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ANNUAL REPORT वार्षिक प्रतिवेदन 2019-20

भाकृअनुप
ICAR

ANNUAL REPORT
वार्षिक प्रतिवेदन

2019

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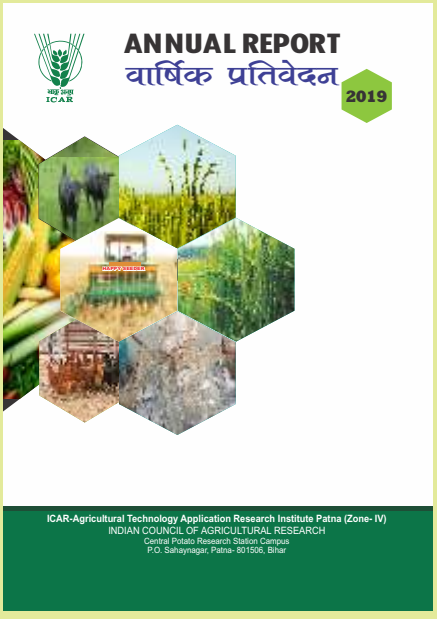

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PREFACE

ICAR- Agricultural Technology Application Research Institute (ATARI), Zone IV, Patna was established in April 2017 by the ICAR New Delhi for monitoring the activities of 68 KrishiVigyanKendras (KVKs) of Bihar and Jharkhand with specific objectives to plan, monitor and evaluate the programmes of KVKs working in under jurisdiction.

In addressing the issues of low productivity of cereals, pulses, vegetables, fruits, milk, meat, egg, fish, etc., and challengesto doubling the farmers' income, enhancing the capacity building of the farmers, rural youth for mitigating the effect of climate change, a large number of new and improved agricultural technologies released by the ICAR institutes and State Agriculture Universityneed to be validated in the farmers' field through 68 KVKs of Zone IV under the technical guidance and supervision of ICAR- Agricultural Technology Application Research Institute (ATARI), Patna. Indian Council of Agricultural Research (ICAR) undertook various new initiatives like Jal Sakti Abhiyan, Doubling Farmers' Income' Programme, GraminKrishiMausamSewa, Pradhan MantriPrampragatKrishiVikasYojna, New Extension methodology in Agriculture, etc. during the year 2019 in addition to the regular guidance of 68 KVKs which were showcased in this Annual Report. This is the third Annual Report of ICAR- ATARI, Patna, Zone IV.

In this report salient achievements of ICAR- ATARI, Patna in developing functional linkage with various stakeholders, performance of Directorates of Extension Education of State Agricultural Universities and 68KVKs of this Zone are represents 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.

Patna
15th July, 2020

In this document, we tried to present report of all mandated activities viz. On-Farm Trails (OFT), Front Line Demonstrations (FLD), Training programme, productionof seedand planting materials, soil and water sample analysis, mobile advisory services, revenue andresource generation, publication, organizing special programme and many others are registered to make various stakeholders to 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 LineDemonstration (CFLD) on Pulses and Oilseeds, National Innovations in Climate Resilient Agriculture (NICRA), Farmer FIRSTProgramme (FFP), Attracting and Retaining Youth in Agriculture (ARYA), Cereal Systems Initiative in South Asia (CSISA), *GraminKrishiMausamSewa* (GKMS), of KVKs are the important activities documented in this report.

In the course of preparing the present report, I extend my sincere thanks to Dr. Amrendra Kumar, Principal Scientist, all Heads & Senior Scientists and the staff members of KVKs of Zone IV, Senior Research Fellows, Young Professionals, 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.

Director

KVKs UNDER ICAR-ATARI PATNA

BIHAR AND JHARKHAND

Bihar

Jharkhand

CONTENT

6.	Soil, Water Sample Analysis and World Soil Day Celebration	
7.	Scientific Advisory Committee (SAC) Meeting	
8.	Publication by KVKs	
9.	Technological Backstopping by Directorate of Extension Education	
10.	Agricultural Technology Information Centre	
11.	HRD Programme	
12.	Outsourcing of Fund by KVKs	
13.	National Farmer's Portal	
14.	Tribal Sub-Plan	
15.	National Innovations in Climate Resilient Agriculture- Technology Demonstration Component (NICRA-TDC)	
	15.1 Natural resource management	
	15.2 Crop production	
	15.3 Livestock and fisheries	
	15.4 Institutional intervention	
	15.5 Village climate risk management committee (VCRMC)	
	15.6 Capacity building	
	15.7 Extension activities	
16	MeraGaonMera Gaurav (MGMG) Programme	
17	CSISA-ICAR Collaborative Project Phase-III	
	17.1 Action taken	
	17.2 Achievements obtained	
18	Skill Development Training Programme (ASCI)	
19	Farmer FIRST Programme	
20	Seed Hub	
21	Attracting and Retaining Youth in Agriculture (ARYA)	
22	KrishiVigyan Kendra (KVK) Knowledge Network/ KVK Portal	
23	Krishi Portal	
24	Management Information System including Financial Management System (MIS-FMS) under ICAR-ERP	
25	Public Finance Management System (PFMS)	
26	Online Reporting by KVKs	
27	Special Programmes	
	27.1 Swachh Bharat Abhiyan	
	27.2 Vaccination programme	
	27.3 Swachhta Hi SewaProgramme	
	27.4 Fertilizer application rural Programme	
	27.5Plantation ProgrammeKVK in rural school	
	27.6 Mini soil testing labs MahilaKisan Divas Programme	
	27.7 Programme on Rural Agricultural Work Experience (RAWE)	
	27.8 Diploma in Agricultural Extension Service for Input Dealers (DASAI) Programme	
	27.9 National Animal Disease Control Program for FMD and brucellosis and Artificial Insemination	
28	New Initiatives Undertaken	
	28.1Jal Shakti AbhiyanProgramme, 2019	
	28.2 New Extension Methodologies and Approaches (NEMA)	
	28.3 KrishiKalyanAbhiyan (KKA)	
	28.4 Institute Website	
	28.5 MahilaKisan Divas' Programme	
	28.6 Pradhan MantriKisanSammanNidhiYojna (PM-KISAN) and PM-KMDY Programme	
29	Personnel	
30	Awards	

कार्यकारी सारांश

भा.कृ.अनु.प.–अटारी जोन -IV, पटना का स्थापना वर्ष 2017–18 के दौरान भा.कृ.अनु.प.–अटारी कोलकाता से पृथक करने के उपरान्त बिहार और झारखण्ड के 68 कृषि विज्ञान केन्द्रोंके कार्यकलापों की निगरानी करने के उद्देश्य से किया गया। केन्द्र ने बिहार और झारखंड राज्यों में कार्यरत कृषि विज्ञान केन्द्रों के कार्यक्रमों की योजना, निगरानी और मूल्यांकन के विशेष उद्देश्य के साथ केंद्रीय आलू अनुसंधान केंद्र के कार्यालय परिसर, सहाय नगर, पटना से माह अप्रैल 2017 में अपनी यात्रा प्रारंभ की। एक ओर सीमित संसाधनों के साथ, अटारी पटना ने कृषि विस्तार, अनुसंधान और ज्ञान प्रबंधन को मजबूत बनाने के उद्देश्य से प्रौद्योगिकीय अनुप्रयोग और अग्रिम पंक्ति विस्तार शिक्षा कार्यक्रम के समन्वय एवं निगरानी का हर संभव प्रयास कर रहा है दूसरी ओर कृषि विज्ञान केन्द्रों प्रौद्योगिकी के मूल्यांकन तथा किसानों के खेतों में उसके व्यापक अनुप्रयोग हेतु अग्रिमपंक्ति प्रदर्शन तथा किसानों, ग्रामीण युवाओं एवं प्रसार पदाधिकारियों के क्षमता निर्माण के संवर्धन पर कार्य कर रहा हैं। यह उल्लेखनिय है कि छोटे एवं मध्यम किसानों, ग्रामीण युवाओं एवं युवतियों तथा अन्य हितधारकों की आकांक्षाओं की पूर्ति करने तथा कृषि विज्ञान केन्द्रों किसानों तक सूचना एवं प्रौद्योगिकिय सहायता उपलब्ध कराने की क्षमता ने उन्हें जिले में तथा राज्य में एक महत्वपूर्ण स्थिति पर खड़ा कर दिया है।

इस जोन में 68 कृषि विज्ञान केन्द्र और राज्य कृषि विश्वविद्यालयों (एसएयू) के 4 प्रसार शिक्षा निदेशालयों (डी.ई.ई.) के कार्यसंचालन के लिए आवंटित निधियों का सफलतापूर्वक प्रबंध किया गया। वर्श 2019–20 के दौरान डी.ई.ई. सहित कृषि विज्ञान केन्द्रों को कुल 6938.80 लाख रूपए की राशि उपलब्ध कराए गए। अधिदेशित कार्यकलापों में, जोन–प्टके कृषि विज्ञान केंद्रो ने वर्ष 2019के दौरान प्रशिक्षण, ऑन फार्म ट्रायल, अग्रिमपंक्ति प्रदर्शन आदि के क्षेत्रों में संपूर्ण निर्धारित लक्ष्य को लगभग हासिल किया है। वर्ष 2019 के दौरान, फसलों की खेती, पशुपालन, मछली पालन, नाशीकीट प्रबंधन, भंडारण तकनीक, आदि से संबंधित आकलन के लिए पूरे जोन में 2718 कृषक प्रक्षेत्रों पर कृषि विज्ञान केन्द्रों ने 391 ऑन फार्म परीक्षण संचालित किए। इन परीक्षणों से प्राप्त समाधानों को टेक्नोलाजी कैप्सूल के रूप में प्रमुख राज्य प्रसार प्रणाली में स्थापित करने से पहले छोटे पैमाने के प्रदर्शन के आधार पर पुनः प्रयोग किया गया। विकसित प्रौद्योगकी में अपेक्षित सुधार/संशोधन के लिए अनुसंधान प्रणाली को फीडबैक भी उपलब्ध कराई गई ताकि विकसित प्रौद्योगिकी क्षेत्र की व्यापक कृषि पारिस्थितिकीय स्थिति के अनुकूल हो।

कृषि विज्ञान केन्द्रों द्वाराचयनित दलहन, तिलहन, अनाज, बागवानी एवं अन्य फसलों की उत्पादकता बढ़ाने हेतु अग्रिमपंक्ति प्रदर्शन संचालित किए गए तथा बीज प्रतिस्थापन करने हेतु नई किस्मों/कृषि क्रियाओं के पैकेज को भी विमोचित किया गया। कृषि विज्ञान केन्द्रों ने खरीफ और रबी के दौरान दलहन एवं तिलहन फसलों में इस जोन के 7877 किसानों को शामिल करते हुए, इस अंग्रिम पंक्ति प्रदर्शन कार्यक्रम के तहत 2040.92 हे. क्षेत्रफल शामिल किया। जिसमें बिहार और झारखंड के कृषि विज्ञान केन्द्रों द्वारा अनाजों (991.56हे.), सब्जियों(253.73हे.), फल(89.70हे.) नकदी एवं अन्य फसलों पुष्पों, मसाला (12.16हे.) जिससे क्रमशः 2296, 2283, 251 तथा 402 किसानो को शामिल किया गया। पशुधन क्षेत्र में 12513 पशुओ के लाभार्थ 1716 किसानों को शामिल किया गया। मत्स्यकी में, 88.0 हे. जल क्षेत्र का आछादन करते हुए कृषि विज्ञान केंद्रो द्वारा 138 प्रदर्शन किए गए। उद्यमों के विस्तार हेतु 1716 प्रद ान तकनीको 12443 किसानों/उद्यमियों के बीच लगाये गये।

कृषि विज्ञान केन्द्रोंके द्वारा पारंपरिक कृषि विधियों की तुलना में नवीनतम तकनीक (1368 ईकाई) जैसे कि वर्मीकम्पोस्ट, मधुमक्खी पालन, मूल्य संवर्धन, खुम्ब उत्पादन, मूर्गीपालन,पोशण वाटिका, बीज उत्पादन, अजोला की खेती तथा अन्य कई उद्यमों को 11410 किसानों और 30102 ग्रामीण युवाओं को भाामिल करते प्रदर्शन किए गए। निश्पादन में उपज एवं लागत लाभ अनुपात के आधार पर, संस्थान द्वारा विकसित किस्मों और कृषि विधियों की श्रेष्ठता पाई गई। प्रदर्शन कार्यक्रमों में प्रसार पदाधिकारियों की सहभागिता से बिहार और झारखंड में खेतीहर समुदाय के हित में प्रदर्शन कार्यक्रमों का बड़े स्तर पर प्रसार हुआ जिससे प्रदर्शन कार्यक्रम का मार्ग प्रशस्त हुआ।

दलहन और तिलहन फसलों की उत्पादकता बढ़ाने के लिए, विशेष रूप से धान परती भूमि का उपयोग करने के संदर्भ में, समूह अग्रिमपंक्ति प्रदर्शन (सीएफएलडी) कार्यक्रम का क्रियान्वयन वर्ष 2019 के दौरान अन्य उपलब्धि में से एक रही। समग्र रूप से, खरीफ दलहन के अन्तर्गत कुल 1040 हे. क्षेत्रफल आवंटित किया गया था, जिसमे 950.10 हे. क्षेत्रफल मे सफलता पूर्वक प्रदर्शन हुआ और खरीफ दलहनों की उपज में औसत वृद्धि 31.06से 54.34 प्रतिशत की दर्ज किया गया। रबी दलहन के अंतर्गत कुल 1340 हे. क्षेत्रफल में मसूर, चना, मूँग, मटर को सम्मिलित कर बिहार और झारखंड में 1383 हे. क्षेत्रफल से उपज में औसत वृद्धि 32.19से 57.27 प्रतिशत दर्ज किया गया। दूसरी

ओर ग्रीष्मकालीन दलहन मूँग और उड़द के अन्तर्गत कुल 980. 25 हे. क्षेत्रफल मे सफलता पूर्वक प्रदर्शन हुआ जो कुल लक्ष्य 970.0 हे. क्षेत्रफल से भी अधिक है।

तिलहन समूह अग्रिम पंक्ति प्रदर्शन (सी.एफ.एल.डी.) कार्यक्रम को कृषि विज्ञान केन्द्रों ने वर्ष 2019 के दौरान खरीफ, रबी और ग्रीष्म मेंसंचालित किए गए। खरीफ में, मूंगफली, सोयाबीन, तिल, नाइजर और सूर्यमुखी फसलों के कुल 645 हे. क्षेत्रफल को 1826 स्थानों पर तथा रबी के अंतर्गत कुल 940.40 हे. क्षेत्रफल में सरसों, अलसी, कुसुम, तिल तथा सूर्यमुखी फसलों के प्रदर्शन को संचालित किए गए। खरीफ में तिलहन फसलों की उपज में वृद्धि 11.39 से 96.00 प्रतिशत के बीच थी, जबकि रबी के दौरान यह 12.5–82.30 प्रतिशत के बीच था। ग्रीष्मकालीनके अन्तर्गत कुल 285 हे. क्षेत्रफल में कार्यक्रम संचालित किया गया जिसे 805 कृषकों के प्रक्षेत्र पर प्रत्यक्षण किया गया।

कृषि और सम्बद्ध क्षेत्रों के स्थायी विकास के लिए पर्याप्त ज्ञान तथा वास्तविक सतही स्थिति में उसके अनुप्रयोग के लिए कौशल की आवश्यकता होती है इसीलिए, किसानों और खेतीहर महिलाओं, ग्रामीण युवाओं एवं युवतियों तथा विस्तार पदाधिकारियों के लिए दक्षता सम्वर्धनकृषि विज्ञान केन्द्रों के प्रमुख कार्य थे जिन्हें उनके द्वारा वांछित स्तर तक प्राप्त किया गया। ज्ञान और कौशल वृद्धि कराने के संबंध में, जोन IV के कृषि विज्ञान केंद्रों ने फसल उत्पादन, बागवानी, मृदा स्वास्थ्य प्रबंधन,कृषि अभियांत्रिकी,पशुधन एवं मत्स्यकी, गृह विज्ञान, कृषि विस्तार और अन्य विभिन्न आयामों पर 1,63,489 कृषिरत किसानों एवं महिलाओं के लिए कुल 5447 प्रशिक्षण कार्यक्रम आयोजित किया।

वर्ष 2019 के दौरान अधिक संख्या में ग्रामीण युवाओं को स्व–रोजगार प्राप्त करने में दक्ष बनाने के उद्धेश्य से जोन प्टके कृषि विज्ञान केन्द्रों के द्वारा कुल 1226 उद्यम–आधारित प्रशिक्षण कार्यक्रम आयोजित किए जिसमें 30102 प्रशिक्षणार्थियों को प्रशिक्षण दिया गया जिससे 20660 ग्रामीण युवाओं और 9442 ग्रामीण युवतियों ने लाभ लिया।

अग्रिमपंक्ति प्रदर्शन के अन्तर्गत कृषकों एवं विस्तार कार्मिकों के क्षमता निर्माण हेतु चयन किया गया ताकि उन्हें कृषि, पशुपालन और मत्स्यकी क्षेत्रों में नवीनतम जानकारी से अवगत कराया जा सके। जोन IV के कृषि विज्ञान केन्द्रों द्वारा 32049 विस्तार पदाधिकारियों के लिए कुल 740 पाठ्यक्रम को सफलतापूर्वक आयोजित किए गए।

स्व–रोजगार अवसर प्राप्त करने की दिशा मे युवाओं को प्रेरित करने के उद्देश्य से जोन IV के कृषि विज्ञान केन्द्रों के द्वारा दीर्घकालिक व्यवसायिक प्रशिक्षण कार्यक्रम भी आयोजित किए। इस प्रक्रिया में 6591 ग्रामीण युवाओं और 3116 ग्रामीण युवतिओं के लिए कुल 304 पाठ्यक्रम (कृषि और संबंद्ध क्षेत्रों) संचालित किए गए। विभिन्न संगठनों द्वारा उनकी आवश्यकता के अनुसार नामित प्रतिभागियों हेतु जोन IV के कृषि विज्ञान केन्द्रों ने 1130 प्रायोजित प्रशिक्षण कार्यक्रमों में कुल95919 प्रशिक्षणार्थीयों को प्रशिक्षित किया गया।

उन्नत कृषि और सम्बद्ध प्रौद्योगिकियों पर ग्रामीण खेतीहर समुदाय को जानकारी उपलब्ध कराने के लिए वृहद स्तर पर जागरूकता कार्यक्रम चलाए गए तथा जोन IV के कृषि विज्ञान केन्द्रों ने 7,00,917 किसानों और 33,810 विस्तार पदाधिकारियों तक पहुँच बढ़ाने हेतु विभिन्न प्रकार के विस्तार कार्यक्रम आयोजित किए।

रोग एवं कीट प्रतिरोधी युक्त किस्मों का गुणवत्तायुक्त बीज, उत्पादकता को बढ़ाने में अति महत्वपूर्ण कड़ी है तथा किसानों की बीज आवश्यकता की पूर्ति बनाये रखने हेतु कृषक सहभागी बीज उत्पादन कार्यक्रम के अंतर्गत भागीदारी प्रक्रिया से अनेक गाँवों में बीज उत्पादन कार्यक्रमों को चलाया गया। वर्ष 2019 के दौरान,जोन IV के कृषि विज्ञान केन्द्रों द्वारा धान, गेहूँ, मक्का, सरसों, मसूर, नाइजर, मूँगफली, अरहर, चना, उड़द, सब्जियों, मसालों, चारा आदि जैसी प्रमुख फसलों के 9837.00 क्विंटल बीज उत्पादित किए गये जिसमें मुख्य रूप से धान (5502. 41क्विंटल), गेहूँ (2313.58 क्विंटल), मक्का (129.57 क्विंटल), सरसों (176.35 क्विंटल), अलसी (16.51 क्विंटल), नाइजर (12. 15 क्विंटल), मूँगफली (6.56 क्विंटल), काबूली चना (321.86 क्विंटल), मटर (128.12 क्विंटल)तथा विभिन्न सब्जियों (373.00 क्विंटल) के बीज उत्पादित किये गये।

कृषि विज्ञान केन्द्रों ने फल फसलों, सब्जियों, पुष्प फसलों, वन्य फसलों, औषधीय एवं सुगंधीय पादपों की कुल 22.85 लाख रोपण सामग्रियों/पौधों का उत्पादन किया जिससे 154382 किसान लाभान्वित हुए।

खेतों में जैव–उत्पाद का प्रयोग पर्यावरण की दृष्टि से अधिक लोकप्रिय हो रहा है और इसलिए कृषि विज्ञान केंद्रों ने 2039.44 टन जैव उत्पाद का उत्पादन किया जिसकी बाजार मूल्य 16,50,302 रूपये है। जैव उत्पाद में जैव उर्वरक, केचुआँ खाद, जैव एजेन्ट तथा केंचुआँ किसानों को उपलब्ध कराया गया।

गुणवत्तापूर्ण पशुधन प्रजाति और मछली अंगुलिकायें

उपलब्ध कराने के लिए, कृषि विज्ञान केन्द्रों ने वर्ष 2019 के दौरान 374 दूधारू पशुओं, 246 छोटे जुगाली पशु, 70 सुअरों,19,198 मुर्गी और 13,21,679 मछलियों के अंगुलिकायें किसानों को उपलब्ध कराए।

मृदा और जल नमूनों के विश्लेशण में, कृषि विज्ञान केन्द्रों ने पूरे जोन के 1409 गाँव से 29238 नमूनों के विश्लेशण किया जिसमें इस जोन में कुल 51609 किसान लाभान्वित हुए। इस प्रक्रिया ने किसानों को उच्च उत्पादकता तथा स्थायी मृदा स्वास्थ्य हासिल करने हेतु फसलों में रसायनिक उर्वरकों का संतुलित प्रयोग करने में सहायता की है। अधिदे ित कार्यकलापों के अलावा, कृषि विज्ञान केन्द्रों ने सार्वजनिक–निजी भागीदारी, विश्व मृदा दिवस, राष्ट्रीय विज्ञान दिवस, वि व पशुचिकित्सा दिवस और अन्य के माध्यम से खेतीहर समुदाय के लिए विशेष दिवस/सप्ताह भी मनाए। इस प्रकार के समारोहों के प्रति बड़ी संख्या में प्रतिभागी आकर्शित हुए और किसानों को उनके लाभ हेतु इन कार्यक्रमों के बारे में जानकारी देने का अवसर भी प्राप्त हुआ।

वांछित उद्धेश्यों की पूर्ति सुनिश्चित करने के लिए पिछले एक वर्षा के दौरान भा.कृअनु.प.–अटारी,पटना जोन IV पर अनेक प्रमुख कार्यक्रमों का कार्यान्वयन करना मुख्य जिम्मेदारी थी। जोन IV में एक राष्ट्रीय नेटवर्क परियोजना, राष्ट्रीय जलवायु अनुकूल कृषिनवोन्मेश (निकरा) एक ऐसा ही कार्यक्रम है जिसका बिहार और झारखंड के 54 गाँवों को समाहित करते हुए इस जोन के 13 कृषि विज्ञान केन्द्रों के जरिये कार्यान्वयन किया जा रहा है। निकरा 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 चिहिंत जिलों की जलवायु भेद्यता 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 वर्षा, आदि जैसी जलवायु भेद्यताओं से निपटनें में सहायता प्राप्त हो सके। पलवार और बाँध बनाने के माध्यम से नमी संरक्षण, वर्षा जल संचयन, भूजल पुनः भरण, जल बचत सिंचाई तकनीक, संरक्षित जुताई, सूखा सहिष्णु धान किस्मों, बाढ सहिष्णु धान किस्मों, उन्नत चारा उप किस्मों, समुदायिक पौधशाला, उच्च एवं टिकाऊ उपज सूचकांक के साथ अंतर फसल प्रणाली, फसल विविधीकरण, सुअर की उन्नत नस्ल, पिछवाड़ा कुक्कुट पालन, बत्तख, सजावटी पंक्षी, मिश्रित एवं मांगुर मछली पालन जैसे प्रौद्योगिकीय घटकों के सफलतापूर्वक कार्यान्वयन से न केवल निकरा गाँवो 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 पहुँचा है।

जोन प्टमें दलहन उत्पादन और पोषाहार को बनाये रखने के लिए दलहनी फसलों का बीज केंद्र एक महत्वपूर्ण घटक है। 10 वर्षा के अन्दर विकसित नयी किस्मों (विमोचित/अधिसूचित) के गुणवत्तापूर्ण बीजों के उत्पादन को बढ़ावा देने के लिए, जोन प्ट के अंतर्गत बिहार के 7 कृषि विज्ञान केन्द्रों और झारखंड के 3 कृषि विज्ञान केन्द्रों में चिन्हित दलहनी फसलों का बीज उत्पादन कर रहे हैं। बीज उत्पादन के लिए चिन्हित फसलों में चना, अरहर, मूंग, उड़द, मसूर और मटर शामिल हैं।

फार्मर फर्स्ट, जो कि एक किसान–केंद्रित कार्यक्रम है को इस जोन के दो भा.कृ.अनु.प. संस्थानों (भा.कृ.अनु.प. –रा ट्रीयलीची अनुसंधानकेन्द्र और भा.कृ.अनु.प.–पूर्वी अनुसंधान परिसर और दो राज्य कृषि विश्वविद्यालयों (बिहार कृषि विश्वविद्यालय, सबौर एवं बिरसा कृषि विश्वविद्यालय, राँची) के माध्यम से कार्यान्वित किया जा रहा है। इस कार्यक्रम का मूल सिद्धांत यह है कि किसान अनुसंधान से जुड़ी समस्या की पहचान करने, प्राथमिकिकरण, परीक्षण के संचालन और किसानों के खेतों में उसके प्रबंधन में अहम भूमिका निभाएं। इस परियोजना के जरिए चयनित किसानों/किसान परिवार की आजीविका में समग्र रूप से सुधार लाने के लिए कार्यान्वयन संस्थानों/राज्य कृि ा विश्वविद्यालयों द्वारा प्राकृतिक संसाधन प्रबंधन, फसल, बागवानी, समेकित कृषि प्रणाली, पशुधन और मत्स्यकी मापांक के तहत विभिन्न कार्यकलापों का कार्यान्वयन किया गया। इस परियोजना से कुल 6795 किसान परिवार वर्ष 2019 के दौरान लाभान्वित हुए।

जनजातीय क्षेत्रों और जनजातीय आबादी में पिछड़ेपन के मुद्दों का समाधान करने हेतु, एक विशिष्ट कार्यक्रम जनजातीय उपयोजना (टीएसपी) इस जोन के 15 जिलों में कार्यान्वित की जा रही है। जनजातीय किसानों को उन्नत कृषि विधियों के लाभ को पहुँचाने के लिए परिसंपत्ति सृजन, ऑन–फार्म परीक्षण,प्रशिक्षण कार्यक्रम, बीज और रोपण सामग्री,आदि जैसी पहल की गई है।

प्रतिवेदित अवधि के दौरान, इस जोन के अंतर्गत कृषि विज्ञान केन्द्रों ने स्प्रेयर, वीडर, कृषि शेड नेट, रिज मेकर आदि के रूप में 12919 परिसंपत्तियाँ सृजित की गई है तथा कुल 4.32 लाख जनजातीय किसानों ने विभिन्न विस्तार कार्यकलापों मे भाग लिया जिसमें 14421 जनजातीय किसानों का मृदा, पौधों तथा पानी के नमूने की जाँच कृषि विज्ञान केन्द्रों के माध्यम से किया गया ।

भा.कृ.अनु.प. ने देशभर के 25 चिन्हित कृषि विज्ञान केन्द्रों के माध्यम से वर्ष 2019 के दौरान कृषि के प्रति युवाओं को स्वरोजगार से स्वावलम्बन हेतु आर्याकार्यक्रम शुरू किया गया ताकि ग्रामीण युवाओं को विभिन्न कृषि एवं संबंध क्षेत्रों की ओर आकर्शित कर उन्हें सशक्त किया जा सके जिससे उन्हें स्थायी आय हासिल करने तथा लाभप्रद रोजगार पाने में सहायता दी जा सके। तद्नुसार, बिहार के 06कृ.वि.केन्द्रों ने और झारखंड के 04कृ. वि.केन्द्रों ने वित्तपोषण सहायता के साथ जोन IV के तहत इस कार्यक्रम का सफलतापूर्वक कार्यान्वयन किया। उद्यमियों को जिले में चिन्हित युवाओं को वित्तीय एवं तकनीकी सहायता उपलब्ध कराने के लिए चयनित किया गया। कृ.वि.केन्द्रों के प्रयास और भा. कृ.अनु.प.–अटारी, पटना के पर्यवेक्षण से 794 ग्रामीण युवाओं एवं युवतीयों ने स्वरोजगार से स्वावलम्बन हेतु अपनी उद्यम स्थापित करनें 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। वर्ष 2019 के दौरान कृ.वि.केन्द्रों के कार्मिकों के क्षमता निर्माण की योजना बनाई गई और कृषि उद्यमियों के ज्ञान के वर्धन के लिए विभिन्न क्षेत्रों में अनेक मानव संसाधन विकास(एच.आर.डी.) कार्यक्रम भी आयोजित किए गए।

आनाज आधारित फसल प्रणाली में सुधार लाने तथा प्राकृतिक संसाधन के संरक्षण, खेती की लागत कम करनें, किसानों की आय बढ़ाने एवं किसानों की बेहतर आजीविका सुनिश्चित करने पर विशेष ध्यान देने के उद्देश्य से भा.कृ.अनु.प. के सहयोग से सी. एस.आई.एस.ए (दक्षिण एशिया में अनाज प्रणाली पहल) परियोजना को इस जोन के 40 कृ.वि.केन्द्रों और 2 कृषि विश्वविद्यालयों के माध्यम से कार्यान्वित किया जा रहा है। फसल स्थापन विधि, धान की सीधी बुआई (डी.एस.आर) में खरपतवार नियंत्रण और शून्य जुताई के तहत अनुक्रम में रबी फसल की खेती इस परियोजना में मूल्यांकित प्रौद्योगिकियाँ है।

कौशल प्रशिक्षण के जरिए उद्यमशीलता विकास के लिए भारतीय कृषि कौशल परिषद(ए.एस.सी.आई) के साथ एक सहयोगात्मक कार्यक्रम आरंभ किया गया। इस जोन के 47 कृषि विज्ञान केंद्रों 02 भा.कृ.अनु.प. के संस्थानों और 01 कृषि विश्वविद्यालय एएससीआई मानदंडों के अनुरूप19 विभिन्न रोजगार कार्य जैसे जैविक उत्पादन, खुम्ब उत्पादन, मधुमक्खी पालन, केंचुआ खाद, आदि रोजगार परख विषयों पर प्रशिक्षण कार्यक्रमों को संचालित किया गया।

जल संचय के महत्व को ध्यान में रखते हुए जल शक्ति अभियान की शुरूआत मिशन मोड के तरह जल के कमी वाले जिलों और प्रखण्डों मे जल संचय, वर्षाजल का संग्रहण, पुराने जलाशयों का जिर्णोधार, जल को पुनः उपयोग, भूगर्व जल संग्रहण संरचनाओं, वाटरशेड विकास एवं वानकीकरण के उद्देश्यों से प्रारंभ किया गया। वर्ष 2019 में जल शक्ति अभियान को देश के कम जल वाले 254 जिलों से इस योजना का शुरूआत किया गया जिसे अटारी जोन VI के बिहार एवं झारखंड राज्यों के 14 जिलों के 35 प्रखण्डों में क्रियान्वयन किया गया।इस अभियान में राज्य सरकार के विभिन्न विभागों, स्वयं सेवी संस्थानों, छात्रों आदि के सहभागिता से किसान मेला, किसान गो ठी, क्वीज, लेख प्रतियोगिता का आयोजन किया गया। इस प्रकार के कुल 54 कार्यक्रमों का आयोजन किया गया जिसमें 162 विशिष्ट व्यक्तियों, 113 राज्य सरकार के पदाधिकारियों एवं 32576 किसानों ने भाग लिया।

भा.कृ.अनु.प., नई दिल्ली नें एक नेटवर्क परियोजना(नेमा)को देश के 11 अटारी और 6 अनुसंधान संस्थाओं के माध्यम से प्रारम्भ किया गया जिसमें अटारी जोन 2 जोधपुर को कार्यकारी एजेन्सी बनाया गया जो भा.कृ.अनु.प., द्वारा विमोचित विभिन्न तकनीकों का आज के परिवेश में मुल्यांकन करेगा। इस योजना में अटारी जोन 4 के कुल 09 जिलों (बिहार– 07 एवं झारखंड–02) के 42 प्रखण्ड़ों के 84 गाँवों में संचालित किया जा रहा है।

भा.कृ.अनु.प–अटारी,पटना द्वारा निगरानी किए जा रहे के.वि.के. ज्ञान पोर्टल ने दूरदराज के क्षेत्रों से बड़ी संख्या में किसानों को कृषि विज्ञान केन्द्रों के कामकाज के बारे में जानकारी प्राप्त करने में तथा उन्नत कृषि और संबंध विधियों के लिए सूचना प्रदान करने में मदद मिली। कृषि विज्ञान केंद्रों ने किसानों को सूचना उपलब्ध कराने के लिए पोर्टल में विभिन्न सूचनाएं अपलोड की, जैसे कि कृ.वि.के. पर उपलब्ध सुविधा, कृषि विधियों का पैकेज, विभिन्न परियोजनाओं की स्थिति, आगामी घटनाक्रमों आदि। इसके अलावा, कृषि की नवीनतम प्रौद्योगिकी,प्रकाशन, परीक्षण डाटा, प्रेक्षणात्मक डाटा, सर्वेक्षण डाटा और जियो–पोर्टल के साथ नियमित रूप से अपलोड किया जाता है। यह रिपोजिट्री कृषि और संबंध क्षेत्रों के बारे में सूचना की मेगाडाटा इन्वेंट्री है, जो किसानों, अनुसंधानकर्ताओं और योजनाकारों द्वारा सहज पहुँच के लिए भा.कृ.अनु.प. संस्थानों/ राज्य कृषि विश्वविद्यालयों के पोर्टल पर उपलब्ध है। राष्ट्रीय

किसान पोर्टल एक सशक्त माध्यम है जो एसएमएस सेवा के माध्यम से किसानों को सलाहकारी सेवाएँ उपलब्ध कराता है।

असंरचित सहायक सेवा डाटा (यूएसइसडी), इंटरेक्टिव वॉयस रिस्पोंस सिस्टम (आईवीआरएस)और पूल एसएमएस कुछ ऐसी मूलर्वित सेवायें हैं जो पोर्टल से संबंधित है 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 हैको अटारी– पटना में भी पूर्णतः लागु किया है।

सार्वजनिक वित्तीय प्रबंधन प्रणाली (पीएफएमएस) को भा.कृ.अनु.प.–अटारी, पटना में कार्यान्वित किया गया है ताकि वित्तीय प्रबंधन, क्रय/प्रापण, भंडार प्रबंधन तथा अन्य संबंधित कार्यकलापों में दक्षता बढ़ाई जा सके। इससे कार्यालय को काफी हद तक कागज रहित कार्य को संचालित करने में सहायता मिली है।

इस जोन के कृषि विज्ञान केन्द्रों को अनेक आवश्यकता आधारित कार्यकलापों, जैसे ग्रामीण कार्य अनुभव कार्यक्रम, ग्रामीण स्कूलों में कृषि पर प्रोत्साहन 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।

वैज्ञानिकों और किसानों के बीच सीधी वार्त्ता में सुविधा देने के लिए, इस जोन के अंतर्गत एकराज्य कृषि विश्वविद्यालय और छः भा.कृ.अनु.प. संस्थानों,भा.कृ.अनु.प.–अटारी, पटना के पर्यवेक्षण के तहत मेरा गाँव मेरा गौरव (एमजीएमजी) कार्यक्रम का कार्यान्वयन कर रहे हैं। वर्ष 2019 के दौरान 12338 किसानों के हित में विभिन्न गतिविधियाँको 49 गाँवो में चलाया गया जिसमें, गाँवों में नियमित रूप से दौरा, पारस्परिक संवाद बैठक, प्रशिक्षण,प्रदर्शन, मोबाइल आधारित सलाह, जागरूकता सृजन, आदि कार्य शामिल है।

भारत सरकार द्वारा चलाई गई व्यापक स्वच्छता मुहिम के अनुक्रम मे, भा.कृ.अनु.प.–अटारी,पटना के तहत इस जोन के सभी 68 कृषि विज्ञान केन्द्रों 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 स्वच्छ भारत अभियान में भाग लिया। कृषि विज्ञान केंद्रों ने जागरूकता कार्यक्रम, सुग्राहीकरण कार्यशाला, स्वच्छता अभियान तथा कम्पोस्ट निर्माण को समाहित करते हुए 670 कार्यक्रमों को आस–पास तथा गोद लिए गाँवो में नियमित रूप से कार्यान्वित किया।

कृषिक्षेत्र में उल्लेखनीय योगदान देने के लिए कथित महिलाओं को सम्मानित करने हेतु भा.कृ.अनु.प.–अटारी, पटना के तहत 7108 महिला किसानों को शामिल करते हुए बिहार के 44 कृषि विज्ञान केन्द्रों तथा झारखंड के 24 कृषि विज्ञान केन्द्रों ने राष्ट्रव्यापी समारोह के अनुक्रम में, राष्ट्रीय महिला किसान दिवस को मनाया गया।

भा.कृ.अनु.प.–अटारी, पटना एक ओर अपने अधिदेश के अनुरूपकार्य कर रहा है, वहीं दूसरी ओर खेतीहर समुदाय के कल्याण के लिए समस्त अधिदेशित एवं अन्य सेवाओं के कार्यान्वयन के लिए कृषि विज्ञान केन्द्रों तथा विस्तार शिक्षा निदेशालयों को सहायता प्रदान करने में सक्रिय भूमिका निभा रहा है। वैज्ञानिक सलाहकार परिषद (एस.ए.सी.) बैठक में भाग लेने तथा प्रदर्शन खेत में दौरा करने के जरिए ऑन द स्पॉट मूल्यांकन भी किया गया ताकि कृषि विज्ञान केन्द्रों द्वारा कार्यान्वयन किए जा रहे प्रमुख कार्यक्रमों के निष्पादन का आकलन किया जा सके। इसके अतिरिक्त कार्यशाला, प्रशिक्षण,बैठकें आदि का आयोजन कृ.वि.के. कार्मिकों के लिए भा.कृ.अनु.प.–अटारी,पटना की एक नियमित गतिविधि रही है जिससे कृषि और संबंध विषयों के बारे में उनके ज्ञान का संवर्धन 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 संसाधनो के अभाव के कारण गरीब किसान उक्त कार्यक्रमों से स्वयं के विकास के लिए लाभ उठा सकें। अनेक प्रमुख कार्यक्रमों में प्राप्त सफलता को राज्य विस्तार कार्यप्रणाली द्वारा अपने व्यापक बर्हिवेशन के लिए अपनाया जा रहा है। विभिन्न राज्य, केंद्रीय और अन्य संगठनों के साथ प्रभावकारी तालमेल और सहयोग किए जाने से कृषि विज्ञान केन्द्रों को लाभकारी प्रयोजन में उपयोग करने के लिए अतिरिक्त संसाधन तथा आय अर्जित करने में भी सहायता मिली है। भा.कृ.अनु.प.–अटारी, पटना में विकसित कार्ययोजना तथा बड़े समर्पण के साथ उसके कार्यान्वयन ने इस जोन के कृषि विज्ञान केन्द्रों को कृषि में कार्यान्तरण लाने हेतु एक सशक्त माध्यम बना दिया है।

EXECUTIVE SUMMARY

ICAR-ATARI Zone IV, Patna established during 2017- 18, after bifurcation from ICAR-ATARI Kolkata, for monitoring activities of 68 *KrishiVigyanKendras* (KVKs) of Bihar and Jharkhand states. ICAR-ATARI Zone-IV began its journey in April 2017from 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 Bihar and Jharkhand. With the limited manpower, ATARI Zone IV, Patna has tried his level best to strengthen agricultural extension research as well as knowledge management along with coordination and monitoring of 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 along with 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 68 KVKs and 4 Directorates of Extension Education (DEE) of the SAUs of this Zone were successfully managed. During 2019-20, a sum of Rs.6938.80lakh has been sanctioned to meet the expenditure of 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 2019, the KVKs of Zone IV conducted 391 on-farm trials in 2718 locations to assess performance of various technologies pertaining to crop sector and livestock sector. The solutions of problems 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, cereals, horticulture and other crops to establish the production potentiality of the newly released varieties/package of practices to enhance the production and productivity of selected crops. The KVKs brought 2040.92 ha under such frontline demonstration programme on pulse, oilseed, cereals, horticulture and other crops during Kharif, Rabi and summer involving 7877 numbers of farmers of this zone. Demonstrations were conducted by the KVKs of Bihar and Jharkhand on cereals (991.56ha), vegetables (253.73ha), fruits crops (89.70ha) and other crops including flowers, spices (12.16ha) involving 2296, 2083,251and 402 farmers, respectively. Demonstrations on enterprises was conducted in 1716 no. involving 12443 farmers. In livestock, 2578 number of farmers was involved in various demonstration programmes for the benefit of 12513 livestock. In fishery, demonstrations were taken up by 138 numbers of farmers to cover a water area of 88ha.

The KVKs also demonstrated various enterprises like vermi-compost, bee keeping, value addition, mushroom production, backyard poultry rearing, homestead vegetable cultivation, feed production, azolla cultivation and many more enterprises involving 11410 farmers and 1368 units and rural youth (30102 nos.) 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 2019. Altogether 1040ha was allotted and brought 950.10ha for *Kharif* pulses under CFLD programmeduring Kharif 2019. The average increase in yield of *Kharif* pulses was in range between 31.06to 54.34%. In Rabi 2019 the targeted area was 1340ha under lentil, chick pea and field pea andcovered 1383ha under programme with yield increase to a tune of 32.19 to 57.27%. On the other hands for summer pulses (green gram and black gram)achieved 980.25 ha over and above target of 970ha covering 2482 demonstrations in Bihar and Jharkhand. CFLD oilseed programme was conducted during *Kharif, Rabi* and Summer by the KVKs of this zone. In Kharif, ground nut, soybean, sesame, niger and sunflower were demonstrated in 645ha on 1826 locations and during *Rabi*, mustard, linseed, safflower, sunflower, sesame was demonstrated covering an area of 940.40ha against the target of 880ha. An increase in yield of oilseed crops recorded in *Kharif* was in the range of 13.93–96.00 %, whereas it was 12.5 to 82.3 % during Rabi. CFLD programme was also conducted during summer 2019 to cover an area of 285ha through805 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 5447 number of training programmes for 1,634,89 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 1,226 numbers of training programmes for benefit of 30,102 rural youths and girls covering 20,660 rural boys and 9,442 rural girls during 2019.

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 740 courses were conducted by the KVKs of Zone-IV for 32,049 extension functionaries.

The KVKs also organized vocational training programme of comparatively longer duration to expose the youths towards self-employment opportunity. In the process, 304 courses in different areas of agriculture and allied sectors were conducted for 6,591 rural boys and 3,166 rural girls.

The KVKs conducted 1,130 sponsored training programme for 95,919 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 of which 274614 were female participants.

Seed and planting materials are the most critical input to increase the productivity of the crop. To cater the need of the growers/farmers, seed production has been initiated in the villages under the head of "village seed production" programme in a participatory mode. During the year 2019, the KVKs of Zone-IV produced 9837.00 q of seeds of major crops like paddy (5502.41q), wheat (2313.58q), maize (129.57), mustard (176.35q), linseed (16.51q), niger(12.15q), groundnut (6.56q), chick pea (321.86), pigeon pea (128.12q) vegetables (373.00q), etc.

During the report period KVKs produced 2,284,577 planting materials/seedlings of fruit crops, vegetables, flower, forest sp., medicinal and aromatic plant for 154382 beneficiaries. Use of bio-product in agricultural field is gaining popularity from environmental point of view and the KVKs produced 203944.4 kg worth Rs.1650302 values of bio-fertilizers including vermi-compost, bio-agents and earthworm to make available among the farmers. In order to provide quality livestock strain and fish fingerling, KVKs made available 374 dairy animals, 246 small ruminants, 70 pigs, 19198 poultry birds and 1321679 fish fingerlings during 2019.

In soil and water sample analysis, the KVKs analyzed 29238 number of samples on grid basis from 1409 villages across the zone and thus it benefitted 51069farmers of the Zone. The process has enabled the farmers about the soil health status and use of need based chemical fertilizer in crops for obtaining higher productivity and to sustained soil health status for longer period. Apart from the mandated activities, the KVKs also organized 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.

Quality seed material of pulses is most important inputs for increasing productivity and production and provide nutritional security in the Zone. 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 comprising Buxar, Bhojpur, East Champaran, Lakhisarai, Munger, Saran, Vaishali and 3 KVKs of Jharkhand (Bokaro, Dumka, East Singhbhum) were engaged in producing pulse seeds of improved varieties of identified pulses during the year covering allseasons. The crops identified for seed production were Horse gram, Pigeon pea, Green gram, Black gram, Chick pea, Lentil and Field pea.

Farmer FIRST, a farmer-centric programme, is operational in the zone through02 ICAR Institutes (ICAR-NRC Litchi and ICAR-RCER, Regional centre) and 02 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 through different interventions of NRM, agronomical crops, horticultural crops, 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 3795 farm families were benefitted from this project during 2019.

In addressing the issues of backwardness in tribal areas and tribal population, a specific programme namely Tribal Sub Plan (TSP) is under operation in 15 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 with an outlay of Rs. 294.15 lakh. During the period under report, KVKs of this zone created 12919 nos. of assets in the form of sprayer, happy-weeder, agro-shed net, ridge maker, etc. A total of 4.32 lakhtribal farmers, youths, and extension personals had been trained out of which 14421tribal farmers tested their soil/ water/ plant/ manure samples from their district KVKs.

ICAR has initiated a programme “Attracting and Retaining Youth in Agriculture” (ARYA) is under operation in Zone IV through 6 KVKs of Bihar and 04 KVKs of Jharkhand in order to attract and empower the rural youth for taking up various agriculture and allied sectors enterprises as a source earning for sustainable income round the year and achieving a gainful employment. 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 794 rural youths to establish their enterprises for enhanced annual income in a sustained manner. Seeing the success of project other rural youths were also motivated to take off-farm enterprises for their livelihood.

For enhancing the capacity building various HRD programmes were organized for KVK personnel during 2019 in field of agri-preneursand other areas for their knowledge updating.

CSISA (Cereal System Initiative in South Asia) project phase III in collaboration with ICAR is under operation in 40 KVKs and two SAUs of Zone IV for improving cereal based cropping system with

emphasis on conserving natural resource base, reduction in cost of cultivation, augmenting farmer income and ensuring better livelihood of the farmers. Crop establishment method, weed management in DSR and *Rabi* crop in sequence under Zero Tillage were some of the technologies evaluated under this project.

A collaborative programme with Agriculture Skill Council of India (ASCI) has been taken up for entrepreneurship development in 19 different job roles through 47 KVKs, 02 ICAR institutes and 01 SAU for imparting skill trainingprogrammes on organic grower, mushroom grower, bee keeper, etc.

For providing impetus to Jal Sanchay, the '*Jal Shakti Abhiyan'* was launched on mission modefocusing mainly on water stressed districts and blocks with interventions like water conservation and rainwater harvesting, renovation of traditional water bodies, reuse of water and recharging of structures, watershed development and afforestation. In 2019, JSA covered 254 water stressed districts across the country of which 14 districts were from this zone 12 from Bihar and 2 of Jharkhand state covering 35 blocks and various programmes was conducted in collaboration with other state line departments, NGOs and students in form of KiassanMela, KissanGhosti, Quiz and Essay proggarmme. etc. Altogether 54 prograames were organized in which 32576 farmers, 1113 state official and 162 VIP participated.

ICAR has launched a network project on New Extension Methodologies and Approaches (NEMA) involving 11 ATARIs and 6 ICAR Research Institutes with the nodal agency ICAR-ATARI Zone II, Jodhpur during the year 2019 to assess the performance of different technology released by ICAR Institutes in the present day situations. The programme in this zone is operational 7 district of Bihar comprising 31 blocks and in Jharkhand 02 districts comparising 6 blocks covering total 84 villages.

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. Periodically KVKs are uploading various information pertaining to facility available at the KVK, package of practices of different crops, status of different projects, upcoming events, etc. in the portal for the benefits of the farmers. Alongside, KRISHI Portal is also regularly uploaded with recent 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 fully implemented in ICAR-ATARI, 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.

Mera Gaon Mera Gaurav (MGMG) progamme is operational through 06 ICAR Institutes and 01SAU of this zone under the supervision of ICAR-ATARI, Patna. Scientist had adopted selected village and transforming the knowledge to farmers by making regular visit, interface meeting, training, demonstration, mobile based advisories, recent publication, and mobilizing other line department person. Altogether 12328 farmers of 49 villages have been covered under this programme during 2019.

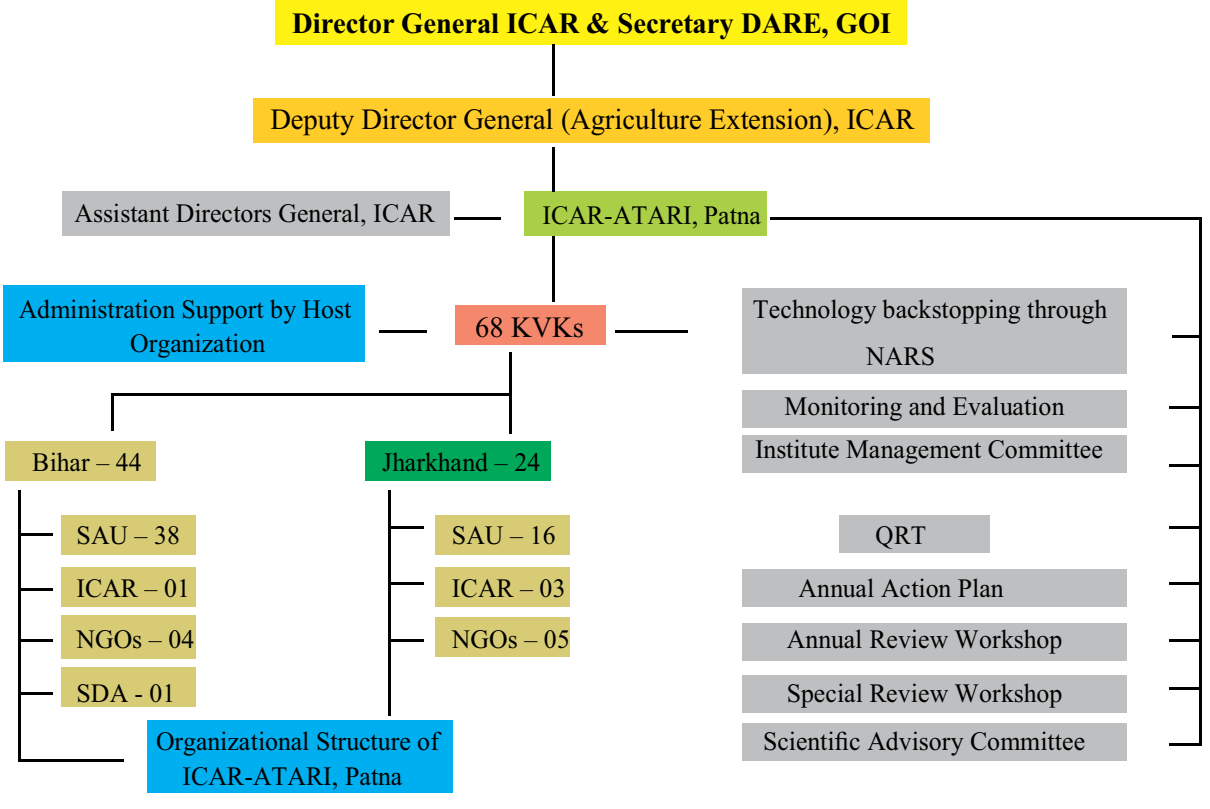
To bring a sense of responsibilities towards clean environment all the staff members of ICAR-ATARI, Patna including staffs of 68 KVKs under this Zone was involved in 'Swachh Bharat Abhiyan' to maintain cleanliness and hygiene in office premises as well as nearby places to create awareness among common citizens. KVKs have executed 622 programmes covering awareness programme, sensitizing workshop, cleanliness campaign, compost making, etc. in the adjoining and adopted villages on a regular basis.

As part of the nationwide celebration of 'RashtriyaMahilaKisan Divas', was celebrated by 68 KVKs in Bihar and Jharkhand involving 7108 farm women under ICAR- ATARI, Patna to honour women for their remarkable contribution in agriculture.

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. 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) looks after the administrative, financial and overall functioning of KVKs. 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 monitoring the activities of KVKs in their zone at State and District level. ICAR–ATARI Patna is among the eleven (11) ATARIs of the country which was recently established in2017,after bifurcation from ICAR-ATARI Kolkata, for monitoring activities of 68*Krishi Vigyan Kendras* (KVKs) of Bihar and Jharkhand. ICAR- ATARI Patna falls under Zone-IV and its office is located in the campus of Central Potato Research Station, P.O. Sahaynagar, Patna, Bihar- 801506.



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 is taken based on assessment of the submitted budget requirement, placing demand for fund, receiving funds and subsequent releasing of fund. Funds allocated for running 68 KVKs and 4 Directorates of Extension Education (DEE) of the SAUs of this Zone are successfully managed. During the year 2019-20, a sum of Rs69388 Lakh has been provided to the KVKs including DEEs in different states as per detail below:

Table 1: Revised Estimate in respect of ICAR-Agricultural Technology Application Research Institute & KVKs under Zone- IV during 2019-20.

DEE/ICAR/ University	KV Ks	P & A	General						Capital								
			T.A	H.R.D	Cont.	TSP (Gen.)	SCSP (Gen)	Total (General)	Equip ments	Work	Furnitu re & fixtures	Lib.	Vehicle	TSP (Capital)	SCSP (Capital)	Total (Capital)	
1	2	3	4	5	6	7	8	9=(4 to 8)	10	11	12	13	14	15	16	17=(10 to16)	18=3+9+17
ATARI Patna		3743386	923959	0	3254670	0	0	**4178629**	12499	1649000	0	0	0	0	0	**1661499**	**9583514**
BAU Sabour	21	201181246	4200000	1050000	15240500	0	650000	**21140500**	400000	6850000	0	0	1100000	0	530000	**8880000**	**231201746**
DRPCAU Pusa	16	96417469	2800000	800000	9920000	0	350000	**13870000**	0	22300000	0	0	7400000	0	210000	**29910000**	**140197469**
BASU Patna	1	8450000	200000	50000	12771586	0	50000	**13071586**	0	0	0	0	0	0	50000	**50000**	**21571586**
BAU Ranchi	16	95426813	3200000	800000	5420000	9718700	350000	**19488700**	0	0	0	0	0	11296000	210000	**11506000**	**126421513**
NGO Bihar	5	53681468	1000000	250000	4175000	0	150000	**5575000**	0	1000000	0	0	1100000	0	110000	**2210000**	**61466468**
NGO Jharkhand	5	67772819	1000000	250000	2670000	2901222	100000	**6921222**	0	0	0	0	0	3390000	60000	**3450000**	**78144041**
ICAR RCER Patna	2	15992137	400000	100000	1620000	0	0	**2120000**	0	3500000	0	0	0	0	0	**3500000**	**21612137**
ICAR-CRRI Cuttack (Kodarma)	1	6080049	200000	50000	660000	0	50000	**960000**	0	0	0	0	0	0	30000	**30000**	**7070049**
ICAR-IINRG, Ranchi (Khunti)	1	1919369	200000	50000	150000	980000	0	**1380000**	0	0	0	0	0	1129000	0	**1129000**	**4428369**
DEE BAU Sabour	1	0	0	0	1667288	0	0	**1667288**	0	0	0	0	0	0	0	**0**	**1667288**
DEE DRPCAU Pusa	1	0	0	0	603349	0	0	**603349**	0	0	0	0	0	0	0	**0**	**603349**
DEE BASU Patna	1	0	0	0	400000	0	0	**400000**	0	0	0	0	0	0	0	**0**	**400000**
DEE BAU Ranchi	1	0	0	0	34073	0	0	**34073**	0	0	0	0	0	0	0	**0**	**34073**
G. Total Exp.	**72**	**550664756**	**14123959**	**3400000**	**58586466**	**13599922**	**1700000**	**91410347**	**412499**	**35299000**	**0**	**0**	**9600000**	**15815000**	**1200000**	**62326499**	**704401602**
ATARI RE 2019-20		3700000	1000000	50000	3380000	0	0	**4430000**	50000	1649000	100000	0	0	0	0	**1799000**	**9929000**
KVKs RE 2019-20	68	547365000	13100000	3400000	44270000	13600000	1700000	**76070000**	0	33901000		0	9600000	15815000	1200000	**60516000**	**683951000**
Total RE 2019-20		**551065000**	**14100000**	**3450000**	**47650000**	**13600000**	**1700000**	**80500000**	**50000**	**35550000**	**100000**	**0**	**9600000**	**15815000**	**1200000**	**62315000**	**693880000**

2. ABOUT KRISHI VIGYAN KENDRA

KVKs, spreading over 739 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 solutions of their different farming problems. KVKs also provides technological backstopping to different State and Central Government Agencies

involved in Agricultural Research and Extension, in addition, to implementing several schemes of Central and State Government at district level. Recently, KVKs have been entrusted with implementation of several National Flagship Programs, 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 Bima Yojna, Swachh Bharat Abhiyan*, Tribal Sub Plan (TSP), *Gramin Krishi Mausam Sewa,* Skill Development in Agriculture, New Extension Methodology in Agriculture (NEMA) and many others.

2.1 STATE-WISE DISTRIBUTION OF KVK:

During 2019, under ICAR-ATARI, Patna a total 68 KVKs of Bihar (44) and Jharkhand (24) were working in two states of eastern India. Host organization-wise distribution showed 53 KVKs under SAU and CAU; 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 states	No. of districts	No of KVKs						Total
		SAU	CAU	ICAR	NGO	SDA	DU	
Bihar	39	22	16	01	04	01	00	44
Jharkhand	24	16	-	03	05	00	00	24
Total	63	38	16	04	09	02	00	68

ICAR – Indian Council of Agricultural Research, SAU – State Agricultural University, CAU- Central Agricultural 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 Institutions	Total
1.	Bihar (44)	Dr Rajendra Prasad Central Agricultural University, Pusa, Samastipur	16
		Bihar Agricultural University, Sabour, Bhagalpur	21
		Bihar Animal Science University, 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
	Sub Total (A)		**44**
2	Jharkhand (24)	Birsa Agricultural University, Kanke, Ranchi	16
		Central Rice Research Institute, (ICAR) Cuttack, Koderma	1
		Indian Institute of Resins and Gum, Namkum, Ranchi	1
		ICAR Research Complex for Eastern Region, Patna, Ramgarh	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
	Sub Total (B)		**24**
Total (A+B)			**68**

* Presently under State administration.

2.2 GENESIS OF KRISHI VIGYAN KENDRA:

ICAR in 1973 appointed Dr. Mohan Singh Mehta Committee and on the recommendation of the Committee first KVK was established in the year 1974 at Pondicherry under Tamil Nadu Agricultural University. Then on approval of Planning Commission different KVKs were established during different plans leading to an increase in number of KVKs to 716 at present. During Vth FiveYear Plan 18 KVKs were established, 12 KVKs opened during 1979, 14 during 1981 and 44 KVKs during VIth Five Year Plan were also started. Thus at the end of VIth Plan 89 KVKs including KVKs of Bihar and Jharkhand started functioning under Zone II, Kolkata. Further, in 2018 reshuffling of zones were made by ICAR and the new zone (Zone IV, ICAR-ATARI Patna) comprising KVKs of Bihar and Jharkhand was established with a total 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 15thAugust, 2015. Indian Council of Agricultural Research established 716 KVKs across the country till the end of year 2019. Under ICAR- ATARI, Patna jurisdiction of Bihar and Jharkhand, 68 KVKs has been established and are operational up to December 2019.

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:

Each KVK has a sanctioned staff strength of 16 which include 01- Senior Scientist and Head; 06- Subject Matter Specialists; 03- Programme Assistants; 02- Administrative Staff, 02- Drivers and 02- Supporting Staff. Accordingly, the total sanctioned staff for 68 KVKs of Zone IV is 1088,out of which 612 (56.25per 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 during 2019

Staff Position	Bihar	Jharkhand	Zone IV
Senior Scientist & Head	33	08	68
Subject Matter Specialist	165	97	408
Program Assistant	87	35	204
Others	145	39	408

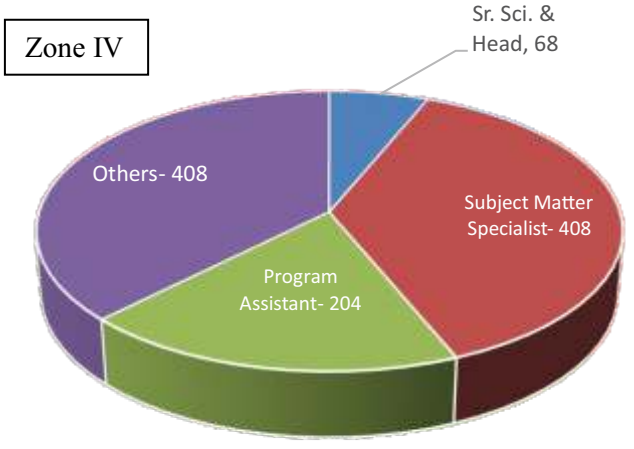


Fig 1: Filled up position in different staff categories in Zone IV

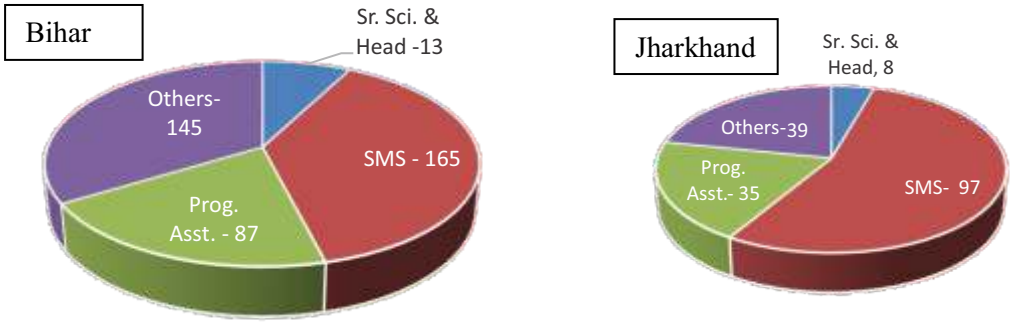


Fig 2&3: Filled up position in different staff categories in Zone IV

Table 5: Filled up position in different staff categories in Zone IV

Name of states	Senior Scientist & Head			SMS			Farm Manager			PA Computer			Program. Assistant (Lab.Technician)			Other			Total		
	S	P	V	S	P	V	S	P	V	S	P	V	S	P	V	S	P	V	S	P	V
Bihar	44	33	11	264	165	99	44	30	14	44	29	15	44	28	16	264	145	119	704	430	274
Jharkhand	24	08	16	144	97	47	24	14	10	24	8	16	24	13	11	144	39	105	384	182	202
Total	68	40	25	408	262	146	68	44	24	68	37	31	68	41	27	408	184	224	1088	612	476

Table 6: Category - wise staff position

Name of states	Senior Scientist & Head			SMS			Farm Manager			PA Computer			Prog. Asst. Lab. Tech.			Assistant			Steno Grade			Diver			Supporting Staff			Total		
	S	P	V	S	P	V	S	P	V	S	P	V	S	P	V	S	P	V	S	P	V	S	P	V	S	P	V	S	P	V
Bihar	44	33	11	264	165	99	44	30	14	44	29	15	44	28	16	44	38	6	44	35	9	88	51	37	88	21	67	704	430	274
Jharkhand	24	08	16	144	97	47	24	14	10	24	8	16	24	13	11	24	7	17	24	6	18	48	12	36	48	14	34	384	182	202
Total	68	40	25	408	262	146	68	44	24	68	37	31	68	41	27	68	45	23	68	41	27	136	63	73	136	35	101	1088	612	476

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 and the income generated is used for improvement of the farm. Revolving fund reported by 68 KVKs of Zone-IV where revolving fund scheme is operating accumulated a net balance was Rs. 11.00 Crore as on 1 January, 2020. In the year 2019, a substantial amount of fund i.e. Rs. 5.96crore was generated by the KVKs of Zone IV through revolving fund scheme. As per state is concerned, Bihar KVKs earned the amount of Rs. 4.52 Crore and Jharkhand of Rs. 1.43 Crore through this scheme in the year 2019. The detail status of revolving fund of KVKs under Zone IV is presented in Table7.

Table 7: Status of operating revolving scheme by the KVKs

State	Year	Opening Balance on1st April	Income during the year	Expenditure during the year	Net balance in hand as on 1st January, 2020	Net balance in hand as on 1st April of each year
Bihar	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
	2019-20	8,20,93,309.50	4,52,98,330.33	4,10,95,013.43	8,51,65,280.09	8,86,33,937.28
Jharkhand	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	1,50,70,954.00	1,10,24,189.90		2,68,84,885.22
	2019-20	2,27,81,059.38	1,43,58,986.00	1,11,96,549.64	2,48,91,419.90	2,56,77,180.76
Total	**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**		**11,13,78,149.40**
	2019-20	**10,48,74,368.88**	**5,96,57,316.33**	**5,22,91,563.07**	**11,00,56,699.99**	**11,43,11,118.04**

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 units, soil and water testing laboratories, rain water harvesting structure with micro-irrigation facilities, portable carp hatchery units, IFS model, E-connectivity, technology information units, vehicles etc. In most of the cases, KVKs utilizes these facilities for skill development and knowledge up-gradation of farmers to demonstrate the benefit of proper management practices. The details of infrastructure facilities available with the KVKs are given in Table 8.

Table 8: State-wise details of infrastructure available with KVKs

Name of states	Admin Building	Farmers Hostel	Demo. Units	Staff Quarters	Rain water harvesting structure	Soil water testing labs	Minimal processing facilities	Carp hatchery	Integrated farming system units	e-linkages facilities	Technology formation unit	Micro nutrient Analysis facilities	Solar panel
Bihar	35	34	54	27	5	26	11	4	10	20	2	10	5
Jharkhand	18	19	18	13	9	17	4	0	6	7	2	7	7
Total	53	53	72	40	14	43	15	4	16	27	4	17	12

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:

- ❖ Productivity enhancement of cereals, pulses and oilseeds
- ❖ Production of quality inputs like seed of major crops, planting materials etc. and breeds of livestock
- ❖ Capacity building among rural youths towards self-employment
- ❖ Integrated nutrient, pest and disease management
- ❖ Establishment of farming system in the region
- ❖ Crop diversification
- ❖ Empowerment of women in terms of improved nutrition, income and drudgery reduction through technological literacy
- ❖ Value addition, processing and market facilitation of household and commercial enterprises
- ❖ Use of resource conservation technology
- ❖ Major initiatives to combat climate change in the region
- ❖ Contingency planning for flood/ drought
- ❖ Initiative for development of fodder technology including azolla and hydroponic fodder cultivation
- ❖ Water harvesting and watershed management
- ❖ Small scale mechanization for reducing cost and drudgery
- ❖ Use of micro irrigation technology for more cropper drop of water
- ❖ Up-gradation of non-descriptive, local cattle by descriptive Indian cattle breeds using AI technology
- ❖ Animal health care and management
- ❖ Doubling the farmer's 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 programs 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 programs like Cluster Front Line Demonstrations (CFLD) under National Pulse Production Program (NPPP), Cluster Front Line Demonstrations (CFLD) under National Oilseed Production Program (NOPP), Seed Hub, Cereal System 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, DAMU, *Jal Shakti Abhiyan, Prampragat Krishi Vikas Yojna*, Plantation Program, NADCP (FMD) and Farmers' FIRST Programwhich are all being successfully implemented in Zone IV under ATARI-Patna.

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 Programs 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 Programs.
- 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 Program, KKV, NADCP (FMD), PKVY, DAMU, *Jal Skakti Abhiyan* 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 December 2019.

Table 9: Staff strength of Agricultural Technology Application Research Institute, Patna

Category	Sanctioned	Filled	Vacant
Director (RMP)	01	01	-
Principal Scientist (Agril. Extension)	01	0	01
Scientist (Horticulture)	01	01	-
Scientist (Animal Science)	01	0	01

3.2 INSTITUTE MANAGEMENT COMMITTEE

Institute Management Committee meeting for ATARI, Patna was held twice on 16th August, 2019 and 19thFebruary, 2020. The members were apprised of the functioning of ATARI, Patna, achievements and various initiatives taken to monitor the activities of the KVKs. 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 QUINQUENNIAL REVIEW TEAM (QRT) FOR KRISHIVIGYANKENDRAS OF ATARI PATNA

Present QRT and terms of reference

1. Composition of QRT

The Secretary, DARE and DG, ICAR vide F. No. A. Extn. 9/19/2019-AE-II dated 19 June, 2019 and F. No. A. Extn. 9/19/2019-AE-II dated 25.11.2019 constituted the present QRT for ATARI Patna and ATARI Kolkata under the Chairmanship of Dr. R. K. Samanta with the following composition,

Name	Designation	Chair/Member
Dr. R. K. Samanta	Former Vice Chancellor, BCKVV, Mohanpur, West Bengal	Chairman
Prof. S. Satpathy	Former Dean Extension, OUAT, Bhubaneswar	Member
Dr. R. B. Sharma	Former Director of Extension Education, IGKV, Raipur	Member
Dr. Y. V. Singh	Former Director, ICAR -ATARI, Jodhpur	Member
Dr. R. Parshad	Former Assistant Director General, Agril. Extension, ICAR	Member
Dr. F. H. Rahman	Principal Scientist, ICAR -ATARI, Kolkata	Member Secretary

TERMS OF REFERENCE OF PRESENT QRT

The QRT was ordained with following terms of references,

- To review the KVK programmes and activities and their relevance, keeping in view the identified and prioritized farmers needs of the area.
- To assess the superiority of the technology/products demonstrated on the farmer's fields through on-farm trials and frontline demonstrations.
- To assess the efforts made in transfer of technology through training of farmers and extension personnel, extension activities and production of seeds and planting materials and other technology inputs.
- To evaluate the innovative extension methodology developed and the procedures adopted by the KVKs to prioritize, monitor and assess the impact of programmes.
- To suggest a road map for KVKs to work as single window knowledge, resource and capacity development centre in the district.
- To assess the existing provision for manpower and infrastructure in KVKs and ATARIs in view of their roles and responsibilities; review the monitoring, coordination, overseeing, liasioning, reporting, budgeting, technology flow and backstopping mechanisms; and
- To suggest measures for organizational and administrative changes for strengthening and overall improving the visibility and efficiency of KVK system.

The QRT members visited selected KVKs of ATARI, Zone IV Patna and workshop were

organized at suitable venues of KVK where, apart from the KVK under visit, other nearby KVKs participated and presented their report before the Committee.

ATARI and State wise travel schedule for review

Sl. No.	State/UT	Date	Venues
	ATARI Kolkata		
ATARI Patna			
1	Bihar	Phase I: 21.11.19 – 26. 11.19	BAU Sabour; BPSAC, Purnea; Dr. Kalam Agricultural College, Kisangunj KVK; Purnea KVK; Bhagalpur KVK; Lakhisarai KVK; Nalanda KVK; Gaya KVK
		Phase II: 09.12.19 – 13.12.19	RPCAU, Pusa; BASU, Patna; Muzaffarpur KVK; East Champaran KVK; Samastipur KVK; Vaishali KVK, ICAR-NRC Litchi, Muzafffarpur
2	Jharkhand	Phase III: 06.01.20 – 11.01.20	BAU, Ranchi; KVK Ranchi; KVK Gumla; KVK Lohardaga; KVK Ramgarh; KVK Hazaribag; KVK Deoghar
3	ATARI Kolkata	06.02.2020	Interaction with Directors Patna for preparation of draft report and Finalization of Report

3.5 NEW INITIATIVES OF ATARI, PATNA

- ICAR-ATARI, Patna, besides performing its regular monitoring activities, also encourage the KVKs of this zone to get them involved in a number ofprograms depending on the farmers need in the district and technical capability of the KVKs to contribute towards growth of agriculture and allied sectors. Some of the flagship Programs which were undertaken by KVKs during 2018-19 and some newly conceived Programsare 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 MantriFasalBimaYojna
- Celebration of *SwachhtaPakhwada* 2019
- Celebration of *MahilaKishanDiwas* 2019
- Celebration of World Soil Health Day 2019
- *GraminKrishiMausamSewa*
- National Animal Disease Control Programme (FMD)
- *PrampragatKrishiVikasYojna*
- District Agro Meteorological Unit
- *Jal SkaktiAbhiyan*
- *NEMA*
- *MeraGaonMera Gaurav*

4. ACHIEVEMENTS

4.1 TECHNOLOGY ASSESSMENT AND REFINEMENT

4.1.1 ON-FARM TRIAL

In fulfilling the most important part of the mandate, 68 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 2019, a total of 68 KVKs of Zone-IV conducted 391 on-farm trials with an objective to assess the technologies developed by different institutions in agriculture and allied sectors. The technologies, which were assessed, included those in the areas of crop production, insect-pest and disease management, nutrient management, feed and fodder management, livestock production and health management, drudgery reduction, value addition and other areas. About 22 thematic areas were identified for assessment and refinement of technologies and are presented in Table 10.

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 and in year2019, the KVKs conducted 391 on-farm trials at2718 locations to assess various technologies.Among various thematic areas, technologies were tested in integrated nutrient management (INM) through 66 on-farm trials in 462 locations, followed by integrated crop production (ICM) through 52 on-farm trials in 364 locations, integrated disease management (IDM) through 35 on-farm trials, Integrated Crop Management (34 OFT),integrated pest management (IPM) through (32OFT), varietal evaluation (19OFT), weed management (21OFT) and Farm Implement and machineries (15 OFT).

In livestock sector, total105 on-farm trial at 723 locations were conducted during 2019 covering 21 on-farm trials

both in disease management and Feed and fodder. In fishery, 11 on-farm trials on 77 locations were conducted during this year.

State-wise analysis of on-farm trials conducted showed that KVKs of Bihar conducted a total of 228 on-farm trials at1590 different locations, the corresponding values for Jharkhand were 163 at1128 locations. 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 10: State wise details of On Farm Trial (OFTs) conducted by KVKs under Zone IV

Thematic Area	Bihar		Jharkhand		Total	
	No. of Location	No. of OFT	No. of Location	No. of OFT	OFTs	Locations
A. Crop Sector						
Integrated Crop management (ICM)	154	22	84	12	34	238
Integrated Disease management (IDM)	126	18	119	17	35	245
Integrated Pest management (IPM)	119	17	105	15	32	224
Integrated Nutrient management (INM)	238	34	224	32	66	462
Varietal Evaluation (VE)	56	08	77	11	19	133
Weed management (WM)	98	14	49	7	21	147
Water management	21	3	21	3	6	42
Storage Technology (ST)	7	1	6	1	2	13
Resource Conservation Technology (RCT)	0	0	21	3	3	21
Farm implements & machineries (FIM)	70	10	35	5	15	105
Crop production	196	28	168	24	52	364
Nursery Raising	0	0	1	1	1	1
Sub Total (A)	1085	155	910	131	286	1995
B. Live Stock Sector						
Production & Management (P & M)	14	2	28	4	6	42
Nutrition Management (NM)	7	1	7	1	2	14
Fishery	63	09	14	2	11	77
Feed & Fodder	91	13	56	8	21	147
Breed Evaluation (BE)	7	1	14	2	3	21
Disease management	126	18	21	3	21	147
Food & Nutrition (F & N)	70	10	28	4	14	98
Value Addition (VA)	91	13	35	5	18	126
Drudgery Reduction (DR)	35	5	14	2	7	49
Enterprise	1	1	1	1	2	2
Sub Total (B)	**505**	**73**	218	32	105	723
Grand Total (A+B)	**1590**	**228**	1128	163	391	2718

BIHAR

KVK BUXAR

THEMATIC AREA: INTEGRATED PEST MANAGEMENT

Assessment of new pesticides molecules for Rice Stem Borer management

RESULTS: An on-firm trial for management of rice stem borer was conducted in 5 locations on different rice field in Buxar districts. Results revealed that yellow stem borer was a serious pest of rice in the district. Moderate to severe incidence was noticed in nursery, planting to mid- tillering and panicle initiation stage resulting in 40-60 *per cent* yield loss. The larvae bore into the central shoot of the young plant which dries up and causes dead hearts symptoms. Results indicated that Chlorantraniliprole + Thiamethoxam @ 2.5 kg/acre were found most effective for the control of rice stem borer and higher yield 8.30% (50.20 Q/ha) was observed over the conventional practice.Cost of cultivation (Rs.29300/ha); Net return (Rs.65817/ha) and BC ratio (3.14) were also higher in application of Chlorantraniliprole + Thiamethoxam.

Table 11: Assessment of new pesticides molecules for Rice Stem Borer management

Technology option	Av yield (q/ha)	% increase	Data related to problem addressed	Cost of cultivation (Rs / ha)	Gross return (Rs/ ha)	Net return (Rs/ ha)	BC ratio
Farmers practice: Use of Cartap hydrochloride 4G)	46.35	-	9.23	28200	85052	59852	3.01
TO1: Chlorantraniliprole + Thiamethoxam @2.5 kg/acre	50.2	8.30	1.25	29300	92117	65817	3.14
TO2: Fipronil 0.3 @ 8 kg/ acre	49.0	7.87	1.42	30000	89915	63715	2.99
TO3: Carbofuron 3 G @ 13 kg/acre	48.33	4.27	1.40	28600	88685	65685	2.29

New pesticides molecules for Rice Stem Borer management

KVK MADHEPURA

THEMATIC AREA: VARIETAL EVALUATION TRIAL(VET)

Assessment of different new varieties of paddy during Kharif

RESULTS: An OFT under varietal evaluation trial in paddy with 04 technological options was conducted in Madhepura districts.A perusal of data revealed that yield attributing characters like effective tillers and test weight were found significant in TO1 (var. Madumani). However, grain yield and straw yield were not significantly affected by different technological options. Maximum yield (55.90 q/ha),net return (Rs.53187/ha) and B: C ratio (2.33) recorded in paddy var. Sabour Sampan.

Table 12:Performance of long duration paddy varieties under low land situation

Technology Options	Parameters				
	No. of effective tillers/m^2	No. of grain/ Panicle	Test wt. (g)	Plant height (cm)	Panicle length (cm)
Farmers practice : local	264	114	21.87	112	23.20
TO_1: Maudamini	130	192	25.86	103	19.00
TO_2: Pratikhya	239	55	21.59	112	25.60
TO_3: Sabour Sampanna	248	136	21.40	102	26.00
SEm (±)	15.77	39.93	1.48	3.51	2.25
CD at 5%	34.36	NS	3.22	7.66	4.91
CV (%)	11.30	50.83	10.30	5.18	15.19

Table13: Yield and economics performance of different paddy varieties under low land situation

Technology Options	Grain Yield (q/ha)	Straw Yield (q/ha)	Cost of cultivation (Rs)	Gross return (Rs)	Net return (Rs/ha)	B C ratio
Farmers practice : local	50.65	63.81	32580	79824	47244	2.45
TO_1: Maudamini	55.90	67.82	34658	80844	46186	2.33
TO_2: Pratikhya	31.35	40.07	34658	49462	14803	0.43
TO_3 : Sabour Sampanna	55.94	67.26	34658	87845	53187	2.53
SEm (±)	8.21	9.15	-	11976	12152	0.71
CD at 5%	17.88	19.94	-	26097	26477	1.55
CV(%)	26.78	24.22	-	25.42	47.61	58.19

Performance of long and short duration paddy cultivars

KVK MUNGER

THEMATIC AREA: INTEGRATED CROP MANAGEMENT (ICM)

Mitigation of terminal heat stress in late sown wheat through foliar application of potassium nitrate (KNO_3)

RESULTS: An OFT on mitigating the terminal heat in late sown wheat was conducted during 2019 in Munger district with 02 technological options i.e. *(TO1: foliar spray of 0.5 % Potassium nitrate (KNO_3) at booting stage & at anthesis stage in and TO2: foliar spray of 1.0 % potassium nitrate (KNO_3) at anthesis stages)*. Data revealed that significantly highest grain yield (35.17q/ha) was recorded in foliar spray of 0.5% Potassium nitrate (KNO_3) at booting stage & at anthesis stagefollowed by foliar spray of 1.0 % Potassium nitrate (KNO_3) at anthesis stagesand farmers practice (No foliar application of KNO_3 in Late sown wheat). Data indicated that TO_1 was better in terms of higher av. numbers of tillers/ plant(294), av. ear length (11.4 cm), no. of grain/ear (48), test wt. (40.6 gm), & B:C ratio (2.15) followed by To2.

Table 14: Effect of potassium nitrate (KNO_3) spray on yield and economics in late sown wheat

Technology option	No. of trials	Av. Tiller population (tillers/m^2)	Yield component			Yield (q/ha)	Cost of cultivation(Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
			Av. Ear length (cm)	Av.No. of grain per ear	Av.Test wt. (1000 grain wt.)					
Farmer practice: No application	10	275	11.0	33	36.1	29.43	33460	65707	32247	1.6
TO_1:0.5% KNO_3 at booting and anthesis stage		294	11.4	48	40.6	35.17	36240	77854	41614	2.15*
TO_2:1.0 % KNO_3 at anthesis stage		286	11.2	42	38.9	32.31	34850	72011	37161	2.07
CD@5%						3.02				

Performance of KNO3 in mitigating heat stress

KVK PURNEA

THEMATIC AREA: INTEGRATED DISEASE MANAGEMENT (IDM)

Management of Panama wilt in Bananathrough application of Trichoderma harzianum

RESULTS: An OFT on management ofPanamawilt in banana through application of *Trichoderma harzianum*inPurnea district was conducted during 2019 with 03 technological options. Results revealed that farmers practice i.e. thrice drenching with Carbendazim 50 WP @ 3g/ l near root zone at 15 days interval was found better in comparison to application of *Trichoderma harzianum*through different methods.

Table 15: Effect of *Trichoderma harzianum*drecnching on management of panama wilt in banana

Technology option	No. of trials	% Wilt Incidence at			Mean wilt incidence	Yield(q/ha)	Cost of cultivation(Rs./ha)	Gross return (Rs/ha)	Net return(Rs./ha)	BC ratio
		5th month	7th month	9th month						
Farmers Practice: Thrice drenching with Carbendazim 50 WP @ 3g/ lnear root zone at 15 days interval	10	2.80	3.00	5.13	3.64	15.87	96000	190500	94500	1.98
TO_1: Thrice drenching of *Trichoderma harzianum* @ 5g/ l near root zone at 15 days interval		2.50	3.70	5.00	3.73	14.67	95500	176100	80600	1.84
TO_2: 04 application of enriched FYM with*Trichoderma*@ 250g/plant near root zone at one monthly interval		5.15	7.40	8.90	7.15	12.65	93750	151800	58050	1.61
TO_3: 04 application of enriched *Trichoderma compost* @ 250g per plant near root zone of the plant at one monthly interval		8.50	13.25	17.50	13.08	9.40	90500	112800	22300	1.24

THEMATIC AREA: LIVESTOCKDISEASE MANAGEMENT (LDM)

Validation of Ovsynch and Heatsynch protocols in post partum anoestrus cows

RESULTS: An OFT in Samastipur district with 02 technological options was conducted to determine fertility after applying the Heatsynch and Ovsynch protocols in dairy females after diagnosis of non pregnant by rectal palpation.Result indicated that Heatsynch protocols are comparatively better than Ovsynch protocols for determining fertility in cows which are not pregnant either by lack of GnRH or surge release of LH or Cysts. Higher conception rate was observed in TO1i.e. Day 0: GnRH (Buserelin) 10 µg, Day 7 : PGF 2α 500 µg; Day 9: GnRH (Buserelin) 10 µg, and Day10: Fixed Time AI in comparison to TO2 i.e. Day0: GnRH (Buserelin) 10 µg; Day7: PGF2α 500 µg; Day8: Oestradiol 1mg; Day10: Fixed Time AI (Heatsynch).

Table 16: -Validation of Ovsynch and Heatsynch protocols

Treatment	No. of cows	Oestrus symptom	Number of animal shown heat symptom	Conception rate
Farmerpractice	7	1	1	14.3%
T.O.1	7	4	3	42.85%
T.O.2	7	2	3	28.57%

Input distribution

Application procedure of technology

KVK AURANGABAD

THEMATIC AREA: INTEGRATED CROP MANAGEMENT(ICM)

To assess Suitable Resource Conservation technology for paddy establishment in south Bihar

RESULTS: Data presented on table revealed that no. of panicle/m^2 recorded significantly higher with TO1(260.45) followed by TO2both were superior over FP. Maximum Grain yield (45.6 q/ha)was recorded in TO2followed by TO3which were higher than FP. However, variation in test weight was not distinct among technological options.Gross return, net return and B: C ratio in TO1and TO2were higher than FP.

Table 17: Effect of DSR in stale bed and with ZTD machine on yield component and yield

Technology option	No. of trials	Yield component		Grain Yield (q/ha)	Straw Yield (q/ha)
		Panicle/m^2	Test wt. (g)		
FP: Transplanting 30 days seedling	5	215.60	23.15	37.2	50.9
TO_1: Direct seeding of Paddy in stale bade condition		260.45	23.90	45.6	56.7
TO_2:DSR with ZTD machine		246.40	23.76	41.3	52.6

Table18: Effect of DSR in stale bed and with ZTD machine on economics of rice.

Technology option	No. of trials	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
FP: Transplanting 30 days seedling	5	32850	63240	30390	1.92
TO_1: Direct seeding of Paddy in stale bade condition		29200	77520	48320	2.65
TO_2:DSR with ZTD machine		27932	70210	42278	2.51

KVK ARARIA

THEMATIC AREA: REARING & MASTITIS MANAGEMENT IN CATTLE (DM)

Evaluation of different therapeutic trial for treatment of clinical Mastitis in cattle

RESULTS: An OFT was conducted during 2019 in Araria district on Evaluation of different therapeutic trial for treatment of clinical Mastitis in cattle with 02 technological options. The result revealed that both the technological options were equally effective against mastitis in cattle. The administration of antibiotics combinations TO1:Enrofloxacin @ 5mg/kg body wt. I/M + Meloxicam @0.5mg/kg I/M and Vitamin E and Selenium @ 20ml orally for 5days, controlled the disease of clinical Mastitis to the level of 60% was better than TO2: Homoeopathic drugs (Belladonna 200, Phytolacca 200, Calcarea carbonica and phosphorus) + topical application of herbal mixture (60 ml Alovera juice+ 15ml lemon juice+25gm slaked lime and 10gm turmeric powder). TO2 was more economically with cost of treatment 120/ cow as against Rs. 289/animal in TO1 and farmers practice in comparison to control (70%) in farmers practice with Rs.1400.00/ animal cost of treatment.

Table 19:Evaluation of different therapeutic trial on clinical mastitis in cattle.

Technology Option	*No of trial*	*Animals free from mastitis (%)*	*Total treatment Days/Animal*	*Cost of treatment (Rs./Animal)*
Farmers practice: Indiscriminate use of higher antibiotics.	10	70	4	1400.00
TO_1: Enrofloxacin @ 5mg/kg body wt. I/M + Meloxicam @0.5mg/kg I/M + Vitamin E and Selenium @ 20ml orally for 5days.	10	60	5	289.00
TO_2: Homoeopathic drugs (Belladonna 200, Phytolacca 200, Calcarea carbonica and phosphorus) + topical application of herbal mixture (60 ml Alovera juice + 15ml lemon juice+25gm slaked lime and 10gm turmeric powder).	10	60	6	120.00

Therapeutic trial for treatment of clinical Mastitis in cattle

KVK ARWAL

THEMATIC AREA: DISEASE MANAGEMENT (DM)

Assessment of different line of treatments to reduce mortality of kids

RESULTS: An OFT to reduce the mortality of kid through deworming was conducted in Arwal district with 02 technological options. The data (Table 20) revealed that TO_2(Deworming with Oxyclozanide (15mg/kg BW) + Levamizole (5mg/kg BW) and Herbal liver tonic 5ml at 15 days of birth for 20 days OD), resulted into higher kid survival rate (90%) and increased in body weight (17%) as compare to control (Farmers' practice). The TO_2 had higher BC ratio (2.14) and wasmore remunerative than other.

Table 20:Result of assessment of different line of treatments in kids

Technology options	No. of kids	Kids survival rate (%)	Gain in av. body weight (kg) at 6 month	% increase in weight	Gross cost/ animal (Rs.)	Gross return/ animal (Rs.)	Net Benefit	B:C ratio
FP: No deworming	100	62	7.65	-	522.50	1530.00	1007.50	1.93
TO_1: Deworming with Oxyclozanide (15mg/kg BW) + Levamizole (5mg/kg BW) at 15 days of birth	100	83	8.15	6.5	530.00	1630.00	1100.00	2.08
TO_2: Deworming with Oxyclozanide 15mg/kg BW) + Levamizole (5mg/kg BW) and Herbal liver tonic 5ml at 15 days of birth for 20 days OD.	100	91	8.95	17.0	570.50	1790.00	1219.50	2.14


Deworming the kids and reducing mortality

KVK LAKHISARAI

THEMATIC AREA: WEED MANAGEMENT (WM)

Assessment of different herbicides against weeds in Wheat

RESULTS: An OFT on weed management in wheat was conducted in Lakhisarai district with 03 technological options viz. TO_1: Sulfosulfuron 75 %WG @ 33 g/ha *a.i.* + Metsulfuron 5 % WG@20g/ha as POE at 30-35 DAS; TO_2: Metribuzin 70 WP@250g/ha as POE at 30-35DAS and farmers practices (2-4 D 80% Na salt @ 1.25 kg/ha as POE at 30-35 DAS). Data revealed that significantly higher wheat yield (36.4 q/ha) was obtained in TO_1in comparison to farmer practice (Table 21). Minimum weed infestation (13.2) and higher BC ratio (1.55)were recorded in TO1in comparison to other options.

Table 21: Performance of Herbicides against Weeds in wheat

Technology option	No. of trials	Weed Population / sq m.)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BC ratio
FP: 2-4 D 80% Na salt @ 1.25 kg/ha as POE at 30-35 DAS	10	72.8	30.8	26200	62400	36200	1.38
TO_1: Sulfosulfuron 75 %WG @ 33 g/ha *a.i.*+ Metsulfuron 5 % WG @ 20g/ha as POE at 30-35 DAS		13.2	36.4	28400	72500	44100	1.55
TO_2: Metribuzin 70 WP @ 250g/ha as POE at 30-35DAS		26.5	34.6	28100	69300	41200	1.47
CD at 5%	-	-	4.80	-	-	-	-
CV	-	-	12.76	-	-	-	-


Effect of herbicides for control of weeds in wheat

KVK JEHANABAD

THEMATIC AREA: INTEGRATED PEST MANAGEMENT(IPM)

Ecofriendly management of pod borer (H. armigera) in Chickpea

RESULTS: An OFT on ecofriendly management of pod borer in chickpea was conducted in Jehanabad district with 03 technological option (FP: Chlorpyrifos 20 EC @ 1500ml/ha), TO_1: Erect Bird perches @ 40/ha + Pheromone trap @ 20/ha and TO_2: 02 spray of Azadirachtin 3000ppm @10 ml/l water) and FP. Results revealed that the combatively higher chickpea yield (15.09 q/ha) and 1.37 BC ratio with low pod infestation 11.78 % were recorded in TO_2 (02 spray of azadirachtin 3000ppm @ 10 ml/l water) followed by TO_1withBird perches @40/ha+ Pheromone trap @20/hawith grain the yield (14.88 q/ha), 2.34 BC ratio and 11.14 per cent pod infestation (Table 22).Whereas, in FP where Chlorpyrifos 20 EC @ 1500ml/hawas applied chickpea yield (14.71 q/ha) and 12.55 per cent pod infestation were recorded.

Table 22:Ecofriendly Management of pod borer, *H. armigera*in chickpea

Technology option	No. of trials	Pod infestation (%)	Yield (q/ha)	Percent increase	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
FP: Chlorpyrifos 20 EC @ 1500ml/ha)	8	12.55	14.71	-	31,000	71,711	40711	1.31
TO_1: Bird perches @40/ha+ Pheromone trap @20/ha	8	11.14	14.88	1.7	31,000	72,540	41540	1.34
TO_2: 02 spray of azadirachtin 3000ppm @ 10 ml/l water	8	11.78	15.08	3.7	31,000	73,515	42515	1.37

Eco friendly management for control of Pod borer

KVK GAYA

THEMATIC AREA: FEED MANAGEMENT (FM)

Effect of feeding urea molasses multi nutrient block to the dairy animals

RESULTS: An OFT on feeding urea molasses multi nutrient block to the dairy animals was conducted in Gaya districts with 03 technological options (Farmers practice (FP)Concentrate @200 g/litre of Milk; TO_1: FP + Mineral mixture @ 50g/day/animal and TO_2: FP + UMMB @ 400g/day /animal). Result showed that after feeding urea molasses multi nutrient block milk production was increased and found more beneficial for farmers (Table 23). Farmers accepted that UMMB block was beneficial for them especially during scarcity of green fodder.

Table 23:Effect of feeding Urea Molasses Multi Nutrient block to the dairy animals

Technology option	No. of trials	Milk Yield (litre/day/cow)	Cost of milk production (Rs.)	Gross Return (Rs)	Net Return (Rs.)	BC ratio
FP: Concentrate @200 g/litre milk	10	6.14	7050	14730	7680	2.09
TO_1: FP + Mineral mixture @ 50g/day /animal	10	6.80	7310	16320	9010	2.23
TO_2 : FP + UMMB @ 400g/day /animal)	10	7.55	8010	18120	10110	2.26

Feeding of UMM blocks by dairy animals

KVK: BANKA

THEMATIC AREA: FEED MANAGEMENT FOR SUCKLING KID (FFN)

Management of feed through multi-nutrient block for suckling kid

RESULTS: An OFT on feed management for suckling kid was conducted in Banka district during 2019. Result indicated that significantly more gain in average body weight (27.0g/day) of suckling kid with feeding of multi-nutrient block 125g/day than kid fed with Cow milk + Multi-nutrient block 125g/day) was 9.0g/day(Table 24). Though daily feed cost was significantly higher in multi-nutrient feeding block but gross profit and net profit was significantlyhigher with multi-nutrient feeding group kid than cow milk.

Table:24 Effect of Multi-nutrient block feeding on suckling kid

Technology option	Farmer's Practice	Suckling+ Multi-nutrient block.125g/day	Cow milk+ Multi-nutrient block.125g/day
Initial body weight	2.98[a]±0.10	2.8 [a] ±0.20	2.71 [a] ±0.07
Final body weight	4.78 [a] ±0.12	6.25 [b] ±0.22	5.07 [a] ±0.09
Total Gain	1.8 [a] ±0.08	3.44 [c] ±0.07	2.35 [b]±0.06
Average daily gain	30 [a] ±1.25	57.37 [c] ±1.20	39.22 [b]±1.08
Daily feed cost (Rs)	1.35 [a]	7.5 [b]	7.5 [b]
Gross profit on meat basis (Rs/day)	12.03 [a] ±0.50	22.95 [c]±0.48	15.69 [b]±0.43
Net profit	10.68 [a] ±0.50	15.45 [c]±0.48	8.19 [b]±0.43
Total profit (Rs) / goat	641	927	491

*a,.bValues with different superscripts in arrow differ ($p<0.05$)

Feeding of Multi-nutrient Block to kid

Feeding with Cow milk

Weighing of Kid

KVK ROHTAS

THEMATIC AREA: INTEGRATED CROP MANAGEMENT (ICM)

Increasing the cropping intensity by intercropping of Potato & Mustard

RESULTS: An OFT on increasing the cropping intensity and economics Potato + Mustard intercropping was conducted in Rohtas districts during 2019. Results revealed that Potato equivalent yield was more in TO_1 (Potato (5line) + Mustard (3 line) followed by TO_2 (Potato (5 line) + Mustard (2 line) with their net return of Rs. 242275 and Rs.218858 respectively. LER of TO_2 was higher than TO_1 and BC ratio was reverse (Table 25).

Table 25: Effect of Potato + Mustard cropping system on Equivalent yield, LER and economics

Treatment		PEY (Q/ha)	Cost of cultivation(Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	B:C ratio	LER
FP	Farmers Practice-(Solo Mustard)	45.0	20000	36000	16000	1.8	
	Solo potato	280.0	105000	224000	119000	2.13	
TO_1	Potato - Five line + Mustard Three line	402.5	79725.0	322000	242275	4.03	0.695
TO_2	Potato - Five line Mustard -Two line	377.5	83142.8	302000	218858	3.63	0.741

Fig: Potato + Mustard intercropping

KVK SAHRASA

THEMATIC AREA: WATER MANAGEMENT (NRM)

Assessment of field establishment practices during Kharif season brinjal

RESULTS: An On farm trial for assessment of establishment practices during rainy seasonbrinjal was conducted in Saharsa district to mitigate the problem of plant mortality. Data shown (Table 26) revealed that there was significant decrease in plant mortality as well as weed count /m^2 area where seedlings transplanted on raised beds and mulched with LDPE. Data from (Table 26) indicated that crop establishment on LDPE mulched raised bed had significant increase in number of fruits per plant (11.0%) and yield (9%) and higher BC ratio (1.86) in respect farmers practices (1.59).

Table 26:Assessment of different crop establishment practices in Kharif Brinjal cultivation

Technology option	No. of trials	Yield Components					Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	B:C ratio
		Plant Height (cm)	No. of Branches / plant	No. of fruit / plant	Mortality (%)	Weed count/ m^2 (No.)					
FP: Seedling transplanting on check basin	10	45	6	11	11.2	41.9	312.40	235780	374880	139100	1.59
TO1: Seedling transplanting on 20cm raised bed		48	8	12	2.6	22.6	328.16	228949	393792	164843	1.72
TO2: Seedling transplanting on 20cm raised bed with LDPE mulch		56	8	14	1.3	2.3	341.21	220135	409452	189317	1.86
SE m^{+}.		0.13	NS	0.14	2.48	4.52	4.36				
CD 5%		0.35	-	0.40	6.56	11.59	11.49				

Establishment of Kharif brinjal in field

KVK SUPAUL

THEMATIC AREA: WEED MANAGEMENT (WM)

Assessment of pre and post emergence herbicides on green gram for control of small melon (Ghurmi) weeds

RESULTS: An On farm trial for assessment of pre and post emergence herbicides on green gram for control of small melon (Ghurmi). The result so far obtained revealed that the yield (8.5q/ha) was in T_3 i.e pre-emergence application of pendimethalin 1.0 kg *a.i* followed by post emergence application of Imazethiapyr 40 g *a.i.*(8.5 q/ha). Less weed infestation of ghurmi in comparison to weedy check TO_1 and TO_2(Table 27). Although TO_3*i.e.* (pre emergence application of Pendimethalin 1.0 kg *a.i* + Post emergence application of Imazethiapyr 60 g *a.i.*/ha recorded highest yield 9.0 q/ha of green gram.

Table 27: Effect of pre and post emergence herbicides for control small melon (Ghurmi) in summer Green gram

Technology option	No. of trials	WI (No. of weeds/m^2)	Yield q/ha	Disease/ insect pest incidence (%)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return(Rs./ha)	BC ratio
FP_1: Weed free	07	25	05	40	12,800,	25,000	12,200	1.95
TO_1: Pendimethalin 38.7 % CS @1.0 kg a.i. /ha (Pre E.)		06	6.75	12	14,000	40,500	26,500	2.89
TO_2: Pendimethalin 38.7 % CS @1.0 kg a.i. /ha (Pre E.) + Imazethapyr10% SL @40 gm a.i/ha (PE)		02	8.5	04	15,000	51,000	36,000	3.4
TO_3: Pendimethalin 38.7 % CS @1.0 kg a.i. /ha (Pre E.) + Imazethapyr 10% SL @60 gm a.i/ha (PE.)		01	9.0	03	15,500	54,000	38,500	3.48

Weed management in Green gram

KVK NALANDA

THEMATIC AREA: RESOURCE CONSERVATION TECHNOLOGY (RCT)

Effect of different mulch on growth and yield of turmeric cv. Rajendra sonia

RESULTS: An OFT in Nalanda district was conducted to control the weeds in turmeric through mulching. Results indicate that T.O.2 was most effective in controlling weed infestation, reduction in pest and disease incidence and increased yield (316.46q/ha) along with as higher BC ratio (1.09) as compare to other treatments(Table 28). However, the farmers' practices and mulch with black polyethylene were not very remunerative.

Table 28: Effect of different mulch on growth and yield of turmeric

Technology option	No. of trials	Plant Height (cm)	No of Rhizome / plant	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BC ratio
FP : Hand weeding	06	110.73	11	243.73	134114.6	236227.3	102112.7	0.76
TO_1: Mulching (black polythene)		112.60	15	287.51	137605.4	260186.7	122581.4	0.89
TO_2: live mulching (paddy straw)		118.29	21	316.46	141511.3	295415.2	153903.9	1.09

KVK KATIHAR

THEMATIC AREA: INTEGRATED NUTRIENT MANAGEMENT(INM)

Assessment of Boron and Molybdenum on Growth, Yield and Quality of Cauliflower.

RESULTS: An OFT was conducted to assess the effect of boron and molybdenum in cauliflower production and quality in Katihar district. Data presented in table indicated that significantly higher marketable yieldof cauliflower (157.41 q/ha) was obtainedwith application of (TO_2: N:P:K (120:60:60) + FYM (20 t/ha) + Borax (20 kg/ha) and Mo (2 kg/ha) and TO_1 in comparison to farmer's practice(Table 29&30). In respect to economics the benefit cost ratio also increased by 4.22 and 4.07 in comparison to farmer's practices. It was possible due to control of hollow heart disease and rusting brown of curd in cauliflower leading to increased production and marketed value increased.

Table 29: Physical-Chemical properties of Experimental Soil

S. N.	pH (1.2.5)		ECe (d Sm^{-1})		OC (%)		Avail. N (kg ha^{-1})		Avail. P (kg ha^{-1})		Avail. K (kg ha^{-1})		Avail. B (ppm)	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
TO_1	6.8	6.8	0.045	0.048	0.45	0.45	242	189	18	17	304	265	0.32	0.34
TO_2	6.8	6.8	0.048	0.048	0.46	0.47	245	210	18	18	292	301	0.38	0.39
TO_3	6.8	6.9	0.048	0.049	0.46	0.47	245	217	19	20	298	304	0.39	0.39
CD (p=0.05)	0.02	0.02	0.001	0.002	0.05	0.03	0.21	0.45	0.12	0.12	0.24	035	0.01	0.01

Table 30: Economics of Cauliflower (Var. Sabour Agrim)

Treatments	marketable curd Yield (qt ha^{-1})	Disease/ insect pest incidence (%)	Cost of Cultivation (Rs ha^{-1})	Gross Income (Rs ha^{-1})	Net Income (Rs ha^{-1})	BC ratio
FP: N:P:K (180:40:20)	144.07	12	90525	360185	269660	2.98
TO_1: N:P:K (120:60:60) + FYM (20 t/ha)	149.26	8	91650	373148	281498	3.07
TO_2: N:P:K (120:60:60) + FYM (20 t/ha) + Borax (20 kg/ha) and Mo (2 kg/ha)	157.41	8	93200	393519	300319	3.22
CD@5%	0.96	0.03				

KVK SAMASTIPUR

THEMATIC AREA- INTEGRATED CROP MANAGEMENT (ICM)

Management of fruit and leaf scarring beetle(Nodostoma subcostatum Jacoby) in Banana

RESULTS: An OFT on management of scaring beetle in Banana under Samastipur district was conducted during 2019. Result from (Table 31)indicated that covering bunches with white non-woven polypropylene bags and clean cultivation resulted better performance and gavehigher fruit yieldto a tune of (530q/ha), reduction in beetle infestation (84.01%) and higher BC ratio (3.90) compared to application of Azadirachtin (TO_2) and farmers practice (FP).

Table 31: Management of fruit and leaf scarring beetle in Banana

Treatments	*Replications*	*Number of scarring beetles/plant*	Yield (q/ha)	Reduction in infestation (%)	Cost of cultivation (Rs/ha.)	Gross Return (Rs/ha)	B:C Ratio
TO_1: Farmers Practice (No spray and no bunch covering)	07	18.20	420	-	110500	336000	2.04
TO_2: Azadirachtin @5ml/litre at 15 days interval starting before bunch appearance		9.12	465	49.89	112500	395250	2.51
TO_3: Covering of bunches at the time of bunch emergence with white non-woven polypropylene cloth and clean cultivation		3.45	530	84.01	122250	477000	2.90
C.D		0.171	9.76				

Fig. Input distribution & technology briefing to farmer

KVK EAST CHAMPARAN

THEMATIC AREA: INTEGRATED NUTRIENT MANAGEMENT (INM)

Effects of Split application of Potassium fertilizer on growth and yield of Rice

RESULTS: An OFT to enhance the yield and stress tolerance through application of Potash was conducted in the East Champaran districts with three technological options.Results revealed that growth as well as yield attributing characters were significantly influenced by application of potash. It was observed that the split application of Potassium fertilizer (50 % Basal application + 25 % at tillering stage + 25 % at panicle initiation stage) in paddy crop was found to be most effective treatment recorded maximum growth in no. of effective tillers/ hill (20), no. of spikelet per panicle (182) and higher yield i.e. 49.3 q (Table 32). Thetechnology option 2 gave the maximum net return (Rs. 43253 per ha) amongst all treatments with high B:C ratio i.e. 1.92.

Table 32: Performance of split application of Potash on Yield and economics of Rice

Technology option	No. of trials	Yield component			% Yield increase	Yield(q/ha)	Cost of cultivation(Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	B:C ratio
		No. of effective tillers/hill	No. of spikelet/ panicle	Test wt. (g)						
FP: 100 % K as Basal dose	10	14	151	16.7	0	47.2	45925	86140	40165	1.87
TO_1: 50: 50 % K Basal and tillering stage		17	161	19.10	1.46	47.2	46412	87417	41005	1.88
TO_2: 50, 25, 25 % K at Basal, Tillering and Panicle Initiation stage		20	182	21.7	4.44	49.3	46719	89972	43253	1.92
TO_3: 50, 25, 25 % K at Basal, Tillering and Milking stage		18	170	19.8	-2.11	46.6	46719	84315	37596	1.80
SE		1.25	6.59	1.03		0.59				

**FP= Farmer practice, SE= Standard of error, CV= Coefficient of Variation, SD= Standard Deviation*

Fig: Monitoring of growth of Paddy crop

Fig: Fully matured Paddy crop

KVK SIWAN

THEMATIC AREA: CROP DIVERSIFICATION (CD)

Assessment of contingent crops for combating drought in Siwan

RESULTS: An OFT on combating drought in Siwan district was conducted during 2019 with 04 technological options as diversified crops. Results shown in Table 33 revealed that all technology options performed better than farmer practice for combating drought. Maximum net return (Rs.2,93,500/ha) was obtained in TO_3(*Kharif* onion) followed by TO_1 i.e. cauliflower cultivation(Rs.1,83,830/ha). Similarly, higher B:C ratio (3.97) was obtained in TO_3followed by TO_1(3.58).

Table 33: Economics of Contingent Crops for combating drought

Technology option	No. of trials	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
F.P.: Drought resistant paddy var. Sahbhagi	10	29.5	25350	44250	18900	1.75
TO_1: Cauliflower var. Sabour Agrim		102	71170	255000	183830	3.58
TO_2 : Lobia var. Pusa Komal		86	59200	172000	112800	2.91
TO_3 : Kharif onion var. Agrifound Dark Red		98	98500	392000	293500	3.97

Paddy (Variety-Shabhagi)

Cowpea (Variety-Pusa Komal)

Cauliflower (Variety-Sabour Agrim)

Onion (Variety-Agrifound Dark Red)

KVK: MUZAFFARPUR (SARAIYA)

THEMATIC AREA: POST HARVEST TECHNOLOGY (PHT)

Assessment of storage duration of vegetable stored in zero energy cool chamber

RESULT: An OFT on storage life of vegetable crops was conducted under zero energy cool chamber in Muzaffarpur district. Results revealed that temperature difference of 5^0Cduring winter season and 5.8^0C during summer season with relative humidity 34.1 to 40.5% were recorded. The percentage weight loss in okra after 5 days was 63percent in comparison room temperature whereas only 7percent at ZECC was recorded and okra can be safely stored in summer season for 5 days in ZECC (Table 34). Likewise, spinach can be stored for two days in ZECC with 10 percent weight loss. The weight loss of spinach at room temperature during winter was 23 percent after 02 days and were not acceptable for marketing/consumption. Similarly, radish was found fit for consumption even after 6 days stored in ZECC with 6.66 percent weight loss and 44.44 percent weight loss even after six days while on room temperature it deteriorated within 03 days (Table 34). Data revealed that mushroom which is highly perishable in nature dried after 3 days at room temperature with 90 percent weight loss whereas stored for 03days in ZECC in good condition.

Table 34: Comparative storage life of some vegetable under ZECC and room temperature (RT)

Sl.No.	Crop	Month	Temp (°c)		Diff. in temp	Humidity		Diff. in humidity	Storage capacity (in days)		Weight In kg after storage		% Weight loss	
			ZECC	RT		ZECC	RT		ZECC	RT	ZECC	RT	ZECC	RT (days)
1	Okra 5kg	Last June	30.05	35.85	5.8	95.5	55.0	40.5	5	1	4.65	1.85	7.0	63 (5)
2	spinach (1.5kg)	Last February	23	28	5.0	90.0	55.9	34.1	2	1	1.35	1.15	10	23 (2)
3	Radish (4.5kg)		23	28					6	3	4.2	2.5	6.66	44.44 (6)
4	Cauliflower (2.0kg)		23	28					2	1	1.9	1.5	5.0	25 (2)
5	Mushroom (o.5 kg)		23	28					3	1	0.35	0.05	30.0	90 (3)





KVK NAWADA

THEMATIC AREA: INTEGRATED PEST MANAGEMENT (IPM)

Effect of botanical and insecticides on pod borer (Helicoverpa armigera Hub.) in Pigeon pea

RESULT: An OFT on control of pod borer in pigeon pea was conducted in Nawada districts. Results revealed that percent reduction in pod borerinfestation (70.97) and yield (15.10q/ha) of pigeon peawere significantly higher in $TO_3$and TO_2as compared to TO_1 and FP (Table 35). Maximum, gross return Rs. 90600/ha, net return of Rs.76332/ha and B:C ratio(6.35) were obtained inTO_3followed byTO_2.

Table 35: Effects of different treatments on Pod Borer infestation, yield and economics in Pigeon-pea

Technology options	Rep.	Infestation (%)	Reduction in infestation (%)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	B:C ratio
FP: no IPM	5	43.20	---	7.75	10,941	46,500	35,559	4.25
TO_1: Spray of NSKE@ 5% at the initial infestation	5	22.40	48.15	12.18	14,794	73,080	58,286	4.94
TO_2: TO1+ Emamectin benzoate (5% SG)@ 250g /ha (02 spray at 15 days interval at late infestation stage).	5	15.47	64.19	14.54	14,990	87,240	72,250	5.82
TO_3: TO1+Flubendiamide (39.35%SC)@187 ml (02 spray at 15 days interval at late infestation stage)	5	12.54	70.97	15.10	14,268	90,600	76,332	6.35
CD (0.05)	---	4.67	---	2.69	---	---	---	---

Management of pod borer in pigeon pea

KVK JAMUI

THEMATIC AREA:CROPPING SYSTEM (CS)

Screening of different cultivars combination (Low water required) for protecting production of R-W system.

RESULT: An OFTon cropping system of Rice and wheat was conducted in Jamui district to get higher net return per unit area. Data presented in the table (35-A) revealed that the technology option 3(Swarn Shreya – HD 2967)recorded higher rice equivalent yield(93.00 q/ha), net return (Rs. 104825) with B:C of 2.89 followed by TO-2(Rajendra Sweta - Sabour Samridhi).

Table 35-A:Impact of Rice Wheat Cropping Systemon yield and economics

Technology option	Rep	Yield component			Yield (q/ha)		Straw Yield (q/ha)		Rice Equi. Yield (q/ha.)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
		Effective tillers/hill (no.)	Spikelet/panicle (no.)	Test wt. (g)	Rice	Wheat	Rice	Wheat					
TO1: FP	10	186	148.5	17.8	23.6	24.6	36.2	37.00	61.36	55700	105761	50061	1.90
TO 2: R-W		240.5	163.2	21.3	30.8	35.4	40.5	52.70	83.28	55,600	143666	88066	2.58
TO 3: R-W		259.5	182.4	23.6	35.4	38.7	46.2	57.30	93.00	55,600	160425	104825	2.89
TO1: FP (MTU 7029 –Lok), TO 2: R-W (Rajendra Sweta - Sabour Samridhi) and TO3:R-W (Swarn Shreya – HD 2967)													

JHARKHAND

KVK: RANCHI

THEMATIC AREA: NURSERY RAISING

Assessment of seed priming method for vigor enhancement in onion var. Bheema Dark Red

RESULT: An OFT on seed priming for vigor enhancement in onion was conducted in Ranchi district. Results of trial revealed that, nutri-priming with $ZnSO_4$ 0.5 % for 10 hr was found significantly superior over technological option 2 (TO*2*) in terms of germination, vigor index and crop yield. Data presented in the above table revealed that the seed priming with 0.5% $ZnSO_4$ for 10 hours resulted higher germination (92%) and Vigor Index (1479) in comparison to TO_2 (Table 36). Primed seeds had faster and synchronized germination which resulted into increase in crop yield by 30 % (TO_1) over farmer's practice and 12.5 % over TO_2.

Table 36: Assessment of Seed Priming method for vigor enhancement in Onion var. Bheema Dark Red

Technology option	No. of trials	Germination %	Shoot length	Root Length	Vigor Index	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
FP: Seeds soaking in equal volume of water for 6hour (Hydro priming) and shade dried to original moisture content.	10	83.8	8.3	6.6	1248	122.3	74100	180000	105900	1.43
TO1: Seed priming with 0.5 % ZnSo4 for 10 hour (Nutri-priming) and shade dried.		91.6	9.0	7.1	1479	158.6	74100	234000	159900	2.16
TO_2: Seed priming with Beej sanjeevani (1.0 litre in 750ml of water) for 10 hour and shade dried.		88.4	8.7	6.9	1382	141.0	74100	216000	141900	1.91
CD @ 5%		0.99	0.08	0.08	24.20	3.39				

Impact of seed priming in onion vigor and yield

KVK DHANBAD

THEMATIC AREA: NATURAL RESOURCE MANAGEMENT (NRM)

Evaluation of drip irrigation with mulch in potato (var.- Kufri lalima)

RESULT: An OFT to evaluate drip irrigation with mulch in Potato was conducted in Dhanbad district. The result depicted in the Table 37 revealed that field water use efficiency, tuber yield and BC ratio in case of drip irrigation in paired row with silver mulch (TO_2) was more than farmer practice and TO_1(Drip Irrigation in paired row without mulch).

Table 37:Evaluation of drip irrigation with mulch in Potato

Technology option	Rep	Yield component			Yield (q/ha)	FWU Efficiency (Kg/m^3 of water)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
		No. of branch / plant	No. of tubers/ plant	FW of tubers/plant (kg)						
FP: Conventional irrigation	10	5.7	12.6	0.425	167.6	3.968	72800	167600	94200	1.29
TO_1: Drip Irrigation in paired row without mulch		6.2	13.2	0.512	202.1	6.151	83100	202100	119000	1.43
TO_2: drip irrigation in paired row with silver mulch		6.8	14.4	0.562	226.6	6.637	88700	226600	137900	1.55

Farmers Practice (FP): Furrow irrigation without mulch

TO_1 &TO_2: Drip Irrigation paired row with without & mulch

THEMATIC AREA: VALUE ADDITION (VA)

Assessment of different value addition technologies of Jackfruit for income generation

RESULT: An OFT on value addition of jackfruit fruit was conducted in Dhanbad district during 2019 for getting higher return and income. Results from table 38 indicated that fromincome generation point making of jackfruit chips among rural youth & SHGs Jackfruit Chips making by blanching(TO_2) was found more remunerative.

Table 38: Assessment of different value addition technologies of Jackfruit for Income Generation

Technology option	Rep	Shelf Life (Organoleptic Test (Color, Texture, Flavor , acceptability) after months			incidence of microbial Spoilage (%)	Production/unit (kg)	Cost of cultivation(Rs./kg)	Gross return (Rs./kg)	Net return(Rs./kg)	BC ratio
		2	4	6						
FP: Fresh use	4	Fair	Fair	Fair	40-50%	10.0	40.00	90.00	50	1.25
TO_1:jack fruit chips	4	Excellent	Good	Fair	20%	10.0	70.00	180.00	110	1.57
TO_2: Jackfruit seed Burfi	4	Excellent	Good	Fair	15%	10.0	75.00	200.00	125	1.66

FP: Fresh used as vegetables/fruits/pickle making; TO_1 : Chips preparation (Blanching of cut pieces + Sun drying + Salt + Turmeric (one pinch) + KMS(0.5%); TO_2 : Addition of milk Powder + Sugar + Elaichi Powder + Chocolate Powder + Ghee)

KVK CHATRA

THEMATIC AREA: CROP PRODUCTION

Assessment of irrigation methods on productivity of potato in medium land

RESULT: The farmers had very scanty knowledge about water budgeting thus the present trial was conducted at Pakariya village of Chatra district to find out the appropriate water requirement and irrigation method in cultivation of Potato. The result indicated that the minimum (1470m^3/ha) water required in farmers practice + drip irrigation (TO_2) and recorded significantly higher potato yield (225q/ha) alongwith more net return (Rs.130000/ha) in comparison to TO_1 (FP + alternate row irrigation in Alternate irrigation schedule) as well as farmers practices (Table 39). Though the net return was more in TO_1, the BC ratio (1.77) was at par in TO_1 with FP.

Table39: Assessment of water budgeting by different irrigation methods on productivity of potato under medium land condition

Technology Assesses	Technical Parameters				Economical Parameter			
	No of tubers/plant	Average tuber weight (gram)	Total quantity of water required per ha area(m^3)	Tuber yield (q/ha)	Cost of cultivation (Rs./ha)	Gross Income (Rs./ha)	Net Income (Rs./ha)	B.C. Ratio.
FP: Planting at (45x15cm) spacing +furrowirrigation.	7	65	2450	180	65000	180000	115000	1.77
TO_1: FP + irrigation in alternate row in alternate irrigation schedule.	6	55	1550	170	70000	170000	124000	1.77
TO_2: FP + Drip irrigation	9	55	1470	225	95000	225000	130000	1.37
CD (5%)	0.8	9.3		27.7				

KVK DUMKA

THEMATIC AREA: NURSERY RAISING

Standardization of planting time for higher profitabilityin Cucumber.

RESULTS: An OFT to advance the planting time for getting higher profitability in cucumber was conducted by KVKDumka in selected farmers of Ramgarh block with 02 technological options (TO_1: sowing of seeds in poly tubes during January and TO_2: Early sowing of seeds in poly tubes under poly tunnel during December). Farmers grew cucumber seedlings in poly tubes under low cost poly tunnels and transplanted it in field. Results revealed that significantly highest mean yield (311.40q/ha) and BC ratio 3.2 were obtained in TO_2 (raising of seedlings in portrayed under poly tunnel) than in TO_1 and FP (Table 40).

Table 40: Effect of planting time on yield and profitability for cucumber cultivation

Technology Assesses	Technical Parameters			Economical Parameters			
Technology Option	Replications	Time of 1st harvest	Mean Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross Return (Rs.)	Net Return (Rs.)	B:C ratio
Farmer's Practice : (Open cultivation)	07	25-30 Mar	195.00	75,000	1,95,000	1,20,000	1.6
TO_1: sowing of seeds in poly tubes during January		10-12 Mar	285.70	85,000	3,21,413	2,36,413	2.7
TO_2: Early sowing of seeds in poly tubes under poly tunnel during December		02-05 Mar	311.40	90,000	3,84,390	2,94,390	3.2
C.D5%			9.382				

Nursery raising activities

KVK GARHWA

THEMATIC AREA: INTEGRATED NUTRIENT MANAGEMENT(INM)

Nutrient management in sesame

RESULTS: An OFT on nutrient management in sesame was conducted with three technological options in Garhwa district during rainy season in marginal and sub marginal lands under poor management and input starved farmers for increasing low productivity of sesame in rain-fed condition. Initial analysis of soil revealedthat farmer's field was low in nitrogen (Av. N 155-220 kg/ha), medium in Av. P_2O_5 and K_2O content. Due to low N content the fertilizer dose in soil test base recommendation has been increased by 25% i.e. 50 kg/ha and P&K dose remain as RDF.The result revealed that maximum seed yield of 3.75 q ha $^{-1}$ was observed in TO_2 treatment followed by TO_1 (3.64 q ha^{-1}) significantly higher than grain yield of sesame in compare to farmer's practice (Table 41). Comparatively higher net profit (Rs.25,000/ha) and B:C ratio (2.00) were recorded in TO_2.

Table 41: Effect of nutrient management on seed yield and economic parameters in sesame

Technology options	Replication	Seed yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net profit (Rs./ha)	B:C ratio
Farmers' practice 22.72 kg N/ha	10	2.55	10,000	25,500	15,500	1.55
TO_1: RDF (40:40:20:20::N:P_2O_5:K_2O:Skg/ha)		3.64	12,350	36,400	24,050	1.90
TO_2: Fertilizer dose as per STBR (50:40:20:20)		3.75	12,500	37,500	25,000	2.00
CV (%)		13.2	-	-	-	-
CD(0.05)		0.45	-	-	-	-

*Initial soil status pH-6.1-6.8 **Selling price of Sesame Rs 10,000 /q.

OC-0.42-0.58; Av. N -155-220kg/ha; Av.P-12-18kg/ha and Av. K_2O-140-182 kg/ha

Field view INM in Sesame

KVK GODDA

THEMATIC AREA: INTEGRATED PEST MANAGEMENT (IPM)

Management of Pod borer (Helicoverpa armigera) and Pod fly (Melanagromyza obtusa) in Pigeonpea

RESULTS: An OFT on integrated pest management of pigeon pea pod borer and pod fly wasconducted in Godda districts with 03 technological options. The data revealed that all the treatments had significant effect in reducing the incidence of pod borer and pod fly. Data shown in Table 42 indicated that the minimum infestation 12.2 % due to pod borer and 14.2% due to pod fly, grain damage 15.8 % by pod borer and 17.4% by pod fly were recorded in TO_1 i.e. 1st spray with NSKE (5%) and 2nd spray with Acephate 75 WP (0.5g/l water). Maximum pigeon pea yield (10.2 q /ha) was obtained in To_1.

Table 42:Effect of plant protection measures on yield and economics of Pigeon pea cultivation.

Technology options	Replication	Pod damage (%)		Grain damage (%)		Yield (q/ha)	Cost of cultivation (Rs/ha)	Gross Return (Rs/ha)	Net Return (Rs/ha)	BC Ratio
		Pod borer	Pod fly	Pod borer	Pod fly					
Farmers' practice	15	22.4	23.6	23.6	24.4	7.4	26364	44400	18036	1.68:1
TO_1: 1st spray NSKE (5%) 2nd application with Acephate 75 WP (0.5g/litre water)		12.2	14.2	15.8	17.4	10.2	28239	61200	32961	2.17:1
TO_2: Two spray with Spinosad 45 SC (0.2 ml/litre)		14.8	16.2	18.2	18.9	8.6	27364	51600	24236	1.88:1
CD		0.62	0.81	0.58	0.85	0.42				

TOI: 1st spray of NSKE (5%) and 2nd spray of Acephate 75 WP (0.5g/litre

TO2 : two spray with Spinosad 45 SC (0.2ml/litre water)

IPM in Pigeon pea

KVK GUMLA

THEMATIC AREA: INTEGRATED PEST MANAGEMENT (IPM)

Management of gall midge in transplanted rice

RESULTS: An OFT was conducted by KVK Gumla for management of rice gall midge under transplanted conditions in 10 different locations which was a major problem of rice cultivation in the area. The data (Table 43) revealed that TO_2 (Spray of Neem oil 3000 ppm @ 5l/ha at nursery stage (15 DAS) and spray of Thiomethoxam 25% WG @ 100 g/ha at 20 DAT) gavemaximum paddy yield (36.43 q/ha), net return (Rs. 28738/ha) and B:C ratio (1.75) with percent yield increment of 36.33 and 21.15 over FP and TO_1.

Table 43 – Performance of technological options for management of gall midge in transplanted rice

Technology option	No. of replication	Infestation		Yield components		Cost of cultivation (Rs./ha)	Gross income (Rs./ha)	Net income (Rs / ha)	BC Ratio
		Percent tiller damage (%)	Percent (%) tiller damage	No. of effective tillers /m^2	Yield (q/ha)				
FP : Application of Regent 4 G @ 12 kg/ha at TP time	**10**	13.13	6.08	219.46	26.72	36190	49031	12841	1.35
TO_1 : One spray of Chlorpyriphos 20% EC @ 1250 ml/ha at 15 DAT		6.79	2.40	237.92	30.07	36289	55178	18889	1.52
TO_2 : Spray of Neem oil 3000 ppm @ 5l/ha at nursery stage (15 DAS) and Thiomethoxam 25% WG @ 100 g/ha at 20 DAT		3.39	1.05	256.36	36.43	38111	66849	28738	1.75
CD(P=0.05)									

KVK PALAMU

THEMATIC AREA: INTEGRATED PEST MANAGEMENT (IPM)

Management of Late blight disease of Potato

RESULTS: An OFT for management of late blight disease and for increasing the productivity in potato was conducted in Palamu district with 03 technological options i.e. 1st spray of Azoxystrobin 25SC (1%) at 45-50DAS and 2nd spray of Metalaxyl 8%WP (0.15%) at 75-80 DAS. Result presented in Table 44 indicated that TO_2 was moreeffective for the management of late blight disease of Potato and werefound cost effective in the management of this disease. The minimum PDI (4.45%), highest yield (187.26q/ha) and BC ratio (2.66) was recorded in TO_2 and highest disease (29.14%), lowest yield (143.63 q/ha) and BC ratio (1:2.23) was observed in farmer's practice.

Table 44: Assessment of foliar spray and Seed treatment with fungicide in Potato tuber.

Technological options	PDI	Yield (q/ha)	% increase in yield	B:C ratio
Famers practice- No spray/ dusting of ash	29.14	143.63	29.14	2.23
TO_1: Tuber treatment with Metalaxyl 8%WP(0.15%) + one spray with Metalaxyl 8% WP(0.15%) after 45-50 DAS	11.34	172.65	11.34	2.58
TO_2: First spray with Azoxystrobin 25 % SC (1.0%) after 45-50 DAS and 2nd spray with Metalaxyl 8%WP (0.15%) 75-80 DAS	4.45	187.26	4.45	2.66
CD(0.05)	0.41	4.12		

Management of late blight disease in Potato

KVK HAZARIBAG

THEMATIC AREA: RESOURCE CONSERVATIONPRACTICES (RCP)

Effect of Resource conservation technology on growthand yield of rice variety IR-64

RESULTS: An OFT to access the effect of rice cultivar and resource conservation practices among 21 farmer's field in different villages of Hazaribagdistrict was conducted with 03 Technological Options (puddle transplanting (FP), un-puddled rice transplanting (TO_1) and direct seeded rice (TO_2). The district comes under rain-fed situation and soil and water are very limiting factor for low paddy productivity and utilization of resources is a big concern. Result revealed that significantly higher number of effective tillers and No. of spikelet/panicle were found in un-puddled transplanting followed by farmers' practices and direct seeded rice however, test weight wasnon-significant. Significantly higher paddy yield (41.5q/ha) was noted in un-puddled transplanting followed byFP (39.4q/a). In un-puddled and DSR cost of cultivation is lower than puddled transplanting resulted to maximum net return and B: C ratio (Table 45).

Table 45: Resource conservation technology on growthand yield of rice variety IR-64

Technology Option	Rep.	Yield component			Yield (q/ha)	Cost of cultiva-tion (Rs./ha)	Gross Return (Rs./ha)	Net Return (Rs./ha)	BC ratio
		No. of effective tillers	No. of spikelet/ panicle	Test weight					
FP: Puddled transplanting	10	365	12	22.40	39.4	32000	70920	38920	2.21
TO_1: Unpuddled transplanting		377	13	22.43	41.5	23500	74700	51200	3.17
TO_2: Direct Seeded Rice		301	11	22.40	39.2	22000	70560	48560	3.20
CD (P=0.05)		***7.21***	***1.34***	***NS***	***1.3***				

Field view of OFT by KVK Hazaribag

KVK SIMDEGA

THEMATIC AREA: LIVESTOCK PRODUCTION AND MANAGEMENT (LPM)

Assessment of aromatic pudina (Mentha piperita) leaves on immune and growth on poultry birds

RESULT: An OFT was conducted to increase the total egg and meat availability in Simdega district with 03 technological options. Result revealed that highest egg and meat productionwere found in TO_2. The trial revealed that Pudina (*Mentha piperita*) leaves adlibgave better results toward immune modulator which in turn decreased mortality rate of birds without vaccinating of birds.

Table 46: Effect of Pudina adlib on egg production and economics of 100 reared birds

Technology option	Mortality % upto			Egg production (270 days) nos.	Total meat production (270 days)	Cost of treatment (Rs. /unit)	Gross income (Rs. /unit)	Gross cost (Rs. unit)	Net income Rs. /unit.)
	90 days	180 days	270 days						
TO_1- Farmers practice (No vaccinations)	20.9	6.5	2.3	3245	28.90	0.00	25331	7000	18331
TO_2- Vaccinations in poultry birds	12.4	3.5	1.6	3732	37.12	1000	29132	7500	21632
TO_3 - Use of pudina (*Mentha piperita*) adlib	8.3	2.8	1.0	4010	41.3	100	31278	7000	24278
CD @ 5%	3.1	1.8	0.5	-	6.2				


4.2 FRONTLINE DEMONSTRATIONS (FLD)

4.2.1 PULSES AND OILSEEDS

Frontline Demonstration (FLD) is a unique extension approach for dissemination of technology to provide a direct interface/ linkages 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 totality. In the process of such demonstration, the KVKs of Zone-IV took up the programs to enhance the production and productivity of pulses and oilseed crops through planning and executing frontline demonstration program across the zone consisting of the states of Bihar and Jharkhand. Frontline demonstrations were conducted both during Summer, 2019 Kharif 2019 and Rabi 2019-20 by the KVKs for an area of 2040.92 ha involving7877 numbers of farmers of this zone.

Table 47: State wise details of Frontline Demonstration conducted during 2019.

States	Oilseeds		Pulses		Cereals		Vegetables		Fruits		Other crops		Total	
	No. of farmers	Area (ha)	No. of farmers	Area (ha)	No. of farmers	Area (ha)	No. of farmers	Area (ha)	No. of farmers	Area (ha)	No. of farmers	Area (ha)	No. of farmers	Area (ha)
Bihar	241	54.00	321	82.07	1384	499.16	868	81.14	222	85.90	354	8.93	3390	810.20
Jharkhand	784	254.20	799	303.50	1612	492.40	1215	172.59	29	3.80	48	3.23	4487	1230.72
Total	**1025**	**308.20**	**1120**	**385.57**	**2996**	**991.56**	**2083**	**253.73**	**251**	**89.70**	**402**	**12.16**	**7877**	**2040.92**

Field view of Front Line Demonstrations on oilseeds

Table 48: Details of Frontline Demonstration of *Kharif*& Rabi 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	BC R	Gross Cost	Gross return	Net Return	BCR
1	Mustard	Bihar	234	46.50	13.45	12.10	11.18	22671.00	57671.00	35000.00	2.54	22205.00	53500.00	31295.00	2.41
		Jharkhand	438	145.20	14.90	13.20	12.88	21480.00	65932.00	44452.00	3.07	20025.00	54410.00	34385.00	2.72
		Total	**672**	**191.70**											
2	Niger	Bihar	0	0.00											
		Jharkhand	138	56.00	5.24	4.60	13.97	18375.00	31140.00	12765.00	1.69	18350.00	26000.00	7650.00	1.42
		Total	**138**	**56.00**											
3	Sesame	Bihar	7	7.50	5.75	5.10	12.75								
		Jharkhand	119	30.00	5.03	4.45	12.92	14000.00	24092.00	10092.00	1.72	12000.00	15561.00	3561.00	1.30
		Total	**126**	**37.50**											
4	Sunflower	Bihar	0	0.00											
		Jharkhand	30	2.00	10.00	9.00	11.11	18000.00	24000.00	6000.00	1.33	17000.00	20000.00	3000.00	1.18
		Total	**30**	**2.00**											
5	Groundnut	Bihar	0	0.00											
		Jharkhand	24	6.00	12.00	11.10	8.11	26600.00	46375.00	19775.00	1.74	22650.00	30300.00	7650.00	1.34
		Total	**24**	**6.00**											
6	Soybean	Bihar	0	0.00											
		Jharkhand	20	10.00	9.71	8.80	10.34	8000.00	13195.00	5195.00	1.65	7000.00	8750.00	1750.00	1.25
		Total	**20**	**10.00**											
7	Linseed	Bihar	0	0.00											
		Jharkhand	15	5.00											
		Total	**15**	**5.00**											
	G T Bihar		**241**	**54.00**											
	G T Jharkhand		**784**	**249.20**											
	Grand Total		**1025**	**308.20**											

Table 49: Details of Frontline Demonstration of Kharif&*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	BC Ratio	Gross Cost	Gross return	Net Return	BC Ratio
1	Pigeon Pea	Bihar	52	20.00											
		Jharkhand	245	88.00	11.16	9.74	14.54	41200.00	60166.67	18966.67	1.46	40566.67	50333.33	9766.67	1.24
		Total	**297**	**108.00**											
2	Chick pea	Bihar	40	9.25	13.05	11.60	12.50	35780.00	60000.00	24220.00	1.68	35080.00	45500.00	10420.00	1.30
		Jharkhand	225	87.50	12.93	11.75	10.04	38250.00	62600.00	24350.00	1.64	37950.00	50175.00	12225.00	1.32
		Total	**265**	**96.75**											
3	Green Gram	Bihar	134	30.00	7.00	6.20	12.90	28000.00	51000.00	23000.00	1.82	27500.00	36100.00	8600.00	1.31
		Jharkhand	45	11.00	5.50	5.00	10.00	23200.00	42000.00	18800.00	1.81	26050.00	33500.00	7450.00	1.29
		Total	**179**	**41.00**											
4	Lentil	Bihar	38	20.02	11.46	10.01	14.49	32784.50	54575.00	21790.50	1.66	32275.00	44277.50	12002.50	1.37
		Jharkhand	112	50.00											
		Total	**150**	**70.02**											
5	Black Gram	Bihar	0	0.00											
		Jharkhand	134	55.00	6.38	5.70	11.84	22000.00	40892.00	18892.00	1.86	19550.00	25670.00	6120.00	1.31
		Total	**134**	**55.00**											
6	Field pea	Bihar	52	2.00	11.60	10.50	10.48								
		Jharkhand	0	0.00											
		Total	**52**	**2.00**											

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	BC Ratio	Gross Cost	Gross return	Net Return	BC Ratio
7	Horse Gram	Bihar	0	0.00											
		Jharkhand	38	12.00	7.30	6.50	12.31	15500.00	28450.00	12950.00	1.84	17500.00	24000.00	6500.00	1.37
		Total	**38**	**12.00**											
8	Ricebean	Bihar	5	0.80	20.00	0.00	0.00	12000.00	21085.00	9085.00	1.76	0.00	0.00	0.00	0.00
		Jharkhand	0	0.00											
		Total	**5**	**0.80**											
	Grand Total Bihar		**321**	**82.07**											
	GT Jharkhand		**799**	**303.50**											
	Grand Total		**1120**	**385.57**											

4.2.2. CEREAL CROPS

Front line demonstrations on cereals, vegetables, cash crops, flowers, spices and other enterprises covering an area of 1347.15 ha were conducted by the KVKs of Bihar and Jharkhand during 2019. Inpaddy, an area of 485.15 ha was brought under demonstration by the KVKs of Bihar and Jharkhand. 22.37% increase in yield in demonstration over local check was recorded. In wheat, KVKs of Bihar and Jharkhand covered355.91ha under demonstration program and the increase in yield in the demonstration plot over local check was between 15.52 to 17.75 per cent with highest benefit-cost ratio of 1.71 to 1.92. In maize, demonstration on 73.50 ha was conducted by the KVKs of Bihar and Jharkhand and the average demonstration yield over local check was an increase of 19.44% in Jharkhand and 20.61 % increase in Biharwith benefit-cost ratio of 1.78 and 1.53 respectively.

Table 50: Details of Frontline Demonstration of Field Crops 2019

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	538	220.45	37.19	33.05	12.51	31697.32	65052.81	33355.49	2.05	31387.71	53833.78	22446.07	1.72
		Jharkhand	761	264.70	35.62	26.94	32.24	31902.50	60859.10	28956.60	1.91	29183.50	44385.45	15201.95	1.52
		Total	**1299**	**485.15**											
2	**Wheat**	Bihar	687	225.21	36.68	31.15	17.75	32970.67	73508.43	40537.76	2.23	32252.81	62048.14	29795.33	1.92
		Jharkhand	499	130.70	29.79	25.79	15.52	25200.00	55207.00	30007.00	2.19	20020.00	34305.00	14285.00	1.71
		Total	**1186**	**355.91**											
3	**Maize**	Bihar	55	16.50	65.11	53.98	20.61	65000.00	114500.00	49500.00	1.76	60000.00	92000.00	32000.00	1.53
		Jharkhand	239	57.00	56.31	47.14	19.44	44066.00	100500.00	56434.00	2.28	42506.00	75500.00	32994.00	1.78
		Total	**294**	**73.50**											
4	**Finger Millet**	Bihar	10	2.00	7.30	6.60	10.61	7300.00	12410.00	5110.00	1.70	7450.00	11220.00	3770.00	1.51
		Jharkhand	113	40.00	7.83	6.85	14.31	19833.33	45155.67	25322.33	2.28	18780.00	33540.00	14760.00	1.79
		Total	**123**	**42.00**											
5	**Barley**	Bihar	5	1.00											
		Jharkhand	0	0.00											
		Total	**5**	**1.00**											

Sl. No.	Crop	State	No. of farmers	Area (ha)	Yield (q/ha)		Increase (%)	Economics of Demonstration (Rs/ha)				Economics of Check (Rs/ha)			
					Demo	Check		Gross Cost	Gross Return	Net Return	BCR	Gross Cost	Gross Return	Net Return	BCR
6	**Oats**	Bihar	12	2.00	480.00	450.00	6.67	15000.00	54000.00	39000.00	3.60	14000.00	45000.00	31000.00	3.21
		Jharkhand	0	0.00											
		Total	**12**	**2.00**											
7	**Jute**	Bihar	77	32.00	24.43	21.05	16.07	29900.00	72016.67	42116.67	2.41	29200.00	61958.33	32758.33	2.12
		Jharkhand	0	0.00											
		Total	**77**	**32.00**											
		GT Bihar	**1384**	**499.16**											
		GT Jharkhand	**1612**	**492.40**											
		Grand Total	**2996**	**991.56**											

4.2.2. VEGETABLE CROPS

Front line demonstrations in Horticulture (vegetables, fruits and other crops) are a focal point in terms of validations of technology by KVKs. In Bihar and Jharkhand FLDs on 23 different vegetable crops were conducted during the year in an area of 253.73 ha during 2019. Among vegetables more focus was on tomato, brinjal, cauliflower, cowpea, potato and onion. In tomato, an area of 46.63ha was brought under demonstration by the KVKs of Bihar and Jharkhand and giving 56.53% increase in yield in demonstration field over local check in Jharkhand whereas in Bihar % increase in yield was 19.74. In brinjal, 42.60 ha were brought under demonstration program which recorded 11.04 to 11.87 % increase in yield over local check in Bihar and Jharkhand with highest benefit-cost ratio of 2.22 to 2.10 respectively. In case of cowpea 31.16 ha area was under demonstration having 20.96 % increase in yield over farmers practice in Jharkhand and 12.73 % in Bihar. Cauliflower which is one of the major crops of Jharkhand recorded 19.91% increase in yield over farmers practice whereas in Bihar 15.04%. Similar trend is recorded in case of broccoli, capsicum, potato and French bean. Among the entire vegetable crops highest BC ratio (3.34) was recorded in bottle gourd. The details are given in the Table 51.

View of FLD on vegetables in bitter gourd and cauliflower improved varieties

Table 51: Details of Frontline Demonstration of Vegetable Crops 2019

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	**Tomato**	Bihar	146	11.15	520.85	435.00	19.74	186062.50	398486.25	212423.75	2.14	184870.00	305772.00	120902.00	1.65
		Jharkhand	173	35.48	357.40	228.32	56.53	182200.71	339722.86	157522.14	1.86	177985.71	213272.14	35286.43	1.20
		Total	**319**	**46.63**											
2	**Brinjal**	Bihar	48	9.70	303.98	273.75	11.04	100000.00	345074.00	245074.00	3.45	72150.00	160150.00	88000.00	2.22
		Jharkhand	204	32.90	295.14	263.83	11.87	75755.14	275728.57	199973.43	3.64	74325.71	155825.71	81500.00	2.10
		Total	**252**	**42.60**											
3	**Cauliflower**	Bihar	344	18.16	224.94	195.54	15.04	63970.12	242770.56	178800.44	3.80	62015.66	169277.09	107261.43	2.73
		Jharkhand	64	6.50	256.00	213.50	19.91	57250.00	256000.00	198750.00	4.47	53250.00	182500.00	129250.00	3.43
		Total	**408**	**24.66**											
4	**Chili**	Bihar	36	2.10	90.85	63.05	44.09	53912.50	200175.00	146262.50	3.71	52112.50	145875.00	93762.50	2.80
		Jharkhand	40	4.00	242.50	193.00	25.65	79171.00	322500.00	243329.00	4.07	79000.00	211750.00	132750.00	2.68
		Total	**76**	**6.10**											
5	**Okra**	Bihar	14	0.48	96.00	71.20	34.83	35500.00	44900.00	9400.00	1.26	33000.00	39500.00	6500.00	1.20
		Jharkhand	52	3.00	168.00	114.00	47.37	51000.00	210000.00	159000.00	4.12	42000.00	140000.00	98000.00	3.33
		Total	**66**	**3.48**											
		Jharkhand	40	2.00	230.00	210.00	9.52	75000.00	275000.00	200000.00	3.67	75000.00	225000.00	150000.00	3.00
		Total	**53**	**2.90**											
8	**Cabbage**	Bihar	10	0.50											
		Jharkhand	20	1.00											
		Total	**30**	**1.50**											
9	**Bottle Gourd**	Bihar	15	2.10	120.00	100.00	20.00	45000.00	180000.00	135000.00	4.00	37000.00	120000.00	83000.00	3.24
		Jharkhand	58	3.50	224.30	152.29	47.29	43208.33	169305.33	126097.00	3.92	38575.00	128792.00	90217.00	3.34
		Total	**73**	**5.60**											
11	**Ridge gourd**	Bihar	0	0.00											
		Jharkhand	10	1.00	145.00	129.00	12.40	21200.00	87500.00	66300.00	4.13	21000.00	61500.00	40500.00	2.93
		Total	**10**	**1.00**											
12	**Bitter Gourd**	Bihar	2	0.25	130.00	100.00	30.00	93000.00	300000.00	207000.00	3.23	85000.00	250000.00	165000.00	2.94
		Jharkhand	85	5.50	160.00	125.00	28.00	103250.00	340800.00	237550.00	3.30	81575.00	230000.00	148425.00	2.82
		Total	**87**	**5.75**											
13	**Pointed gourd**	Bihar	0	0.00											
		Jharkhand	2	0.40											
		Total	**2**	**0.40**											
14	**Cucumber**	Bihar	15	0.65	85.26	75.10	13.52	37432.81	143391.24	105958.43	3.83	36237.59	81846.20	45608.61	2.26
		Jharkhand	110	17.00	62.00	55.00	12.73	49607.50	182950.00	133342.50	3.69	47740.00	120050.00	72310.00	2.51
		Total	**125**	**17.65**											

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
15	**Cucurbits**	Bihar	42	7.00	178.00	158.00	12.66	175000.00	595000.00	420000.00	3.40	162000.00	497000.00	335000.00	3.07
		Jharkhand	0	0.00											
		Total	**42**	**7.00**											
16	**Cowpea**	Bihar	20	1.00	75.25	66.75	12.73	49687.50	238700.00	189012.50	4.80	48230.80	186900.00	138669.20	3.88
		Jharkhand	81	30.16	38.03	31.44	20.96	33325.00	110780.00	77455.00	3.32	30646.00	72150.00	41504.00	2.35
		Total	**101**	**31.16**											
17	**French bean**	Bihar	0	0.00											
		Jharkhand	82	15.00	67.83	58.60	15.76	56666.67	144500.00	87833.33	2.55	53666.67	120500.00	66833.33	2.25
		Total	**82**	**15.00**											
18	**Potato**	Bihar	31	11.00	264.15	238.70	10.66	74445.00	174905.00	100460.00	2.35	76430.00	157840.00	81410.00	2.07
		Jharkhand	37	7.16	241.55	210.88	14.55	115870.00	271600.00	155730.00	2.34	110762.00	223850.00	113088.00	2.02
		Total	**68**	**18.16**											
19	**Onion**	Bihar	61	14.00	315.25	270.25	16.65	111385.00	257687.15	146302.15	2.31	100385.00	200187.50	99802.50	1.99
		Jharkhand	24	2.20	129.83	95.86	35.44	53572.67	137814.00	84241.33	2.57	52787.00	103259.67	50472.67	1.96
		Total	**85**	**16.20**											
20	**Elephant foot yam**	Bihar	31	0.65	212.50	186.00	14.25	531250.00	2103750.00	1572500.00	3.96	490000.00	1337700.00	847700.00	2.73
		Jharkhand	2	1.00	240.00	220.00	9.09	310000.00	600000.00	290000.00	1.94	289000.00	500000.00	211000.00	1.73
		Total	**33**	**1.65**											
21	**Sweet Potato**	Bihar	0	0.00											
		Jharkhand	4	2.00	182.79	139.76	30.79	51250.00	182798.00	131548.00	3.57	48875.00	119768.00	70893.00	2.45
		Total	**4**	**2.00**											
22	**Garden Beet**	Bihar	0	0.00											
		Jharkhand	10	0.40											
		Total	**10**	**0.40**											
23	**Other Veg. Crops**	Bihar	0	0.00											
		Jharkhand	82	0.54	130.00	100.00	30.00	89083.33	201985.67	112902.33	2.27	78201.00	114940.67	36739.67	1.47
		Total	**82**	**0.54**											
		GT Bihar	**868**	**81.14**											
		GT Jharkhand	**1215**	**172.59**											
		Grand Total	**2083**	**253.73**											

4.2.4. FRUIT CROPS

Bihar and Jharkhand are the hub of subtropical fruits crops like mango, litchi, guava, and banana hence due attention was required to conduct FLD in fruit production covering 89.70 ha area under fruit crops during 2019. In Bihar under FLD on litchi and mango 30 and 40 ha area was covered with increase in fruit yield of 24.27 and 4.0 % respectively over farmers practice.

Demonstration on some high value crops like makhana, strawberry and pineapple had been started in Bihar. In Jharkhand there is more thrust on papaya demonstration than other fruit crops. The details are given in the following Table 52.

Table 52: Details of Frontline Demonstration of Fruits Crops 2019

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	Papaya	Bihar	33	1.00											
		Jharkhand	29	3.80	441.13	381.07	15.76	209233.00	441130.00	231897.00	2.11	207200.00	381070.00	173870.00	1.84
		Total	**62**	**4.80**											
2	Litchi	Bihar	60	30.00	270.54	217.70	24.27	95865.00	283760.00	187895.00	2.96	98352.00	178450.00	80098.00	1.81
		Jharkhand	0	0.00											
		Total	**60**	**30.00**											
3	Mango	Bihar	78	40.00	67.60	65.00	4.00								
		Jharkhand	0	0.00											
		Total	**78**	**40.00**											
4	Pineapple	Bihar	5	1.00	390.00	325.00	20.00	245000.00	468000.00	223000.00	1.91	230000.00	390000.00	160000.00	1.70
		Jharkhand	0	0.00											
		Total	**5**	**1.00**											
5	Strawberry	Bihar	3	0.50	80.00	63.00	26.98	130000.00	336000.00	206000.00	2.58	110000.00	250000.00	140000.00	2.27
		Jharkhand	0	0.00											
		Total	**3**	**0.50**											
6	Banana	Bihar	5	0.40											
		Jharkhand	0	0.00											
		Total	**5**	**0.40**											
7	Makhana	Bihar	38	13.00											
		Jharkhand	0	0.00											
		Total	**38**	**13.00**											
	GT Bihar		**222**	**85.90**											
	GT Jharkhand		**29**	**3.80**											
	Grand Total		**251**	**89.70**											

4.2.5. OTHER CROPS (FLOWER, SPICES AND OTHERS)

In recent year cultivation of commercial flowers crops like marigold, tuberose and gladiolus has been started covering significant area. Seeing the importance, FLDs on marigold was conducted in an area of 3.43ha in Bihar and Jharkhand with 11.43 to 12.07% increase in flower yield respectively. FLDs on spices, perennial drumstick and green manure crop had been approved and conducted during the year 2019. The details are given in the following Table 53.

Table53:Details of Frontline Demonstrations of other crops (Spices, flower and Dhaincha) during 2019

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	**Spices**	Bihar	1	0.08											
		Jharkhand	30	1.80	160.00	150.00	6.67	206165.00	513000.00	306835.00	2.49	227166.00	450000.00	222834.00	1.98
		Total	**31**	**1.88**											
2	**Marigold**	Bihar	28	2.00	78.00	70.00	11.43	35000.00	123900.00	88900.00	3.54	36500.00	90000.00	53500.00	2.47
		Jharkhand	18	1.43	88.63	79.08	12.07	57750.00	182287.50	124537.50	3.16	55750.00	105420.00	49670.00	1.89
		Total	**46**	**3.43**											
3	**Dhaincha**	Bihar	10	2.00											
		Jharkhand	0	0.00											
		Total	**10**	**2.00**											
	Drumstick	Bihar	**315**	**4.85**											
		Jharkhand	**0**	**0**											
		Total	**315**	**0**											
		GT Bihar	**354**	**8.93**											
		GT Jharkhand	**48**	**3.23**											
		Grand Total	**402**	**12.16**											

4.2.6. LIVESTOCK AND FISHERY:

Frontline demonstrations were also conducted on livestock and fisheries related to assessment of breed, feed and fodder management, vaccination of animals, deworming, pond management, stocking density, fish fingerling production and other areas by the KVKs of Bihar and Jharkhand. In livestock, 2578farmers were involved in such demonstration for the benefit of 12513 livestock. Out of the total number of farmers, 1644 number of farmers were involved in Bihar and 934 in Jharkhand. In fisheries total 138demonstrations were conducted by the KVKs to cover a water area of 88.00 ha in respect of both the state with farmers and water bodies brought under demonstration.

Table 54 : State wise details of Frontline Demonstration on Livestock and Fishery 2019

Sl. No.	Category	State	No. of Farmers	Livestock/fisheries Nos.
1	Livestock	Bihar	1644	8453.86
		Jharkhand	934	4059.00
		Total	**2578**	**12513.00**
2	Fishery	Bihar	122	72.00
		Jharkhand	16	16.00
		Total	**138**	**88.00**

4.2.7. OTHER ENTERPRISES:

Apart from conducting demonstration on field crops, horticultural crops, livestock and fisheries, the KVKs also conducted demonstrations on various agro enterprises in the farmers' fields to exhibit relative advantage of improved technologies over conventional practices and to introduce newer income generating enterprises. In this process, altogether 1716 enterprises like vermi-compost, bee keeping, value addition, mushroom production, backyard poultry rearing, homestead vegetable cultivation, feed production, azolla cultivation and many more were taken up by KVKs, with Bihar KVK demonstrating1368 enterprises involving 11410 farmers and Jharkhand KVKs demonstrated 348 enterprises covering 1033 farmers during 2019.

Table 55 : State wise details of Frontline Demonstration on Enterprise 2019

Sl. No.	Category	State	No. of Enterprises	No. of farmers
1	Enterprise	Bihar	1368	11410
		Jharkhand	348	1033
		Total	**1716**	**12443**

4.2.8. FARM IMPLEMENTS:

The use of farm machinery, tools and implements saveslabour requirement, reduced seed rate, enhanced water use efficiency and also reduce drudgery upto certain level. Various farm machinery, tools and implements were also demonstrated in this zone for the benefit of 7175 farmers. The performance of improved tools and implements were demonstrated in 2204.30ha area during 2019. The KVKs of Jharkhand covered 1320.80ha area involving 6156 farmers for such demonstrations and in KVKs of Bihar demonstrated to 995 farmers to covering883.50 ha.

Table56: State wise details of Frontline Demonstration on Farm Implement and machinery2019.

Sl. No.	Category	State	No. of Farmers	Area (ha)
1	Implement	Bihar	995	883.50
		Jharkhand	6156	1320.80
		Total	**7151**	**2204.30**



4.2.9. WOMEN EMPOWERMENT:

Advance agro techniques were demonstrated targeting the farm women to empower them in decision making process and in income generating activities of tailoring, value addition, embroidery and other activities in which total 626 farm women were involved with 443 from Bihar 183 farm women from Jharkhand.

Table 57: State wise Frontline Demonstration on Women Empowerment 2019

Sl. No.	Category	State	No. of Women
1	Women Empowerment	Bihar	443
		Jharkhand	183
		Total	**626**

4.2.9. F1 HYBRID SEEDS:

In Bihar and Jharkhand majority of farmers are small and marginal with small land holding and fragmented plots. To get higher return farmers are adopting F1 hybrid varieties of different crops which KVKs of Bihar and Jharkhand demonstrated in 455.30 ha area involving 907 farmers. More area was brought under Jharkhand than Bihar in the use of hybrid varieties.

Table 58: State wise details of Frontline Demonstration on F1 Hybrid varieties 2019

Sl. No.	Category	State	No. of Farmers	Area (ha)
1	Hybrid	Bihar	45	4.40
		Jharkhand	862	450.90
		Total	**907**	**455.30**

4.3 CLUSTER FRONTLINE DEMONSTRATION (CFLD):

With a view to bring some of existing land of rice-wheat system tounder pulses/oilseeds cultivation by frontline demonstrations to enhance the total production, productivity and area of pulses and oilseed crops, an ambitious programme has been implemented during Kharif2019 and Rabi 2019-20 through the KVKs of Bihar and Jharkhand by Department of Agriculture & Cooperation and Farmers Welfare (DAC & FW), Govt. of India. 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 under pulse and oilseed crops cultivations with advanced technologies/varieties.

4.3.1 KHARIF PULSES:

CFLD on pigeon pea, black gram, green gram and horse gram was conducted during Kharif 2019 with covering an area of 950.10ha against target 1040 ha were allotted for *Kharif*pulses under CFLD program in Bihar and Jharkhand. Performance analysis of individual pulse crop indicated that in pigeon pea, there was 36.69 to 46.56*percent* increase in average yield under demonstration in the two states with a yield difference of approximately 4.0q/ha. In black gram, the increase in average yield in the KVKs of Bihar and Jharkhand under CFLD program was recorded by 40.56 to 43.50%with a yield difference of about 3.0q/ha over check. In respect of yield enhancement, the KVKs of Bihar reported as an average increase of demonstration yield to the extent of 54.34*per cent* in Green gram. Under the CFLD programme in pigeon pea an area of 470.10ha was brought by the KVKs of Bihar and Jharkhand. The details presented in Table 59.

Fig. CFLD on Kharif Pulses conducted by KVKs

Table 59:Cluster Frontline Demonstration on Kharif Pulses during 2019

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD		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	Black gram	Bihar	150	60	126	50	10.93	7.85	40.56	3.08
		Jharkhand	475	190	509	180	9.47	6.49	43.50	2.98
		Total	**625**	**250**	**635**	**230**				
2	Green gram	Bihar	75	30	47	10	10.65	6.9	54.34	3.75
		Jharkhand	325	130	404	130	8.89	6.45	31.06	2.44
		Total	**400**	**160**	**451**	**140**				
3	Pigeon pea	Bihar	825	330	828	285	15.19	10.99	36.69	4.2
		Jharkhand	475	190	679	185.1	13.14	9.09	46.56	4.05
		Total	**1300**	**520**	**1507**	**470.1**				
4	Horse gram	Bihar	25	10	38	10	11	8.3	32.5	2.7
		Jharkhand	250	100	289	100	7.45	5.29	47.34	2.16
		Total	**275**	**110**	**327**	**110**				
		Grand Total	**2600**	**1040**	**2920**	**950.1**				

4.3.2 RABI PULSES:

IN Rabi pulses under CFLD on pulses demonstration were conducted in 1383 ha under lentil, chickpea and field pea pulses by KVKs of Bihar and Jharkhand against target of 1340 ha only. The performance of demonstration in lentil showed that 33.65*per cent* average increase was recorded in Bihar and 36.52*percent* in Jharkhand. In chick pea, the KVKs of Bihar and Jharkhand reported an average increase in yield to the extent of 40.03*per cent* in Jharkhand and 33.60*per cent*in Bihar. Under CFLD program, in field pea CFLDgave57.27 per cent higher yield in Jharkhand and 32.19% in Bihar. The details are given in Table 60.



Table 60: Cluster Frontline Demonstration on Rabi Pulses during 2019

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD		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	Chick pea	Bihar	750	300	895	280	13.33	9.82	33.63	3.51
		Jharkhand	475	190	579	190	13.49	9.89	36.52	3.60
		Total	**1225**	**490**	**1474**	**470**				
2	Lentil	Bihar	1275	510	1523	573	12.63	9.31	36.95	3.33
		Jharkhand	375	150	610	150	10.72	7.57	40.03	3.15
		Total	**1650**	**660**	**2133**	**723**				
3	Field pea	Bihar	250	100	378	110	13.60	9.93	32.19	3.67
		Jharkhand	225	90	386	80	13.73	8.8	57.27	4.93
		Total	**475**	**190**	**764**	**190**				
		Total Rabi	**3350**	**1340**	**4371**	**1383**				

4.3.3 SUMMER PULSES:

KVKs of Bihar and Jharkhand under CFLD programme on summer pulses conducted demonstration on green gram and black gram and covering an area of 980.25 ha against the target of970 ha. In green gram, 640 ha area was covered by KVKs of Bihar whereas; in Jharkhand 250.25ha was brought under demonstration. In black gram, 90.0ha was brought under demonstration in this zone of which 60.0ha area Jharkhand and 30.0ha in Bihar was covered under CFLD with38.77 to 43.53 % increase in yield in Bihar and Jharkhand respectively and highest yield difference of 9.72q/ha was recorded in green gram in Jharkhand. 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 61.


Fig. Demonstration of summer Pulses in CFLD Programme

Table 61: Cluster Frontline Demonstration on Summer Pulse during 2019

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD		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	1550	620	1550	640	10.26	6.69	40.17	3.57
		Jharkhand	625	250	706	250.25	16.79	7.07	43.05	9.72
		Total	**2175**	**870**	**2256**	**890.25**				
2	Black gram	Bihar	75	30	75	30	9.73	6.53	38.77	3.2
		Jharkhand	175	70	151	60	9.96	7.26	43.53	2.7
		Total	**250**	**100**	**226**	**90**				
	Grand total		**2425**	**970**	**2482**	**980.25**				

4.3.4 KHARIF OILSEEDS:

With the target of increasing Oilseed production in India and decreasing the import bill of oilseed the cluster frontline demonstration programme was started in oilseed crops both in Kharif, Rabi and Summer 2019 by the KVKs of this zone. In Kharif, ground nut, sesame, niger, sunflower and soybean were demonstrated in 645.0ha against the allotted target of 650 ha. In Ground nut, area under demonstration was 180.0 ha in Bihar and Jharkhand resulting in 53.61 % more yield over local check in Jharkhand whereas in Bihar 31.89% increase in yield over local check. In Sesame total area covered under CFLD was215 ha in both the states with an increase in yield to the range of 33.14 to 43.61 per cent, and yield difference of 1.56q/ha in Jharkhand. Another oilseed crop, Niger was demonstrated in Bihar and Jharkhand to covering an area of 160.0 ha with increase in average demonstration yield of 49.38 per cent in Jharkhand. The KVKs of Bihar and Jharkhand conducted cluster frontline demonstration programme in soybean and covered an area of 70.0 ha. Sunflower was also taken under the CFLD programme and covered 20.0ha area in both the states with a yield increase in 96.0% in the Jharkhand (Table 62).

Table 61: Cluster Frontline Demonstration on Summer Pulse during 2019

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD		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	1550	620	1550	640	10.26	6.69	40.17	3.57
		Jharkhand	625	250	706	250.25	16.79	7.07	43.05	9.72
			2175	**870**	**2256**	**890.25**				

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD		Average yield (q/ha)		Yield Increase (%)	Difference of yield between demo and local (q/ha)
			No. of Demonstration	Area (ha)	No. of Demonstration	Area (ha)	Demo	Local		
2	Black gram	Bihar	75	30	75	30	9.73	6.53	38.77	3.2
		Jharkhand	175	70	151	60	9.96	7.26	43.53	2.7
		Total	**250**	**100**	**226**	**90**				
Grand total			**2425**	**970**	**2482**	**980.25**				

With the target of increasing Oilseed production in India and decreasing the import bill of oilseed the cluster frontline demonstration programme was started in oilseed crops both in Kharif, Rabi and Summer 2019 by the KVKs of this zone. In Kharif, ground nut, sesame, niger, sunflower and soybean were demonstrated in 645.0ha against the allotted target of 650 ha. In Ground nut, area under demonstration was 180.0 ha in Bihar and Jharkhand resulting in 53.61 % more yield over local check in Jharkhand whereas in Bihar 31.89% increase in yield over local check. In Sesame total area covered increase in yield to the range of 33.14 to 43.61 per cent, and yield difference of 1.56q/ha in Jharkhand. Another oilseed crop, Niger was demonstrated in Bihar and Jharkhand to covering an area of 160.0 ha with increase in average demonstration yield of 49.38 per cent in Jharkhand. The KVKs of Bihar and Jharkhand conducted cluster frontline demonstration programme in soybean and covered an area of 70.0 ha. Sunflower was also taken under the CFLD programme and covered 20.0ha area in both the states with a yield increase in 96.0% in the Jharkhand (Table 62).

Fig. Oilseeds crops in different locations during Kharif

Table 62: Cluster Frontline Demonstration on Kharif Oilseed during 2019

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD		Average yield (q/ha)		Yield Increase (%)	Difference in yield between demo and local (q/ha)
			No. of Demonstration	Area (ha)	No. of Demonstration	Area (ha)	Demo	Local		
1	Groundnut	Bihar	100	40	150	40	14.64	11.24	31.89	3.40
		Jharkhand	350	140	460	140	16.83	11.59	53.61	5.24
		Total	**450**	**180**	**610**	**180**				
2	Soybean	Bihar	100	40	27	10	15.68	8.99	42.66	6.69
		Jharkhand	150	60	164	60	12.39	5.28	34.18	3.17
		Total	**250**	**100**	**191**	**70**				
3	Sesame	Bihar	**125**	**50**	151	60	5.38	4.03	33.14	1.35
		Jharkhand	350	140	392	155	5.00	3.44	43.61	1.56
		Total	**475**	**190**	**543**	**215**				
4	Niger	Bihar	25	10	25	10	4.48	3.54	26.55	0.94
		Jharkhand	375	150	402	150	5.48	3.70	49.38	1.78
		Total	**400**	**160**	**427**	**160**				
5	Sunflower	Bihar	25	10	28	10	17.17	15.07	13.93	2.1
		Jharkhand	25	10	27	10	11.12	6.1	96.00	5.02
		Total	**50**	**20**	**55**	**20**				
	Grand Total		**1625**	**650**	**1826**	**645**				

4.3.5 RABI OILSEEDS:

During 2019, Rabi oilseeds were demonstrated by the KVKs of Bihar and Jharkhand for an area of 940.4ha against target of 880.0 ha in CFLD on oilseed. In rapeseed &mustard, the KVKs of Bihar conducted 939 demonstration covering area of 428.4 ha with32.49 % increase in demonstration yield over local check, while in Jharkhand it was 45.83 %. In linseed, the demonstrations in clustered mode covered 180.0ha area and recording37.68 % higher yield over the local check in Jharkhand. The KVKs of Bihar recorded the highest increase of 35.28 % in Sesame, whereas in Sunflower yield increase was 82.30 % as compared to 47.46% in Jharkhand. In, Safflower Jharkhand covered 10.0 ha with 12.5% yield advantage over check and yield difference of 5.0q/ha.

Fig. CFLD on Rabi Oilseeds

Table 63: Cluster Frontline Demonstration on Rabi Oilseed during 2019

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD		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	Rapeseed & Mustard	Bihar	1000	400	939	428.4	12.61	9.30	32.49	3.31
		Jharkhand	500	200	531	272	11.70	7.84	45.83	3.86
		Total	**1500**	**600**	**1470**	**700.4**				
2	Linseed	Bihar	200	80	178	60	9.88	7.56	32.06	2.32
		Jharkhand	300	120	326	120	7.54	5.58	37.68	1.96
		Total	**500**	**200**	**504**	**180**				
3	Sesame	Bihar	25	10	25	10	6.02	4.45	35.28	1.57
		Jharkhand	0	0	0	0	0	0	0	0
		Total	**25**	**10**	**25**	**10**				
4	Sunflower	Bihar	75	30	25	10	11.12	6.1	82.3	5.02
		Jharkhand	75	30	78	30	8.33	5.63	47.46	2.70
		Total	**150**	**60**	**103**	**40**				
5	Safflower	Bihar	0	0	0	0	0	0	0	0
		Jharkhand	25	10	28	10	9	4	12.5	5
		Total	**25**	**10**	**28**	**10**				
	Grand Total		**2200**	**880**	**2130**	**940.4**				

4.3.6 SUMMER OILSEEDS:

Cluster frontline demonstration was also conducted during summer 2019 on oilseed crop in an area of 285 ha against the targeted area of 295 ha. The crops identified were sesame, ground nut and sunflower. Only sesame crop was successful in both the states and Jharkhand reported for 126.91% increase in yield over local check however Bihar reported for 54.12 % yield increase. Sunflower was very successful in Jharkhand with average increase in yield of 75% and yield difference of 4.5q/ha. The state-wise target and actual conduct of demonstration are given in the following Table 64.

CFLD on Oilseeds

Table 64: Cluster Frontline Demonstration on Summer Oilseed during 2019

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD		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	Sesame	Bihar	250	100	253	100	7.213	4.68	54.12	2.533
		Jharkhand	125	50	134	40	8.01	3.53	126.91	4.48
		Total	**375**	**150**	**387**	**140**				
2	Sunflower	Bihar	262.5	105	298	105	4.15	10.85	-61.75	-6.7
		Jharkhand	50	20	50	20	10.5	6	75	4.5
		Total	**312.5**	**125**	**348**	**125**				
3	**Groundnut**	Bihar	50	20	70	20	10.3	19	-45.79	-8.7
		Jharkhand	0	0	**0**	**0**				
		Total	**50**	**20**	**70**	**20**				
	Grand Total		**737.5**	**295**	**805**	**285**				

4.3.6 ADDITIONAL AREA UNDER OILSEEDS:

Seeing the success of the programme an additional target of 5070 ha was given under Cluster frontline demonstrations for oilseed crops in which Bihar achievement CFLD on Sesame in 185 ha and the additional area for Rapeseed& Mustard crop for both the states was 4805 ha yield increase was of 36.08 to 42.75% in Bihar and Jharkhand states respectively. The state-wise target and actual conduct of demonstration are given in the following Table 65.

Table65: Additional crop under CFLD oilseed 2019-20

Sl. No.	Crops	State	Target of CFLD Approved		Achievement of CFLD Oilseed during 2019-20		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		
i	Sesame	Bihar	662.5	265	477	185	Standing Crop			
		Jharkhand	0	0	0	0				
		Total	**662.5**	**265**	**477**	**185**				
ii	Rapseed & Mustard	Bihar	6812.5	2725	6426	2576.6	14.10	10.35	36.08	3.76
		Jharkhand	5200	2080	6128	2210	10.84	7.49	42.75	3.36
		Total	**12012.5**	**4805**	**12554**	**4786.6**				
		Grand Total	**12675**	**5070**	**13031**	**4971.6**				

4.4 TRAINING ACHIEVEMENTS

4.4.1 PRACTICING FARMERS:

For the sustainable development of agriculture and allied sectors adequate knowledge and skill development are essential at the field condition. Hence, providing knowledge and technological skills to the practicing farmers is pre-requisite in developing agriculture through adoption/application of advanced agricultural technologies. Large number of farmers and farm-women came forward to register their names for acquiring improved knowledge and technological skills in different areas of field crop production, vegetable and fruit production, 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 hands on skill training in more specific areas which are considered to have potentiality for enterprise development in the respective districts. In respect to extension functionaries, the assessment of training need is made by the concerned departments/organizations for the knowledge upgradation. KVKs helps them to refresh and upgrade their knowledge mainly in the areas of frontier technology developed by research institution and their application in farmers' field. For imparting training to farmers, rural youths and extension functionaries, the KVKs conduct these 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 is given by the KVKs concentrated on providing more number of on-campus training programs. A total of 5447 numbers of training programs was organized by the KVKs during 2019 covering 163489 farmers. Participation of farm women in these training programs was 49733, whereas number of farm men was 113756.

Table 67: Training Programme for farmers and farm women (Bihar and Jharkhand) during 2019

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	3619	63253	16378	79632	12723	8242	20965	2592	1601	4193	78568	26221	104789
Jharkhand	1828	12807	6411	19195	5854	4124	9975	16527	12977	29481	35188	23512	58700
Total	**5447**	**76060**	**22789**	**98827**	**18577**	**12366**	**30940**	**19119**	**14578**	**33674**	**113756**	**49733**	**163489**

Detailed analysis of category-wise training programs organized by the KVKs of Zone-IV indicated that out of total 5447 programmes,1221 courses were conducted in crop production related areas, 899 in horticulture, 508 in soil fertility management, 573 in livestock production and management, 683 in plant protection, 614 in home science and women empowerment, 477 in agricultural engineering, 151 in fisheries, 85 in production of inputs, 186 in capacity building and group dynamics and 20 in agro-forestry.

A further classification of thematic area-wise training programmes organized by the KVKs revealed that 1221 number of courses were conducted by the 68 KVKs for 28660 farmers and 9271 farm women in crop production thematic area. Among various sub-thematic areas, highest number of courses offered in cultivation of vegetables (540)

followed by integrated crop management (315) and integrated pest management (364). Other sub-thematic areas in order of courses organized were poultry farming (72), seed production (184), disease management in livestock (139), integrated nutrient management (129), feed management (81), dairy management (117),weed management (128), value addition (106), repair and maintenance of farm machinery and implements (152), soil and water testing (92), cropping system (94), soil fertility management (96), nursery raising (143), income generation activities for empowerment of rural women (61), integrated farming (14), crop diversification (58), off-season vegetable cultivation (55), installation and maintenance of micro irrigation systems (119) and others as shown in the Table 68.

Horticulture was the 2nd most important thematic areas where as a whole, 899 numbers of courses were organized for 26,790 farmers of which 7907 were women (29.51%). Among seven sub-thematic areas, highest number of courses was offered in cultivation of vegetable crops (540) with total farmers' participants (15841) followed by cultivation of fruit (204), ornamental plants (34), tuber crop (20), medicinal and aromatic (32) and spices (33). Among vegetable crops more focus was on nursery raising 4157 farmers followed by 2654 farmers in grading and standardization of technologies. In fruit crops layout and management of orchard was more focused with total farmers training (1606).

Plant protection was third important thematic area both in terms of training programmes organized and participation of farmers. The KVKs of Bihar and Jharkhand together organized 683number of courses for the benefit of 20911 farmers of which 3829 (18.31%) participants were farm-women. Among plant protection integrated pest management where 364 courses conducted were most important followed by integrated disease management (199 programs) and biocontrol of pests and diseases with 56 courses conducted were thrust areas.

Livestock production and management was considered as the fourth important frontier area for training both in respect of number of courses offered and participation of farmers took place. In this thematic area, 573 numbers of training was organized for 17941 farmers. Disease management, dairy management, goat farming and feed management were the four major areas where 139, 117, 92 and 81 numbers of training were conducted by the KVKs for 4107, 3867, 3044 and 2337 numbers of farmers' participations, respectively.

Soil health and fertility management is another important area where 508 training coursed were offered and 15966 farmers received training in topics integrated nutrient management (3777), soil fertility management (3030), soil water testing (2641), and other areas like micronutrient deficiency in crops, nutrient use efficiency, production and use of organic inputs were more focused.

In terms of courses offered and participation, home science/women empowerment was the next important thematic area, where 614 courses were conducted for 17519 farmers of which 12059 were women covering68.33 per cent of the participants. Among topics household food security by kitchen gardening and nutrition gardening (102) and value addition (106) were considered important sector with 2938 and 2698 farm women participations respectively.

Agriculture Engineering is another emerging thematic area in which repair and maintenance of farm machinery and implements was the most important sub-thematic both in terms of courses conducted and farmers participated. In this thematic area, 477 numbers of courses were offered and 13846 farmers participation 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 4791 numbers (34.60%). Installation and maintenance of micro-irrigation systems was the second-most important subject where 119 courses were offered for3294 farmers. The overall participation of farm-women was to the tune of 21.85*per cent.*

In fisheries, 151 numbers of courses were conducted by the KVKs for the involvement of 3506 farmers and farm women. Among different aspects fish farming, composite fish culture & fish disease and carp breeding & hatchery management were more focused by covering 38, 33 and 25 courses during the year with involvement of 970, 682 and 632 farmer participations.

KVKs of Bihar and Jharkhand conducted 186 numbers of courses for 5192 farmers and farm-women in capacity building and group dynamics. Major areas covered in this thematic area included courses on entrepreneurial development of farmers/youths (56), formation and management of SHGs (45), group dynamics (28), leadership development (18) and others. Highest number of participation was recorded in entrepreneurial development of farmers (1631) followed by formation and management of SHGs (1259), group dynamics (735) and others.

Trainings under the thematic area production of inputs at site was conducted for 2363trainees, where seed production and vermi-compost production were two major areas of training. The KVKs also organized 20 courses on agro-forestry covering IFS, production technologies etc. The overall analysis of the training programmes organized by the KVKs of Zone-IV indicates that KVKs have tried to provide necessary improved 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 68:Training Programme for men and farm women (Thematic Area wise) 2019

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	58	725	99	824	245	80	325	356	227	583	1326	406	1732
Cropping Systems	94	1180	324	1504	389	168	553	617	292	909	2186	784	2970
Integrated Crop Management	315	4946	882	5828	951	495	1446	1637	660	2297	7534	2037	9571
Integrated Nutrient Management	40	554	107	661	99	75	174	190	292	482	843	474	1317
Nursery management	54	778	159	937	336	132	468	285	112	397	1399	403	1802
Others, (cultivation of crops)	107	1869	240	2109	326	143	469	403	214	617	2598	597	3195
Production of organic inputs	71	871	331	1202	285	204	489	375	226	601	1531	761	2292
Resource Conservation Technologies	95	1695	267	1962	410	156	566	316	190	506	2421	613	3034
Seed Production	184	2206	521	2727	802	561	1363	749	681	1412	3757	1763	5520
Water management	75	1132	197	1326	367	181	548	581	198	781	2080	576	2656
Weed Management	128	2067	368	2435	503	209	712	415	280	695	2985	857	3842
Sub Total	**1221**	**18023**	**3495**	**21515**	**4713**	**2404**	**7113**	**5924**	**3372**	**9280**	**28660**	**9271**	**37931**
II. Horticulture													
a) Vegetable Crops													
Crop Geometry	58	603	156	759	141	140	281	342	278	620	1086	574	1660
Enterprise development	17	204	73	277	23	21	44	18	86	104	245	180	425
Export potential vegetables	41	584	120	704	126	65	191	73	101	174	783	286	1069
Grading and standardization	101	1371	307	1678	356	165	521	277	178	455	2004	650	2654
Nursery raising	143	1984	630	2614	465	240	705	456	382	838	2905	1252	4157
Off-season vegetables	55	872	209	1081	206	82	286	229	143	377	1307	434	1741
Others, if any (Cultivation of Vegetable)	61	1100	558	1658	253	224	477	116	105	221	1469	887	2356

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 of low volume and high value crops	62	705	265	970	217	136	353	268	141	409	1190	542	1732
Protective cultivation	2	8	16	24	6	17	23	0	0	0	14	33	47
Sub Total (V)	**540**	**7431**	**2334**	**9765**	**1793**	**1090**	**2881**	**1779**	**1414**	**3198**	**11003**	**4838**	**15841**
b) Fruits													
Cultivation of fruits	30	425	126	551	224	38	262	96	62	158	745	226	971
Export potential fruits	22	536	87	623	114	40	154	3	2	5	653	129	782
Layout and Management of Orchards	52	945	184	1129	146	67	213	201	63	264	1292	314	1606
Management of young plants/orchards	18	300	139	439	114	68	182	50	29	79	464	236	700
Micro irrigation systems of orchards	12	125	80	205	48	29	77	31	24	55	204	133	337
Others, if any(INM)	9	143	39	182	16	19	35	5	3	8	164	61	225
Plant propagation techniques	24	330	110	440	83	27	110	81	41	122	494	178	672
Rejuvenation of old orchards	21	302	86	388	48	17	65	71	107	178	421	210	631
Training and Pruning	16	307	90	397	60	13	73	53	20	73	420	123	543
Sub Total (F)	**204**	**3413**	**941**	**4354**	**853**	**318**	**1171**	**591**	**351**	**942**	**4857**	**1610**	**6467**
c) Ornamental Plants													
Export potential of ornamental plants	4	8	10	18	4	8	12	57	23	80	69	41	110
Nursery Management	18	249	37	286	70	29	99	55	50	105	374	116	490
Management of potted plants	2	10	11	21	5	7	12	9	7	16	24	25	49
Others, if any	4	52	6	58	12	2	14	0	0	0	64	8	72
Propagation techniques of Ornamental	6	55	11	66	33	12	45	32	15	47	120	38	158
Sub Total (O)	**34**	**374**	**75**	**449**	**124**	**58**	**182**	**153**	**95**	**248**	**651**	**228**	**879**
d) Plantation crops													
Others, if any	9	197	11	208	14	73	87	20	18	38	231	102	333
Processing and value addition	6	57	29	86	15	19	34	19	16	35	91	64	155
Production and Management technology	21	464	97	551	84	60	144	16	16	32	564	173	737
Sub Total (P)	**36**	**718**	**137**	**845**	**113**	**152**	**265**	**55**	**50**	**105**	**886**	**339**	**1225**
e) Tuber crops													
Others, if any	2	32	2	34	4	2	6	13	6	19	49	10	59
Processing and value addition	1	0	15	15	0	8	8	0	0	0	0	23	23
Production and Management technology	17	228	61	289	53	28	81	58	64	122	339	153	492
Sub Total (T)	**20**	**260**	**78**	**338**	**57**	**38**	**95**	**71**	**70**	**141**	**388**	**186**	**574**
f) Spices													
Processing and value addition	13	69	13	82	16	17	33	76	127	203	161	157	318
Production and Management technology	17	88	30	119	24	15	39	239	85	324	351	130	481
Others, if any	3	18	9	27	2	3	5	12	5	17	32	17	49
Sub Total (s)	**33**	**175**	**52**	**228**	**42**	**35**	**77**	**327**	**217**	**544**	**544**	**304**	**848**
g) Medicinal and Aromatic Plants													
Nursery Management	7	116	68	184	13	13	26	5	0	5	134	81	215
Others, if any	4	42	16	58	8	9	17	6	86	92	56	111	167
Post harvest technology and value addition	5	86	12	98	36	6	42	4	1	5	126	19	145
Production and Management technology	16	137	84	221	14	6	20	87	101	188	238	191	429
Sub Total (MAP)	**32**	**381**	**180**	**561**	**71**	**34**	**105**	**102**	**188**	**290**	**554**	**402**	**956**
Total (H)	**899**	**12752**	**3797**	**16540**	**3053**	**1725**	**4776**	**3078**	**2385**	**5468**	**18883**	**7907**	**26790**
III. Soil Health and Fertility Management													
Integrated Nutrient Management	129	1701	456	2157	342	248	590	520	510	1030	2563	1214	3777
Management of Problematic soils	20	179	30	209	57	17	74	191	113	294	427	160	587
Micro nutrient deficiency in crops	43	459	108	567	157	36	193	286	123	409	902	267	1169
Nutrient Use Efficiency	20	184	52	236	71	43	114	120	74	194	375	169	544
Others, if any	11	1074	16	1090	35	4	39	39	44	83	1148	64	1212
Production and use of organic inputs	62	626	171	797	147	40	187	485	263	748	1258	474	1732
Soil and Water Conservation	35	446	254	700	216	45	261	194	89	283	856	388	1244
Soil and Water Testing	92	1133	384	1517	370	132	502	432	190	622	1935	706	2641
Soil fertility management	96	1460	480	1940	365	292	661	269	194	463	2094	966	3060
Sub Total	**508**	**7262**	**1951**	**9213**	**1760**	**857**	**2621**	**2536**	**1600**	**4126**	**11558**	**4408**	**15966**
IV. Livestock Production and Management													
Dairy Management	117	1709	412	2121	465	222	687	634	425	1059	2808	1059	3867
Disease Management	139	2032	628	2660	443	310	753	318	376	694	2793	1314	4107

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	81	1153	381	1534	240	206	446	154	203	357	1547	790	2337
Fish management	5	38	8	46	15	4	19	28	27	55	81	39	120
Goat farming	92	1154	585	1739	330	324	654	233	418	651	1717	1327	3044
Piggery Management	31	83	34	117	148	115	263	317	239	547	548	388	936
Poultry Management	72	892	395	1287	274	275	547	270	291	566	1436	961	2397
Production of quality animal products	17	199	88	287	73	34	107	39	34	73	311	156	467
Others, if any Animal Husbandry	19	192	101	293	65	47	112	177	84	261	434	232	666
Sub Total	**573**	**7452**	**2632**	**10084**	**2053**	**1537**	**3588**	**2170**	**2097**	**4263**	**11675**	**6266**	**17941**
V. Home Science/Women empowerment													
Design and development of low/minimum cost diet	66	268	763	1031	61	281	342	85	382	477	414	1426	1840
Enterprise development	47	343	382	725	131	238	369	56	295	351	530	915	1445
Gender mainstreaming through SHGs	22	141	235	376	39	114	153	21	114	135	201	463	664
Household food security by kitchen gardening and nutrition gardening	102	730	1017	1747	224	422	646	211	334	545	1165	1773	2938
Income generation activities for empowerment of rural Women	65	204	542	746	116	680	796	92	121	213	412	1343	1755
Location specific drudgery reduction technologies	28	79	216	295	52	116	168	60	118	178	191	450	641
Minimization of nutrient loss in processing	21	112	192	304	38	90	128	40	100	140	190	382	572
Others, if any	36	369	355	724	82	127	209	9	47	56	460	529	989
Rural Crafts	10	0	166	166	0	91	91	0	0	0	0	257	257
Storage loss minimization techniques	34	398	248	646	74	227	301	55	120	175	527	595	1122
Value addition	106	453	858	1311	144	531	675	141	571	712	738	1960	2698
Women and child care	77	446	998	1444	144	661	805	42	307	349	632	1966	2598
Sub Total	**614**	**3543**	**5972**	**9515**	**1105**	**3578**	**4683**	**812**	**2509**	**3331**	**5460**	**12059**	**17519**
VI. Agril. Engineering													
Farm Mechanization	53	777	121	898	115	56	171	185	160	345	1077	337	1414
Installation and maintenance of micro irrigation systems	119	1839	428	2267	417	117	534	350	143	493	2606	688	3294
Others, if any	44	635	193	828	84	46	130	119	29	148	838	268	1106
Post Harvest Technology	42	452	192	644	159	84	243	81	155	236	692	431	1123
Production of small tools and implements	34	553	204	747	94	114	208	148	94	242	795	412	1207
Repair and maintenance of farm machinery and implements	152	2980	525	3505	705	164	869	359	58	417	4044	747	4791
Small scale processing and value addition	13	212	8	220	59	21	80	26	23	49	297	52	349
Use of Plastics in farming practices	20	366	83	449	85	8	93	20	0	20	471	91	562
Sub Total	**477**	**7814**	**1754**	**9558**	**1718**	**610**	**2328**	**1288**	**662**	**1950**	**10820**	**3026**	**13846**
VII. Plant Protection													
Bio-control of pests and diseases	56	797	111	908	236	59	295	258	74	332	1291	244	1535
Integrated Disease Management	199	3663	498	4161	729	333	1062	471	313	784	4863	1144	6007
Integrated Pest Management	364	7498	1036	8534	1337	478	1815	795	465	1260	9630	1979	11609
Others, if any	36	474	144	618	126	80	206	95	51	146	695	275	970
Production of bio-control agents & bio-pesticides	28	410	62	472	79	25	104	114	100	214	603	187	790
Sub Total	**683**	**12842**	**1851**	**14693**	**2507**	**975**	**3482**	**1733**	**1003**	**2736**	**17082**	**3829**	**20911**
VIII. Fisheries													
Breeding and culture of ornamental fishes	3	48	15	63	2	1	3	3	3	6	53	19	72
Carp breeding and hatchery management	25	398	61	459	89	16	105	50	18	68	537	95	632
Carp fry and fingerling rearing	16	246	23	269	40	32	72	6	5	11	292	60	352
Composite fish culture & fish disease	33	467	79	546	113	15	128	6	2	8	586	96	682
Fish processing and value addition	2	38	11	49	1	0	1	0	0	0	39	11	50
Hatchery management and culture of freshwater prawn	10	167	19	186	42	7	49	2	2	4	211	28	239
Others, if any	7	79	52	131	14	6	20	0	0	0	93	58	151
Prawn farming with carp culture	2	24	15	39	2	0	2	0	0	0	26	15	41
Water quality and its management	4	85	7	92	3	2	5	0	0	0	88	9	97
Fish feed	11	150	19	169	42	9	51	0	0	0	192	28	220

Thematic Area	No. of Courses	No. of Participants									Grand Total		
		Other			SC			ST					
		M	F	T	M	F	T	M	F	T	M	F	T
Fish farming	38	498	111	609	201	48	249	89	23	112	788	182	970
Sub Total	**151**	**2200**	**412**	**2612**	**549**	**136**	**685**	**156**	**53**	**209**	**2905**	**601**	**3506**
IX. Production of Inputs at site													
Bio-fertilizer production	5	58	9	67	28	7	35	22	9	31	108	25	133
Bio-pesticides production	4	17	20	37	11	7	18	29	50	79	57	77	134
Organic manures production	12	217	23	240	50	13	63	36	12	48	303	48	351
Others, if any Lac production	2	15	0	15	0	0	0	25	0	25	40	0	40
Planting material production	6	86	9	95	34	8	42	31	8	39	151	25	176
Production of Bee-colonies & wax sheets	3	16	7	23	10	6	16	39	8	47	65	21	86
Production of livestock feed and fodder	3	49	1	50	20	5	25	7	1	8	76	7	83
Seed Production	23	326	70	396	70	25	95	61	22	83	457	117	574
Small tools and implements	2	29	4	33	0	4	4	22	7	29	51	15	66
Vermi-compost production	25	163	56	219	82	37	119	224	158	382	469	251	720
Sub Total	**85**	**976**	**199**	**1175**	**305**	**112**	**417**	**496**	**275**	**771**	**1777**	**586**	**2363**
X. Capacity Building and Group Dynamics													
Entrepreneurial development of farmers/youths	56	745	163	908	189	133	322	257	144	401	1191	440	1631
Formation and Management of SHGs	45	574	182	756	149	135	284	89	130	219	812	447	1259
Group dynamics	28	364	60	424	88	24	113	94	105	191	546	189	735
Leadership development	18	202	47	249	67	25	92	52	87	139	321	159	480
Mobilization of social capital	16	294	98	392	46	7	53	2	0	2	342	105	447
Others, if any	12	283	19	302	27	1	28	6	0	6	316	20	336
Production technologies	2	29	30	59	7	1	8	0	0	0	36	31	67
Value addition	4	67	9	76	7	5	12	9	0	9	83	14	97
WTO and IPR issues	3	50	6	56	14	3	17	5	3	8	69	12	81
Nuesery Management	2	52	3	55	3	0	3	1	0	1	56	3	59
Sub Total	**186**	**2660**	**617**	**3277**	**597**	**334**	**932**	**515**	**469**	**976**	**3772**	**1420**	**5192**
XI. Agro-forestry													
Frost Management	1	20	0	20	2	0	2	0	0	0	22	0	22
Nursery Management	3	39	8	47	27	3	30	5	3	8	71	14	85
Integrated Farming Systems	14	194	22	216	41	44	85	79	20	99	314	86	400
Production technologies	2	15	7	22	14	3	17	0	3	3	29	13	42
Sub Total	**20**	**268**	**37**	**305**	**84**	**50**	**134**	**84**	**26**	**110**	**436**	**113**	**549**
Grand Total	**5447**	**76060**	**22789**	**98827**	**18577**	**12366**	**30940**	**19119**	**14578**	**33674**	**113756**	**49733**	**163489**

4.4.2 RURAL YOUTH:

With the objective of giving skill oriented training to rural youth for employed generation, KVKs of Zone-IV conducted various enterprise-orientedtraining programmes in a planned manner for a large number of rural youths during 2019. In the course of inculcating knowledge and skill, KVKs conducted 1226 numbers of training programmes for the benefit of 30102 rural youths covering 20660rural boys and 9442 rural girls during 2019. Among the participants 17.91% were in the category of Schedule Caste and 19.97% in

Schedule Tribe. A total of 1226 courses were offered for 30102 rural youths. In terms of preferred courses, mushroom production was mostly preferred by the trainees (4729). The second highest number of trainees (2691) was recorded for seed production training followed by integrated farming (2100) and bee-keeping (1619) numbers of trainees. In case of animal sector sheep and goat farming was taken by 1202 people in 60 courses. Under Dairy sector 61 courses was selected by 1606 participants; in value addition 63 courses by1522 trainees, poultry production in 762 trainees participated in 34 courses, production of organic inputs was covered in 43 courses by 976 rural youths and post-harvest technology in 21 courses by530 trainees. Overall trend showed that rural youths including girls have relied on the training from KVKs for self-employment generation and additional income through agro-based enterprises.

Table 69: Training Programme for Rural Youth, State wise at a Glance 2019

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	809	11017	3992	15009	2485	1701	4186	301	164	465	13803	5857	19660
Jharkhand	417	2561	1129	3690	759	445	1204	3537	2011	5548	6857	3585	10442
Total	**1226**	**13578**	**5121**	**18699**	**3244**	**2146**	**5390**	**3838**	**2175**	**6013**	**20660**	**9442**	**30102**

Table 70:Training Programme for Rural Youth,(Thematic Area wise) during 2019

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	60	583	59	642	142	52	194	660	123	783	1385	234	1619
Commercial fruit production	23	380	41	421	97	18	115	47	12	59	524	71	595
Composite fish culture	13	235	2	237	19	0	19	4	0	4	258	2	260
Dairying	61	822	302	1124	214	141	355	91	36	127	1127	479	1606
Enterprise development	30	313	126	439	37	62	99	107	51	158	457	239	696
Fish harvest and processing technology	5	79	2	81	9	4	13	2	0	2	90	6	96
Fry and fingerling rearing	2	27	0	27	2	0	2	3	0	3	32	0	32
Integrated farming	67	1311	215	1526	193	69	262	232	80	312	1736	364	2100
Mushroom Production	196	1934	1143	3077	410	423	833	433	386	819	2777	1952	4729
Nursery Management of Horticulture crops	65	648	378	1026	203	88	291	237	158	395	1088	624	1712
Ornamental fisheries	3	65	5	70	1	0	1	1	0	1	67	5	72
Others, if any	43	358	203	561	64	89	153	199	117	316	621	409	1030
Para extension workers	2	41	19	60	4	3	7	0	0	0	45	22	67
Para vets	5	42	8	50	12	5	17	28	1	29	82	14	96
Piggery	22	141	32	173	138	52	190	119	72	191	398	156	554
Planting material production	40	460	132	592	118	28	146	157	77	234	735	237	972
Post Harvest Technology	21	202	160	362	92	34	126	16	26	42	310	220	530
Poultry production	34	359	58	417	145	40	185	118	42	160	622	140	762
Production of organic inputs	43	524	132	656	103	53	156	108	56	164	735	241	976
Production of quality animal products	14	131	85	216	45	53	98	31	10	41	207	148	355
Protected cultivation of vegetable crops	43	441	103	544	120	41	161	117	119	236	678	263	941
Quail farming	8	49	36	85	13	7	20	8	23	31	70	66	136
Rabbit farming	4	11	6	17	13	2	15	60	29	89	84	37	121
Repair and maintenance of farm machinery and implements	62	846	174	1020	145	92	237	131	17	148	1122	283	1405
Rural Crafts	26	31	266	297	38	84	122	15	6	21	84	356	440
Seed production	103	1537	268	1805	332	102	434	381	71	452	2250	441	2691

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
Sericulture	11	79	30	109	13	12	25	80	102	182	172	144	316
Sheep and goat rearing	60	659	108	767	177	58	235	146	54	200	982	220	1202
Small scale processing	9	61	65	126	35	5	40	2	50	52	98	120	218
Tailoring and Stitching	26	34	334	368	37	164	201	15	85	100	86	583	669
Training and pruning of orchards	19	249	44	293	74	23	97	54	31	85	377	98	475
Value addition	63	408	495	903	91	238	329	49	241	290	548	974	1522
Vermi-culture	43	518	90	608	108	104	212	187	100	287	813	294	1107
Grand Total	**1226**	**1357 8**	**5121**	**1869 9**	**3244**	**2146**	**5390**	**3838**	**2175**	**6013**	**20660**	**9442**	**30102**

Training of rural youth for skill development

4.4.3 EXTENSION FUNCTIONARIES:

State Government Departments Extension functionaries play key role in disseminating agricultural technologies among the larger farming communities and time to time knowledge upgradation is required about recent advances in newly developed and 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 740 courses were conducted in various thematic areas for 32049 extension functionaries comprising 5325 females and 26724 males. Training programmes on productivity enhancement in field crops, integrated pest management, productivity enhancement in field crops, production and use of organic inputs, integrated nutrient management, protected cultivation technology and livestock feed and fodder production were in the priority list.120 courses were organized for 4237 extension functionaries in the field of productivity enhancement in field crops and in integrated pest management 104 courses were conducted in which 5670 extension functionaries participated at the same time. At the same time 76 courses in integrated nutrient management for 2326 persons and 50 courses in production and use of organic inputs and 21 courses for livestock feed and fodder production for 1135 persons were conducted by the KVKs.

Table 71: A glance of Training programme for Extension Functionaries (Bihar Jharkhand), 2019.

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	534	19374	2639	22013	2347	719	3066	298	49	347	22019	3407	25426
Jharkhand	206	2896	571	3467	382	139	521	1427	1208	2635	4705	1918	6623
Total	**740**	**22270**	**3210**	**25480**	**2729**	**858**	**3587**	**1725**	**1257**	**2982**	**26724**	**5325**	**32049**

Table 72: Training programme for extension functionaries(Thematic Area wise) 2019

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	21	288	88	376	33	8	41	181	84	265	502	180	682
Care and maintenance of farm machinery and implements	34	1066	121	1187	151	64	215	75	65	140	1292	250	1542
Crop intensification	15	742	84	826	58	7	65	2	25	27	802	116	918
Fertility management	6	105	7	112	5	4	9	0	0	0	110	11	121
Formation and Management of SHGs	34	741	140	881	42	35	77	42	91	133	825	266	1091
Gender mainstreaming through SHGs	9	33	41	74	17	15	32	22	65	87	72	121	193
Group Dynamics and farmers organization	27	293	49	342	35	10	45	160	281	441	488	340	828
Household food security	20	501	161	662	93	52	145	29	100	129	623	313	936
Information networking among farmers	8	163	23	186	9	2	11	25	7	32	197	32	229
Integrated Nutrient management	76	1714	143	1857	184	49	233	164	72	236	2062	264	2326
Integrated Pest Management	104	4326	348	4674	589	173	762	160	74	234	5075	595	5670
Livestock feed and fodder production	21	831	105	936	120	42	162	32	5	37	983	152	1135
Low cost and nutrient efficient diet designing	10	99	98	197	45	23	68	12	13	25	156	134	290
Management in farm animals	40	992	565	1557	152	50	202	92	42	134	1236	657	1893
Others if any	46	1911	304	2215	169	95	264	101	16	117	2181	415	2596
Production and use of organic inputs	50	2158	214	2372	195	50	245	227	99	326	2580	363	2943
Productivity enhancement in field crops	120	3327	242	3569	403	56	459	132	77	209	3862	375	4237
Protected cultivation technology	45	1583	127	1710	198	19	217	171	47	218	1952	193	2145
Rejuvenation of old orchards	26	1041	129	1170	173	36	209	49	22	71	1263	187	1450
Value addition	14	166	73	239	40	35	75	43	22	65	249	130	379
Women and Child care	10	125	129	254	7	30	37	1	50	51	133	209	342
WTO and IPR issues	4	65	19	84	11	3	14	5	0	5	81	22	103
Grand Total	**740**	**22270**	**3210**	**25480**	**2729**	**858**	**3587**	**1725**	**1257**	**2982**	**26724**	**5325**	**32049**

4.4.4 SPONSORED TRAINING PROGRAMME

The KVKs of Zone-IV have reached in almost every corner of the districts of Bihar and Jharkhand. Thus, it has not only helped the farming community in receiving need-based support and information back-up but also attracted different organizations engaged in agricultural development activities to come in close contact with KVKs and improve the linkages between different agencies. Visit and interaction with KVKs and farming community convinced them to solicit help and guidance from KVKs for 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 Zone-IV towards agricultural development in general and capacity building of farmers in particulars, a number of govt. and other organizations have approached KVKs to get their clients training on 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.

Table 73: State wise sponsored training programme during 2019

State	No. of Courses	General			SC			ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Bihar	906	61795	11523	73318	10773	3673	14446	346	109	455	72914	15305	88219
Jharkhand	224	2690	780	3470	351	143	494	2463	1273	3736	5504	2196	7700
Total	**1130**	**64485**	**12303**	**76788**	**11124**	**3816**	**14940**	**2809**	**1382**	**4191**	**78418**	**17501**	**95919**

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, value addition and others. Among the identified thematic areas, highest number of courses (479) were offered in crop production and management for 56490 participants followed by Horticultural Crops Production (121) for 7047, agricultural extension (311) for 21326 participants, livestock and fisheries (44) for 228 participants and others. The trend of participation indicated that the sponsoring organizations preferred to get their clienteles trained in those areas where the participants might start their own venture for self-employment.

Table 74: Sponsored training conducted by Zone-IV during 2019

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	479	40042	7005	47047	6467	2190	8657	577	209	786	47086	9404	56490
Agricultural Extension	311	14265	2734	16999	3115	945	4060	175	92	267	17555	3771	21326
Horticultural Crops Production	121	3771	844	4615	559	210	769	1114	549	1663	5444	1603	7047
Entrepreneurship Development	111	1588	533	2121	214	215	429	684	316	1000	2486	1064	3550
Livestock Production & Management	44	1117	375	1492	334	143	477	150	109	259	1601	627	2228
Farm Machinery	21	2593	610	3203	243	50	293	73	24	97	2909	684	3593
Production and use of Organic Inputs	17	560	39	599	40	1	41	9	7	16	609	47	656
Home Science	14	302	151	453	74	51	125	25	71	96	401	273	674
Post Harvest technology & Value Addition	12	247	12	259	78	11	89	2	5	7	327	28	355
Total	**1130**	**64485**	**12303**	**76788**	**11124**	**3816**	**14940**	**2809**	**1382**	**4191**	**78418**	**17501**	**95919**

4.4.5 VOCATIONAL TRAINING PROGRAMME:

KVKs of the Zone IV organized 304 vocational training programmes to address problem of unemployment among the rural youths. Based on the potential of agro-based enterprise in the district as well as interest of farmers, the KVKs identified frontier areas like mushroom production, production of organic inputs, entrepreneurship development, dairy management, vegetable cultivation, farm mechanization, income generation and commercial fruit production, tailoring and stitching 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 for seed money which helped them to overcome their anxiety in the case of enterprise development.

Table 75: State wise Vocational Training Programme during 2019

Sl. No.	State	No. of Training	Grand Total		
			Male	Female	Total
1	Bihar	230	4524	2091	6516
2	Jharkhand	74	2067	1075	3142
TOTAL		**304**	**6591**	**3166**	**9658**

Vocational training in different areas of crop production, livestock rearing, fishery, post-harvest technology and value addition, poultry farming were the part of KVK training programmes which helped to build up trained manpower for self-employment in different areas of rural farming and agro-based enterprises. Vocational courses being of longer duration, helped to upgrade the skill and knowledge of the rural youths and farmers. During the year 2019, KVKs of Zone-IV organized 304 courses in different areas of agriculture and allied sectors which covered 6591 rural boys and 3166 rural girls. Category wise analysis of vocational training showed that rural youths and girls preferred training in mushroom production i.e. 738 rural boys and 742 girls were trained through 40 courses during the year. Entrepreneurship development was another courses selected by 1183 boys and 373 girls. Commercial seed production was on demand by many of the trainees, 776 rural youth took this training through 31 courses. Tailoring, stitching, embroidery, dying etc. were preferred by 305 rural girls and they were being trained through 13 courses. About 859 participants were trained in dairy management in 25 courses. Similarly, 249 rural youths had chosen poultry farming as their desired vocation and was trained through 2 courses. Commercial fruit production, vermi composting, repair and maintenance of farm machinery and implements, organic farming, rural crafts were also the other areas where trainees showed their interest.

Table76: Vocational Training Programme, 2019

Area of Training	No. of courses	Grand Total		
		Male	Female	Total
Entrepreneurship Development	41	1183	373	1544
Mushroom Production	40	738	742	1424
Seed Production	31	776	123	899
Goat farming	30	658	191	818
Dairy Management	25	699	160	859
Value addition	20	92	416	508
Income generation	15	207	146	353
Tailoring and Stitching	13	55	305	360
Vermi-compost production	12	269	69	338
Commercial Fruit Production	12	176	116	292
Poultry farming	12	249	51	300
Beekeeping	8	415	92	507
Vegetable cultivation	7	118	91	209
Integrated farming system	7	247	130	377
Farm Mechanization	7	148	5	153
Production of Organic Input	6	143	19	162
Integrated Nutrient management	6	215	65	280
Fish Production	5	98	1	99
Organic Farming	4	70	37	107
Soil & water testing	2	35	14	49
Protected cultivation	1	0	20	20
TOTAL	**304**	**6591**	**3166**	**9658**

4.5 EXTENSION PROGRAMMES

In creating awareness among farmers about the benefit of advanced agricultural and allied technologies, scientific livestock rearing, fish fingerling production, soil testing, group farming and other related aspects, the KVKs of Zone-IV organized 1,67,169 different extension activities to reach out 734727farmers and extension officials. Among the beneficiaries 700917 and 33810 extension officials participated in the extension activities. Gender-wise classification indicates that 257817 farm women took part in various extension

activities against 476910numbers of farm men. In respect of extension officials, however, there were 7,009 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 number of farmers and farmwomen. A total of 294 soil health camp was organized involving 5,528 famers and extension officials. Another important category was workshop where 158 programmes were organized by the KVKs to facilitate 79,661 beneficiaries. The KVKs also extended their expertise through delivering 1,837 number of lectures as resource person for 21043 farmers. The KVK personnel also paid visit 62,178 times to the farmers' field to interact with 54021 numbers of farmers and farmwomen.Method demonstration is 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 12285 beneficiaries participated. Other important extension activities carried out by the KVKs includesconducting kisan gosthi, field day, film show, group meeting, soil test campaign, self-help group mahila mandal and farm science club, conveners' meet, celebration of important days and others.

Table 77: Extension activities organized by Zone IV during 201

Name of Extension Activity	No. of activities	Farmer			Extension officials			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Advisory Services	80240	127167	54400	181567	1112	455	1567	128279	54855	183134
Agri mobile clinic	120	668	994	1662	56	39	95	724	1033	1757
Animal Health Camp	49	1716	888	2604	112	63	175	1828	951	2779
Any Other (Specify)	933	11097	10617	21714	1284	328	1612	12381	10945	23326
Celebration of important days (specify)	246	5642	8285	13927	1120	307	1427	6762	8592	15354
Diagnostic visits	3675	6330	3090	9420	539	164	703	6869	3254	10123
Exhibition	255	12523	13115	25638	746	224	970	13269	13339	26608
Farm Science Club Conveners meet	19	440	181	621	37	22	59	477	203	680
Farmers Seminar	132	8059	3448	11507	636	142	778	8695	3590	12285
Farmers visit to KVK	62178	33537	20484	54021	1464	325	1789	35001	20809	55810
Field Day	712	11126	5618	16744	924	161	1085	12050	5779	17829
Film Show	599	8915	5619	14534	699	284	983	9614	5903	15517
Group meetings	228	2943	2024	4967	285	203	488	3228	2227	5455
International Yoga Day	27	293	97	390	113	29	142	406	126	532
Kisan Choupal	105	1604	554	2158	39	13	52	1643	567	2210
Kisan Ghosthi	1107	33747	16500	50247	6985	683	7668	40732	17183	57915
Kisan Mela	181	52532	50466	102998	4092	875	4967	56624	51341	107965
Lectures delivered as resource persons	1837	13327	7716	21043	1364	824	2188	14691	8540	23231
Mahila Kisan Divas	71	1847	6586	8433	233	312	545	2080	6898	8978
MahilaMandals Conveners meetings	50	214	2097	2311	241	56	297	455	2153	2608
Method Demonstrations	276	2874	1144	4018	331	58	389	3205	1202	4407

Name of Extension Activity	No. of activities	Farmer			Extension officials			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Parthenium Awareness Week	18	230	130	360	6	2	8	236	132	368
Scientific visit to farmers field	11991	17799	11512	29311	1438	257	1695	19237	11769	31006
Self Help Group Conveners meetings	207	585	1635	2220	199	69	268	784	1704	2488
Soil health Camp	294	2923	2147	5070	346	112	458	3269	2259	5528
Soil test campaigns	445	2506	1764	4270	360	126	486	2866	1890	4756
Swachhata Pakhwda	356	2082	3340	5422	313	96	409	2395	3436	5831
Swatchta Hi Sewa	346	9111	4635	13746	181	133	314	9292	4768	14060
Training through Video Conferencing at KVK	68	724	653	1377	0	5	5	724	658	1382
Workshop	158	71188	7966	79154	404	103	507	71592	8069	79661
World Soil Day	82	1425	1065	2490	148	60	208	1573	1125	2698
Rabi/ Kharif Krishak Sammelan	52	2572	1434	4006	903	432	1335	3475	1866	5341
Exposure Visit	112	2363	604	2967	91	47	138	2454	651	3105
Grand Total	**167169**	**450109**	**250808**	**700917**	**26801**	**7009**	**33810**	**476910**	**257817**	**734727**

Kishan Ghoshti organized in Gumla (Jharkhand)

Soil Health Card Distributed in Banka (Bihar)

Swachhata Pakhwda organized at KVK Godda.

Swatchta Hi Sewa organized at KVK Simdega

4.5.1 OTHER EXTENSION ACTIVITIES

The KVKs also exercised for other means of communication like publishing through newspaper, radio/ TV talks, writing popular article, preparing extension literature as well as organizing awareness camps etc. The KVKs of Zone-IV conducted 56574

number of such extension activities for the benefit of farmers. The KVKs prepared and distributed 52192 extension literature depicting cultivation techniques of crops, vegetables, fish rearing, livestock rearing etc. in local vernacular. Among all the states, KVKs of Bihar developed and distributed (10274) of extension literature while Jharkhand (41918). KVK personnel delivered TV talk 12 times in Jharkhand, 138 times in Bihar. Activities of KVKs of Zone IV also were published through newspaper by 3119 times.

Table 78: Others Extension Activities organized during 2019

Nature of Extension Activity	No. of Activities		Total
	Bihar	Jharkhand	
Extension Literature	10274	41918	**52192**
No. of Soil Sample Analyzed	398	86	**484**
Other, if any	51	14	**65**
Popular articles	232	150	**382**
Radio talks	158	24	**182**
TV talks	138	12	**150**
News paper coverage	3046	73	**3119**
Total	**14297**	**42277**	**56574**

Newspaper Coverage by KVK

4.5.2 TECHNOLOGY WEEK

In creating awareness among farmers about the benefit of advanced agricultural and allied technologies, the KVKs of Zone-IV organized 47technology week involving 7088 farmers and extension officials during the year 2019.

Technology Week	
No. of programmes organized	No. of participants
47	7088

Technology showcasing to the farmers by the KVK

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 on which the production and productivity of crops depends and it is important that seed replacement should be done by farmers at regular interval to maintain and increase productivity of the crop. As farm size in KVKs is limited so seed production cannot be done in large quantities at KVK farm. To maximize the seed production and meet the demands of farmers for quality seed it has been initiated in the villages under the "village seed production" programme. During the year 2019, the KVKs produced 9837.00 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 79: State wise seed production during 2019

Sl. No.	State	Seed Production (q)
1	Bihar	7999.13
2	Jharkhand	1837.87
Grand Total		**9837.00**

Table 80: Crop wise seed production during 2019

State wise Seed Production at KVKs in Zone-IV in 2019				
Crop Type	Name of Crop	Bihar	Jharkhand	Total
		Quantity of Seed (q)	Quantity of Seed (q)	Quantity of Seed (q)
Cereals	Paddy	4303.60	1198.81	5502.41
	Wheat	2181.74	131.84	2313.58
	Maize	117.63	11.94	129.57
	Ragi	0.00	5.20	5.20
	Sorghum	0.00	0.60	0.60
Pulses	Chick pea	316.26	5.60	321.86
	Green gram	186.75	7.65	194.40
	Lentil	143.30	0.32	143.62
	Pigeon pea	106.29	21.83	128.12
	Field pea	6.90	44.61	51.51
	Black gram	0.52	0.50	1.02
	Horse gram	0.00	1.00	1.00
	Rajma	0.94	0.00	0.94
Oilseeds	Mustard	133.77	42.58	176.35
	Linseed	14.81	1.70	16.51
	Niger	0.55	11.60	12.15
	Sesame	9.83	0.00	9.83

State wise Seed Production at KVKs in Zone-IV in 2019				
Crop Type	**Name of Crop**	**Bihar**	**Jharkhand**	**Total**
		Quantity of Seed (q)	**Quantity of Seed (q)**	**Quantity of Seed (q)**
	Groundnut	1.60	4.96	6.56
	Soybean	1.00	0.00	1.00
Vegetables	Potato	163.00	210.00	373.00
	Elephant foot yam	0.10	119.60	119.70
	Lobia	17.00	0.00	17.00
	Tomato	0.04	0.35	0.39
	Brinjal	0.00	0.34	0.34
	French Bean	0.00	0.29	0.29
	Cowpea	0.00	0.22	0.22
	Sponge gourd	0.00	0.11	0.11
	Capsicum	0.00	0.02	0.02
	Cucumber	0.00	0.02	0.02
Fodder Crops	Barseem	249.00	0.00	249.00
	Maize (Fodder)		1.60	1.60
Spices	Turmeric	2.00	7.20	9.20
	Chili	0.00	0.02	0.02
Green Manure	Dhaincha	7.50	7.37	14.87
Commercial Crops	Sugarcane	35.00	0.00	35.00
Total		**7999.13**	**1837.87**	**9837.00**

5.2 PLANTING MATERIALS

Seedlings, saplings and other quality planting materials like grafts, gooties, bulbs etc. were produced to supply among the farmers of the the district. During 2019, 22.84 lakh no. of planting materials were produced by the KVKs generating revenue of Rs. 93.90 lakh and beneficiaries covered under this programme were127978 in Zone-IV. Vegetable seedlings produced were 17.28 lakh, along with plantation planting material30 thousand.

Table 81: State wise production of Horticultural planting materials by KVKs during 2019

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
Vegetable seedlings	1289730	558264.00	11234	438939	463124.75	87309	1728669	1021388.75	98543
Spices	44420	25420.00	221	165895	49335.25	25059	210315	74755.25	25280
Fruits	152576	7253375.00	13699	43689	299095.00	3399	196265	7552470.00	17098
Medicinal & Aromatic	5035	6050.00	12	80500	152500.00	11000	85535	158550.00	11012
Plantation	29588	549480.00	1193	200	1000.00	14	29788	550480.00	1207
Flower	13880	5735.00	45	5675	2675.00	34	19555	8410.00	79
Fodder				14450	24400.00	1163	14450	24400.00	1163
Total	**1535229**	**8398324.00**	**26404**	**749348**	**992130.00**	**127978**	**2284577**	**9390454.00**	**154382**

Table 82: Production of planting materials in fruitscrops by KVKs during 2019

Commercial	Planting Materials	Bihar			Jharkhand		
		No. of Plants	Value (Rs.)	No. of Farmers	No. of Plants	Value (Rs.)	No. of Farmers
Fruits	Mango	85812	5831485.00	4737	19211	51190.00	92
	Papaya	26669	301730.00	1166	13900	40000.00	114
	Guava	11842	411590.00	1832	7501	133135.00	2092
	Litchi	7653	337460.00	493	150	12000.00	36
	Guava	5000	100000.00	1500			
	Lime	2483	64955.00	924	1725	56500.00	1063
	Banana	1500	5000.00	200			
	Lemon	1000	22500.00	700			
	Custard Apple	22	220.00	3	52	520.00	0
	Pomegranate	889	31115.00	117			
	Dragon fruit cutting	1155	69300.00				
	Anola	500	12000.00	200			
	Jack fruit	400	2600.00	127			

Plant distribution by KVKs

Table 83: Production of planting materials in vegetable crops by KVKs during 2019

Commercial	Planting Materials	Bihar			Jharkhand		
		No. of Plants	Value (Rs.)	No. of Farmers	No. of Plants	Value (Rs.)	No. of Farmers
Vegetable crops	Cabbage	321391	41961.00	1033	59200	42500.00	439
	Cauliflower	176532	67118.00	1567	75437	38309.25	12414
	Tomato	159588	91876.00	1732	117192	58693.00	20604
	Brinjal	110695	57419.00	1290	142790	63322.50	50658
	Drumstick	15550	181500.00	5520	15000	225000.00	3000
	Broccoli	10615	6365.00	101			
	Capsicum	862	1972.00	3			
	Seedless cucumber	300	1200.00				
	Bottle gourd	35	70.00		5000		10
	Broccoli				10000	10000.00	100
	Cucurbits				600	6000.00	
	Sponge gourd				3000		10
	Ridge Gourd				5000		10
	Elephant yams				700	18800.00	24
	Others	2450	1225.00	97			

5.3 BIO-PRODUCTS

There is huge demand for bio-products and to motivate farmers to use and produce these products,the KVKs of Zone-IV also facilitated supply of bio fertilizers, bio-pesticides and bio-agent, vermicompost, azolla, earthworm to Most demanded commodity is Vermicompost and huge quantity of 53174kg vermicompost was produced by the KVKs along with the production ofEarthworm- 42 kg, bio-fertilizers- 2560 kg, bio-agent- 4626.4kg.

Table 84: State wise bio-product productions by KVKs during 2019

Name of Bio-Product	Bihar			Jharkhand		
	Quantity (kg/l)	Value (Rs.)	No. of Farmers	Quantity (kg/l)	Value (Rs.)	No. of Farmers
Vermi-compost	143542	881793.00	306	53174	498220.00	176
Bio-agents				4626.4	48364.00	46
Bio-fertilizers	2560	15000.00	52			
Earthworm	42	12600.00		0	194325.00	174
Total	**146144**	**909393.00**	**358**	**57800.4**	**740909.00**	**396**


5.4 LIVESTOCK PRODUCTION

Livestock production is an inherent property of small and marginal farmers of this zone to support their income. In order to provide quality materials to the farmers like livestock strain, poultry birds, ducks, piglets, fingerlings spawn etc. KVKs made available 374dairy animals, 246Small ruminants, 19198Poultry birds,70 Piggery and 1321679 fisheries fingerlings to different farmers under this zone.

Table 85: State wise livestock production during 2019

Particulars of Livestock	Bihar		Jharkhand	
	Numbers	Value (Rs.)	Numbers	Value (Rs.)
Dairy animals	372	2,74,000.00	2	4,000.00
Fisheries	1321626	1,14,880.00	53	43,860.00
Piggery	0	0	70	2,19,000.00
Poultry	1370	1,67,678.00	17828	94,150.00
Small ruminants	140	1,39,080.00	106	4,81,800.00
Total	**1323508**	**6,95,638.00**	**18059**	**8,42,810.00**


6.SOIL AND WATER SAMPLE ANALYSIS AND "*WORLD SOIL DAY*" CELEBRATION

Soil testing and soil based fertilizer application is very important with farming intensification and KVK scientists of Zone IV through different awareness and training programmes have tried to motivate farmers to test soil before crop cultivation so that soil test based fertilizer application may be promoted to reduce

indiscriminate use of fertilizers, and to manage environmental and other health hazards. The KVKs have also tested a large number of water samples supplied by the farmers for its quality analysis at KVK laboratories. In year 2019, 29238 soil samples were analyzed from 1409 villages benefitting51069 farmers of this Zone. A minimum amount was charged from farmers for testing soil samples. The KVKs of this Zone celebrated "*World Soil Day"* on 5th December, 2019. On this occasion, various programmes like seminar, lectures, hands on training on soil sampling methodology, awareness programme were conducted. The distribution of soil health cards to the farmers by local MPs/ MLAs/ other Public representatives was one of the major highlightsoil day celebration by the KVKs and total 8130farmers participated in this program where 6051 nos. soil health card were distributed to the farmers.

Table 86: State wise soil and water Testing by KVKs of Zone-IV during 2019

State	Name of Sample	Number of			Amount realized (Rs.)
		Sample Analyzed	Farmers	Villages	
Bihar	Soil & Water	18224	24205	815	1129985.00
Jharkhand	Soil & Water	11014	26864	594	586440.00
Total		**29238**	**51069**	**1409**	**1716425.00**

Table 87: State wise World Soil Day celebration at KVKs on 5th December 2019

State	Total Participants	No. of Soil Health Card Distributed to farmers	No. of VIPs attended
Bihar	4640	3221	72
Jharkhand	3490	2830	45
Grand Total	**8130**	**6051**	**117**

7.SCIENTIFIC ADVISORY COMMITTEE (SAC) MEETING

To review the day to day work and discuss about local problems to finalize the Action Plan for the next year with the suggestions from line department members, progressive farmers, NGOs and other agencies the Scientific Advisory Committee (SAC) Meeting is being organized by the KVKs every 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 2019, out of total 68 KVKs of ICAR-ATARI, Patna conducted total of 42 SAC meetings covering 25 KVK of Bihar and 17 KVKs of Jharkhand state. Thesemeetings was attended by 1721participants with presence of all nominated members.

Table 88: SAC Meeting during 2019

State	No. of SAC Meeting	No. of Participants
Bihar	25	**1097**
Jharkhand	17	**624**
Total	**42**	**1721**

SAC Meeting organised by KVKs

8.PUBLICATION BY KVKs

To highlight the research and transfer of technology through print media in local language the KVKs scientists were encouraged to actively involve themselves in 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 1774 publications comprising of 124 research papers, 132 symposia papers, 277 newsletter, 200 popular articles, 66 book chapters, 414 extension pamphlets/ literature, 168 technical bulletins and 86 electronic publications were published by the KVK personnel of this Zone. The total number of circulation was 195687during the year 2019.

Table 89: List of publications by KVKs and ATARI Patna during 2019

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	Research Paper	87	-	63	37	-	36	124	-	99
2	Seminar/Conference/Symposia Papers	90	-	8	42	-	5	132	-	13
3	Books	15	2178	-	14	563	-	29	2741	-
4	Bulletins	120	12099	-	48	1380	-	168	13479	-
5	News Letter	182	18200	-	95	9500	-	277	27700	-
6	Popular Articles	169	38867	-	31	2005	5	200	40872	5
7	Book Chapter	57	4093	-	9	0	-	66	4093	-
8	Extension Pamphlets/Literature	270	81767	-	144	14350	-	414	96117	-
9	Technical Reports	205	8298	-	73	862	-	278	9160	-
10	Electronic Publication (CD/DVD etc)	53	1160	-	33	365	-	86	1525	-
		1248	**166662**		**526**	**29025**		**1774**	**195687**	

9. TECHNOLOGICAL BACKSTOPPING BY DIRECTORATES OF EXTENSION EDUCATION

The process of technology transfers 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 68 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 has21 KVKs; Dr. Rajendra Prasad Central Agricultural University (DRPCAU), Pusa, Samastipur with 16 KVKs 16 KVK under Birsa Agricultural University (BAU), Ranchi with 16 KVKs; and there is one KVK under Bihar Animal Sciences university (BASU), Patna 2019. All the KVKs of this Zone have 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 2019, all 4 Directorates of this Zone supplied updated technologies and technological products to 68 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.

Considering the demand of KVK personnel, to improve their skill for efficient transfer of technologies and to make the newly recruited staff of KVK to aware of mandate and functioning of KVKs, all the Extension Directorate of this Zone conducted HRD programme throughout the year 2019-20. 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 on142 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 empower KVKs with knowledge and skill. The DEEs of Bihar and Jharkhand state visited their KVKs for proper application of proposed work plan under different projects.The DEE officials of BAU, Bhagalpur visited their OFT fields for 12 times and FLD fields also for 24 times to monitor the performance of *Sabour Ardhajal* rice variety; *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. DEE of DRPCAU, Pusa official visited 17 times for OFT fields and 18 times for FLD fieldsDEE official of BASU, Patna visited 5 times for OFT fields and 6 times for FLD fieldsto follow up the performance of various cereal, pulses and oilseed crops, establishment of new orchards, farm mechanization, establishment of apiary technology they also 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 other technologies. A total 119 field visits for OFT, FLDs, field days, SAC meeting, kisan gosthi,general monitoring etc. by officials of BAU, Sabour; total 69 field visits under different component of KVK activities made by DRRPCAU, Pusa and total 20 field visits were covered by BASU, Patna under different KVKs activities. A total 74 visits by government officials/DEE under supervision of BAU, Sabour; 50 visits under supervision of DRRPCAU, Pusa; 18 visits under supervision of BASU, Patna were completed for meetings, field days, workshop, seminars, training programme etc. A total 10 number of workshop/meetings successfully organised by BAU, Sabour; 11 by DRPCAU, Pusa and 6 by BASU, Patna in during 2019.

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 DRPCAU, Pusa and 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 2019,2754 farmers visited ATIC for information and other services.

As per technology information was concerned, 2182

farmers used kisan call centre to get the information on improved hybrids varieties, pest management, disease management, agro-techniques, soil and water conservation, post-harvest technology and value addition, and animal husbandry including fisheries. The majority of the farmers were interested in receiving information on disease management of various crops (1912), followed by information on pest management (546), , animal husbandry and fishery (146), soil health card (651), soil and water testing (29238) and post-harvest technology and value addition (239). During the period, a total of 1525 farmers, were benefitted from video showing in the ATICs of this Zone. 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 and about 9837q of seed, 22.84 lakh no of planting materials, 19198 numbers of poultry birds and livestock as well as 1967quintals of vermicomposting, and13 lakh fish fingerlings were provided to farmers by ATIC, RPCAU, Pusa.

11. HUMAN RESOURCE DEVELOPMENT PROGRAMME:

Table 90: Meetings, Workshop, Conferences Training etc. organized by ICAR-ATARI, Patna in 2019

S. No.	Workshop/Meeting	Date	Venue	No. of Participants
1.	Action Plan Finalization Workshop	16 -17 Apr. 2019	CPRS ,Patna	81
2.	Brainstorming cum Workshop on Implementation of KSHMATA Activities.	27 Apr. 2019	BAU, Ranchi	21
3.	Brainstorming cum Workshop on Implementation of KSHMATA Activities.	03 May 2019	DRCAU, Pusa, Samastipur	15
4.	Brainstorming cum Workshop on Implementation of KSHMATA Activities	03 May 2019	BAU, Sabour	45
5.	NICRA Review Workshop	16-17 May 2019	KVK, Supaul	22
6.	Review meeting on TSP Activities	18 May 2019	KVK, Ranchi	15
7.	Review Workshop of ARYA Project	21 May 2019	KVK, Aurangabad	17
8.	Review meeting of FFP	31 May 2019	BAU, Sabour	55
9.	Annual Zonal Workshop for the KVKs under ICAR- ATARI Patna	08-10 June 2019	UBKV, Coochbehar	69
10.	Uploading and management of Website and use of ICT Tools	26 June 2019	DRCAU, Pusa, Samastipur	35
11.	Uploading and management of Website and use of ICT Tools	27 June 2019	BAU, Sabour	26
12.	Uploading and management of Website and use of ICT Tools	28 June 2019	BAU, Ranchi	44
13.	3rd IMC meeting	16 Aug. 2019	ATARI, Patna	07
14.	Review meeting of KVKs	19 Aug. 2019	ATARI, Patna	40
15.	PKVY Project Action Plan	17-18 Sept. 2019	ICAR-RCER,Patna	58
16.	Training on PFMS	25-26 Sept. 2019	BAU, Ranchi	44
17.	150th Gandhi Jayanti Programme	02 Oct. 2019	ATARI, Patna	79
18.	Workshop cum training on GKMS (DAMU)	16 Oct. 2019	BAMETI, Patna	28

S. No.	Workshop/Meeting	Date	Venue	No. of Participants
19.	Training and certification and Marketing of Organic product	06-08 Nov. 2019	ATARI, Patna	39
20.	QRT Meeting	08 Nov. 2019	ATARI, Patna	42
21.	QRT Meeting	23 -26 Nov. 2019	BAU, Sabour,	67
22.	Skill Development TOT	28-30 Nov. 2019	BASU, Patna	64
23.	QRT Meeting	09 Dec. 2019	BASU, Patna	41
24.	QRT Meeting	11-12 Dec. 2019	DRCAU, Pusa, Samastipur	58
Total				**1012**

12. OUTSOURING OF FUND BY KVKS

The KVK scientists of this Zone are actively involved in receiving funds from a large number of external sources through sanctioning projects in their favour. The projects include organizing additional training programmes, research projects, building infrastructural facilities etc. which help in supporting and strengthening of KVKs. The KVKs of ICAR-ATARI, Patna managed to get funds from State Department of Agriculture, Central Government, RKVY, NABARD, ATMA, NGOs, Zila Parishad and many other sources. and of Rs. 588.40Lakhs as revenue was generated by the KVKs of ICAR-ATARI, Patna during 2019.

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 249118 advisories and more than 662crore 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 for tribal development is a concept intended to address the issues of backwardness in tribal areas and tribal population in an integrated way with the aim to minimize the gap between the livelihood of tribal people and others. Total 14 KVKs of ICAR-ATARI, Patna were selected for this scheme during the year 2018-19.and in the FY 2019-20 KVK Saraikela is added under TSP project. Now, a total 15 KVKs are under TSP project in the FY 2019-20 and Rs. 2,94,14922 (Two Crore Ninety-Four Lakh Fourteen Thousand Nine Hundred Twenty-Two Rupees) was earmarked for this project in 15 selected KVKs of this Zone. To improve the livelihood and skill up-gradation of tribal people, KVKs under ICAR-ATARI, Patna conducted various agricultural and allied sectorial activities including agricultural farming, horticulture, animal husbandry, fish production, vocational training etc. throughout the year providing direct benefit to the individual or families belonging to schedule tribes. During the period, KVKs of this Zone created 12919 number of assets in the form of sprayer, weeder, agro-shed net, ridge maker, maize sheller, sickle, Khurpi, seed bin/ drum, drip irritation kits, chaff cutter, poultry feeder and drinker, pheromone trap, water tank etc. for the tribal people in the concerned district. In addition, KVKs working under TSP of this Zone produced 7248.19 quintal of various seeds, 732118 number of different planting materials distributed in the tribal areas. About 14421 farmers tested their soil/ water/ plant/ manure samples from their district KVKs and more than 1160077 number of farmers were benefitted by getting farm related SMS and advisories & total number of beneficiaries under this project was 432242 nos.

State	Total Assets such as spray, seed bin, water tank etc.	Total various seed(in quintal)	Planting material	Number of farmers for soil /water/plant sample tested	Farmers benefitted with SMS	Total number of beneficiaries
Bihar	1773	125	16225	2507	8450	9996
Jharkhand	11146	7123.19	715893	11914	1151627	422246
Total	**12919**	**7248.19**	**732118**	**14421**	**1160077**	**432242**

Activities organised by KVKs under TSP

15. NATIONAL INNOVATIONS IN CLIMATE RESILIENT AGRICULTURE - TECHNOLOGY DEMONSTRATION COMPONENT (NICRA-TDC)

A National Network Project on National Innovations in Climate Resilient Agriculture (NICRA) launched during 2011 to address the climate resilience of Indian agriculture 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 in order 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 *seven* core research institutes of ICAR. The emphasis has been given to capture and improve 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 of hours.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. During the Kharif 2019 distinct variation in rainfall was observed in the project locations in NICRA district. Some of the NICRA district received higher rainfall than their normal viz. Buxar (17.81mm), Supaul (12.64mm) and Gumla (6.00mm) whereas, some district had deficit in rainfall namely Nawada (48.90mm),Jehanabad (37.12mm), Godda (23.46), Saran (16.00mm) and Koderma (14.84mm) than normal precipitation (Table 91).

Table 91: Seasonal rainfall pattern of district under NICRA project

State	Name of the District	Actual (mm)	Normal (mm)	Excess/ deficit (mm)
Jharkhand	Chatra	1174	1180	6.00
	Gumla	1132.6	1100	2.87
	Koderma	980.3	1125.8	-14.84
	E. Singhbhum	1497.2	1369.3	9.34
	Godda	837.9	1094.8	-23.46
	Palamu	1181.7	1163.4	1.57
Bihar	Aurangabad	1012.23	1017	-0.51
	Jehanabad	569.3	904.9	-37.12
	Nawada	509.5	996.5	-48.90
	Saran	958	1140	-16.00
	Supaul	1514	1344	12.64
	Banka	1050.8	1156.3	-9.12
	Buxar	838.3	1020	17.81

15.1 NATURAL RESOURCE MANAGEMENT(MODULE 1)

Major activities under Natural resources management (NRM) are *in situ* moisture conservation, rain water harvesting and recycling for supplemental irrigation, conservation tillage where appropriate, utilization of residual moisture for crop sowing, etc. During 2019, covered 871.41haarea involving 2329farmers in different activities, water conservation of about 526760 m^3 from 79 rain water harvesting structures and production of 100q of Vermi-compost from 02 units under demonstration (Table 92).Major outcomes were recharge of ground water table, water saving irrigation technique and demonstration on rainwater harvesting structures resulted into visible impact of enhanced cropping intensity of the villages through cultivation of high value crops like vegetables, spices and flowers etc.

Table 92 : Coverage of farmers and areas under Module 1 (Natural Resource Management)

S. No	Name of submodules	No of farmers	Coverage		
			Area (ha)	Nos.	Capacity
1	In-Situ moisture conservation	913	576.16		
2	Rain water harvesting and recycle for supplemental irrigation	974	-	79 unit	526760 m^3
3	Conservation tillage where appropriate like zero tillage/ minimum tillage etc.	287	199.75		
4	Utilization of residual moisture	110	95.50		
5	Vermi compost production	45	-	02 unit	100q
	Total	**2329**	**871.41**		

15.2 CROP PRODUCTION (MODULE 2)

Under crop production module 3697 demonstrations covering 1120.54 ha areas were taken up under different interventions. Major emphasis was given on introduction of less water requiring crops (Ragi, Niger, Sweet potato) specially in upland of Jharkhand involving 1620 farmers covering 466.74ha followed by introducing short duration/drought tolerant varieties to overcome weather vagaries for 516 farmers with 185.97 ha coverage. Under sub module crop diversification to combat with drought situation was another important activities covering 89.23ha with 315 beneficiaries. Location specific intercropping system with high sustainable yield index viz. (maize + okra; elephant foot yam+ bitter gourd; chickpea+ linseed; maize + pigeon pea) was taken as another important activities involving 211 farmers and covering 110.83ha area. Other activities of crop production module were water saving through SRI, DSR and Advancement in sowing date of Rabi crops had shown great impact.

Table 93: Details of beneficiaries and area coverage under Module 2 (Crop production)

S. No.	Name of submodules	No of farmers	Area (ha)
1	Introducing of short duration varieties of rice, maize, horse gram, chick pea	516	185.97
2	Introducing of drought crop with varieties of paddy (Sahbhagidhan, Anjali, Abhishek, IR-64, SabourArdhjal)	1620	466.74
3	Introducing flood tolerant varieties of Paddy (Rajendramansuri, Swarna Sub-1)	39	11.10
4	Advancement of planting dates of rabbi crops in area with terminal heat stress	302	88.65
5	Crop diversification (Tomato, Chili, French bean, Elephant foot yam, Turmeric, groundnut, lac (Ranginee), Pigeon pea	315	89.23

S. No.	Name of submodules	No of farmers	Area (ha)
6	Location specific intercropping system with high sustainable yield index (maize+ Okra; Elephant foot yam+ bitter gourd; Chickpea+ Linseed; Maize + Pigeon pea	211	110.83
7	Community nurseries for delayed monsoon	180	33.77
8	Water saving paddy cultivation method (SRI, aerobic, direct seeding)	266	134.25
9	Custom hiring centre for timely planting	248	91.00
	Total	**3697**	**1120.54**

15.3 LIVESTOCK AND FISHERIES (MODULE 3)

Livestock and fisheries plays significant role in stabilising the productivity of farming system component. Introduction and demonstration of improved breed of poultry was very successful activities and altogether 2640 nos. of poultry breed of Jharsim (500), Vanraja (1000) Khakhi (500) and local (640) were provided to 173 beneficiaries for making the module sustainable. Introduction and demonstration of improved breed of pig and goat were another very successful activities in Bihar and Jharkhand covering 24 units of Goatery and 2 unit of pig with 2 females and one male totaling 84nos. were provided to the beneficiaries in NICRA villages during 2019. Other major activities involved are preventive vaccination among 7470 cattle, use of community land for foddere production covered about 50.55ha area and management of 42 fish ponds/ tanks were important one (Table 94).

Table 94: Details of beneficiaries and area coverage under Module 3 (Livestock & Fisheries)

S. No	Name of submodules	No of farmers	Coverage	
			Nos.	Ha
1	Use of community lands for fodder production during drought	248		50.55
	Azolla	25	-	0.0025
2	Preventive vaccination	5332	7470	

S. No	Name of submodules	No of farmers	Coverage	
			Nos.	Ha
3	Introduction of improved breed of Poultry			
	Jharsim	36	500	
	Vanraja	100	1000	
	Khakhicampbell	35	500	
	Local breed	2	640	
	Sub total	**173**	**2640**	
4	Management of fish pond/tanks during water scarcity and excess water	42	0	4.45
5	Introduction of improved breed of pig/Goat			
	Jharsuk	4	12	
	Black Bengal	24	72	
Total		**5848**	10146	55.0025

15.4 INSTITUTIONAL INTERVENTION (MODULE 4)

To strengthen the existing institutional interventions new initiatives related to seed bank, fodder bank, commodity groups, custom hiring centre and climate literacy through a village weather station and awareness was developed in the zone involving 2712 farmers covering 878.00 ha area with production of 12424.09 q as seed banks of different crops and fodder.

Table 95: Details of beneficiaries and area coverage under Module 4(Institutional Intervention)

S. No.	Name of submodules	No of farmers	Quantity (q)	Area (ha)
1	Climate literacy through village level weather station	866	Twice in a week	
2	Seeds banks	473	10767.59	
3	Fodder	171	1656.50	
4	Custom hiring centre	1035	-	801.50
5	Commodity group	167	-	76.50
	Total	**2712**	**12424.09**	**878.00**


15.5 VILLAGE CLIMATE RISK MANAGEMENT COMMITTEE (VCRMC)

In every NICRA village a committee was constituted with in-depth discussion with farmers namely Village Climate Risk Management Committee (VCRMC) to mitigate the climatic vulnerabilities of the villages and the strategies to be adopted under NICRA. 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. Performance of the VCRMC of different NICRA district is given as below (Table no. 96).

Table 96: Revenue generation in Village Climate Risk Management Committee (VCRMC)

S.no.	Name of KVKS	Amount (Rs.)
1	Aurangabad	233475
2	Banka	51901
3	Buxar	61500
4	Jehanabad	200000
5	Nawada	242625
6	Saran	5000
7	Supaul	177712
8	Chatra	15210
9	East Singhbhum	94900
10	Gumla	109090
11	Godda	80000
12	Koderma	95289
13	Palamu	38000
	Grand total	**1404702**


15.6 CAPACITY BUILDING (MODULE 5)

Knowledge upgradation through capacity building is an important module of NICRA programme and during 2019 a total of 191 no. of courses under 13 thematic area were conducted in which 4115 farmers were benefited among them 2740 were men and 1365 were women farmers. Among thematic areas maximum emphasis was given on natural

resources management and integrated crop management production covering 38 courses in each involving 609 and 959 farmers respectively. The next important thematic areas were crop production (32) and livestock's (26) programmes with involvement of 657 and 510 farmers.

Table97: Details of beneficiaries and area coverage under Module 5(capacity building)

S. No.	Thematic area	No of course	No of beneficiaries		
			Male	Female	Total
1	Natural resource management	38	467	133	609
2	Integrated Nutrient management	12	160	94	254
3	Crop diversification	5	69	64	133
4	Nutritional security	5	24	46	70
5	Resource conservation technology	6	125	63	188
6	Farm mechanization	10	216	92	308
7	Integrated pest management	12	168	122	290
8	Integrated crop management	38	623	336	959
9	Water conservation	2	19	32	51
10	Water resource Development	0	0	0	0
11	Crop production	32	519	138	657
12	Livestock	26	316	194	510
13	Pest and disease management	5	34	52	86
	Total	**191**	**2740**	**1365**	**4115**

15.7 EXTENSIONS ACTIVITIES (SUB MODULE)

Under extension activities total 721 programmes were covered involving 11486 farmers among them 7361 men and 4125 women farmers received training on in different thematic areas of NICRA-TDC. The major extension activities were agro advisory services, field day, field visit and group meeting, awareness programme and exposure visit of farmers.

Table98: Details of beneficiaries and area coverage under Sub module 5(extension activities)

S.No	Thematic area	No of programme	No of beneficiaries		
			Male	Female	Total
1.	Field day organized	47	940	587	1527
2.	Organized Kisanmela	3	882	462	1344
3.	Field visit	41	260	47	307
4.	Kisangosthi	23	534	346	880
5.	Exposure visit of farmers	15	379	586	665
6.	Strengthen- SGH	16	154	190	344
7.	Strengthen-kisan club	8	148	67	215
8.	Integrated farming system	9	46	41	87
9.	Method demonstrations	26	346	114	460
10.	Awareness	25	1242	617	1859
11.	Group meeting	38	612	589	1201
12.	Agro advisory services	420	418	59	477
13.	Diagnostic Visit	4	14	16	30
14.	Other	26	1386	704	2090
	Total	**721**	**7361**	**4125**	**11486**

16. MERA GAON MERA GAURAV PROGRAMME (MGMG)

An innovative initiative "MeraGaonMera Gaurav" has been planned to promote the direct interface of scientists with the farmers to bridge the gap between lab and land. The objective of this scheme is to provide farmers with required information, knowledge and advisories on regular basis by adopting villages. In Zone IV, 6 ICAR Institutes and 1 SAU were implementing MGMG programme, so far, 55 villages have been covered for the benefit of 14525 farmers andtotal 929 field activities were conducted 1193 no of messages are sent. The major activities performed include visit to village by scientific teams, Interface meeting/ *Goshthies*with farmers, providing *t*raining, conducting demonstrations, mobile based advisories, literature support as per the agro-ecological conditions of the village, awareness and educating farmers through newspapers, community radio etc.

Table 99: Detail of work under MGMG

State	Institutes/ universities involved	Total No. of Groups formed	No. of Scientist Involved	No. of village covered	No. of field activities conducted	No. of messages/ advisory sent	Farmers involved (No.)
Bihar	4	23	134	26	720	887	8750
Jharkhand	3	18	70	29	209	306	5775
Total	**7**	**41**	**204**	**55**	**929**	**1193**	**14525**

Guidance on packaging of vegetables

Interaction on management of insect pests in okra

Farmers scientist interaction at Sangaithel (Latehar)

Demonstration of conservation agriculture at Chene, Jharkhand

17. Implementation of CSISA-ICAR Collaborative Project Phase-III

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

research at the 'research platforms' that were jointly established and managed by ICAR and CSISA scientists. Collaborations were also initiated with the Extension Division through a jointly sponsored and continuing dialogue on modernizing extension services that was launched at an event hosted by IFPRI and the University of Illinois in June, 2015.The goal of CSISA in Phase III (2017-2020) was 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 42 in which 40 KVKs of Bihar and Jharkhand and 2 institutes BAU, Sabour and DRPCAU, Pusa under ICAR- ATARI, Zone IV, Patna are implementing the collaborative project. A sum of Rs. 17, 43,004 was allocated for this project during FY 2019-20.

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 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 farmer's 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 selectedICAR 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.

17.1 ACHIEVEMENTS OBTAINED:

1. Strengthen technology and knowledge scaling pathways

· Creation or support for service providers for mechanization

· Leveraging NGOs, SHGs to reach the unreached

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

2. Mainstream new research and outreach approaches with NARES partners

- Developing partnership between public and private sectors
- ToTs for On farm technologies assessment
- GIS based tools for technologies targeting + assessment
- 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

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

4. Pursue policy solutions for supporting SI adoption at scale

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

Work undertaken under CSISA –ICAR Project by different KVKs

18. SKILL DEVELOPMENT TRAINING PROGRAMME (ASCI)

Indian Council of Agricultural Research (ICAR) in collaboration with Agriculture Skill Council of India (ASCI) has taken an initiative of entrepreneurship development through imparting skill development programme through 47 KVKs, 1 SAU and 2 ICAR Institutes. Each training centres has to provide 2 Skill development training on 2 Job roles for 200 hr. each. A total of 19 Job Roles were identified during the year for training 980 youths for 200 hours.

Table 101: Skill Development training undertaken by KVKs during 2019.

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	205	20
			2. Assistant Gardener	200	20
	2	ARARIA	1. Mushroom grower	200	20
			2. Assistant Gardener	200	20
	3	ARWAL	1.Vermicompost Producer	200	20
			2.Mushroom Grower	200	20
	4	AURANGABAD	1. Mushroom grower	200	20
			2. Assistant Gardener	200	20
	5	BANKA	1. Mushroom Grower	200	20
			2. Dairy Farmer Entrepreneur	200	20
	6	BEGUSARAI	1. Tractor Operator	200	20
			2. Agriculture Extension Service Provider	200	20
	7	BHAGALPUR	1. Assistant Gardener	200	20
			2. Small Poultry Farmer	240	20
	8	BHOJPUR	1. Mushroom Grower	200	20
			2. Beekeeper	200	20
	9	BUXAR	1. Organic Grower	200	20
			2. Beekeeper	200	20
	10	DARBHANGA	1. Assistant Gardener	200	20
			2. Mushroom Grower	200	20
	11	EAST CHAMPARAN	1. Organic Grower	200	20
			2. Mushroom Grower	200	20
	12	JEHANABAD	1. Mushroom Grower	200	20
			2. Animal Health Worker	300	20
	13	KAIMUR	1. Medicinal Plants Cultivator	200	20
			2. Mushroom Grower	200	20
	14	KHAGARIA	1. Mushroom Grower	200	20
			2. Quality Seed Grower	200	20
	15	MADHEPURA	1. Mushroom Grower	200	20
			2. Beekeeper	200	20
	16	MADHUBANI	1. Assistant Gardener	200	20
			2. Agriculture Machinery Repair And Maintenance Service Provider	200	20
	17	MUNGER	1. Mushroom Grower	200	20
			2.Vermicompost Producer	200	20
	18	MUZAFFARPUR	1.Organic Grower	200	20
			2.Micro Irrigation Technician	200	20
	19	NALANDA	1.Organic Grower	200	20
	20	JAMUI	1.Beekeeper	200	20
			2.Quality Seed Grower	200	20
	21	PATNA	1.Mushroom Grower	200	20
			2.Vermicompost Producer	200	20
	22	PURNEA	1.Quality Seed Grower	200	20
			2.Mushroom Grower	200	20

State	Sl. No	Name of KVK	Name of Job Roles/QPs Trainings	Duration of training (hrs.)	No. of Participants
	23	NAWADA	1.Mushroom Grower	200	20
			2.Layer Farm Worker	200	20
	24	ROHTAS	1.Medicinal Plants Cultivator	200	20
	25	SAHARSA	1.Tractor Operator	200	20
			2.Quality Seed Grower	200	20
	26	SAMASTIPUR	1.Agriculture Machinery Repair and Maintenance Service Provider	200	20
			2.Dairy Farmer Entrepreneur	200	20
	27	SARAN	1.Organic Grower	200	20
			2.Mushroom Grower	200	20
	28	SITAMARHI	1.Mushroom Grower	200	20
			2.Animal Health Worker	300	20
			3.Assistant Gardener	200	20
	29	SIWAN	1.Quality Seed Grower	200	20
			2.Assistant Gardener	200	20
	30	SUPAUL	1.Quality Seed Grower	200	20
			2.Assistant Gardener	200	20
	31	SHEIKHPURA	1.Organic Grower	200	20
			2.Mushroom Grower	200	20
	32	WEST CHAMPARAN	1.Mushroom Grower	200	20
			2.Beekeeper	200	20
	33	MUZAFFARPUR Add	1.Assistant Gardener	200	20
			2.Ornamental Fish Technician	200	20
	34	NRCL, MUZAFFARPUR	1.Beekeeper	200	20
			2.Vermicompost Producer	200	20
	35	ICAR-RCER, Patna	1.Boiler Farm Worker	200	20
			2.Aquaculture Worker	200	20
JHARKHAND	36	BOKARO	1.Agriculture Machinery Repair and Maintenance Service Provider	200	20
			2. Quality Seed Grower	200	20
	37	CHATRA	1.Mushroom Grower	200	20
			2. Quality Seed Grower	200	20
	38	DEOGHAR	1.Beekeeper	200	20
			2.Vermicompost Producer	200	20
	39	EAST SINGHBHUM	1.Vermicompost Producer	200	20
			2.Assistant Gardener	200	20
	40	GARAWAH	1. Small Poultry Farmer	240	20
			2. Vermicompost Producer	200	20
	41	GIRIDIH	1. Mushroom Grower	200	20
			2. Quality Seed Grower	200	20
	42	GODDA	1.Animal Health Worker	300	20
			2. Assistant Gardener	200	20
	43	GUMLA	1.Animal Health Worker	300	20
			2. Micro Irrigation Technician	200	20
	44	HAZARIBAG	1. Medicinal Plants Cultivator	200	20
			2. Vermicompost Producer	200	20
	45	PAKUR	1 Vermicompost Producer	200	20
			2. Quality Seed Grower	200	20

State	Sl. No	Name of KVK	Name of Job Roles/QPs Trainings	Duration of training (hrs.)	No. of Participants
	46	PALAMAU	1. Assistant Gardener	200	20
			2. Mushroom Grower	200	20
	47	RAMGARH	1. Group Farming Practitioner	200	20
			2 Mushroom Grower	200	20
	48	RANCHI	1. Assistant Gardener	200	20
			2. Beekeeper	200	20
	49	SAHIBGANJ	1. Vermi Compost Producer	200	20
			2. Quality Seed Grower	200	20
	50	WEST SINGHBHUM	1. Mushroom Grower	200	20
			2. Assistant Gardener	200	20

MUSHROOM GROWER

The objective of this programme was to train the participants for the job of producing and marketing mushroom for income generation. The skills imparted during this training were knowledge on health benefits of mushroom, preparation of mushroom growing bag, care and management of growing mushroom, different types of cultivating different varieties of mushroom and packaging technique and value addition. The training was conducted by 24 KVKs involving 480 rural men and women for self-employment.

Mushroom Training at KVK Patna, Bihar

Mushroom Training at KVK Gumla, Jharkhand

ORGANIC GROWER

This programme was aimed at developing/ imparting skill in various techniques associated with organic crop production like soil testing techniques, technique for organic input preparations, organic fruit and vegetable cultivation methods, organic cereals and pulse production techniques, marketing strategy for organic products etc. 5 KVKs conducted imparted this training involving 100 participants.


Making of Organic Solution by trainees at KVK Buxar, Bihar

QUALITY SEED GROWER

The purpose of skill training on quality seed grower was to produce quality seed at village level for easy access to healthy, pure seeds with high seed vigor and good germination percentage to the farmers. Timely availability of good quality seeds at reasonable price could ensure good yield and profit to the farmers. The training dealt with every aspects of seed production of major crops of the district such as paddy, lentil, mustard etc. The farmers were taught various aspects of quality seed production including nursery management, land preparation, sowing, fertilizer application, weed management, disease and pest management, harvesting, post-harvest handling etc. It also emphasized on applied aspects of seed production such as soil health management, seed and its characteristics, seed germination and purity, seed certification process, storing of seeds etc. The total number of trainees for this job role was 220 in 11 KVKs.


Quality Seed Grower training at KVK

Quality Seed Grower training at KVK, Sahibganj, Jharkhand

BEE KEEPER

This job role was to impart skills in the area of management of bee colony, quality honey production, extraction, processing and packaging, its preservation and marketing for secondary income generation. Skill was also imparted on production of other products like bee wax, pollen, royal jelly etc to total of 160 rural youth/ farmers from 8 KVKs.

Bee Keeper training at KVKRanchi, Jharkhand

Bee Keeper training atKVK Buxar, Bihar

VERMI-COMPOST PRODUCER

The skill training aimed at developing skill in various techniques associated with Vermi-composting,including soil testing techniques, organic input preparations, packaging and marketing, organic fruit and vegetable cultivation methods, organic cereals and pulse production techniques, marketing strategy for organic products etc, 10 KVKs conducted this training involving 200 participants for 200 hrs.

Vermi-compost Producer training at KVK Patna, Bihar

Vermi-compost Producer training at KVK Munger, Bihar

ASSISTANT GARDENER

The main objective of Assistant Gardener training programe was to impart skill training for nursery management for vegetable seedlings and different fruits plants material, propagation technique of different fruit species, mangemnt of nursery, garden designing, landscaping etc, trainees also learnt about creating and designing various component of the garden. 14 KVKs and 1 SAU conducted this training involving 300 participants for 200 hrs.

Assistant Gardener training at KVK Sitamarhi, Bihar

Assistant Gardener training atKVK Ranchi

DAIRY FARMER ENTREPRENEUR

This training aimed at imparting skill in various techniques associated with successful Dairy Farmer Entrepreneur. The main emphasis was upon selection of suitable Dairy breeds, feeding management from locally available feed resources dairy management,its production and marketing for doubling farmer's income. 2 KVKs conducted this training involving 40 participants.

Dairy Farmer Entrepreneur training at KVK Banka, Bihar

Dairy Farmer Entrepreneur training at KVK Samastipur, Bihar

AGRICULTURE MACHINERY REPAIR AND MAINTENANCE SERVICE PROVIDER

The training aimed at imparting skill in various techniques associated with agriculture machinery repair and maintenance service providerlike agricultural machinery status and custom hiring in the locality of selected trainees. machine maintenance operation and various tools management etc. 3 KVKs and 1 Agriculture University conducted this training involving 80 participants.

Agriculture Machinery Repair and Maintenanceat KVK Banka at BAU, Sabour

Agriculture Machinery Repair and Maintenanceat KVK Samastipur, RPCAU, Bihar

SMALL POULTRY FARMER

The poultry birds are one of the most important sources of lean meat with high nutritional value, protein and reliable steady source of income. Training changes the level of knowledge and skills of the farmer and provides knowledge regarding identification of improved backyard poultry birds, layer birds, dual purpose breed and its diseases, feed and production management. It also emphasized in controlling the climatic stresses, feed formulation techniques and poultry waste management.

Small Poultry Farmer training at KVKGarhwa

Small Poultry Farmer training at KVK Garwah,

MICRO IRRIGATION TECHNICIAN

Thistraining aimed at imparting skill in various techniques associated with Micro Irrigation Technician which delivers water and nutrients directly to the plant's roots zone, in the right amounts, at the right time, so each plant gets exactly what it needs, when it needs it, to grow optimally. Through drip irrigation, farmers can produce higher yields while saving on water as well as fertilizers, energy and even crop protection products. Trainees were taught on maintenance of micro-irrigation system and skill associated with it, 2 KVKs conducted this training involving 40 participants.

Skill training for Micro irrigation technician at KVK Saraiya, Muzaffarpur, DRPCAU, Pusa

19. FARMER FIRSTPROGRAMME (FFP)

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, and 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.

Table 102: The name of the Institute, their project title, budget allotted during 2019

Sl. No.	Name of the Institute	Title of project	Fund sanctioned during 2019-20 (Rs. in lakh)
1.	Bihar Agricultural University, Sabour, Bhagalpur, Bihar	"Cross Sectional Livelihood Improvement and Income Enhancement through Agro-Enterprise Diversification"	18.50
2.	Birsa Agricultural University, Ranchi	"Technology integration for doubling farm income through participatory research and extension approaches in Ranchi district of Jharkhand"	18.75
3.	ICAR-NRC, Litchi, Muzaffarpur	"Improved livelihood through good practices in agricultural production system"	20.00
4.	ICAR-RCER, RC, Ranchi	"Enhancing food, nutritional and livelihood security of marginal and small farmers in Jharkhand through need based agricultural technologies"	19.85
Total			**77.10**

Table 103: Achievements of Farmer FIRST Programme (FFP) during 2019

Modules	Demonstrations (No.)	No Farm Families	No of Animals
NRM Module	28	160	-
Crop Module	193	813	-
Horticulture Module	90	582	-
Livestock & Poultry	403	2189	3048
IFS Model	18	51	-
Total	**732**	**3795**	**3048**

Table 104:Extension Activities in 2019

State	No. of programs	Farmers
Bihar	67	3245
Jharkhand	12	870
Total	**79**	**4115**

NRC Litchi, Muzaffarpur

BAU, Sabour

BAU, Ranchi

ICAR-RCER, RC, Ranchi

20. SEED HUB

India is the largest producer, consumer and importer of pulses but in recent years, the area under pulses was decreasing steadily resulting in increased import bill and rising prices of pulses. In order to fulfil growing demand and reduce import, our government focused on increasing pulse production from 23.13 million tonnes during 2016- 17 to 26.5 million tonnesby 2020. It is a Centrally Sponsored Scheme of NFSM (National food security mission) with project entitled (Creation of Seed Hub for increasing indigenous production of pulses in India) Started in June 15, 2016.Hence, Ministry of Agriculture and Farmers Welfare has developed a plan to establish 150 'Seed Hubs' each targeting to produce 100 tonnes of pulses seeds during the next three years and provide to quality seeds to our farmers. 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 (Buxar, Bhojpur, East Champaran, Lakhisarai, Munger, Saran, Vaishali) of Bihar and 3 KVKs (Bokaro, Dumka, East Singhbhum) of Jharkhand under Zone IV have been established. A total 7380quintals pulses seed was expected from the Seed Hubs of Zone IV during the period 2019 but crop failure due to heavy rainfall, construction of forestry college etc. only 3140 quintal pulses seed could be produced during this year in seed hub project.

Table 105: Performance of Seed Hub during 2019

Institute name	KVKs	Different Crops	Varieties	Seed Target (q)	Area sown (ha.)	Production (q)	Category of seed (F/S, C/S, T/L)	Constraints
ICAR-ATARI, ZONE-IV	10	Pigeon Pea	NDA-1,IPA-203, Rajeev lochan,TJT-501, BirsaArhar -1	1440	103	670	F/S, C/S (IPA-203) ;F/S (Rajeev lochan) ;F/S 1(TJT-501); F/S (BirsaArhar -1)	Crop Failure due to Heavy Rainfall+ all crop damaged Due to construction of forestry college
		Lentil	HUL-57,KLS-218,IPL-316,WBL-277	2490	232	327	F/S,C/S(IPL-316);C/S,T/L (HUL-57), F/S(WBL-277)	Crop damaged at flowering due to heavy rainfall
		Green Gram	HUM-16,SML-668	845	81.5	347	F/S (HUM-16),	Crop in standing position
		Chickpea	RVG202,PUSA3043, Subhra,PG-186,BG-372, GNG-1581, JG-12, JG-14	2280	211.67	1575	F/S ,C/S (RVG 202); T/L(PUSA 3043); C/S(PG-186);C/S(BG-372, GNG-1581,JG14); F/S(JG-12)	Poor yield due to late flood and heavy rainfall at flowering stage
		Black Gram	WBU-19(Sulata),WBU-109	175	40	181	C/S	Crop failed due to heavy rainfall
		Horse gram	VLG-19, IK-01	100	13	20	F/S-1	Crop failed due to heavy rainfall
		Pea	GDFP-1, HUDP-15	50	8	20	T/L	
		TOTAL		**7380**	**689.17**	**3140**		

Seed Produced and Revolving Fund Status

KVKs	Total seed produced (in quintal)	Revolving fund status (in Rs.)
1. Munger	667.26	3812656
2. Lakhisarai	675	2006561
3. Saran	240	8796344
4. East Champaran	Crops standing till Dec 2019	9080000
5. Vaishali	0	9499000
6. Dumka	750	10308648
7. Bokaro	530	10944725
8. East Singhbhum	790	5149000
9. Buxar	175.76	8944191
10. Bhojpur	764	4662995

Seed processing plant in KVK Munger

Seed production farm in KVK Buxar

21. ATTRACTING AND RETAINING YOUTH IN AGRICULTURE (ARYA)

To attract the rural youth towards agriculture and allied sector as income generating enterprise ICAR has initiated a programme "Attracting and Retaining Youth in Agriculture" during 2019 through 96 identified KVKs. This programme is aimed at taking up capital intensive activities like processing, value addition and marketing. Accordingly, 6 KVKs (Aurangabad, Bhagalpur, Bhojpur,Vaishali, EastChamparan, West Champaran) of Bihar and 4 KVKs (Chatra, East Singhbhum, Gumla, Ranchi) of Jharkhand implemented this programme under Zone-IV. ARYA project has opened a new avenue of opportunities and income for the rural youths in their native places. Rural Youths have accepted these enterprises (Goatary, Backyard, Nursery Raising, Fish Cultivation, Broiler Production, Bee keeping, Mushroom production, Poultry pig farming, Quail Farming, Banana Fiber, Duck farming, Backyard Poultry farming, Seed Production and lac cultivation, etc.) as a major source of income for their livelihood which is also helping in reducing the migration problem prevalent in this zone. ARYA project has brought profound change in the living status of the family and encouraging the youth toward agricultural enterprises.

Table 106: Achievement of ARYA Programme during 2019.

Name of State	Name of Enterprises	No. of youths Identified for different enterprises	No. of training programme conducted	No. of rural youths trained	No of youths established their enterprise	No. of unit developed per enterprise	No. of youths running the entrepreneurial units in a sustainable manner	Adoption of the enterprises by other youths of the districts	No. of KVKs
Bihar	Goat Farming	20	2	40	20	1	20	105	1
	Poultry Farming	145	4	125	105	86	66	160	2
	Mushroom Grower	372	13	331	158	121	131	253	5
	Nursery Raising	245	9	232	22	22	22	27	3
	Fish Cultivation	120	3	90	37	37	37	6	1
	Broiler Production	120	4	120	41	41	41	9	1
	Bee Keeper	85	3	65	30	30	21	20	2
	Quail	100	10	100	10	10	10	20	1
Sub Total (A)		**1207**	**48**	**1103**	**423**	**348**	**348**	**600**	**16**
Jharkhand	Pig Farming	156	8	256	26	35	35	22	2
	Mushroom Production	70	3	100	30	25	25	10	1
	Seed Production	70	3	90	20	25	25	5	1

Name of State	Name of Enterprises	No. of youths Identified for different enterprises	No. of training programme conducted	No. of rural youths trained	No of youths established their enterprise	No. of unit developed per enterprise	No. of youths running the entrepreneurial units in a sustainable manner	Adoption of the enterprises by other youths of the districts	No. of KVKs
	Production	70	3	90	20	25	25	5	1
	Nursery Raising	200	5	235	25	25	25	25	1
	Poultry Farming	200	5	140	25	25	25	30	1
	Duck farming	200	5	130	25	25	25	20	1
	Goat Farming	147	6	193	95	52	52	40	2
	Bee Keeper	135	5	106	68	68	57	22	2
	Lac Cultivation	147	8	265	57	51	51	60	2
Sub Total (B)		**1325**	**48**	**1515**	**371**	**331**	**320**	**234**	**13**
Grand Total (A+B)		**2532**	**96**	**2618**	**794**	**679**	**668**	**834**	**29**

Establishment of Fish Cultivation by KVK, Bhagalpur, Bihar

Establishment of Quail farming by KVK, Bhojpur

Establishment of Goat Farming by KVK, Gumla

Establishment of Nursery raising by KVK East Shinghbhum

Establishment of Pig Farming by KVK Chatra

22. KRISHIVIGYAN KENDRA (KVK) KNOWLEDGE NETWORK/ KVK PORTAL

System (NARS), KrishiVigyan 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, 68 KVKs (44 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 as per direction. The KVKs have also uploaded Monthly Progress Report to the Portal.

23. KRISHI PORTAL

KRISHI (Knowledge based Resources Information Systems Hub for Innovations in Agriculture) Portal has been developed during 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 2019, input data on latitude and longitude of all KVKs under the Zone- IV was submitted to the concerned authority to put them in geo-portal. As per guidelines of the Council, various kinds of publications pertaining to this institute were uploaded in this portal. The portal can be accessed at http://krishi.icar.gov.in.

24. MANAGEMENT INFORMATION SYSTEM INCLUDING FINANCIAL MANAGEMENT SYSTEM (MIS-FMS) UNDER ICAR-ERP

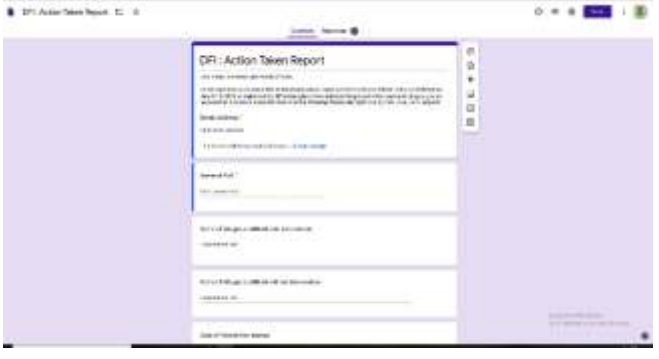
ICAR-ERP developed under NAIP project "Implementation of Management Information System (MIS) including Financial Management System (FMS) in ICAR" was initiated in the year 2015-16. Since September 2017, the system is regularly being updated for proper system management in respect of personnel and finance 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 by ICAR-ATARI, Patna.

25. IMPLEMENTATION OF PUBLIC FINANCE MANAGEMENT SYSTEM (PFMS)

Public Finance Management System (PFMS) is an electronic fund tracking mechanism which 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 utilization. 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 flow 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 2019-20 and thus it has brought transparency in the system and helped in easy transfer and tracking of funds.

26. ON-LINE REPORTING BY KVKS

The data collection and report compilation of the Zone IV is a basic component for monitoring the activities of ICAR-ATARI Patna. The World Wide Web (WWW) is increasingly used worldwide recognized search engine as a tool and platform for data collection and easier compilation. 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 physical and financial Progress Report, Mandated activities of KVK, Soil analysis, special programs etc. Specific guidelines for filling up the forms and sheets have been provided to all KVKs of the Zone for easy understanding and proper timely reporting.



27.SPECIAL PROGRAMMES

27.1 SWACHH BHARAT ABHIYAN

As a part of mass movement of cleanliness, initiated by the Government of India, all the staff members of ICAR-ATARI, Patna including KVKs under this Zone picked up the broom to clean the dirt, garbage, debris, litters, other obnoxious/ unwanted materials from the office surroundings, roads, dwelling places etc. The KVKs of this Zone observed the cleanliness drive through sensitizing farmers/ villagers adopting the slogan "*Neither litter, nor let others*

litter". A number of awareness programmes, sensitizing workshops and campaigns were carried out within KVKs and even in the remote villages for all categories of citizens. A sense of responsibility was evolved among the people to keep the environment clean which also included field sanitation and plantation drive. 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. All the 68 KVKs under ICAR-ATARI, Patna conducted thisabhiyan during the year and made 622 successful programme.

Table 107: Swachh Bharat Abhiyan held during 2019

State	No. of observation/ programme	No. of KVK
Bihar	414	44
Jharkhand	208	24
Total	**622**	**68**

Activities taken during Swacch Bharat Abhiyan by different KVKs of Zone IV

27.2. VACCINATION PROGRAMME

Mass vaccination in livestock was done by all 68 KVKs of Bihar and Jharkhand during 2019. 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), HaemorrahagicSepticaemia (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 2019, KVKs of this zone vaccinated 76594 animals of 48753 Bihar and 27841 of Jharkhand.

Table 108: Vaccination programme in livestock

State	No. of animals vaccinated
Bihar	48753
Jharkhand	27841
Total	**76594**

Vaccination / AI Camp at KVK Godda

Vaccination Camp at KVK Siwan

27.3 SWACHHTA HI SEWAPROGRAMME

To commemorate the 150th Birth anniversary of Mahatma Gandhi Swachhta Hi Sewaprogramme was launched by Govt. of India from 11 September to 1st October 2019. A number of programmes were undertaken this programme including plastic waste management and towards the effective ban of single use plastic (SUP) with focus on Swachh Bharat Diwas by massive community mobilization and shramdaan for plastic waste collection organized by all the KVKs under Zone IV of ATARI, Patna. Massive awareness activities were undertaken across the rural areas.

Table 109: Activities conducted under SHS Programme by all KVKs of Zone-IV, ATARI-PATNA

S. No.	Name of ICAR-Institutes/ ATARIs/ KVKs	Quantity of Plastic Waste Collected (Kg)	Quantity of Plastic Waste effectively disposed (Kg)	Method used for effective disposal of Plastic Waste	Total number of hours of Shramdan (hours)	Number of Farmers participated	Number of Employees/Students participated
	ATARI Patna Zone IV	1180	1073	· Provided to scrap dealer Collected and buried · Buried in Deep Pit · Refill deep land and some provided to scrap dealer · Donated to plastic scrap dealer · Open the dig in the soil and disposed with soil · Filling in waste land pits and provided to scrape man · Given to scrappers for safe disposal · Provided to scrapper · Handed over to garbage picker of RMC	1319	3361	826

Table 110: List of activities performed by KVKs of Bihar and Jharkhand under Swachh Bharat Mission during 2019

S.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	32	14
2	Organize cleaning of streets, drains and back alleys through awareness drives	118	412
3	Organize waste collection drives in households and common or shared spaces	144	81
4	Conduct Door to door meeting to drive behavior change with respect to sanitation behaviour	48	72
5	Organize awareness campaigns around better sanitation practices like using a toilet, hand washing, health and hygiene awareness, etc.	273	116
6	Perform Swachhata related NukkadNataks/street plays, folk song and dance performances	32	163
7	Conduct Village or School-level rallies to generate awareness about sanitation	18	72
8	Make wall paintings in public places on the theme of Swachhata	32	48
9	Volunteer for segregation of solid waste into non-biodegradable and biodegradable waste	47	38
10	Mobilize community to build compost pits, where organic matter decomposes to form manure	116	65

Table 111: Consolidated action done by all KVKs under SHS programme

S.No	Institute Name	Name of activities As per theme of SHS	No. of adopted village	Number of activities As per theme of SHS	Number of Farmer participated	Number of Students participated	Number of images/ photographs uploaded etc
1	ATARI-IV, Patna	276	215	276	16789	6938	173
Total		**276**	**215**	**276**	**16789**	**6938**	**173**

27.4 FERTILIZER APPLICATION AWARENESS PROGRAMME

Fertilization Application Awareness Program was organized on 22 October 2019 by all KVKs of Bihar & Jharkhand of Zone IV- ATARI- Patna regarding balanced use of Fertilizer. In this program progressive farmers and people representative actively participated and lecture and ghosti was also organized on this occasion. An amount of Rs50,000 was sanctioned for each KVK toprovided this program by DAC& FW and altogether 12334 participants were participated which included 55 Chief Guests, 299 other guests and 11980 farmers.

Table 112: Fertilizer Application Awareness program details during 2019

No. of KVK	Number of Chief Guests	Number of other Guest attended	No. of Farmers attended program	Total participants
63	55	299	11980	12334

Fertilizer awareness programme at KVK Banka

Fertilizer awareness programme at KVK Gumla

27.5 PLANTATION PROGRAMME

Special drive was conducted for plantation at all KVKs of Bihar and Jharkhand on 17th September 2019. On this occasion planting materials of orchard and Agro forestry and medicinal plants were distributed to farmers and farm women to create awareness importation of plant in our ecosystem for sustainable development.A total 10858 participants were participated during the programme and 51260 plants were distributed among the farmers for plantation.

Table 113: Details of planting material provided during Plantationprogramme by KVKs of Bihar & Jharkhand on 17th September 2019.

No. of KVK	Number of MPs Attended program	Number MLAs Attended program	Number of Other VIPs	No. of Farmers attended program	Total participants	Number of plants planted
63	1	1	213	10520	10858	51260

27.6 MINI SOIL TESTING LABS

For setting up soil mini testing lab in KVKs to issue advisories and Soil Health Cards report. A total number of 20042 farmers were benefitted altogether 16197 advisories were issued on soil health management and 15257 Soil health cards were distributed under this programme.

Table 114: Details of Soil testing with mini soil testing labs by KVKs under ATARI- Patna

No. of KVK where Mini labs has been set up in 2019	Number of mini soil testing labs with KVKs	No. of Advisory issued on soil health management	No. of Soil Health Card (SHC) issued	Total Number of farmers benefitted
63	40	16197	15257	20042

27.7 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.

Details of RAWE programm e conducted during 2019

Name of the State	No. of student/ ARS trained	No. of days stayed
Bihar	281	545
Jharkhand	-	-
Total	**281**	**545**

27.8 KVK IN RURAL SCHOOL

Agriculture has always been a basic priority for the society and thus to study the role and importance 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.


KVK Muzaffarpur visit to Rural Schools

27.9 DIPLOMA IN AGRICULTURAL EXTENSION SERVICE FOR INPUT DEALERS (DASAI) PROGRAMME

KVKs of Bihar (Saharsa, Gopalgunj, Vaishali, Madhubani, Bhojpur, Buxar) and Jharkhand(West Sighbhum)during 2019 conducted 07 Diploma in Agricultural Extension Service for Input Dealers (DASAI) Programme sponsored by ATMA of the concerned districts to educate Agri-Input Dealers. The purpose of this programme was to facilitate Agri-Input Dealers for serving the farmers in better way and they will act as para-extension professionals in the districts. Altogether seven (07) programmes were conducted in which total 298 participants received training.

DASAI	
No. of programmes organized	**No. of participants**
7	298

27.10 NATIONAL ANIMAL DISEASE CONTROL PROGRAM FOR FMD AND BRUCELLOSIS AND ARTIFICIAL INSEMINATION

On the launch of National Disease Control Programme for FMD & Brucellosis and Artificial insemination Programme on 11th September 2019 zone wise one workshop was organized with topics on vaccination and disease management in KVKs of Zone IV and 38 KVKs of Bihar and 22 KVK of Jharkhand conducted this workshop.

Table 115: Detail of activities conducted on FMD & Brucellosis and AI by KVKs.

State	Number of KVKs Organised program	Number of MPs Attended program	Number MLAs Attended program	Number of Other VIPs	No. of Farmers	Total	No. Of Animals for AI and Vaccination
BIHAR	39	7	5	238	5431	6089	1227
JHARKHAND	24	2		119	2870	3067	849
TOTAL	**63**	**9**	**5**	**357**	**8301**	**9156**	**2076**

FMD & Brucellosis and AI by KVK Gaya

FMD & Brucellosis and AI by KVK Kaimur

27.11 PRE-KHARIF AND PRE-RABI KISAN SAMMELAN

Pre-Kharif and Pre-Rabi Sammelan 2019 were organized by the KVKs of ICAR-ATARI, Patna under the banner of the Indian Council of Agricultural Research (ICAR), Ministry of Agriculture and Farmers' Welfare to create awareness amongst the farmers and other stake holders about the latest agricultural technologies. On the occasion, technologies show casing, group meetings, video film on technologies, exhibitions, demonstrations, seminars, lectures, etc. were arranged by the KVK personnel to enrich the farmers and other line department personnel about agricultural knowledge for developing and adopting various strategies for ensuing higher crop production. During the period under report, 63 KVKs of ATARI, Zone IV organized 339 *Pre-Kharif* and *Pre-Rabi Abhiyan*programme in which 101997 numbers of participants were present includingpublic representative MP/MLA/ MLC and others.

Pre Kharif And Pre Rabi Abhiyan	
No. of programmes organized	**No. of participants**
339	101997

27.12PRADHAN MANTRI KRISHISI NCHAYEEYOJANA (PMKSY)

Pradhan MantriKrishiSinchaiYojana is a national mission to improve farm productivity and ensure better utilization of the resources in the country.The primary objectives of PMKSY are to attract investments in irrigation system at field level, develop and expand cultivable land in the country, enhance ranch water use in order to minimize wastage of water, enhance crop per drop by implementing water-saving technologies and precision irrigation. The goal is to open the doors for optimal water budgeting in all sectors. Tagline for PMKSY is "more crop per drop".

This programme is running in 43 KVKs of Bihar and Jharkhand among them 06 was NGO and 04 in ICAR KVKs. Altogether 205 micro irrigation units were installed and 7476 farmers participated and benefitted.

Micro irrigation	
No. of units established	**No. of participants**
205	7476

27.13PARAMPRAGATKRISHIVIKASYOJNA (PKVY)

The ParamparagatKrishiVikasYojana (PKVY) is an initiative to promote organic farming in the country. The scheme envisages promotion of commercial organic production through certified organic farming, the produce will be pesticide residue free and will contribute to improve the health of consumer, it will raise farmer's income and create potential market for traders, it will motivate the farmers for natural resource mobilization for input production. The programme was operational in all 63 KVKs of Bihar and Jharkhand under the banner of ICAR-ATARI, Patna covering 327 farmers.

27.14WORLD FOOD DAY

The ICAR-ATARI Zone IV, Patna and the KVKs of Bihar and Jharkhand celebrated the World Food Day on 16th October, 2019. World Food Day is a day of action dedicated to tackling global hunger. This day has special relevance to people from around the world come together to declare their commitment to eradicate worldwide hunger from our lifetime. Food and Agriculture Organization (FAO) commemorated World Food Day 2019 on the theme "healthy diets for a zero hunger world", to raise awareness, share experiences and plan for future activities. The KVKs had successfully organized Kisangosthi, filed day and other activities on this day and large number of persons participated on functions.

27. 15NATIONAL FARMERS DAY/ KISAN DIWAS

Every year 23rd December 2019 in India is celebrated as National Farmers Day/KisanDiwas to mark the birth anniversary of Chaudhary Charan Singh. Chaudhary Charan Singh has served as the sixth prime minister from 28 July 1979 until 14 January 1980 and passed away in 1987. During his tenure as the Prime Minister of India, Chaudhary Charan Singh introduced policies to improve the lives and conditions of farmers in the country. He also played a leading role in the agricultural sector of the country by introducing bills for farmers' reforms. It is believed that 'Zamindari Abolition Bill-1952' was passed due to Chaudhary Charan Singh's hard work. To pay him tribute, the government in 2001 decided to celebrate his birth anniversary as National Farmer's day. On this day, the KVKs of ICAR ATARI, Zone IV organized many activities, workshops, seminars on agriculture in which large number of farmers participated and honored the progressive farmers under the jurisdiction.

27.16 INTERNATIONAL YOGA DAY

To mark the importance and significance of yoga in one's life, June 21 is observed as International Day of Yoga every year since the United Nations declared it in 2015. The theme of 5thInternational Yoga Day 2019 is "Climate Action". Yoga, which has been practiced for thousands of years, is a holistic solution for physical as well as mental wellness. On this day, several events were organized across the KVKs of Bihar and Jharkhand and 1729 personsparticipated in yoga, meditation, debates, meetings along with a variety of cultural performances.

International Yoga Day	
State	**No. of participants**
Bihar	988
Jharkhand	741
Total	**1729**

International Yoga Day Celebration at KVK Muzaffarpur

International Yoga Day Celebration at KVK Simdega

27.17 MOTHER'S DAY

In an attempt to honor mother, the ATARI and KVKs of Bihar and Jharkhand states celebrated 12th May, 2019 as Mother's day likewise every year. Mother's Day, it is observed on the second Sunday of May every year. On this occasion specially the female farmers were invited and honored to successful farmers by the KVKs.

27.18 PROGRAMMES/ SPECIAL DAY CELEBRATED AT ATARI PATNA

A. HINDI PAKHWARA:-(14TH-29TH SEPTEMBER, 2019)

ICAR-ATARI, Zone-IV celebrated the Hindi Pakhwara from 14thto 29th September, 2019 and conducted various events for promoting use of Hindi (Rajbhasha) in official work. The main events held were essay competition, Hindi poem recitation, speeches and typing test in which staffs of the Institute took participation. On closing day Director, ATARI, Patna distributed the prizes to winner, Sh. Mukesh Kumar was overall winner of prizes in Hindi typing test and quiz.

B. CONSTITUTION DAY-(26 NOV. 2019)

On 26th Nov 2019 the Institute celebrated the 70th Year of Indian constitution adoption by constituent Assembly and all the staff took pledge to save our constitution and observed as SamvidhanDiwas. Director, ICAR-ATARI, Patna, Zone-IV brief the all staff members about the preamble of our constitution and gave Oath to all staffs


C. GANDHI JAYANTI (2ND OCTOBER, 2019)

The ICAR-ATARI, Zone-IV, Patna observed the 150th anniversary of Father of Nation Mahatma Gandhi on 2nd October 2019 in order to follow his principle of non-violence and remember his contribution in making India independence.

D. VIGILANCE AWARENESS WEEK (28 OCT-2 NOV. 2019)

ICAR-ATARI, Patna observed vigilance awareness week from 28th October to 2nd November, 2019 with the Theme "Integrity – A way of life." Director had given the pledge to all staff on this occasion to make corruption free India. A series of events, debates, queries, essay and speech were organised during the vigilance week 2019.

27.NEW INITIATIVE UNDERTAKEN

28.1 JAL SHAKTI ABHIYAN PROGRAMME, 2019

For providing impetus to Jal Sanchay, the Jal Shakti Abhiyan was launched on mission mode water conservation security campaign in which the focus was on water stressed districts and blocks with interventions like water conservation and rainwater harvesting, renovation of traditional water bodies, reuse of water and recharging of structures, watershed development and afforestation. In 2019 JSA covered 254 water stressed districts across the country of which 14 districts were from this zone 12 from Bihar and 2 of Jharkhand state

covering 35 blocks. Under the Abhiyan large scale awareness programme was conducted in collaboration with other state line departments, NGOs and students in form of KiasanMela, KissanGhosti, Quiz and essay programme etc. Large Kisanmela 28 in number were organized with full day activities on optimum usage of water in farming with focus on increasing water use efficiency by adopting different methods like drip irrigation for more crop per drop, conservation and harvesting of rainwater, smart irrigation scheduling, raising of drought tolerant and short duration varieties, shifting towards less water consuming crops, conservation tillage, composting and mulching etc. Altogether 54 activities were organized comprising 32576 farmers, 1113 officials and 162 VIPs during the programme.

Table 116: Details of Jal Shakti Abhiyan in selected water stressed districts of Zone IV- ATARI- Patna during 2019

KVKs	Activity	No. of participants		
		Farmers	Officials	VIP
Begusarai	1	5856	130	8
Bhojpur	6	1923	171	35
Gaya	2	2470	101	8
Gopalganj	17	5590	15	7
Jehanabad	11	3342	86	15
Katihar	1	1123	29	9
Muzaffarpur Add.	3	1282	154	15
Nalanda	2	1568	40	12
Nawada	2	2110	84	11
Patna	2	1024	32	4
Saran	1	1498	117	12
Vaishali	2	875	60	4
Bokaro	2	1978	70	16
Dhanbad	2	1937	24	6
Total	**54**	**32576**	**1113**	**162**

Kissanmela on JSA at KVK Saran, RPCAU, Pusa

Kissanmela on JSA at Barh, Patna, BAU, Sabour

28.2. NEW EXTENSION METHODOLOGIES AND APPROACHES (NEMA)

ICAR has launched a network project on New Extension Methodologies and Approaches (NEMA) involving 11 ATARIs and 6 ICAR Research Institutes with the nodal agency ICAR-ATARI Zone II, Jodhpur during the year 2019 to assess the performance of different technology released by ICAR Institutes in the present day situations. In this connection ICAR-Agricultural Technology Application Research Institute, Hyderabad organized a three-day "Annual Zonal Review Workshop of 71 KVKs in Zone-X (Andhra Pradesh, Telangana, Tamil Nadu & Puducherry)" at ICAR-National Academy of Agricultural Research Management, Hyderabad from 24th to 26th May, 2019.

ICAR's Agricultural Extension Division's new initiatives had launched the network project on New Extension Methodologies and Approaches (NEMA) involving 11 ATARIs and 6 ICAR Research Institutes on May 2019.New Extension Methodologies and Approaches (NEMA) project running in ICAR-ATARI, Patna involving 9 districts of Bihar and Jharkhand. In Bihar, 7 district comprising West Champaran, Sheohar, Purnea, Begusarai, Banka, Munger, Aurangabad in 31 selected blocks and in Jharkhand 02 districts involving Dumka and Pakur in 6 blocks covering two village in each block and a total 84 villages by sampling plan (Socio-economic Impact Evaluation) which includes 10 adopter and 20 non adopter of Wheat variety HD 2967.

28.3 KRISHI KALYAN ABHIYAN III

The Department of Agriculture, Cooperation and Farmers' Welfare under Ministry of Agriculture and Farmers' Welfare, Government of India launched KrishiKalyanAbhiyan, Phase- I (KKA-I) programmew.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. Altogether 11639 programme for KrishiKalyanAbhiyan III was conducted in 2019 and benefitted 83507 farmers benefitted in phase III.

Table 117: List of activities covere in KKA – II during 2019

No. of KVKs	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.]	
32	11639	1177804	590742	8805	0.001 Lakhs	115



28.4 INSTITUTE WEBSITE

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

28.5 MahilaKisan 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 management. On this back drop, the Ministry of Agriculture and Farmers' Welfare, GoI had decided in 2016to observe 15th of October every year as "RashtriyaMahilaKisanDiwas".

Thus, MahilaKisanDiwas was celebrated at KrishiVigyanKendras across the Zone IV to recognize the contribution of women in Agriculture. As part of the nationwide celebration of 'MahilaKisan Divas', various programmes like seminar, farm visit, extempore, drawing competition, exhibition etc were organized at different KVKs under ICAR- ATARI, Patna to honour women for their remarkable contribution in agriculture. In Bihar, MahilaKisanDiwas was celebrated by 39 KVKs across the state involving farm women. Similarly, 20 KVKs of Jharkhand celebrated MahilaKisanDiwas with the active participation of 7108 women to encourage women in agricultural activities.

28.6 PRADHAN MANTRIKISANSAMMANNIDHI (PM-KISAN) AND PRADHAN MANTRI KISAN MAANDHAN YOJANA (PM-KMY) 2019

On February 24, 2019, the Hon'ble Prime Minister of India launched the new scheme of Govt. of India-Pradhan MantriKisanSammanNidhiYojna (PM-KISAN) from a programme organized at Gorakhpur, U.PA total of 6314 farmers participated in Pradhan MantriSammanYojna.

28.7 GRAMINKRISHIMAUSAMSEWA (GKMS)

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 2019, a total of 20 centres comprising 14 centres under Bihar Agricultural University, Sabour, Bhagalpur and 06 centres under Birsa Agricultural University, Ranchi have prepared and disseminated block level Agromet Advisory Service to the farmers of the respective districts. Altogether 1487 adviosries bulletin had been issued covering 257 blocks of Bihar and Jharkhand by which 51183 farmers has been benefitted. During the year total 647 farmers awareness programme were organized to benefit the famers about the usefulness of the Gramin Krishi Mausam Sewa.

Table118 :Agromet advisory services during the year 2019

S.N	Name of State	No. of KVKs	No. of Blocks Agromet Advisory	No. of advisory bulletin	No. of FAP's organised	No. of farmers feedback	No. of farmers received agromet advisory bulletin	No. of Publication
1	Bihar	14	198	1092	507	1287	35731	38
2	Jharkhand	6	59	395	140	233	15452	5
	Total	**20**	**257**	**1487**	**647**	**1520**	**51183**	**43**


किसानों को सिखाये गये मौसम आधारित खेती प्रबंधन के गुर

28.8 DOUBLING FARMERS' INCOME IN BIHAR AND JHARKHAND

The Doubling Farmers' Income (DFI) Central Committee recognises agriculture as a value led enterprise and suggests empowering farmers with "improved market linkages" and enabling "self-sustainable models" as the basis for continued income growth for farmers. Science and Technology (S&T) and Innovation in Farm Management are critical inputs for economic development and poverty alleviation in the country. The Committee identifies and focuses on seven major sources of growth operating within and outside the agriculture sector. These are (i) Improvement in crop productivity, (ii) Improvement in livestock productivity, (iii) Resource use efficiency or saving in cost of production, (iv) Increase in cropping intensity, (v) Diversification towards high value crops, (vi) Improvement in real prices received by farmers and (vii) Shift from farm to non-farm occupations. In view of achieving the target of doubling the farmers' income by March 2022, initiatives for Doubling Farmers' Income in Bihar and Jharkhand have been undertaken by State Coordination Committee (SCC) where the Director of ICAR- ATARI, Patna has been involved actively in formulation of strategy documents for both the states. During the year 2019 KVKs of Bihar and Jharkhand conducted various programme in which 52290 farmers participated and took the benefits.

Activities Conducted under DFI	Participants
Dairy Farming, Fish Farming, Vegetable cultivation, Capacity Building Rural youth Training Farm Advisory Discussion on Soil Health Card & Soil Testing Mobile Agro Advisory	52290

29.PERSONNEL

Sl. No	Name	Designation
1.	Dr. Anjani Kumar	Director
2.	Dr. Amrendra Kumar	Pr. Scientist.
Project Staff		
1.	Rabindra Kumar	SRF (NICRA)
2.	Khushboo Kumari	SRF (CFLD Oilseed)
3.	Ravi Kant Chaubey	SRF (ARYA)
4.	Avinash Sarin Saxena	SRF (CFLD Pulses)
5.	Sumit Kumar Singh	SRF (NEMA)
6.	Preeti Kumari	Young Professional II (FFP)
7.	Anshu Kumari	DEO (CFLD Pulses)
8.	Raj Kumar Bharati	DEO (ARYA)
9.	Suraj Kumar	DEO (CFLD Oilseed)
10.	Manoj Kumar	DEO (CSISA)

30. AWARDS

30.1 Awards and Recognitions obtained by the Farmers during the year 2019:

Name	Name of the Award	Year	Conferring Authority	Purpose
Smt. Bina Devi Vill.- Tilkari, Block- Asarganj, Dist.-Munger	Nari Shakti Award	2019	His Excellency President Sri Ram Nath Kovind on 08.03.2020	Mushroom Production
Smt. Babita Devi, Vill.- Alouli, Dist.-Khagaria	Krishi Karman Award, (Excellent Performance in Wheat Production)	2019	Agriculture Minister, Govt. of India	Excellent Performance in Wheat Production
Sri Dhananjay Pd. Singh Vill.- Paharpur, Dist.-Munger	Innovative Farmer	2019	ICAR-IARI, New Delhi	New Innovation
Shri Dilip Kumar Singh, Farmer, Vill.-Mohadganj, Dist.-Rohtas	Innovative Farmer	2019	ICAR-IARI, New Delhi	Innovation in Vegetable Production
	Dhanuka Innovation Agriculture Award	2019	Dhanuka, New Delhi	Save Water & Rain Water Harvesting Innovation
Sri Ashok Manjhi, Vill- Kishanpur, Amarpur, Dist.-Banka	Krishi Samrat Samman (Machinikaran) 2020 (National)	2019	Mahindra Samridhi India Agri Award	Manual Paddy Transplanter
Sri Pappu Thakur, Vill.- Jlalpur Dist - Sitamarhi	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices

Name	Name of the Award	Year	Conferring Authority	Purpose
Sri Nagendr kumar Sahni Vill.- Dhurahu kothiya, Dist- Saran	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices
Sri Vimlesh Kumar Vill. –Gopalpur Dist - Begusarai	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices
Sri Vijay Kuma Vill.- Korigama Dist - Motihari	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices
Sri Suresh Prsad Vill.- Goriya kothi Dist - Siwan	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices
Sri Manoj Kumar Singh Vill. – Minapur Balha Dist - Sheohar	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices
Sri Sambhu Kr. Chaubey Vill.-Barauli, Dist- Gopalganj	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices
Sri Shivji Prsad Vill.-Jagdishpur, Dist- West Champaran	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices
Sri Ram Pukar Singh, Vill.-Somnaha, Dist. Samastipur	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices
Sri Ram Babu Thakur, Bithar, Madhubani	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices
Sri Hariwansh Narayan Singh, Dhobauli, Vaishali	Abhinav Farmers Award	2019	RPCAU, Pusa	Good Agriculture Practices

30.2 Awards and recognition of scientists/institutions/university during 2019.

Name	Name of the Award	Year	Conferring Authority	Purpose
BAU, Sabour	National Award for e-Governance (Silver)	2019	Department of Administrative Reforms and Public Grievances, Under Ministry of Personal, Public Grievances, Government of India	ICT based e-Agricultural Extension for enhanced Technology and information delivery of Bihar Agricultural University, Sabour, Bihar for Ourstanding Research on citizen centric services by Academic/Research Institutions

Name	Name of the Award	Year	Conferring Authority	Purpose
KVK Bhagalpur	National Best KVK Award	2019	ICAR	-
KVK Rohtas	Zonal Best KVK Award	2019	ICAR	-
Dr. R. K. Sohane	ANSI-Best Extesionist Award	2019	Animal Nutrition Society of India, Karnal	outstanding contribution in the field of Extension Education
Dr. R. K. Sohane	Dr. R. S. Paroda Medal	2019	Bioved Research Institute forAgriculture, Technology & Science, Allahabad (Society)& Rama University, Kanpur	Outstanding contribution in the field of Animal Nutrition on the occasion of National Conference on Technological Approaches for Enhancement of Employment and Income in Agriculture at Kanpur from 2-4 March, 2020
Dr. Dharmendra Kumar, SMS (Animal Science), KVK, Banka	Best Extension Scientist Award	2019	Bihar Agricultural University, Sabour	Outstanding contribution in the field of Animal Science.
	Best Presentation Award	2019	International Conference Animal Nutrition (INCAN)	For best Best Presentation Award
	Excellence in Research Award	2019	Science & Tech Society for Integrated Rural Improvement, Telangana	Outstanding contribution in the field of Animal Science.
Dr. Ram Datt, Asstt. Prof. (Extn. Education), BAC, Sabour	Dr. Gopalji Trivedi Best Extension Professional Award-2020	2019	Bihar Agricultural University, Sabour	outstanding contribution in the field of Extension Education
Dr. SeemaKumari Senior Scientist & Head, KVK, Jalalgarh, Purnea	KVK Scientist Award	2019	Dr.Ram Avtar Shiksha Samiti	Outstanding contribution in the field of Agriculture & Allied
Dr. Abhishek Pratap Singh, SMS (Hort.), KVK, Jalalgarh, Purnea	Fellow of CHAI-2019	2019	CHAI New Delhi	GBPUA&T Pantnagar
Pankaj Kumar SMS, (EE), KVK, Katihar	Young Scientist Award	2019	Indian Society of Extension Education during ISEE national seminar -2019 on socio-Digital Approaches for transforming Indian agriculture.	Outstanding work done in the field of extension research and field extension
Ms.Jubuli Sahu, SMS (Agromet)	Young Extension Worker Award	2019	Society for Agriculture Innovation & Development, Ranchi	Outstanding work done in the field of Agrometeorology

Name	Name of the Award	Year	Conferring Authority	Purpose
Dr R.K. Tiwari Sr. Scientist & Head	KVK Scientist Award	2019	Dr Ram Avatar Shiksha Samiti, UP	Outstanding contribution in the field of transfer of technology
Dr R.K. Tiwari Sr. Scientist & Head	Certificate of Appreciation	2019	RPCAU, Pusa	Outstanding contribution in the field of transfer of technology
Dr R. K. Tiwari Sr. Scientist & Head	Best Extension Scientist Award	2019	Mahima Research Foundation and Social welfare, Varanasi, UP	Outstanding contribution in the field of transfer of technology
Dr R. K. Tiwari Sr. Scientist & Head	Best paper presentation award	2019	International conference on Climate change and its impact on global food security and sustainability of agriculture.	Outstanding contribution in the field of transfer of technology
Dr R.K. Tiwari Sr. Scientist & Head	Young Scientist Award	2019	Green Agri. Professional Society, Dhanbad, Jharkhand	Outstanding contribution in the field of transfer of technology
Dr R.K. Tiwari Sr. Scientist & Head	Certificate of Appreciation	2019	Director, Extension Education, RPCAU, Pusa	Outstanding contribution in the field of transfer of technology
Dr. Ranjan Kumar (SMS)	Best presentation award	2019	International conference on animal nutrition 2019 by Animal Nutrition Society of India	Outstanding contribution in the field of transfer of technology
Dr. Ranjan Kumar (SMS)	Best extension Scientist award	2019	Green Agri. Professional Society, Dhanbad, Jharkhand	Outstanding contribution in the field of transfer of technology
Dr. Sanjay Kumar (SMS)	Best Poster Presentation award	2019	Indian Institute of Pulse Research, Kanpur held at Bhopal	Outstanding contribution in the field of transfer of technology
Sharvan Kumar Gupta	Jagjivan Ram Abhinav Kisan Puruskar	2019	ICAR	
Sarita Devi	Pandit Deen Dayal Upadhyaya Antyodhyay Krishi Puruskar	2019	ICAR	
Gumla	Best NICRA KVK Award	2019	ICAR-CRIDA, Hyderabad	
Aurangabad	Best NICRA KVK Award	2019	ICAR-CRIDA, Hyderabad	