

ANNUAL REPORT वार्षिक प्रतिवेदन

2018-19



ICAR - Agricultural Technology Application Research Institute (ATARI) Patna
INDIAN COUNCIL OF AGRICULTURAL RESEARCH
Central Potato Research Station Campus
P.O. Sahaynagar, Patna - 801506, Bihar

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PREFACE

ICAR- Agricultural Technology Application Research Institute (ATARI), Patna, Zone IV began its journey in April 2017, after bifurcation from ICAR-ATARI Kolkata, for monitoring activities of 63 Krishi Vigyan Kendras (KVKs) of Bihar and Jharkhand with some specific objectives to plan, monitor and evaluate the programmes of KVKs working in Bihar and Jharkhand.

In addressing huge demand of cereals, pulses, vegetables, fruits, milk, meat, egg, fish etc, challenge for asserting doubling farmers' income, capacity building of the farmers, rural youth and mitigating the effect of climate change, a large number of new and improved agricultural technologies were implemented in the farmers' field through 63 KVKs of Zone IV under the technical guidance of ICAR- Agricultural Technology Application Research Institute (ATARI), Patna. ICAR-ATARI, Patna under Indian Council of Agricultural Research (ICAR) undertook various new initiatives like Doubling Farmers' Income' Programme, Gramin Krishi Mausam Sewa, Krishi Kalyan Abhiyan etc during the year 2018- 19 in addition to the regular guidance of 63 KVKs which were showcased in this Annual Report. This is the second Annual Report of ICAR- ATARI, Patna, Zone IV.

This report presents the salient achievements of ICAR-ATARI, Patna in developing functional linkage with various stakeholders, performance of Directorates of Extension Education of State Agricultural Universities and 63 KVKs of this Zone. It has been represented in a very systematic manner to enable a clear vision about this Institute, mode of functioning and contribution of KVKs towards the progress in agriculture.

In this document, all mandated activities of KVKs,

i.e., On-Farm Trails (OFT), Front Line Demonstrations (FLD), Training programme, production of seed and planting materials, soil and water sample analysis, mobile advisory services, revenue and resource generation, publication, organizing special programme and many others are registered to make various stakeholders understand the importance of KVK system in present-day agriculture. Moreover, the responsibility of Directorates of Extension Education of various State Agricultural Universities in overseeing KVK activities and providing technological backstopping to the KVKs under their jurisdictions have also been included in this report.

Many flagship programmes like Cluster Front Line Demonstration (CFLD) on Pulses and Oilseeds, National Innovations in Climate Resilient Agriculture, Farmer FIRST, Attracting and Retaining Youth in Agriculture (ARYA), Cereal Systems Initiative in South Asia (CSISA), Gramin Krishi Mausam Sewa (GKMS), Krishi Kalyan Abhiyan (KKA) of KVKs are the important activities documented in this report.

In the course of preparing the present report, I extend my sincere thanks to all Heads and Senior Scientists and the staff members of KVKs of Zone IV, Dr. Avijit Haldar, Principal Scientist and administrative staff of ICAR- ATARI, Kolkata, Zone V, Senior Research Fellows, Data Entry Operators of ICAR- ATARI, Patna, Zone IV, all Host Organizations and Indian Council of Agricultural Research, New Delhi for their enormous help, supports and needful contribution of relevant information for bringing out this report. It is a great pleasure to acknowledge all who helped directly or indirectly to get ready this report.

Patna
17th December 2019

Director

KVKs UNDER ICAR-ATARI PATNA

BIHAR AND JHARKHAND



Bihar



Jharkhand

CONTENT

Sl. No.	Particulars	Page No.
	कार्यकारी सारांश	i
	Executive Summary	vi
1.	Organizational structure and staff position	1
	1.1 Profile	1
	1.2 Budget provision	1
2.	About Krishi Vigyan Kendra	2
	2.1 State-wise distribution of KVK	3
	2.2 Genesis of Krishi Vigyan Kendra	4
	2.3 Mandate	4
	2.4 Manpower	4
	2.5 Revolving Fund	6
	2.6 Infrastructure facilities	6
	2.7 Thrust areas	7
3.	About Agricultural Technology Application Research Institute (ATARI) Patna	7
	3.1 Mandate	8
	3.2 Staff position	8
	3.3 Institute Management Committee	8
	3.4 New Initiatives of ATARI Patna	8
4.	Achievements	9
	4.1 Technology Assessment and Refinement	9
	4.1.1 On-farm trials	9
	4.2 Frontline Demonstration	30
	4.2.1 Pulses and oilseeds	30
	4.2.2 Other crops	32
	4.2.3 Livestock and fishery	37
	4.2.4 Other enterprises	37
	4.2.5 Farm implements	38
	4.3 Clustered Frontline Demonstration	38
	4.3.1 Kharif pulses	39
	4.3.2 Rabi pulses	39
	4.3.3 Summer pulses	40
	4.3.4 Kharif oilseeds	41
	4.3.5 Rabi oilseeds	42
	4.3.6 Summer oilseeds	43
	4.4 Training Achievements	44
	4.4.1 Practicing farmers	44
	4.4.2 Rural youth	54
	4.4.3 Extension functionaries	57
	4.4.4 Sponsored training programme	59
	4.4.5 Vocational training programme	60
	4.5 Extension Programmes	62
	4.5.1 Other extension activities	64
5.	Production of Seed, Planting materials and Bio-products	65
	5.1 Seed produced by KVKs	65
	5.2 Planting materials	67
	5.3 Bio-products	68
	5.4 Livestock production	68
6.	Soil, Water Sample Analysis and World Soil Day Celebration	69
7.	Scientific Advisory Committee (SAC) Meeting	70



8.	Publication by KVKs	70
9.	Technological Backstopping by Directorate of Extension Education	71
10.	Agricultural Technology Information Centre	72
11.	HRD Programme	73
12.	Outsourcing of Fund by KVKs	75
13.	National Farmer's Portal	75
14.	Tribal Sub-Plan	76
15.	Protection of Plant Varieties & Farmers Rights	76
16.	National Innovations in Climate Resilient Agriculture- Technology Demonstration Component (NICRA-TDC)	77
	16.1 Natural resource management	77
	16.2 Crop production	78
	16.3 Livestock and fisheries	79
	16.4 Institutional intervention	80
	16.5 Village climate risk management committee (VCRMC)	81
	16.6 Custom hiring of farm implements and machinery at NICRA adopted villages	81
	16.7 Capacity building	81
	16.8 Extension activities	82
	16.9 Convergence by NICRA with ongoing development programmes	82
17.	Pradhan Mantri Fasal Bima Yojana (PMFBY) Kisan Sammelan	83
18.	Pre-Kharif and Pre-Rabi Kisan Sammelan	83
19.	Mera Gaon Mera Gaurav (MGMG) Programme	84
20.	CSISA-ICAR Collaborative Project Phase-III	84
	20.1 Action taken	86
	20.2 Achievements obtained	86
21.	Skill Development Training Programme (ASCI)	87
22.	Farmer FIRST Programme	91
23.	Seed Hub	92
24.	Attracting and Retaining Youth in Agriculture (ARYA)	93
25.	Krishi Vigyan Kendra (KVK) Knowledge Network/ KVK Portal	95
26.	Krishi Portal	95
27.	Management Information System including Financial Management System (MIS-FMS) under ICAR-ERP	96
28.	Public Finance Management System (PFMS)	96
29.	Online Reporting by KVKs	96
30.	Special Programmes	97
	30.1 Swachh Bharat Abhiyan	97
	30.2 Vaccination programme	98
	30.3 Programme on Rural Agricultural Work Experience (RAWEX)	98
	30.4 KVK in rural school	98
	30.5 Swachhta Hi Sewa Programme	99
	30.6 Mahila Kisan Divas Programme	99
	30.7 Diploma in Agricultural Extension Service for Input Dealers (DASAI) Programme	100
31.	New Initiatives Undertaken	100
	31.1 Gramin Krishi Mausam Sewa	100
	31.2 Innovative Farmers Meet at ATARI, Patna Zone IV	102
	31.3 Pradhan Mantri Kisan Samman Nidhi Yojna (PM-KISAN) Programme	102
	31.4 Krishi Kalyan Abhiyan (KKA)	103
32.	Personnel	105
33.	Awards	106
	33.1 Farmers Awards 2018- 19	106
	33.2 KVK Awards 2018- 19	109



कार्यकारी सारांश

भाकृअनुप को बिहार और झारखंड के 63 कृषि विज्ञानों केंद्रों (केविके) के कार्यकलापों की निगरानी करने के लिए भाकृअनुप-अटारी कोलकाता से अलग किए जाने के बाद 2017-18 के दौरान जोन IV के रूप में नए ढंग से स्थापित किया गया। भाकृअनुप-अटारी पटना, जोन-IV ने बिहार और झारखंड में कार्यरत कृषि विज्ञान केंद्रों के कार्यक्रमों की योजना, निगरानी और मूल्यांकन के विशेष उद्देश्य के साथ केंद्रीय आलू अनुसंधान केंद्र, सहाय नगर, पटना के कार्यालय परिसर से अप्रैल 2017 में अपनी यात्रा शुरू की। सीमित संसाधन के साथ, अटारी पटना ने जोन IV में प्रौद्योगिकीय अनुप्रयोग और अग्रपंक्ति विस्तार शिक्षा कार्यक्रम के समन्वय एवं निगरानी के साथ कृषि विस्तार अनुसंधान और ज्ञान प्रबंधन को मजबूत बनाने के लिए हर संभव प्रयास किया। दूसरी ओर, कृषि विज्ञान केंद्र प्रौद्योगिकी के मूल्यांकन तथा किसानों के खेतों में उसके व्यापक अनुप्रयोग हेतु प्रदर्शन और किसानों, ग्रामीण युवाओं एवं विस्तार पदाधिकारियों के क्षमता निर्माण के संवर्धन पर कार्य कर रहे हैं। यह उल्लेखनीय है कि छोटे एवं मध्यम किसानों, ग्रामीण युवाओं तथा अन्य हितधारकों की आकांक्षाओं की पूर्ति करने में कृषि विज्ञान केंद्रों की पहुंच कई गुणा बढ़ गई है। कृषि विज्ञान केंद्रों की किसानों तक सूचना एवं प्रौद्योगिकीय सहायता उपलब्ध कराने की सक्षमता ने उन्हें जिले में तथा राज्य में एक महत्वपूर्ण स्थिति पर खड़ा कर दिया है।

इस जोन में 63 कृषि विज्ञान केंद्र और राज्य कृषि विश्वविद्यालयों (एसएयू) के 3 विस्तार शिक्षा निदेशालयों (डीईई) के कार्यसंचालन के लिए आवंटित निधियों का सफलतापूर्वक प्रबंध किया गया। वर्ष 2018-19 के दौरान डीईई सहित कृषि विज्ञान केंद्रों को कुल 7188.12 लाख रुपए उपलब्ध कराए गए। अधिदेशित कार्यकलापों में, जोन-IV के कृषि विज्ञान केंद्रों ने वर्ष 2018-19 के दौरान प्रशिक्षण, ऑन-फार्म परीक्षण, अग्रपंक्ति प्रदर्शन आदि के क्षेत्रों में संपूर्ण निर्धारित लक्ष्य को लगभग हासिल किया है। वर्ष 2018-19 के दौरान, फसलों की खेती, पशुपालन, मछली पालन, नाशीकीट प्रबंधन, थकाऊ कार्य में कमी, भंडारण तकनीक आदि से संबंधित आकलन के लिए पूरे जोन में 2821 स्थानों में कृषि विज्ञान केंद्रों ने 403 ऑन-फार्म परीक्षण संचालित किए। इन परीक्षणों से प्राप्त समाधानों को टेक्नोलाजी कैप्सूल के रूप में प्रमुख राज्य विस्तार प्रणाली में स्थापित करने से पहले छोटे पैमाने के प्रदर्शन के आधार पर पुनः टेस्ट किया गया। विकसित प्रौद्योगिकी में अपेक्षित सुधार/संशोधन के लिए अनुसंधान प्रणाली को फीडबैक भी उपलब्ध कराई गई ताकि विकसित प्रौद्योगिकी क्षेत्र की व्यापक कृषि पारिस्थितिकीय स्थिति से अनुकूल हो।

चयनित दलहनों एवं तिलहन फसलों की उत्पादकता बढ़ाने और अनाज एवं अन्य फसलों के संबंध में बीज प्रतिस्थापन करने हेतु नई विमोचित किस्मों/कृषि क्रियाओं के पैकेज की उत्पादन क्षमता को स्थापित करने के लिए कृषि विज्ञान केंद्रों ने दलहनों, तिलहनों तथा अन्य फसलों में अग्रपंक्ति प्रदर्शन संचालित किए। कृषि विज्ञान केंद्रों ने खरीफ और रबी के दौरान दलहन एवं तिलहन फसलों में इस जोन के 9293 किसानों को शामिल करते हुए, इस अंगप्रक्ति प्रदर्शन कार्यक्रम के तहत 2184.83 हैक्टे. क्षेत्रफल शामिल किया। बिहार और झारखंड के कृषि विज्ञान केंद्रों द्वारा अनाजों, सब्जियों, नकदी फसलों, पुष्पों, मसाला एवं अन्य उद्यमों पर 1634.40 हैक्टे. क्षेत्रफल में प्रदर्शन किए गए। पशुधन में 11640 पशुओं के लाभार्थ 2363 किसानों को शामिल किया गया। मात्स्यकी में, 93.50 हैक्टे. जल क्षेत्र को कवर करते हुए कृषि विज्ञान केंद्रों द्वारा 70 प्रदर्शन आयोजित किए गए। कृषि विज्ञान केंद्रों ने पारंपरिक कृषि विधियों की तुलना में अपनी तकनीक को प्रदर्शित करने हेतु 1108 किसानों और ग्रामीण युवाओं को शामिल करते हुए अनेक उद्यमों, जैसे कि वर्मीकम्पोस्ट, मधुमक्खी पालन, मूल्यवर्धन, खुम्ब उत्पादन, बैकयाई मूर्गीपालन, वासभूमि सब्जी उत्पादन, बीज उत्पादन, अजोला की खेती तथा और भी कई उद्यमों को प्रदर्शित किया। किसानों के खेतों में रिकॉर्ड किए गए निष्पादन में उपज एवं लागत लाभ अनुपात के आधार पर, संस्थान द्वारा विकसित किस्मों और कृषि विधियों की श्रेष्ठता पाई गई। प्रदर्शन कार्यक्रमों में विस्तार पदाधिकारियों की सहभागिता से बिहार और झारखंड में खेतीहर समुदाय के हित में प्रदर्शन कार्यक्रमों का बड़े पैमाने पर प्रसार हुआ।

दलहन और तिलहन फसलों की उत्पादकता बढ़ाने के लिए, विशेष रूप से से चावल परती भूति का उपयोग करने के संदर्भ में, कलस्टर अग्रपंक्ति प्रदर्शन (सीएफएलडी) कार्यक्रम का कार्यन्वयन वर्ष 2018-19 के दौरान अन्य उपलब्धि रही है। कुल मिलाकर, खरीफ दलहनों के लिए 1225 हैक्टे. क्षेत्रफल आवंटित किया गया; और खरीफ 2018-19 के दौरान सीएफएलडी कार्यक्रम के तहत अंततः 1235 हैक्टेयर क्षेत्रफल शामिल किया गया। खरीफ दलहनों की उपज में औसत वृद्धि 11.49 और 55.66 प्रतिशत की रेंज में थी। रबी 2018-19 में 1662.6 हैक्टेयर क्षेत्रफल को शामिल करते हुए मसूर, काबूली चना, मूंग, हरी मटर और अरहर को सीएफएलडी कार्यक्रम के तहत शामिल किया गया। बिहार और झारखंड में 968 प्रदर्शनों को शामिल करते हुए 360.25 हैक्टेयर क्षेत्रफल को कवर करने के लिए मूंग और उड़द जैसी ग्रीष्मकालीन दलहनों पर सीएफएलडी संचालित किए गए। तिलहनों में, इस जोन के कृषि विज्ञान केंद्रों



ने वर्ष 2018-19 के दौरान खरीफ, रबी और ग्रीष्म में सीएफएलडी कार्यक्रम संचालित किए। खरीफ में, मूंगफली, तिल, नाइजर और सोयाबीन को 588.6 हैक्टे. क्षेत्रफल में तथा रबी में तोरिया, सरसों और मसूर को 1257.8 हैक्टे. क्षेत्रफल को कवर कर प्रदर्शित किया गया। खरीफ में तिलहन फसलों की उपज में वृद्धि 22.3 से 160.0 प्रतिशत के बीच थी, जबकि रबी के दौरान यह 10.4-84.3 प्रतिशत के बीच थी। ग्रीष्म 2019 के दौरान 70 हैक्टे क्षेत्रफल के लिए भी सीएफएलडी कार्यक्रम संचालित किया गया जिसमें 958 प्रदर्शन कवर किए गए।

कृषि और संबद्ध क्षेत्रों के स्थायी विकास के लिए पर्याप्त ज्ञान तथा वास्तविक फील्ड स्थिति में उसके अनुप्रयोग के लिए कौशल की आवश्यकता होती है। इसीलिए, किसानों और खेतीहर महिलाओं, ग्रामीण युवाओं और विस्तार पदाधिकारियों के लिए क्षमता निर्माण कृषि विज्ञान केंद्रों के प्रमुख कार्य थे जिन्हें उनके द्वारा वांछित स्तर तक हासिल किया गया। ज्ञान और कौशल उपलब्ध कराने के संबंध में, जोन-IV के कृषि विज्ञान केंद्रों ने फसल उत्पादन, बागवानी, मृदा स्वास्थ्य प्रबंधन, कृषि अभियांत्रिकी, पशुधन एवं मात्स्यकी, गृह विज्ञान, कृषि विस्तार और अन्य के विभिन्न आयामों पर 1,96,414 कृषिरत किसानों एवं महिलाओं के लिए 5728 प्रशिक्षण कार्यक्रम आयोजित किए। ग्रामीण युवाओं को स्व-रोजगार प्राप्त करने में सक्षम बनाने के उद्देश्य से इस जोन-IV के कृषि विज्ञान केंद्रों ने विशाल संख्या में ग्रामीण युवाओं के लिए उद्यम-आधारित प्रशिक्षण कार्यक्रम आयोजित किए। उन्हें ज्ञान और कौशल प्रदान कराने के दौरान, कृषि विज्ञान केंद्रों ने वर्ष 2018-19 के दौरान 25,861 ग्रामीण लड़कों और 11,554 ग्रामीण लड़कियों को शामिल कर 37,452 ग्रामीण युवाओं और कन्याओं के हित में 1,406 प्रशिक्षण कार्यक्रम आयोजित किए। विस्तार कार्मिकों के क्षमता निर्माण के लिए अग्रपंक्ति क्षेत्रों का चयन किया गया ताकि उन्हें कृषि, पशुपालन और मात्स्यकी क्षेत्र में नवीनतम विकास से अवगत कराया जा सके। जोन- IV के कृषि विज्ञान केंद्रों द्वारा 29,861 विस्तार पदाधिकारियों के लिए कुल 687 पाठ्यक्रम संचालित किए गए। कृषि विज्ञान केंद्रों ने स्व-रोजगार अवसर हासिल करने की दिशा में युवाओं को एक्सपोज करने हेतु दीर्घकालिक व्यावसायिक प्रशिक्षण कार्यक्रम भी आयोजित किए। इस प्रक्रिया में 9,610 ग्रामीण लड़कों और 4,091 ग्रामीण लड़कियों के लिए कृषि और संबद्ध क्षेत्रों के विभिन्न क्षेत्रों में 500 पाठ्यक्रम आयोजित किए गए। कृषि विज्ञान केंद्रों ने विभिन्न संगठनों द्वारा नामित 72438 प्रतिभागितयों के लिए उनकी आवश्यकता के अनुसार, 1007 प्रायोजित प्रशिक्षण कार्यक्रम भी आयोजित किए। उन्नत कृषि और संबद्ध प्रौद्योगिकियों पर ग्रामीण खेतीहर समुदाय को जानकारी उपलब्ध कराने के लिए बड़े पैमाने

पर जागरूकता कार्यक्रम चलाए गए। जोन-IV के कृषि विज्ञान केंद्रों ने 7,13,244 किसानों और विस्तार पदाधिकारियों तक पहुंच बढ़ाने हेतु विभिन्न प्रकार के 1,67,169 विस्तार कार्यक्रमलाप आयोजित किए।

फसल की उत्पादकता को कायम रखने में बीज एक अति महत्वपूर्ण सामग्री होती है। इसलिए, किसानों की बीज आवश्यकता की पूर्ति करने हेतु "ग्राम बीज उत्पादन" कार्यक्रम के अंतर्गत भागीदारी प्रक्रिया में अनेक गांवों में बीज उत्पादन कार्यक्रम चलाया गया। वर्ष 2018-19 के दौरान, जोन- IV के कृषि विज्ञान केंद्रों ने धान, गेहूं, मक्का, सरसों, मसूर, नाइजर, मूंगफली, लाल मसूर (अरहर), काबूली चना, उड़द, सब्जियों, मसालों, चारा आदि जैसी प्रमुख फसलों के 11,876.08 किंवाटल बीज उत्पादित किए। कृषि विज्ञान केंद्रों ने 49,650 लाभार्थियों के लिए फल फसलों, सब्जियों, पुष्प फसलों, वन्य फसलों, औषधीय एवं संगंधीय पादपों की 25.19 लाख रोपण सामग्रियों/पौधों का भी उत्पादन किया। खेतों में जैव-उत्पाद का प्रयोग पर्यावरण की दृष्टि से काफी लोकप्रिय हो रहा है और इसलिए कृषि विज्ञान केंद्रों ने 2,08,462 कि. ग्रा. जैव उर्वरक और वर्मीकम्पोस्ट भी उत्पादित किया और उन्हें किसानों को उपलब्ध कराया। गुणवत्तापूर्ण पशुधन प्रजाति और मछली फिंगरलिंग उपलब्ध कराने के लिए, कृषि विज्ञान केंद्रों ने वर्ष 2018-19 के दौरान 32 गायें, 68 बकरियां, 24,120 ब्रायलर पक्षियां, 11,664 डकलिंग उपलब्ध कराए।

मृदा और जल नमूनों के विश्लेषण में, कृषि विज्ञान केंद्रों ने पूरे जोन के 2,309 गांवों से 48,384 नमूनों का विश्लेषण किया जिससे इस जोन में कुल 1,00,807 किसान लाभान्वित हुए। इस प्रक्रिया ने किसानों को उच्च उत्पादकता तथा स्थायी मृदा स्वास्थ्य हासिल करने हेतु फसलों में रासायनिक उर्वरकों का केवल वैकल्पिक प्रयोग करने में सहायता की है। अधिदेशित कार्यक्रमलापों के अलावा, कृषि विज्ञान केंद्रों ने सार्वजनिक-निजी भागीदारी, विश्व मृदा दिवस, राष्ट्रीय विज्ञान दिवस, विश्व पशुचिकित्सा दिवस और अन्य के माध्यम से प्रौद्योगिकी सप्ताह जैसे साधनों के रूप में खेतीहर समुदाय के लिए विशेष दिवस/सप्ताह भी मनाए। इस प्रकार के समारोहों के प्रति बड़ी संख्या में प्रतिभागी आकर्षित हुए और किसानों को उनके लाभ हेतु इन कार्यक्रमों के बारे में जानकारी देने का अवसर भी प्राप्त हुआ।

वांछित उद्देश्यों की पूर्ति की सुनिश्चतता के लिए पिछले एक वर्ष के दौरान भाकृअनुप-अटारी, पटना पर अनेक प्रमुख कार्यक्रमों का कार्यान्वयन करना मुख्य जिम्मेदारी थी। जोन IV में एक राष्ट्रीय नेटवर्क परियोजना, राष्ट्रीय जलवायु अनुकूल कृषि नवोन्मेष (निक्रा) एक ऐसा ही कार्यक्रम है जिसका बिहार और झारखंड के 54 गांवों



को कवर करते हुए इस जोन के 13 कृषि विज्ञान केंद्रों के जरिए कार्यान्वयन किया जा रहा है। निक्का का प्रौद्योगिकी प्रदर्शन घटक (टीडीसी) वर्तमान जलवायु विचनशीलता से उपयुक्त उपायों के द्वारा निपटने के लिए किसानों के साथ कार्य करने का एक बड़ा अवसर प्रदान करता है। अतः, चिह्नित जिलों की जलवायु भेद्यनीयता का गहनता से आकलन किया गया है ताकि प्रौद्योगिकीय सहायता, संसाधन विकास और खेतीहर समुदाय के समग्र सशक्तिकरण के आधार पर, विशेष आवश्यकता की पहचान की जा सके और उन्हें सूखा, बाढ़, गरम हवाओं, अनियमित बरसात आदि जैसी जलवायु भेद्यनीयताओं से निपटने में सहायता प्राप्त हो सके। मल्लिचंग और बांध बनाने के माध्यम से स्व-स्थाने नमी संरक्षण, वर्षा जल संचयन, भूजल पुनर्भरण, जल बचत सिंचाई तकनीक, संरक्षण जुताई, सूखा सहिष्णु धान किस्मों, बाढ़ सहिष्णु धान किस्मों, उन्नत चारा उप-किस्मों, समुदाय नर्सरी, उच्च एवं टिकाऊ उपज सूचकांक के साथ अंतर फसल प्रणाली, फसल विविधीकरण, सुअर की उन्नत नस्ल, बैकयाई कुक्कुट, बत्तख, सजावटी पक्षी, मिश्रित एवं कैट फिश पालन जैसे प्रौद्योगिकीय घटकों के सफलतापूर्ण कार्यान्वयन से न केवल निक्का गांवों में एक सकारात्मक प्रभाव सृजित हुआ, अपितु किसानों के हित में, इन उपायों का अन्य जिलों में बड़े पैमाने पर अंगीकरण का मार्ग भी प्रशस्त हुआ। ग्राम जलवायु जोखिम प्रबंधन समिति (वीसीआरएमसी) के सृजन और इस कार्यक्रम के माध्यम से कृषि औजारों तथा अन्य घटकों की कस्टम हायरिंग प्रणाली से भेद्यनीय जिलों के किसानों को बहुत लाभ पहुंचा है।

जोन में दलहन उत्पादन और पोषाहार को बढ़ाने के लिए दलहनों का 'बीज केंद्र' एक महत्वपूर्ण घटक है। 10 वर्षों से कम की नई किस्मों (विमोचित/अधिसूचित) के गुणवत्तापूर्ण बीजों के उत्पादन को बढ़ावा देने के लिए, जोन IV के अंतर्गत बिहार के 7 कृषि विज्ञान केंद्रों और झारखंड के 2 कृषि विज्ञान केंद्रों में 9 'बीज केंद्र' तीन फसल ऋतुओं को कवर कर पूरे वर्ष चिह्नित दलहन फसलों का बीज उत्पादन कर रहे हैं। बीज उत्पादन के लिए चिह्नित फसलों में चना, अरहर, मूंग, उड़द, काबूली चना, मसूर और हरी मटर शामिल हैं।

फार्मर फ्रस्ट, जो कि एक किसान-केंद्रित कार्यक्रम है, को इस जोन में दो भाकृअनुप संस्थानों (भाकृअनुप-एनआरसी, लीची, मुजफ्फरपुर और भाकृअनुप-आईआईएबी, रांची) और दो राज्य कृषि विश्वविद्यालयों (बीएयू, साबौर एवं बीएयू, रांची) के माध्यम से कार्यान्वित किया जा रहा है। इस कार्यक्रम का मूल सिद्धांत यह है कि किसान अनुसंधान से जुड़ी समस्या की पहचान करने, प्राथमिकीकरण, परीक्षण के संचालन और किसानों के खेतों में उसके प्रबंधन में अहम भूमिका निभाएं। इस परियोजना के जरिए

चयनित किसानों/किसान परिवारों की आजीविका में समग्र रूप से सुधार लाने के लिए कार्यान्वयन संस्थानों/एसएयू द्वारा एनआरएम, फसल, बागवानी, आईएफएस, पशुधन और मात्स्यकी मॉड्यूलों के तहत विभिन्न कार्यकलापों का कार्यान्वयन किया गया। इस परियोजना से कुल 6,890 किसान परिवार वर्ष 2018-19 के दौरान लाभान्वित हुए।

जनजातीय क्षेत्रों और जनजातीय आबादी में पिछड़ेपन के मुद्दों का समाधान करने हेतु, एक विशिष्ट कार्यक्रम, नामतः जनजातीय उप योजना (टीएसपी) इस जोन के 13 जिलों में कार्यान्वित की जा रही है। जनजातीय किसानों को उन्नत कृषि विधियों के लाभ को पहुंचाने के लिए परिसंपत्ति सृजन, ऑन-फार्म परीक्षण, प्रशिक्षण कार्यक्रम, बीज और रोपण सामग्री उत्पादन आदि जैसी पहलें की गईं। प्रतिवेदित अवधि के दौरान, इस जोन के अंतर्गत कृषि विज्ञान केंद्रों ने स्प्रेयर, वीडर, कृषि शेड नेट, रिज मेकर आदि के रूप में 4235 परिसंपत्तियां सृजित कीं। कुल 1.34 लाख जनजातीय किसानों ने विभिन्न विस्तार कार्यकलापों में भाग लिया।

भाकृअनुप ने देशभर के 25 चिह्नित कृषि विज्ञान केंद्रों के माध्यम से वर्ष 2017-18 के दौरान "कृषि के प्रति युवाओं को आकर्षित करना और उससे जोड़े रखना" (आर्या) कार्यक्रम शुरू किया है ताकि ग्रामीण युवाओं को विभिन्न कृषि एवं संबद्ध क्षेत्रों की ओर आकर्षित कर उन्हें सशक्त किया जा सके जिससे उन्हें स्थायी आय हासिल करने में तथा लाभप्रद रोजगार पाने में सहायता दी जा सके। तदुसार, बिहार के पूर्वी चम्पारन के केविके और झारखंड से गुम्ला केविके ने वित्तपोषण सहायता के साथ जोन-IV के तहत इस कार्यक्रम का कार्यान्वयन किया। उद्यमियों को अपने मूल स्थानों में वाणिज्यिक उद्यम सृजित करने हेतु दिए गए अवसर के आधार पर, उद्यमों को जिले में चिह्नित युवाओं को वित्तीय एवं तकनीकी सहायता उपलब्ध कराने के लिए चयनित किया गया। केविके के प्रयास और भाकृअनुप-अटारी, पटना के पर्यवेक्षण से 260 ग्रामीण युवाओं को स्थायी प्रक्रिया में बढ़ती वार्षिक आय प्राप्त करने के लिए स्वयं के उद्यम स्थापित करने में सहायता मिली। परियोजना की सफलता ने अन्य ग्रामीण युवाओं को अपनी आजीविका के लिए ऑफ-फार्म उद्यम स्थापित करने के लिए भी अभिप्रेरित किया।

इस संस्थान द्वारा वर्ष 2018-19 के दौरान केविके कार्मिकों के क्षमता निर्माण की योजना बनाई गई और उसका कार्यान्वयन किया गया। केविके कार्मिकों और कृषि उद्यमियों के ज्ञान के वर्धन के लिए विभिन्न क्षेत्रों में अनेक एचआरडी कार्यक्रम भी आयोजित किए गए।

आनाज आधारित फसल प्रणाली में सुधार लाने तथा प्राकृतिक



संसाधन आधार के संरक्षण, खेती की लागत कम करने, किसानों की आय बढ़ाने एवं किसानों की बेहतर आजीविका सुनिश्चित करने पर विशेष ध्यान देने के उद्देश्य से भाकृअनुपा के सहयोग से सीएसआईएसए (दक्षिण एशिया में अनाज प्रणाली पहल) परियोजना को इस जोन के आठ जिलों में कार्यान्वित किया जा रहा है। फसल स्थापन विधि, डीएसआर में खरपतवार प्रबंधन और शून्य जुताई के तहत अनुक्रम में रबी फसल इस परियोजना में मूल्यांकित प्रौद्योगिकियां हैं।

कौशल प्रशिक्षण के जरिए उद्यमशीलता विकास के लिए भारतीय कृषि कौशल परिषद (एएससीआई) के साथ एक सहयोगात्मक कार्यक्रम आरंभ किया गया। इस जोन के नौ कृषि विज्ञान केंद्रों को एएससीआई मानदंडों के अनुरूप जैविक उत्पादन, खुम्ब उत्पादन, मधुमक्खी पालन आदि पर प्रशिक्षण कार्यक्रमों को संचालित करने की जिम्मेदारी सौंपी गई।

पौधा किस्म संरक्षण और किसान अधिकार अधिनियम (पीपीवी एवं एफआर अधिनियम) का उद्देश्य पादप ब्रीडर्स के अधिकारों का समाधान करने में किसानों द्वारा खेती, संरक्षण किस्मों के विकास तथा चयन में निभाई गई बहु भूमिकाओं को अभीस्वीकृत करना है। पीपीवी एवं एफआर प्राधिकरण के साथ एक सहयोगात्मक दृष्टिकोण के रूप में, पिछले एक वर्ष के दौरान इस जोन के 18 कृषि विज्ञान केंद्रों के माध्यम से घरेलू पादप किस्मों के संरक्षण की महत्ता के बारे में बड़े पैमाने पर जागरूकता सृजित की गई।

भाकृअनुप-अटारी, पटना द्वारा निगरानी किए जा रहे केविके ज्ञान पोर्टल ने दूरदराज के क्षेत्रों से बड़ी संख्या में किसानों को कृषि विज्ञान केंद्रों के कामकाज के बारे में जानकारी प्राप्त करने में तथा उन्नत कृषि और संबद्ध विधियों के लिए सूचना सहायता प्राप्त करने में मदद मिली। कृषि विज्ञान केंद्रों ने किसानों को सूचना उपलब्ध कराने के लिए पोर्टल में विभिन्न सूचनाएं अपलोड कीं, जैसे कि केविके पर उपलब्ध सुविधा, कृषि विधियों का पैकेज, विभिन्न परियोजनाओं की स्थिति, आगामी घटनाक्रम आदि। इसके अलावा, KRISHI को प्रौद्योगिकी, प्रकाशन, परीक्षण डाटा, प्रेक्षणात्मक डाटा, सर्वेक्षण डाटा और जियो-पोर्टल के साथ नियमित रूप से अपलोड किया जाता है। यह रिपोजिट्री कृषि और संबद्ध क्षेत्रों के बारे में सूचना की मेटाडाटा इन्वेंट्री है, जो किसानों, अनुसंधानकर्ताओं और योजनाकारों द्वारा सहज पहुंच के लिए भाकृअनुप संस्थानों/एसएयू पर उपलब्ध है।

राष्ट्रीय किसान पोर्टल एक सशक्त टूल है जो एसएमएस सेवा के माध्यम से किसानों को एडवाइजरी सेवाएं उपलब्ध कराता

है। असंरचित सहायक सेवा डाटा (यूएसएसडी), इंटरैक्टिव वॉयस रिस्पॉस सिस्टम (आईवीआरएस) और पुल एसएमएस कुछ ऐसी मूलवर्धित सेवाएं हैं जो पोर्टल से संबद्ध हैं और किसानों तथा अन्य हितधारकों को संदेश प्राप्त करने तथा इंटरनेट कनेक्शन के बिना अपने मोबाइल पर वेब आधारित सेवाएं प्राप्त करने में सहायता करती हैं।

सार्वजनिक वित्तीय प्रबंधन प्रणाली (पीएफएमएस) को भाकृअनुप-अटारी, पटना में कार्यान्वित किया गया है ताकि वित्तीय प्रबंधन, क्रय/प्रापण एवं भंडार प्रबंधन तथा अन्य संबद्ध कार्यकलापों में दक्षता बढ़ाई जा सके। इससे कार्यालय को काफी हद तक कागजी कार्य किए बिना कार्य संचालित करने में सहायता मिली है।

इस जोन के कृषि विज्ञान केंद्रों को अनेक आवश्यकता आधारित कार्यकलापों, जैसे कि आरएडल्यूई कार्यक्रम, ग्रामीण स्कूलों में कृषि पर प्रोत्साहक कार्यक्रम, पशुधन रोग रिपोर्टिंग तथा अन्य के संचालन में मार्गदर्शन दिया गया। इसके परिणामस्वरूप, कृषि विज्ञान केंद्रों को अन्य हितधारकों की आवश्यकता की पूर्ति करने में भी सहायता मिली।

सामग्री वितरकों के ज्ञान और कौशल का वर्धन करने तथा उन्हें किसानों को उपयुक्त सूचना एवं समाधान उपलब्ध कराने में सहायता देने के लिए बिहार में पूर्वी चम्पारन के केविके और वैशाली के केविके द्वारा सामग्री डीलरों के लिए कृषि विस्तार सेवा में डिप्लोमा पर एक सहयोगात्मक कार्यक्रम चलाया गया। इस एक वर्षीय डिप्लोमा पाठ्यक्रम के लिए हैदराबाद में स्थित मैनेज, एटीएमए के माध्यम से वित्तीय सहायता उपलब्ध कराता है।

वैज्ञानिकों और किसानों के बीच सीधी बातचीत करने में सुविधा देने के लिए, इस जोन के अंतर्गत एक एसएयू और छः भाकृअनुप संस्थान भाकृअनुप-अटारी, पटना के पर्यवेक्षण के तहत मेरा गांव मेरा गौरव (एमजीएमजी) कार्यक्रम का कार्यान्वयन कर रहे हैं। वर्ष 2018-19 के दौरान 18429 किसानों के हित में विभिन्न गतिविधियां चलाई गईं, जिनमें गांवों में नियमित रूप से दौरा, पारस्परिक संवाद बैठक, प्रशिक्षण, प्रदर्शन, मोबाइल आधारित एडवाइजरियां, जागरूकता सृजन आदि शामिल हैं। अभी तक, इस कार्यक्रम के तहत 90 गांवों को कवर किया गया है।

भारत सरकार द्वारा चलाई गई व्यापक स्वच्छता मुहिम के अनुक्रम में, भाकृअनुप-अटारी, पटना के तहत इस जोन के सभी 63 कृषि विज्ञान केंद्रों सहित सभी स्टाफ सदस्यों ने आम नागरिकों के बीच जागरूकता सृजित करने हेतु कार्यालय परिसरों तथा आस-पास के स्थानों में स्वच्छता और साफ-सफाई कायम रखने हेतु स्वच्छता



भारत अभियान' में भाग लिया। कृषि विज्ञान केंद्रों ने जागरूकता कार्यक्रम, सुग्राहीकरण कार्यशाला, स्वच्छता अभियान तथा कम्पोस्ट निर्माण को कवर करते हुए 523 कार्यक्रमों को आस-पास तथा गोद लिए गांवों में नियमित रूप से कार्यान्वित किया।

कृषि में उल्लेखनीय योगदान देने के लिए कथित महिलाओं को सम्मानित करने हेतु भाकृअनुप-अटारी, पटना के तहत बिहार से 6,655 महिला किसानों को शामिल करते हुए 38 कृषि विज्ञान केंद्रों तथा 17 कृषि विज्ञान केंद्रों झारखंड में शामिल करते हुए, राष्ट्रव्यापी समारोह के अनुक्रम में, 'राष्ट्रीय महिला किसान दिवस' मनाया गया। इसके अलावा, दिनांक 24 फरवरी 2019 को 'प्रधानमंत्री किसान सम्मान निधि योजना' में भारत के माननीय प्रधानमंत्री के संबोधन को बिहार और झारखंड के कृषि विज्ञान केंद्रों ने वेबकास्टिंग के जरिए 19,976 किसानों को प्रसारित किया। इसके अलावा, इस अवधि के दौरान, आईसीएआर- एटीएआरआई पटना केवीके द्वारा कृषि कल्याण अभियान, ग्रामीण कृषि मौसम सेवा, किसानों की आय को दोगुना, इनोवेटिव फार्मर्स मीट जैसी नई पहलों को लागू करने में भी शामिल था।

भाकृअनुप-अटारी, पटना एक ओर अपने अधिदेश के अनुरूप कार्य कर रहा है, वहीं दूसरी ओर खेतीहर समुदाय के कल्याण के लिए समस्त अधिदेशित एवं अन्य सेवाओं के कार्यान्वयन के लिए कृषि विज्ञान केंद्रों तथा विस्तार शिक्षा निदेशालयों को सहायता

प्रदान करने में सक्रिय भूमिका निभा रहा है। आवश्यकता आधारित अवरंरचना और वित्तीय सहायता उपलब्ध कराने के अलावा, भाकृअनुप-अटारी तथा केविके दोनों स्तरों पर समस्त वित्तीय प्रबंधन प्रणाली का डिजटीकरण किया गया है। एसएसी बैठक में भाग लेने तथा प्रदर्शन खेत में दौरा करने के जरिए ऑन द स्पॉट मूल्यांकन भी किया गया ताकि कृषि विज्ञान केंद्रों द्वारा कार्यान्वयन किए जा रहे प्रमुख कार्यक्रमों के निष्पादन का आकलन किया जा सके। कार्यशाला, प्रशिक्षण, बैठकें आदि का आयोजन केविके कार्मिकों के लिए भाकृअनुप-अटारी, पटना की एक नियमित गतिविधि रही है जिससे कृषि और संबद्ध विधियों के बारे में उनके ज्ञान का वर्धन किया जा सके। केंद्र सरकार की किसान-हितैषी योजनाओं का बड़ी संख्या के किसानों के बीच पर्याप्त रूप से प्रचार-प्रसार किया जाता है ताकि संसाधनों के अभाव के कारण गरीब किसान उक्त कार्यक्रमों से अपने स्वयं के विकास के लिए लाभ उठा सकें। अनेक प्रमुख कार्यक्रमों में हासिल सफलता को राज्य विस्तार कार्यप्रणाली द्वारा अपने व्यापक बहिर्वेशन के लिए अपनाया जा रहा है। विभिन्न राज्य, केंद्रीय और अन्य संगठनों के साथ प्रभावकारी तालमेल और सहयोग किए जाने से कृषि विज्ञान केंद्रों को लाभकारी प्रयोजन में उपयोग करने के लिए अतिरिक्त संसाधन/आय अर्जित करने में भी सहायता मिली है। भाकृअनुप-अटारी, पटना में विकसित कार्ययोजना तथा बड़े समर्पण के साथ उसके कार्यान्वयन ने इस जोन के कृषि विज्ञान केंद्रों को कृषि में कार्यांतरण लाने हेतु एक सशक्त टूल बना दिया है।



Executive Summary

ICAR-ATARI Patna has been established as Zone IV 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, Zone-IV began its journey in April 2017 from the office premises located within the campus of Central Potato Research Station, Sahay Nagar, Patna with the specific objective to plan, monitor and evaluate the Programmes of KVKs working in Bihar and Jharkhand. With the limited manpower, ATARI Patna has tried at the level best to strengthen agricultural extension research and knowledge management along with coordination and monitoring technology application and frontline extension education programme in Zone IV. The KVK on the other hand remains engaged in technology assessment and demonstration for its wider application at the farmer's field as well as enhancement in capacity building of the farmers, rural youth and extension functionaries. It is to mention that the reach of KVK has been extended many-fold in meeting up the aspiration of small and medium farmers, rural youths and other stakeholders. The ability of KVKs to deliver information and technology support at the doorstep of the farmers has placed them in an important position in the district and the state as well.

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 2018-19, a sum of Rs 7188.12 lakh has been provided to the KVKs including DEEs. In mandated activities, the KVKs of Zone-IV achieved almost the entire set target in the areas of training, on-farm trial, frontline demonstration etc. during the year 2018-19. During the year 2018-19, the KVKs conducted 403 on-farm trials in 2821 locations across the zone to assess various technologies pertaining to crop cultivation, livestock rearing, fish cultivation, insect-pest management, drudgery reduction, storage technique etc. The solution so found out was again tested in the form of small scale

demonstration before feeding it to mainstream state extension system in the form of technology capsules. The feedback to research system is also provided for the necessary improvement/modification of the developed technology to suit the wider agro-ecological situation of the zone.

Frontline demonstrations have been conducted by the KVKs in pulse, oilseed and other crops to establish the production potentiality of the newly released varieties/package of practices to enhance the productivity of selected pulse and oilseed crops and replace seed in the case of cereal and other crops. The KVKs brought 2184.83 ha under such frontline demonstration programme on pulse and oilseed crops both during Kharif and Rabi involving 9293 numbers of farmers of this zone. Demonstrations were conducted by the KVKs of Bihar and Jharkhand on cereals, vegetables, cash crops, flowers, spices and other enterprises for an area of 1634.40 ha involving 6388 numbers of farmers. In livestock, 2363 number of farmers was involved in various demonstration programmes for the benefit of 11640 livestock. In fishery, demonstrations were taken up by 101 numbers of farmers to cover a water area of 93.50 ha. The KVKs also demonstrated various enterprises like vermicompost, bee keeping, value addition, mushroom production, backyard poultry rearing, homestead vegetable cultivation, feed production, azolla cultivation and many more enterprises involving 1108 farmers and rural youth to exhibit its relative advantage over conventional practices. The performance recorded in the farmers' field indicated the superiority of the varieties and package of practices in terms of yield and benefit-cost ratio. The involvement of extension functionaries in the demonstration programmes paved the way for its large-scale dissemination for the benefit of the farming community in Bihar and Jharkhand.

Implementation of Clustered Frontline Demonstration (CFLD) programme both for pulse and oilseed crops to enhance the productivity with



particular emphasis on to utilize rice fallow has been another achievement recorded during 2018- 19. Altogether 1225 ha was allotted for Kharif pulses; finally 1235 ha was brought under CFLD programme during Kharif 2018- 19. The average increase in yield of Kharif pulses was in range between 11.49 and 55.66%. In Rabi 2018-19, lentil, chick pea, field pea, green gram and pigeon pea were brought under CFLD programme to cover an area of 1662.6 ha. CFLD on Summer pulses, namely green gram, black gram and chick pea was also undertaken taken to cover an area of 360.25 ha covering 968 demonstrations in Bihar and Jharkhand. In oilseed, CFLD programme was conducted in Kharif, Rabi and Summer during 2018-19 by the KVKs of this zone. In Kharif, ground nut, sesame, niger, soybean, mustard and sunflower were demonstrated in 588.6 ha and in Rabi, mustard, linseed, lentil, ground nut, safflower, sunflower, sesame were demonstrated covering an area of 1257.8 ha. An increase in yield of oilseed crops recorded in Kharif was in the range of 22.3- 160.0 %, whereas it was 10.4-84.3 % during Rabi. CFLD programme was also conducted during Summer 2019 for an area of 70 ha covering 958 demonstrations.

The sustainable development of agriculture and allied sectors needs adequate knowledge and skill for its application in the actual field condition. Capacity development on the part of farmers and farm women, rural youth and extension functionaries was one of the core assignments of KVKs carried out up to desired level. In providing knowledge and skill, the KVKs of Zone-IV organized 5728 number of training programmes for 1,96,414 farm men and women on various aspects of crop production, horticulture, soil health management, agricultural engineering, livestock and fishery, home science, agricultural extension and many more. With an aim to make the rural youths self-employed the KVKs of Zone-IV conducted enterprise-potential training programmes for a large number of rural youths. In the course of inculcating knowledge and skill, the KVKs conducted 1,406 numbers of training programmes for benefit of 37,452 rural youths and girls covering 25,861 rural boys and 11,554 rural

girls during 2018- 19. Frontier areas were selected for the capacity building of extension personnel to make them aware of the recent development in agriculture, animal husbandry and fishery field. A total of 687 courses were conducted by the KVKs of Zone-IV for 29,861 extension functionaries. The KVKs also organized vocational training programme of comparatively longer duration to expose the youths towards self-employment opportunity. In the process, 500 courses in different areas of agriculture and allied sectors were conducted for 9,610 rural boys and 4,091 rural girls. The KVKs conducted 1007 sponsored training programme for 72438 participants nominated by various organizations as per the need of the participants. In creating large-scale awareness among the rural farming community about the benefit of advanced agricultural and allied technologies, the KVKs of Zone-IV organized 1,67,169 number of various extension activities to reach out 7,13,244 farmers and extension officials.

Seed is the most critical input to maintain productivity of the crop. To cater the need of the farmers, seed production has been initiated in the villages under the head of “village seed production” programme in a participatory mode. During the year 2018-19, the KVKs of Zone-IV produced 11,876.08 q of seeds of major crops like paddy, wheat, maize, mustard, linseed, niger, groundnut, red gram, chick pea, black gram, vegetables, spices, fodders etc. KVKs also produced 25.19 lakh planting materials/seedlings of fruit crops, vegetables, flower, forest sp., medicinal and aromatic plant for 49,650 lakh beneficiaries. Use of bio-product in agricultural field is becoming fast popular from environmental point of view and the KVKs produced 2,08,462 kg bio-fertilizers including vermicompost to make available among the farmers. In order to provide quality livestock strain and fish fingerling, KVKs made available 32 cows, 68 goats, 24,120 poultry birds and 11,664 fish fingerlings during 2018- 19.

In soil and water sample analysis, the KVKs analyzed 48,384 number of samples from 2,309 villages across the zone and it benefitted a total of 1,00,807 farmers in this Zone. The process has enabled the



farmers to optionally utilize chemical fertilizer in crops for higher productivity as well as sustained soil health. Apart from the mandated activities, the KVKs also celebrated special day/week as a means to create awareness among farming community like technology week through public-private partnership, world soil day, national science day, world veterinary day and others. Such celebrations attracted good number of participants and provides the opportunity to elaborate the benefit of such programmes among the farmers.

Implementation of a good number of flagship programmes to ensure the fulfillment of the desired objectives was essential activity on the part of ICAR-ATARI, Patna during last one year. A National Network Project, National Innovations in Climate Resilient Agriculture (NICRA) is one such programme in operation in Zone IV through 13 KVKs covering 54 villages in Bihar and Jharkhand. Technology Demonstration Component (TDC) of NICRA offers a great opportunity to work with the farmers to address current climate variability with matching responses. Thus, climatic vulnerability of the identified districts has been critically assessed to bring forward definite requirement in terms of technological support, resource development and overall empowerment of farming community to enable them to cope up with climatic vulnerabilities like droughts, flood, heat wave, erratic rainfall etc. Successful implementation of technology components like in-situ moisture conservation measures through Mulching and bunding, rain water harvesting, ground water recharge, water saving irrigation technique, conservation tillage, drought tolerant paddy varieties, flood tolerant paddy varieties, improved fodder cultivars, community nursery, intercropping system of high sustainable yield index, crop diversification, improved breed of pig, backyard poultry, duck, ornamental bird, composite and cat fish farming have not only created positive impact in the NICRA villages but also paved the way for its out scaling in other districts for the benefit of the farmers. Creation of Village Climate Risk Management Committee (VCRMC) and custom hiring system of farm implements

and other components carried out through this programme have immensely benefitted the farmers of vulnerable districts.

‘Seed Hub’ of pulses is an important commodity for increasing pulse production and nutritional in the Zone. 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 are engaged in producing pulse seeds of identified pulse crops throughout the year covering three cropping seasons. The crops identified for seed production are gram, pigeon pea, green gram, black gram, chick pea, lentil and field pea.

Farmer FIRST, a farmer-centric programme, is in operation in this zone through two ICAR Institutes (ICAR-NRC, Litchi, Muzaffarpur and ICAR-IIAB, Ranchi) and two State Agricultural Universities (BAU, Sabour and BAU, Ranchi). The basic concept of this programme is that farmers play the key role in research problem identification, prioritization, conduct of experiment and its management in farmer’s fields. Various interventions under NRM, crop, horticulture, IFS, livestock and fisheries modules have been executed by the implementing institutes/SAUs to bring overall improvement in livelihood of the selected farmers/farm families through this project. A total of 6,890 farm families have been benefitted from this project during 2018-19.

In addressing the issues of backwardness in tribal areas and tribal population, a specific programme namely Tribal Sub Plan (TSP) is under operation in 13 districts of this zone. Initiatives like asset creation, conducting on-farm trials, training programmes, seed and planting material production etc. were taken to extend the benefit of improved agricultural practices among the tribal community. During the period under report, KVKs of this zone created 17,091 number of assets in the form of sprayer, weeder, agro-shed net, ridge maker etc. A total of 1.44 lakh tribal farmers participated in different extension activities.



ICAR has initiated a programme “Attracting and Retaining Youth in Agriculture” (ARYA) 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. Accordingly, KVK East Champaran from Bihar and KVK Gumla from Jharkhand implemented this programme under Zone-IV. Based on the opportunity to create commercial venture in the native places, enterprises have been selected to provide financial and technical support to the identified youths in the district. The efforts of KVK and supervision of ICAR-ATARI, Patna has enabled 260 rural youths to establish their enterprises for enhanced annual income in a sustained manner. The success of this project has motivated other rural youths also to take off-farm enterprises for their livelihood.

Capacity development of the KVK personnel was planned and executed by this Institute during 2018-19. Various HRD programmes were also organized for KVK personnel and agri-preneurs in different areas for their knowledge updating.

In view of improving cereal based cropping system with emphasis on conserving natural resource base, reducing cost of cultivation, augmenting farmer income and ensuring better livelihood of the farmers, CSISA (Cereal System Initiative in South Asia) project in collaboration with ICAR is under operation in eight districts of this zone. Crop establishment method, weed management in DSR and rabi crop in sequence under Zero Tillage are some of the technologies evaluated in this project.

A collaborative programme with Agriculture Skill Council of India (ASCI) has been taken up for entrepreneurship development through imparting skill training. Nine KVKs of this Zone were assigned with the job of undertaking the training programmes on organic grower, mushroom grower, bee keeper etc in the line of ASCI norms.

The Protection of Plant Varieties and Farmers’ Rights

Act (PPV&FR Act) seeks to address the rights of plant breeders and it recognizes the multiple roles played by the farmers in cultivating, conserving, developing and selecting varieties. As a collaborative approach with PPV&FR Authority, large-scale awareness was created about the importance of conserving indigenous plant varieties through 18 KVKs of this zone during last one year.

KVK Knowledge Portal monitored by ICAR-ATARI, Patna has helped a large number of farmers from remote areas to know about KVK functioning and solicit information support for improved agriculture and allied practices. KVKs have uploaded various information e.g. facility available at the KVK, package of practices, status of different projects, upcoming events etc. in the portal for the information of the farmers. Alongside, KRISHI Portal is also regularly uploaded with technology, publication, experimental data, observational data, survey data and geo-portal. This repository is a metadata inventory of information regarding agriculture and allied sectors which is available at ICAR Institutes/ SAUs for its easy access by the farmers, researchers and planners.

National Farmers Portal is a powerful tool to provide advisory services to the farmers through SMS service. Unstructured Supplementary Service Data (USSD), Interactive Voice Response System (IVRS) and pull SMS are the value added services associated with this portal which enables farmers and other stakeholders to receive message and get web-based services in their mobile without internet connection.

Public Financial Management System (PFMS) has been implemented in ICAR-ATAI, Patna to enhance the efficiency in financial management, procurement and store management and other related activities. This has helped in running the office without resorting to paper work to a substantial extent.

KVKs of this zone have been guided to undertake a number of need-based activities like RAWE programme, motivational programme on



agricultural farming at rural school, livestock disease reporting and others. This has enabled the KVKs to address the need of other stakeholders also.

A collaborative programme on Diploma in Agriculture Extension Service for Input Dealers (DAESI) was carried out by KVK East Champaran and KVK Vaishali in Bihar to update the knowledge and skill of input dealers to enable them to provide proper information and solution to the farmers. MANAGE, Hyderabad provides fund support through ATMA for this one year Diploma course.

In facilitating direct interaction between scientists and farmers, six ICAR Institutes and one SAU of this zone are implementing Mera Gaon Mera Gaurav (MGMG) programme under the supervision of ICAR-ATARI, Patna. The activities like regular visit to villages, interface meeting, training, demonstration, mobile based advisories, creation of awareness etc. have been taken up for the benefit of 18429 farmers during 2018- 19. So far, 90 villages have been covered under this programme.

As a part of mass movement of cleanliness, initiated by the Government of India, all the staff members of ICAR-ATARI, Patna including all 63 KVKs under this Zone have been involved in 'Swachh Bharat Abhiyan' to maintain cleanliness and hygiene in office premises as well as nearby places to create awareness among common citizens. KVKs have executed 523 programmes covering awareness programme, sensitizing workshop, cleanliness campaign and also compost making in the adjoining and adopted villages on a regular basis. A sense of responsibility was evolved among the people to keep the environment clean.

As part of the nationwide celebration of 'Rashtriya Mahila Kisan Divas', was celebrated by 38 KVKs in Bihar and 17 KVKs of Jharkhand involving 6,655 farm women under ICAR- ATARI, Patna to honour women for their remarkable contribution in agriculture. Besides, the Hon'ble Prime Minister of India launched the new scheme of Govt. of India, Pradhan Mantri Kisan Samman Nidhi Yojna (PM-

KISAN) on February 24, 2019. This programme was displayed through webcasting at KVKs of Bihar and Jharkhand involving 19,976 farmers. Besides, during the period under report, ICAR-ATARI Patna was involved in implementing many new initiatives like Gramin Krishi Mausam Sewa, Doubling Farmers' Income' programme, Innovative Farmers Meet, Krishi Kalyan Abhiyan etc.

ICAR-ATARI, Patna has been intensely involved in carrying out its mandate in one hand and extending support to KVKs and Directorates of Extension Education for taking up all the mandated and other activities for the betterment of farming community. Apart from providing need based infrastructure and financial support, digitization has been done for entire financial management system both at ICAR-ATARI level and KVK as well. On the spot evaluation has also been carried out through attending SAC meeting and visit to demonstration field to assess the performance of flagship programmes carried out by KVKs. Organizing workshop, training, meeting etc has been a regular feature on the part of ICAR-ATARI, Patna for the KVK personnel to sharpen their knowledge about advanced agricultural and allied practices. Farmer-friendly schemes of central Govt. have been given adequate publicity among large number of farmers to take the benefit of such programmes by the resource poor farmers for their own development. The success achieved in a number of flagship programme has been replicated by the state extension mechanism for its large-scale extrapolation. Effective convergence and collaboration with a number of State, Central and other organizations have also helped KVKs to earn additional resources/revenue for its use in productive purpose. The plan of work developed at the level of ICAR-ATARI, Patna and its execution with utmost sincerely have made the KVKs of this zone a powerful tool to transform the agriculture.



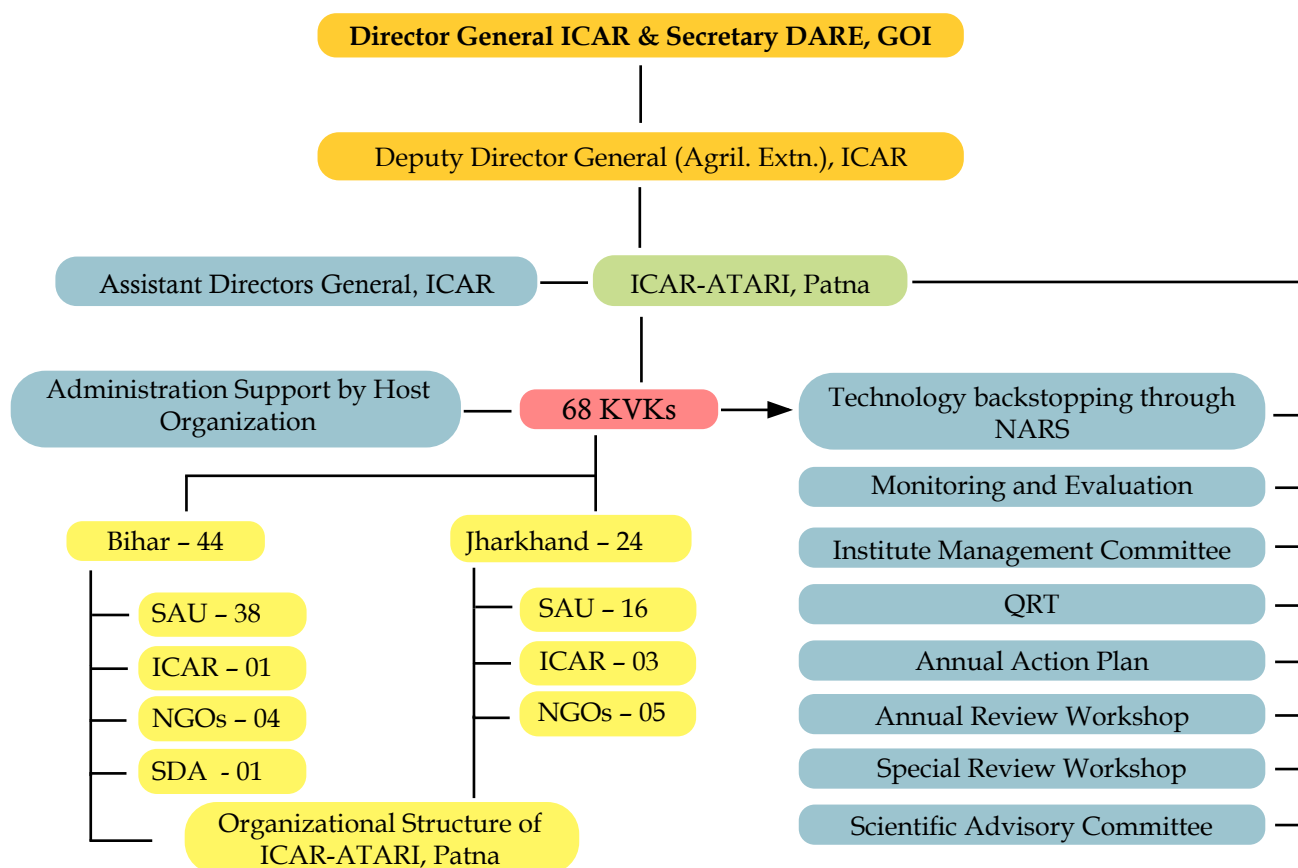
1. Organizational Structure and Staff Position

Division of Agricultural Extension of Indian Council of Agricultural Research (ICAR) is monitoring the activities of 717 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 2017, 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 2018-19, a sum of Rs 8336.60 Lakh has been provided to

the KVKs including DEEs in different as per detailed below.

Table 1: Revised Estimate in respect of ICAR-Agricultural Technology Application Research Institute & KVKs under Zone- IV during 2018-19

(Rs. in lakh)

DEE/ICAR/ University	KVKs	Recurring							Non-Recurring					Revol. Fund	Grand Total
		P & A	Total (Pay+ Allow.)	T.A.	H.R.D	Cont.	TSP Cont.+ Capital	Total (General)	Equip.&furn	Works	Lib.	Vehicle	Total (Capital)		
1	2	3	4=3	5	6	7	8	9=5+6+7+8	10	11	12	13	14=10+11+12+13	15	16=4+9+14
BAU Ranchi	16	95016666	95016666	2400000	480000	14870594	20589000	35459594	5550000	0	0	0	5550000	0	136026260
DRCAU Pusa	12	87989999	87989999	1800000	360000	12981113	0	12981113	4850000	3600000	0	5241000	13691000	0	114662112
BAU Sabour	21	173155000	173155000	3150000	630000	19210000	2072000	21282000	5050000	0	0	8900000	13950000	0	208387000
NGO Bihar	5	49891667	49891667	1000000	100000	4755330	0	4755330	2950000	0	0	2000000	4950000	0	59596997
NGO Jharkhand	5	55739667	55739667	1000000	100000	5292223	5335500	10627723	1750000	0	0	2000000	3750000	0	70117390
ICAR-RCER Patna	2	18716667	18716667	400000	60000	2290000	0	2290000	2450000	0	0	0	2450000	0	23456667
ICAR-NRRI, Cuttack (Kodarma)	1	6250000	6250000	150000	30000	1261931	0	1261931	500000	0	0	0	500000	0	8011931
ICAR-IINRG, Ranchi (Khunti)	1	2650000	2650000	150000	30000	290000	919500	1209500	0	3100000	0	0	3100000	0	6959500
DEE Sabour			0			1975000		1975000	0	4000000	0	0	4000000	0	5975000
DEE Ranchi			0			1975000		1975000	0	0	0	0	0	0	1975000
DEE Pusa			0			1975000		1975000	0	0	0	0	0	0	1975000
GRAND TOTAL		489409666	489409666	10050000	1790000	66876191	28916000	95792191	23100000	10700000	0	18141000	51941000	0	637142857
ATARI RE 18-19		3566031	3566031	0	0	3700450	0	3700450	537332	0	0	799457	1336789	0	8603270
KVKs RE 2018-19		556433969	556433969	0	0	68939550	28916000	97855550					55919211	0	710208730
Total RE 2018-19			560000000					101556000					57256000	0	718812000

2. About 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 Fasal BimaYojna, Swachh Bharat Abhiyan, Tribal Sub Plan (TSP), Gramin Krishi Mausam Sewa, Krishi Kalyan Abhiyan (KKA), Skill Development in Agriculture and many others.

2.1 State-wise distribution of KVK:

During 2018-19, 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 Krishi Vigyan Kendras

Name of the State	No. of Districts	No. of KVKs under						Total
		SAU	ICAR	DU	CU	NGO	SDA	
Bihar	38	22	1	-	16	4	1	44
Jharkhand	24	16	3	-	-	5	0	24
Total	62	38	4	-	16	9	1	68

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 Krishi Vigyan Kendras

Sl. No.	State/UT	Host Institution	Total
2.	Bihar (44)	Dr Rajendra Prasad Central Agricultural University, Pusa, Samastipur	16
		Bihar Agricultural University, Bhagalpur	21
		BASU, Patna	1
		ICAR Research Complex for Eastern Region, Patna (Buxar)	1
		Sone Command Area Development Agency, (SDA) Bhojpur	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	68	

* Presently under state administration



2.2 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 706 at present. During VthFiveYear Plan 18 KVKs were established, 12 KVKs opened during 1979, 14 during 1981, 44 during VIthFive Year Plan were also started. Thus at the end of VIthPlan 89 KVKs including KVKs of Bihar and Jharkhand started functioning under Zone II, Kolkata. Further, in 2018 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 2018.

Under ICAR- ATARI, Patna with its jurisdiction of Bihar and Jharkhand, 63 KVKs has been established up to March 2018. There are also proposal for opening new KVKs in Bihar and Jharkhand.

2.3 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.

2.4 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 622 (62 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	20	09	63
Subject Matter Specialist	168	92	378
Prog. Assistant	94	48	189
Others	150	41	378
TOTAL	432	190	1008

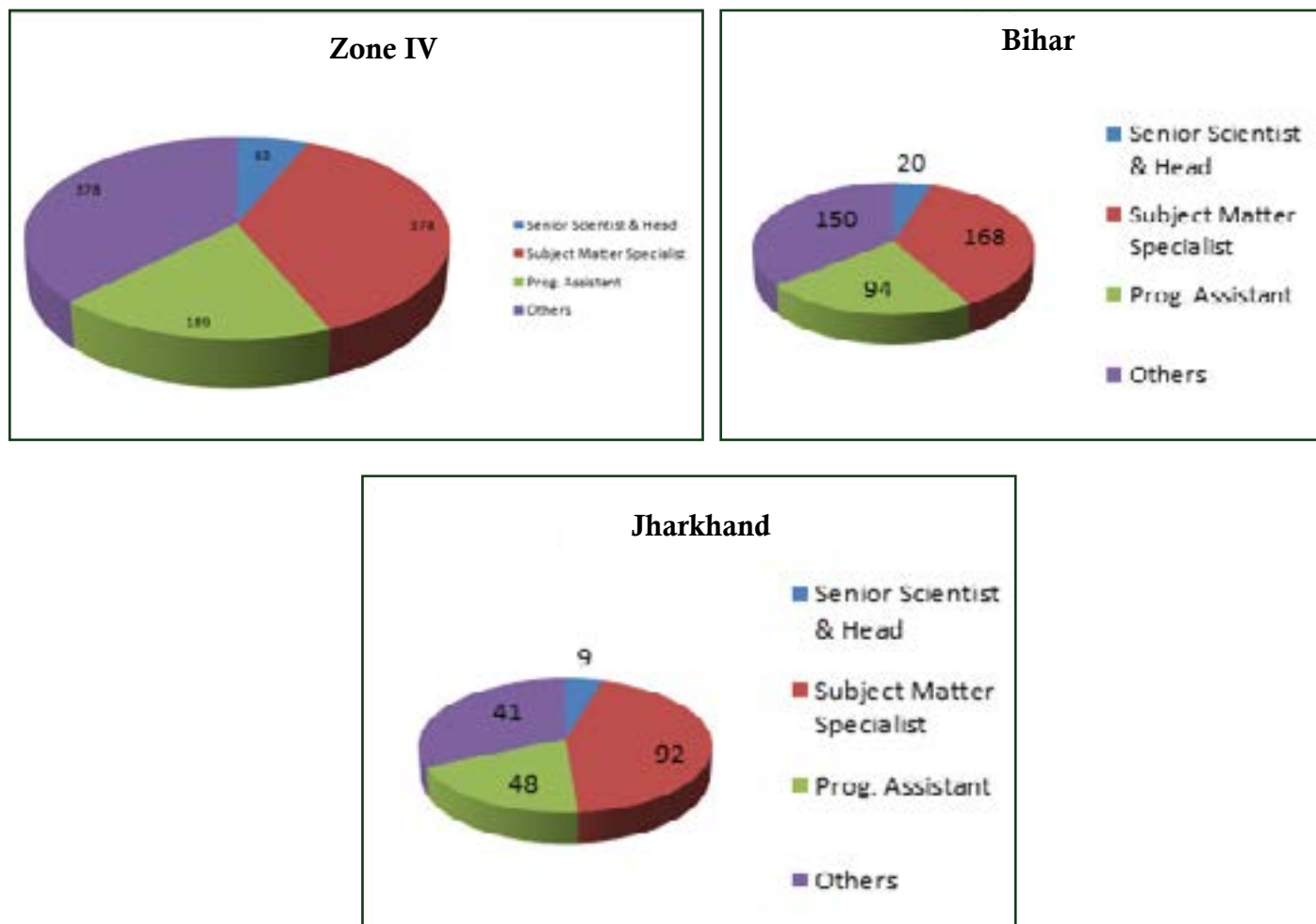


Fig 1: Filled up position in different staff categories in Zone IV

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	44	20	19	264	168	66	44	33	06	44	30	09	44	31	08	264	150	84	704	432	192
Jharkhand	24	09	15	144	92	52	24	14	10	24	12	12	24	12	12	144	41	103	384	180	204
Total	68	29	34	408	260	118	68	47	16	68	42	21	68	43	20	408	191	187	1088	612	396

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 supporting 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	44	20	19	264	168	66	44	33	06	44	30	09	44	31	08	44	39	0	44	35	04	88	50	28	88	26	52	704	432	192
Jharkhand	24	09	15	144	92	52	24	14	10	24	12	12	24	12	12	24	10	14	24	05	19	48	13	35	48	13	35	384	180	204
Total	68	29	34	408	260	118	68	47	16	68	42	21	68	43	20	68	49	14	68	40	23	136	63	63	136	39	87	1088	612	396

2.5 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. 11.13 crore as on 1stApril, 2019. In the year 2018-19, a substantial amount of fund i.e. Rs. 6.66 crore was generated by the KVKs of Zone IV through revolving fund scheme. As per state is concerned, Bihar KVKs earned the amount of Rs. 5.15 crore and Jharkhand of Rs. 1.5 crore through this scheme in the year 2018-19. 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
	2018-19	7,14,35,614.74	5,15,65,131.42	3,85,07,481.94	8,44,93,264.22
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
	2018-19	2,28,38,121.12	1,50,70,954	1,10,24,189.9	2,68,84,885.22
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
	2018-19	9,42,73,735.86	6,66,36,085.42	4,95,31,671.84	11,13,78,149.4

2.6 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 7.

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	35	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



2.7 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 development of fodder technology including azola and hydroponic fodder cultivation
- 13) Water harvesting and watershed management
- 14) Small scale mechanization for reducing cost and drudgery
- 15) Use of micro irrigation technology for more crops from each drop of water
- 16) Up-gradation of non-descriptive, local cattle by descriptive Indian cattle breeds using AI technology
- 17) Animal health care and management
- 18) 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 2018 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), Skill Development in Agriculture and allied fields under Agriculture Skill Council of India (ASCI), Krishi Kalyan Abhiyan (KKA)- I, II, III and Farmers' FIRST Programme were also carried out.



3.1 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, 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.

3.2 Staff: ICAR-ATARI, Patna is having total sanctioned staff strength of 4, out of which only one

post has been filled up to March 2019.

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

Category	Sanctioned	Filled
Director (RMP)	1	1
Principal Scientist (Agriculture Extension)	1	0
Scientist (Horticulture)	1	0
Scientist (Ag. Extn.)	1	0

3.3 Institute Management Committee

Institute Management Committee meeting for ATARI, Patna was held on 27th February, 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 the effective functioning of the Institute. Approval for the proposed agenda items was also taken.

3.4 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 2018-19 and 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



- ▲ 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) on Pulses and Oilseeds
- ▲ Tribal Sub Plan (TSP)
- ▲ Protection of Plant Varieties & Farmers Right Act (PPV&FRA)
- ▲ Pradhan Mantri Fasal Bima Yojna
- ▲ Celebration of Swachhta Pakhwada 2018
- ▲ Celebration of Mahila Kishan Diwas 2018
- ▲ Celebration of World Soil Health Day 2018
- ▲ Krishi Kalyan Abhiyan (KKA)- I, II, III
- ▲ Gramin Krishi Mausam Sewa

4. Achievements

4.1 Technology 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 2018-19, a total of 63 KVKs of Zone-IV conducted 403 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 23 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 2018-19, the KVKs conducted 403 on-farm trials in 2821 locations to assess various technologies.** Among various thematic areas, technologies were tested in integrated nutrient management (INM) through 48 on-farm trials, followed by integrated crop production (ICM) through 31 on-farm trials, integrated disease management (IDM) through 50 on-farm trials, integrated pest management (IPM) through 38 on-farm trials), varietal evaluation (16 on-farm trials), weed management (26 on-farm trials) and Farm Implement and machineries (11 OFT). In livestock sector, the highest number (28) of on-farm trial was conducted in the area of livestock nutritional management followed by disease management (17 on-farm trials). In fishery, 8 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 259 on-farm trials distributed in 1813 locations, the corresponding values for Jharkhand were 144 and 1008.** 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 KVKs under Zone IV

Thematic Area	Bihar		Jharkhand	
	No. of Location	No. of OFT	No. of Location	No. of OFT
Integrated Crop management (ICM)	175	25	42	6
Integrated Disease management (IDM)	217	31	133	19
Integrated Pest management (IPM)	154	22	112	16
Integrated Nutrient management (INM)	252	36	84	12
Varietal Evaluation (VE)	63	9	49	7
Weed management (WM)	133	19	49	7
Water management	28	4	28	4
Storage Technology (ST)	28	4	28	4
Resource Conservation Technology (RCT)	42	6	42	6
Farm implements & machineries (FIM)	35	5	42	6
Evaluation of Sowing time	42	6	0	0
Crop production	189	27	133	19
Protected Cultivation	7	1	7	1
Nursery Raising	0	0	7	1
Total	1365	195	756	108
Live Stock Sector				
Production & Management (P & M)	0	0	7	1
Fishery	56	8	0	0
Feed & Fodder and Nutrition	119	17	77	11
Breed Evaluation (BE)	14	2	14	2
Disease management	70	10	49	7
Total	259	37	147	21
Enterprise	21	3	14	2
Food & Nutrition (F & N)	49	7	14	2
Value Addition (VA)	70	10	70	10
Drudgery Reduction (DR)	49	7	7	1
Total	189	27	105	15
Grand Total	1813	259	1008	144

Bihar

KVK Aurangabad

Thematic Area: Integrated Crop Management (ICM)

Mitigation of terminal heat stress in late sown wheat through foliar application of potassium nitrate (KNO₃)

An on farm trial was conducted in Aurangabad district to assess the mitigation of terminal heat stress in late sown wheat through foliar application of potassium nitrate (KNO₃). There were two

technology options. Foliar spray of 0.5 % KNO₃ at booting and 0.5% potassium nitrate at anthesis stage has been found the best among two technology options.



Table 10: Effect of foliar application on grain performances

Treatment	Replication	No. of effective tillers/m ²	No. of grains/Ear	1000 grain weight (g)
Farmer Practice (No foliar spray of KNO ₃)	5	198	38.56	36.58
To ₁ - Foliar spray of 0.5 % KNO ₃ at booting and 0.5% potassium nitrate at anthesis stage.		294	52.42	39.94
To ₂ - Foliar spray of 1.0 % KNO ₃ at anthesis stage.		265	50.26	38.51

Table 11: Effect of foliar application on yield and economics

Treatment	Replication	Yield (q/ha)	HI (%)	Cost of cultivation	Gross Income (Rs)	Net Income (Rs)	B:C
Farmer Practice (No foliar spray of KNO ₃)	5	31.25	38.35	27564	54688	27124	1.98
To ₁ - Foliar spray of 0.5 % KNO ₃ at booting and 0.5% potassium nitrate at anthesis stage.		42.75	44.23	27800	74813	47013	2.69
To ₂ - Foliar spray of 1.0 % KNO ₃ at anthesis stage.		40.68	43.18	28000	71190	43190	2.54



KVK Supaul

Thematic Area: Resource Conservation Technology (RCT)

Performance of different organic mulch in Rabi Maize

An On Farm trail (OFT) on the topic as mentioned above has been conducted at KVK, Raghopur, Supaul during the Year 2018-19. The technology option To₁, Organic mulching



with water hyacinth performed better than other technology option. Highest yield of 68.7 qt/ha and highest BC ratio of 3.3 has been achieved in technology To₁ when maize mulched with water hyacinth.



Table 12: Effect of organic mulching on weed population, number of irrigation and economics

Technology option	Weed Population 30 DAS	Weed Population 60 DAS	No. of irrigation	Cost of cultivation (Rs.)	Yield (q)	BC ratio
Farmers Practice	205	180	04	32,000	62.50	2.5
Organic mulching To₁	21	28	03	27,000	68.70	3.30
Organic mulching with Paddy To ₂	24	36	03	31,000	63.30	2.69

KVK Buxar

Thematic Area: Resource Conservation Technology (RCT)

Assessment of different sowing schedule of ZT wheat on yield, yield attributes and economics of wheat

Poor yield of wheat due to majority of farmers adopting conventional methods of wheat sowing (broadcasting of wheat after more number of tillage operation) after harvesting of long duration rice variety, led to delayed sowing of wheat in Buxar. Accordingly, a trial was conducted on “Assessment of different sowing schedule of ZT wheat on yield, yield attributes and economics of wheat.” under

Rice-wheat cropping system. Sowing time is shown in Table 13. Wheat sowing between 16-30 November recorded maximum number of shoots/m², biomass/m² and grain/panicle. Wheat yield during the period recorded maximum net return as well as maximum BC ratio (2.34) as compared to the other treatments in the trial.

Table 13: Effect of different sowing window on yield and economics of wheat

Technology option	No. of trials	No of shoots/m row length	Biomass/ m ²	Grains/ spike	1000 grain weight	Grain yield (kg/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
Farmers practice-	05	56	0.83	48	38.16	3950	27840	79100	512600	1.84
TO-1: 1-15 November wheat sowing by ZT		64	1.13	64	41.22	5160	31800	105280	73480	2.31
TO-2: 16-30 November wheat sowing by ZT		68	1.17	66	41.18	5215	31800	106270	74470	2.34
TO-3: 1-15 December wheat sowing by ZT		61	1.09	58	40.36	4120	28500	84360	55860	1.96
TO-4: 15-31 December wheat sowing by ZT		52	0.81	53	39.81	4010	28500	82180	53680	1.88



KVK Khagaria

Thematic Area: Varietal Evaluation (VE)

Assessment of performance of different varieties of soybean in Khagaria district

An OFT was conducted with three technology options along with farmers practice keeping 3 replications in each option. It was found that maximum yield of 20.20 q/ha with BC ratio of 2.04 was observed with PS-1241 variety followed by PS-1042 with yield of 20.10 q/ha and BC ratio of 2.03. PS-1042 variety is suitable in slightly water logged condition.

Variety assessed:

Farmers practice: JS- 335

TO 1 : PS - 1042

TO 2 : PS - 1241

TO 3 : RSC-10-46



Table 14: Performance of different varieties of soybean in Khagaria district

Technology option	No. of replications	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BC ratio
Farmers practice	03	16.60	29700	49800	20100	1.68
TO 1	03	20.10	29700	60300	30600	2.03
TO 2	03	20.20	29700	60600	30900	2.04
TO 3	03	18.50	29700	55500	28800	1.87

KVK Kishanganj

Thematic Area: Varietal Evaluation (VE)

Performance of difference wheat varieties under late sown irrigated condition

There was a scarcity of availability of suitable varieties of wheat for specific situation like late sown irrigated condition in Kishanganj District due to very low productivity and profitability of wheat. Based on the information generated by BAU, Sabour, an OFT was undertaken at the farmers field for evaluation of

different wheat varieties under late sown irrigated condition. An OFT conducted on farmers field to assess the wheat (*Triticum aestivum* L.) cultivars under irrigated late sown condition in Kishanganj district of Bihar during the Rabi season of 2018-19 revealed that the cultivar HD 2985 recorded higher

grain yield (31.0 q/ha) which was at par with the cultivar HI 1563 (30.20 q/ha) in comparison to other cultivars. Lowest grain yield was recorded by the farmers with local variety NL (23.20 q/ha). The

yield attributing characters and economics were also found significantly higher in cultivar of HD 2985 as compared to other varieties evaluated.

Table 15: Performance of different wheat cultivars on yield, yield attributes and economics

Cultivars	Effective tillers/m ²	Spike length (cm)	No. of grain/ spike	1000 -grain wt.	Grain Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	B:C ratio
Farmers practice: Local (NL)	298	16.5	32	36.6	23.2	18300	34800	16500	1.90
TO ₁ :DBW 14	305	17	36	38.2	26.8	19400	40200	20800	2.07
TO ₂ : HI 1563	313	25.4	46	41.8	30.2	19400	45300	25900	2.34
TO ₃ :HD-2985	324	30	48	42.6	31.0	19400	46500	27100	2.40
CD at 5%	3.47	2.73	1.79	NS	3.14	--	--	--	--

KVK Arwal

Thematic Area: Integrated Pest Management (IPM)

Assessment of efficacy of various insecticides in management of Brown Plant Hopper of Rice (BPH)

In Arwal districts, low productivity and low profitability in rice due to heavy attack of brown plant hopper (BPH) has been reported.

Technology assessed: T.O. I - Two sprays of Imidacloprid 17.8 % SL 1 ml per 3 litre of water at the time of tillering. T.O. II - Two sprays of Dinotefuran 20SG @40g ai/ha at 15 days' interval.

The trial was conducted with 10 numbers of replications. Minimum number of BPH was recorded at T.O.-II (23 per hill) followed by T.O.-I (26.6 per hill) and farmers practice (45 per hill). Maximum yield was recorded in T.O.-II (44 q/ha) followed

by T.O.-I (42 q/ha) and farmers practice (27 q/ha). Hence, Dinotefuran i.e. T.O.-II was found effective in management of Brown Plant Hopper in Rice.



Table 16: Effect of various insecticides on brown plant hopper incidence, rice yield and economics

Technology option	No. of trials	No. of BPH per hill	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BC ratio
Farmer's practice- No fungicide spray.	10	45 ^b	27 ^c	16785	39040	22255	2.32
T.O. I- Two spraying of Imidachloprid 17.8 SL @ 125ml ai/ha	10	26.6 ^c	42 ^a	17586	50760	33174	2.88
T.O. II - Two spraying of Dinotefuran 20SG @40g ai/ha	10	23 ^a	44 ^b	17950	52800	34850	2.94
CD at 5%		4.70	4.40				
CV		15.86	12.44				

KVK Samastipur

Thematic Area: Integrated Nutrient Management (INM)

Effect of sulphur on growth, yield and economics of soybean in Samastipur

In Samastipur District, low productivity of soybean was recorded at farmers field due to no application of recommended dose of fertilizer with Sulphur. Thus, KVK Samastipur attempted to evaluate different fertilizer dose applications in soybean for augmenting productivity according to state and test based fertilizer recommendations. There were four

technology options along with farmers practice: Farmer practice (40:100:40), T.O.1: RDF (20:80:20), T.O.2: RDF + S 20 kg/ha, T.O.3: RDF + S 30 kg/ha and T.O.4: RDF +S 40 kg/ha. Application of Sulphur @20 kg and 30 kg /ha with RDF showed better in terms of yield and BC Ratio.



Table 17: Effect of sulphur application on soybean yield and economics

Treatments	Yield q/ha	Increase in yield	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net Return (Rs./ha)	BC Ratio
Farmer Practice	14.04	-	25500	49140	23640	1.93
T.O. 1	14.66	0.62	24800	51310	30010	2.06
T.O. 2	16.34	2.30	26800	57190	30390	2.13
T.O. 3	16.98	2.94	27800	59430	31630	2.13
T.O. 4	16.62	2.58	28800	58170	29370	2.01

KVK Jamui

Thematic Area: Weed Management (WM)

Assessment of post emergence herbicide in zero tilled wheat crop

Wheat covers maximum area in rabi season in Jamui district. However, incidence of huge weeds in zero tilled wheat crops is common. On farm trial on assessment of post emergence herbicide in zero tilled wheat crops was conducted at farmer's field in Jamui 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 2: Sulfosulfuron 75% WG @ 25gm ai/ha at 27 days after sowing as compared to other Tech. Option 1 as well as farmer practices. The statistical analysis revealed that Tech. Option 2: Sulfosulfuron at 25 g ha⁻¹ at 27 day, provided higher net return with 1: 2.5 followed by Tech. Option 1 as 1:2.2. So, the farmers became interested in the above Tech. Option 2 to control weeds in wheat crop field.

Technologies selected for assessment/refinement	<p>Farmers practice: No herbicide application</p> <p>Tech option 1: Clodinafop at 60 g ha⁻¹ at 27 DAS</p> <p>Tech option 2: Sulfosulfuron at 25 g ha⁻¹ at 27 DAS</p>
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Table 18: Effect of herbicides on wheat yield and economics

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 effective tillers/M ²	No. of grains per spike	Test wt. (100 grain wt.)					
Farmer practices	10	271.6	43	34.7	26.8	19,850	53,560	33,710	1.7
Tech. Option 1	10	306	44.7	36.8	33.5	20,770	68,150	47,380	2.2
Tech. Option 2	10	316	46	37.8	35.4	20,750	72,180	51,430	2.5

KVK Saharsa

Thematic Area: Water Management (WM)

Assessment of raised bed planting system and mulching on crop establishment in cultivation of Banana

The farmers did not have any knowledge on water budgeting. Thus, an OFT was conducted in the farmers' field (n= 5) with an objective to find out the appropriate cost in cultivation of banana. Crop establishment methods for banana cultivation had high soil moisture in root zone of plant that affected the growth of plants and finally productivity. The furrow irrigated raised bed (FIRB) practice of crop establishment was compared with farmers' practice where establishment of plant in check basin was common. Mulching of furrows by locally available banana leaves was also practiced under trial for the study of volume of water utilized per irrigation and frequency of irrigation in cultivation practices. The volume of water applied per irrigation has been saved by 20 per cent and 25 per cent respectively

in case of FIRB plant establishment and mulching of furrows with banana leaves. The frequency of irrigation was found better in case of mulched furrow. The significant increase in yield has been observed with FIRB plant establishment.



Table 19: Assessment of different crop establishment methods in banana cultivation

Tech. Option/ Treatment	No. of trials	Volume of water utilized (m ³ /ha.)	Frequency of irrigation (Days)	No. of fingers per plant	Finger weight (g)	Yield (q/ha)	Cost of cultivation (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	BC Ratio
Farmer practices: Plants in check basin	05	700	15	212	214	410	88215	184500	96285	2.09
TO I: Plants on FIRB		560	16	228	216	417	80470	187650	107180	2.33



Tech. Option/ Treatment	No. of trials	Volume of water utilized (m ³ /ha.)	Frequency of irrigation (Days)	No. of fingers per plant	Finger weight (g)	Yield (q/ha)	Cost of cultivation (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	BC Ratio
TO II: Plants on FIRB With mulched furrows		520	18	234	214	419	84312	188550	104238	2.24
SEM		0.8734	0.0963	0.1786	N/S	0.1239				
CD at 5%		2.2796	0.2581	0.4625	-	0.3270				

KVK Bhagalpur

Thematic Area: Storage Technology (ST)

Evaluation of different storage method to minimize the post-harvest loss

The district comprises with 35% marginal farmer and major crops grown in the district are rice, maize and wheat. Farmers use rice and wheat for consumption or for seed purpose. But, they do not bother to keep the grain properly. They use only gunny bag for storage of grains and thus 10-20 % of loss in grain during storage is found. An OFT was conducted

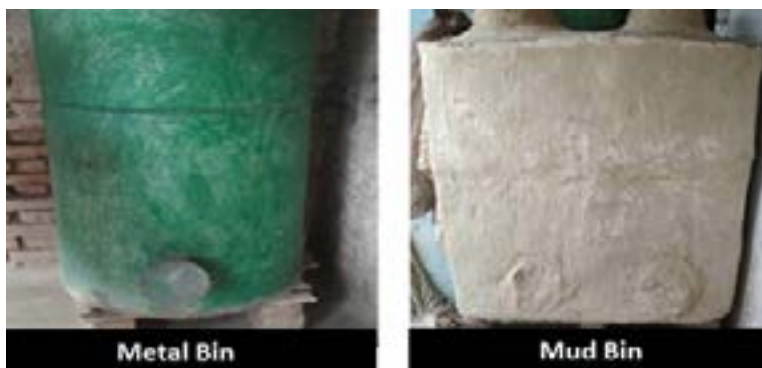
using the following storage materials. The highest seed germination rate with no storage loss as well as no insect infestation was found in Super grain bag (Tech. Opt. - II). This Super grain bag (Tech. Opt. - II) technology also maintained optimum moisture content (Maize - 11.75 %, Rice - 11.38 % and Wheat - 11.45 %).

Details of technologies selected for assessment/ refinement	Farmers’ Practice: Traditional storage method Technology Option 1: General plastic bag Technology Option 2: Super grain bag
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Table 20: Evaluation of different storage materials to minimize the post-harvest loss

Crop : Maize				
Technology option	Storage Loss	Seed Germination Rate	Moisture content	Insect Infestation
Farmer Practice	3 %	70 %	13.50 %	6.5 %
Technology option - 1	2.5 %	72 %	13.15 %	6.0 %
Technology option - 2	Nil	92 %	11.75 %	Nil
Crop : Rice				
Farmer Practice	7.0 %	58 %	13.35 %	7.5 %
Technology option - 1	6.5 %	62 %	13.05 %	6.5 %
Technology option - 2	Nil	90 %	11.38 %	Nil
Crop : Wheat				
Farmer Practice	3.1 %	60 %	13.60 %	6.1 %
Technology option - 1	3.5 %	62 %	13.30 %	5.64 %
Technology option - 2	Nil	90 %	11.45 %	Nil





KVK Rohtas

Thematic Area: Crop Production (CP)

Assessment of different spacing in direct seeded rice for better yield

At recommended spacing (17 cm) a huge loss in direct seeded rice (DSR) crop was recorded due to severe attack of rice blast (07 score) during Kharif, 2017. Row spacing has a major role in the incidence of a disease in a crop. Hence, the present study aimed to assess the incidence of different diseases in DSR sown at different row spacing. The highest yield (5979.9 kg/ha) was recorded in treatment TO₁ (20 cm inter row spacing), followed by TO₂ (25 cm inter row spacing), having yield of 5796.4 kg/ha and FP (17 cm inter row spacing), having yield of 55770.9

kg/ha.. The finding was also supported by BC ratio values. Similar trends were also recorded for number of effective tiller/m² and test weight. Rice blast was also observed to have lowest score (02) in TO₁, followed by TO₂ (03) and FP (05). Similar results were found in Kharif 2018 trails also. These findings revealed that inter row spacing of 20 cm was most suitable for DSR cultivation for getting maximum yield as well as for controlling the rice blast in rice variety Rajendra Sweta.

<p>Details of technologies selected for assessment/refinement</p>	<p>FP :- 17 cm (row to row) TO₁:- 20 cm (row to row) TO₂:- 25 cm (row to row)</p>
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Table 21: Effect of different row spacing on yield and yield components and blast incidence in DSR

Technology option	No. of trials	Yield component			Rice blast scoring (0-9 scale)	Yield (kg/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BC ratio
		No. of effective tillers/m ²	No. of grain per panicle	Test wt. (1000 grain wt.)						
FP	07	334.3	247.14	23	5	5770.9	46775	89449	43674	1.91
TO ₁	07	350.0	248.14	25	2	5979.9*	47694	92688	44994	1.94
TO ₂	07	361.0	248.57	24	3	5796.4	48261	89844	41583	1.86
CD at 5%		34.11	4.56			192.32				

KVK Banka

Thematic Area: Nutrient Management

Effect of feeding multi-nutrient block to suckling kid

In Banka district, mainly Black Bengal goat and some cross with jamunapari and sirohi are found. Black Bengal goats generally give more than 2 kids/ parturition. Milk production is less which is not sufficient for 3-4 kids. It results less growth and sometimes mortality of 1-2 kids. Also when mother goat is died, there is difficult to rear suckling goat for 1 month till the kids are able to graze. Generally, the farmers offer cow milk through bottle feeding.

An OFT for 60 days was undertaken to save suckling kids by offering multi-nutrient block. There were two technology options as depicted as follows. Average daily gain (ADG) was better in case of Technology Option II and Technology Option I as compared to farmers practices. Net profit was higher in case of Technology Option II as compared to Technology Option I and farmers practices. There was no mortality in either of technology options.

Details of technologies selected for assessment/refinement	Farmers practices. Cow milk through bottle Technology Option I: Cow milk through bottle + ad lib Multi-nutrient block Technology Option II: Suckling + ad lib Multi-nutrient block
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Table 22: Effect of Multi-nutrient block on performances of kids

Technology option	Farmer's Practice	Technology Option I	Technology Option II
Initial body weight	2.70±0.12	3.05±0.30	3.06±0.38
Final body weight	4.05±0.21	5.80±0.29	6.13±0.52
Total Gain	1.35±0.14	2.75±0.15	3.07±0.25
ADG	22.51±2.28	45.8±2.55	51.15±4.19
Daily feed cost (Rs)	17.35	15.50	15.50
Gross profit on meat basis	9	18.32	20.46
Net profit	-8.35	2.82	4.96
Mortality%	15	0	0

KVK Madhepura

Thematic Area: Production and Management (P&M)

Effect of feeding UMMB (Pashu chocolate) and mineral mixture on repeat breeding cow

Repeat breeding is a common problem in crossbred cows who suffer from malnutrition as well as minerals deficiency. Hence, a trial was conducted on 18 repeat breeding cows for a period of 60 days.

Details of technologies selected for assessment/refinement	<p>Farmers' practice: Wheat bhusa/ paddy straw + locally available concentrated mixture 1-2 Kg/day</p> <p>TO 1: F.P + Mineral mixture @ 75 gm/day/cow</p> <p>TO 2: F.P + UMMB @ 400 gm/day/cow</p>
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The analysis of data revealed that conception rate of cows was higher in case of TO 1 and TO 2 as compared to the cows under farmer's practice (Table 23). AI required per conception for cows under TO 1 and TO 2 was much less than the cows maintained by farmer's practice. The average dairy milk production as well as total milk production

was significantly higher in cows under T.O II than the cows maintained by farmer's practice (Table 24). Milk Production increased by 20.90% in cows under TO II and 10.30% in cows under TO I. Thus, supplementation of UMMB in repeat breeding cow was more beneficial to reduce the incidences of repeat breeding problem and enhance milk production.

Table 23: Effect of feeding of UMMB and mineral mixture on repeat breeding problem in crossbred cows

Technology option	No. of trials	No. of AI	No. of conceived cow	Conception rate (%)	AI required per conception	Cost of each conception
Farmers Practice: Wheat Bhusa/ Paddy straw+ locally available concentrated mixture 1-2 Kg/day.	6	18	01	16.66 ^a	18	2700.00 ^a
T.O I : F.P + Mineral mixture 75 gm/day/cow	6	16	05	83.33 ^b	3.2	480.00 ^b
T.O II : F.P + UMMB 400 gm/day/cow	6	12	05	83.33 ^b	2.4	360.00 ^c



Table 24: Effect of feeding of UMMB and mineral mixture on milk production in crossbred cows

Technology option	No. of trials	Yield component			Gross Cost (Rs.)	Gross return (Rs)	Net return (Rs.)	BC ratio
		Avg. Milk yield/day/cow (Lt.)	Total Milk Yield/day/cow(Lt.)	%Increase Milk Yield				
Farmers Practice	6	4.64 ±0.26 ^a	278.50±16.32	-	6500.00	9747.5	3247.5	1.49
T.O I :	6	5.11±0.24 ^{ab}	306.95±14.12	10.30	7220.00	10743.25	3523.25	1.48
T.O II :	6	5.60±0.19 ^b	336.08±9.42	20.90	7940.00	11762.9	3822.9	1.48

KVK Muzaffarpur

Thematic Area: Drudgery Reduction (DR)

Comparative performance of small weeding tools for drudgery reduction of farm women

Weeding in crop is important intercultural operation requiring large number of labour and consistence of work for longer period leading to drudgery. Due to migration of poor men to other places, women are

left behind at home for household and farm work. Hence a trial was conducted in 7 farmer’s field on use of women friendly weeding tools.

Details of technologies selected for assessment/refinement	<ul style="list-style-type: none"> • Weeding by Khurpi in line sowing • Weeding by wheel Hoe in line sowing • Weeding by Improved Grabar Refined by KVK Sheohar in line sowing
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The result showed that TO2 performance was efficient in terms of area covered, cost of weeding and time required for weeding with less physical

stress. Thus, introduction of women friendly weeding tools could enhance its popularization and save time, manpower and reduce drudgery.

Table 25: Details of weed mortality and acceptability rate for different weeding implements

Technology option	No. of trials	Area covered (ha/day)	Weed Mortality (%)	Economics		Perception				Acceptability for drudgery reduction & economy
				Cost of Weeding (2 times per crop) (Rs/ha)	Net Saving (Rs/ha)	Blood Pressure (mm Hg)		Heart beat/ minute		
						Before starting of work	After completion of work	Before starting of work	After completion of work	
Farmer practice: Weeding in pulses and vegetables crops by Khurpi in line sowing	07	0.03	95-98	24640 (40 mandays/ha @ Rs 308/-)	-	118/72	124/86	73	79	-
T.O. 1: Weeding in pulses and vegetables crops by wheel Hoe in line sowing		0.13	82-85	14784 (24 mandays/ha @ Rs 308/-)	9856 (40.03%)	118/78	120/82	73	76	Moderately accepted
T.O. 2: Weeding in pulses and vegetables crops by Grabar in line sowing		0.16	85-87	12320 (20 man days/ha @ Rs 308/-)	12320 (50%)	120/80	120/82	73	73	Highly Accepted

Jharkhand

KVK Simdega

Thematic Area: Varietal Evaluation (VE)

Performance assessment of different improved varieties of pigeon pea under rain fed upland situation during Kharif in Simdega District

Three improved varieties of pigeon pea were tested during the year 2018-19 with 12 replications. Pusa-855 provided the highest seed yield (16.2 q/ha) with higher net return and BC ratio followed by Jagriti (ICPL-151) and UPAS- 120. Pusa-855 was found superior as compared to all other varieties.

Table 26: Performances of different improved varieties of pigeon pea

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's practice: Non-descript variety	12	155	10.8	20000	58860	38860	2.94
TO1: UPAS- 120		145	13.9	22000	75755	53755	3.44
TO2: Pusa - 855		156	16.2	22000	88290	66290	4.01
TO3: Jagriti (ICPL-151)		138	14.5	22000	79025	57025	3.59
SEm±		-	0.463	-	1368	1214	-
CD(0.5)		-	1.01	-	3357	3109	-

KVK Gridih

Thematic Area: Crop Production (CP)

Evaluation of rice based cropping systems in medium lands

Maximum area under paddy is either left fallow or cultivated by traditional crops in Rabi season in Gridih district. Therefore, an OFT has been designed to assess the profitability of different paddy based crop sequences in agro climate of Giridih. Rice-Potato

cropping system resulted higher rice equivalent yield (258.5 q/ha) and BC ratio (5.38) as compared to other cropping systems. Thus, Rice-Potato (cv. Kufri Ashoka) cropping system was recommended for the district in irrigated conditions.



Framer's practice: Rice fallow



TO- 3: Rice - Potato (Kufri Ashoka)



Table 27: Yield attributing characters in rice based cropping system

Technology Options	Plant height at harvest (cm)	Effective tiller/m ² at harvest	1000 grain weight (g)	No. of grains/panicle	Grain yield (q/h)	Straw yield (q/h)	Yield of subsequent crop (q/ha)	Rice equivalent yield (q/ha)	BC Ratio
FP: Rice-Fallow	94.6	268	22.7	74	33.0	49.0	-	33.0	1.65
TO-1: Rice-Gram (KPG-59)	95.8	277	23.5	79	33.9	50.4	10.9	57.6	2.88
TO-2: Rice-Wheat (K-9107)	94.7	272	23.2	76	33.4	49.6	39.9	83.4	3.33
TO-3: Rice - Potato (K. Ashoka)	96.2	272	24.0	79	33.4	49.7	225	258.5	5.38
CD (at 0.05)		4.72	23.39	3.49	5.75	3.9	2.31	-	5.34

KVK Gumla

Thematic Area: Integrated Crop Management (ICM)

Identification of high production and income generating alternative system in irrigated upland farming system

The objective was to find out the suitable and profitable alternative system for maximum yield and more income. Thus, an OFT was conducted on different cropping systems at 10 farmer’s fields in the village Gunia (Ghaghra) and Salam Nawatoli (Bishunpur). The data observed during the trial clearly indicated that technology option 2 (i.e. Maize - Potato - Onion) cropping system yielded maximum Maize equivalent yield (MEY) of 211.31 Q/ha, While Maize - Wheat (i.e. FP) yielded 79.76

Q/ha MEY. The maximum net income (Rs. 184552/ha) and BC ratio (2.05) was also observed under TO₂ (i.e. Maize- Potato - Onion) in the same situation. The percentage yield increment under TO₂ was 164.93 and 58.52 which was significantly superior over FP and TO₁. Hence, technology option 2 (i.e. Maize - Potato - Onion) was recommended in irrigated upland farming system for maximum yield and more income.



Table 28: Yield and economics in different cropping systems in irrigated upland farming system

Technology option	No. of replication	Yield	Cost of cultivation (Rs./ha)	Gross income (Rs./ha)	Net income (Rs/ ha)	BC Ratio
		System yield (Maize Equivalent Yield (q/ha))				
FP : Maize - Wheat	10	79.76	70450	135643	65193	1.93
TO ₁ : Maize - Potato		133.30	116350	226610	110260	1.95
TO ₂ : Maize - Potato - Onion		211.31	174675	359227	184552	2.05
SEm±		1.49				
CD(P=0.05)		4.44				

KVK East Singhbhum

Thematic Area: Integrated Pest Management (IPM)

Use of different bio pesticides to manage pod borer of pigeon grain

High infestation of pod borer causes low productivity and profitability in pigeon pea in East Singhbhum district. A field trial was conducted to manage pod borer of pigeon pea. TO-2 (installation of birds perchers + spray of spinosade @ 1ml/ liter of water from pre flowering stage for 3 times at 15

days interval) resulted lowest pod borer infestation (6.6%) and highest yield (15.3 q/ha) as compare to TO-1 (installation of birds perchers + spray of neem based insecticide from pre flowering state for 3 times at 15 days interval) and farmers practice.

Table 29: Effect of different bio pesticides on pod borer in pigeon pea

Treatment	no of trials	Insect pest incidence (%)	Yield q/ ha	Cost of cultivation	Gross return	Net Return	B:C Ratio
PF- Chemical pesticides available in the market like endosulfan rogor etc when symptoms of infestation appear in the field	10	12.7	10.2	21000	61600	33600	1.66
TO1-Installation of birds perchers+ Spraying of neem based insecticide from pre flowering stage for 3 times at 15 days interval.		8.1	12.9	22000	77400	46600	2.11
TO2- Installation of birds perchers + Spraying of Spinosade @ 1ml/ liter of water from pre flowering stage for 3 times at 15 days interval.		6.6	15.3	23500	91800	68300	2.90
CD		1.577	1.543				
CV		0.527	0.515				
SEM		18.236	12.731				



KVK Chatra

Thematic Area: Integrated Disease Management (IDM)

Assessment of bacterial wilt resistant genotypes of tomato

An OFT was conducted to assess the wilt resistant varieties in bio-physical condition of Chatra district in 10 locations. Result indicated that average minimum mortality was observed in Swarn Sampada varieties (5.26%) followed by Swarn Kanchan (7.73%), Swarn Lalima (7.96%). The highest yield (222 q/ha) was recorded in Swarn sampada with Rs. 6400 net

income and 2.84 BC ratio. Keeping the fact under consideration, all three tomato varieties i.e. Swarn Sampada, Swarn Kanchan and Swarn Lalima were recommended for wilt resistant varieties of tomato in bio-physical and socio-economic conditions of the farmers.

Table 30: Assessment of bacterial wilt resistant genotypes of tomato

Technology Assesses	Technical Parameter					Economic Parameters				
	Appearance of disease after transplanting (%)	Intensity of disease on plants at 15, 30, 45 Days DAT (%)				Yield	Cost of cultivation	Gross Income (Rs./ha)	Net Income (Rs./ha)	BC Ratio
		15	30	45	Mean %					
Farmers practices - Rohit-2	4	14	19.6	23.6	19.06	155	39500	93000	53500	2.35
TO-I - Swarn Lalima	01	06	8.4	9.5	7.96	188	46800	112800	66000	2.41
TO-II - Swarn Kanchan	01	06.5	7.8	8.9	7.73	210	46800	126000	79200	2.69
TO-III - Swarn Sampada	-	04	5.4	6.4	5.26	222	46800	133200	86400	2.84



KVK Ranchi

Thematic Area: Storage Technology

Effect of seed treatment with different botanicals on seed quality during storage of green gram under ambient condition of storage

Pulse beetle (*C. chinensis*) seriously damages pulses during storage. To control storage insect pests, several synthetic pesticides are used during storage, but they show adverse effects on environment and persist for longer period in form of residues and entered in the food chain after utilization of grains by the human being and it causes serious human health hazards. The seed treatment with TO3: Neem + Karanj oil recorded significantly higher seed

germination, seedling length, seedling vigor index as compared to other technology options. The low insect infestation at the end of six month of storage was observed in TO3: Neem + Karanj oil (13.25%) followed by TO1: Neem oil (13.5 %) and TO2: Karanj Oil (13.75%) over farmers practice. Seed treatment with karanj oil was low cost technology and easily available at village level as Karanj tree is abundant in the forest of the district.

Table 31: Effect of seed treatment with different botanicals on seed quality during storage of green gram

Technology option	No. of trials	Pulse beetle infestation %		Germination %		Seedling Length		Seedling Vigour Index		Cost of Technology Used (for storage of 2.5 q seed)
		3 month	6 month	3 month	6 month	3 month	6 month	3 month	6 month	
FP: Seed storage with Sindwar leaves	10	9.75	26.25	84.5	71.5	27.07	20.49	2287	1465	-
TO1: Seed treatment with Neem oil @ 10ml/kg seed (Recommended)		4.25	13.50	92.5	92.0	27.65	21.46	2558	1974	1750.00
TO2: Seed treatment with Karanj oil @ 10ml/kg seed		4.75	13.75	92.0	90.0	27.48	21.18	2528	1906	300.00
TO3: Seed treatment with Neem + Karanj oil (1:1) @ 10ml/kg seed		3.75	13.25	93.0	92.0	27.92	21.81	2597	2006	1025.00



KVK Deoghar

Thematic Area: Crop Production (CP)

Performance of rice under different weed control methods in upland condition

Rice cultivation covers maximum area in Kharif season in Deoghar district. However, low yield of rice has been recorded due to lack of organic carbon and high infestation of weeds. On farm trial was conducted with three technology options at farmer's field in Deoghar district with 10 replications. The highest grain yield, net return and BC ratio were recorded in TO 2 as compared to other two technology options.

Details of technologies selected for assessment/refinement	Farmer's practice - Broadcasted Paddy along with manual weeding
	TO 1 - Line sowing of paddy + Dhaincha in between rice rows followed by incorporation in soil at 30 DAS with weeder
	TO 2 - Line sowing of paddy after Broadcasted Dhaincha followed by 2,4 - D @ 0.5 kg/ha at 30 DAS (Brown Manuring).
	TO 3 - Line sowing of paddy with application of Nominee Gold 200 ml/ha at 20 DAS

Table 32: Performance of rice under different weed control methods in upland condition

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/hill	No. of spikelet per panicle	Test wt. (100 grain wt.)						
Farmer's practice	10	78.6	110.3	16.1	11.7	20.3	14700	21540	6840	1.48
TO 1	10	91.8	113.2	26.3	9.8	23.4	16300	25970	9670	1.61
TO 2	10	107.1	114.5	28.2	8.6	27.3	17400	28360	10960	1.66
TO 3	10	92.3	108.4	24.7	10.2	22.8	16200	25920	9720	1.56

Table 33: Effect of different weed control methods on fertility status of soil

Soil sample	Initial soil status					Final soil status				
	pH	O.C. (%)	N (kg/ha)	P (kg/ha)	K (kg/ha)	pH	O.C. (%)	N (kg/ha)	P (kg/ha)	K (kg/ha)
Farmer's practice	5.7	0.48	258.6	12.3	132.7	5.8	0.50	259.6	11.8	141.5
TO 1	5.6	0.49	277.3	10.6	129.4	5.7	0.51	286.3	12.3	137.4
TO 2	5.6	0.46	251.8	11.3	123.6	5.7	0.52	262.1	13.9	135.2
TO 3	5.6	0.47	262.5	9.7	120.5	5.5	0.48	270.4	10.8	126.1



KVK Dumka

Thematic Area: Feed and Fodder

Evaluation of suitable concentrate feed using locally available feed ingredients in crossbred cattle

The lack of quality feed is prevailed in villages of Dumka District. Hence, an OFT with three technology options was designed for feeding of concentrate feed using locally available feed ingredients at farmer's field in Dumka. Significant

increase in milk production was observed in case of all three technology options (Table 34). An increase in Fat% and SNF % was also observed in TO1, TO2 and TO3 as compare to farmer's practice (Table 35 and Table 36).

Details of technologies selected for assessment	Farmer's practice- Wheat bran & cake in 3:1 ratio
	TO 1 - Maize 50% + wheat bran 25% + MOC 22% + MM 2% + salt 1%
	TO 2 - Maize 30% + Jawar 20% + wheat bran 25% + MOC 22% + MM 2% + salt 1%
	TO 3- Maize 30% + Broken rice 20%+ wheat bran 25% + MOC 22% MM 2% + salt 1%

Table 34: Mean ± S.E of milk production (kg) at different interval of time

Gr/ days	0 day	15 day	30 day	45 day	60 day	75 day	90 day
FP	7.26±0.33	7.15±0.37	7.43±0.34	7.50±0.31	7.58±0.33	7.68±0.31	7.63±0.34
TO 1	7.86±0.31	8.25±0.36	8.76±0.42	9.0±0.41	9.01±0.38	8.9±0.37	8.88±0.39
TO 2	7.58±0.35 ^a	7.85±0.35 ^a	8.31±0.36 ^b	8.67±0.37 ^b	8.66±0.40 ^b	8.75±0.37 ^b	8.73±0.42 ^b
TO 3	7.05±0.29 ^a	7.41±0.38 ^{ab}	7.90±0.27 ^{bc}	8.26±0.19 ^c	8.45±0.20 ^c	8.58±0.23 ^c	8.33±0.27 ^c

Means bearing the same superscript in a row did not vary significantly

Table 35: Mean ± S.E of fat% at different interval of time

Gr/ days	0 day	15 day	30 day	45 day	60 day	75 day	90 day
FP	3.85±0.12	3.80±0.13	3.86±0.14	3.91±0.17	3.83±0.11	3.85±0.15	3.88±0.18
TO 1	4.33±0.06 ^a	4.4±0.05 ^{ab}	4.66±0.08 ^c	4.61±0.10 ^{bc}	4.61±0.07 ^{bc}	4.6±0.08 ^{bc}	4.61±0.06 ^{bc}
TO 2	3.51±0.09 ^a	3.8±0.08 ^{ab}	3.9±0.12 ^b	4.0±0.1 ^b	4.01±0.09 ^b	3.95±0.16 ^b	3.91±0.17 ^b
TO 3	3.53±0.16 ^a	3.71±0.17 ^{ab}	3.8±0.18 ^{ab}	3.95±0.16 ^{ab}	4.03±0.14 ^{ab}	4.06±0.12 ^b	4.05±0.14 ^b

Means bearing the same superscript in a row did not vary significantly



Table 36: Mean ± S.E of SNF % at different interval of time

Gr/ days	0 day	15 day	30 day	45 day	60 day	75 day	90 day
FP	8.25±0.16	8.31±0.15	8.51±0.23	8.28±0.15	8.3±0.15	8.26±0.12	8.21±0.10
TO 1	8.15±0.13 ^a	8.35±0.17 ^{ab}	8.66±0.22 ^{abc}	8.83±0.20 ^{bc}	8.88±0.22 ^{bc}	8.95±0.19 ^{bc}	9.03±0.17 ^c
TO 2	8.0±0.16 ^a	8.21±0.18 ^{ab}	8.4±0.22 ^{ab}	8.56±0.17 ^{ab}	8.55±0.16 ^{ab}	8.68±0.19 ^b	8.75±0.17 ^b
TO 3	8.13±0.13 ^a	8.2±0.11 ^{ab}	8.45±0.14 ^{abc}	8.61±0.18 ^{bc}	8.58±0.15 ^{abc}	8.81±0.16 ^c	8.85±0.13 ^c

Means bearing the same superscript in a row did not vary significantly



KVK Godda

Thematic Area: Food and Nutrition

Value addition of traditional badis through different leafy and other vegetables

An OFT was designed with three technology options and 10 replications to enhance value of traditional badis using different leafy and other vegetables. All three technology options gave good shelf life with

taste in comparison to farmers practice. Among the options tested, maximum shelf life with good taste and colour was observed when badi was prepared with TO 2: cowpea + drumstick leaves (5: 1).

Details of technologies selected for assessment/refinement	Farmers’ practice: Badis made with cowpea TO 1: Cowpea + tomato pulp (5 : 1) TO 2: Cowpea + drumstick leaf (5 : 1) TO 3: Cowpea + spinach leaves (5 : 1)
------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------



Table 37: Effect of value addition on traditional badis

Technology option	No. of trials	Yield component				Cost of Preparation (Rs/500 gm)	Expected Gross return (Rs/1 K.g.)	Expected Net return (Rs/500 gm)	BC ratio
		Shelf life (days)	Colour	Texture	Taste				
Farmer's practice	10	120	Normal	Semi Soft	Good	75	120	60	1.60
TO 1		155	Good	Semi Soft	Good	85	160	75	1.88
TO 2		200	Good	Semi Soft	Very Good	80	160	70	2.00
TO 3		180	Dull	Semi Soft	Good	80	160	70	2.00

4.2 Frontline Demonstrations (FLD)

4.2.1 Pulses and oilseeds

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 alongwith 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 pulse and oilseed crops 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 2018 and Rabi 2018-19 by the KVKs for an area of 2184.83 ha to involve 9293 numbers of farmers of this zone.

Table 38: State wise details of Frontline Demonstration on Pulses and Oilseeds

State	Oilseed		Pulses		Other than Oilseed & Pulse		Total	
	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)
Bihar	77	31.50	369	112.80	3147	856.50	3593	1000.80
Jharkhand	657	212.00	1802	194.13	3241	777.90	5700	1184.03
Total	734	243.50	1171	306.93	6388	1634.40	9293	2184.83

Table 39: Details of Frontline 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	Mustard	Bihar	77	31.50	11.35	8.82	25.46	21387.50	50128.00	28740.50	2.45	18675.00	36373.00	17693.00	1.96
		Jharkhand	488	157.00	11.57	7.73	46.72	16391.46	48187.08	32143.31	3.42	13966.54	31501.46	17558.00	2.32
		Total	565	188.50											
2	Niger	Jharkhand	130	43.00	4.08	3.05	34.02	10831.11	20460.11	9628.67	1.91	9686.11	16216.33	6530.22	1.66
		Total	130	43.00											
3	Ground-nut	Jharkhand	39	12.00	14.37	9.44	51.58	28300.00	74183.33	46216.67	1.86	22983.33	43660.00	20676.67	1.31
		Total	39	12.00											
		G. Total	734	243.50											



FLD on Ground Nut



FLD on Niger



FLD on Sesame



FLD on Sunflower

Table 40: Details of Frontline Demonstration on Rabi Pulses

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	Pigeon Pea	Jharkhand	299	80.80	11.81	7.30	45.32	20579.00	56709.30	36130.30	2.56	18410.00	44966.50	26556.50	2.36
		Total	299	80.80											
2	Chickpea	Bihar	93	24.75	16.00	12.52	30.75	25662.50	72521.50	46859.00	2.84	24400.00	56824.00	32424.00	2.33
		Jharkhand	190	47.00	13.45	9.67	38.58	22537.50	53528.63	31491.13	2.26	20628.57	45918.00	25289.43	2.01
		Total	283	71.75											
3	Lentil	Bihar	209	71.25	17.11	13.77	28.24	22400.00	64666.25	42266.25	2.93	20601.50	51963.75	31362.25	2.50
		Total	209	71.25											
4	Green Gram	Jharkhand	114	25.00	7.90	5.00	59.38	26771.25	53998.75	27227.50	1.96	17950.00	35686.67	17736.67	1.68
		Total	114	25.00											
5	Fieldpea	Bihar	35	6.00	73.90	55.15	26.57	48285.00	133100.00	84815.00	2.76	48285.00	101850.00	53565.00	2.20
		Jharkhand	96	16.00	45.75	29.76	43.75	32937.50	95702.50	62765.00	2.50	36916.67	73933.33	37016.67	1.95
		Total	131	22.00											
6	Black Gram	Jharkhand	61	15.00	7.97	5.77	38.98	19733.33	41500.00	21766.67	2.14	17633.33	30111.67	12478.33	1.71
		Total	61	15											

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
7	Chickpea	Jharkhand	15	5.00	13.60	9.20	47.83	20000.00	46580.00	26580.00	2.33	20000.00	31510.00	11510.00	1.58
		Total	15	5.00											
8	Rajma	Bihar	5	0.80	20.00	0.00	0.00	38085.00	12000.00	81915.00	3.15	0.00	0.00	0.00	0.00
		Total	5	0.80											
9	Garden pea	Jharkhand	12	0.33	118.50	89.50	32.40	92550.00	237000.00	144450.00	2.56	87250.00	179000.00	91750.00	2.05
		Total	12	0.33											
10	Green Gram	Bihar	27	10.00											
	(Summer)	Jharkhand	15	5.00											
		Total	42	15.00											
		G. Total	1171	306.93											



FLD on Lentil



FLD on Chick Pea



FLD on Green Gram



FLD on Field Pea

4.2.2 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 1634.40 ha. In

paddy, an area of 690.40 ha was brought under demonstration by the KVKs of Bihar and Jharkhand. The increase in yield in demonstration over local check was higher (33.05) recorded.

In wheat, KVKs of Bihar and Jharkhand brought 290.90 ha under demonstration programme. Advantage in yield in the demonstration over local check was between 23 - 33 per cent with highest benefit-cost ratio of 1.7.

In maize, demonstration was conducted in an area of 160.9 ha by the KVKs of Bihar and Jharkhand. Average demonstration yield over local check was highest 40.92 per cent in Jharkhand followed by per

cent in 20.48 in Bihar and benefit-cost ratio was 1.7.

Other crops included okra, onion, ragi, bittergourd, marigold and cauliflower demonstrated by the KVKs. All these crops produced higher yield by 37 per cent in demonstration over local check. The 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 41.

Table 41: Details of Frontline Demonstration of 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	973	435.40	41.27	33.84	22.71	31853.31	69053.36	38088.93	2.11	30909.76	56766.55	25864.35	1.75
		Jharkhand	768	255.00	36.45	26.30	43.46	30366.38	58845.76	27308.43	1.92	28045.50	42125.00	14092.45	1.46
		Total	1741	690.40											
2	Wheat	Bihar	475	141.10	35.10	29.08	22.92	30433.12	62461.82	32161.06	1.91	29844.82	53095.24	23250.42	1.58
		Jharkhand	389	149.80	32.75	25.30	31.21	26720.71	56987.68	30848.89	2.18	24575.71	42725.43	18178.29	1.82
		Total	864	290.90											
3	Maize	Bihar	145	37.50	737.50	522.25	20.48	34561.25	99140.50	64579.25	2.29	28516.67	87000.00	58483.33	1.50
		Jharkhand	424	123.40	101.40	74.03	40.92	38335.71	140626.57	102290.86	3.16	25757.14	53839.64	28082.50	2.10
		Total	569	160.90											
4	Jute	Bihar	200	101.00	29.25	21.37	38.19	23500.00	70715.00	66340.00	4.08	18400.00	63823.50	41373.50	3.02
		Total	200	101.00											
5	Okra	Bihar	61	2.18	85.67	58.33	29.58	35750.00	63933.33	46183.33	2.74	36000.00	61500.00	48500.00	2.84
		Jharkhand	311	71.00	168.67	138.33	16.59	33500.00	129000.00	95500.00	3.11	40000.00	153600.00	113600.00	3.84
		Total	372	73.18											
6	Cowpea	Bihar	41	1.40	123.65	84.05	45.09	29000.00	161176.50	132175.00	5.50	26500.00	110175.00	83525.00	4.15
		Jharkhand	159	40.50	96.25	71.97	35.77	39500.00	67875.00	28375.00	2.52	37000.00	51610.00	14610.00	1.57
		Total	200	41.90											
7	Brinjal	Bihar	145	6.99	272.53	216.62	21.39	64867.60	204019.00	147951.40	3.42	58428.67	156131.11	80320.22	2.70
		Jharkhand	135	18.90	290.91	218.21	35.75	58083.71	197730.00	139646.29	3.18	59613.33	160446.67	100833.33	2.76
		Total	280	25.89											
8	Fodder	Bihar	63	7.50	511.67	390.33	31.10	23783.33	68416.67	39633.33	2.16	22500.00	52583.33	30083.33	1.91
		Jharkhand	51	16.00	317.50	256.50	23.50	24250.00	65250.00	41000.00	2.52	21000.00	50700.00	29500.00	2.43
		Total	114	23.50											
9	Tomato	Bihar	152	10.86	388.23	277.48	40.17	104013.89	275629.44	181393.33	2.49	103384.63	221972.25	140837.63	2.11
		Jharkhand	158	12.80	426.67	268.73	50.25	76100.00	256721.25	179371.25	3.04	79950.00	216348.57	136398.57	2.53
		Total	310	23.66											
10	Millet	Bihar	16	0.46	350.00	210.00	66.60	65500.00	170000.00	104500.00	2.59	57750.00	105000.00	47250.00	1.81



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
		Jharkhand	76	21.86	24.25	19.16	27.98	19193.33	48136.67	25872.67	2.54	17780.00	38319.33	20539.33	2.18
		Total	92	22.32											
11	Cauli-flower	Bihar	152	14.77	228.92	183.26	24.00	55336.98	209821.39	151992.79	3.70	49854.32	145356.69	116208.28	3.02
		Jharkhand	82	6.40	261.35	190.74	38.66	52887.50	173999.50	121112.00	3.30	46400.00	121306.50	74906.50	2.67
		Total	234	21.17											
12	Potato	Bihar	51	13.90	250.83	218.10	15.34	81097.50	164077.50	82955.00	2.08	81590.00	142170.00	60580.00	1.78
		Jharkhand	25	4.00	252.95	186.14	39.96	75645.00	208387.50	132722.50	3.35	73841.00	158400.00	38006.50	2.45
		Total	76	17.90											
13	Onion	Bihar	63	10.90	331.83	245.50	30.79	90628.33	255229.17	164600.83	2.87	86128.33	195062.50	108934.17	2.26
		Jharkhand	30	6.00	221.75	157.25	40.20	62645.00	222100.00	154455.00	3.44	60270.00	150700.00	90430.00	2.47
		Total	93	16.9											
14	Veg. Pea	Bihar	25	1.00	79.28	62.50	26.84	28500.00	138740.00	110240.00	4.86	27500.00	109375.00	81875.00	3.97
		Jharkhand	20	15.00	215.00	125.00	72.00								
		Total	45	16.00											
15	Litchi	Bihar	40	15.00	314.34	199.49	38.66	85432.50	274080.00	188649.50	3.24	65176.00	205175.00	139999.00	2.56
		Total	40	15.00											
16	Oats	Bihar	34	12.50	282.50	235.50	21.90	18375.00	58250.00	39875.00	2.70	18000.00	48750.00	30750.00	2.30
		Total	34	12.5											
17	French bean	Jharkhand	75	12.00	59.00	55.30	5.60	50000.00	88500.00	38500.00	1.77	48000.00	82950.00	34950.00	1.72
		Total	75	12.00											
18	Cucurbits	Bihar	59	8.67	147.00	114.50	32.64	126000.00	351900.00	225900.00	2.45	121500.00	288900.00	167400.00	1.53
		Total	59	8.67											
19	Bottle Gourd	Bihar	40	6.00	330.00	250.00	24.00	20000.00	120000.00	100000.00	6.00	24000.00	88000.00	64000.00	3.60
		Jharkhand	20	2.00	315.00	224.50	40.41	24900.00	157500.00	132600.00	6.06	24450.00	112250.00	87800.00	4.39
		Total	60	8.00											
20	Bitter Gourd	Bihar	2	0.25	180.00	100.00	80.00	93000.00	300000.00	210000.00	1.25	70000.00	250000.00	180000.00	1.00
		Jharkhand	26	6.20	305.53	163.00	28.05	256500.00	621300.00	364800.00	2.30	101150.00	300000.00	198850.00	1.96
		Total	28	6.45											
21	Marigold	Bihar	30	3.00	142.50	90.00	40.83	42500.00	146950.00	104450.00	3.47	40750.00	95000.00	54250.00	2.33
		Jharkhand	19	1.17	129.80	76.82	66.23	56000.00	177600.00	88266.67	3.17	52333.33	106425.00	54091.67	2.09
		Total	49	4.17											
22	Chilli	Bihar	56	0.68	94.08	77.16	21.39	107090.00	191600.00	154510.00	3.37	101925.00	151200.00	117775.00	2.74
		Jharkhand	33	3.00	242.50	193.00	18.41	79171.00	322500.00	243329.00	4.03	79000.00	211750.00	132750.00	2.62
		Total	89	3.68											
23	Elephant Foot Yam	Bihar	15	0.51	261.25	208.50	24.02	95000.00	565000.00	470000.00	5.95	95000.00	439000.00	344000.00	4.62
		Jharkhand	204	3.00	520.00	380.00	136.80	100000.00	165200.00	65200.00	1.63	0.00	0.00	0.00	0.00



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
		Total	219	3.51											
24	Pineapple	Bihar	15	3.00	395.00	325.00	21.54	225000.00	711000.00	486000.00	3.16	220000.00	585000.00	365000.00	2.66
		Total	15	3.00											
25	Mango	Bihar	5	2.50	131.00	85.00	46.00	34000.00	157200.00	123200.00	4.62	25200.00	102000.00	76800.00	4.04
		Total	5	2.50											
26	Cabbage	Bihar	20	1.20	189.10	141.15	33.94	35702.50	95250.00	59547.50	2.53	32500.00	150600.00	118100.00	4.63
		Jharkhand	40	1.00	510.00	322.00	58.38	60300.00	255000.00	194700.00	4.22	45800.00	161000.00	115200.00	3.51
		Total	60	2.20											
27	Kauni	Bihar	12	2.00	5.00	4.00	25.00	8000.00	15500.00	7500.00	1.90	8500.00	10000.00	1500.00	1.17
		Total	12	2.00											
28	Garlic	Jharkhand	10	2.00	148.60	124.60	19.26	87000.00	297200.00	210200.00	3.42	85000.00	249200.00	164200.00	2.93
		Total	10	2.00											
29	Ginger	Bihar	10	0.50	179.00	138.00	29.71	85600.00	650000.00	564400.00	7.59	85600.00	530000.00	444400.00	6.19
		Jharkhand	20	0.80	160.00	150.00	21.00	206165.00	513000.00	306835.00	2.50	227166.00	450000.00	222834.00	1.98
		Total	30	1.30											
30	Ridge Gourd	Jharkhand	10	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	10	1.00											
31	Broccoli	Bihar	30	0.10	132.20	80.00	27.50	190150.00	416600.00	226450.00	2.83	24550.00	72000.00	47450.00	1.47
		Jharkhand	27	0.81	155.10	157.50	211.60	66250.00	237160.00	170910.00	3.62	61750.00	213500.00	151250.00	3.45
		Total	57	0.91											
32	Capsicum	Bihar	28	0.62	122.69	102.00	19.60	167320.50	381625.00	214304.50	2.17	34320.50	61200.00	26879.50	0.85
		Jharkhand	5	0.40	212.00	0.00	0.00	50000.00	121000.00	71000.00	1.42	0.00	0.00	0.00	0.00
		Total	33	1.02											
33	Strawberry	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	0.50											
34	Turmeric	Bihar	10	0.50	223.00	170.00	31.17	85500.00	750000.00	664500.00	8.77	85500.00	632000.00	546500.00	7.39
		Total	10	0.50											
35	Saag	Bihar	5	0.20	3.00	2.00	50.00	3000.00	1100.00	1900.00	2.70	2700.00	1200.00	1500.00	2.25
		Jharkhand	8	0.16	92.69	60.29	54.31	33500.00	108965.00	75465.00	3.25	33000.00	71155.00	43155.00	2.53
		Total	13	0.36											
36	Carrot	Jharkhand	4	0.16	120.20	76.15	57.84	35000.00	120200.00	85200.00	3.43	30000.00	60920.00	30920.00	2.03
		Total	4	0.16											
37	Other Crops	Bihar	171	13.81											
		Jharkhand	112	3.54											
		Total	283	17.35											
		G. Total	6388	1634.40											



FLD on Paddy



FLD on Wheat



FLD on Brinjal



FLD on Capsicum



FLD on Strawberry



FLD on Marigold

4.2.3 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, 2363 number of farmers was involved in such demonstration for the benefit of 11640 livestock. Out of the total number of farmers, 1242 number of farmers was involved in Bihar and 1121 in Jharkhand. However, in terms of livestock, 1512 number of livestock was brought under improved rearing practices in Jharkhand followed by 522 in Bihar. In fishery, 101 numbers of demonstrations were taken up by the KVKs to cover a water area of 93.50 ha in respect of both the

involvement of the farmers and water area brought under demonstration.



FLD on vaccination

Table 42: State wise details of Frontline Demonstration on Livestock and Fishery

Sl. No.	Category	State	No. of Farmers	Area (ha)/No
1	Livestock	Bihar	1242	2255
		Jharkhand	1121	9385
		Total	2363	11640
2	Fishery	Bihar	79	71.50
		Jharkhand	22	22.00
		Total	101	93.50

4.2.4 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 1350 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 788 enterprises involving 11171 farmers and KVKs of Jharkhand demonstrated 562 enterprises covering 1186 farmers.

Table 43: State wise details of Frontline Demonstration on other Enterprises

Category	State	No. of Farmers	No. of Enterprises
Other Enterprises	Bihar	1171	788
	Jharkhand	1186	562
	Total	2357	1350



FLD on vermicompost



FLD on bee keeping



FLD on mushroom production



FLD on value addition products

4.2.5 Farm Implements:

Various farm tools and implements were also demonstrated in this zone for the benefit of 4758 farmers. The tools and implements were demonstrated in 1366.7 ha area. The KVKs of Jharkhand brought

750 ha area for such demonstrations involving 3691 farmers and 1094 farmers to cover 616.70 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 44: State wise details of Frontline Demonstration on Farm Implement s

Category	State	No. of Farmers	Area (ha)/No
Farm Implement	Bihar	1094	616.70
	Jharkhand	3691	750.00
	Total	4785	1366.70

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

2018 and Rabi 2018-19 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 Kharif Pulses:

In CFLD on pulse crops during Kharif 2018, pigeon pea, black gram, green gram and horse gram were selected for demonstration as per the communication received from DAC& FW. Altogether 3063 ha was allotted for kharif pulses of which 3635 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, 34-35 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 pigeon pea, an area of 690 ha was brought under the CFLD programme by the KVKs of Bihar and Jharkhand. The details are given in Table 45.

Table 45: Cluster Frontline Demonstration on Kharif Pulses during 2018-19

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	738	295	897	295	16.16	11.51	40.42	4.65
		Jharkhand	925	370	1146	395	12.47	8.77	42.09	3.69
		Total	1663	665	2043	690				
2	Black Gram	Bihar	25	10	25	10	11.63	9.55	21.78	2.08
		Jharkhand	500	200	579	200	9.41	6.04	55.66	3.36
		Total	525	210	604	210				
3	Horse Gram	Bihar	50	20	55	15	11.20	8.50	31.76	2.70
		Jharkhand	325	130	322	120	7.21	5.16	39.86	2.06
		Total	375	150	377	135				
4	Chick pea	Bihar	25	10	25	10	11.52	9.10	26.59	2.42
		Jharkhand	50	20	26	10	13.58	9.70	40.00	3.88
		Total	75	30	51	20				
5	Green Gram	Jharkhand	350	140	480	150	9.80	6.51	50.57	3.29
6	Sesame	Jharkhand	50	20	52	20	4.14	2.90	42.76	1.24
7	Field Pea	Jharkhand	25	10	28	10	16.50	14.80	11.49	1.70
		Grand Total	3063	1225	3635	1235				

4.3.2 Rabi Pulses:

In Rabi 2018-19, lentil, chick pea and field pea were brought under clustered demonstration programme by the KVKs of Bihar and Jharkhand to cover an area

of 1662.60 ha. The performance of demonstration in lentil showed that 47.14 per cent average increase was recorded in Bihar and 38.44 percent in Jharkhand. In chick pea, the KVKs of Bihar and Jharkhand reported an average increase in yield to the extent

of 41.43 per cent in Jharkhand and 38.53 per cent in Bihar. Another pulse crop, field pea taken up for demonstration produced 43.83 per cent higher yield in both the states. The details are given in Table 46.

Table 46: Cluster Frontline Demonstration on Rabi Pulses during 2018-19

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	2063	825	2243	835	14.12	10.20	38.44	3.92
		Jharkhand	250	100	314	110.16	11.07	7.53	47.14	3.55
		Total	2313	925	2557	945.16				
2	Chick Pea	Bihar	825	330	978	350	15.45	11.15	38.53	4.30
		Jharkhand	525	210	659	187.39	13.60	9.62	41.43	3.98
		Total	1350	540	1637	537.39				
3	Field Pea	Bihar	300	120	413	120	16.20	12.51	29.55	3.70
		Jharkhand	125	50	125	30.05	14.60	9.23	58.12	5.37
		Total	425	170	538	150.05				
4	Green Gram	Jharkhand	75	30	25	10	9.77	8.00	22.13	1.77
5	Pigeon Pea	Bihar	50	20	57	20	18.60	14.22	30.80	4.38
	Grand Total		4213	1685	4814	1662.60				

4.3.3 Summer Pulses:

Clustered frontline demonstration was also taken by the KVKs of Bihar and Jharkhand on green gram and black gram to cover an area of 360.2 ha against the target 390 ha. In green gram, 180 ha area was covered by KVKs of Bihar whereas in Jharkhand,

200 ha was brought under demonstration. In Green gram, 260.25 ha was brought under demonstration programme in this zone of which 120.2 ha in Jharkhand and 140 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 47.

Table 47: Cluster Frontline Demonstration on Summer Pulses during 2018-19

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	Green Gram	Bihar	475	190	407	140	9.37	6.76	38.60	2.61
		Jharkhand	275	110	309	120.25	8.37	5.88	42.53	2.50
		Total	750	300	716	260.25				
2	Black Gram	Bihar	50	20	50	20	7.86	5.83	34.82	2.03



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		
		Jharkhand	150	60	154	60	8.29	5.65	46.68	2.64
		Total	200	80	204	80				
3	Chick Pea	Jharkhand	25	10	48	20	15.50	14.50	6.90	1.00
		Grand Total	975	390	968	360.25				



CFLD on Kharif Pulse



CFLD on Rabi Pulses

4.3.4 Kharif Oilseeds:

Clustered frontline demonstration was also conducted in oilseed crops both in Kharif 2018, Rabi and Summer 2018-19 by the KVKs of this zones. In kharif, ground nut, sesame, niger and soybean were demonstrated in 588.6 ha against the allotted target of 610 ha. Ground nut, which was demonstrated in Bihar and Jharkhand for an area of 155 ha produced 52.35 per cent more yield over local check. Sesame

covered an area of 150 ha in both the states and the increase in yield was in the range of 41-42 per cent, highest increase being recorded in Jharkhand (48.01 per cent). Another oilseed crop, niger was demonstrated in Bihar and Jharkhand to cover an area of 158.6 ha. The increase in average demonstration yield was in the range of 36.1 per cent. The KVKs of Bihar and Jharkhand conducted clustered frontline demonstration programme in soybean for an area of 55 ha. The details are given in Table 48.

Table 48: Cluster Frontline Demonstration on Kharif Oilseed during 2018-19

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	60	10	11.23	6.50	72.77	4.73
		Jharkhand	400	160	449	145	14.62	11.07	32.02	3.55
		Total	425	170	509	155				
2	Sesame	Bihar	100	40	105	40	19.21	4.23	35.467	14.99
		Jharkhand	275	110	277	110	5.36	3.62	48.01	1.74
		Total	375	150	382	150				

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		
3	Niger	Bihar	25	10	30	10	4.37	3.24	34.88	1.13
		Jharkhand	437.5	175	363	148.6	5.07	3.57	42.12	1.50
		Total	462.5	185	393	158.6				
4	Soybean	Bihar	63	25	64	25	18.39	15.03	22.36	3.36
		Jharkhand	75	30	86	30	14.37	6.93	107.21	7.43
		Total	138	55	150	55				
5	Mustard	Jharkhand	100	40	145	60	11.95	8.35	43.11	3.60
6	Sunflower	Jharkhand	25	10	16	10	6.50	2.50	160.00	4.00
		Grand Total	1525.5	610	1595	588.6				

4.3.5 Rabi Oilseeds:

In Rabi 2018-19, Rabi oilseeds were demonstrated by the KVKs of Bihar and Jharkhand for an area of 1257.8 ha. In rapeseed -mustard, the KVKs of Bihar reported 40.20 per cent increase in demonstration

yield over local check, while in Jharkhand it was 47.34 per cent. In linseed, the demonstration programme in clustered mode produced 42.44 per cent higher yield over the local check. The KVKs of Bihar recorded the highest increase of 51.5 per cent, whereas it was 33.33 per cent in Jharkhand.

Table 49: Cluster Frontline Demonstration on Rabi Oilseed during 2018-19

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	1775	710	1880	700	14.09	10.05	40.28	4.05
		Jharkhand	700	280	840	307.7	9.89	6.71	47.34	3.18
		Total	2475	990	2720	1007.7				
2	Linseed	Bihar	250	100	254	90	10.37	6.85	51.50	3.53
		Jharkhand	225	90	278	90.1	7.26	5.44	33.39	1.82
		Total	475	190	532	180.1				
3	Lentil	Jharkhand	100	40	54	20	8.87	6.75	31.41	2.12
4	Ground Nut	Jharkhand	50	20	29	10	13.80	12.50	10.40	1.30
5	Safflower	Jharkhand	25	10	27	10	5.90	3.20	84.38	2.70
5	Sunflower	Jharkhand	25	10	25	10	9.10	6.10	49.18	3.00
6	Sesame	Jharkhand	25	10	60	20	3.20	2.50	28.00	0.70
		Grand Total	3175	1270	3447	1257.8				

4.3.6 Summer Oilseeds:

Clustered frontline demonstration was also conducted during summer 2019 for an area of 70 ha against the allotted area of 85 ha. The crops identified

were sesame, ground nut and sunflower. The state-wise target and actual conduct of demonstration are given in the following Table 50.

Table 50: Cluster Frontline Demonstration on Summer Oilseeds during 2018-19

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	Sunflower	Bihar	113	45	44	30	16.37	13.98	17.14	2.40
2	Ground Nut	Bihar	50	20	39	20	18.90	17.80	6.18	1.10
2	Sesame	Jharkhand	50	20	57	20	4.80	4.15	15.66	0.65
Grand Total			213	85	140	70				



CFLD on Kharif Oilseed



CFLD on Summer Oilseed



CFLD on Rabi Oilseed



CFLD on Rabi Pulses

4.4 Training Achievements

4.4.1 Practicing Farmers:

Adequate knowledge and skill development are essential for the sustainable development of agriculture and allied sectors at the 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 5728 numbers of training programmes was organized by the KVKs during 2018-19 covering 1,96,414 farmers. Participation of farm women in these training programmes was 58,451 (29.75%), whereas number of farm men was 1,37,963 (70.25%).

Table 51: Training Programme for farm men and women at a Glance

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	4066	82811	19255	102066	16740	9478	26218	3636	2219	5855	103187	30952	134139
Jharkhand	1662	14942	8894	23836	5627	4755	10382	14207	13850	28057	34776	27499	62275
Total	5728	97753	28149	125902	22367	14233	36600	17843	16069	33912	137963	58451	196414



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 5,728 programmes, 1176 courses were conducted in crop production related areas, 601 in horticulture, 682 in livestock production and management, 827 in plant protection, 656 in home science and women empowerment, 519 in soil health and fertility management, 395 in agricultural engineering, 147 in fisheries, 149 in production of inputs, 230 in capacity building and group dynamics and 13 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 38,961 farmers and 9,687 farm women in crop production thematic area. Among various sub-thematic areas, highest number of courses offered in cultivation of vegetables (601) followed by integrated crop management (311) and integrated disease management (206). Other sub-thematic areas in order of courses organized were poultry farming (98), seed production (161), disease management in livestock (203), integrated nutrient management (124), feed management (105), dairy management (121), weed management (108), 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 (61), integrated farming (91), crop diversification (39), off-season vegetable cultivation (82), installation and maintenance of micro irrigation systems (7) and others as shown in the following Table 52.

In horticulture as a whole, 933 numbers of courses were organized for 31,101 farmers of which 9,014 were women (29.13%). Among seven sub-thematic areas, highest number of courses was offered in cultivation of vegetable crops (601) followed by cultivation of fruit (213), ornamental plants (29), 20 for tuber crop, 20 for medicinal and 19 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, 682 numbers of training programmes was organized for 23,475 farmers. Disease management and Dairy management were the two major areas where 201 and 121 numbers of training programmes were conducted by the KVKs for 7,415 and 4,469 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 827 number of courses for the benefit of 29,449 farmers of which 5,902 (20.04%) participants was farm-women. In terms of courses offered and participation took place, home science/women empowerment was the next important thematic area, where 827 courses were conducted for 29,449 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 519 numbers of courses covered for 18,687 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, 395 numbers of courses were offered to 12,141 farmers out of which 136 courses were in repair and maintenance of farm machinery. The participation of farmers in this sub-thematic area was to the extent of 4,467 numbers (36.79%). Installation and maintenance of micro-irrigation systems was the second-most important area where 81 courses were offered to 2,632 farmers. The overall participation of farm-women was to the tune of 20 per cent. In fisheries, 147 numbers of courses were conducted by the KVKs for the involvement of 3,767 farmers and farm women.

KVKs also conducted 230 numbers of courses for 9,174 farmers and farm-women in capacity building and group dynamics. Major areas covered in this thematic area included formation and management of SHGs (42 number), entrepreneurial development of farmers/youths (84 number of courses), group dynamics (33 courses), leadership development (20 number) and others. However, highest number of participation was recorded in entrepreneurial development of farmers (3,844) followed by formation and management of SHGs (875), group dynamics (831) and others. Training programme under the thematic area of production of inputs was conducted for 5,995 participants. Seed production

and vermicompost production were two major areas of training. The KVKs also organized 13 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 52: Training Programme for farm men and women during 2018-19

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	39	554	97	651	147	95	242	177	146	323	878	338	1216
Cropping Systems	122	1815	608	2423	938	607	1545	686	572	1258	3439	1787	5226
Integrated Crop Management	311	5946	662	6608	1103	308	1411	679	461	1140	7728	1431	9159
Integrated Farming System	91	832	337	1169	266	201	467	541	1111	1652	1639	1649	3288
Integrated nutrient management	48	1000	103	1103	283	107	390	158	99	257	1441	309	1750
Nursery Management	33	566	133	699	135	74	209	222	138	360	923	345	1268
Others, (cultivation of crops)	56	972	259	1231	169	145	314	125	57	182	1266	461	1727
Production of organic inputs	66	1247	195	1442	261	125	386	149	113	262	1657	433	2090
Resource Conservation Technologies	80	1968	268	2236	368	104	472	147	154	301	2483	526	3009
Seed Production	161	2660	580	3240	513	267	780	443	289	732	3616	1136	4752
Water management	61	1197	300	1497	230	148	378	180	159	339	1607	607	2214

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
Weed Management	108	1811	364	2175	475	168	643	311	133	444	2597	665	3262
Sub Total	1176	20568	3906	24474	4888	2349	7237	3818	3432	7250	29274	9687	38961
II. Horticulture													
a) Vegetable Crops													
Crop geometry	59	1956	294	2250	265	123	388	349	936	1285	2570	1353	3923
Export potential vegetables	118	2369	641	3010	356	142	498	163	163	326	2888	946	3834
Grading and standardization	32	622	104	726	99	85	184	113	76	189	834	265	1099
Integrated nutrient management	40	811	78	889	241	46	287	27	14	41	1079	138	1217
Nursery raising	100	1878	427	2305	371	249	620	332	325	657	2581	1001	3582
Off-season vegetables	82	1071	261	1332	256	196	452	400	290	690	1727	747	2474
Others, if any (Cultivation of Vegetable)	52	838	335	1173	146	159	305	359	297	656	1343	791	2134
Production of low volume and high value crops	118	1899	467	2366	411	196	607	254	463	717	2564	1126	3690
Sub Total	601	11444	2607	14051	2145	1196	3341	1997	2564	4561	15586	6367	21953
b) Fruits													
Cultivation of Fruit	50	707	163	870	228	63	291	236	126	362	1171	352	1523
Export potential fruits	9	109	25	134	39	21	60	17	5	22	165	51	216
Layout and Management of Orchards	54	1119	176	1295	151	79	230	184	53	237	1454	308	1762
Management of young plants/orchards	26	443	189	632	82	45	127	78	34	112	603	268	871
Micro irrigation systems of orchards	7	35	33	68	13	19	32	26	117	143	74	169	243
Others, if any(INM)	10	117	42	159	13	17	30	6	21	27	136	80	216
Plant propagation techniques	18	213	48	261	45	16	61	126	62	188	384	126	510

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
Rejuvenation of old orchards	30	457	105	562	72	32	104	101	76	177	630	213	843
Training and Pruning	9	86	33	119	19	12	31	28	18	46	133	63	196
Sub Total	213	3286	814	4100	662	304	966	802	512	1314	4750	1630	6380
c) Ornamental Plants													
Export potential Ornamental	2	31	26	57	7	5	12	2	2	4	40	33	73
Management of potted plants	6	52	22	74	11	7	18	16	14	30	79	43	122
Nursery Management	14	209	62	271	58	32	90	72	72	144	339	166	505
Others, if any	2	23	17	40	1	5	6	0	0	0	24	22	46
Production and Management technology	1	0	0	0	0	0	0	21	8	29	21	8	29
Propagation techniques of Ornamental Plants	4	27	54	81	6	49	55	17	10	27	50	113	163
Sub Total	29	342	181	523	83	98	181	128	106	234	553	385	938
d) Plantation crops													
Others, if any	1	0	6	6	0	8	8	6	8	14	6	22	28
Processing and value addition	9	123	23	146	43	11	54	18	20	38	184	54	238
Production and Management technology	22	261	45	306	44	26	70	52	49	101	357	120	477
Sub Total	32	384	74	458	87	45	132	76	77	153	547	196	743
e) Tuber crops													
Grdding and standardization	1	2	1	3	0	0	0	1	12	13	3	13	16
Processing and value addition	5	97	15	112	7	0	7	0	0	0	104	15	119
Production and Management technology	14	174	28	202	47	40	87	58	36	94	279	104	383
Sub Total	20	273	44	317	54	40	94	59	48	107	386	132	518
f) Spices													
Processing and value addition	4	22	5	27	5	11	16	27	11	38	54	27	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
Production and Management technology	15	92	38	130	15	15	30	207	119	326	314	172	486
Sub Total	19	114	43	157	20	26	46	234	130	364	368	199	567
g) Medicinal and Aromatic Plants													
Nursery Management	4	89	26	115	10	5	15	5	0	5	104	31	135
Others, if any	4	73	12	85	15	8	23	3	0	3	91	20	111
Post harvest technology and value addition	5	99	11	110	11	4	15	8	3	11	118	18	136
Production and Management technology	7	67	9	76	29	2	31	35	45	80	131	56	187
Sub Total	20	328	58	386	65	19	84	51	48	99	444	125	569
III. Soil Health and Fertility Management													
Integrated Nutrient Management	124	2145	727	2872	438	244	682	455	452	907	3038	1423	4461
Management of Problematic soils	25	266	77	343	115	34	149	154	152	306	535	263	798
Micro nutrient deficiency in crops	35	483	103	586	146	47	193	140	70	210	769	220	989
Nutrient Use Efficiency	23	331	179	510	38	114	152	75	210	285	444	503	947
Others, if any	30	1479	99	1578	118	66	184	110	61	171	1707	226	1933
Production and use of organic inputs	79	1053	373	1426	205	172	377	377	381	758	1635	926	2561
Soil and Water Conservation	43	521	132	653	143	72	215	185	135	320	849	339	1188
Soil and Water Testing	73	1575	323	1898	387	122	509	246	111	357	2208	556	2764
Soil fertility management	87	1903	288	2191	336	77	413	289	153	442	2528	518	3046
Sub Total	519	9756	2301	12057	1926	948	2874	2031	1725	3756	13713	4974	18687
IV. Livestock Production and Management													
Dairy Management	121	2439	679	3118	558	360	918	263	170	433	3260	1209	4469
Disease Management	203	3852	1059	4911	927	518	1445	600	459	1059	5379	2036	7415



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
Feed management	105	1601	436	2037	432	187	619	217	224	441	2250	847	3097
Fish management	2	32	1	33	3	2	5	0	0	0	35	3	38
Goat farming	78	1023	548	1571	316	270	586	240	186	426	1579	1004	2583
Others, if any	22	398	147	545	126	99	225	130	109	239	654	355	1009
Piggery Management	35	121	100	221	169	75	244	343	174	517	633	349	982
Poultry Management	98	1344	549	1893	336	268	604	380	525	905	2060	1342	3402
Production of quality animal products	18	182	66	248	68	80	148	41	43	84	291	189	480
Sub Total	682	10992	3585	14577	2935	1859	4794	2214	1890	4104	16141	7334	23475
V. Home Science/Women empowerment													
Design and development of low/ minimum cost diet	32	227	391	618	72	152	224	69	132	201	368	675	1043
Designing and development for high nutrient efficiency diet	21	151	228	379	23	202	225	8	31	39	182	461	643
Drudgery reduction	42	541	383	924	102	76	178	26	41	67	669	500	1169
Enterprise development	43	592	497	1089	208	245	453	80	153	233	880	895	1775
Formation and management of SHG	2	5	0	5	8	0	8	14	15	29	27	15	42
Gender mainstreaming through SHGs	18	75	274	349	54	208	262	0	40	40	129	522	651
Household food security by kitchen gardening and nutrition gardening	172	1402	2616	4018	579	1079	1658	424	812	1236	2405	4507	6912
Income generation activities for empowerment of rural Women	61	534	663	1197	177	547	724	56	234	290	767	1444	2211

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	15	202	213	415	30	124	154	7	36	43	239	373	612
Minimization of nutrient loss in processing	21	33	277	310	12	90	102	23	72	95	68	439	507
Others, if any	43	813	223	1036	239	118	357	6	2	8	1058	343	1401
Rural Crafts	18	129	145	274	8	125	133	29	52	81	166	322	488
Small scale processing	8	119	80	199	8	23	31	0	0	0	127	103	230
Storage loss minimization techniques	27	590	249	839	95	94	189	49	71	120	734	414	1148
Value addition	94	696	995	1691	201	473	674	125	286	411	1022	1754	2776
Women and child care	39	82	577	659	33	322	355	0	108	108	115	1007	1122
Sub Total	656	6191	7811	14002	1849	3878	5727	916	2085	3001	8956	13774	22730
VI. Agril. Engineering													
Farm Mechanization	6	147	0	147	18	0	18	0	0	0	165	0	165
Installation and maintenance of micro irrigation systems	81	1519	120	1639	323	57	380	354	259	613	2196	436	2632
Others, if any	43	515	114	629	110	40	150	313	151	464	938	305	1243
Post Harvest Technology	36	442	146	588	143	86	229	111	81	192	696	313	1009
Production of small tools and implements	46	643	197	840	157	128	285	169	37	206	969	362	1331
Repair and maintenance of farm machinery and implements	136	2524	420	2944	611	230	841	406	276	682	3541	926	4467
Small scale processing and value addition	23	252	24	276	92	33	125	91	61	152	435	118	553
Use of Plastics in farming practices	24	475	62	537	116	20	136	45	23	68	636	105	741
Sub Total	395	6517	1083	7600	1570	594	2164	1489	888	2377	9576	2565	12141
VII. Plant Protection													



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
Bio-control of pests and diseases	95	1839	580	2419	445	177	622	377	309	686	2661	1066	3727
Integrated Disease Management	206	3902	593	4495	1070	464	1534	347	216	563	5319	1273	6592
Integrated Pest Management	430	9627	1163	10790	1714	562	2276	1357	692	2049	12698	2417	15115
Others, if any	58	1527	471	1998	335	181	516	251	107	358	2113	759	2872
Production of bio control agents and bio pesticides	38	497	244	741	217	75	292	42	68	110	756	387	1143
Sub Total	827	17392	3051	20443	3781	1459	5240	2374	1392	3766	23547	5902	29449
VIII. Fisheries													
Breeding and culture of ornamental fishes	1	8	1	9	1	0	1	0	0	0	9	1	10
Carp breeding and hatchery management	16	251	65	316	23	6	29	9	24	33	283	95	378
Carp fry and fingerling rearing	2	22	7	29	3	1	4	2	19	21	27	27	54
Composite fish culture & fish disease	58	1105	171	1276	284	59	343	0	0	0	1389	230	1619
Fish Farming	5	90	0	90	8	0	8	0	0	0	98	0	98
Fish feed preparation & its application to fish pond, like nursery, rearing & stocking pond	15	271	27	298	55	14	69	46	15	61	372	56	428
Fish Processing & value addition	1	25	0	25	5	0	5	0	0	0	30	0	30
Hatchery management and culture of freshwater prawn	5	81	4	85	29	7	36	17	11	28	127	22	149
Integrated fish farming	36	585	24	609	135	7	142	53	27	80	773	58	831
Others, if any	3	52	7	59	15	8	23	0	0	0	67	15	82
Post stocking management	1	19	0	19	0	0	0	0	0	0	19	0	19

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
Prawn farming with carp culture	3	47	1	48	6	0	6	0	0	0	53	1	54
Water quality and its management	1	14	0	14	1	0	1	0	0	0	15	0	15
Sub Total	147	2570	307	2877	565	102	667	127	96	223	3262	505	3767
IX. Production of Inputs at site													
Bio-fertilizer production	5	51	11	62	32	9	41	22	9	31	105	29	134
Bio-pesticides production	4	41	15	56	14	7	21	29	10	39	84	32	116
Organic manures production	11	67	46	113	34	21	55	116	105	221	217	172	389
Others, if any	21	622	185	807	62	84	146	151	92	243	835	361	1196
Planting material production	13	168	32	200	46	12	58	55	40	95	269	84	353
Production of fish feed	5	20	9	29	7	7	14	128	59	187	155	75	230
Production of livestock feed and fodder	8	99	26	125	52	17	69	28	35	63	179	78	257
Seed Production	31	409	28	437	75	18	93	189	87	276	673	133	806
Small tools and implements	1	6	4	10	0	4	4	7	7	14	13	15	28
Vermi-compost production	50	1019	450	1469	251	198	449	346	222	568	1616	870	2486
Sub Total	149	2502	806	3308	573	377	950	1071	666	1737	4146	1849	5995
X. Capacity Building and Group Dynamics													
Entrepreneurial development of farmers/youths	84	1925	684	2609	554	411	965	139	131	270	2618	1226	3844
Formation and Management of SHGs	42	687	311	998	96	125	221	43	82	125	826	518	1344
Group dynamics	33	503	39	542	95	48	143	78	68	146	676	155	831
Leadership development	20	611	41	652	55	18	73	58	24	82	724	83	807
Mobilization of social capital	18	439	96	535	95	65	160	15	0	15	549	161	710

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	4	140	105	245	79	105	184	0	0	0	219	210	429
Others, if any	23	477	132	609	88	63	151	34	25	59	599	220	819
Value addition	3	40	26	66	26	30	56	0	0	0	66	56	122
WTO and IPR issues	3	173	20	193	13	59	72	0	3	3	186	82	268
Sub Total	230	4995	1454	6449	1101	924	2025	367	333	700	6463	2711	9174
XI. Agro-forestry													
Integrated Farming Systems	7	60	11	71	36	12	48	45	29	74	141	52	193
Nursery Management	4	39	8	47	27	3	30	29	10	39	95	21	116
Production technologies	1		3	3			0	7	23	30	7	26	33
Seed Production	1	0	2	2	0	0	0	8	15	23	8	17	25
	13	99	24	123	63	15	78	89	77	166	251	116	367
Grand Total	5728	97753	28149	125902	22367	14233	36600	17843	16069	33912	137963	58451	196414

4.4.2 Rural Youth:

To make the rural youth self-employed, KVKs of Zone-IV conducted various enterprise-oriented training programmes in a planned way for a large number of rural youths during 2018- 19. In the course of inculcating knowledge and skill, KVKs conducted 1,406 numbers of training programmes for the benefit of 37,452 rural youths covering 25,861 rural boys and 11,554 rural girls during 2018- 19. Among the participants 16.54% were in the category of Schedule Caste and 24.62% in Schedule Tribe. A total of 1406 courses were offered for 37,452 rural youths. In terms of preferred courses, mushroom

production was mostly preferred by the trainees (7,180). The second highest number of trainees (4,076) was recorded for vermin culture training followed by 2,727 numbers of trainees for seed production training. Sheep and goat farming was taken by 1,298 people in 53 courses. Dairying was chosen by 2,045 participants in 88 courses, value addition in 65 courses for 1,666 trainees, poultry production in 37 courses for 872 trainees, integrated farming in 45 courses for 1,345 trainees, and post harvest technology in 22 courses for 545 trainees. Overall trend showed that rural youths including girls have relied on the training from KVKs for self employment generation and additional income.

Table 53: Training Programme for Rural Youth at a Glance

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
Bihar	918	12679	4424	17103	2863	1867	4730	476	490	966	16018	6781	22799
Jharkhand	488	3583	1455	5028	799	587	1362	5502	2749	8241	9843	4773	14653
Total	1406	16262	587	22131	3662	2454	6092	5978	3239	9207	25861	11554	37452



Training on Dairying for Rural Youth in Bihar



Training on Mushroom Production for Rural Youth in Jharkhand

Table 54: Training Programmes for Rural Youth during 2018-19

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	62	1011	257	1268	289	98	387	238	90	328	1538	445	1983
Commercial fruit production	15	220	40	260	18	9	27	9	17	26	247	66	313
Composite fish culture	48	735	103	838	175	30	205	50	25	75	960	158	1118
Cultivation of fruit.	3	36	6	42	23	8	31	17	4	21	76	16	92
Dairying	88	1138	384	1522	239	127	366	94	63	157	1418	574	2045
Enterprise development	43	306	221	527	71	56	127	153	46	199	530	323	853
Fish harvest and processing technology	4	75	5	80	6	1	7	0	0	0	81	6	87
Fry and fingerling rearing	3	45	3	48	14	5	19	13	6	19	72	14	86
Integrated farming system	45	716	153	869	125	105	230	201	54	255	1042	312	1354
Mushroom Production	229	2336	1256	3592	468	441	909	1762	917	2679	4566	2614	7180
Nursery Management of Horticulture crops	93	1245	172	1417	197	44	241	148	50	198	1590	266	1856
Ornamental fisheries	2	33	0	33	1	6	7	3	2	5	37	8	45



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			
Others if any	21	306	100	406	46	30	76	5	7	12	357	137	494
Para extension workers/ enterprenuer	6	26	11	37	2	2	4	168	41	209	196	54	250
Para vets	11	126	5	131	14	1	15	53	51	104	193	57	250
Pesticide & fertilizer applicator	7	48	55	103	11	32	43	5	13	18	64	100	164
Piggery	18	117	9	126	107	30	113	88	62	150	311	101	412
Planting material production	32	467	69	536	135	25	160	80	47	127	682	141	823
Post Harvest Technology	22	245	82	327	125	36	161	15	42	37	385	160	545
Poultry production	37	315	54	369	119	61	180	150	182	332	584	297	872
Production of organic inputs	52	543	170	713	129	92	221	171	62	233	844	325	1169
Production of quality animal products	15	128	55	183	58	34	92	61	70	131	247	159	396
Protected cultivation of vegetable crops	34	415	109	524	72	20	92	107	49	156	594	178	772
Quail farming	7	111	19	130	2	2	4	0	3	3	113	24	137
Repair and maintenance of farm machinery and implements	67	829	142	971	229	88	317	154	18	172	1211	249	1460
Rural Crafts	18	149	299	448	16	108	124	56	8	64	221	415	636
Seed production	112	1675	224	1899	280	93	373	412	50	462	2367	367	2727
Sericulture	5	56	14	70	5	18	23	60	22	82	121	54	175
Sheep and goat rearing	53	538	163	701	170	122	292	147	148	305	855	433	1298
Small scale processing	13	90	150	240	31	73	104	35	19	54	156	242	398
Soil Fertility	13	166	8	174	24	1	25	34	3	37	224	12	236

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
Tailoring and Stitching	26	11	451	462	8	154	162	0	55	55	19	660	679
Training and pruning of orchards	27	353	130	483	77	76	153	88	81	169	518	287	805
Value addition	65	291	693	984	101	313	414	62	205	267	455	1211	1666
Vermiculture	110	1361	267	1618	275	113	388	1339	727	2066	2987	1089	4076
Grand Total	1406	16262	5879	22131	3662	2454	6092	5978	3239	9207	25861	11554	37452

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 687 courses were conducted for 29,861 extension functionaries. In these training programmes, 5,190 female and 24,671 male participated.. 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 126 courses were organized

for 6,220 extension functionaries in the field of productivity enhancement in field crops. At the same time 83 courses in integrated pest management for 4,625 persons, 69 courses in integrated nutrient management for 2,264 persons and 24 courses in livestock feed and fodder production for 1,013 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 55 and Table 56. 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.



Training on Integrated Pest Management for Extension Functionaries in Bihar



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

Table 55: Training Programme for Extension Functionaries at a Glance

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			
Bihar	491	17248	2503	19751	2550	717	3267	248	134	382	20046	3354	23400
Jharkhand	196	2385	650	3035	427	301	728	1813	885	2698	4625	1836	6461
Grand Total	687	19633	3153	22786	2977	1018	3995	2061	1019	3080	24671	5190	29861

Table 56: Training Programme for Extension Functionaries during 2018-19

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	11	373	59	432	46	6	52	94	23	117	513	88	601
Care and maintenance of farm machinery and implements	31	1419	80	1499	200	27	227	82	18	100	1701	125	1826
Crop intensification	21	274	24	298	30	11	41	259	10	269	563	45	608
Formation and Management of SHGs	12	261	108	369	13	25	38	10	6	16	284	139	423
Gender mainstreaming through SHGs	9	192	12	204	15	10	25	41	11	52	248	33	281
Group Dynamics and farmers organization	11	152	34	186	27	13	40	68	15	83	247	62	309
Household food security	21	164	252	416	33	82	115	24	26	50	221	360	581
Information networking among farmers	10	241	74	315	35	19	54	19	6	25	295	99	394
Integrated Nutrient management	69	1260	240	1500	204	132	336	204	224	428	1668	596	2264
Integrated Pest Management	83	3440	321	3761	502	102	604	206	54	260	4148	477	4625
Livestock feed and fodder production	24	706	78	784	125	40	165	37	27	64	868	145	1013
Low cost and nutrient efficient diet designing	13	175	63	238	27	15	42	50	44	94	252	122	374
Management in farm animals	35	541	556	1097	105	104	209	166	55	221	812	715	1527
Others, if any	56	2004	123	2127	281	36	317	166	48	214	2451	207	2658
Production and use of organic inputs	55	1445	255	1700	277	108	385	134	53	187	1856	416	2272
Productivity enhancement in field crops	126	4681	379	5060	698	140	838	208	114	322	5587	633	6220



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			
Protected cultivation technology	36	816	83	899	92	33	125	104	84	188	1012	200	1212
Rejuvenation of old orchards	24	545	70	615	95	13	108	109	68	177	749	151	900
Value addition	25	690	186	876	100	44	144	45	106	151	835	336	1171
Women and Child care	9	195	135	330	32	48	80	5	22	27	232	205	437
WTO and IPR issues	6	59	21	80	40	10	50	30	5	35	129	36	165
Grand Total	687	19633	3153	22786	2977	1018	3995	2061	1019	3080	24671	5190	29861

4.4.4 Sponsored Training Programme:

KVKs of Zone-IV are working hard to reach at 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 clientele 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 (388) was offered in crop production and management for 40,397 participants followed by horticultural crops production (207) for 6,034, agricultural extension (91) for entrepreneurship development 3,386 participants, livestock and fisheries (82) for 8,480 participants and others. The trend of participation indicated that the sponsoring organizations preferred to get their clientele trained in those areas where the participants might start their own venture for self-employment.

Table 57A: State-wise Sponsored Training Conducted During 2018- 19

State	No. of Courses	General			SC			ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Bihar	659	33734	4621	38355	4307	1241	5548	1728	1439	3167	39769	7301	47070
Jharkhand	348	17220	2494	19714	2197	918	3115	1474	1065	2539	20891	4477	25368
Total	1007	50954	7115	58069	6504	2159	8663	3202	2504	5706	60660	11778	72438

Table 57 B: Sponsored Training Conducted during 2018- 19

Area of Training	No. of Courses	General			SC			ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Crop Production & Management	388	30734	3921	34655	3346	1124	4470	832	440	1272	34912	5485	40397
Horticultural Crops Production	207	3678	442	4120	303	80	383	1029	502	1531	5010	1024	6034
Entrepreneurship Development	91	1836	457	2293	299	165	464	405	224	629	2540	846	3386
Livestock Production & Management	82	5750	1025	6775	1101	271	1372	149	184	333	7000	1480	8480
Production and use of Organic Inputs	59	2572	250	2822	301	76	377	198	97	295	3071	423	3494
Post Harvest technology & Value Addition	58	667	59	726	185	23	208	10	0	10	862	82	944
Agricultural Extension	54	2871	415	3286	362	214	576	195	61	256	3428	690	4118
Farm Machinery	44	2498	381	2879	540	176	716	137	89	226	3175	646	3821
Home Science	24	348	165	513	67	30	97	247	907	1154	662	1102	1764
Total	1007	50954	7115	58069	6504	2159	8663	3202	2504	5706	60660	11778	72438



Sponsored Training Programme on Value addition of seasonal fruits in Bihar



Sponsored Training Programme on Livestock Production and Management in Jharkhand



4.4.5 Vocational Training Programme:

KVKs of the Zone organized about 500 vocational training programmes to address unemployment problem of the rural youths. 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 2018-19, KVKs of Zone-IV organized 500 courses in different areas of agriculture and allied sectors which covered 9,610 rural boys and 4,091 rural girls. Category wise analysis of vocational training showed that rural youths and girls preferred maximum training in mushroom production i.e. 2,382 rural boys and 1,246 girls were trained through 99 courses during the year. Commercial vegetable production was on demand by many of the trainees, 514 rural youth took this training through 24 courses. Tailoring, stitching, embroidery, dying etc. were preferred by 278 rural girls and they were being trained through 13 courses. About 805 participants were trained in dairy management in 39 courses. Similarly, 287 rural youths had chosen poultry farming as their desired vocation and was trained through 14 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.



Vocational Training Programme involving rural women in Bihar



Vocational Training Programme on Commercial Fruit Production in Jharkhand

Table 58: State-wise Vocational Training Programme During 2018-19

State	No. of Courses	Grand Total		
		Male	Female	Total
Bihar	314	6280	2198	8478
Jharkhand	186	3330	1893	5152
Total	500	9610	4091	13630

Table 59: Vocational Training Programme during 2018-19

Area of Training	No. of Courses	Grand Total		
		Male	Female	Total
Beekeeping	8	141	27	168
Commercial Fruit Production	24	403	111	514
Dairy Management	39	603	202	805
Enterpreneurship Development	47	693	422	1115
Farm Mechanization	21	163	77	240
Gaot farming	19	290	65	355
Income generation	21	293	141	419
Integrated farming system	13	223	93	316
Integrated Nutrient management	13	321	14	325
Mushroom Production	99	2382	1246	3582
Organic Farming	5	80	26	106
Poultry farming	14	240	47	287
Production of Organic Input	59	1983	717	2700
Protected cultivation	7	102	60	162
Seed Production	28	511	95	606
Tailoring and Stitching	13	39	278	317
Value addition	14	99	230	329
Vegetable cultivation	36	636	188	824
Vermicompost production	11	225	40	265
Soil & water testing	5	100	5	105
Fish production	4	83	7	90
Grand Total	500	9610	4091	13630

4.5 Extension Programmes

In creating awareness about advanced agricultural and allied technologies among the farmers, KVKs of Zone-IV organized 1,67,169 number of various extension activities to reach out 7,13,244 farmers and extension officials. Among the beneficiaries farmers constituted 7,01,180 numbers of participants and 30,852 were extension officials. Gender-wise classification indicates that 2,50,808 numbers of farm women took part in various extension activities against 4,50,109 numbers of farm men. In respect of extension officials, however, there are 30,852 members were women extension officials and 26,801 were male extension officials. In respect of programme organized, advisory service was the most important programme for the KVKs where

80,240 numbers of advisory services were provided to 1,81,567 numbers of farmers and farmwomen. A total of 294 soil health camp was organized involving 5,634 famers and extension officials. Another important category was workshop where 158 numbers of programmes were organized by the KVKs to facilitate 79,661 beneficiaries. The KVKs also extended their expertise through delivering 1,837 numbers of lectures as resource person for 19,230 farmers. The KVK personnel also paid visit 62,178 times to the farmers' field to interact with 54,021 numbers of farmers and farmwomen. Method demonstration was also very important activity of KVKs where 4,018 farmers were benefited by organizing 276 numbers of programme. KVKs had conducted as many as 132 numbers of farmer seminars where 11,902 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.



Kishan ghoshti organized in Jharkhand



Soil health Distributed in Bihar



Animal Health Camp organized in Bihar



Animal Health Camp organized in Jharkhand

Table 60: Extension Activities Organized by Different States during 2018- 19

Name of Extension Activity	Bihar		Jharkhand	
	No. of Activities	No. of Participants	No. of Activities	No. of Participants
Advisory Services	75853	75705	4387	104574
Agri mobile clinic	85	1007	35	750
Celebration of important days	182	9973	64	5099
Diagnostic visits	2797	2248	878	7441

Name of Extension Activity	Bihar		Jharkhand	
	No. of Activities	No. of Participants	No. of Activities	No. of Participants
Exhibition	226	12729	29	13378
Farmers Seminar	67	6792	65	5110
Farmers visit to KVK	41048	20329	21130	33723
Field Day	495	5458	217	11284
Film Show	461	8319	138	7198
Group meetings	141	1905	87	3550
International Yoga Day	19	406	8	121
Kisan Choupal	105	2210	0	0
Kisan Ghosthi	886	42617	221	14222
Kisan Mela	125	46232	56	58641
Lectures delivered as resource persons	1089	9826	748	9404
Mahila Kisan Divas	41	5510	30	3704
Mahila Mandals Conveners meetings	25	1635	25	973
Method Demonstrations	210	3034	66	1373
Parthenium Awareness Week	10	299	8	69
Scientific visit to farmers field	10081	14321	1910	14852
Self Help Group Conveners meetings	176	1270	31	1195
Soil health Camp	71	1701	223	3933
Soil test campaigns	384	1900	61	2715
Swachhata Pakhwda	356	5608	346	14060
Workshop	88	12574	70	67087
World Soil Day	74	981	8	1433
Training through Video Conferencing	68	1178	0	0
Rabi/ Kharif Krishak Sammelan	52	1926	18	1365
Any Other	407	11611	526	11487
Total	135622	309578	31385	398741

4.5.1 Other Extension Activities

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. KVKs of Zone-IV conducted 56,090 number of such extension activities for the benefit

of farmers. KVKs prepared and distributed 52,192 extension literature depicting cultivation techniques of crops, vegetables, fish rearing, livestock rearing etc. in local vernacular. KVKs of Bihar developed and distributed 10,274 extension literature, while KVKs of Jharkhand developed and distributed 41,918 extension literature. KVK personnel delivered



The Hon'ble Minister of Agriculture and Farmers Welfare, GoI, Shri Radha Mohan Singh ji visited Kisan Kalyan Mela at East Champaran, Bihar



Mahila Kishan Diwas Programme held on 15.10.18

TV talk 12 times in Jharkhand, 138 times in Bihar. Activities of KVKs of Zone IV also were published

through newspaper by 3,119 times.

Table 61: Others Extension Activities Performed by Different States during 2018-19

Nature of Extension Activity	No. of Activities		Total
	Bihar	Jharkhand	
Extension literature	10274	41918	52192
Popular articles	232	150	382
Other publication	51	14	65
Radio talks	158	24	182
TV talks	138	12	150
News paper coverage	3046	73	3119
Total	13899	42191	56090

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

5.1 Seed Produced by 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 2018-19, the KVKs produced 11876.0825 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.

Table 62: State-wise Seed Production during 2018-19

State	Seed Production (q)
Bihar	9630.2130
Jharkhand	2245.8695
Total	11876.0825



Table 63: Crop-wise Seed Production during 2018- 19

Crop Type	Name of Crop	Quantity of Seed (q)
Cereals	Paddy	5482.0500
	Wheat	2634.2500
	Paddy	757.9900
	Maize	6.1720
	Finger millet	4.9300
Pulses	Chickpea	315.9600
	Lentil	201.7300
	Pigeon pea	199.4900
	Green Gram	60.8350
	Field Pea	16.0700
	Horse Gram	1.2000
	Rajma	0.9400
	Black Gram	0.9000
	Urad	0.3800
	Mustard	170.3650
Oilseeds	Linseed	20.3200
	Sesame	9.7400
	Groundnut	6.9100
	Niger	6.5500
	Soybean	3.6800
Commercial Crops	Sugarcane	1178.1500
	Potato	264.0000
	Mushroom	1.3000
	Marigold	0.0500
Vegetables	Elephant Foot Yam	111.2000
	Veg. Pea	46.0840
	Lobia	17.0000
	Tomato	0.0400
	Cowpea	0.0200
	French Bean	0.0146
	Sponge Gourd	0.0106
	Brinjal	0.0096
	Tomato	0.0075
	Capsicum	0.0020
Fodder Crops	Cucumber	0.0002
	Barseem	299.0000
Spices	Lathyrus	1.2000
	Turmeric	45.0000
Fiber Crops	Chili	0.0020
	Jute	2.7000
Others	Dhaincha	9.8300
Grand Total		11876.0825

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 2018-19, 25.19 lakh no. of planting materials were produced by the KVKs which earned revenue of Rs. 14785044.80. The number of beneficiaries covered under this programme was 49,650 in Zone-IV.



Seed production in Bihar



Seed production in Jharkhand

Table 64: State-wise Production of Planting Materials by KVKs during 2018-19

Commercial	Bihar			Jharkhand			Total		
	No. of Plants	Value (Rs.)	No. of Farmers	No. of Plants	Value (Rs.)	No. of Farmers	No. of Plants	Value (Rs.)	No. of Farmers
Fruits	186050	10578285.00	6272	57594	813377.00	6083	243644	11391662.00	12355
Vegetable Seedlings	1005009	198498.00	5367	967451	758751.30	10729	1972460	957249.30	16096
Spices	2 quintal	7000.00	18	4.24 quintal	14840.00	440	6.24 quintal	21840.00	458
Medicinal and Aromatic	7012	70120.00	1505	26646	23970.00	16765	33658	94090.00	18270
Ornamental Plants	9990	274785.00	705	29264	42889.50	641	39254	317674.50	1346
Fodder	0	0.00	0	63400	19300.00	162	63400	19300.00	162
Forest Species	150000	1500000.00	563	0	0.00	0	150000	1500000.00	563
Tuber	509	6729.00	5	650	19000.00	24	1159	25729.00	29
Plantation	15250	457500.00	371	0	0.00	0	15250	457500.00	371
Total	1373820	13092917.00	14806	1145005	1692127.80	34844	2518825	14785044.80	49650

Table 65: Plant-wise Production of Planting Materials by KVKs of Bihar and Jharkhand during 2018-19

Commercial	Planting Materials	Bihar			Jharkhand		
		No. of Plants	Value (Rs.)	No. of Farmers	No. of Plants	Value (Rs.)	No. of Farmers
Fruits	Mango	128992	8997930.00	3014	18104	419570.00	2972
	Guava	23873	559160.00	773	7871	156513.00	367
	Banana	10628	406550.00	764	0	0.00	0

Commercial	Planting Materials	Bihar			Jharkhand		
		No. of Plants	Value (Rs.)	No. of Farmers	No. of Plants	Value (Rs.)	No. of Farmers
	Papaya	9463	52025.00	691	26936	104599.00	459
	Litchi	7453	386370.00	237	483	30695.00	83
	Lime	2456	66815.00	382	1000	35000.00	142
	Others	1500	60000.00	15	0	0.00	0
	Pomegranate	920	32005.00	135	0	0.00	0

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. A large quantity of 208462 kg bio-fertilizers including vermicompost was produced by KVKs.

Table 66: State-wise Bio-Product Productions by KVKs during 2018-19

Name of Bio-Product	Bihar			Jharkhand		
	Quantity (Kg/Lit.)	Value (Rs.)	No. of Farmers	Quantity (Kg/Lit.)	Value (Rs.)	No. of Farmers
Bio-fertilizers including vermicompost	143358	9,86,527	232	65104	34,26,060	318
Bio-pesticide	500	-	50	34	1,190	-
Bio-agents	53	15,900	10	685	1,84,924	682
Others	-	-	-	1222	1,22,280	203
Total	143911	10,02,427	292	67045	37,34,454	1203



Bio- Fertilizers Production in Jharkhand



Vermicompost Production in Bihar

5.4 Livestock Production:

In order to provide quality materials to the farmers like dairy animals, goats, poultry birds, ducks, piglets and fish fingerlings, KVKs made available 32

cows, 68 goats, 24,120 poultry birds and 11,664 fish fingerlings.

Table 67: State-wise Livestock Production during 2018-19

Particulars of Livestock	Bihar		Jharkhand	
	Numbers	Value (Rs.)	Numbers	Value (Rs.)
Dairy animals	13	1,20,000.00	19	5,44,500.00
Small ruminants	28	55,648.00	40	2,05,000.00
Poultry	5343	1,89,150.00	18777	24,07,860.00
Piggery	16	1,19,500.00	100	3,57,300.00
Fish fingerlings	10080	4,29,000.00	1584	7920.00
Total	15480	9,13,298.00	20520	35,22,580.00

6. Soil and Water Sample Analysis and “World Soil Day” Celebration

KVK scientists of Zone IV tried through different awareness and training programmes 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 2018-19, 48,384 soil samples were tested from 2,309 villages and it benefitted a total of 1,00,807 farmers in this Zone.

A minimum amount was charged from farmers' for testing each soil sample. The KVKs of this Zone celebrated “World Soil Day” on 5th December, 2018. 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.

Table 68: State-wise Soil and Water Testing by KVKs of Zone-IV during 2018-19

State	Name of Sample	Number of			Amount realized (Rs.)
		Sample Analyzed	Farmers	Villages	
Bihar	Soil and Water	27684	29664	1389	13,52,785.00
Jharkhand	Soil and Water	20700	71143	920	5,34,615.00
Total		48384	100807	2309	18,87,400.00

Table 69: State-wise World Soil Day Celebration at KVKs on 5th December 2018

State	Total Participants	No. of Soil Health Card Distributed to farmers	No. of VIPs attended
Bihar	6619	7048	91
Jharkhand	5910	7386	99
Grand Total	12529	14434	190



World Soil Day celebration in Bihar



World Soil Day celebration in 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-ATARI 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 2018-19, out of total 63 KVKs of ICAR-ATARI, Patna conducted 58 SAC meetings at thirty seven KVKs of Bihar and twenty one KVKs of Jharkhand. The meeting was attended by 1993 participants. It was assured that all nominated members were present in the meeting.

Table 70: SAC Meeting during 2018-19

State	No. of SAC Meeting	No. of Participants
Bihar	37	1277
Jharkhand	21	716
Total	58	1993



8. Publication By KVKs

To highlight the achievements of research and other related activities, KVKs scientists were actively involved during 2018-19 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 945 publications comprising of 222 research papers, 194 symposia papers, 108 newsletter, 114 popular articles, 44 books, 308 extension pamphlets/ literature, 124 bulletins, and 81 electronic publications were published by the KVK personnel of this Zone. A total number of circulations was 433420 during the period of report.

Table 71: List of Publications by KVKs and ATARI Patna during 2018-19

Sl. No.	Item	Bihar			Jharkhand			Total		
		Number	No. Circulated	No. of Research papers in NAAS rated Journals	Number	No. Circulated	No. of Research papers in NAAS rated Journals	Number	No. Circulated	No. of Research papers in NAAS rated Journals
1	Re-search Paper	129	-	88	93	-	86	222	-	174

Sl. No.	Item	Bihar			Jharkhand			Total		
		Number	No. Circulated	No. of Research papers in NAAS rated Journals	Number	No. Circulated	No. of Research papers in NAAS rated Journals	Number	No. Circulated	No. of Research papers in NAAS rated Journals
2	Seminar/Conference/Symposia Papers	136	4008	25	58	500	5	194	4508	30
3	Books	28	6111	-	16	2150	-	44	8261	-
4	Bulletins	78	46476	-	46	9880	-	124	56356	-
5	Newsletter	44	42148	-	64	32200	-	108	74348	-
6	Popular Articles	88	30356	-	26	45005	5	114	75361	5
7	Book Chapter	41	1693	7	20	-	-	61	1693	7
8	Extension Pamphlets/Literature	184	99998	-	124	78000	-	308	177998	-
9	Technical Reports	168	11757	-	66	862	-	234	12619	-
10	Electronic Publication (CD/DVD etc)	49	21621	-	32	655	-	81	22276	-

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 (DRPCA), Pusa, Samastipur with 13 KVKs; Bihar Animal Science University, Patna with 1 KVK and



Birsa Agricultural University (BAU), Ranchi with 24 KVKs during 2018-19. 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 2018-19, 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 20 KVKs whereas DRPCAUPusa Directorate supplied to 16 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 2018-19. 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. To oversee the activities of KVKs, DEEs and their officials visited KVKs for 204 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 visited their KVKs time to time. The DEE officials of BAU, Bhagalpur visited their OFT fields for 54 occasions and FLD fields also for 22 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 and officials of DRPCAUPusa visited 14 times for OFT fields and 18 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 2018-19, 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 2018* (Hindi), *Krishi Calendar 2018* (Hindi), *Mrida Swastha Prabandhan Dwara Tikaoo Kheti* (Hindi), *Udyan Parshikhan Nirdeshikad* (Hindi), *Krishievam SamdadhKshetrake Vishisth KisanevamVaigyanik* (Hindi), *DalhanUtpadan* (Samasya, PrabhadhanEbomUnnati).

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 2018-19, ATICs were visited by 15,398 farmers from different districts of this Zone.

As per technology information was concerned, 3,812 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 2018-19. The majority of the farmers were interested in receiving information on disease management of various crops 2016, followed by information on pest management (524), crop varieties (688), animal husbandry and fishery (313), soil and

water conservation (398), agro-techniques (404) and post-harvest technology and value addition (232). During the period, a total of 981 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. Maximum farmers were interested on varietal training (424) followed by disease management (513), animal husbandry and fishery (389) and pest management (186). 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 72 (A): Meetings, Workshop, Conferences etc attained by ICAR-ATARI, Patna

Sl. No.	Workshop/Meeting	Date	Venue
1	Meeting cum workshop on CFLD	10 May 2018	KrishiBhawan
2	Extension council meeting	18 May 2018	BAU Sabour
3	Meeting on Parliamentary committee on Ag.	7 July 2018	BNR Ranchi
4	Meeting on Parliamentary committee on Ag.	9 July 2018	RCER
5	ICAR Foundation Day	16 July 2018	NAAS
6	Cadre review meeting	18 July 2018	NAAS
7	Annual National Workshop of NICRA	7-8 August 2018	NAAS
8	Annual National Workshop of ARYA	24-25 August 2018	NAAS
9	Foundation day of BASU	29 August 2018	BASU
10	Regional Committee Meeting	14-15 September 2018	BNR Ranchi
11	Foundation stone function of farmers hostel, IFS Motihari	2 October 2018	IFS Institute
12	Ext. Council meeting	7 October 2018	BAU Sabour
13	State level seminar by NHRDF	8 October 2018	Horticulture College Noorsarai
14	KrishiManthan (Z news)	9 October 2018	RabindraBhawan
15	International Conference on Rural livelihood improvement for enhancing farmers income through Sustainable innovative Agri. and allied enterprises (RLISAAE)	30 October- 1 November 2018	BIT Patna (Society for upliftment of Rural Economy)
16	Meeting with IMD officers regarding training to newly appointed SMS	8 November 2018	IMD Delhi
17	1 st Convocation of CAU	15 November 2018	RPCAU
18	Meeting cum workshop on GAP	26 November 2018	NAAS



Sl. No.	Workshop/Meeting	Date	Venue
19	PPV&FRA Meeting	2 December 2018	Katoria
20	KisanSamagam (DainikJagaran) AM Programme	16 December 2018	Maurya Hotel
21	ISFE National seminar on Integrated farming System for enhancing farmers income and nutritional security	5-7 December 2018	WBUAFS Kolkata
22	Kisan Samagam (Dainik Jagaran)	16 December 2018	Maurya Hotel, Patna
23	International conference on Food security and Sustainable Agriculture	21-23 December 2018	Thailand
24	Director Conference	31 January - 1 February 2019	NAAS
26	Agriculture Science Congress	20-22 February 2019	NAAS
27	Foundation of Cooperative training centre	2 March 2019	KVK Piprakothi

Table 72 (B): Meetings, Workshop, Conferences Training etc. Organised by ICAR-ATARI, Patna

Sl. No.	Review /Workshop	Date	Venue	No. of Participants
1	Meeting on finalization of action plan for KVKs of Jharkhand	09/5/2018	BAU, Ranchi	46
2	Meeting on finalization of action plan for KVKs of Bihar	14/5/2018	DRPCAU, Pusa, Samastipur	19
3	Meeting on finalization of action plan for KVKs of Bihar	19/5/2018	BAU, Sabour	72
4	Zonal workshop of KVKs of Bihar and Jharkhand	26/5/2018 to 27/5/2018	OUAT, Bhuwaneshwar	63
5	Annual workshop of NICRA-TDC, 2018 of Zone IV and V	27/6/2018 to 28/6/2018	WBAUAFS, Kolkata	50
6	Review meeting of KKA	06/7/2018	BAU, Ranchi	27
7	Review meeting on CFLD on pulses and oilseeds	13/10/2018 to 14/10/2018	KVK, Ranchi	65
8	Review meeting of FFP	12/10/2018	ICAR- RCER Research Centre, Ranchi	18
9	Meeting on augmenting income of tribal farmers through popularization of rapseed and mustard in rice- fellow area of Jharkhand	23/10/2018	ICAR-ATARI, Patna	7
10	Review workshop of action plan finalization of NICRA Project	25/10/2018 to 26/10/2018	KVK - East Singbhum	22
11	Workshop on finalization of OFT on Horticulture & Plant Protection of KVKs of Bihar & Jharkhand	15/02/2019 to 16/02/2019	BAU, Sabour	84
12	Workshop on finalization of OFT on Agronomy, Soil Science, Plant Breeding & Genetics of KVKs of Bihar & Jharkhand	18/02/2019 to 19/02/2019	BAU, Sabour	61
13	Orientation programme on IPM in Agricultural and Horticultural crops of Bihar and Jharkhand	26/02/2019 to 28/02/2019	BAU, Ranchi	27
14	Workshop on finalization of OFT on Agriculture Engineering & Animal Science of KVKs of Bihar and Jharkhand	01/03/2019 to 02/03/2019	BAU, Ranchi	50
15	Workshop on finalization of OFT on Agriculture Extension & Home Science of KVKs of Bihar and Jharkhand	06/03/2019	DRPCAU, PUSA, Samastipur	48
16.	Capacity Building Workshop	25/03/2019 to 27/03/2019	Agwanpur, Saharsa (BAU, Sabour)	23
17.	Training programme on PFMS	04/09/2018 to 05/09/2018	DRPCAU, PUSA, Samastipur	49

Sl. No.	Review / Workshop	Date	Venue	No. of Participants
18.	Orientation programme on GKMS (DAMU Project)	20/08/2018 to 21/08/2018	ICAR-ATARI, Patna	44
19.	Training programme on PFMS	07/09/2018 to 08/09/2018	BAU, Sabour	109
20.	Meeting regarding TOT programme on collaboration & co-operation with PWC	11/09/2018	ICAR-ATARI, Patna	10
21.	TOT programme on Skill Development (ASCI) of Bihar & Jharkhand	18/09/2018 to 20/09/2018	BAU, Ranchi	74
22.	Training programme on GKMS (DAMU Project)	22/11/2018 to 27/11/2018	ICAR-ATARI, Patna	47
23.	Innovative farmers meet	13/12/2018 to 14/12/2018	ICAR-ATARI, Patna	96
24.	HRD Training for Farm Manager	11/02/2019 to 13/02/2019	BAU, Sabour	42

12. Outsourcing 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. 588.40 lakhs was generated by the KVKs of ICAR-ATARI, Patna during 2018-19.

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 377 crore messages with 2,49,118 advisories and more than 662 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. 14 KVKs of ICAR-ATARI, Zone IV, Patna were selected for this scheme during the year 2018-19. A total of Rs. 28,91,600.00 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 sectors 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 17,091 number of assets in the form of sprayer, weeder, agro-shed net, ridge maker, maize sheller, sickle, khurpi, seed bin/ drum, drip irrigation 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 4,54,199 tribes including youths, farmers, farm women and extension personnel. A total of 1.44 lakh tribal farmers participated in different extension activities. In addition, KVKs working under TSP of this Zone produced 246.6 tonnes various seeds, 45,7,851 planting materials and 21,936 livestock strains and fish fingerlings in the tribal areas. About 20,135 farmers tested their soil/ water/ plant/ manure samples from their district KVKs and more than 8,82,194 farmers were benefitted by getting farm related SMSs.



Distribution of plants among the tribal farmers



Distribution of mushroom spawns among the tribal farm women

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 2018-19. The districts had the availability of number of traditional of plant varieties and cultivated over long period of time. Good number of farmers has 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 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 also 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. Important objective of the programme is getting existing technologies into the hands of small and marginal farmers and developing situation specific technologies to meet the demands of a changing climate. To enhance the resilience of Indian agriculture against climatic variability and climate change, NICRA project is functioning in 13KVK 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 2018-19 NICRA villages in Bihar received 13 to 16 days of dry spell in June. Likewise in Jharkhand also villages received dry spell during June is about 8-12 days but received good rainfall during August. Dry spell in June affected the Nursery Management of Rice and Vegetables crops.

16.1 NATURAL RESOURCE MANAGEMENT

Various NRM activities under NICRA were water harvesting and recycling for supplemental irrigation, improved drainage in flood prone areas, *in situ* moisture conservation, conservation tillage where appropriate, artificial ground water recharge, water saving irrigation methods and rainwater harvesting structure development. 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 2018-19 about 2997 farmers were benefitted through Natural Resource Management (NRM)

activities which were carried out in about 1296 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 426 farmers in 219.61 ha area. Water harvesting and recycling for supplemental irrigation were demonstrated in NICRA adopted villages involving 815 numbers of farmers. Conservation



tillage in wheat, paddy, lentil, pea and chickpea demonstrated in 129 ha in different adopted villages and covered 214 farmers. The technologies followed mainly by zero tillage operation. Wheat with cultivation through ZTD showed maximum yield of 46 q/ha. Zero tillage technology showed very promising results in pulse and oilseed cultivation. Pea (var. Arkel) gave highest economic return (B:C::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 in 294 ha area and covered 401 farmers. Ground water recharge through SRI by sub-soiler recorded highest paddy yield of 58 q/ha

with B:C::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 99.0 ha. Farmers benefitted are 118. There were 80 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 450 q compost were prepared from solid wastes had been added to the soil through which 52 thousand carbon sequestrations was done during 2018-19.

16.2 Crop Production

Under crop production interventions, about 4694 demonstrations were taken up. Crop production interventions included 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 planting of crops. Crop diversification with high value crops like pulses (lentil, chick pea, peas etc), vegetable was 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 like 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 805 number of farmers in 206.38 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) Short duration variety of potato pukkhraj gave maximum economic return. Flood tolerant varieties of paddy like Swarna sub 1 and R.Mansuri were introduced through demonstration covering 19.0 ha are and 61 farmers get benefitted.. 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 71 ha area of 156 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 B:C:: 2.25. To combat the situation of delayed monsoon intervention of staggered

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 24.30 ha area of 122 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 demonstrations were carried out in 233.5 ha area involving 613 numbers of farmers. Introduction of *ol* (var. Gajendra) in the cropping pattern showed the most promising one.

16.3 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 rural piggery have been started in NICRA villages in 2018-

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

19. 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 285 farmers' fields. Multi carp culture 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 120 farmers' 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 87.4 ha involving 181 farmers 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.

16.4 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 in the zone involving 1209 farmers.



16.5 Village Climate Risk Management Committee (VCRMC)

Village Climate Risk Management Committee (VCRMC) was constituted to mitigate the climatic vulnerabilities of the villages and adopt the strategies 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.

16.6 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 3.62 lakhs during 2018- 19.

16.7 Capacity Building

About 130 training programs involving about 3547 farmers and farm women were taken up on different



climate resilient issues and themes as part of capacity building programme during 2018-19. Thematic areas



covered were 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.

16.8 Extension Activities

A total of 308 extension activities on various thematic areas were conducted by KVKs under NICRA-TDC.



It benefitted 8661 practicing farmers and farm women during 2018-19. 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.



16.9 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 2018-19. 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 Sammellan

Initiative has 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 Sammellan. During the year 2018-19, 63 KVKs from this Zone organized the programme involving local MPs, MLAs and other public representatives of the concerned districts. Total 4002 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 Sammellan

Under the banner of the Indian Council of Agricultural



Research (ICAR), Ministry of Agriculture and Farmers' Welfare, the Pre-Kharif and Pre-Rabi

Sammellan 2018-19 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 Sammellan were organized by 63 KVKs of which grand total of 61,388 participants participated with august presence of 729 public representatives including MLA/ MP/ MIC.

19. Mera Gaon Mera Gaurav (MGMG) Programme

An innovative initiative “Mera Gaon Mera Gaurav” (MGMG) has been planned to promote the direct interface of scientists with the farmers to bridge



for the benefit of 18,429 farmers and total 827 field activities are conducted 1439 messages are sent. The major activities performed included visit to village



the gap between lab and land. The objective of this scheme was 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, 90 villages have been covered

by teams, interface meeting/ *Goshthies* with farmers, providing training, 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.

Table 73: Details of MGMG Programme during 2018- 19

State	Institutes/ Universities Involved (No.)	Groups/ Team Formed (No.)	Scientists Involved (No.)	Villages Covered (No.)	Field Activities Conducted (No.)	Messages/ Advisory Sent (No.)	Farmers Benefited (No.)
Bihar	9	48	140	60	692	1116	13486
Jharkhand	3	28	44	30	135	323	4943
Zone- IV Summary	12	76	184	90	827	1439	18429

20. 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.

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 74: 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	<ol style="list-style-type: none"> 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.

Sl. No.	ATARI/ Name of KVK	Proposed work plan
		5. Boron deficiency induced sterility in wheat and its effect on the yield and yield attributes of wheat. 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 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	<ul style="list-style-type: none"> • Similar to 1-10 of Bhojpur KVK • Crop establishment method in <i>Rabi</i> Maize
4.	Buxar KVK	<ul style="list-style-type: none"> • Similar to 1-10 of Bhojpur KVK • Residue management in rice-wheat system
5.	East Champaran KVK	<ul style="list-style-type: none"> • Similar to 1-10 of Bhojpur KVK • Crop establishment method in <i>Rabi</i> Maize
6.	Jamui KVK	<ul style="list-style-type: none"> • Similar to 1-10 of Bhojpur KVK
7.	Rohtas KVK	<ul style="list-style-type: none"> • Similar to 1-10 of Bhojpur KVK • Residue management in rice-wheat system
8.	Lakhisarai KVK	<ul style="list-style-type: none"> • Similar to 1-10 of Bhojpur KVK
9.	Muzaffarpur KVK	<ul style="list-style-type: none"> • Similar to 1-10 of Bhojpur KVK • Crop establishment method in <i>Rabi</i> Maize

20.1 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.

20.2 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.

21. 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 45 KVKs of Zone IV during 2018-19. Out of 45 KVKs across the Zone IV, 26 KVKs of Bihar and 19 KVKs of Jharkhand including DoEE, BAU, Sabour were assigned with the job of undertaking the training programmes in the line of ASCI norms. A total of 14 Job Roles were covered during the year under report.

Table 75: Skill Development training undertaken by KVKs during 2018-19

State	Sl. No	Name of KVK	Name of Job Roles/QPs Trainings	Duration of training (hrs.)	No. of Participants
Bihar	1	DoEE, BAU, Sabour	1. Service & Maintenance, Technician- Farm Machinery	200	20
			2. Assistant Gardener	200	20
	2	ARARIA	1. Mushroom grower 2. Assistant Gardener	200 200	20 20
	3	AURANGABAD	1. Mushroom grower 2. Assistant Gardener	200 200	20 20
	4	BANKA	1. Mushroom Grower 2. Vermicompost Producer	200 200	20 20
	5	BEGUSARAI	1. Mushroom Grower 2. Vermicompost Producer	200 200	20 20
	6	BHAGALPUR	1. Mushroom Grower 2. Small Poultry Farmer	200 240	20 20
	7	BHOJPUR	1. Mushroom Grower 2. Beekeeper	200 200	20 20
8	BUXAR	1. Quality Seed Grower 2. Vermicompost Producer	200 200	20 20	



State	Sl. No	Name of KVK	Name of Job Roles/QPs Trainings	Duration of training (hrs.)	No. of Participants	
	9	DARBHANGA	1. Organic Grower 2. Mushroom Grower	200 200	20 20	
	10	EAST CHAMPARAN	1. Organic Grower 2. Bee Keeper	200 200	20 20	
	11	GAYA	1. Mushroom Grower 2. Quality Seed Grower	200 200	20 20	
	12	JEHANABAD	1. Mushroom Grower 2. Dairy Farmer Entrepreneur	200 200	20 20	
	13	KAIMUR	1. Quality Seed Grower 2. Mushroom Grower	200 200	20 20	
	14	KATIHAR	Vermicompost Producer	200	20	
	15	KHAGARIA	1. Mushroom Grower 2. Quality Seed Grower	200 200	20 20	
	16	KISHANGANJ	1. Vermicompost Producer 2. Artificial Insemination Technician	200 200	20 20	
	17	LAKHISARAI	1. Quality Seed Grower 2. Mushroom Grower	200 200	20 20	
	18	MUZAFFARPUR	1. Mango Grower 2. Mushroom Grower	200 200	20 20	
	19	NALANDA	1. Mushroom Grower 2. Bee keeper	200 200	20 20	
	20	NAWADA	1. Mushroom Grower 2. Vermicompost Producer	200	20 20	
	21	PATNA	1. Mushroom Grower 2. Vermicompost Producer	200 200	20 20	
	22	PURNEA	1. Assistant Gardener 2. Mushroom Grower	200 200	20 20	
	23	ROHTAS	Mushroom Grower	200	20	
	24	SAMASTIPUR	1. Quality Seed Grower 2. Seed Processing Worker	200 200	20 20	
	25	SARAN	1. Organic Grower 2. Mushroom Grower	200 200	20 20	
	26	SITAMARHI	1. Mushroom Grower 2. Vermicompost Producer	200 200	20 20	
	27	SHEIKHPURA	1. Organic Grower 2. Mushroom Grower	200 200	20 20	
	Jharkhand	1	BOKARO	1. Mango Grower 2. Mushroom Grower	200 200	20 20
		2	CHATRA	1. Floriculturist-Open cultivation 2. Small Poultry Farmer	200 200	20 20
		3	DEOGHAR	1. Mushroom Grower	200	20
		4	DUMKA	1. Quality Seed Grower 2. Mushroom Grower	200 200	20 20
		5	EAST SINGHBHUM	1. Mango Grower 2. Mushroom Grower	200 200	20 20

State	Sl. No	Name of KVK	Name of Job Roles/QPs Trainings	Duration of training (hrs.)	No. of Participants
	6	GARAWAH	1. Quality Seed Grower 2. Vermicompost Producer	200 200	20 20
	7	GIRIDIH	1. Mushroom Grower 2. Quality Seed Grower	200 200	20 20
	8	GODDA	1. Small Poultry Farmer 2. Assistant Gardener	240 200	20 20
	9	GUMLA	1. Mushroom Grower 2. Quality Seed Grower	200 200	20 20
	10	HAZARIBAG	1. Mango Grower 2. Mushroom Grower	200 200	20 20
	11	LATEHAR	1. Quality Seed Grower 2. Vermicompost Producer	200 200	20 20
	12	LOHARDAGA	1. Organic Grower 2. Quality Seed Grower	200 200	20 20
	13	PAKUR	1. Mushroom Grower 2. Nursery Worker	200 200	20 20
	14	PALAMAU	1. Assistant Gardener 2. Quality Seed Grower	200 200	20 20
	15	RAMGARH	1. Nursery Worker 2. Quality Seed Grower	200 200	20 20
	16	RANCHI	1. Organic Grower 2. Dairy Farmer Entrepreneur	200 200	20 20
	17	SAHIBGANJ	1. Vermi Compost Producer 2. Quality Seed Grower	200 200	20 20
	18	SIMDEGA	1. Quality Seed grower 2. Layer farm worker	200 200	20 20
	19	WEST SINGHBHUM	1. Mushroom Grower 2. Vermi Compost Producer	200 200	20 20

1. Mushroom Grower

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 was conducted by 28 KVKs involving 560 rural men and women for self-employment.



Mushroom Training at KVK Sitamarhi, Bihar



Mushroom Training at KVK Gumla, Jharkhand

2. Quality Seed Grower

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



Quality Seed Grower training at KVK, Buxar, Bihar

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 320 by 16 KVKs.



Quality Seed Grower training at KVK, Dumka, Jharkhand

3. Organic Grower

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. Six KVKs conducted this training involving 120 participants.



Organic Grower at KVK Sitamarhi, Bihar



Organic Grower at KVK Ranchi, Jharkhand

4. Bee Keeper

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 60 rural youth/ farmers were trained under this job role.



Bee Keeper training at KVK Bhojpur, Bihar

5. Small Poultry Farmer

Skill training on Broiler Poultry Farm Worker was mainly consisted of understanding of housing, site selection, sanitary measure, feeding, brooding



Small Poultry Farmer training at KVK, Bhagalpur, Bihar

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 60.



Small Poultry Farmer training at KVK, Godda Jharkhand

22. 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 2018-19.

Table 76: The Name of the Institute, their Project Title, Budget allotted during 2018- 19

Sl. No.	Name of the Institute	Title of project	Fund sanctioned during 2018-19 (Rs. in lakh)
1.	Bihar Agricultural University, Sabour, Bhagalpur, Bihar	“Cross Sectional Livelihood Improvement and Income Enhancement through Agro-Enterprise Diversification”	17.55
2.	Birsa Agricultural University, Ranchi	“Technology Integration for Doubling Farm Income through Participatory Research and Extension Approaches in Ranchi District of Jharkhand”	26.55
3.	ICAR-NRC, Litchi, Muzaffarpur	“Improved livelihood through good practices in agricultural production system”	22.05
4.	ICAR- Research Complex For Eastern Region, Research centre, Palandu, Ranchi	“Enhancing food, nutritional and livelihood security of marginal and small farmers in Jharkhand through need based agricultural technologies”	24.55
Total			90.70

Table 77: Achievements of Farmer FIRST Programme during 2018- 19

Module	No of Farm Families Benefited
NRM Module	520
Crop Module	1208
Horticulture Module	1307
Livestock Based Module	2497
IFS Model	67
Enterprise based Modules	791
Soil health management	500
Total	6890



Performance of DSR with variety Sahabhagi in farmers field



Small Poultry Farmer training at KVK , Godda Jharkhand

23. 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 Hub' each targeting to produce 100 tonnes of pulses seeds during the next three years. 'Seed Hub' 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, 10 'Seed Hubs' at 7 KVKs of Bihar and 3 KVKs of Jharkhand under Zone IV have been established. A total 4369.51 q seeds was produced from the Seed Hub of Zone IV during the period 2018-19.



Performance of DSR with variety Sahabhagi in farmers field



Small Poultry Farmer training at KVK , Godda Jharkhand

Table 78: Performances of Seed Hub during 2018- 19

ZONE IV	Name of KVKs	Crop	Variety	Target (q)	Area sown (ha)	Production / Expected production (q)	Category of Seed (F/S,C/S or I/L)
	10	Lentil	IPL-16 ,PL-8,HUL-57,Maitri	2680	240	1738.4	IPL-60F/S, PL-8 C/S,C/S,F/S
		Chickpea	RVG-202, RVG-203, JNG-1581,TGT-501,NDA-2,PG-186,JG-14,GNG-1581	2450	148.43	1448.69	RVG-202,203 F/S JNG-1581 C/S
		Green Gram	SML-668,HUM-16	900	67	330	RVG-202,203 F/S JNG-1581 C/S
		Gram	PG-186 GCP-105 GCP-105 ,BG- 372	750	59	462.42	F/S C/S
		Horse Gram	Birsa Kulthi-1,BK-1	250	20	94	C/S
		Black Gram	WBU-109 Sulata	250	15	82	F/S
		Pigeon pea	IPA-203 KLS-218, TJT-501	600	105	164	F/S-II,C/S
		Urd	WB 109	20	5	0	F/S
		Moong	HUM 16	200	30	50	C/S
		TOTAL			8100	689.43	4369.51

24. Attracting and Retaining Youth in Agriculture (ARYA)

ICAR has initiated a programme “Attracting and Retaining Youth in Agriculture” during 2018- 19 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. 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 79: Achievement of ARYA Programme during 2018- 19

Sl. No.	KVK Name	Enterprises promoted	No. of youths identified for different enterprised	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, Jharkhand	Pig farming	162	7	162	4	162	10	152
		Goat Farming	287	1	287	6	256	15	272
		Bee Keeping	97	14	97	1	97	14	83
		Lac cultivation	225	21	225	1	17	21	204
2	East Champaran, Bihar	Mushroom Production	197	197	197	7	197	75	481
		Bee Keeping	98	98	98	3	98	28	211
		Fish Spawn Production	26	26	26	2	26	8	31
		Goat Farming	100	100	100	3	100	45	287
		Poultry Production	93	93	93	2	93	44	277
Total			1285	557	1285	29	1046	260	1998



Establishment of Bee Keeping enterprise by KVK, Gumla, Jharkhand



Establishment of Poultry Farming enterprise by KVK, East Champaran, Bihar



Establishment of Goat Farming enterprise by KVK, Gumla, Jharkhand



Establishment of Mushroom Grower enterprise by KVK, East Champaran, Bihar



Establishment of Lac Cultivation enterprise by KVK, Gumla, Jharkhand



Establishment of Pig Farming enterprise by KVK, Gumla, Jharkhand

25. 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.

26. 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 2018-19, 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>.



27. 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.



28. 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 2018- 19 and thus it has brought transparency in the system and helped in easy transfer and tracking of funds.

29. 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.

30. Special Programmes

30.1. Swachh Bharat Abhiyan

To make a mass movement of cleanliness, 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 80: Swachh Bharat Abhiyan held during 2018-19

State	No. of Programmes Undertaken	No. of KVK
Bihar	269	39
Jharkhand	254	24
Total	523	63

30.2. Vaccination Programme

Mass vaccination in livestock was done by all 63 KVKs of Bihar and Jharkhand during 2018-19. 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), Haemorrhagic 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 2018-19, KVKs of this zone vaccinated 28,117 animals of Bihar and 30,291 of Jharkhand.

Table 81: Vaccination Programme in Livestock

State	No. of Animals Vaccinated
Bihar	28117
Jharkhand	30291
Total	58408

30.3. 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.

Table 82: Students Participated in RAWE Programme

Name of the State	No. of Students	No. of Days Stayed
Bihar	309	1554
Jharkhand	112	872
Total	421	2426



30.4. 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. 112 nos. of schools have been covered and 234 visits have been made.

30.5 Swachhta Hi Sewa Programme



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 2019 was observed during 15th September- 2nd October 2019 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. A programme on cleanliness drive was organized at ICAR-ATARI, Patna 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. A total of 63 KVKs under ATARI Patna celebrated the Swachhta Pakhwada during 15th September – 2nd October 2019 at their respective offices/ adopted villages.

Table 83: Swachhta Hi Sewa programme held in Bihar and Jharkhand from 15th September to October 2nd 2019 under Swachh Bharat Mission

Sl. No.	List of activities (suggested by M/o Drinking water & sanitation)	Site of activity under taken (No. of Sites also)	No. of employees participated
1	Toilet pit-digging exercise and other toilet construction activities	18	11
2	Organize cleaning of streets, drains and back alleys through awareness drives	210	372
3	Organize waste collection drives in households and common or shared spaces	152	70
4	Conduct Door to door meeting to drive behavior change with respect to sanitation behaviour	45	64
5	Organize awareness campaigns around better sanitation practices like using a toilet, hand washing, health and hygiene awareness, etc.	260	111
6	Perform Swachhata related Nukkad Nataks/street plays, folk song and dance performances	26	157
7	Conduct Village or School-level rallies to generate awareness about sanitation	18	69
8	Make wall paintings in public places on the theme of Swachhata	21	43
9	Volunteer for segregation of solid waste into non-biodegradable and biodegradable waste	51	30
10	Mobilize community to build compost pits, where organic matter decomposes to form manure	108	63

30.6 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, 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



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

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



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

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. Mahila Kisan Diwas was celebrated by 38 KVKs of Bihar and 17 KVKs of Jharkhand with the active participation of 6,655 women to encourage women in agricultural activities.

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

During 2018-19, 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.

31. New Initiatives Undertaken

31.1 Gramin Krishi Mausam Sewa

Agromet Advisory Service rendered by India Meteorological Department (IMD), Ministry of Earth Sciences, GoI is a set-up to contribute weather information based crop /livestock management strategies and operations dedicated to enhancing crop production and food security. At present IMD in collaboration with ICAR is venturing into implementation of block level agro met advisory service through KVKs under Gramin Krishi Mausam Sewa (GKMS).

This programme is run with the border objectives of

- To prepare Agromet Advisory Bulletins for farmers and stakeholders regarding weather sensitive agricultural operations to mitigate weather based risk on crop cultivation
- To impart training to the farmers about climate change and its mitigating options.

During 2018- 19, a total of 8 centres under Bihar Agricultural University, Sabour, Bhagalpur has prepared and disseminated block level Agromet Advisory Service to the farmers of the respective districts.

Table 84: Agromet Advisory Service during 2018- 19

Sl. No.	Name of Institution/ KVK	District	No. of Blocks for which Agromet Advisory is prepared	No. of advisory bulletin published during 2018-19	No. of FAP's organised during 2018-19	No. of feedback taken from farmers during 2018- 19
1	KVK, Sheikhpura	Sheikhpura	06	94	39	141
2	KVK, Purnea	Purnea	13	66	36	112
3	KVK, Araria	Araria	09	92	25	163
4	KVK, Khagaria	Khagaria	07	101	31	165
5	KVK, Katihar	Katihar	15	98	29	94

Sl. No.	Name of Institution/ KVK	District	No. of Blocks for which Agromet Advisory is prepared	No. of advisory bulletin published during 2018-19	No. of FAP's organised during 2018-19	No. of feedback taken from farmers during 2018-19
6	KVK, Aurangabad	Aurangabad	11	41	21	51
7	KVK, Gaya	Gaya	24	95	49	143
8	KVK, Banka	Banka	11	102	41	122

Activities:

A. Agro met advisory bulletin published/ prepared:

Every Block level advisories were prepared after proper discussion with the advisory panel which consisted of scientists from related departments and concerned nodal officer of AMFUs. Before preparation of bulletin, a real time assessment was done for status of the crop and livestock. Besides, feedback of the farmers was also taken into consideration.

B. Dissemination: The advisory was prepared every Tuesday and Friday and disseminated through different channels among the farmers. The advisories were also sent to the DAOs, BAOs and ground level extension functionaries of the State Department of Agriculture.

Table 85: Number of Farmers received Agromet Advisory Bulletin during 2018- 19

Sl. No.	Name of Institution/ KVK	No. of farmers received agromet advisory bulletin through social media/ whats' app group
1	KVK, Sheikhpura	1503
2	KVK, Purnea	804
3	KVK, Araria	683
4	KVK, Khagaria	834
5	KVK, Katihar	1204
6	KVK, Aurangabad	1835
7	KVK, Gaya	1077
8	KVK, Banka	1367
Total		9307

C. Farmers Awareness Programme (FAP's):

Farmer's awareness programme was organised with the objective of better understanding of block

level agromet advisory service among the farmers. These programmes were very useful in effective preparation of bulletins and taking feedback from the framers regarding its effectiveness. Every centre on regular basis organised such programmes, so that maximum farmers could be benefited from this service. Apart from Organising FAP's, the information was also shared through different farmers interactive programmes like *Kisan chaupal*, *Kisan Goshthi*, *Kisan mela* etc. Apart from social media and M-Kishan portal, the bulletin was also disseminated through local newspapers, university website and through personnel contact.



D. Feedback: At the initiation of the project at each centre, about 50 farmers were selected. The operational area was predominantly under grain and vegetable cultivation. Main food crops being rice, maize and wheat, and vegetables like cauliflower, tomato, brinjal, chillies, gourds, peas, potato and sugarcane were available. Farmers of these selected villages also grew other cereal, pulse and oilseed crops too.





31.2 Innovative Farmers Meet at ATARI, Patna Zone IV

To encourage farmers for their indigenous technologies in agriculture, innovative farmers meet was organised on December 13-14, 2018. A total of 106 Farmers from different districts of Bihar and Jharkhand along with KVK Scientists and head participated in the meet. The farmers displayed their technologies via presentation and working models. Best innovations were encouraged and suggestions were given by panel of scientists.



31.3 Pradhan Mantri Kisan Samman Nidhi Yojna (PM-KISAN) Programme

On February 24, 2019, the Hon'ble Prime Minister of India launched the new scheme of Govt. of India- Pradhan Mantri Kisan Samman Nidhi Yojna (PM-KISAN) from a programme organized at Gorakhpur, U.P. This programme was webcasted throughout India. A total of 19,976 farmers of Bihar and Jharkhand observed this programme.



31.4 Krishi Kalyan Abhiyan (KKA)

The Department of Agriculture, Cooperation and Farmers' Welfare under Ministry of Agriculture and Farmers' Welfare, Government of India launched Krishi Kalyan Abhiyan, Phase-I (KKA-I) programme w.e.f. 01.06.2018 to 31.07.2018 which was extended upto 15.08.2018 to assist and advice the farmers on how to improve their farming techniques and increase their income. After getting success of KKA-I, The Department of Agriculture, Cooperation and Farmers' Welfare again decided to implement KKA- II w.e.f. 02.10.2018 to 25.12.2018. Following the success of KKA-I and KKA-II, the Department of Animal Husbandry, Dairying and Fisheries of Govt of India decided to extend artificial insemination under genetic up gradation programme through high yielding indigenous cattle semen at the farmer's doorstep under KKA-III w.e.f. 15.01.2019 to 15.04.2019. A total of 2,259 programme under

KKA-I, 1,669 under KKA- II and 257 programme under KKA-III was conducted. A total of 1,66,128 farmers during KKA-I, 78,499 farmers during KKA-II and 33,507 during KKA-III was benefitted. A total of 98,278 soil health cards and 402 farm implements was distributed during KKA-I. A total of 6197 NADEP pit was established in KKA-I. Also a total number of 79,796 soil health card and 3,062 farm implements was distributed during KKA-II. 2104 NADEP pits were established in KKA II.

Table 86: Number of programmes and number of farmers benefited for KKAs

Name of Programme	No. of Programmes	No. of Farmers Benefitted
KKA-I	2259	166128
KKA-II	1669	78499
KKA-III	257	33507
Total	4185	278134

Table 87: Distribution of seed, planting material, input etc and number of farmers benefited under KKAs

Name of programme	No. of Programme	Total quantity distributed				No. of farmers benefited
		Seed (q)	Planting material (lakh)	Input (kg)	Other (kg/ No.)	
KKA-I	655	50161.15	2.85	98675	27878	200420
KKA-II	481	12333.79	0.60	17637.5	13174	49988
Total	1136	62494.94	3.45	116312.5	41052	250408



Table 88: Activities undertaken for livestock improvement under KKAs

Name of programme	No. of Programme	Activities performed				No. of other officials (except KVK) attended the programme
		No. of animals vaccinated	No. of animals dewormed	Feed/ nutrient supplements provided (kg)	Any other (Distribution of animals/ birds/ fingerlings) [No.]	
KKA-I	964	226602	16920	0	0	327
KKA-II	850	192004	16793	0	0	292
KKA-III	999	177804	19074	8805	0	115
Total	2813	596410	52787	8805	0	734



Table 89: Soil Health Card distributed and NADEP Pit established under KKAs

Name of programme	Activities	No. of farmers benefited
KKA-I	Soil Health Card Distributed	98278
	NADEP Pit established	6197
	Farm implements distributed	4402
	Others, if any	1087
KKA-II	Soil Health Card Distributed	79796
	NADEP Pit established	2104
	Farm implements distributed	3062
	Others, if any	2958



Table 90: Target and achievement of NADEP Pit establishment under KKAs

Number of KVKs	Target of NADEP unit	No. of NADEP Unit constructed	% Progress
32	9600	7891	82.2

**Table 91: Target and achievement of Micro irrigation units establishment under KKAs**

Number of KVKs	Target of Micro irrigation unit	No. of Micro irrigation Unit constructed	% Progress
32	32	27	84.4



32. Personnel

Sl. No.	Name	Designation
1	Dr. Anjani Kumar	Director
2	Ravindra Kumar	SRF (NICRA)
3	Khushboo Kumari	SRF (CFLD Oilseed)
4	Avinash Sarin Saxena	SRF (Pulses)
5	Ravi Kant Chaubey	SRF (ARYA)
6	Manoj Kumar	Data Entry Operator
7	Raj kumar Bharti	Data Entry Operator
8	Anshu Kumari	Data Entry Operator
9	Preeti Kumari	Young professional II
10	Suraj Kumar	High Skilled
11	Mukesh Kumar	Skilled

33. Awards

33.1 Farmers Awards 2018-19

Name of KVK	Name of the Award	Name of the Farmer	Year	Conferring Authority	Amount (Rs.)	Purpose
KVK, Banka	Jagjivan Ram Award	Smt. Savita Devi	2018-19	ICAR	Rs 50 thousand Certificate	Mushroom Cultivation
KVK, Patna	Best Farmer Award	Sri Survijay Singh	2018-19	BAU, Sabour, Bhagalpur	Certificate	Best Farmer of District
KVK, Patna	Best Innovative Farmer Award	Sri Amarjeet Kumar Sinha	2018-19	ICAR, RCER, Patna	Certificate	Best Farmer of District
KVK, Bhojpur	Best Innovative Farmer Award	Sri Jitendra Singh	2018-19	ICAR-ATARI, Patna	Certificate	Best Farmer of District
KVK Saharsa	Best Progressive Farmer Award	Sri Arun Kumar Singh	2018-19	BAU, Sabour, Bhagalpur	Certificate	Best Farmer of District
KVK Saharsa	Best Farmer Award	Sri Rajeev Lochan Singh	2018-19	Horticultural Exhibition 2019 Raj Bhawan Patna	Certificate	Best Farmer for MAP in the district
KVK Buxar	Best Innovative Farmer Award	Manoj Kumar Singh	2018-19	ICAR-ATARI, Patna	Certificate	Best Farmer of District
KVK Buxar	Best Innovative Farmer Award	Ashutosh Pandey	2018-19	ICAR-ATARI, Patna	Certificate	Best Farmer of District
KVK Buxar	Best Innovative Farmer Award	Uday Narayan Rai	2018-19	ICAR-ATARI, Patna	Certificate	Best Farmer of District
KVK Buxar	Best Innovative Farmer Award	Kamlesh Singh	2018-19	ICAR-ATARI, Patna	Certificate	Best Farmer of District
KVK, Samastipur	Innovative Farmer Award	Sri Nawal Kumar Singh	2018-19	RPCAU, Pusa, Samastipur	Certificate	Best Farmer of District
KVK Aurngabad	Best farmers award	Sri Alok Kumar	2018-19	BAU Sabour, Bhagalpur	Certificate	Best farmer of the district
KVK Jehanabaed	Outstanding performance in agriculture field 2018	Sri Gaurav Raj	2018-19	ICAR-RCER, Patna	Certificate	18th Foundation day of ICAR
KVK Jehanabaed	Best Innovative farmer 2018	Sri Harendra Singh	2018-19	BAU, Sabour	Certificate	Regional Kisan Mela, BAU, Sabour, 2019
KVK Jehanabaed	Best Innovative farmer 2018	Sri Yogendra Sharma	2018-19	BAU, Sabour	Certificate	National Farmer's Science Congress/ Foundation day of BAU, Sabour 05-07 Aug. 2018
KVK Jehanabaed	Best progressive farmer (Dairy),18	Sri Braj Kishore Sharma	2018-19	Print Media	Certificate	NSIT, Bihta, patna
KVK Jehanabaed	Farmer Innovation	Sri Sudhir Kumar	2018-19	ATARI, Zone IV, Ptna	Certificate	Innovators Meet Programme



Name of KVK	Name of the Award	Name of the Farmer	Year	Conferring Authority	Amount (Rs.)	Purpose
KVK Jehanabaed	Farmer Innovation	Smt. Sunita Kumari	2018-19	ATARI, Zone IV, Ptna	Certificate	Innovators Meet Programme
KVK Jehanabaed	Farmer Innovation	Smt. Sunita Kumari	2018-19	ATARI, Zone IV, Ptna	Certificate	Innovators Meet Programme
KVK, Gopalganj	Abhinav Kisan Puraskar	Sri Sunil singh	2018-19	DrRPCAU, Pusa, samastipur	Certificate	Best farmer of the district
KVK, Saran	Abhinav Kisan Puraskar	Sri Rajesh Kumar	2018-19	DrRPCAU, Pusa, samastipur	Certificate	Best farmer of the district
KVK, Godda	Progressive Farmer Award	Mr. Neeraj Kumar	2018-19	BAU, Ranchi	Certificate	Mushroom production
KVK Nalanda	Best progressive farmer award	Sri Narendra Prasad	2018-19	BAU, Sabour, Bhagalpur	Certificate	Outstanding work in IFS
KVK Nalanda	Krishi Conclave Award	Smt Rinku Devi	2018-19	Hindustan, Dainik	Certificate	Outstanding work in IFS
KVK Nalanda	Krishi Conclave Award	Sri Harivansh Prasad	2018-19	Hindustan, Dainik	Certificate	Outstanding work in Organic Farming
KVK Nalanda	Horticulture Show	Sudhir Kumar	2018-19	BAU, Sabour, Bhagalpur	3000	Ist prize in Pumpkin veg.
KVK Nalanda	Horticulture Show	Surendra Ram	2019	BAU, Sabour, Bhagalpur	3000	Ist prize in Potato veg.
KVK Nalanda	Horticulture Show	Mithlesh Kumar	2019	BAU, Sabour, Bhagalpur	1000	3rd prize in Aonla
KVK Supaul	Best Innovative Farmer Award	Sri. Bhikhari Mehta	2018-19	BAU, Sabour, Bhagalpur	Certificate	Best Prize
KVK Supaul	District Progressive Farmers	Sri. Sheshnath Singh	2018-19	BAU, Sabour, Bhagalpur	Certificate	District Progressive Farmers
KVK JAMTARA	District Progressive Farmers	Sri Vivek Gorai	2018-19	BAU Ranchi	Certificate	District Progressive Farmers
KVK Munger	Best Progressive farmer	Smt. Bina Devi	2018-19	BAU Sabour, Bhagalpur	Certificate	Best District Progressive Farmers
KVK Munger	Best Stall	Sri Mukesh Kumar	2018-19	BAU Sabour, Bhagalpur	Certificate	2nd Price
KVK, MADHEPURA	Best Progressive farmers of the district	Sri Gulshan Kumar	2018-19	Hon'ble V.C, BAU, Sabour	Memento, Certificate & Shawl	Best performance in dairy production
KVK, MADHEPURA	Best performance in Aromatic crops	Sri Dharmendra Kumar	2018-19	Director, CIMAP, Lucknow	Certificate	Bulk growth of root of Khas
KVK, Sitamarhi	Kisan Abhinav Puraskar	Mrs. Archana Devi	2018-19	Dr. RPCAU, Pusa, Samastipur	Medal, Certificate, Rs. 5000/-	Integrated Farming System
KVK, Rohtas	Mahindra Samridhi Award	Vijay Kumar Singh	2018-19	Mahendra & Mahendra Co. Ltd.	Rs. 50000 & Certificate	For development of Cultivator into Multi-crop Seed Drill



Name of KVK	Name of the Award	Name of the Farmer	Year	Conferring Authority	Amount (Rs.)	Purpose
KVK, Rohtas	Best Innovative Farmers' Award	Arjun Singh	2018-19	BAU, Sabour	Certificate, Shawl	For formation of tomato marketing hub in Masona village
KVK, Rohtas	Award for PPV & FRA	Arjun Singh	2018-19	PPV & FRA, Govt. of India	Certificate, Shawl	Protection of farmer's variety (Nataki-Rice)
KVK, Sheikhpura	Best Progressive Farmer Award	Sri kripa Sindhu Prasad	2018-19	BAU, Sabour, Bhagalpur	Certificate	Best Farmer of District
KVK, Banka	Pt. Deen Dayal Upadhdhay Kisan Abhinav Award	Smt. Savita Devi	2018-19	ICAR, New Delhi	Medal, Certificate, Rs. 50000/-	Best performance in dairy production
KVK, Banka	Best Progressive Farmer	Sri Sudhir Rajak	2018-19	BAU, Sabour	Certificate	For Strawberry cultivation
KVK, Banka	Best Progressive Farmer	Sri Kunj Bihari	2018-19	Fishery Research Institute, Barackpur, Kolkata	Certificate	Best Fishery Farmer Award
KVK, Kaimur	Innovative Dairy Farmer Award	Sri Shivnarayan Singh	2018-19	Dairy Technocrats Association, Bihar	Certificate, Shawl	For Promating Dairy Technology
KVK, East Champaran	Abhinav Kisan Puraskar	Sri Jagdeo Prasad Kushwaha	2019	RPCAU, Pusa, Samastipur	Medal, Certificate, Rs. 5000/-	For Organic Farming
KVK, Madhubani	Abhinav Kisan Puraskar	Sri krishndev yadav	2019	RPCAU, Pusa, Samastipur	Medal, Certificate, Rs. 5000/-	For integrated farming
KVK Dhanbad	District Progressive farmers	Shri Abdul Raheem	2018-19	BAU, Ranchi	Certificate, Shawl	Vegetable production using micro irrigation
KVK, Siwan	Innovative Farmer Award	Sri Surendra Rai	2018-19	RPCAU, Pusa, Samastipur	Medal, Certificate, Rs. 5000/-	Vermi-compost and organic farming
KVK, Darbhanga	Innovative Farmer Award	Smt. Kanchan Kumari	2018-19	RPCAU, Pusa, Samastipur	Medal, Certificate, Rs. 5000/-	Value addition of mushroom
KVK, Vaishali	Innovative Farmer Award	Smt. Sunita Devi	2018-19	RPCAU, Pusa, Samastipur	Medal, Certificate, Rs. 5000/-	Best Farmer of District
KVK, Koderma	Best Innovative Milk Producer of district	Sri ashok Yadav	2018-19	BAU, Agro tec Mela, at Ranchi	Certificate, Shawl	Best Innovative Milk Producer of district
KVK, Koderma	Best Vegetable grower of district	Raj Kumar Singh	2018	ATMA, Koderma	Certificate, Shawl	Best Vegetable grower of district
KVK, Koderma	Innovative farmer	Ajay Saw	2018	ATMA, Koderma	Certificate	Innovative farmer of district
KVK, Koderma	Best Innovative Mushroom grower of district	Smt Swarwati Davi	2018	BAU, Agro tec Mela, at Ranchi	Certificate, Shawl	Best Innovative Mushroom grower of district
KVK, Khagaria	Best innovative farmer of the district in Kisan Mela	Sri Ramdas Sahu	2018	BAU, Sabour	Certificate	Best innovative farmer of the district



Name of KVK	Name of the Award	Name of the Farmer	Year	Conferring Authority	Amount (Rs.)	Purpose
KVK, Khagaria	Best farmer for Kadaknath poultry exhibit in Kisan Mela	Sri Ranjay Paswan	2018	BAU, Sabour	Certificate	Best farmer for Kadaknath poultry exhibit
KVK, Khagaria	Second Best farmer for Banaraja poultry exhibit in Kisan Mela	Sri Rabindra Ray	2018	BAU, Sabour	Certificate	Best farmer for Banaraja poultry exhibit
KVK, Khagaria	Third best farmer for papaya and Capsicum exhibits in Kisan Mela	Sri Dheeraj Kumar	2018	BAU, Sabour	Certificate	best farmer for papaya and Capsicum exhibits
KVK, Khagaria	Third best farmer for papaya and Capsicum exhibits in horticultural exhibition	Sri Dheeraj Kumar	2018	Rajbhavan, Patna	Certificate	best farmer for papaya and Capsicum exhibits
KVK, Khagaria	Third best armer for bottlegourd exhibits in horticultural exhibition	Sri Ajay Choudhary	2018	Rajbhavan, Patna	Certificate	best armer for bottlegourd exhibits
KVK, Khagaria	Third best farmer for beetroot exhibits in horticultural exhibition	Sri Sudarshan Kumar	2018	BAU, Sabour	Certificate	best farmer for beetroot exhibits
KVK, Deoghar	Innovative farmers	Kumar Gautam	2018	ICAR, ATARI-Patna	Certificate	Vermicompost production
KVK, Deoghar	Innovative farmers	Rajendra Yadav	2018	ICAR, ATARI-Patna	Certificate	Integrated farming
KVK, Deoghar	Innovative farmers	Sunil Kumar Satasangi	2018	ICAR, ATARI-Patna	Certificate	Dairy, organic farming
KVK, Deoghar	Innovative farmers	wakil prasad yadav	2018	ICAR, ATARI-Patna	Certificate	Modifying machineries
KVK, Ramgarh	Innovative farmers	Rachiya Mahto	2018	IARI, New Delhi	Certificate	Progressive Farmer
KVK, Begusarai	Kishan Abhinav Award	Shri Ramswarth Mahto	2018-19	Hon'ble VC, RPCAU Pusa	Certificate	Seed production and Vermicompost production
KVK, Bokaro	Innovative Farmer	Sri Ramjeet Besra	2018-19	BAU, Ranchi, Jharkhand	Certificate	

31.2 KVK Awards 2018-19

Name of KVK	Name of the Award	Year	Conferring Authority	Amount (Rs.)	Purpose
KVK, Patna	Best Extension Scientist Award	2018-19	ISEE, New Delhi	Certificate	
KVK, Patna	Best Scientist National Award	2018-19	IRDP, Chennai	Certificate & Medal	
KVK Buxar	Best stall	2018-19	Agriculture Department, Bihar Govt.	Certificate	
KVK Buxar	Best stall	2018-19	NDUAT, Faizabad	Certificate	
KVK Jehanabad	For outstanding contribution to society work	2018-19	Society for Agriculture Innovation and Development (SAID), Ranchi	Certificate	For outstanding contribution to society work



Name of KVK	Name of the Award	Year	Conferring Authority	Amount (Rs.)	Purpose
KVK Jehanabad	For best paper on contribution of rural women in dairy	2018-19	Society for Agriculture Innovation and Development (SAID), Ranchi	Certificate	For best paper on contribution of rural women in dairy
KVK Jehanabad	On 30th Oct.- 1st Nov. 2018 in International Conference for outstanding contribution in the field of Agriculture Extension	2018-19	Society for Upliftment of Rural Economy (SURE), Varanasi (U.P.), India	Certificate	On 30th Oct.- 1st Nov. 2018 in International Conference for outstanding contribution in the field of Agriculture Extension
KVK Jehanabad	On December (5-7), 2018 at WBUAFS, Kolkata for best paper entitled IFS for enhancing farmers' income and nutritional security	2018-19	Indian Society of Extension Education (ISEE), New Delhi	Certificate	On December (5-7), 2018 at WBUAFS, Kolkata for best paper entitled IFS for enhancing farmers' income and nutritional security
KVK Jehanabad	For outstanding contribution in the field of Home Science Extension Education	2018-19	Society of ATDS, Ghaziabad during 20-22 Oct, 2018 at Meerut	Certificate	For outstanding contribution in the field of Home Science Extension Education
KVK Jehanabad	For best poster in the area of soil water conservation	2018-19	Society of ATDS, Ghaziabad during 20-22 Oct, 2018 at Meerut	Certificate	For best poster in the area of soil water conservation
KVK, Gopalganj	Best KVK Award	2018-19	Dr RPCAU, Pusa, saamastipur	Certificate	For overall activities of KVK
KVK, Godda	Young Extension Worker Award	2018-19	S&T, SIRI, Thorrur, Mahabubabad, Telengana	Certificate	Outstanding contribution in the field of Agricultural Extension
KVK, Godda	Outstanding Extension Worker Award	2018-19	S&T, SIRI, Thorrur, Mahabubabad, Telengana	Certificate	Outstanding contribution in the field of Animal Nutrition
KVK, Godda	Appreciation certificate	2018-19	DAO, Godda.	Appreciation certificate	Live demonstration and putting stall in district level Kisan Mela



Name of KVK	Name of the Award	Year	Conferring Authority	Amount (Rs.)	Purpose
KVK, Rohtas	Pandit Deendayal Krishi Vigyan Protsahan Puraskar (Zonal)	2018-20	ICAR, New Delhi	Certificate & Rs.225000	Outstanding contribution in the field of Agriculture extension and allied activities
KVK, Rohtas	3rd Best stall exhibition Award	2018-19	BAU, Sabour	Certificate	Best stall exhibition in BAU, Kisan Mela-2019
KVK Banka	Young Extension Worker Award	2018-19	Society for Agriculture Innovation and Development, Ranchi & Bihar Animal Sciences University, Patna i	Certificate	For Young Extension Worker Award
KVK Banka	Young Scientist Award	2018-19	OHIO STATE UNIVERSITY association with Endling	Certificate	For Young Scientist Award
KVK Banka	Best oral Presentation award	2018-19	BAU, Sabour	Certificate	Best oral Presentation award
KVK Dhanbad	Excellence in Extension Award	2018-19	BVC Patna	Certificate	Outstanding contribution in the field of agricultural extension
KVK Dhanbad	Special Achievement Award	2018-19	CIFA Dhanbad	Certificate	Outstanding contribution in the field of agricultural extension
KVK, Dhanbad	Outstanding Achievement Award	2018-19	PRAGATI 2018	Certificate	Overall contribution in KVK activities
KVK, Koderma	Fellow Award	2018-19	ABAS 2018	Certificate	Outstanding contribution in the field of Home Science,
KVK, Koderma	Associate Fellow	2018-19	RLISAAe 2018	Certificate	Outstanding contribution in the field of Animal Science
KVK, Koderma	Best KVK Professional Award	2018-19	Society of Extension Education 2018	Certificate	In the field of Extension education
KVK, Koderma	Best KVK Professional Award	20108-19	Society of Extension Education 2018	Certificate	In the field of Animal Science
KVK, Koderma	Best KVK Professional Award	2018-19	Society of Extension Education 2018	Certificate	In the field of Home Science



Name of KVK	Name of the Award	Year	Conferring Authority	Amount (Rs.)	Purpose
KVK, Koderma	Received Outstanding Ph.D. Thesis award	2018	society for Agriculture Innovation and Development Ranchi, during National conference on Livelihood and Food Security (LFS-2018)	Certificate	In the field of Vet. Science
KVK, Koderma	Received Outstanding Ph.D. Thesis award	2018	RASSA National Convention-cum- Seminar	Certificate	In the field of Nutrition
KVK, Koderma	Best NRRI-Worker	2018	NRRI, Cuttack, Odisa	Certificate	In the field of KVK, activities
KVK, Koderma	Best Oral Presentation	2018	society for Agriculture Innovation and Development Ranchi, during National conference on Livelihood and Food Security (LFS-2018)	Certificate	Best oral Presentation award
KVK, Koderma	KVK Scientist Award	2018	Samagra Vikash Welfare Society (SVWS)	Certificate	KVK Scientist Award
KVK, Khagaria	“Distinguished Scientist Award”, 2018 in the National Conference on Livelihood and Food Security (LFS-2018)	2018	Society for Agriculture Innovation & Development, Ranchi	Certificate	In the field of Home Science
KVK, Khagaria	“Best poster presentation award” in the National Conference on Livelihood and Food Security (LFS-2018)	2018	Society for Agriculture Innovation & Development, Ranchi	Certificate	In the field of Home Science
KVK, Khagaria	“Excellence in Extension Award” International Conference on Food Security and sustainable Agriculture	2018	Society for Agriculture Innovation & Development, Ranchi	Certificate	In the field of Home Science
KVK, Khagaria	KVK, Khagaria got first position for stall exhibition in Regional Kisan Mela	2018	BAU, Sabour in collaboration with Ministry of Agriculture & Farmers Welfare, Govt of India	Certificate	Overall contribution in KVK mandarty activities
KVK, Khagaria	Cert. of appreciation for obtaining 6 position uploading no of events at KVK portal of ICAR	2018	BAU, Sabour	Certificate	Overall contribution in KVK mandarty activities
KVK, Bokaro	Outstanding Achievement Award in International Conference on Food Security and Sustainable Agriculture	2018	SAID, Society	Certificate	In the field of Agril. Engg.
KVK, Bhagalpur	ICAR Award	2019	Deen Dayal Upadhyay Best KVK Award (National)	Certificate Cash	KVK activities
KVK, Rohtas	ICAR Award	2019	Deen Dayal Upadhyay Best KVK Award (Zonal)	Certificate Cash	KVK activities



NOTES





हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद

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**ICAR-Agricultural Technology Application Research Institute Patna
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