apart from working on the mandated activities.

The major areas covered by the KVKs were crop production and management, agricultural extension, livestock and fishery, production and value addition, farm machinery, post-harvest technology and value addition and others. Among the identified thematic areas, highest number of courses (246) was offered in crop production and management for 37,592 participants followed by farm machinery (74) for 4,987, agricultural extension (60) for 10,768 participants, livestock and fisheries (58) for 3,742 participants and others. The trend of participation indicated that the sponsoring organizations preferred to get their clienteles trained in those areas where the participants might start their own venture for self-employment.

Table 55: Sponsored training conducted by Zone-IV during 2017- 18

Area of Training	No. of courses	General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Crop production and management	246	26970	2421	29768	6123	1281	7323	33811	3702	37592
Post harvest Technology and value addition	19	1601	104	1705	244	54	298	1845	158	2003
Farm machinery	74	3552	345	4115	639	149	761	4435	494	4987

Area of Training	No. of courses	General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Home science	26	1976	447	2453	170	112	259	2256	559	2811
Entrepreneurship Development	5	102	20	122	40	28	68	142	48	190
Livestock production and management	58	1825	301	2427	776	311	1060	2892	612	3742
Agricultural Extension	60	7860	1322	9331	1004	188	1157	9320	1510	10768
Total	**488**	**43886**	**4960**	**49921**	**8996**	**2123**	**10926**	**54701**	**7083**	**62093**

Sponsored Training Programme on Post Harvest Technology and Value Addition in Bihar

Sponsored Training Programme on Livestock Production and Management in Jharkhand

4.4.5 Vocational training programme

Addressing unemployment problem of the rural youths as well as retaining them in agriculture has been one of the major accomplishments of the KVKs of the Zone. Based on the potential of agro-based enterprise in the district, the KVKs identified areas like crop production and management, integrated crop management, post-harvest technology and value addition, livestock and fisheries, income generating activities and agriculture extension to enable the youths to develop their own enterprise/ consultancy as a source of their livelihood. In most of the cases, financial/ credit institutions were associated to help the youths and overcome their anxiety in the case of enterprise development.

Vocational training in different areas of crop production, livestock rearing, fishery, post-harvest technology value addition were the part of KVK training programmes which helped to build up trained manpower who could take up self employment in different areas of rural farming. Vocation courses were being longer duration, helped to upgrade the skill and knowledge of the rural youths and farmers. During the year 2017-18, KVKs of Zone-IV organized 295 courses in different areas of agriculture and allied sectors which covered 6119 rural boys and 3015 rural girls. Category wise analysis of vocational training showed that rural youths and girls preferred maximum training in mushroom production i.e. 656 rural boys and 593 girls were trained through 35 courses during the year. Commercial vegetable production was on demand by many of the trainees, 377 rural youth took this training through 15 courses. Tailoring, stitching, embroidery, dying etc. were preferred by 539 rural girls and they were being trained through 21 courses. About 499 participants were trained in dairy management in 15 courses. Similarly, 465 rural youths had chosen poultry farming as their desired vocation and was trained through 10 courses. Commercial fruit production, vermin composting, repair and maintenance of farm machinery and implements, organic farming, rural crafts were also the other areas liked by the trainees.

Table 56: Vocational training conducted in Zone-IV during 2017- 18

Area of Training	No. of courses	Grand Total		
		Male	Female	Total
Bee Keeping	10	236	35	271
Commercial Fruit Production	25	517	87	604
Dairy Management	15	377	122	499
Enterprenurship Development	52	1176	707	1883
Farm Mechanization	8	165	15	180
Fish production	4	78	32	110

Area of Training	No. of courses	Grand Total		
		Male	Female	Total
Goat Farming	15	378	204	582
Integrated Farming System	5	193	47	240
Mushroom Production	35	656	593	1249
Organic Farming	3	70	5	75
Poultry Farming	10	381	84	465
Production of Organic inputs	2	40	13	53
Protected cultivation	2	22	38	60
Rural crafts	3	0	62	62
Seed Production	31	752	100	852
Soil and water testing	6	134	0	134
Tailoring and Stitching	21	27	512	539
Value addition	13	152	175	327
Vermicompost Production	16	360	84	444
Vegetable Cultivation	4	78	50	128
Commercial vegetable Production	15	327	50	377
Total	**295**	**6119**	**3015**	**9134**

Vocational Training Programme on Tailoring and Stitching in Bihar

Vocational Training Programme on Commercial Fruit Production in Jharkhand

4.5 Extension Programmes

In creating awareness among farmers about the benefit of advanced agricultural and allied technologies, scientific livestock rearing, fish fingerling production, soil testing, group farming and other related aspects, the KVKs of Zone-IV organized 1,44,413 number of various extension activities to reach out 12,20,734 farmers and extension officials. Among the beneficiaries farmers constituted 11,93,378 numbers of participants and 27,356 were extension officials. Gender-wise classification indicates that 2,53,869 numbers of farm women took part in various extension activities against 9,39,509 numbers of farm men. In respect of extension officials, however, there are 4,257 members were women extension officials and 23,099 were male extension officials. In respect of programme organized, advisory service was the most important programme for the KVKs where 68,190 numbers of advisory services were provided to 2,86,573 number of farmers and farmwomen. A total of 3623 soil health camp was organized involving 25637 famers and extension officials. Another important category was workshop where 149 numbers of programmes were organized by the KVKs to facilitate 27,823 beneficiaries. The KVKs also extended their expertise through delivering 1,148 number of lectures as resource person for 61,308 farmers. The KVK personnel also paid visit 14,972 times to the farmers' field to interact with 58,975 numbers of farmers and farmwomen where as 66,753 farmers and farm women visited different KVKs in 51,455 occasions. Method demonstration was also very important activity of KVKs where 4,869 farmers were benefited by organizing 178 numbers of programme. KVKs had conducted as many as 412 numbers of farmer seminars where 25,887 beneficiaries participated. Other important extension activities carried out by the KVKs include conducting kisan gosthi, field day, film show, group meeting, soil test campaign, self-help group mahila mandal and farm science club, conveners' meet, celebration of important days and others.

Table 57: Extension activities organized by Zone-II during 2017- 18

Nature of Extension Activity	No. of activities	Farmers			Extension officials			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Advisory Services	68190	242604	43364	285968	514	91	605	243118	43455	286573
Exhibition	345	25140	11006	36146	858	178	1036	25998	11184	37182
Farmers Seminar	412	19083	5877	24960	730	197	927	19813	6074	25887
Farmers visit to KVK	51455	51827	13434	65261	1058	434	1492	52885	13868	66753
Field Day	778	18474	4521	22995	596	122	718	19070	4643	23713
Film Show	373	16114	5413	21527	611	103	714	16725	5516	22241
Group meetings	95	1869	1108	2977	113	37	150	1982	1145	3127
Kisan Ghosthi	981	51526	13683	65209	2733	497	3230	54259	14180	68439
Kisan Mela	157	71558	23792	95350	2721	494	3215	74279	24286	98565
Lectures delivered as resource persons	1148	49462	8859	58321	2475	512	2987	51937	9371	61308
Mahila Mandals Conveners meetings	74	581	5067	5648	201	122	323	782	5189	5971
Method Demonstrations	178	3590	1107	4697	154	18	172	3744	1125	4869
Sankalp se siddhi	27	13760	5064	18824	1079	101	1180	14839	5165	20004
Scientist visit to farmers field	14972	45478	11539	57017	1654	304	1958	47132	11843	58975
Self Help Group Conveners meetings	134	1562	2694	4256	95	54	149	1657	2748	4405
Soil health Camp	3623	19724	4922	24646	680	311	991	20404	5233	25637
Soil test campaigns	114	5935	1418	7353	213	99	312	6148	1517	7665
Workshop	149	20561	6170	26731	918	174	1092	21479	6344	27823
Celebration of important days (specify)	224	28913	11981	40894	1091	166	1257	30004	12147	42151
Any Other (Specify)	984	251748	72850	324598	4605	243	4848	256353	73093	329446
Grand Total	**144413**	**939509**	**253869**	**1193378**	**23099**	**4257**	**27356**	**962608**	**258126**	**1220734**

Kisan Ghosthi organized in Bihar

Soil health Camp organized in Jharkhand

Table 58: Extension activities organized by different states during 2017- 18

Nature of Extension Activity	Bihar		Jharkhand	
	No. of activities	No. of participants	No. of activities	No. of participants
Advisory Services	62706	277288	5484	9285
Exhibition	182	21782	163	15400

Nature of Extension Activity	Bihar		Jharkhand	
	No. of activities	No. of participants	No. of activities	No. of participants
Farmers Seminar	391	25003	21	884
Film Show	265	16303	108	5938
Group meetings	58	1774	37	1353
Kisan Mela	102	60937	55	37628
Lectures delivered as resource persons	796	53335	320	6241
Mahila Mandals Conveners meetings	48	3584	26	2387
Method Demonstrations	128	3383	50	1486
Sankalp Se Siddhi	15	12435	12	7569
Scientific visit to farmers field	13127	45185	1845	13790
Soil health Camp	264	11422	3359	14215
Soil test campaigns	84	5797	30	1868
Workshop	106	18473	43	9350
Field Day	561	14559	217	9154
Kisan Ghosthi	610	54442	371	13997
Lectures delivered as resource persons	19	1105	13	627
Farmers visit to KVK	42899	49704	8556	17049
Self Help Group /Kisan Club Conveners meetings	76	2444	58	1961
Any Other (Specify)	526	321256	458	8190
Celebration of important days (specify)	179	32010	45	10141
Total	**123142**	**1032221**	**21271**	**188513**

The Hon'ble Minister of Agriculture and Farmers Welfare, GoI, Shri Radha Mohan Singh ji is present in Sankalp Se Siddhi programme at Patna, Bihar on 26.08.17

Mahila Kishan Diwas Programme held at Gumla Jharkhand on 15.10.17

4.5.1 Other Extension activities

The KVKs also exercised for other means of communication like publishing through newspaper, radio/ TV talks, writing popular article, preparing extension literature as well as organizing awareness camps etc. The KVKs of Zone-IV conducted 4665 number of such extension activities for the benefit of farmers. The KVKs prepared and distributed 443 extension literature depicting cultivation techniques of crops, vegetables, fish rearing, livestock rearing etc. in local vernacular. Among all the states, KVKs of Bihar developed and distributed highest number (315) of extension literature followed by Jharkhand (128). KVK personnel delivered TV talk 255 times in Jharkhand, 180 times in Bihar. Activities of KVKs of Zone IV also were published through newspaper by 2510 times.

Table 59: Other Extension Activities organized in different states during 2017- 18

Nature of Extension Activity	No of Activities		Total
	Bihar	Jharkhand	
News paper coverage	2012	498	2510
Radio talk	448	98	546
TV talk	180	255	435
Popular articles	289	194	483
Extension Literature	315	128	443
Animal Health Camp	180	68	248
Total	**3424**	**1241**	**4665**

Animal Health Camp organized in Bihar

Animal Health Camp organized in Jharkhand

5. Production of Seed, Planting Materials and Bio-Products

5.1 Seed

Production of seed by the KVKs (Farm and village seed production)

Seed is the most critical input which is needed by the farmers to maintain productivity of the crop. Due to limited land in the KVKs, seed production could not be done in large quantities in KVK farm. To cater the need of the farms, seed production has been initiated in the villages under the head of "village seed production" programme. During the year 2017-18, the KVKs produced 13993.87 q of seeds of major crops like paddy, wheat, maize, mustard, linseed, niger, groundnut, red gram, chick pea, black gram, vegetables, spices, fodders etc.

The seed production system of KVKs aims at production of major important varieties of cereals, pulses, oilseeds, vegetables, fruits etc. Major varieties in seed production are Paddy- Abhishek, MTU 7029, Prabhat, Swarna Sub-1, Pratima, Wheat- HI 1563, DBW-17, DBW-39, PBW-580, HD 2985, K 307, HD 2824, WR 544, HD 2733, K-9107 etc., Mustard- Pusa Mahak, Shavani, Rajendra suflam, B-54, Sita, Tomato- Arka Bikash, Arkha Abha, Rai- GPU-28, Redgram- Biarsa, Arhar- Arhar 1, Malviya 13, NDA 1, Chickpea- PG 186, Pusa 362, Groundnut- TG-22, BAU 25, Niger- Birsa niger 3, Birsa niger-1, Lentil- HUL-57, KLS-218, DPL-62, PL-639, Greengram- HUM-16, Sesame-TKG306 etc.

Table 60: State-wise seed production in KVKs during 2017- 18

State	Seed Production
Bihar	9,609.92
Jharkhand	4,383.95
Total	**13,993.87**

Table 61: Crop wise seed production in Zone-IV during 2017- 18

Crop Type	Name of Crop	Seed Production	
		Quantity of Seed (q)	Value (Rs.)
Cereals	Paddy	7054.12	9683619.00
	Wheat	2778.53	3541746.00
	Maize	5.00	15000.00
	Finger Millet	2.30	3375.00
Oilseeds	Mustard	295.77	1685771.00
	Sesame	15.87	97725.00
	Niger	14.50	84082.00
	Linseed	8.15	6600.00
	Soybean	8.00	0.00
	Ground Nut	2.36	15422.00
Pulses	Chick Pea	290.44	1284854.00
	Lentil	256.08	362248.00
	Green Gram	127.12	354599.00
	Red Gram	92.23	915096.00
	Pea	84.14	421440.00
	Pigeon Pea	83.90	480485.00
	Black Gram	14.76	94691.00
	Horse Gram	11.00	52700.00
	Field Pea	5.00	15000.00
Commercial Crops	Sugarcane	2143.36	104900.00
	Potato	223.00	406500.00
Vegetables	Elephant Foot Yam	72.85	210000.00
	Cowpea	14.42	3000.00
	Mushroom	10.47	83000.00
	Onion	6.00	18000.00
	Tomato	2.98	9530.00
	Brinjal	1.03	28440.00
	Bottle gourd	0.96	955.00
	Rajma	0.90	1500.00
	Lady finger	0.44	1225.00
	Cabbage	0.28	84.00
	Sponge gourd	0.27	834.00
Fruits	Mango	18.60	38400.00
	Aonla fruits	11.00	17676.00
	Guava	5.22	8352.00
	Watermelon	0.25	250.00
	Papaya	0.00	4000.00

Crop Type	Name of Crop	Seed Production	
		Quantity of Seed (q)	Value (Rs.)
Fodder Crops	Barseem	299.00	103100.00
Spices	Turmeric	24.00	39440.00
	Chilli	0.16	1820.00
Fiber Crops	Jute	5.00	45000.00
Others	Dhaincha	4.43	19600.00
Total		**13,993.87**	**2,02,60,059.00**

Table 62: State wise seed production (q) at KVKs in Zone-IV during 2017- 18

Crop Type	Name of Crop	Bihar			Jharkhand		
		Quantity of Seed (q)	Value (Rs.)	Number of Farmers	Quantity of Seed (q)	Value (Rs.)	Number of Farmers
Cereals	Paddy	4126.32	5046098.00	1619	2927.80	4637521.00	462865
	Wheat	2649.62	3342968.00	221	128.91	198778.00	42
	Maize	0.00	0.00	0	5.00	15000.00	0
	Finger Millet	0.00	0.00	0	2.30	3375.00	0
Oilseeds	Mustard	134.39	443835.00	109	161.38	1241936.00	93009
	Sesame	6.00	0.00	0	9.87	97725.00	
	Niger	1.00	8000.00	23	13.50	76082.00	110
	Linseed	8.15	6600.00	19	0.00	0.00	0
	Soybean	8.00	0.00	0	0.00	0.00	0
	Ground Nut	0.00	0.00	0	2.36	15422.00	0
Pulses	Chick Pea	261.17	1100655.00	115	29.27	184199.00	0
	Lentil	256.08	362248.00	64	0.00	0.00	0
	Green Gram	109.10	166920.00	157	18.02	187679.00	0
	Red Gram	91.12	901260.00	175	1.11	13836.00	0
	Pea	37.75	57540.00	10	46.39	363900.00	0
	Pigeon Pea	24.50	45000.00	0	59.40	435485.00	66000
	Black Gram	9.00	42800.00	0	5.76	51891.00	0
	Horse Gram	0.00	0.00	0	11.00	52700.00	0
	Field Pea	5.00	15000.00	0	0.00	0.00	0
Commercial Crops	Sugarcane	1432.01	104900.00	0	711.35	0.00	0
	Potato	81.00	122500.00	0	142.00	284000.00	0
Vegetables	Elephant Foot Yam	5.85	9000.00	7	67.00	201000.00	0
	Cowpea	10.16	3000.00	72	4.26	0.00	0
	Mushroom	10.47	83000.00	120	0.00	0.00	0
	Onion	0.00	0.00	0	6.00	18000.00	0
	Tomato	2.31	3300.00	53	0.67	6230.00	73
	Brinjal	0.00	0.00	0	1.03	28440.00	20
	Bottle gourd	0.00	0.00	0	0.96	955.00	0

Crop Type	Name of Crop	Bihar			Jharkhand		
		Quantity of Seed (q)	Value (Rs.)	Number of Farmers	Quantity of Seed (q)	Value (Rs.)	Number of Farmers
	Rajma	0.90	1500.00	0	0.00	0.00	0
	Lady finger	0.02	805.00	5	0.42	420.00	0
	Cabbage	0.00	0.00	0	0.28	84.00	0
	Sponge gourd	0.00	0.00	0	0.27	834.00	0
Fruits	Mango	18.00	36000.00	0	0.60	2400.00	0
	Aonla fruits	0.00	0.00	0	11.00	17676.00	0
	Guava	0.00	0.00	0	5.22	8352.00	0
	Watermelon	0.00	0.00	0	0.25	250.00	0
	Papaya	0.00	0.00	0	0.00	4000.00	0
Fodder Crops	Barseem	299.00	103100.00	323	0.00	0.00	0
Spices	Turmeric	15.00	15400.00	0	9.00	24040.00	100000
	Chilli	0.00	1500.00	1	0.16	320.00	0
Fiber Crops	Jute	5.00	45000.00	15	0.00	0.00	0
Others	Dhaincha	3.00	18000.00	0	1.43	1600.00	0
Total		**9609.92**	**12085929.00**	**339**	**4383.95**	**8174130.00**	**100000**

Seed production in Bihar

Seed production in Jharkhand

5.2 Planting Materials

Seedlings, saplings and other planting materials like grafts, gooties, bulbs etc. were produced to supply among the farmers of the neighbouring locality and the district. During 2017-18, 26.82 lakh no. of planting materials were produced by the KVKs which earned revenue of Rs. 65.73 lakh. The number of beneficiaries covered under this programme was 23908 lakh in Zone-IV. Vegetable seedlings produced were 19.04 lakh. Forest species 1.56 lakh and medicinal and aromatic plant was produced were 87.0 lakh.

Table 63: Planting Materials Productions at KVKs in Zone-IV during 2017- 18
Planting Materials Productions in KVKs

Commercial	Planting Materials	Bihar			Jharkhand		
		Numbers	Value (Rs.)	Number of Farmers	Numbers	Value (Rs.)	Number of Farmers
Fruits	Aonla	287	20305.00	5	0	0.00	0
	Avacado	0	0.00	0	325	13000.00	18
	Banana	1290	2500.00	30	0	0.00	0

Commercial	Planting Materials	Bihar			Jharkhand		
		Numbers	Value (Rs.)	Number of Farmers	Numbers	Value (Rs.)	Number of Farmers
	Custard Apple	21	3150.00	3	0	0.00	0
	Guava	12596	439250.00	569	3214	145355.00	80
	Jack fruit	517	3510.00	8	0	0.00	0
	Lime	4768	159175.00	200	432	32700.00	10
	Litchi	5559	160770.00	37	630	37800.00	20
	Mango	44593	2307715.00	2772	5464	340795.00	580
	Papaya	39296	63557.00	68	13749	68305.00	1165
	Pomegranate	333	12160.00	19	10500	840000.00	5
	Bael	20	900.00	0	0	0.00	0
Vegetable seedlings	Bottle Gourd	200	1000.00	0	0	0.00	0
	Brinjal	81730	46143.00	547	243962	203795.75	2468
	Broccoli	2305	1138.00	20	1250	1100.00	10
	Cabbage & Cauliflower	405364	83312.00	685	199650	185150.00	5204
	Capsicum	935	935.00	20	16654	25154.00	174
	Onion	340000	13750.00	190	174603	1939.00	56
	Tomato	186989	58101.00	899	247144	167644.00	2529
	Cucerbitacy	200	550.00	7	3000	30000.00	45
Spices	Chilli	58539	23836.20	366	97942	54710.75	1241
Medicinal and Aromatic	Alovera	3	30.00	1	0	40000.00	0
	Citronella	0	0.00	0	0	20000.00	3220
	Palmarosa	0	0.00	0	0	40000.00	0
	Turmeric	7500	7500.00	25	80050	66900.00	70
	Lemon Grass	0	0.00	0	0	40000.00	0
Ornamental Plants	Marigold	345000	100.00	20	0	0.00	0
	Rose	3305	94600.00	111	0	0.00	0
	Gurhal, Chandni	20	300.00	12	0	0.00	0
	Croton	23	690.00		0	0.00	0
Fodder crop saplings	Fodder crop saplings	0	0.00	0	3020	18120.00	0
Forest Species	Sangwan, Sesum & Mahogni	1509	15090.00	0	960	3840.00	0
Tuber	Elephant yams	1625	16250.00	27	20300	203000.00	1
Plantation	Teak	15250	457500.00	371	0	0.00	0
Total		**1559777**	**3993817.20**	**7012**	**1122849**	**2579308.50**	**16896**

Planting materials production in Bihar

Planting materials production in Jharkhand

5.3 Bio-Products

The KVKs of Zone-IV also facilitated supply of bio fertilizers, bio-pesticides and bio-agent, vermicompost, azolla, earthworm for use by the farmers. Vermicompost is very much in demand by the farmers. A large quantity of 128086.5 kg vermicompost was produced by the KVKs along with the production of BGA- 2680 kg, bio-fertilizers- 13944 kg, bio-agent- 88112 kg, vermi wash-1403 litres.

Table 64: State wise Bio-product production by KVKs during 2017- 18

Product Name	Name of bio-product	Bihar			Jharkhand		
		Quantity (kg)	Value (Rs)	No. of Farmers	Quantity (kg)	Value (Rs)	No. of Farmers
Bio- Fertilizer	Vermicompost	76722	550980	467	51364.50	331387	204
	Bio- Fertilizers	13038	109800	137	906.00	110900	223
Total		**89760**	**660780**	**604**	**52270.50**	**442287**	**427**
Bio Agents	Bio Agent	87960	28980	102	152	10099	55
	Honey	0	0	0	9866	2506701	500
	Vermi wash	0	0	0	1403.5	129234	3975
	BGA	2680	16080	15			
Total		**270160**	**1366620**	**1325**	**1638105**	**3276210**	**6552420**
Earth worm		0	0	0	321100.37	267504	400

Bio- Fertilizers production in Bihar

Vermicompost production in Jharkhand

5.4 Livestock Production

In order to provide quality materials to the farmers like livestock strain, poultry birds, ducks, piglets, fingerlings spawn etc. KVKs made available 84 cows, 32 calves, 75 goats, 11849 broiler birds, 15856 ducklings.

Table 65: State wise livestock production in Zone-IV

Particulars of Livestock	Bihar			Jharkhand		
	Quantity (Number)	Value (Rs)	No. of Farmers	Quantity (Number)	Value (Rs)	No. of Farmers
Dairy animals						
Cows	7	180000	0	77	109000	0
Buffaloes	0	0	0	0	0	0
Calves	6	28000	0	26	0	0
Other (Pl. Specify) Goat	59	129169	0	16	8000	200
Poultry						
Broilers	749	57831	0	11100	2145333	275
Layers	30	9000	2	0	0	0

Particulars of Livestock	Bihar			Jharkhand		
	Quantity (Number)	Value (Rs)	No. of Farmers	Quantity (Number)	Value (Rs)	No. of Farmers
Duals (Broiler and layer)	94	22000	0	30	6000	10
Ducks	156	25000	0	15700	1226070	535
Egg	0	0	0	0	0	0
Piggery						
Pig	0	0	0	0	0	0
Piglet	22	65000	1	40	144000	17
Indian carp	50	0	0	0	0	0
Mix carp	100	0	0	0	0	0
Fingerling	8587	39450	7	0	0	0
Fish spwan	173	259500	0	0	34500	0

6. Soil and Water Sample Analysis and "*World Soil Day*" Celebration

Through different awareness and training programmes, KVK scientists of this Zone tried to motivate farmers to test soil before crop cultivation to reduce indiscriminate use of fertilizers, and to control environmental and other health hazards. The scientists also tested a large number of water samples supplied by the farmers for the quality analysis at KVK laboratories. During 2017-18, 10489 soil samples were tested from 3213 villages and it benefitted a total of 18364 farmers in this Zone. A minimum amount was charged from farmers' for testing each soil sample. Thus, KVKs of ICAR-ATARI, Patna earned about Rs. 29.68 lakh during the period. The KVKs of this Zone celebrated "*World Soil Day*" on 5th December, 2017. On the occasion, KVKs organized various programmes like seminar, lectures, hands on training, awareness programme and so on. The distribution of soil health cards to the farmers by local MPs/ MLAs/ other Public Representatives was one of the major activities of KVKs on that day. From different states of this Zone, total 18364 persons were participated in World Soil Day programme.

Table 66: Soil and water testing by KVKs in Zone IV

State	Name of sample	Number of			Amount realized (Rs.)
		Samples	Farmers	Villages	
Bihar	Soil, water	32701	43259	1709	2161624.00
Jharkhand	Soil, water	17921	52723	1504	807025.00
Total		**50622**	**95982**	**3213**	**2968649.00**

Table 67: State wise World Soil Day celebration at KVKs

State	Total Participants	Farmers Attended	No. of Soil Health Card Distributed to farmers	No. of VIPs attended
Bihar	17171	12243	7853	101
Jharkhand	7889	7103	9008	103
Grand Total	**25060**	**19346**	**16861**	**204**

Sri Vinod Kumar Singh, Hon'ble Minister, Mines and Geology Department, Govt. of Bihar is inaugurating World Soil Day celebration programme at KVK, Katihar, Bihar

Sri Ravindra Singh, Hon'ble MLA, Arwal and Dr. A. K. Singh, Director, ATARI, Patna, Zone 4 are handing over soil health card to the farmers at KVK, Arwal, Bihar

The Hon'ble Chief Minister, Jharkhand, Sri Raghubar Das is addressing the farmers on the occasion of World Soil Day at KVK, Ranchi, Jharkhand

The farmers are celebrating World Soil Day at KVK, Lohardaga, Jharkhand

7. Scientific Advisory Committee (SAC) Meeting

The Scientific Advisory Committee (SAC) Meeting is being organized by the KVKs every year to finalize the Action Plan for the next year. As per the guidelines of ICAR, the committee comprises of representatives from ICAR-ATAR Patna, Host Organization, other nearby ICAR Institutes, State Agricultural Universities, development departments of the district, media personnel, financial institutions, progressive farmers and farm women and others. During the year 2017-18, out of total 63 KVKs of ICAR-ATARI, Patna conducted 62 SAC meetings at thirty eight KVKs of Bihar and twenty four KVKs of Jharkhand. The meeting was attended by 2266 participants. It was assured that all nominated members were present in the meeting.

State	*No. of SAC Meeting*	*No. of Participants*
Bihar	38	1452
Jharkhand	24	814
TOTAL	**62**	**2266**

8. Publication by KVKs

To highlight the achievements of research and other related activities, KVKs scientists were actively involved during 2017-18 in preparing and publishing research papers, technical bulletins, newsletters, popular articles, leaflets/pamphlets, DVD/CD etc. to make it available to other KVKs, SAUs, ICAR institutes, line departments, ATMA, NABARD, other agencies, farmers and other stake holders. A total of 1031 publications comprising of 53 research papers,131 symposia papers, 210 newsletter, 103 popular articles, 2 books, 282 extension pamphlets/ literature,238 bulletins, and 14 electronic publications were published by the KVK personnel of this Zone. The total number of circulation was 278510 during the period of report.

Table 68: Publication of KVKs in ICAR-ATARI, Patna
Publication by KVKs

Sl. No.	Item	Bihar		Jharkhand		Total	
		Number	No. Circulated	Number	No. Circulated	Number	No. Circulated
1	Research Paper	35	-	18	-	53	-
2	Seminar/Conference/ Symposia Papers	82	-	49	-	131	-
3	Books	2	-	-	-	-	-
4	Bulletins	124	8452	114	7543	238	15995
5	News Letter	112	28255	98	15784	210	44039
6	Popular Articles	82	12700	21	25412	103	38112

Sl. No.	Item	Bihar		Jharkhand		Total	
		Number	No. Circulated	Number	No. Circulated	Number	No. Circulated
7	Book Chapter	-	-	-	-	-	--
8	Extension Pamphlets/ Literature	180	110210	102	19500	282	167822
9	Technical Reports	-	-	-	-	-	-
10	Electronic Publication (CD/ DVD etc)	14	12542	-	-	14	12542

9. Technological Backstopping By Directorates of Extension Education

The process of technology transfer from Research Institutes/Agricultural Universities to the farmers' field and its feedback from the end users to the researchers play an important role for conducting different activities by the KVKs either in the form of on-farm-trial (OFT) or front line demonstration (FLD) or through organizing various training programmes/health camps etc. Under the technological and administrative support of Directors of Extension Education (DEEs), all 63 KVKs of this Zone disseminated need based agricultural technologies developed by the researchers of various institutes/ universities. The Extension Directorate of Bihar Agricultural University (BAU), Sabour, Bhagalpur was allotted with 25 KVKs; Dr. Rajendra Prasad Central Agricultural University (DRPCAU), Pusa, Samastipur with 13 KVKs; Birsa Agricultural University (BAU), Ranchi During 2017-18. All the KVKs of this Zone were benefitted from the DEEs in various ways like supplying of seeds, planting materials, bio-products, livestock and poultry birds, livestock products, package of management practices for agriculture, livestock and fish farming and also various printed literatures. During the year 2017-18, all 3 Directorates of this Zone supplied updated technologies and technological products to 63 KVKs in the form of seeds, planting materials, biological products, livestock and poultry breeds, mineral mixture for animals, fish spawn/ fingerlings, apiary unit, mushroom spawn etc. The Directorate of BAU, Sabour supplied their products to 103 KVKs whereas DRPCAU-Pusa Directorate supplied to 47 KVKs.

Considering the demand of KVK personnel, to improve their skill for efficient transfer of technologies and to make the newly recruited staff of KVK aware of mandate and functioning of KVKs, all the Extension Directorate of this Zone conducted HRD programme throughout the year 2017-18. During the period under report, a total of 38 HRD programmes for 1424 KVK personnel were conducted. The area covered in those training programmes were documentation, soil health management, improving communication and extension skills, quality seed production, conducting front line demonstrations, livestock management during disaster, conducting health/ vaccination camp for animals, skill development in laboratory work, advance agriculture and allied technologies, mechanization in agriculture, scientific fish production, disease/ pest management and many others. The number of KVKs from different Directorates of this Zone involved in such programmes was 445 during 2017-18.

To oversee the activities of KVKs, DEEs and their officials visited KVKs for 345 occasions during different programmes including SAC meeting, field days celebration, technology week celebration, training programmes, interaction meeting, Kisan Mela, Kisan Gosthi, Kisan Chaupal, Rabi and Kharif Campaign, World Soil Day celebration, Adibasi Divas celebration, special programme celebration, monitoring of OFTS/ FLDs, monitoring of KVKs working etc. The overseeing of KVK activities by the DEEs is important to assess the technological needs of KVKs and to make the KVKs empowered with knowledge and skill. The DEEs of Bihar state visited their KVKs for 280 times (BAU, Sabour- 180 times and RAU, Pusa- 100 times), DEE of Jharkhand state for 88 times. During the period under report, the DEE officials of BAU, Bhagalpur visited their OFT fields for 25 occasions and FLD fields also for 20 times to monitor the performance of *Sabour Ardhajal* rice varieties; *Sabour Shankar Makka 1 & 2* maize varieties; *Sabour Shreshth*, *Sabour Samridhi* and *Sabour Nirjal* wheat varieties; effective weed management in zero tillage, management module against mango hoppers etc. The DEE of DRPCAU, Pusa official visited 15 times for OFT fields and 20 times for FLD fields to follow up the performance of various cereal, pulses and oilseed crops, establishment of new orchards, farm mechanization, establishment of apiary technology and so on. They inspected the field to assess the performance of different

herbicide for controlling weeds in onion, drum seeder, improved poultry and duck breeds, different fungicides used in fruits and vine rot of pointed gourd, nutrient management for groundnut production and many others.

During 2017-18, all Directorates under ICAR-ATARI, Patna were engaged in publishing a large number of literatures in the form of newsletter, bulletin, magazine etc. in English and local languages covering all aspects related to agriculture and allied sectors for the benefit of farmers. The Directorate of BAU, Sabour published 8 such publications viz. *Bihar Ke Gaurav Kisan* (Hindi), *Agri-entrepreneurs of Bihar* (English), *Bihar Kisan Diary 2017* (Hindi), *Krishi Calendar 2017* (Hindi), *Mrida Swastha Prabandhan Dwara Tikaoo Kheti* (Hindi), *Udyan Parshikhan Nirdeshika* (Hindi), *Krishievam Samdadh Kshetrake Vishisth Kisanevam Vaigyanik* (Hindi), *Dalhan Utpadan (Samasya, Prabhadhan Ebom Unnati)*and more than 13 technological/varieties released during 2017-18.

10. Agriculture Technology Information Centre

To deliver updated technologies available at the research institute/ state agricultural universities related to agriculture, animal husbandry and fishery sciences to the end users i.e. farmers, Agricultural Technology Information Centre (ATIC) serves as a "*single window*" system which usually present at the entrance of any institute. It enables farmers to access the desired information for solution to their problems. Under this Zone, the ATICs are being operated in Bihar state under Bihar Agricultural University (BAU), Sabour and Rajendra Agricultural University (RAU), Pusa; in Jharkhand state under Birsa Agricultural University (BAU), Ranchi. The facilities available in ATIC are reception centre, exhibition/ technology museum, touch screen kiosk, sales counter, farmers' feedback register, video conferencing facility, library, cafeteria, community radio station etc. During 2017-18, ATICs were visited by 18658 farmers from different districts of this Zone.

As per technology information was concerned, 5603 farmers used kisan call centre to get the information on varieties/ hybrids, pest management, disease management, agro-techniques, soil and water conservation, post-harvest technology and value addition, and animal husbandry including fisheries during the year 2017-18. The majority of the farmers were interested in receiving information on disease management of various crops (1875), followed by information on pest management (900), crop varieties (680), animal husbandry and fishery (542), soil and water conservation (452), agro-techniques (321) and post-harvest technology and value addition (256). During the period, a total of 872 farmers were benefitted from video showing in the ATICs of this Zone. Seventy five farmers met their queries by sending letters to the concerned authorities of the ATICs. To fulfil the demands of farmers/ technocrats/ students, ATICs of this Zone were used for training of 1982 farmers/ technocrats/ students. Maximum farmers were interested on varietal training (365) followed by disease management (328), animal husbandry and fishery (264) and pest management (225). In addition, a large number of farmers were benefitted from Kisan Gyan Rath and Mobile Veterinary Clinic services. The ATIC of this Zone was also a potential source of supplying various technological products like seeds, planting materials, livestock, poultry birds, eggs, fish fingerlings, bio-products, bio-fertilizers, farm-produces, vermi-compost etc.

11. HRD Programme

Table 69: Workshop-cum-training programme and meetings organized by ICAR-ATARI, Patna

Sl. No.	*Title of the programme*	*Organized at*	*Date*	*No. of Participants*
1.	Review meeting on CFLD Pulses & Oilseeds	ICAR-RCER, Patna	20.06.2017	51
2.	Review meeting on CFLD Pulses & Oilseeds for KVKs of Jharkhand	KVK RK Mission,Ranchi	07.07.2017	32
3.	Training on Soil testing kit for KVKs of Bihar	ICAR-RCER, Patna	05.07.2017	48
4.	Training on Soil testing kit for KVKs of Jharkhand	KVK Morabadi, Ranchi	06.07.2017	29
5.	Workshop of Zone IV and V on Mridaparikshak on Soil Testing Kit	WBUAFS, Kolkata	12.08.2017	48

Sl. No.	Title of the programme	Organized at	Date	No. of Participants
6.	Farmer FIRST Zonal Review Workshop of Zone IV and V	ICAR-ATARI, Kolkata	21.08.2017	21
7.	Meeting on Doubling the Farmer's Income. Issued related to seed certification and strengthening of KVK with the support of Govt.	ICAR-RCER ,Patna	23.10.2017	45
8.	Review Meeting on CFLD Pulses and Oilseeds	ICAR ATARI, Patna	08.01.2018 09.01.2018	131
9.	Review Workshop on NICRA Work of Zone IV and Zone V	KVK, Nimpith, South 24 Parganas, W.B.	13.01.2018 to 15.01.2018	52
10.	Workshop on mKrishi platform for Digital farming	RCER-Patna	07.02.2018	80

Review meeting on CFLD Pulses and Oilseeds held at KVK, Ranchi, Jharkhand on 7th July 2017

Review Meeting on CFLD Pulses and Oilseeds held at ICAR-ATARI, Patna on 8th- 9th January 2018

Review Workshop on NICRA Work of Zone IV and Zone V held at KVK, Nimpith, South 24 Parganas, W.B. on 13th- 15th January 2018

12. Outsouring of Fund by KVKs

The KVK scientists of this Zone are actively involved in receiving funds from a large number of external sources through sanctioning projects in their favour. The projects include organizing additional training programmes, research projects, building infrastructural facilities etc. which help in supporting and strengthening of KVKs. The KVKs of ICAR-ATARI, Patna managed to get funds from State Department of Agriculture, Central Government, RKVY, NABARD, ATMA, NGOs, Zila Parishad and many other sources. Revenue of Rs. 2.83 crore was generated by the KVKs of ICAR-ATARI, Patna during 2017-18. Bihar KVKs about Rs. 1.24 crore, Jharkhand about Rs. 76.83 lakh.

13. National Farmers' Portal

All Central and State Government organizations in agriculture & allied sectors i.e. State Agriculture Universities, KVKs, Agromet Forecasts Units of India Meteorological Department, ICAR Institutes, Organization in Animal Husbandry, Dairying & Fisheries etc. provide information/ services/ advisories to the farmers by SMS in English/ Hindi/ Local languages on weather conditions, agricultural and allied sectors practices through mKisan Portal. As part of agricultural extension (extending research from lab to the field), under the National e-Governance Plan-Agriculture (NeGP-A), various modes of delivery of services have been envisaged. These include internet, touch screen kiosks, agri-clinics, private kiosks, mass media, Common Service Centres, Kisan Call Centres, and integrated platforms in the departmental offices coupled with physical outreach of extension personnel equipped with pico-projectors and hand held devices. Since its inception, about 432 crore messages with 352314 advisories and more than 1250 crore SMSs have been sent to the farmers. The supplied information includes crops, seeds, pesticides, farmers' insurance, farm machineries, storage, fertilizers, market price of agricultural produce, package of practices, disease outbreak and its prevention, various extension activities etc. There are also provisions of downloading different schemes, farm friendly handbook and like many other things. The portal can be accessed at *www.mkisan.gov.in.*

14. Tribal Sub Plan

The Tribal Sub Plan (TSP) strategy of tribal development is a concept intended to address the issues of backwardness in tribal areas and tribal population in an integrated way. The aim is to minimize the gap between the livelihood of tribal people and general communities. Sixteen KVKs of ICAR-ATARI,Patna were selected for this scheme during the year 2017-18. A total of Rs. three crore thirty two lakh ninty five thousand

The sprayer has been provided to the tribal farmers

was earmarked during the period for selected KVKs of this Zone. To uplift the livelihood of tribal people, KVKs under ICAR-ATARI, Patna conducted various agricultural and allied sectoral activities including agricultural farming, horticulture, animal husbandry, fish production, vocational training etc. throughout the year for providing direct benefit to the individual or families belonging to schedule tribes. During the period under report, KVKs of this Zone created 4235 number of assets in the form of sprayer, weeder, agro-shed net, ridge maker, maize sheller, sickle, khurpi, seed bin/ drum, drip irritation kits, chaff cutter, poultry feeder and drinker, pheromone trap, water tank etc. for the tribal people in the concerned district. The KVK scientists trained about 1.68 lakh tribes including youths, farmers, farm women and extension personnel. A total of 1.34 lakh tribal farmers participated in different extension activities. In addition, KVKs working under TSP of this Zone produced 288.5 tonnes various seeds, 6.42 lakh planting materials and 4.3 lakh livestock strains and fish fingerlings in the tribal areas. About 0.09 lakh farmers tested their soil/ water/ plant/

Vermi-compost unit has been established at the tribal farmers' field

Crop production at the tribal farmers' field

manure samples from their district KVKs and more than 12 lakh farmers were benefitted by getting farm related SMSs

15. Protection of Plant Varieties and Farmers' Right

The Protection of Plant Varieties and Farmers' Rights Act (PPV&FR Act) seeks to address the rights of plant breeders and farmers on an equal footing. It affirms the necessity of recognizing and protecting the rights of farmers with respect to the contribution they make in conserving, improving and making Plant Genetic Resources (PGR) available for the development of new plant varieties.

The PPV&FR Act recognizes the multiple roles played

by the farmers in cultivating, conserving, developing and selecting varieties. With regard to developing or selecting varieties, the Act refers to the value added by farmers to wild species or traditional varieties/ landraces through selection and identification for their economic traits. Accordingly, farmers' rights encompass the roles of farmers as users, conservers and breeders.

As a collaborative approach, ICAR-ATARI Patna coordinated several programmes in 18 KVKs of Bihar & Jharkhand for crafting awareness among the farmers of the concerned districts during the period of 2017-18. The districts had the availability of number of traditional of plant varieties and cultivated over long period of time. So far, 458 numbers of varieties have been identified for registration at PPV& FR level. Moreover, a good number of farmers have also been selected for different categories of award initiated by PPV & FRA.

16. National Innovations in Climate Resilient Agriculture-Technology Demonstration Component (nicra-tdc)

A National Network Project, National Innovations in Climate Resilient Agriculture (NICRA) launched in 2011 to address the resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration. Technology Demonstration Component (TDC) of NICRA offers great opportunity to work with farmers and apply such technologies under field conditions to address current climate variability. This will enhance the pace of adoption of these resilient technologies. On-farm participatory demonstrations for climate resilience are being implemented in village clusters through KVKs in 121 climatically vulnerable districts across the country and by 7 core research institutes of ICAR. The emphasis has been on capturing and improving the understanding on performance of technologies in different agro-ecologies and farming systems. This also facilitates identification of what constitutes climate resilience in different bio-physical and socio-economic contexts. NICRA KVKs prepared and implemented village level contingency crop plans and measures.

Adoption of climate resilient practices and technologies by farmers are now a necessity. Technology Demonstration Component (TDC) of NICRA offers a great opportunity to work with farmers to address current climate variability with matching responses. Getting existing technologies into the hands of small and marginal farmers and developing new technologies like drought or flood tolerant crops to meet the demands of a changing climate also come under the purview of NICRA programme. To enhance the resilience of Indian agriculture covering crops, livestock and fisheries against climatic variability and climate change, NICRA project is functioning in 13 KVK districts of Bihar and Jharkhand covering 54 villages. NICRA programme has brought forward definite requirement in terms of technological support, human resource development and overall empowerment of farming community to enable them to cope up with climate vulnerabilities like droughts, erratic rainfall, heat wave, flood, cyclonic storm. Plan of action, accordingly, was prepared for its implementation through executing technological interventions to initiate crop production, resource conservation, livestock and fish rearing, water harvesting etc. in the vulnerable villages of KVK districts. During the year 2017-18 NICRA villages in Bihar received 13 to 16 days of dry spell in June and 8-10 days during September likewise in Jharkhand also villages received dry spell during June is about 8-12 days but received good rainfall during September. Dry spell in June affected the Nursery Management of Rice and Vegetables crops. The distinguished character of rainfall is, although the average rainfall of the season not deviated much from that of average.

Natural Resource Management

In situ moisture conservation, water harvesting and recycling for supplemental irrigation, improved drainage in flood prone areas, conservation tillage where appropriate, artificial ground water recharge, water saving irrigation methods and rainwater harvesting structure development were various NRM activities under NICRA. As part of natural resource management, emphasis has been on in-situ number of rainy days is showing declining trend in past years and it affect crop growth moisture conservation measures in all the rainfall zones, water harvesting and its efficient use in medium to high rainfall zones, recharging of bore wells, renovation of water harvesting structures, efficient irrigation methods and enhancing cropping intensity wherever opportunities exists. During the year 2017-18 about 5205 farmers were benefitted through Natural Resource Management (NRM) activities which were carried out in about 1367 ha. The activities included under NRM were *in-situ* moisture conservation measures through Mulching and bunding, rain water harvesting and recycling for supplemental irrigation, bringing uncultivable land into cultivation through soil conservation measures, demonstration on conservation tillage, Artificial ground recharge, water saving irrigation technique, and demonstration on rainwater harvesting structures. The result were quite impactful and resulted into enhanced cropping intensity of the villages through cultivation of high value crops like vegetables, spices and flowers etc. *In situ* moisture conservation technologies have been demonstrated in 13 NICRA adopted villages covering 800 farmers in 220 ha area. Water harvesting and recycling for supplemental irrigation were demonstrated in NICRA adopted villages involving 962numbers of farmers. Conservation tillage in wheat, paddy, lentil, pea and chickpea demonstrated in different adopted villages in an area of 243ha of 458 numbers of the farmers. The technologies followed mainly by zero tillage operation. Wheat with cultivation through ZTD showed maximum yield of 46q/ha. Zero tillage technology showed very promising results in pulse and oilseed cultivation. Pea (var. Arkel) gave highest economic return (B:C ratio:: 1.86) among the pulse demonstration through ZTD. Artificial ground water recharge done by field bunding, water management and through SRI by sub soiler in paddy covering 294area in 401farmers' fields. Ground water recharge through SRI by sub-soiler recorded highest paddy yield (58 q/ha) and benefit: cost ratio (1.65). Water saving irrigation methods like sprinkler irrigation, LEWA in rice, RBF in brinjal, micro-lift irrigation in paddy demonstrated in NICRA adopted villages covering an area of 52.0 ha in 130 farmers fields. There were 51 number of rainwater harvesting structures have been developed which could store 152264.4 cu m of water. This intervention increased the cropping intensity to the maximum extent upto 250-300%. Around 450q compost prepared from solid wastes was added to the soil through which 52 thousand carbon sequestrations was done during 2017-18.

Crop Production

About 2106 demonstrations were taken up under crop production interventions which include demonstration of short duration and drought tolerant varieties to overcome weather vagaries, introduction of minimum water requiring crops like Ragi, Niger, sweet potato specially in upland of Jharkhand, demonstration on advance sowing date of Rabi crops, use of fumigation in vegetables to combat frost, intercropping system of high sustainable yield index, community nursery to overcome risk of dry spell specially in paddy, introduction of new crops/ crop diversification, and establishment of custom hiring centre for agricultural implements to ensure timely panting of crops. Crop diversification with high value crops like pulses (lentil, chick pea, peas etc), vegetable also taken up at several locations of Bihar and Jharkhand. Cropping intensification is one of the flag ship interventions of the NICRA programme and short duration paddy followed by zero till cultivation, improved planting methods are being demonstrated . Climate resilient technologies like

nutrient management in late sown Rabi crops eg wheat were demonstrated successfully in the district of Bihar. Under crop production module introduction of drought resistant varieties of paddy, brinjal, niger, maize, pigeon pea, and ragi were demonstrated in 13 NICRA adopted villages involving 572 number of farmers in162.0 ha area. Drought escaping short duration paddy cultivars such as Abhishek, Sahabhagi, Anjali, Swarnashreya has shown distinct yield advantage in Jharkhand state. Drought tolerant paddy varieties like Sahbhagi, Anjali, Naveen, Abhishek were demonstrated in 56.6 ha areas

of 144 number of farmers' field, among which Sahbhagi with drum seded showed highest yield potential (38.5q/ha) Shorty duration variety of potato pukkhraj gave maximum economic return . Flood tolerant varieties of paddy like Swarna sub 1 and Sabita were introduced through demonstration in 98.0 ha area in 138 farmers' fields. To avoid terminal heat stress in crops like rice, wheat, lentil, mustard, potato, *etc.* were sown in 13 days advance (avg) during rabi season. Water saving paddy cultivation through SRI, short duration varieties, direct seeded rice, brown manuring *etc.* have been demonstrated in 201.0 ha area of 317 number of farmers' fields. These interventions were carried out in 13 NICRA adopted villages. Among all the interventions paddy cultivation with Sahbhagi variety showed highest increase in yield whereas paddy cultivation with variety Rajendra Sweta with ZTD gave maximum economic return in the tune of BC ratio of 2.25. To combat the situation of delayed monsoon intervention of staggered community nursery for paddy has become very popular in Bihar and Jharkhand. Seedlings of 25-30 days age are transplanted in July so as to complete flowering of photosensitive varieties before October and harvesting by mid-November to facilitate taking up of timely sowing of rabi crops. Such a practice ensures optimum performance of both kharif and rabi crops. However, Bihar experienced aberrant rainfall situations in 4 out of the previous 10 years impacting adversely rice production and livelihood of farmers. Besides paddy, other crops like of cauliflower, brinjal, and tomato have been followed for staggered nursery development. These intervention were demonstrated in 40.0 ha area of 257 numbers of farmers. Among all the demonstration the community nursery for cauliflower was the most promising one which showed highest increase in yield as well as economic return. Crop diversification through introducing new crops in prevailing cropping pattern was demonstrated in the different NICRA adopted

villages. These demonstration were carried out in 172ha area involving 484 number of farmers. Introduction of *ol* (var. Gajendra) in the cropping pattern showed the most promising one.

Livestock and Fisheries

Livestock plays an important role in stabilising the productivity of farming system. Demonstration of improved breed of pig and goat were some of successful activities in Bihar and Jharkhand. About 70 unit of Goatery and 100 unit of piggery have been started in NICRA villages in 2017-18. Khaki Campbell duck was also introduced through this intervention. Demonstration of rural backyard poultry (kuroiler, Nicobari fowl), khaki Campbell duck, T X D breed of pig, mineral mixture and azolla as animal feed were carried out in 285number of farmers' fields. Multi carp cuture in perennial ponds was demonstrated successfully to enhance the productivity of water body in villages. Composite and cat fish rearing in the existing pond or in renovated pond were demonstrated in 125farmers' fields of NICRA adopted villages. Improved ornamental bird was introduced

through this intervention which showed very promising results. Adequate supply of fodder, either green or dry, is crucial to the livelihoods of livestock in rainfed areas. Short and medium duration fodder cultivars of several crops and fodder species both in *kharif* and *rabi* seasons were demonstrated in farmers' fields under rainfed and limited irrigation conditions to support income and cash flow from animal husbandry. Community lands of an area of 31 ha involving 156farmers utilized for different fodder production were demonstrated in ten different NICRA adopted villages. Demonstration of improved fodder cultivars like quality legume fodder Berseem (Var. Wardan, JHB-146, Var. Muskavi), fodder production of Maize/ Sudan, Hybrid Napier, Sorghum (Moti), Oat (Var. JHO-822, Kent), Azolla production were taken up in several villages to ensure availability of quality fodder in villages. Vaccination programme against FMD in cattle, buffaloes, BQ vaccine in cattle, PPR in goats, Ranikhet in poultry birds, deworming and feeding of mineral mixture were taken up in NICRA adopted villages by KVKs. Improved shelters for animals and poultry birds have reduced heat stress. Mortality rate was reduced upto the extent of 98% and milk yield was increased upto 42% after all such interventions.

Institutional intervention

Strengthening the existing institutional interventions or initiating new ones relating to seed bank, fodder bank, commodity groups, custom hiring centre, collective marketing group, and introduction of weather index based insurance and climate literacy through a village weather station and awareness was developed involving 1158 number of farmers in the zone.

Village Climate Risk Management Committee (VCRMC)

Village Climate Risk Management Committee (VCRMC) was constituted after in-depth discussion with the villagers about the mitigation of the climatic vulnerabilities of the villages and the strategies to be adopted under NICRA. The members of the committee were selected by the villagers under the facilitation of KVKs where NICRA was being implemented. VCRMC became operational with opening of a bank account in their name being jointly handled by the President of VCRMC and the Programme Coordinator of the KVK concerned. The custom hiring of various farm tools and implements was being supervised by VCRMC apart from taking important decisions on the technological interventions to be implemented at the village in consultation with the KVK.

Custom Hiring of Farm Implements and Machinery at NICRA Adopted Villages

Timeliness of agricultural operations is crucial to cope with climate variability, especially in case of sowing and intercultural operations. Access to implements for planting in ridge-furrow, broad bed furrow and raised beds is essential for widespread adoption of resilient practices for *in situ* soil moisture conservation and drainage of excess water in heavy soils. In rainfed areas, availability of such farm implements to small and marginal farmers is important. Similarly in irrigated areas, residue management of *kharif* crops through zero till cultivation of *rabi* crops reduces the problem of burning of residues and adds to the improvement of soil health and increases water use efficiency. Custom hiring centres (CHCs) for farm implements were established in NICRA villages. A committee of farmers' manages the custom hiring centre. The rates for hiring the machines/ implements are decided by the VCRMC. This committee also uses the revenue generated from hiring charges and deposits in a bank account opened in the name of VCRMC. The revenue is used for repair and maintenance of the implements and 25% share is earmarked as a sustainability fund. Different types of farm machinery are stocked in the CHCs, the most popular being Zero till drill, Happy seeder, BBF planter, drum seeder, multi crop planter, power weeder and chaff cutter. Each CHC was provided an initial sum of Rs. 4.25 lakhs for its establishment under NICRA project. The custom hiring centres regenerated revenue ranging from 0.27 to 2.84 lakhs during 2017- 18.

Capacity Building

About 170 training programs on different climate resilient issues and themes involving about 619 farmers and farm women were taken up as part of capacity building programme during 2017-18. Thematic areas covered on SRI, scientific crop management, crop diversification, green manuring, natural resource management, resource conservation technology, animal feed management, nursery raising, pest and disease management, weed control, vermicompost, value addition, livestock management, oilseed and pulse demonstration, farm implements, drudgery reduction etc. The HRD programme conducted on the basis of priority area of farmers or farm women.

Extension Activities

NICRA implementing KVKs conducted a total of 777 extension activities on various thematic areas benefitting 7710 practicing farmers and farm women during 2017-18. The extension activities were conducted on method demonstrations, agro advisory services, awareness camp, animal health camp, krishak chaupal, kishan gosthi, celebration of field and farmers' days, diagnostic visits, group discussion, technology week, kisan mela *etc.*

Convergence By NICRA With Ongoing Development Programmes

A number of interventions were taken up by NICRA KVKs during the year in convergence with developmental programs which were operational at the village level. Support from these developmental programs was used for scaling up of proven interventions in the village. In case of NRM, support was mobilized for various water harvesting structures, recharge structures, micro irrigation systems, polythene lining of farm ponds, deepening of drainage channels, distribution of green manuring, distribution of seed to large number of farmers, tree planting including horticulture, *etc*. In crop production, convergence with line departments was used for increasing the spread of HYV of food crops, promotion of cultivation practices such as SRI, DSR etc. In case of animal husbandry, interventions such as animal vaccination camps, and health camps, timely availability of medicines, large scale production and availability of improved fodder crop seed, planting material and material for silage making were taken up in convergence. Capacity building of the farmers in NICRA villages was also taken up in convergence in the form of trainings and exposure visits as part of the ongoing programs. Efforts were made to enhance the coverage of the interventions in the villages with the support of the line departments through convergence. Huge number of convergence programmes was carried out by each of the NICRA implementing KVK with ongoing development programmes or schemes during 2017-18. The prominent development schemes are MGNREGA, National Micro and Minor Irrigation Scheme, Pradhan Mantri Gram Sadak Yojana, NABARD, IWMP, Forest Department, IAP Yojana, RKVY *etc*

17. Pradhan Mantri Fasal Bima Yojana (PMFBY) Kisan Sammelan

Initiative been taken by Union Cabinet to protect the farmer regarding crop damage against natural disaster by implementing Pradhan Mantri Fasal Bima Yojana (PMFBY) by replacing the previously existed two crop insurance schemes- i) National Agricultural Insurance Scheme (NAIS) and ii) Modified NAIS. The scheme aims at supporting sustainable production in agriculture sector by way of - a) providing financial support to farmers suffering crop loss/ damage arising out of unforeseen events, b) stabilizing the income of farmers to ensure their continuance in farming, c) encouraging farmers to adopt innovative and modern agricultural practices, and d) ensuring flow of credit to the agriculture sector which will contribute to food security, crop diversification and enhance growth and competitiveness of agriculture sector besides protecting farmers from production risks. In this regard, all the KVKs under ICAR-ATARI, Patna have been given responsibility to sensitize the farming community towards the new insurance and to create awareness on different other schemes like soil health cards, production of organic inputs and water use efficiency etc. through

organizing PMFBY Kisan Sammelan. During the year 2017-18, 63 KVKs from this Zone organized the programme involving local MPs, MLAs and other public representatives of the concerned districts. Total 3635 farmers participated in the meeting from Bihar & Jharkhand. In addition to a total of 160 numbers of MPs, MLAs and other public representatives from different districts, 8 Central Ministers graced the occasion in Bihar & Jharkhand.

18. Pre-Kharif and Pre-Rabi Kisan Sammelan

Under the banner of the Indian Council of Agricultural Research (ICAR), Ministry of Agriculture and Farmers' Welfare, the Pre-Kharif and Pre-Rabi Sammelan 2017-18 were organized by the KVKs of ICAR-ATARI, Patna to create awareness amongst the farmers and other stake holders about the latest agricultural technologies through using different extension methodologies for wider publicity of the KVK. On the occasion, group meetings, film shows, exhibitions, demonstrations, seminars, lectures etc. were arranged by the KVK personnel to enrich the farmers with agricultural knowledge for developing and adopting various strategies for ensuing crop production. During the period under report, Pre-Kharif and Pre-Rabi Sammelan were organized by 63 KVKs of which grand total of 54299 nos. of participants participated with august presence of 611 nos. public representative including MLA/ MP/ MIC.

19. Special Programmes

19.1. Swachh Bharat Abhiyan

As a part of mass movement of cleanliness, initiated by the Government of India, all the staff members of ICAR-ATARI, Patna including KVKs under this Zone picked up the broom to clean the dirt, garbage, debris, litters, other obnoxious/ unwanted materials from the office surroundings, roads, dwelling places etc. The KVKs of this Zone observed the cleanliness drive through sensitizing farmers/ villagers adopting the slogan "*Neither litter, nor let others litter*". A number of awareness programmes, sensitizing workshops and campaigns were carried out within KVKs and even in the remote villages for all categories of citizens. A sense of responsibility was evolved among the people to keep the environment clean. Scientists of KVKs made effort to train the people for making compost from different kinds of waste materials and also taught them in maintaining hygiene and sanitation in and around the houses. 63 KVKs under ICAR-ATARI, Patna conducted this abhiyan during last one year.

Table 70: Swachh Bharat Abhiyan

State	No. of observation/ programme	No. of KVK
Bihar	328	39
Jharkhand	178	24

19.2. Vaccination Programme

Mass vaccination in livestock was done by all 63 KVKs of Bihar and Jharkhand during 2017- 18. Substantial numbers of livestock especially cattle, buffalo, sheep, goat, pig, duck, poultry were affected by various diseases like Foot and Mouth Disease (FMD), Black Quarter (BQ), Haemorrahagic Septicaemia (HS), *Peste des Petits Ruminants* (PPR), Goat Pox, Ranikhetet caused huge economic loss. The KVKs of this Zone reported the incidence of such outbreaks and conducted awareness and vaccination camps to control livestock diseases. During 2017- 18, KVKs of this zone vaccinated 36072 animals of Bihar and 29208 of Jharkhand.

Table 71: Vaccination programme in livestock

State	No. of animals vaccinated
Bihar	36072
Jharkhand	29208
Total	**65280**

19.3. Programme on Rural Agricultural Work Experience (RAWE)

Students of various Agricultural Universities pursuing agricultural degree and ARS trainee probationers were assigned to undergo rural agricultural work experience (RAWE) at various KVKs of this zone. The sole purpose of such programme was to get acquainted with the overall agricultural scenario in rural India. Such trainees/ trainee officers were also associated with the Scientists and administrative staff of ATARI Patna in order to make a note of the activities of this institute.

Name of the State	No. of student/ ARS trained	No. of days stayed
Bihar	271	1600
Jharkhand	41	130
Total	**312**	**1730**

RAWE students studied then working of the ZRS and KVK Darisai, in light of the agro-climatic and soil parameters peculiar to the individual outstation.

Fig: Students learning about Drip Irrigation.

Fig: Students learning about Inarching in Mango.

Fig: Students learning about harvesting of Paddy.

Fig: Students learning about components of Disc Filter.

19.4. KVK in Rural School

Agriculture has always been a basic priority for the society and thus to know the role of agriculture in a society, KVK personnel extended their hand to the rural school with an objective to bring the youth in agriculture. 48 KVKs of ICAR-ATARI, Patna made an effort to motivate such young buds to inculcate the basic knowledge of agriculture through delivering lectures, showing audiovisuals, distributing leaflets and pamphlets, group discussion, presentations, organizing quizzes etc. 115 nos.of school been covered and 204 visit been made.

KVK Muzaffarpur visit to Rural Schools

20. Mera Gaon Mera Gaurav (MGMG) Programme

An innovative initiative "Mera Gaon Mera Gaurav" has been planned to promote the direct interface of scientists with the farmers to bridge the gap between lab and land. The objective of this scheme is to provide farmers with required information, knowledge and advisories on regular basis by adopting villages. In Zone IV, 6 ICAR Institutes and 1 SAU are implementing MGMG programme, so far, 415 villages have been covered for the benefit of 3463 farmers and total 217 field activities are conducted 2182 no of messages are sent. The major activities performed include visit to village by teams, Interface meeting/ *Goshthies* with farmers, providing *t*raining, conducting demonstrations, mobile based advisories, Literature support as per the agro-ecological conditions of the village, awareness and educating farmers through news papers, community radio etc.

Interaction with the farmers of Badipur, Patna

ATARI	No. of institutes/ universities involved	Total No. of Groups formed	No. of Scientist Involved	No. of villages covered	No. of field activities conducted	No. of messages/ advisory sent	Farmers benefited (No.)
PATNA (Zone-IV)	6 ICAR Institutes and 1 SAU (BAU)	16	50	415	217	2182	3463

24. On Going Programmes

24.1 Implementation of CSISA-ICAR Collaborative Project Phase-III

Indian Council of Agricultural Research (ICAR) in collaboration with Cereal Systems Initiative in South Asia (CSISA) of CIMMYT has implemented a collaborative project for the transfer of developed technologies at the farmers' field. CSISA was first approved by DARE on December 28, 2008 with subsequent agreements to support specific collaborative activities with ICAR institutes sanctioned under this over-arching umbrella. In Phase II of CSISA (2012 – 2015), close collaborations were developed and executed through the Natural Resources Management Division's research institutes in Karnal (Central Soil Salinity Research Institute – CSSRI) and in Patna (Research Complex for the Eastern Region – RCER), primarily in the form of process-based field research at the 'research platforms' that were jointly established and managed

by ICAR and CSISA scientists. Collaborations were also initiated with the Extension Division through a jointly sponsored and continuing dialogue on modernizing extension services that was launched at an event hosted by IFPRI and the University of Illinois in June, 2015. The goal of CSISA in Phase III (2017 – 2020) remained to support the widespread adoption of sustainable intensification technologies to encourage agricultural growth, both within the time horizon of the project and beyond. A total of 8 KVKs of Bihar under ICAR- ATARI, Zone IV, Patna are implementing the collaborative project. A total of Rs. 34.95 lakh was allocated for this project during 2017-18.

Guidelines- Coordination and implementation

- Selected KVKs to revisit the old recommendations and modify them if they lead to more gains with less investment.
- Concerned agronomist will be co-opted as Co-PI to strengthen the interface between research and extension at university or institution level.
- Each KVK or participant may determine one or two treatments based on local conditions but the data emerged from these activities will be shared with the concerned University or Institution to develop a consensus around a particular intervention.
- The work proposed here include cereal based cropping systems, mostly dealing with management of crops, cropping system including better bet agronomy within the domain of each KVK.
- Organize cross-site visits across networks of on-farm demonstrations that promote exchange of experience and knowledge among farmers and R & D workers on different approaches and production systems that emerge and evolve under different circumstances in 12 KVKs
- Intended to provide a frame work for KVK scientist to create data sets not only to provide an evidence based feedback to researcher but also to accumulate practical knowledge at farmers field on what works and what does not work. Protocol to be arranged by CSISA.
- KVKs administered by NGOs and ICAR should have shared interest in including all or part of their data for modifying recommendations at the level of the concerned SAU- DDG to decide the O&M for three ICAR KVKs.
- The work plan for CSISA project allows the scientist working in the project to cover the whole districts that represent all ecologies and any technology available anywhere in the system as dictated the treatment details.
- PI will be from concerned KVK and co-PI will be from the main campus of the university. Both will be nominated by the Director.

Table 72: KVK-wise Work Plan of ICAR-CSISA Collaborative Project

Sl. No.	ATARI/ Name of KVK	Proposed work plan
1.	ATARI Patna	Monitoring, supervising the implementation of work plan by participating KVKs of Bihar through regular review meetings, joint field visits and crop inspection etc.
2.	Bhojpur KVK	1. Performance of short duration (SDVs) and long duration varieties (LDVs) under different sowing schedules across ecologies. 2. Assessing the role of additional irrigation during terminal heat stress period during grain filling stage to beat the heat stress and its effect on wheat productivity 3. Response of wheat to fertilizer P applied in both rice &wheat and only in wheat in rice-wheat rotation. 4. Impact of herbicide application technology on performance of herbicide in wheat. 5. Boron deficiency induced sterility in wheat and its effect on the yield and yield attributes of wheat.Potential of using pre-seeding herbicide like glyphosate applied immediately before sowing wheat under zero tillage. 6. Potential of using pre-seeding herbicide like glyphosate applied immediately before sowing wheat under zero tillage. 7. Quantifying the gains in wheat productivity through zero-tillage mediated advance sowing of wheat. 8. Response of nitrogen and phosphorus applied in timely shown and late shown wheat

Sl. No.	ATARI/ Name of KVK	Proposed work plan
2.	Bhojpur KVK	9. Quantifying the adoption of recommended technologies related to individual components of crops in rotation. 10. Research on extension methods 11. Residue management in rice-wheat system
3.	Begusarai KVK	• Similar to 1-10 of Bhojpur KVK • Crop establishment method in *Rabi* Maize
4.	Buxar KVK	• Similar to 1-10 of Bhojpur KVK • Residue management in rice-wheat system
5.	East Champaran KVK	• Similar to 1-10 of Bhojpur KVK • Crop establishment method in *Rabi* Maize
6.	Jamui KVK	• Similar to 1-10 of Bhojpur KVK
7.	Rohtas KVK	• Similar to 1-10 of Bhojpur KVK • Residue management in rice-wheat system
8.	Lakhisarai KVK	• Similar to 1-10 of Bhojpur KVK
9.	Muzaffarpur KVK	• Similar to 1-10 of Bhojpur KVK • Crop establishment method in *Rabi* Maize

Action taken:

- Conduct multi-location farmer's participatory trials and evaluation of integrated crop and resource management practices that enhance crop performance, resource use efficiency and farmer's income and revise the package of practices.
- Monitor, Evaluate and provide feedback on farmer's acceptance of new technologies and to sensitize policy and decision makers to develop policies that enable wider dissemination.
- Training of Trainers (ToTs) and development of training material including videos, fact sheets, tips, and leaflets for business development of service providers, dealers and extension agencies.
- Conduct research on participatory technology development and extension approaches.

Achievements obtained:

1. Strengthen technology and knowledge scaling pathways

I. Creation or support for service providers for mechanization

II. Leveraging NGOs, SHGs to reach the unreached

III. Providing business intelligences to private sector companies and their dealers and distributors.

2. Mainstream new research and outreach approaches with NARES partners

I. Developing partnership between public and private sectors

II. ToTs for On farm technologies assessment

III. GIS based tools for technologies targeting + assessment

IV. Bridging the gap between research and extension through evidence based data management and demand driven recommendations and their modifications wherever needed.

3. Close key knowledge gaps and mobilize technologies with decision rules and tools

I. Refining integrated strategies for enhancing yield and reducing risk in a variable monsoon (diversification nursery enterprise, rice establishment methods, maize based cropping systems).

II. Intensifying fallows and optimizing systems (bringing maize in kharif fallow, creating more space between sowing of crops in rabi season after harvesting rice and for using residual moisture bringing hybrids, short/medium duration rice followed by long duration wheat etc.).

III. Implementing technologies massively like early wheat sowing, ZT wheat and other crops in rotation, long duration wheat varieties and better agronomy practices based on cropping system.

4. Pursue policy solutions for supporting SI adoption at scale

I. Proper monitoring, evaluation and learning process based on diagnostic survey, impact assessment survey and other tools that help integrating the process of innovation and delivery of technologies in a Non-linear model.

II. Data presentation in the Research and Extension councils of concerned SAUs and ICAR research institutions or NGOs, KVKs within the domain of each SAUs including the results in the package of recommendations wherever needed.

III. Research on Extension methods that may change the way extension interacts with other actors at districts, regional and state level.

Total area Harvested by Combine Harvester at Sakari Chandrapura Village

24.2 Skill Development Training Programmes (ASCI)

Indian Council of Agricultural Research (ICAR) in collaboration with Agriculture Skill Council of India (ASCI) has taken an initiative of taking up entrepreneurship development programmes through imparting skill training by 100 KVKs during 2016-17. Out of 100 KVKs across the country, 9 KVKs (5 KVKs of Bihar and 4 KVKs of Jharkhand) of this Zone were assigned with the job of undertaking the training programmes in the line of ASCI norms. These 9 KVKs were Saran, East Champaran, Samastipur, Lakhisarai and Jehanabad of Bihar and East Singhbhum, Gumla, Hazaribag and Palamu of Jharkhand. Each of them was tasked with 2 training programmes during the year under report. A total of 7 Job Roles were covered under 17 Skill Development Training Programmes for 340 participants undertaken by 9 KVKs during 2017-18. During the year, a fund of Rs. 6 lakh 36 thousand was allocated to ATARI Patna for this purpose. The Job Role-wise details with the KVKs involved are given below:-

Table 73: Skill Development training undertaken by KVKs during 2017-18

State	*Name of KVK*	*Job Role/QPs of trainings*	*Duration of training (hrs.)*	*No. of participants*
Bihar	Saran	Mushroom grower	200	20
		Organic grower	200	20
	East Champaran	Bee Keeper	150	20
		Organic grower	200	20
	Samastipur	Seed Processing worker	130	20
		Broiler poultry farm worker	200	20
	Lakhisarai	Quality seed grower	200	20
		Mushroom grower	200	20
	Jehanabad	Bee keeper	150	20
		Broiler poultry farm worker	200	20

State	Name of KVK	Job Role/QPs of trainings	Duration of training (hrs.)	No. of participants
Jharkhand	East Singhbhum	Quality seed grower	200	20
		Organic grower	200	20
	Hazaribag	Seed Processing worker	130	20
		Mushroom grower	200	20
	Gumla	Mushroom grower	200	20
		Quality Seed grower	200	20
	Palamu	Sericulturist	200	20

1. Mushroom Grower (Saran, Lakhisarai, Jehanabad, Hazaribagh, Gumla, Godda)

The objective of the programme was to train the participants for the job of producing mushroom and marketing mushroom for income generation. The skills imparted during this training were knowledge on health benefits of mushroom, preparation of mushroom growing bed, care and management of growing mushroom, various types of cultivation methods according to the various types of mushrooms and packaging technique. The training has a great potential for self-employment, particularly rural women. Number of participants in training was 100.

Mushroom Training at KVK Jehanabad, Bihar

Mushroom Training at KVK Godda, Jharkhand

2. Organic Grower (Saran, East Champaran, East Singhbhum)

The programme was aimed at developing/ imparting skill in various techniques associated with organic crop production like soil testing techniques, organic input preparations for organic farming, organic fruit and vegetable cultivation methods, organic cereals and pulse production techniques, marketing strategy for organic products etc. Number of participants in training was 60.

3. Bee Keeper (East Champaran, Jehanabad)

This job role was undertaken in order to impart skills in the areas like management of bee hives, extraction of honey, preservation of honey and marketing for secondary income generation. A total of 40 rural youth/ farmers were trained under this job role.

Bee Keeper training at KVK East Chmaparan, Bihar

4. Seed Processing Worker (Samastipur, Hazaribagh)

Skill training on Seed Processing Worker was mainly consisted of understanding the importance of seed processing, collection of seed from seed grower, lab testing of seed for its moisture content and disease infestation, cleaning and grading, chemical treatment and storage. A total of 40 farmers were trained under this job role.

Seed Processing Worker training at KVK Samastipur, Bihar

Seed Processing Worker training at KVK, Jharkhand

5. Broiler Poultry Farm Worker (Jehanabad, Samastipur)

Skill training on Broiler Poultry Farm Worker was mainly consisted of understanding of housing, site selection, sanitary measure, feeding, brooding house management, care and management of broiler poultry, diseases of broiler poultry and their preventive measures including vaccination schedule. The total number of trainees trained for the job role was 62.

Broiler Poultry Farm Worker training at KVK Jehanabad, Bihar

6. Quality Seed Grower (Lakhisarai, East Singhbhum, Gumla)

The purpose of skill training on Quality Seed Grower was to produce quality seed at village for easy access of healthy, pure seeds with high seed vigour and good germination percentage. Timely availability of good quality seeds at reasonable price could ensure good yield and profit to the farmers. The training dealt with every aspects of seed production of major crops of the district such as paddy, lentil, mustard etc. The farmers were taught various aspects such as nursery management, land preparation, sowing, fertilizer application, weed management, disease and pest management, harvesting, post harvest handling etc. It also emphasized some applied aspects of seed production such as soil health maintenance, seed and its characteristics, seed germination and purity, seed certification process, storing of seeds etc. The total number of trainees trained for the job role was 60.

Quality Seed Grower training at KVK Lakhisarai, Bihar

Quality Seed Grower training at KVK, E. Singhbhum Jharkhand

24.3 Farmer FIRST Programme

Farmer FIRST is an adaptive research project. The term *"Farmer FIRST"* signifies the farmers' Farm, Innovations, Resources, Science and Technology (FIRST). The basic concept is that the farmer of a village will be in a centric role for research problem identification, prioritization, conduct of experiments and its management in farmers' field conditions. It emphasizes resource management, climate resilient agriculture, production management including storage, marketing, supply chains, value chains, innovation systems and mobilization of information systems for focusing on shifting from production to profit. Thus, the initiative was taken by ICAR to move beyond the production and productivity; to privilege the smallholder agriculture; and complex, diverse and risk prone realities of majority of the farmers. Major four components of the project included (i) Farmers-scientists interface, (ii) Technological implementation and assessment, (iii) Institutional linkage through development of partnership at the village level and (iv) Content mobilization through publication, documentation of success story and uploading information in Farmer FIRST portal. With this concept, Agricultural Extension Division of ICAR, New Delhi invited project proposals for funding under Farmer FIRST Programme from ICAR Institutes/ Agricultural Universities and thereafter four projects, two for ICAR Institutes and two for state agricultural Universities, were sanctioned under ICAR-ATARI, Patna during 2017-18.

Table 74: The name of the institute, their project title, budget allotted during 2017- 18

Sl. No.	Name of the Institute	Title of project	Fund sanctioned during 2017-18 (Rs. in lakh)
1.	Bihar Agricultural University, Sabour, Bhagalpur, Bihar	"Cross Sectional Livelihood Improvement and Income Enhancement through Agro-Enterprise Diversification"	47.86
2.	Birsa Agricultural University, Ranchi	"Technology integration for doubling farm income through participatory research and extension approaches in Ranchi district of Jharkhand"	39.07
3.	ICAR-NRC, Litchi, Muzaffarpur	"Improved livelihood through good practices in agricultural production system"	45.40
4.	ICAR-IIAB, Ranchi	"Enhancing food, nutritional and livelihood security of marginal and small farmers in Jharkhand through need based agricultural technologies"	14.00
Total			**146.33**

Table 75: Achievements of Farmer FIRST Programme (FFP) during 2017- 18

Module	No of Demons made	No of farm families benefited
NRM Module	15	1985
Crop Module	156	2351
Horticulture Module	86	826
Livestock	23	1273
IFS Model	24	643
Total	**304**	**7078**

24.4 Seed Hub

India is the largest producer, consumer and importer of pulses. In order to fulfil growing demand and reduce import, it is need of the hour to increase pulse production from 23.13 mt during 2016- 17 to 26.5 mt by 2020. Hence, Ministry of Agriculture and Farmers Welfare has developed a plan to establish 150 'Seed Hubs' each targeting to produce 100 tonnes of pulses seeds during the next three years. 'Seed Hubs' Pulses are the important commodities for nutritional securities and the efforts of the KVKs will be helpful to meet demand of pulses as well as to reduce imports. In order to promote production of quality seeds of new varieties (released / notified) not older than 10 years, 9 'Seed Hubs' at 7 KVKs of Bihar and 2 KVKs of Jharkhand under Zone IV have been established. A Total 3169.65 q production is expected from the Seed Hubs of Zone IV during the period 2017-18.

Table 76: Performances of Seed Hubs under Zone IV during 2017- 18

Zone	No. of KVKs	Crop	Variety	Target (q)	Area sown (ha)	Production/ Expected production	Category of Seed (F/S, C/S or T/L)
IV	9	Pigeon pea	NDA-2, Pusa-9, Naren dar Arahar1, Malvia 13, Bahar	1080	68	840	C/S, T/L, F/S
		Black Gram	WBU-109 (Sulata), Uttra	600	44	450	C/S, F/S
		Green Gram	IPM 2-3, PDM-139, HUM-16	550	55	65.25	C/S, F/S
		Chick Pea	PG-186, P-256, GNG-1581, Pusa 372, KPG-59, CSJ-515, BGM-547	2150	158	1150	C/S, T/L, F/S
		Lentil	HUL-57, WBL-77	1025	170	500	C/S, T/L, F/S
		Field pea	HUDP-15, Dantewara Field Pea-1, Malviya Matar15, Azad P3	150	40	100	C/S, T/L, F/S
		Gram		**100**	**10**	**64.4**	C/S, T/L, F/S
Total				5655	545	3169.65	

Seed Hub at KVK Dumka | Seed Hub at KVK Vaishali

24.5 Attracting and Retaining Youth in Agriculture (ARYA)

ICAR has initiated a programme "Attracting and Retaining Youth in Agriculture" during 2017- 18 through 25 identified KVKs of this country in order to attract and empower the rural youth for taking up various agriculture and allied sectors enterprises and earning a sustainable income and achieving a gainful employment. The programme aimed at taking up capital intensive activities like processing, value addition and marketing. Accordingly, KVK East Champaran from Bihar and KVK Gumla from Jharkhand implemented this programme under Zone-IV with a fund support of Rs. 98.0 lakh during 2017- 18. ARYA project has opened a new door of opportunity and income for the rural youths in their native places. Rural Youths have accepted these enterprises (pig farming, goat farming, bee keeping and lac cultivation, mushroom production etc) as a major source of income for their livelihood. Earlier youths from impoverished families travelled to other places for employment opportunities leaving behind their children and older member of the family. Youths got opportunity for self employment at their places only through ARYA. Thus, migration rate became slow down by 20-25%. ARYA programme brought profound change in the living status of the family.

Table 77: Achievement of ARYA Programme during 2017- 18

Sl. No.	KVK Name	Enterprises promoted	No. of youths identified for different enterprises	No. of unit developed per enterprise	No. of youths benefitted	No. of training programme conducted	No. of rural youths trained	No. of youths, running the entrepreneurial units in a sustainable manner	Adoption of the enterprises by other youths of the districts
1	**GUMLA**	Pig farming	213	30	10	03	163	30	213
		Goat farming	177	55	35	02	85	55	177
		Bee keeping	210	40	10	06	130	29	210
		Lac cultivation	170	40	20	03	109	40	170
2	**East Champaran**	Mushroom Production	50	17	25	01	25	17	27
		Bee Keeping	50	18	25	01	25	18	26

Sl. No.	KVK Name	Enterprises promoted	No. of youths identi-fied for different enterpris-es	No. of unit developed per enter-prise	No. of youths benefitted	No. of training programme conducted	No. of rural youths trained	No. of youths, running the entre-preneurial units in a sustainable manner	Adoption of the enterprises by other youths of the districts
		Fish Spawn Production	50	8	10	01	10	8	9
		Poultry Production	50	17	23	01	23	17	18
Total			**970**	**225**	**158**	**18**	**570**	**214**	**850**

Establishment of bee keeping enterprise by KVK, Gumla, Jharkhand

Establishment of pig farming enterprise by KVK, Gumla, Jharkhand

Skill Development Training on Bee Keeping by KVK, East Champaran

Skill Development Training on Fish Spawn Production by KVK, East Champaran

24.6 Krishi Vigyan Kendra (KVK) Knowledge Network/ *KVK Portal*

As an integral part of National Agricultural Research System (NARS), Krishi Vigyan Kendra (KVK) of this zone is working on application of location specific technology modules in agriculture, livestock, fishery and allied sectors through technology assessment, refinement and demonstrations. KVK also serves as Knowledge and Resource Centre of Agricultural Technology which supports public, private and voluntary sector for improving the agricultural economy of any given district and is linking the NARS with extension system and farmers. KVKs are also producing quality technological products like seed, planting material, bio-agents, livestock, fish fingerlings etc. and make them available to farmers. However, there is mostly only one KVK for serving the whole district. Sometimes, the farmers may not get access to KVK services. To bridge the communication gap between the farmers and KVK, ICAR has developed one portal named as *KVK Knowledge Network/ KVK Portal* (*www.kvk.icar.gov.in*) for the farmers and other stakeholders where various information about KVK and various activities of KVK have been uploaded by the KVK Scientists for quick dissemination of technologies in the district and in the country as a whole. During the period under report, 63 KVKs (39 KVKs of Bihar and 24 KVKs of Jharkhand) of ICAR-ATARI, Patna have uploaded various information e.g. KVK profile report, facility available at the KVK, past and upcoming events,

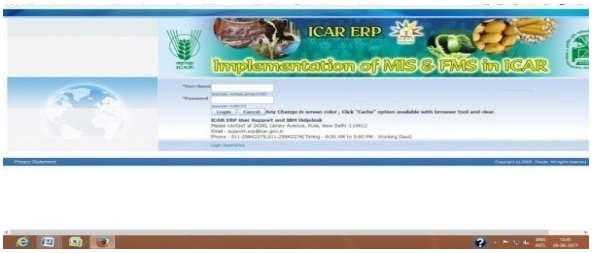
package of practices, status of Cluster Front Line Demonstration (CFLD) on Pulses and Oilseeds etc. in the portal. This portal is being continuously updated by the KVK Scientists as per direction of the competent authorities. The KVKs have also uploaded Monthly Progress Report to the Portal.

24.7 *KRISHI* Portal

KRISHI (Knowledge based Resources Information Systems Hub for Innovations in Agriculture) *Portal* has been developed since 2016- 17 as ICAR Research Data Repository for knowledge management. Data Inventory Repository aims at creating Meta Data Inventory through information related to data availability at Institute level. The portal consists of six repositories viz. technology, publication, experimental data, observational data, survey data and geo-portal. During the period of 2017-18, input data on latitude and longitude of all KVKs under the Zone- IV was submitted to the concerned authority to put them in geo-portal. As per guidelines of the Council, various kinds of publications pertaining to this institute were uploaded in this portal. The portal can be accessed at *http://krishi.icar.gov.in.*

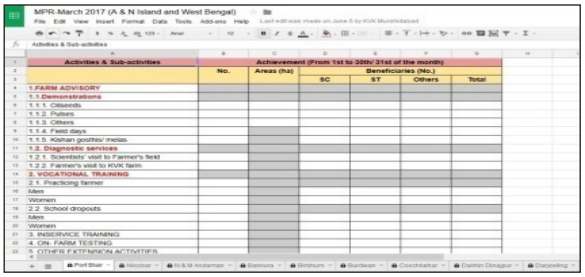
24.8 Management Information System including Financial Management System (MIS-FMS) under ICAR-ERP

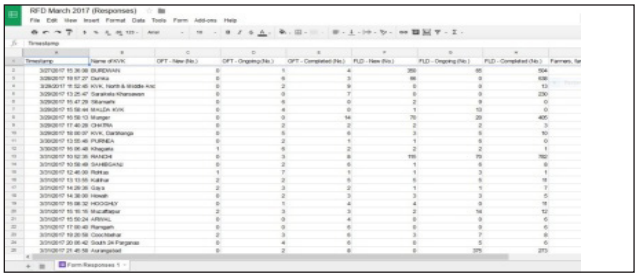
ICAR-ERP developed under NAIP project "Implementation of Management Information System (MIS) including Financial Management System (FMS) in ICAR" was initiated in the year 2015-16. Since September 2017, the system is regularly being updated for proper system management in respect of personnel and finance of the ICAR-ATARI Patna. There are five modules of MIS-FMS, viz., Financial management, Supply chain management (SCM), Human resource management (HRM), Payroll module and Project management. All the modules of the MIS-FMS are being regularly implemented at this institute.



24.9 Online Reporting by KVKs

The data collection, report collection and compilation of the Zone IV is a basic methodology component in the monitoring activities of ICAR-ATARI Patna. The World Wide Web (WWW) is increasingly used as a tool and platform for data collection and easier compilation. Again, Google is a worldwide recognized search engine. It also provides internet related services and products to a wide range of users at greater utility and lesser cost. There are many web based applications of Google like Google docs, Google forms, Google drive, Google slides, Google sheets etc., which have immense potential for increasing productivity of academicians, researchers, professionals and policy makers etc. The non-tampered analysis of the data with fullest authenticity is also possible within few seconds without any manual tabulation and coding. Further, online method of reporting is much faster than the traditional method of data collection. ICAR-ATARI Patna has started online method data collection system using Google forms and sheets for data collection on various aspects like Results Framework Document, Monthly Progress Report, Mandated activities of KVK and Soil analysis etc. Specific guidelines for filling up the forms and sheets have been provided to all KVKs of the Zone for easy understanding and proper reporting.





24.10 Celebration of Swachhta Hi Sewa Programme 2017

The cleanliness campaign, one of the important flagship programmes of Govt. of India was launched on 2nd October 2014 as 'Swachh Bharat Mission'. In strengthening the cleanliness related activities, the Swachhta Hi Seva Programme 2017 was observed during 15th September- 2nd October 2017 by taking cleanliness oath (Swachhta Shapath) and by promising to improve cleanliness in the surrounding areas of the ICAR- ATARI Patna/ KVKs as well as in the nearby villages. The programme has also emphasized on the fast and clean disposal of official work. During the programme, the staff of this institute/ KVKs strived for their sincere contribution towards the cause of overall cleanliness, sanitation aspects by adopting various means as separate dry and wet bins, vermicomposting, recycling of wastes etc. Daily reporting on the activities taken during the Pakhwada was done for national level compilation on the programme.

Table 78: Swachhta Hi Sewa from 15th September to October 2nd 2017 under Swachh Bharat Mission

Sl. No.	Activity	No. of KVKs involved	No. of villages Involved	No. of Participants
1.	Celebration of Sewa Divas(17th Sept. 2017)	63	139	3379
2.	Celebration of Samagra Swatchhta Diwas 24th Sept. 2017	63	155	3608
3.	Celebration of Sarwatra Swatchhta 25th Sept. 2017	59	180	3984
4.	Swachhta of nearby Tourist Spots.	52	-	581
5.	Public Function/ Award Ceremony	39	39	4168
6.	Other Misc. activities	50	124	2849
Total		**326**	**637**	**18569**

The details of the activities undertaken at ATARI Patna as well as KVKs during the fortnight-long programme are presented as follows.

At ICAR-ATARI, Patna

A programme on cleanliness drive was organized at ICAR-ATARI, Patna on 20.10.2017 as a part of celebrating Swachhta Pakhwara in which the premises of office were thoroughly cleaned by all the staff members. The bushes, grasses etc. were cleaned from around the office building and outside the main gate. The programme created awareness about the cleanliness in the nearby areas.

At KVKs under ICAR-ATARI, Patna

A total of 63 KVKs under ATARI Patna celebrated the Swachhta Pakhwada 2017 during 15th September - 31st October 2017 at their respective offices/ adopted villages. The summary of the programmes undertaken by them has been tabulated as under.

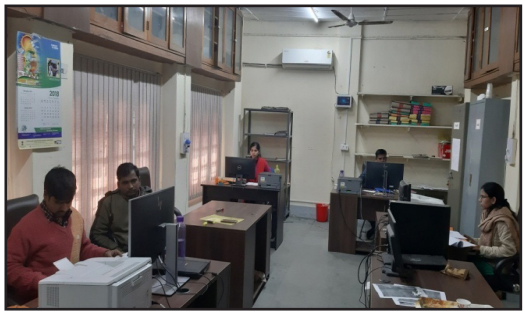
Table 79: Swachhta Hi Sewa programme held in Bihar and Jharkhand from 15th September to October 2nd 2017 under Swachh Bharat Mission

Sl. No.	Parameters	No. of KVKs performed	Brief details	Action photographs
1	Treatment of bio-degradable/non bio-degradable wasters	63	Awareness cum training programme on right method of compost and vermi-compost preparation was organized at KVK adopted villages.	
2	Steps taken for awareness in Yoga/health/positive thinking/ water conservation etc.	43	Awareness cum training programme on how to optimally utilize the water for irrigating rabi crops was organized at KVK adopted villages.	
3	Uploading of activities/ photographs of swachhta pakhwada and news / events emerged in print and electronic media and website	72	Regularly uploaded in the website and immerged in the print and electronic media.	
5	Steps for transparency in works, motivation and participation of institutes officials/ staff	63	Awareness on vigilance, motivation was undertaken.	
6	Special work/ achievement during swachhtapakhwada	63	Swachhta oath taking was conducted	
7	Usage of eco-friendly technologies, lesser use of plastics, etc.	59	Awareness on these issues were discussed in detail	
8	Housekeeping, cleanliness in office buildings, rooms, labs, campus, residential area, etc.	63	Regular cleaning and housekeeping activities were undertaken by all the KVKs	
9	Punctuality and regularity of staff	63	Sensitization and motivation programme for maintaining punctuality and regularity of staff was undertaken	

25. New Initiatives Undertaken

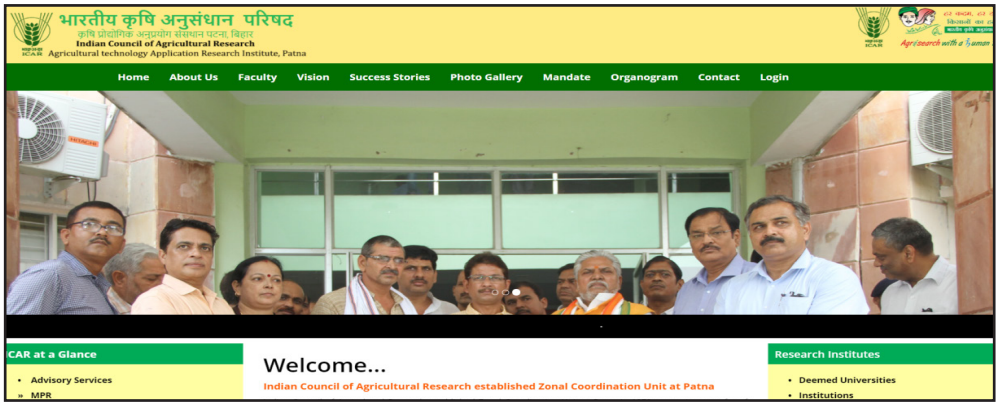
25.1 Office of ICAR-ATARI Patna, Zone IV Set-Up

The office of ICAR-ATARI, Patna, Zone IV has been set-up with some working facilities during the year under report in the existing building at the campus of Central Potato Research Station, P.O. Sahaynagar, Patna, Bihar. The office is monitoring the activities of 39 KVKs of Bihar and 24 KVKs of Jharkhand.



25.2 Institute Website

The official website of ATARI Patna was launched during the year under reporting. Regular in-house uploading of information was regularly carried out in order to maintain the dynamic nature of the website. The website of the institute was regularly updated for latest information on KVKs and their host organizations, personnel of ICAR-ATARI, Patna, district profiles, different ongoing programmes, publications, awards, news, recruitment details and many others. The website can be accessed through *www.ataripatna.org*.



25.3 'Sankalp se Siddhi' Programme

In 1942, our freedom fighters had taken a pledge of 'Quit India' and in 1947, India achieved independence. To celebrate 75th anniversary of 'Quit India Movement', the programme 'Sankalp se Siddhi'- New India Manthan was organized at KVKs in the entire country from 19th "August, 2017 to 10th September, 2022. A pledge was made for the all-round development of the country. The pledge included Swachchhata, poverty alleviation, corruption, terrorism, communalism and castesim free India along with doubling farmers' income by 2022. In a planned move to double the income of our farmers by 2022, KVKs have organized various activities focussing on 'seven-point strategies' to convert this initiative into "Sankalp se Siddhi". 'Seven-point strategies' contained (i) Focus on assured irrigation, (ii) Increase production through improved seeds, planting materials, organic farming and soil health card, (iii) Strengthening warehousing and cold chain facilities to curb post-harvest losses, (iv) Value addition through food processing, (v) Overcoming deficiencies in agriculture marketing through e-NAM, (vi) Work on institutional loan to reduce risk and growth of agriculture sector and (vii) Allied activities of agriculture like dairy development, poultry, beekeeping, fisheries, agro-forestry and integrated farming system. A total of 48 KVKs organized "Sankalp se Siddhi" programme in

Zone IV. Thus, KVKs have made immense contribution in promoting agriculture and agricultural technology through this programme involving 38,229 farmers in Bihar and Jharkhand. Sixteen KVKs of Bihar, namely Araria, Darbhanga, East Champaran, Gopalganj, Katihar, Kisanganj, Madhepura, Madhubani, Muzaffarpur, Purnea, Saharsa, Samastipur, Sheohar, Sitamarhi, Supaul, West Champaran could not organize this programme due to flood in those districts. The details of programme under ICAR- ATARI Patna are presented in the following tables.

The Hon'ble Minister of State, Agriculture and Farmer Welfare, GoI, Shri. Sudarshan Bhagat and other guests and farmers are taking oath in " Sankalp Se Siddhi "Programme at KVK, Gumla, Jharkhand

Farmers are participating in " Sankalp Se Siddhi "Programme at KVK, Siwan, Bihar

Table 80: 'Sankalp Se Sidhi'- New India Manthan programme held in Bihar and Jharkhand from 17th Aug to 10 Sept 2017

Sl. No.	State	No. of KVKs organized the program	No. of Union Ministers attended the programme	No. of Hon'ble MPs (Loksabha/ Rajyasabha) participated	No. of State Govt. Ministers attended	Participants (No.)							Coverage by Door Darshan (Yes/ No)	Coverage by other channels (Number)
						MLAs attended the programme	Chairman Zila Panchayat	Distt. Collector/ DM	Bank Officials	Farmers	Govt. Officials, PRI members etc.	Total		
1	**Bihar**	24	6	14	8	12	12	7	42	20,472	1,487	**22,020**	15	51
2	**Jharkhand**	24	3	12	0	13	23	11	61	17,757	332	**18,089**	11	26
	TOTAL	**48**	**9**	**26**	**8**	**25**	**35**	**18**	**103**	**38,229**	**1,819**	**40,109**	**26**	**77**

25.4 'Mahila Kisan Divas' Programme

Women comprise a major workforce in Indian agriculture. Women are playing multi-dimensional role in agriculture and allied sectors including sowing,

Celebration of 'Mahila Kisan Divas' at KVK, Buxar, Bihar

planting, fertilizing, plant protection, harvesting, weeding, storage and livestock care. According to the Food and Agriculture Organization (FAO), women participate in 48% of agriculture-related employment in India and around 7.5 crore women are actively involved in livestock management. On this back drop, the Ministry of Agriculture and Farmers' Welfare, GoI had decided in 2016 to observe 15th of October every year as "Rashtriya Mahila Kisan Diwas".

Thus, Mahila Kisan Diwas was celebrated at Krishi Vigyan Kendras across the country to recognize the contribution of women in Agriculture. As part of the nationwide celebration of 'Mahila Kisan Divas', various programmes like seminar, farm visit, extempore, drawing competition, exhibition etc were organized at different KVKs under ICAR- ATARI, Patna to honour women for their remarkable contribution in agriculture. In Bihar, Mahila Kisan Diwas was celebrated by 30 KVKs across the state involving 3577 farm women. Similarly, 15 KVKs of Jharkhand celebrated Mahila

Celebration of 'Mahila Kisan Divas' at KVK, Khunti, Jharkhand

Kisan Diwas with the active participation of 2170 women to encourage women in agricultural activities.

25.5 Krishi Unnati Mela 2018 and its Webcasting

The Ministry of Agriculture and Farmers' Welfare, GoI organized Krishi Unnati Mela 2018 during 16-18th March 2018 for showcasing the progress made in agriculture and allied sectors in the country. The Hon'ble Prime Minister of India, Shri. Narendra Modi inaugurated Krishi Unnati Mela 2018 on 17th March 2018 and he addressed the mass, particularly the farmers of the country. The inaugural address of the Hon'ble Prime Minister of India was displayed through webcasting at KVKs of Bihar and Jharkhand under ICAR- ATARI, Patna involving

5481 farmers. The KVK officials, and selected farmers of this zone (total around 94) and other stakeholders attended the programme. An exhibition stall of ICAR-ATARI, Patna was made for Krishi Unnati Mela 2018 with the active participation of the selected KVKs of this zone. On 16th March 2018, Dr. T. Mohapatra, Secretary, DARE and DG, ICAR visited the stall and appreciated the collective efforts of KVKs of this zone. On 18th March 2018, the Minister of Agriculture and Farmers Welfare, GoI, Shri Radha Mohan Singh ji visited ICAR- ATARI, Patna stall and admired the hard work of KVK personals' of this zone. During 16-18th March 2018, the 10th National Conference on KVKs was organized at IARI campus, New Delhi. A total of 63 KVKs participated in the conference. The Director and the scientist in-charge of ICAR-ATARI Patna also took active part in the conference apart from exhibition stall arrangement for Krishi Unnati Mela 2018 during the period.

Webcasting of the inaugural address of the Hon'ble Prime Minister of India at KVK, Bhagalpur, Bihar

Webcasting of the inaugural address of the Hon'ble Prime Minister of India at KVK, Godda, Jharkhand

25.6 Implementation of Public Finance Management System (PFMS)

Public Finance Management System (PFMS) is an electronic fund tracking mechanism compiles, collates and provides real time information on resource availability, flows and actual utilization. It provides unified platform to scheme managers for tracking releases and monitoring their last mile utilisation. Considering the diversity and multiplicity of channels through which money is spent/ transferred, the PFMS is designed to serve the pertinent need of establishing a common electronic platform for complete tracking of fund flows from the Central Government to large number of programme implementing agencies, both under Central Government and the State Governments till it reaches the final intended beneficiaries. The PFMS Scheme has been rolled-out by the Controller General of Accounts (CGA) at the behest of Finance Ministry, Department of Expenditure as a cherished Public Finance Management (PFM) reform in the country since 2009. PFMS is poised to develop as one of the biggest Financial Management Systems of the world, which is critical for bringing about a transformational accountability and transparency in the Government Financial Management Systems and promoting overall Good Governance. The latest enhancement in the functionalities of PFMS has been commenced in late 2014 for the implementation of various Schemes through Direct Benefit Transfer (DBT) mechanism in this regard. ICAR-ATARI, Patna has implemented PFMS during the financial year 2017- 18 and thus it has brought transparency in the system and helped in easy transfer and tracking of funds.

25.7 Initiatives for Doubling Farmers' Income in Bihar and Jharkhand

Agriculture is the largest enterprise in the country. Agriculture in India today is described by a net sown area of 141 million hectares, with field crops continuing to dominate, as exemplified by 55 per cent of the area under cereals. However, agriculture has been diversifying over the decades. Horticulture now accounts for 16 per cent of net sown area. The nation's livestock population counts at more than 512 million. India today is not only self-sufficient in respect of demand for food, but is also a net exporter of agri-products occupying seventh position globally. Though the country faces deficit of pulses and oilseeds, it is one of the top producers of cereals (wheat and rice), fruits, vegetables, milk, meat and marine fish. However, economic indicators do not show equitable and egalitarian growth in income of the farmers. The Indian farmers remain in frequent distress, despite higher productivity and production. The production and availability of fruits, vegetables, milk, meat and fish have been increased over the decades, but affordability to a vast majority, including large number of farmers too, remains a question mark. India's yield averages for most crops at global level do not compare favourably. The costs of cultivation are rising. The magnitude of food loss and food waste is alarming. The markets do not assure the farmer of remunerative returns on his produce. In short, sustainability of agricultural growth faces serious doubt, and agrarian challenge even in the midst of surpluses has emerged as a core concern. Large tracts of arable land have turned problem soils, becoming acidic, alkaline and saline physico-chemically. Another primary factor of production, namely, water is also under stress. Climate change is beginning to challenge the farmer's ability to adopt coping and adaptation measures that are warranted. In broad sense, the farmers face the twin vulnerabilities of risks and uncertainties of production environment and unpredictability of market forces.

Agriculture when defined as an enterprise comprises two segments – production and post-production. The success of production as of now amounts to half success, and is therefore not sustainable. Recent agitations of farmers (June- July 2017) in certain parts of the country demanding higher prices on their produce following record output or scenes of farmers dumping tractor loads of tomatoes and onions onto the roads or emptying canisters of milk into drains exemplify neglect of other half segment of agriculture. Thus, the answer to agrarian challenges and realization of the aim of farmers' welfare lies in higher and steady incomes.

It is true that an enterprise can survive only if it can grow consistently. In India, the absolute number of

households engaged in agriculture in 2011 (119 million) outpaces those in 1951 (70 million). The welfare of this elephantine size of India's population is predicated upon a robust agricultural growth strategy that is guided by an income enhancement approach. In this context, the Hon'ble Prime Minister shared the vision of doubling farmers' income with the nation at his Bareilly address on 28th February, 2016. The call of the Hon'ble Prime Minister to double farmers' income has generated so much of positive buzz around the subject. Further, recognising the urgent need for a quick and time-bound transformation of the vision into reality, a time frame of six years (2016-17 to 2022-23) has been delineated as the period for implementation of such new strategy.

The Doubling Farmers' Income (DFI) Central Committee recognises agriculture as a value led enterprise and suggests empowering farmers with "improved market linkages" and enabling "self-sustainable models" as the basis for continued income growth for farmers. Science and Technology (S&T) and Innovation in Farm Management are critical inputs for economic development and poverty alleviation. The Committee identifies and focuses on seven major sources of growth operating within and outside the agriculture sector. These are (i) Improvement in crop productivity, (ii) Improvement in livestock productivity, (iii) Resource use efficiency or saving in cost of production, (iv) Increase in cropping intensity, (v) Diversification towards high value crops, (vi) Improvement in real prices received by farmers and (vii) Shift from farm to non-farm occupations.

In view of achieving the target of doubling the farmers' income by March 2022, initiatives for Doubling Farmers' Income in Bihar and Jharkhand have been undertaken by State Coordination Committee (SCC) where the Director of ICAR- ATARI, Patna has been involved actively in formulation of strategy documents for both the states. The first meeting on doubling farmers' income was held on 23.03.17 at ICAR- RCER, Patna where Dr. A. Haldar, Principal Scientist attended the meeting from ICAR- ATARI, Kolkata as the representative of the Zone. Later, Dr. Anjani Kumar and the Head and Senior Scientists of KVKs of Bihar took active part in the meeting held on 23.10.17 at ICAR- RCER, Patna.

बिरसा कृषि विश्वविद्यालय में प्रथम राज्य समन्वय की बैठक आयोजित, विशेषज्ञों ने लिया हिस्सा

किसानों की आय दुगुनी करने पर मंथन

उचित समय पर सलाह दें

इसपर भी दें ध्यान

In Jharkhand, the Head and Senior Scientists of KVKs of Jharkhand actively participated in the meeting held on 23.08.17 at BAU, Ranchi for exchanging views and giving inputs, particularly success already realized at the farmer's field by the effort of KVKs, in the formulation of strategy document for doubling farmers' income by March 2022.

25.8 Digital Farming Initiative in Agriculture

The Hon'ble Prime Minister, Shri. Narendra Modi launched Digital India on July 1, 2015 to create digital infrastructure for empowering rural communities, enabling digital delivery of services and promoting digital literacy. Given that 68 per cent of India's population is rural based and agriculture is the main source of livelihood for 58 per cent of that rural population, thus the role of Digital Agriculture

Farming within Digital India is enormous. Over the last few decades massive technological development and opportunities have transformed people's lives. However, these opportunities have not benefited the agriculture sector in a significant way. Hence, Indian Council Agricultural Research (ICAR), New Delhi in collaboration with Tata Consultancy Services (TCS) has undertaken a new initiative to develop a digital agricultural extension services using KVK network across the country during the month of January, 2018. The key components to support the implementation of Digital Agriculture Farming is Spatial (and Temporal) Data Infrastructure (SDI) and low-cost smart phones and tablets to support the bi-directional flow of data and information to rural consumers. SDI has been the key driver to support modern farming in the US, Australia and Europe as well as emerging economies of China and Brazil.

Agriculture is a data-intense enterprise which consists of soil variability, moisture and nutrient levels, rainfall variability and timing of key operations like planting and harvesting and market price volatility. Advanced agriculture practices help farmers manage these production and market risks through the application of spatial/ temporal data bases that are cloud enabled and integrated through Application Programming Interfaces (APIs). In Digital Farming Initiative, ICAR will provide the technical inputs and advisory through KVK network and TCS will provide its digital platform mKRISHI to use two way interactive digital extension services. At least 10 farmers from each village of the country under each KVK have been targeted to be connected with this mKRISHI platform by August 15, 2018. The details of each farmer have been collected in a prescribed format of Agriculture Extension Division, ICAR, New Delhi in different phases and submitted to the Council during the period under report.

It is expected that the present initiative in Digital Agriculture Farming will create a rich and dynamic data ecosystem that will enable advanced analytics to inform farmers of the best economic options to maximise profitability and minimise risk- the two critical variables farmers in India would also like to manage. This platform will support the delivery of timely, tailored information, low cost data and services to the farmers based on crop, planting date, variety sown, real time localised observed weather and projected market prices to make agriculture

farming a profitable enterprise and sustainable (socially, economically and environmentally) and attractive for the practising farmers and youth both, while delivering safe, nutritious and affordable food for ALL.

25.9 Diploma in Agricultural Extension Service for Input Dealers (DASAI) Programme

During 2017- 18, KVK East Champaran and KVK Vaishali in Bihar with total number of 70 participated conducted Diploma in Agricultural Extension Service for Input Dealers (DASAI) Programme to educate Agri-Input Dealers in their respective districts on agriculture, to facilitate them to serve the farmers better and to act as para-extension professionals. The programme was implemented by ATMA.

Inauguration of DAESI Programme at KVK, Piprakothi

26. Personnel (As on 31.03.2018)

Sl. No.	Name	Designation
1	Dr. Anjani Kumar	Director
2	Ravindra Kumar	SRF (NICRA)
3	Khushboo Kumari	SRF (CFLD Oilseed)
4	Dr. Sarvesh Kumar	SRF (Pulses)
5	Ravi Kant Chaubey	SRF (ARYA)
6	Alok Singh	Data Entry Operator
7	Anshu Kumari	Data Entry Operator
8	Preeti Kumari	Data Entry Operator
9	Nilu Kumari	High Skilled
10	Mukesh Kumar	Skilled

27. Awards

27.1 Farmers Award

Name of KVK	Name of the Award	Name of the Farmer	Year	Conferring Authority	Amount (Rs.)	Purpose
Bihar						
Bhagalpur	Best farmer	Sri Dhannajay Kumar Suman	2018	BAU, Sabou, Bhagalpur	Certificate	Resource conservation technique
Buxar	ICAR RCER, Foundation day	Mr. Udai Narayan Rai	2018	Mr Radha Mohan Singh Union Minister of Agriculture & FW	Certificate	IFS
Buxar	ICAR RCER, Foundation day	Mr. Sunil Mishra	2018	Mr Radha Mohan Singh Union Minister of Agriculture & FW	Certificate	RCT
East Champaran	Abhinav Kisan Puraskar	Sri Durga Singh, Vill-Belwatiya, Piprakothi	2017	DRPCAU, Pusa	5000	For best work in the field of RCT
East Champaran	ARISE SMRAT	Sri Durga Singh, Vill-Belwatiya, Piprakothi	2018	BAYER Crop Science Ltd.	Certificate	For outstanding performance in ARISE Gold 6444 farming in the year 2017.
East Champaran	ARISE SMRAT	Sanjay Jaiswal, Vill- Suryapur, Piprakothi	2018	BAYER Crop Science Ltd.	Certificate	For outstanding performance in ARISE Gold 6444 farming in the year 2017.
East Champaran	ARISE SMRAT	Rabindra Singh	2018	BAYER Crop Science Ltd.	Certificate	For outstanding performance in ARISE Gold 6444 farming in the year 2017.
Khagaria	Krishi Karaman Award for coarse grain	Sri Anil Kumar, Vil- Gouchhari, block- Gogri	2017	Ministry of Agril. and Farmers Welfare, GOI	200000	To recognise farmers who attained highest productivity of crops

Name of KVK	Name of the Award	Name of the Farmer	Year	Conferring Authority	Amount (Rs.)	Purpose
Khagaria	Krishi Karaman Award for coarse grain	Smt. Neelam Kumari, Vil- Kulharia, Block- Parbatta	2017	Ministry of Agril. and Farmers Welfare, GOI	200000	
Khagaria	Best Innovative Farmer Award	Sri Ranjay Paswan, Vil- Budhwa Parri, Block- Alouli	2018	SAID, Ranchi and BASU, Patna	Certificate	
Khagaria	Best Animal Exhibition Award for Poultry (Hen)	Sri Ranjay Paswan, Vil- Budhwa Parri, Block- Alouli	2018	Ministry of Agril. and Farmers Welfare, GOI and BAU, Sabour	500	
Khagaria	Best Animal Exhibition Award for Poultry (Cock)	Sri Ranjay Paswan, Vil- Budhwa Parri, Block- Alouli	2018	Ministry of Agril. and Farmers Welfare, GOI and BAU, Sabour	500	
Khagaria	Best Animal Exhibition Award (Goat)	Sri Ranjay Paswan, Vil- Budhwa Parri, Block- Alouli	2018	Ministry of Agril. and Farmers Welfare, GOI and BAU, Sabour	500	
Khagaria	Best Innovative Farmer Award	Sri Ranjay Paswan, Vil- Budhwa Parri, Block- Alouli	2018	Ministry of Agril. and Farmers Welfare, GOI and BAU, Sabour	Certificate	
Banka	Progressive Farmer Awards	Smt. Nitu Kumari	2017	BAU, Sabour	Certificate	-
Patna	Best Farmer Award	Sri Mritunjay Kumar Singh	2017-18	BAU, Sabour, Bhagalpur	Certificate	Best Farmer of District
Patna	Best Innovative Farmrs	Sri Amarjit Sinha	2017-18	Hinhustan Press	Certificate	Best Farmer of District
Patna	Best Innovative Farmrs	Sri Narendra Prasad	2017-18	Mahindra and Hindustan Press	Certificate	Best Farmer of District
Jehanabad	Best Innovative Farmer	Sri Braj Kishore	2017	BAU, Sabour	Certificate and Shawl	Kisan Mela BAU, Sabour
Jehanabad	Consolation Prize	Sri Ganesh Prasad	2017	BAU, Sabour	Certificate	Horticultural Exhibition, Kisan Mela BAU, Sabour
Jehanabad	3rd prize	Sri Laxmi Kant Azad	2017	State Govt.	Certificate	State level mango diversity exhibition cum competion
Jehanabad	85th Golden Jubilee Celebration of IFFCO, India	Sri Laxmi Kant Azad	2017	IFFCO	Certificate	Outstanding work in agriculture
Jehanabad	Progressive farmer award during Agri Expo 11-13, Jan. 2018	Sri Laxmi Kant Azad	2018	ICAR-RCER, Patna	Momento	A step towards doubling the income, ICAR-RCER, Patna
Jehanabad	Outstanding performance in agriculture field	Sri Gaurav Raj	Feb, 2018	ICAR-RCER, Patna	Certificate	18th Foundation day of ICAR
Jehanabad	Best Innovative farmer	Sri Gaurav Raj	Feb, 2018	BAU, Sabour	Certificate	Regional Kisan Mela, BAU, Sabour, 24-26, Feb. 2018

Name of KVK	Name of the Award	Name of the Farmer	Year	Conferring Authority	Amount (Rs.)	Purpose
Madhepura	Innovative District Progressive Farmer Award	Sri Binod Shah	2018	V.C, B.A.U, Sabour (Bhagalpur)	Shawl & Certificate	Innovative works in Agriculture
Rohtas	Best Innovative Farmer Award	Vijay Kumar Singh	2017	ICAR, N. Delhi	Certificate	For developing multiple seed drill
Rohtas	Best Innovative Farmer Award	Sri Dharmendra Mali	2017	BAU, Sabour	Certificate	For Skill development in flower cultivation
Rohtas	Best Farmer Award	Sri Vijay Kumar Singh	2017	IFFCO	Certificate	For developing multiple seed drill
Siwan	Abhinav Kisan Puraskar	Sri Surendra Singh	2018	Dr.RPCAU, Pusa	5000	Encouragement
Supaul	Sri Devendra Pd. Verma	Late Jainarayan Prasad	2017	BAU, Sabour	Certificate	District progressive farmer
Vaishali	Jagjivan Ram Award	Sri Sanjeev Kumar	2017	ICAR	Certificate	
Vaishali	Abhinav Kisan Award	Sri Ramveer Chaursiya	2018	DRPCAU, Pusa	Certificate	
Vaishali	Progressive Farmers of the district	Sri Prabhu Dayal Singh	2018	Govt. of India	Certificate	
Aurangabad	Best Farmers Award	Sri Brijkishore Mehta	2017	BAU Sabour	Certificate	For Strawberry Cultivation
Aurangabad	Innovetive Farmers Award	Sri Alok Kumar	2018	Hindustan	Certificate	Mechanized Farming
Aurangabad	Innovetive Farmers Award	Sri Srikant Kumar Singh	2018	Hindustan	Certificate	Vermi Compost
Aurangabad	Best Farmers Award	Sri Anil Kumar Singh	2017	IFFCO	Certificate	IFS
Jharkhand						
Deoghar	Best Farmer	Sri Avinash Pd.Sahi	2013	Vibrant Gujrat Global Agri.business Summit and Agri. Tech.Asia Exhibition Gandhi Nagar,Gujrat.	51,000=00	SRI/SWI/Vermicompost/ Vegetables/Pulses / Oilseed
Deoghar	Young Agri. Preneur	Sri Umesh Kumar	2011-12	Ministry of Agri.& Co-operation New Delhi.	Certificate	Best young Agri.Preneur in Dairy.
Deoghar	Best Agri.Farmer	Sri Jairam Singh	2010-11	District Agriculture Office, Deoghar	Certificate	SRI/SWI/Pigeon pea/ Vermicompost.
Deoghar	Best Agri.Farmer	Sri Dashrath Kapri	2011-12	District Agriculture Office,Deoghar	25000=00	Vegetables cultivation
Dumka	Innovative farmers	Parmeshwar mandal	2018	BAU, Ranchi	Certificate	-
Gumla	Progressive farmer award of the district in Agro tech kisan mela, BAU Ranchi	Phulkuwari Bhagat	2017-18	BAU Ranchi	Certificate	Commercial cultivation of Mushroom
Chatra	Best Farmers	Danbhushan Lakra	2017	ATMA Chatra	10000	Seed Production

Name of KVK	Name of the Award	Name of the Farmer	Year	Conferring Authority	Amount (Rs.)	Purpose
Dhanbad	Innovative farmers Award	Sh. Panna Lal Mahto	2018	Birsa Agriculture University Kanke Ranchi	Certificate	Innovation
Giridih	Innovative Farmer ward	Hemlal Mahto	2018	VC, BAU, Ranchi	Certificate	
Bokaro	Innovative Farmers Award	Sri Bharat Murmu	2018	BAU, Ranchi	Certificate	In the field of drip irrigated vegetable producer
Latehar	Best progreesive Farmer	Birbal Oraon	2018	BAU,Ranmchi	Certificate	
Latehar	Innovative Farmer	Ganesh Ganjhu	2018	BAU,Ranchi	Certificate	
Kodarma	Best Fruit grower	Ramchandra Mehto	2017-18	ATMA Koderma	Certificate	Best Produce
Kodarma	Best vegetable grower	Raj kumar singh	2017-18	ATMA Koderma	Certificate	Best Produce
Ranchi	**"Jharkhand Gaurav Samman"**	Sri Gandura Oraon	2017	Govt of Jharkhand	100000	For establishment of Integrated farming System model
Ranchi	Best organic farmers at district level	Sri Chandramohan Bedia	2017	Ramakrishna Mission Ashrama, Divyayan KVK, ranchi	Certificate	Best organic grower

27.2 KVK Awards

Name of KVK	Name of the Award	Year	Conferring Authority	Amount (Rs.)	Purpose
Bihar					
Banka	Best Stall Exhibition in Regional Agriculture fair	2018	Ministry of Agril. and Farmers Welfare, GOI and BAU, Sabour	Certificate	
Banka	Best Paper presentation Award	2017	BAU, Sabour & Indian Ecological Society, Ludhiana	Certificate	
Jehanabad	Kisan mela stall prize	2017	BAU, Sabour	Certificate	
Jehanabad	Best Oral presentation award, (Dr. Shobha Rani)	2017	SAID, Kathmandu	Certificate	
Jehanabad	Excellence in Extension award, (Dr. Shobha Rani)	2017	SAID, Kathmandu	Certificate	
Jehanabad	Excellence in Research award, (Dr. Shobha Rani)	2017	SVWS, Lucknow	Certificate	
Jehanabad	Fellow Award, (Dr. Wajid Hasan)	2017	ATDS, Ghajiabad	Certificate	
Jehanabad	Young Extension Worker Award, (Dr. Wajid Hasan)	2017	SAID, Ranchi	Certificate	
Jehanabad	Young Extension Worker Award, (Er. Jeetendra Kumar)	2017	SAID, Ranchi	Certificate	
Jehanabad	Yooung Scientist Award, (Er. Jeetendra Kumar)	2017	ICFA, Dhanbad	Certificate	
Rohtas	Best Extension Scientist	2018	BAU, Sabour, Bhagalpur	Certificate	For extension work in the Rohtas district

Name of KVK	Name of the Award	Year	Conferring Authority	Amount (Rs.)	Purpose
Muzaffarpur	Best KVK, Award-2017	2018	Dr.R.P.C.A.U,Pusa, Samastipur	Certificate	
Jharkhand					
Bokaro	Consolation prize during Agrotek Kisan Mela-2018	2018	BAU, Ranchi	-	
Kodarma	Best Poster Presentation Award	2017	RASSA National Convention-cum-Seminar on "Doubling Farmers' income & Farm Profitability by 2022" held at Babasaheb Bhimrao Ambedkar University (BBAU), Lucknow, U.P., India.	Certificate	Best Poster Presentation Award
Hazaribagh	Fellow award 2017	2017	Mobilization Society – IARI, New Delhi	Certificate	
Hazaribagh	Siksha Ratna award 2017	2017	Global Society for Health & Education Growth, New Delhi	Certificate	