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2019

ICAR - Agricultural Technology Application Research Institute Kolkata- Zone V

भाकृअनुप - कृषि तकनीकी अनुप्रयोग संस्थान कोलकाता

Bhumi Vihar Complex, Salt Lake, Kolkata - 700097

भूमि विहार कॉम्प्लेक्स, सॉल्ट लेक, कोलकाता - 700097

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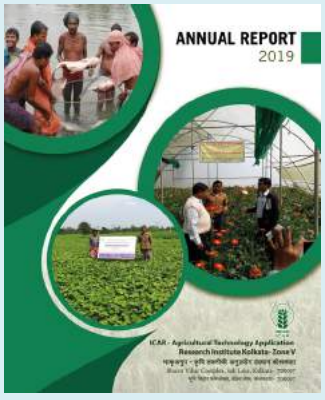

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CONTENTS

कार्यकारी सारांश

ग्यारह कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थानों के निपटारे में 717 केवीके रखने के लिए जोनों का पुनर्गठन और राज्यों के विभाजन ने कुछ हद तक केवीके की कम संख्या होने पर एटीएआरआई के दबाव को आसान बना दिया है। हालांकि, इसने एटीएआरआई को नए राज्यों के केवीके ग्राहकों के सामाजिक, आर्थिक और संबंधित पहलुओं को समझने में अतिरिक्त घंटे काम करने के लिए मजबूर किया है, अपनी आकांक्षा के अनुरूप कार्रवाई की योजना तैयार की है और यह सुनिश्चित किया है कि किसानों की बेहतरी के लिए केवीके के सभी प्रयासों को निर्देशित किया जाए। ओडिशा राज्य के सभी ग्रामीण जिलों में काम कर रहे 33 केवीके को बिहार और झारखंड के स्थान पर आईसीएआर-एटीएआरआई, कोलकाता (जोन-V) के अधिकार क्षेत्र में दिया गया है। तदनुसार, 2019 के दौरान, आईसीएआर-एटीएआरआई, कोलकाता को अंडमान एवं निकोबर द्वीप, ओडिशा और पश्चिम बंगाल के 59 केवीके की निगरानी, मूल्यांकन और मार्गदर्शन करने की ज़िम्मेदारी दी गई है।

केवीके के साथ एटीएआरआई के परिवर्तित जनादेशों के साथ, एटीएआरआई ने समन्वय और निगरानी प्रौद्योगिकी अनुप्रयोग और फ्रंटलाइन विस्तार शिक्षा कार्यक्रम के साथ कृषि विस्तार अनुसंधान और ज्ञान प्रबंधन को मजबूत करने पर अधिक ध्यान दिया है। दूसरी ओर केवीके अपने व्यापक अनुप्रयोग के लिए प्रौद्योगिकी मूल्यांकन और प्रदर्शन पर ध्यान केंद्रित कर रहा है और क्षमता निर्माण को बढ़ाने के लिए प्रयासरत है। हालांकि बुनियादी गतिविधियां समान बनी हुई हैं, लेकिन छोटे और मध्यम किसानों, ग्रामीण युवाओं और अन्य हितधारकों की आकांक्षा को पूरा करने में केवीके की पहुंच को कई गुना बढ़ा दिया गया है। किसानों के सूचना और प्रौद्योगिकी सहायता देने के लिए केवीके की क्षमता ने उन्हें जमीनी स्तर पर अनुसंधान और विस्तार के बीच एक महत्वपूर्ण लिंक बना दिया है।

अनिवार्य गतिविधियों में, जोन -V के केवीके ने वर्ष2019 के दौरान प्रशिक्षण, खेतों के परीक्षण, फ्रंटलाइन प्रदर्शन इत्यादि के क्षेत्रों में लगभग पूरे लक्ष्य को हासिल किया। केवीके ने क्षेत्र भर में 3667 अलग-अलग स्थानों पर आयोजित 629 कृषि परीक्षणों के माध्यम से फसल की खेती, पशुधन पालन, मछली की खेती, कीट प्रबंधन, भंडारण तकनीक इत्यादि से संबंधित 394 पहचान प्रौद्योगिकियों का आकलन किया। इस तरह के समाधान को फिर से तकनीकी कैप्सूल के रूप में राज्य विस्तार प्रणाली को प्रदान करने से पहले छोटे पैमाने पर प्रदर्शन के रूप में परीक्षण किया गया था। क्षेत्र की व्यापक कृषि-पारिस्थितिकीय स्थिति के अनुरूप विकसित सुधार की गई प्रौद्योगिकी के आवश्यक सुधार / संशोधन के लिए शोध प्रणाली को प्रतिक्रिया भी प्रदान की गई।

केवीके द्वारा दाल, तिलहन और अन्य फसलों के उत्पादकता में वृद्धि और तेजी से बीज प्रतिस्थापन की गति को बढ़ाने के लिए केवीके द्वारा चयनित दाल और तिलहन फसलों की फ्रंटलाइन प्रदर्शन आयोजित किए गए हैं। 7819 किसानों की भागीदारी के साथ 1580.82 हेक्टेयर में केवीके ने ऐसे प्रदर्शन कार्यक्रमों का आयोजन किया। किसानों के क्षेत्र में दर्ज प्रदर्शन ने उपज और लाभ-लागत अनुपात के संदर्भ में किस्मों और प्रेक्टिस के पैकेज की श्रेष्ठता का संकेत दिया। प्रदर्शन कार्यक्रमों में विस्तार कार्यकर्ताओं की भागीदारी ने कृषि समुदाय के लाभ के लिए अपने बड़े पैमाने पर प्रसार के केवीके द्वारा लिए मार्ग प्रशस्त किया। पशुधन और मत्स्यपालन पर प्रदर्शन 7331 इकाइयों में 3978 संख्याओं के कार्यक्रमों के माध्यम से किया गया था।

किसानों और कृषि महिलाओं, ग्रामीण युवाओं और विस्तार कार्यकर्ताओं के हिस्से में क्षमता विकास वांछित स्तर तक किए गए जो केवीके के मूल कार्य में से एक था। ज्ञान और कौशल प्रदान करने में, केवीके ने 85913 किसानों और फसल उत्पादन, बागवानी, मिट्टी स्वास्थ्य प्रबंधन, कृषि इंजीनियरिंग, पशुधन और मत्स्य पालन, गृह विज्ञान, कृषि विस्तार और कई अन्य पहलुओं को शामिल करने वाली कृषि-महिलाओं के लिए3943 पाठ्यक्रम आयोजित किए। हालांकि ग्रामीण युवाओं के संबंध में, , क्षमता निर्माण के ऐसे क्षेत्रों का चयन किया गया था जो फार्म खेत और आफ फार्म उद्यमों में स्व-रोजगार प्रदान कर सकते थे। इस प्रक्रिया में, लड़कियों सहित 13432 ग्रामीण युवाओं को 604 पाठ्यक्रमों के माध्यम से प्रशिक्षित किया गया था। कृषि कर्मियों, पशुपालन और मत्स्यपालन क्षेत्र में हालिया विकास के बारे में जागरूक करने के लिए विस्तार कर्मियों की क्षमता निर्माण के लिए फ्रंटियर क्षेत्रों का चयन किया गया था। केवीके ने 13810 प्रतिभागियों के लिए 451 ऐसे पाठ्यक्रम आयोजित किए। इसके अलावा, केवीके ने युवाओं को स्व-रोज़गार अवसर उजागर करने के लिए तुलनात्मक रूप से लंबी अवधि के व्यावसायिक प्रशिक्षण कार्यक्रम का भी आयोजन किया। इस प्रक्रिया में, 102 पाठ्यक्रम 2788 युवाओं के लिए आयोजित किए गए। क्षमता विकास के कार्यक्रम में केवीके की क्षमता को सरकार और अन्य संगठनों द्वारा केवीके के प्रशिक्षण कार्यक्रम देने के माध्यम को पर्याप्त रूप से मान्यता प्राप्त है। केवीके ने प्रतिभागियों की आवश्यकता के अनुसार विभिन्न संगठनों द्वारा प्रायोजित 8970 प्रतिभागियों के लिए 307 कार्यक्रम आयोजित किया। विभिन्न विस्तार गतिविधियों के माध्यम से किसानों के बीच बड़े पैमाने पर जागरूकता का आयोजन केवीके की एक और उल्लेखनीय उपलब्धि थी। इस अवधि के दौरान, केवीके ने 13961449 किसानों, विस्तार कार्यकर्ताओं और अन्य लोगों की भागीदारी के साथ ऐसी 52796 विस्तार गतिविधियां आयोजित की।

किसानों को गुणवत्ता के बीज और रोपण सामग्री प्रदान करना हमेशा की आवश्यकता है। केवीके द्वारा केवीके फार्म में या बीज गांव कार्यक्रम के माध्यम से भाग लेने वाले मोड में बीज बनाने के लिए प्रयास किया। उल्लिखित अवधि के दौरान केवीके ने समय-समय पर बीज की अनुपलब्धता को दूर करने हेतु सब्ज़ियों के गुणवत्ता वाले बीज के प्रमुख अनाज और फसलों का

8820 क्विंटल का उत्पादन किया। केवीके न गुणवत्ता के फलों की फसल, सब्जियां, फूल उत्पादन के लिए के 50.1 लाख रोपण सामग्री /रोपण भी पैदा किए। कृषि क्षेत्र में जैव उत्पाद का उपयोग पर्यावरणीय दृष्टिकोण से तेजी से लोकप्रिय हो रहा है और केवीके ने 108758 किसानों को उपलब्ध कराने के लिए 297305.2 किलोग्राम विभिन्न जैव-निर्माण का उत्पादन किया। इस तरह के 7373935 उपज के उत्पादन के माध्यम से गुणवत्ता पशुधन तनाव और मछली फिंगरलिंग उत्पादन को केवीके द्वारा पर्याप्त महत्व दिया गया था।

मिट्टी और जल विश्लेषण में, केवीके ने किसानों को मिट्टी स्वास्थ्य कार्ड प्रदान करने के लिए क्षेत्र में 19027 के नमूनों का विश्लेषण किया। इस प्रक्रिया ने किसानों को उच्च उत्पादकता के साथ-साथ निरंतर मिट्टी के स्वास्थ्य के लिए वैकल्पिक रूप से फसलों में रासायनिक उर्वरक का उपयोग करने में सक्षम बनाया है। अनिवार्य गतिविधियों के अलावा, केवीके ने सार्वजनिक निजी भागीदारी, विश्व मिट्टी दिवस, राष्ट्रीय विज्ञान दिवस, विश्व पशु चिकित्सा दिवस और अन्य के माध्यम से प्रौद्योगिकी सप्ताह जैसे कृषि समुदाय के बीच जागरूकता पैदा करने के साधन के रूप में विशेष/ दिन /सप्ताह भी मना गया। इस तरह के समारोहों ने प्रतिभागियों की अच्छी संख्या को आकर्षित किया और किसानों के बीच इस तरह के कार्यक्रमों के लाभ को विस्तारित करने का अवसर प्रदान किया। केवीके ने जिला स्तर पर विभिन्न अभिसरण कार्यक्रम के माध्यम से 682.8 लाख रुपये के राजस्व भी पैदा किए। इस तरह के समर्थन से केवीके को मौजूदा कृषि स्थिति में सुधार के लिए जिले के दूरदराज के इलाकों तक पहुंच प्रदान करने में मदद मिलती है।

पिछले एक साल के दौरान आईसीएआर-एटीएआरआई, कोलकाता के हिस्से पर वांछित उद्देश्यों की पूर्ति सुनिश्चित करने के लिए आईसीएआर-एटीएआरआई और केवीके के माध्यम से बड़ी संख्या में फ्लैगशिप कार्यक्रम का कार्यान्वयन किया गया है। कार्यक्रमों की निरंतर निगरानी ने न केवल गुणवत्ता के उत्पादन को लाया बल्कि कृषि समुदाय और नीति निर्माताओं के बीच उच्चतम स्तर पर केवीके का घरेलू नाम भी बनाया। जलवायु रेजिएंटल एग्रीकल्चर में राष्ट्रीय नवाचार आईसीएआर-एटीएआरआई, कोलकाता द्वारा 9 केवीके के माध्यम से जोन-V में ऑपरेशन, ऐसा एक कार्यक्रम है। पहचान किए गए जिलों की जलवायु भेद्यता का मूल्यांकन, तकनीकी समर्थन, संसाधन विकास और खेती समुदाय के समग्र सशक्तिकरण के संदर्भ में निश्चित आवश्यकता को आगे बढ़ाने के लिए प्रयास किया गया है ताकि उन्हें बाढ़, गर्मी, चक्रवात तूफान, अनियमित वर्षा जैसे जलवायु भेद्यता का सामना करने में सक्षम बनाया जा सके। आदि। गर्मी की खेती, हरी खाद, शून्य टिलेज, कार्बनिक मल्चिंग, बीबीएफएस, कार्बन अनुक्रमण के बाद प्रौद्योगिकी घटकों के सफल कार्यान्वयन के बाद पानी की बचत सिंचाई विधियों, कृत्रिम भूजल रिचार्ज, बड़े पैमाने पर जल संचयन संरचनाओं का निर्माण, तालाबों का नवीनीकरण आदि न केवल एनआईसीआरए गांवों में सकारात्मक प्रभाव डाला, बल्कि किसानों के लाभ के लिए अन्य जिलों में इसके के लिए मार्ग प्रशस्त किया। वैकल्पिक फसल पैटर्न का लोकप्रियकरण, उचित फसल किस्मों का परिचय, सामुदायिक नर्सरी जैसे अभिनव तरीकों, चारा की खेती पर जोर, वीसीआरएमसी और कस्टम भर्ती प्रणाली का निर्माण और इस कार्यक्रम के माध्यम से किए गए अन्य घटकों ने दूर-दराज जिलों के किसानों को बेहद लाभान्वित किया है।

चावल के परती जमीन का उपयोग करने के लिए विशेष जोर देने के साथ उत्पादकता में वृद्धि के लिए तिलहन और दाल फसलों दोनों के लिए क्लस्टरर्ड फ्रंटलाइन प्रदर्शन)सीएफएलडी (कार्यक्रम का कार्यान्वयन पिछले एक साल के दौरान दर्ज एक और उपलब्धि रही है। तिलहन में नियमित कार्यक्रम में दर्ज औसत उपज19-54% की सीमा में थी जबकि यह अतिरिक्त कार्यक्रम में 34-50% थी। सभी तीन मौसमों खरीफ, रबी और गर्मी के दौरान पल्स फसलों में उच्च उपज भी देखी गई थी। उपज में औसत वृद्धि 37.5 से 59.1% की सीमा में थी।

चयनित केवीके में पल्स बीज हब का निर्माण गुणवत्ता पल्स बीजों की आवश्यकता और आपूर्ति के बीच के अंतर को कम करने के लिए एक सराहनीय कदम है। इस क्षेत्र में, 10 बीज हब साल भर की पहचान की गई जो पल्स फसलों के बीज बनाने में लगे होते हैं और तीन फसल के मौसम को कवर करते हैं। बीज उत्पादन के लिए पहचाने जाने वाली फसलें चना, पीजन, मटर, हरी चना, काली चना, चिक मटर, मसूर और मटर हैं। 2019 के दौरान, कुल 1674.7 क्विंटल गुणवत्ता वाले बीज का उत्पादन किया गया था।

पहले इस क्षेत्र में किसान के रूप में किसान केंद्रित कार्यक्रम के लिए तीन आईसीएआर संस्थानों और आईसीएआर-एटीएआरआई, कोलकाता के तहत एक राज्य कृषि विश्वविद्यालय के माध्यम से कार्यक्रम की निगरानी के लिए नोडल संस्थान के रूप में कार्यरत है। इस कार्यक्रम का सार यह है कि किसान अनुसंधान समस्या पहचान, प्राथमिकता, प्रयोग के संचालन और किसान के खेतों में इसके प्रबंधन में महत्वपूर्ण भूमिका निभाते हैं। धान में एकीकृत पोषक प्रबंधन, नई किस्मों का परिचय, मछली को पूरक आहार, पोल्ट्री नस्लों के लोकप्रियता, बेहतर जल प्रबंधन विधियों, ऊतक कल्चर केले, परियोजना क्षेत्र में मिनी दाल मिल हेतु संस्थानों /एसएयू द्वारा हस्तक्षेप कृष /चयनित किसान / कृषि परिवारों की आजीविका में समग्र सुधार लाने के लिए हैं। 2019 में इस क्षेत्र में चार परियोजनाओं के कार्य शुरू की गई।

कृषि नेतृत्व वाले व्यवसाय में ग्रामीण युवाओं को शामिल करना और बनाए रखना देश भर में नीति निर्माताओं के लिए चुनौतियों में से एक है। एक उचित उपाय खोजने के लिए, कृषि में युवाओं को आकर्षित करना और बनाए रखना (एआरवाईए) - भारतीय कृषि अनुसंधान परिषद की एक परियोजना आईसीएआर-एटीएआरआई, कोलकाता द्वारा इस क्षेत्र के 9 केवीके के माध्यम से लागू की जाती है। जिलों में वाणिज्यिक उद्यम बनाने के अवसर के आधार पर, पहचाने गए युवाओं को चरणबद्ध तरीके से वित्तीय और तकनीकी सहायता प्रदान करने के लिए उद्यमों का चयन किया गया है। केवीके के प्रयासों और आईसीएआर-एटीएआरआई, कोलकाता की देखरेख ने 300 ग्रामीण युवाओं को निरंतर वार्षिक आय के लिए निरंतर तरीके से अपने उद्यम स्थापित करने में सक्षम बनाया है। इस परियोजना की सफलता ने अन्य ग्रामीण

युवाओं को अपनी आजीविका के लिए ऑफ-फार्म उद्यमों को भी प्रेरित करने के लिए प्रेरित किया गया है।

आबादी के हानिकारक हिस्से की विकास आवश्यकताओं को संबोधित करते हुए, इस क्षेत्र के 10 जिलों में जनजातीय उप योजना (टीएसपी) का एक विशिष्ट कार्यक्रम चल रहा है जिसमें बड़ी जनजातीय आबादी है। जनजातीय समुदाय के बीच बेहतर कृषि पद्यतियों के लाभ को बढ़ाने के लिए परिसंपत्ति निर्माण, कृषि परीक्षणों, प्रशिक्षण कार्यक्रमों, बीज और रोपण सामग्री उत्पादन आदि जैसी पहल की गई थी। मूल्यांकन करने पर यह संकेत से संकेत मिलता है कि 17420 किसानों के लाभ के लिए अब तक 184 आदिवासी गांवों को इस परियोजना के तहत लाया गया है।

क्लाइमेट रेजिलिएंट एग्रीकल्चर में नेशनल इनोवेशन, आईसीएआर-एटीएआरआई, कोलकाता द्वारा 9 केवीके के माध्यम से जोन-5 के संचालन में एक ऐसा कार्यक्रम है। तकनीकी सहायता, संसाधन विकास और कृषक समुदाय के समग्र सशक्तीकरण के संदर्भ में महत्वपूर्ण जिलों की जलवायु भेद्यता का गंभीर रूप से आकलन किया गया है, ताकि उन्हें सूखा, बाढ़, गर्मी की लहर, चक्रवाती तूफान अनिश्चित वर्षा जैसी जलवायु कमजोरियों से निपटने में सक्षम बनाया जा सके। आदि जैसे गर्मियों की जुताई, हरी खाद, जीरो टिलेज, ऑर्गेनिक शहतूत, बीबीएफएस, कार्बन सीक्वेराटेशन जैसे जल बचत सिंचाई विधियों, कृत्रिम भूजल पुनर्भरण, बड़े पैमाने पर जल संचयन संरचनाओं का निर्माण, तालाबों के जीर्णोद्धार आदि के सफल कार्यान्वयन। न केवल एनआईसीआरए गांवों में सकारात्मक प्रभाव पैदा किया, बल्कि किसानों के लाभ के लिए अन्य जिलों में इसके बहिष्कार का मार्ग प्रशस्त किया। वैकल्पिक फसल के पैटर्न को लोकप्रिय बनाना, उपयुक्त फसल किस्मों की शुरूआत, सामुदायिक नर्सरी जैसे नवीन तरीकों, चारे की खेती पर जोर, वी सी आर एम सी का निर्माण और कस्टम हायरिंग सिस्टम और इस कार्यक्रम के माध्यम से किए गए अन्य घटकों ने कमजोर जिलों के किसानों को काफी लाभ पहुंचाया है।

जिला कृषि इकाई (DAMU) की स्थापना के माध्यम से ग्रामीण कृषि मौसम सेवा केंद्र पिछले साल के दौरान शुरू किया गया था और ओडिशा और पश्चिम बंगाल के 16 चयनित KVK में से 6 केवीके ने वर्ष 2019 के दौरान काम करना शुरू कर दिया था। अन्य लोगों के बीच, महत्वपूर्ण गतिविधि, मौसम से संबंधित था। 624 मैसेजिंग लगभग 45000 किसानों को लाभान्वित किया।

इस क्षेत्र के चयनित केवीके द्वारा कौशल प्रशिक्षण प्रदान करने के माध्यम से उद्यमिता के विकास पर कृषि कौशल परिषद (एएससीआई) के साथ एक सहयोगी कार्यक्रम किया जा रहा है। केवीके स्तर पर बाद में प्रशिक्षण प्रदान करने के लिए प्रशिक्षकों का प्रशिक्षण भी आयोजित किया गया और 45 प्रशिक्षण संस्थानों द्वारा कुल 1202 किसानों / ग्रामीण युवाओं को प्रशिक्षित किया गया।

आईसीएआर-एटीएआरआई कोलकाता की अन्य महत्वपूर्ण उपलब्धियों में 2022 तक किसान की आय दोगुनी करने की दिशा में ओडिशा और पश्चिम बंगाल के राज्यों के लिए कार्यान्वयन योग्य कार्य योजना को अंतिम रूप देना शामिल है। कार्य योजना एसएयू, आईसीएआर संस्थान, राज्य सरकार के परामर्श से तैयार की गई थी। अधिकारियों, केवीके कर्मियों और अन्य हितधारकों। खेती की लागत में कमी, एमएसपी, कृषि मशीनीकरण, फसल विविधीकरण, फसल कटाई में कमी, कोल्ड स्टोरेज सहित बुनियादी सुविधाओं की सुविधा, विपणन खुफिया जानकारी, आईसीटी का उपयोग आदि जैसे उपायों से किसानों की आय को दोगुना करने का सुझाव दिया गया। 2019 के दौरान, इस क्षेत्र में 59 केवीके के माध्यम से 118 गाँव इस कार्यक्रम में शामिल हुए, जिसमें 4477 किसान लाभान्वित हुए।

वैज्ञानिकों और किसानों के बीच सीधी बातचीत की सुविधा के लिए, इस क्षेत्र के 17 आईसीएआर संस्थान और 2 एसएयू/ आईसीएआर-एटीएआरआई, कोलकाता की देखरेख में मेरा गॉव मेरा गौरव कार्यक्रम लागू कर रहे हैं। 32354 किसानों के लाभ के लिए नियमित रूप से गांवों, इंटरफ़ेस मीटिंग, प्रशिक्षण, प्रदर्शन, मोबाइल आधारित सलाह, जागरूकता निर्माण आदि जैसी गतिविधियां शुरू की गई हैं। अब तक, इस कार्यक्रम के तहत 385 गांवों को कवर किया गया है।

इस क्षेत्र के दो जिलों में प्राकृतिक संसाधन आधार को संरक्षित करने, खेती की लागत को कम करने, किसानों की आय बढ़ाने और किसानों की बेहतर आजीविका सुनिश्चित करने के लिए अनाज आधारित फसल प्रणाली में सुधार के संदर्भ में, सीएसआईएसए परियोजना आईसीएआर (दक्षिण एशिया में अनाज प्रणाली पहल) के सहयोग से चल रही है। फसल स्थापना विधि, डीएसआर और रबी फसल में प्रबंधन, शून्य टिलेज के तहत अनुक्रम में इस परियोजना में मूल्यांकन की गई कुछ तकनीके हैं। वर्ष के दौरान, इस क्षेत्र के 17 केवीके द्वारा लैंडस्केप डायग्नोस्टिक सर्वे / प्रोडक्शन प्रैक्टिस सर्वे किया गया था।

आईसीएआर-एटीएआरआई, कोलकाता के केवीके ज्ञान पोर्टल ने दूरदराज के क्षेत्रों से बड़ी संख्या में किसानों को केवीके कार्य करने के बारे में जानने और बेहतर कृषि और सहयोगी प्रेक्टिस के लिए सूचना समर्थन मांगने में मदद की है। केवीके किसानों के लिए राष्ट्रीय स्तर पर इस तरह के कार्यक्रमों के बारे में जानने और समीक्षा और निगरानी की सुविधा के लिए इस पोर्टल में उपलब्ध सुविधाओं, पिछले और आगामी कार्यक्रमों, प्रेक्टिस के पैकेज, कार्यान्वित कार्यक्रमों का विवरण, मासिक प्रदर्शन रिपोर्ट इत्यादि जैसी सुविधाओं से संबंधित जानकारी डाल रहे हैं। इसके साथ-साथ, क्रिशी पोर्टल को नियमित रूप से प्रौद्योगिकी, प्रकाशन, प्रयोगात्मक डेटा, अवलोकन डेटा, सर्वेक्षण डेटा और भू-पोर्टल भी अपलोड किया जाता है। यह भंडार किसानों, शोधकर्ताओं और योजनाकारों द्वारा आसानी से पहुंच के लिए आईसीएआर संस्थानों / एसएयू में उपलब्ध कृषि और संबद्ध क्षेत्रों से संबंधित जानकारी की मेटाडाटा सूची है।

इसके अलावा, रिपोर्ट के अवधि के दौरान, आईसीएआर-एटीएआरआई कोलकाता ज़ोन -4 और 5 में क्यूआरटी बैठकों की श्रृंखला आयोजित करने में भी शामिल था। सिंचाई प्रणाली, पोषण के प्रति संवेदनशील कृषि संसाधन

और नवाचार, कृषि में मूल्यवर्धन और प्रौद्योगिकी ऊष्मायन केंद्र, परम्परागत कृषि विकास योजना के तहत मॉडल क्लस्टर प्रदर्शन, राष्ट्रीय पशु रोग नियंत्रण कार्यक्रम, विभिन्न सरकारी कार्यक्रम के लाइव वेबकास्टिंग कार्यक्रम आदि। इस अवधि में किसानों के नवाचारों और सफलता की कहानियों के साथ साथ किसानों द्वारा बड़े पैमाने पर प्रौद्योगिकी अपनाने के कुछ मामले केवीके द्वारा दर्ज किए गए थे।

राज्य कृषि /पशु और मत्स्य विज्ञान विश्वविद्यालय के विस्तार शिक्षा निदेशालय ने केवीके कर्मियों की गतिविधियों की निगरानी करने और केवीके कर्मियों के ज्ञान को लगातार अद्यतन करने के लिए विभिन्न कार्यक्रमों का आयोजन करने में पर्याप्त रूप से समर्थन किया। आईसीएआर संस्थानों और एसएयू के तहत किसानों को संचालित एटीआईसी के माध्यम से सूचना और तकनीकी सहायता भी प्रदान की गई है। सभी संबंधित लोगों के संचयी प्रयास ने केवीके को समग्र कृषि और ग्रामीण विकास के लिए जिलों के भरोसेमंद ग्रामीण संगठन बनने के लिए किसान-अनुकूल पहल को और अधिक विकसित किया है।

आईसीएआर-एटीएआरआई, कोलकाता एक तरफ अपने जनादेश को पूरा करने और खेती समुदाय के सुधार के लिए सभी अनिवार्य और अन्य गतिविधियों को पूरा करने के लिए केवीके और विस्तार शिक्षा निदेशालय को समर्थन प्रदान करने में काफी हद तक शामिल है। आवश्यकता आधारित आधारभूत संरचना और वित्तीय सहायता प्रदान करने के अलावा, आईसीएआर-एटीएआरआई स्तर और केवीके दोनों में भी संपूर्ण वित्तीय प्रबंधन प्रणाली के लिए डिजिटलीकरण किया गया है। एसएसी बैठक में भाग लेने और केवीके द्वारा किए गए प्रमुख कार्यक्रमों के प्रदर्शन का आकलन करने के लिए प्रदर्शन क्षेत्र पर जाकर स्पॉट मूल्यांकन भी किया गया है। मानव संसाधन विकास केवीके कर्मियों के लिए आईसीएआर-एटीएआरआई, कोलकाता के हिस्से में उन्नत कृषि और सहयोगी प्रेक्टिस के बारे में अपने ज्ञान को विकसित करना एक नियमित विशेषता रही है। गरीब किसानों द्वारा अपने विकास के लिए केंद्र सरकार की किसान-अनुकूल योजनाएं/ संसाधन जैसे कार्यक्रमों का लाभ उठाने के लिए बड़ी संख्या में किसानों के बीच पर्याप्त प्रचार किया गया है। कई बड़े पैमाने पर कार्यक्रम में हासिल की गई सफलता को राज्य विस्तार तंत्र द्वारा बड़े पैमाने पर एक्सट्रापोलेशन के लिए दोहराया गया है। प्रभावी अभिसरण और कई राज्यों, केंद्रीय और अन्य संगठनों के सहयोग ने केवीके को प्रभावोत्पादक, उद्देश्य में सफलता तथा इसके उपयोग के लिए अतिरिक्त संसाधन /राजस्व अर्जित करने में भी मदद की है। आईसीएआर-एटीएआरआई, कोलकाता के स्तर पर विकसित काम की योजना और ईमानदारी से निष्पादन ने इस क्षेत्र के केवीके को कृषि को बदलने के लिए एक शक्तिशाली उपकरण बना दिया है।

EXECUTIVE SUMMARY

Division of states to place 717 KVKs at the disposal of eleven Agricultural Technology Application Research Institutes have eased the pressure of ATARIs towards looking after less number of KVKs to some extent. However, it has also compelled the ATARIs to work extra hour in understanding the social, economic and related aspects of the KVK clientele of the new states, prepare plan of action to suit their aspiration and ensure that all the efforts of KVKs are directed towards the betterment of the farming community. In this backdrop, the state of Odisha along with 33 KVKs functioning in all rural districts has come under the jurisdiction of ICAR-ATARI, Kolkata (Zone V) in place of Bihar and Jharkhand. Accordingly, ICAR-ATARI, Kolkata vests with the responsibility to monitor, evaluate and guide 59 KVKs of A&N Islands, Odisha and West Bengal during 2019.

With the revised mandates of ATARI vis-à-vis KVK, ATARI has laid more focus on strengthening agricultural extension research and knowledge management along with coordination and monitoring technology application and frontline extension education programme. The KVK on the other hand is concentrating on technology assessment and demonstration for its wider application and to enhance capacity building. Though the basic activities have remained identical, 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 made them an important link between research and extension at the grass root level.

In mandated activities, the KVKs of Zone-V achieved almost the entire set target in the areas of training, on-farm trial, frontline demonstration etc. during the year 2019. The KVKs assessed 394 identified technologies pertaining to crop cultivation, livestock rearing, fish cultivation, insect-pest management, drudgery reduction, storage technique etc. through 629 number of on farm trials conducted in 3667 different locations across the zone. The solution so found out was again tested in the form of small scale demonstration before feeding it to mainstream state extension system in the form of technology capsules. The feedback to research system is also provided for the necessary improvement/modification of the developed technology to suit the wider agro-ecological situation of the zone.

Frontline demonstrations have been conducted by the KVKs in pulse, oilseed and other crops to establish the production potentiality of the newly released varieties/package of practices to enhance the productivity of selected pulse and oilseed crops and faster the pace of seed replacement in the case of cereal and other crops. The KVKs brought 1580.82 ha under such demonstration programmes with the involvement of 7819 numbers of farmers. 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. Demonstration on livestock and fishery was also carried out by the KVKs in 7331 units through 3978 numbers of programmes.

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 upto desired level. In providing knowledge and skill, the KVKs organized 2943 number of courses for 85913 farmers and farm-women covering various aspects of crop production, horticulture, soil health management, agricultural engineering, livestock & fishery, home science, agricultural extension and many more. In respect of rural youths, however, such areas of capacity building was selected that could provide self-employment in farm and off-farm enterprises. In this process, 13432 rural youths including girls were trained through 604 numbers of courses. 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. The KVKs conducted 451 such courses for 13810 participants. In addition, the KVKs also organized vocational training programme of comparatively longer duration to expose the youths towards self-employment opportunity. In the process, 102 courses were conducted for 2788 youths.

The potentiality of KVKs in capacity development programme has adequately been recognized through awarding training programme to KVKs by Govt. and other organizations. The KVKs conducted 307 sponsored training programme for 8950 participants nominated by various organizations as per the need of the participants. Conducting large-scale awareness among farmers through various extension activities was another notable achievement of the KVKs. During the period reported upon, the KVKs conducted 52847 number of such extension activities with the involvement of 2952860 farmers, extension functionaries and others.

Providing quality seed and planting materials to the farmers is the perpetual requirement that KVKs try to meet up either producing seeds at KVK farm or through seed village programme in a participatory mode. The KVKs during the mentioned period produced 8820 q of quality seeds of major cereals and crops/ vegetables for addressing the issue of non-availability of seeds in time. KVKs also produced 50.1 lakh planting materials/seedlings of fruit crops, vegetables, flower, forest sp. etc. for quality production. Use of bio-product in agricultural field is becoming fast popular from environmental point of view and the KVKs produced 297305.2 kg of different bio-formulation to make available to 108758 number of farmers. Quality livestock strain and fish fingerling production was also given adequate importance by the KVKs through production of 7373935 number of such produce.

In soil and water analysis, the KVKs analyzed 19027 number of samples across the zone to provide soil health card to the farmers. The process has enabled the farmers to optionally utilize chemical fertilizer in crops for higher productivity as well as sustained soil health. Apart from the mandated activities, the KVKs also celebrated special day/week as a means to create awareness among farming community like technology week through public-private partnership, world soil day, national science day, world veterinary day and others. Such celebrations attracted good number of participants and provides the opportunity to elaborate the benefit of such programmes among the farmers. The KVKs also generated revenue worth Rs.682.8 lakh through various convergence programme at the district level. Such support helps the KVKs in extending its reach to the far-flung areas of the district to improve the existing agricultural situation.

Implementation of a good number of flagship programme both at ICAR-ATARI and through KVKs to ensure the fulfillment of the desired objectives has been the core activity on the part of ICAR-ATARI, Kolkata during last one year. Continuous supervision of the programmes has not only brought quality output but also made KVKs a household name among the farming community and policy makers at the highest level.

Implementation of Clustered Frontline Demonstration (CFLD) programme both for oilseed and pulse crops to enhance the productivity with particular emphasis on to utilize rice fallow has been another achievement recorded during last one year. In oilseed, average yield recorded in Regular programme was in the range of 19-54% whereas it was 34-50% in Additional programme. Higher yield was also observed in pulse crops during all three seasons, viz. kharif, rabi and summer. The average increase in yield was in range of 37.5 to 59.1%.

Creation of pulse seed hub in selected KVKs is a praiseworthy step to reduce the gap between requirement and supply of quality pulse seeds. In this zone, 10 seed hubs are engaged in producing seeds of identified pulse crops throughout the year covering three cropping seasons. The crops identified for seed production are pigeon pea, green gram, black gram, chick pea, lentil and field pea. During 2019, a total of 1674.7 q of quality seed was produced.

A farmer-centric programme in the form of Farmer FIRST is in operation in this zone through three ICAR Institutes and one State Agricultural University under ICAR-ATARI, Kolkata as the Nodal Institute to monitor the programme. The essence 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. Integrated nutrient management in paddy, introduction of newer varieties, supplementary feeding to fish, popularization of poultry breeds, improved water management methods, tissue culture banana, mini dal mill in the project area are some of the interventions executed by the institutes/SAU to bring overall improvement in livelihood of the selected farmers/farm families through this project. Four projects were undertaken in this Zone during 2019.

Involving and retaining rural youths in farm-led vocation is one of the challenges for policy makers

across the country. To find a suitable measure, Attracting and Retaining Youth in Agriculture (ARYA) – a project of Indian Council of Agricultural Research is implemented by ICAR-ATARI, Kolkata through 9 KVKs of this zone. Based on the opportunity to create commercial venture in the districts, enterprises have been selected to provide financial and technical support to the identified youths in a phased manner. The efforts of KVK and supervision of ICAR-ATARI, Kolkata has enabled 300 rural youths to establish their enterprises for enhanced annual income in a sustained manner. The success of this project has motivated other rural youths also to take off-farm enterprises for their livelihood.

In addressing the development needs of the disadvantageous part of the population, a specific programme namely Tribal Sub Plan (TSP) is under operation in 10 districts of this zone having sizeable tribal population. 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. The assessment done indicates that 184 tribal villages have been brought under this project for the benefit of 17420 farmers during 2019.

National Innovation in Climate Resilient Agriculture is another programme in operation in Zone V through 9 KVKs monitored by ICAR-ATARI, Kolkata. 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, cyclonic storm erratic rainfall etc. Successful implementation of technology components like summer ploughing, green manuring, zero tillage, organic mulching, BBFS, carbon sequestration followed by water saving irrigation methods, artificial ground water recharge, creation of large scale water harvesting structures, renovation of ponds etc. have not only created positive impact in the NICRA villages but also paved the way for its outscaling in other districts for the benefit of the farmers. Popularization of alternate cropping pattern, introduction of suitable crop varieties, innovative methods like community nursery, emphasis on fodder cultivation, creation of VCRMC and custom hiring system and other components carried out through this programme have immensely benefitted the farmers of vulnerable districts.

Gramin Krishi Mausam Sewa through establishment of District AgroMet Unit (DAMU) was initiated during last year and out of 16 selected KVKs of Odisha and West Bengal, 6 KVKs started functioning during the year 2019. The significant activity, among others, was weather farecast related messaging which was to the tune of 624 catering to about 45000 farmers.

A collaborative programme with Agriculture Skill Council of India (ASCI) on development of entrepreneurship through imparting skill training is being carried out by selected KVKs of this zone. A Training of Trainers was also organized for providing subsequent training at KVK level and a total of 1202 farmers/ rural youth were trained by 45 training institutions.

Other significant achievements of ICAR-ATARI, Kolkata include finalization of implementable action plan for the states of Odisha and West Bengal towards doubling farmer's income by 2022. The plan of action was prepared in consultation with SAUs, ICAR Institutes, State Govt. officials, KVK personnel and other stakeholders. Measures like reduction in cost of cultivation, ensured MSP, farm mechanization, crop diversification, reduction in post harvest loss, infrastructure facility including cold storage, marketing intelligence, use of ICT etc. were suggested to make doubling farmers income a reality. During 2019, 118 villages through 59 KVKs across the zone were involved in this programme benefitting 4477 farmers.

In facilitating direct interaction between scientists and farmers, 17 ICAR Institutes and 2 SAUs of this zone are implementing Mera Gaon Mera Gaurav progamme under the supervision of ICAR-ATARI, Kolkata. The activities like regular visit to villages, interface meeting, training, demonstration, mobile based advisories, creation of awareness etc. have been taken up for the benefit of 32354 farmers. So far, 385 villages have been covered under this programme.

In view of improving cereal based cropping system with emphasis on conserving natural resource base, reducing cost of cultivation, augmenting farmer income and ensuring better livelihood of the farmers, CSISA (Cereal System Initiative in

South Asia) project in collaboration with ICAR is under operation in two districts of this zone. Crop establishment method, weed management in DSR and rabi crop in sequence under Zero Tillage are some of the technologies evaluated in this project. During the year, the landscape diagnostic survey/ production practices survey was done by 17 KVKs of this Zone.

KVK Knowledge Portal monitored by ICAR-ATARI, Kolkata 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. The KVKs are putting up information related to facilities available, past and upcoming events, package of practices, details of programmes implemented, monthly performance report etc. in this portal for the farmers to know about such events and to facilitate the review and monitoring at the national level. Alongside, KRISHI Portal is also regularly uploaded with technology, publication, experimental data, observational data, survey data and geo-portal. This repository is a metadata inventory of information regarding agriculture and allied sectors which is available at ICAR Institutes/SAUs for its easy access by the farmers, researchers and planners.

Besides, during the period under report, ICAR-ATARI Kolkata was also involved in conducting series of QRT meetings across the Zone IV and V. New initiatives were also implemented viz., New Extension Methodologies and Approaches, Krishi Kalyan Abhiyan, Establishment of Micro-irrigation System, Nutri-sensitive Agricultural Resources and Innovations, Value Addition and Technology Incubation Centres in Agriculture, Model Cluster Demonstrations under Paramparagat Krishi Vikas Yojana, National Animal Disease Control Programme, Live Webcasting of various Govt. programmes etc. Some cases of large scale technology adoption by the farmers were recorded by KVKs during this period alongwith the farmers' innovations and success stories.

Directorates of Extension Education of State Agricultural/Animal & Fishery Science University have adequately extended supporting hands in overseeing the activities of KVKs and organizing various programmes to continuously update the knowledge of KVK personnel. Information and technological support have also been provided through the ATICs operating under ICAR Institutes and SAU to the farmers. The cumulative endeavour of all concerned has developed the KVKs to take up more number of farmer-friendly initiatives to become the trustworthy rural organization of the districts for the overall agricultural and rural development.

ICAR-ATARI, Kolkata has been intensely involved in carrying out its mandate in one hand and extending support to KVKs and Directorates of Extension Education for taking up all the mandated and other activities for the betterment of farming community. Apart from providing need based infrastructure and financial support, digitization has been done for entire financial management system both at ICAR-ATARI level and KVK as well. On the spot evaluation has also been carried out through attending SAC meeting and visit to demonstration field to assess the performance of flagship programmes carried out by KVKs. Human resource development has been a regular feature on the part of ICAR-ATARI, Kolkata 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 earn additional resources/revenue for its use in productive, purpose. The plan of work developed at the level of ICAR-ATARI, Kolkata and its execution with utmost sincerely have made the KVKs of this zone a powerful tool to transform the agriculture.

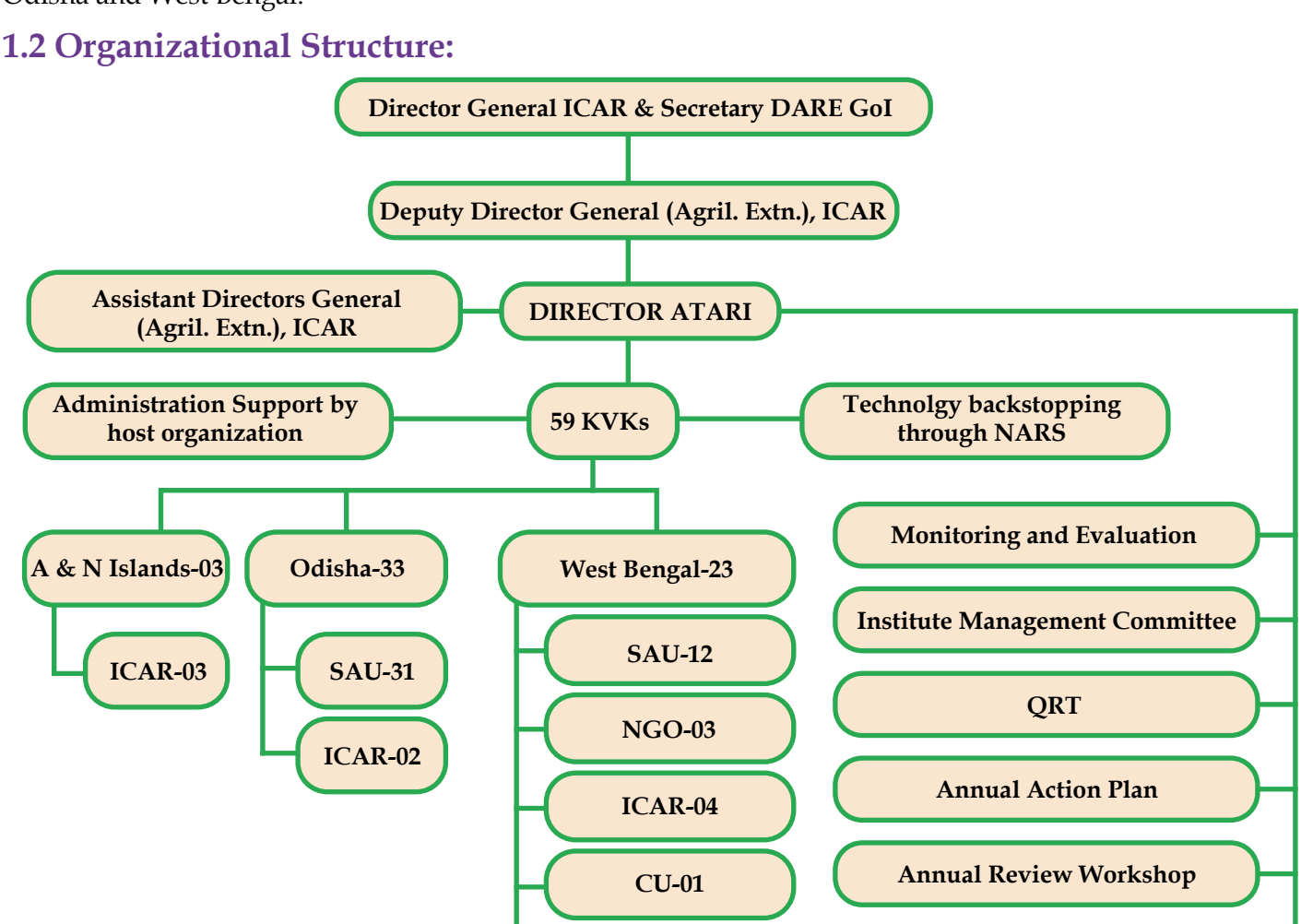
1.0 INTRODUCTION

In a bid to effectively run the KVK system in the country, Indian Council of Agricultural Research has approved 11 Agricultural Technology Application Research Institutes to look after and guide the activities of 720 KVKs functioning in almost all the rural districts of the country. In a few larger districts, additional KVK has also been established by ICAR to meet up the technological and information support to all the households. In the process, ICAR-ATARI, Kolkata has been entrusted with the responsibility of monitoring 59 KVKs spread across A&N Islands, Odisha and West Bengal.

1.1 Profile:

ICAR-ATARI, Kolkata like all other ten ATARIs is functioning as an integral part of Division of Agricultural Extension, New Delhi headed by the Deputy Director General (AE).All the SMDs in ICAR including Division of Agricultural Extension come under the office of Secretary (DARE) and Director General (ICAR). The organizational structure of ICAR-ATARI, Kolkata is depicted below through a concise chart.

1.2 Organizational Structure:



1.3 Budget Provision:

It is always ensured that KVKs receive fund in time throughout the year for the mandated activities and to meet up other requirements. Thus, providing need based fund to the KVKs of this zone is of utmost importance in running the KVKs. Accordingly, assessment of budget requirement, placing demand for fund and releasing fund are carried out by this Institute on a regular basis. The process helped 59 KVKs and 4 Directorates of Extension Education of the SAUs of this zone to receive a sum of Rs.7706.03 lakh during 2019-20 from ICAR-ATARI, Kolkata. Head-wise details are as follows:

Table : Budget in respect of ICAR-Agricultural Technology Application Research Institute & KVKs under Zone-V during 2019-20

(Rs. in lakh)

ATARI/KVK	Recurring							Non-Recurring					Revol. Fund	Grand total
	P & A	T.A.	H.R.D	Cont.	TSP Cont.	SCSP Cont.	Total	Equip.& furn	Works	Lib.	Vehicle	Total		
ICAR-ATARI, Kolkata	315.00	19.00	1.50	66.30	0.00	0.00	401.80	0.98	0.00	0.00	0.00	0.98	0.00	402.78
State Agricultural University														
OUAT, Bhubaneswar (31)	2587.00	39.50	9.30	276.50	77.40	72.00	3061.70	0.00	410.96	3.10	16.00	430.06	0.00	3491.76
UBKV, Coochbehar, West Bengal (5)	652.00	7.10	1.50	10.50	0.00	61.00	732.10	0.00	8.19	0.50	0.00	8.69	0.00	740.79
BCKV, Nadia, West Bengal (4)	462.10	3.85	1.20	3.00	0.00	51.50	521.65	0.00	34.99	0.40	0.00	35.39	0.00	557.04
WBUA&FS, Kolkata (3)	427.00	3.40	0.90	2.50	0.00	38.30	472.10	0.00	4.70	0.30	0.00	5.00	0.00	477.10
ICAR														
ICAR-CIARI, A&N Islands (3)	360.00	7.00	0.90	38.00	8.98	0.00	414.88	0.00	0.00	0.30	0.00	0.30	0.00	415.18
ICAR-CRRI, Cuttack, Orissa (1)	77.00	1.30	0.30	11.00	0.00	4.00	93.60	0.00	0.00	0.10	0.00	0.10	0.00	93.70
ICAR-CIFA, Bhubaneswar, Orissa (1)	163.50	1.00	0.30	13.00	0.00	3.00	180.80	0.00	0.00	0.10	0.00	0.10	0.00	180.90
CRIJAF, West Bengal (2)	192.00	6.05	0.60	4.20	0.00	20.50	223.35	0.00	9.99	0.20	0.00	10.19	0.00	233.54
ICAR-CISH, Lucknow (1)	0.00	0.50	0.00	0.00	0.00	9.00	9.50	0.00	12.09	0.10	0.00	12.19	0.00	21.69
ICAR-NDRI, Karnal (1)	0.00	0.80	0.30	1.00	0.00	12.00	14.10	0.00	19.89	0.10	0.00	19.99	0.00	34.09
Central Univerisity, Visva Bharati, West Bengal (1)	135.00	0.80	0.30	1.00	0.00	13.50	150.60	0.00	5.00	0.10	0.00	5.10	0.00	155.70
Deemed Univerisity, RKMVERI, West Bengal (2)	213.40	2.30	0.60	4.00	0.00	25.50	245.80	0.00	99.96	0.20	0.00	100.16	0.00	345.96
State Govt. Undertaking														
WBCADC, Kolkata (1)	48.00	0.90	0.30	0.00	0.00	8.70	57.90	0.00	0.00	0.10	0.00	0.10	0.00	58.00
NGO														
West Bengal (3)	368.00	2.70	0.90	1.00	0.00	36.00	408.60	0.00	5.00	0.30	16.00	21.30	0.00	429.90
Strengthening of DEEs														
DEE, OUAT, Bhubaneswar	0.00	2.50	2.00	20.00	0.00	0.00	24.50	0.00	0.00	0.00	0.00	0.00	0.00	24.50
ATIC, Bhubaneswar	0.00	0.20	0.30	5.50	0.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00
DEE, UBKV, Coochbehar, WB	0.00	0.70	2.00	11.30	0.00	0.00	14.00	0.00	0.00	0.00	0.00	0.00	0.00	14.00

ATARI/KVK	Recurring							Non-Recurring					Revol. Fund	Grand total
	P & A	T.A.	H.R.D	Cont.	TSP Cont.	SCSP Cont.	Total	Equip.& furn	Works	Lib.	Vehicle	Total		
DEE, BCKV, Nadia, WB	0.00	1.00	2.20	7.50	0.00	0.00	10.70	0.00	0.00	0.00	0.00	0.00	0.00	10.70
DEE, WBUA&FS, Kolkata, WB	0.00	2.00	2.20	8.50	0.00	0.00	12.70	0.00	0.00	0.00	0.00	0.00	0.00	12.70
GRAND TOTAL	**6000.00**	**102.60**	**27.60**	**484.80**	**86.38**	**355.00**	**7056.38**	**0.98**	**610.77**	**5.90**	**32.00**	**649.65**	**0.00**	**7706.03**

2.0 Krishi Vigyan Kendras

The farming community needs regular access to newer agricultural and allied technologies developed by SAUs and research institutes for the betterment of their economic and social condition. To facilitate the process of making technologies available at the doorstep of the farmers, Indian Council of Agricultural Research established Krishi Vigyan Kendras for the rural districts of the country since 1974. Alongside, capacity development of farmers, rural youths and extension functionaries, fostering technology diffusion process in a holistic manner is also vested with the KVKs. To cater to the technology and information needs of the farmers, Krishi Vigyan Kendra is working as the link between National Agricultural Research System (NARS) and Transfer of Technology System (TOT) through effective convergence with state and other organs. Apart from the set mandated activities, the KVKs are also involved in a number of flagship programmes of state/central government to achieve the desired objectives.

2.1 Genesis of KVK:

The journey of KVK started in the form of polytechnique for providing vocational training. Later on objectives of other programmes like Lab to Land, National Demonstration etc. were merged into an institutional shape in the form of Krishi Vigyan Kendra. The first KVK was established in 1974 at Puducherry under Tamilnadu Agricultural University followed by the second KVK in West Midnapore district of West Bengal of this zone. During the same plan period other two KVKs were also established, one at South 24 Pgs of West Bengal (Nimpith) and Khorda, Odisha. During VI Five Year Plan, 7 KVKs were established of which six in Odisha and one in West Bengal followed by 6 KVKs during Annual Plan of 1090-92. The process of establishment of KVKs continued in each Five Year Plan and 4 KVKs were established during VIII Five Year Plan. In IX Five year plan, this zone was approved only one KVK but 26 KVKs were established during X Five year plan. In the next two Five Year Plan periods, 6 KVKs each were established in this zone. However, in XII Five year plan, 5 additional KVKs were established in 5 larger districts of West Bengal namely, Murshidabad, Nadia, North 24 Pgs, South 24 Pgs and Malda.

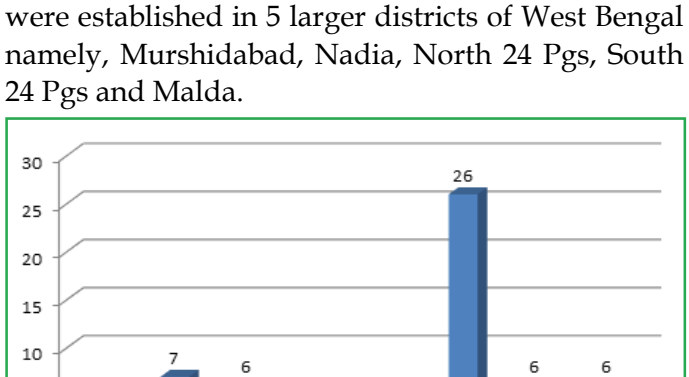


Figure : No of KVKs opened in Zone V

2.2 Mandate:

The mandate of KVK has been changed many a times as per the need of stakeholders for better application of policy initiatives in agricultural development. The present mandate of KVK is Technology Assessment and Demonstration for its wider Application and to enhance Capacity Development (TADA-CD). For accomplishment of the existing mandate the following activities are entrusted with the functioning of KVKs.

- Conduct on-farm trials to identify the location specificity of agricultural technologies under various farming systems.

- Organize frontline demonstrations to establish production potential of various crops and enterprises on 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.

2.3 State-wise distribution of KVK:

State/Union Territory-wise distribution of KVKs under ICAR-ATARI, Kolkata indicates that in Odisha 33 KVKs are working in all 31 districts, 23 KVKs are functioning in West Bengal and 3 KVKs are in operation in A&N Islands. The details of state-wise and host organization-wise distribution of KVKs are given below.

Table: State wise status of Krishi Vigyan Kendras

Name of the State	No. of Districts	No. of KVKs under						TOTAL
		SAU	ICAR	DU	CU	NGO	SDA	
A&N Islands	3	-	3	-	-	-	-	3
Odisha	30	31	2	-	-	-	-	33
West Bengal	23	12	4	2	1	3	1	23
Total	**59**	**43**	**9**	**2**	**1**	**3**	**1**	**59**

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

Table: Host organization wise status of Krishi Vigyan Kendras

Sl. No.	State/UT	Host Institution	Total
1.	**A & N Islands (3)**	Central Agricultural Research Institute (ICAR), Port Blair	**3**
2.	**Odisha (33)**	Orissa University of Agriculture & Technology, Bhubaneswar	**31**
		ICAR-National Rice Research Institute, Cuttack	**1**
		ICAR-Central Institute of Fresh Water Aquaculture, Bhubaneswar	**1**
3.	**West Bengal (23)**	Bidhan Chandra KrishiViswavidyalaya, Nadia (SAU)	**4**
		Uttar BangaKrishiViswavidyalaya, Coochbehar (SAU)	**5**
		West Bengal University of Animal & Fishery Sciences, Kolakta (SAU)	**3**
		VisvaBharati, Bolpur, Santiniketan (CU)	**1**
		Central Research Institute of Jute and Allied Fibres, (ICAR) Barrackpore	**2**
		W.B. Comprehensive Area Development Corporation (SDA)	**1**
		Kalyan, Purulia (NGO)	**1**
		SevaBharati, Jhargram (NGO)	**1**
		Rama Krishna Ashram, South 24 Parganas (NGO)	**1**
		Ram Krishna Mission Vivekananda University, Belur Math (DU)	**2**
		ICAR-ERS NDRI Kalyani, Nadia (ICAR)	**1**
		ICAR-CISH Regional Station, Malda (ICAR)	**1**
Total			**59**

2.4 Manpower:

The achievement of KVKs in both mandated and associated activities greatly depends on deployed manpower. All the host organizations having KVK in this zone are constantly pursued to fill up the vacant posts on priority. In non-ICAR run KVKs, there has been recruitment but the ICAR-run KVKs are still suffering due to skeleton staff strength. The summary of staff position is given below.

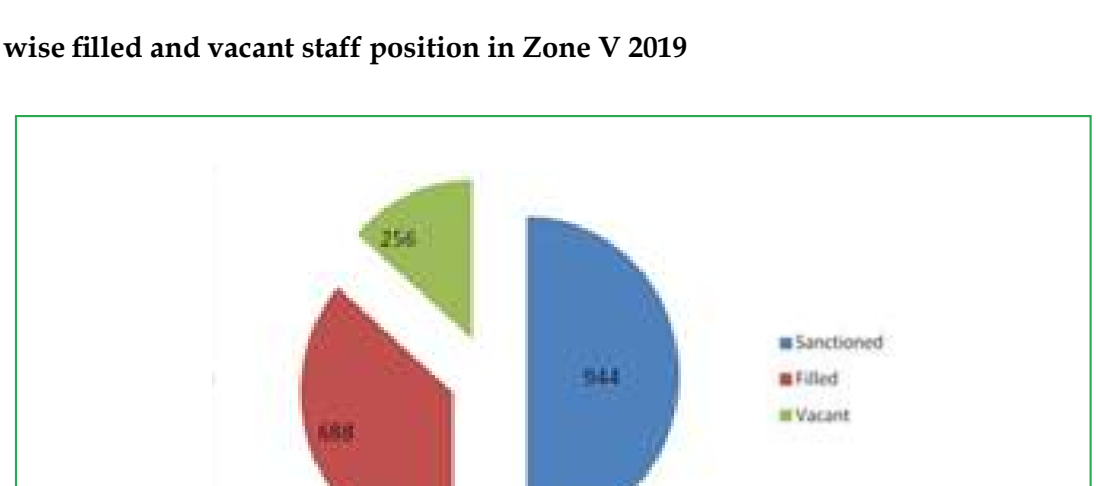
Table: State-wise staff position under ICAR-ATARI, Kolkata
Scientific and technical

Name of the State	Sr. Scientist and Head			Subject Matter Specialist/T-6			Farm Manager/T-4			Program Assistant (computer)/T-4			Program Assistant (lab technican)/ T-4		
	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V
A&N Islands	3	1	2	18	13	5	3	2	1	3	1	2	3	1	2
Odisha	33	29	4	198	139	59	33	27	6	33	31	2	33	23	10
West Bengal	23	19	4	138	92	46	23	15	8	23	17	6	23	17	6
TOTAL	**59**	**49**	**10**	**354**	**244**	**110**	**59**	**44**	**15**	**59**	**49**	**10**	**59**	**41**	**18**

Administrative staff and total staff

Name of the State	Assistant			Stenographer grade III			Driver/T-1			Skilled Support Staff			Total		
	S	F	V	S	F	V	S	F	V	S	F	V	S	F	V
A&N Islands	3	1	2	3	2	1	6	5	1	6	2	4	**48**	**28**	**20**
Odisha	33	0	33	33	28	5	66	65	1	66	58	8	**528**	**400**	**128**
West Bengal	23	16	7	23	12	11	46	36	10	46	36	10	**368**	**260**	**108**
TOTAL	**59**	**17**	**42**	**59**	**42**	**17**	**118**	**106**	**12**	**118**	**96**	**22**	**944**	**688**	**256**

Percentage wise filled and vacant staff position in Zone V 2019



2.5 Infrastructure facilities:

The matter of providing adequate infrastructure to the KVKs of this zone has been given priority to help KVKs discharge their responsibilities in a better way. Barring a few KVKs, rest are having administrative building, farmers' hostel, staff quarter and demonstration unit. A few KVKs are also having other facilities. The summary of infrastructure facilities available with KVKs is given below.

Table: Status of Infrastructure facilities

Name of the State/ UT	Admn. Bldg.	Farm-ers Hostel	Staff Qtrs,	De-mons. Unit	Soil and Water Testing Labora-tory	Rain Water har-vesting struc-ture	Inte-grated Farm-ing Sys-tem	Min-imal process-ing facility	e-Con-nec-tivity (ER-NET)	Carp hatch-ery	Solar Panel	Tech-nology Infor-mation Unit	Mi-cronu-tient Facil-ity	Trac-tor	Four Wheel-er	Two Wheel-er
A & N Islands	2	1	1	2	1	1	0	0	3	1	0	0	0	1	2	6
Odisha	32	28	19	116	27	0	14	4	8	10	0	3	3	30	30	49
West Bengal	23	23	16	54	13	9	10	8	4	7	1	5	5	22	23	38
Total	**57**	**52**	**36**	**172**	**41**	**10**	**24**	**12**	**15**	**18**	**1**	**8**	**8**	**53**	**55**	**93**

2.6 Thrust Areas:

In a bid to formulate effective and implementable plan of action, the KVKs have identified the major thrust areas of the district including agriculture, horticulture, animal husbandry, fishery, drudgery reduction, nutritional requirement, entrepreneurship development and others. Based on available expertise, the KVKs address the issues in a sustained manner. The identified thrust areas are:

- Varietal substitution of field crops
- Enhancement of water use efficiency through micro-irrigation system
- Crop diversification
- Promotion of IFS
- Improvement of livestock sector with feed and other management practices
- Soil health management
- Economic improvement of farm women
- Drudgery reduction
- Value addition and minimization of post harvest loss
- Popularization of fodder production technology
- Management practices in fishery
- Application of RCT
- Application of ICT towards agricultural development
- Entrepreneurship development among rural youths
- Development of suitable strategy to combat climatic vulnerability towards crops and livestock production

3.0 About Agricultural Technology Application Research Institute (ATARI) Kolkata

ICAR-Agricultural Technology Application Research Institutes ATARI came into existence during July 2015 as upgradation of Zonal Project Directorates. All such eight (8) Zonal Project Directorates were renamed as ATARI with the inclusion of research component in its functioning. With the increase in the number of Krishi Vigyan Kendras across the country, it was felt necessary to create additional ATARIs to bring parity in the monitoring and evaluation process. Accordingly, three additional ATARIs were created and the jurisdiction of all eleven ATARIs was re-adjusted keeping more or less equal number of KVKs under them. In the same process, ICAR-ATARI, Kolkata started monitoring and evaluating the activities of 59 KVKs functioning in A&N Islands, Odisha and West Bengal.

The present network of 720 KVKs spread across the country is centrally governed by Division of Agricultural Extension under Indian Council of Agricultural Research, headed by Deputy Director General. The guidelines of administrative, financial and overall functioning of KVK are provided by

Division of Agricultural Extension. The ATARIs send regular report to Division of Agricultural Extension in all areas of KVK functioning.

Apart from looking after KVK activities and providing need based support, ICAR-ATARI, Kolkata is also implementing a number of flagship programme of DAC&FW, ICAR, IMD, I&B, Ministry of Tribal Affairs, Deptt. of Forestry, Ministry of Petroleum and others through selected KVKs of this zone. A number of other organizations have also been allowed to work with KVKs in the areas of fuel efficiency, water management, farm mechanization, plantation of sapling, fertilizer awareness etc. Collaboration with CYMMIT through CSISA project has also been established in this zone.

Capacity development for the manpower of KVKs has been taken up by this ATARI on a regular basis either through organizing specialized training programme at this institute or in collaboration with other ICAR institutes for improving the knowledge and skill level of the KVK personnel. The scientific, administrative and other staff of this institute are also encouraged to undergo specialized programme organized by national/international institutes. Application of ICT in monitoring of KVK activities has been ensured followed by financial transaction through Public Financial Management System. All the KVKs have been brought under this system for effortless transaction of fund at the shortest possible time.

3.1 Revised mandate:

The revised mandates of Agricultural Technology Application Research Institute are as follows:-

1. Coordination and monitoring technology application and Frontline Extension Education Programs.
2. Strengthening Agricultural Extension Research and Knowledge Management

The Agricultural Technology Application Research Institute, Kolkata takes up the following functions to achieve the above mandates.

- Formulate, implement, monitor, guide and evaluate the programmes and activities of KVKs.
- Coordinate the work relating to KVKs and ATICs implemented through various agencies such as SAUs, ICAR institutes, voluntary agencies and development departments.
- Coordinate with State/Central Government organizations, financial institutions and other organizations for successful implementation of programmes.
- Partner with Directorates of Extension Education of SAUs in assured technological backstopping to KVKs and appropriate overseeing of KVK activities.
- Strengthen the Directorates of Extension Education of SAUs with financial support.
- Serve as feedback mechanism from the projects to research and extension systems.
- Implement projects of ICAR like NICRA, NIFTD 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 Position of ATARI:

The Agricultural Technology Application Research Institute, Kolkata is having total sanctioned staff strength of 18, out of which 14 were filled up on 31.12.2019.

Table: Staff strength of ATARI, Kolkata

Category	Sanctioned	Filled
Director (RMP)	1	1
Scientific	6	6
Technical	1	1
Administrative	8	5
Skilled Supporting Staff (Gr. II)	2	1
Total	**18**	**14**

3.3 Institute Management Committee:

The 13th Institute Management Committee Meeting was held on at ICAR-ATARI, Kolkataunder the Chairmanship of Director, ICAR- ATARI, Kolkata. Eight members participated in the meeting and considered two proposals made by the Institute on approval for procurement of office vehicle. The recommendations were sent to the Council. A brief

presentation was also made on the achievement by the Institute.

3.4 New Initiatives of ATARI Kolkata:

ICAR-ATARI Kolkata, besides performing its regular monitoring activities, also encouraged the KVKs of this zone to get them involved in a number of programmes depending on the farmers need in the district and expertise of the KVKs to better contribute towards growth of agriculture and allied sectors. Some of the programmes of national importance which were undertaken by KVKs during 2019 and newly conceived ATARI activities are enlisted as under:-

- NICRA- National Innovation in Climate Resilient Agriculture
- GKMS –Gramin Krishi Mausam Seva
- CFLD- Clustered Front Line Demonstration
- ARYA-Attracting and Retaining Youth in Agriculture
- CSISA-ICAR collaborative Project Phase III
- FFP- Farmer First Programme
- TSP- Tribal Sub Plan
- Doubling Farmers income
- New extension methodologies and approaches (NEMA)
- Krishi Kalyan Abhiyan (KKA, Phase – I, II, III)
- Nutri-sensitive agricultural resources and innovations (NARI)
- Value addition and technology incubation centre in agriculture (VATICA)
- Model cluster demonstration under Paramparagat KrishiVikasYojana(PKVY)
- Pradhan Mantri Kisan Samman Nidhi Yojana (PMKSNY)
- Collaborative project on agro-forestry
- Agro-ecotourism
- SAP- Swachhta Action Plan
- SCSP- Schedule Caste Sub Plan
- KSHAMTA
- CSC-Common Service Centre
- Digital farming initiative in agriculture
- Indigenous cow based Kamdhenu project
- DAESI—Diploma in Agricultural Extension Service for input dealers
- Seed Hub
- MGMG-Mera Gaon Mera Gaurav
- Farm mechanization
- IFS-Integrated Farming system

4.0 Achievements

4.1 Technology Assessment:

4.1.1 On-farm Trials:

On farm trails were conducted as a part of mandated activities of Krishi Vigyan Kendras spread over the states of Odisha ,West Bengal and Andaman and Nicobar Islands. The various technologies evolved by the research institutions/ universities are tested in farmers field. These on-farm trails cover all the disciplines addressing the local problems and issues. The issues addressed the productivity enhancement, plant protection measure, value addition, integrated nutrient management, livestock management and different enterprises.

4.1.2 Area-wise Trials Conducted:

A number of thematic areas were chosen to conduct on-farm trial by the KVKs of Zone V during 2019. Most favoured thematic areas in which on-farm trials were conducted was varietal evaluation. It was followed by integrated nutrient management. The assessed technologies also included Integrated pest management, integrated crop management, evaluation of animal breed, nutrition of animal, processing and value addition, post harvest technology and value addition. About 29 thematic areas were chosen for assessment of technology as depicted in the graph.

4.1.3 Thematic area-wise Trials Conducted:

Technologies related to crop, livestock enterprise, integrated farming system, storage techniques, integrated nutrient management, integrated disease management were assessed in the farmers' field. During 2019, about 629 OFTs were conducted by 59 KVKs and 3667 trials were laid down to conduct these OFTs.

As observed in other years, maximum number of trials was conducted in the areas of varietal evaluation (98 OFTs) in 630 trials. Integrated nutrient management was also an important area for evaluation where 80 OFTs were laid out in 500 trials. In the thematic area of integrated pest 64 OFTs were conducted in 368 trials, while integrated crop management was taken up trials in 34 OFTs, Weed management (34 OFTs) and integrated disease management (39 OFTs). In livestock sector, production and management of livestock (2 OFTs) and feed and fodder management (27 OFTs) were mostly conducted OFTs. OFTs (18) were also conducted in different areas of fishery technology. In other areas like processing and value addition (20 OFTs), drudgery reduction (70 OFTs), small scale income generation (8 OFTs), mechanization (7 OFTs) were conducted to assess the technologies. The details of On-farm trials conducted are given in below table:

A state-wise analysis of OFTs revealed that West Bengal conducted 253 OFTs through 1397 trials. Trials are mainly in the areas of integrated nutrient management (32 OFTs), varietal evaluation (23 OFTs), integrated pest management (20 OFTs), production and management of livestock (17), fishery (12), drudgery reduction, processing and value addition health and nutrition (20 OFTs each).

Table: State-wise details of on-farm trials conducted by the KVKs

Thematic areas	Number of OFT	No. of trials	Number of OFT	No. of trials	Number of OFT	No. of trials	Number of OFT	No. of trials
	A & N Islands		Odisha		West Bengal		Total	
1. Crop Production								
Integrated Nutrient Management	6	16	42	296	32	187	80	500
Varietal Evaluation	0	0	75	487	23	143	98	630
Integrated Pest Management	2	6	42	276	20	90	64	368
Integrated Crop Management	2	14	16	118	16	95	34	215
Integrated Disease Management	2	6	15	122	22	114	39	238
Small Scale Income Generation Enterprises	2	6	1	13	5	21	8	36
Weed Management	0	0	23	139	11	47	34	186
Resource Conservation Technolo gy	2	10	0	0	4	30	6	32
Farm Machineries	0	0	11	53	3	30	14	83
Integrated Farming System	0	0	0	0	5	16	5	16
Seed / Plant production	2	10	2	7	11	44	15	53
Post-Harvest Technology / Value addition	0	0	3	14	1	10	4	24
Drudgery Reduction	0	0	3	14	0	0	3	14
Storage Technique	0	0	2	13	2	20	4	33
Others	4	20	13	70	19	102	36	176
Total	**22**	**88**	**248**	**1622**	**174**	**949**	**444**	**2604**
2. Livestock								
Disease Management	3	26	3	19	2	11	8	56
Evaluation of Breeds	5	16	8	69	3	13	16	98

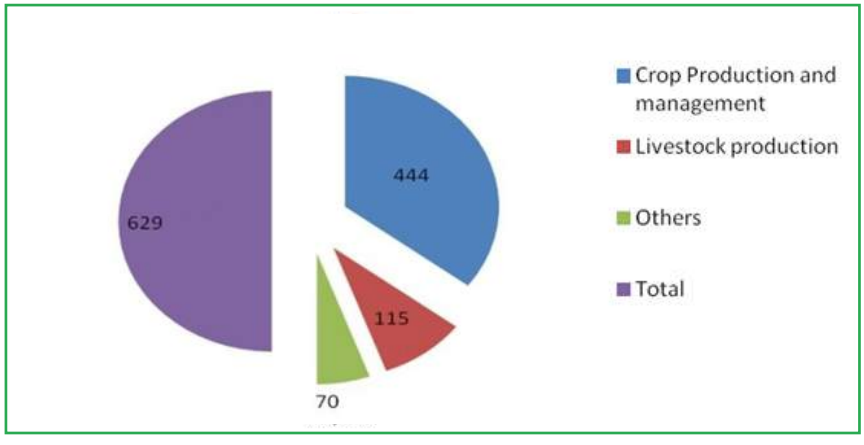
Thematic areas	Number of OFT	No. of trials	Number of OFT	No. of trials	Number of OFT	No. of trials	Number of OFT	No. of trials
	A & N Islands		Odisha		West Bengal		Total	
Feed and Fodder management	1	7	13	83	13	69	27	159
Nutrition Management	3	14	8	93	9	49	20	153
Production and Management	0	0	9	56	17	120	26	176
Fishery	2	1	4	19	12	75	18	95
Total		**64**	**45**	**339**	**56**	**337**	**115**	**737**
3. Other								
Drudgery reduction	0	0	5	38	2	7	7	45
Health and nutrition	0	0	0	0	2	14	2	14
Processing and value addition	9	6	9	51	2	7	20	64
Energy conservation	0	0	0	0	1	10	1	10
Small-scale income generation	0	0	8	62	0	0	8	62
Agroforestry management	0	0	3	15	1	10	4	25
Mechanization	0	0	5	23	2	20	7	43
Resource conservation technology	0	0	2	9	0	0	2	9
Any other	0	0	6	11	13	43	19	54
Total	**9**	**6**	**38**	**209**	**23**	**111**	**70**	**326**
Grand Total	**45**	**135**	**331**	**2170**	**253**	**1397**	**629**	**3667**

In the state of Odisha, a large number of trials were laid in the area of varietal evaluation (75 OFTs), while the thematic areas like integrated nutrient management and integrated pest management (42 OFTs each) were conducted. Weed management was also taken up for evaluation in 23 OFTs in the state. In livestock, feed and fodder management (13 OFTs), production and management (9 OFTs), evaluation of breed (8 OFTs) were taken for assessment of technologies. In other areas, processing and value addition (9 OFTs), small scale income generation (8 OFTs) and mechanization (5 OFTs) were undertaken to verify the available technologies.

In the UT of A&N Islands, 45 OFTs were conducted through 135 trials. Assessment was done mostly in the areas of processing and value addition (9 OFTs). integrated nutrient management (6 OFTs) and evaluation of breeds (5 OFTs),

The OFTs which were tested for 2-3 years and proven beneficial were selected for demonstration, which is the basic purpose of on-farm trials.

Distribution of OFT in different thematic areas



4.1.4 Details of Selected On-farm Trials

Andaman & Nicobar Islands

Port Blair KVK

Thematic area: Varietal management

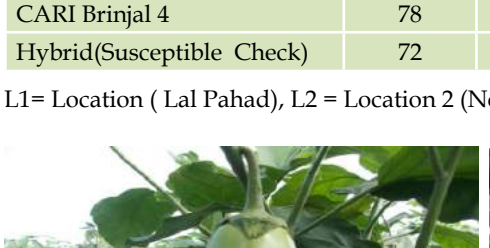
Study on development of Biotic Stress Resistant Lines in Brinjal (*Solanum melongena*)

Three bacterial wilt resistant brinjal lines were evaluated through on-farm trial for yield and disease resistance with two checks, viz CARI Brinjal 1 (resistant check), Hybrid Check (susceptible check) during dry spell (Jan-May). The OFT/Experiment was conducted in CRBD with three replications at two multi-located areas, Lal Pahad and New Manglutan villages of South Andaman in association with Field Crop Improvement and scie. The planting was done at the inter-row and inter-plant spacing respectively of 65 and 45 cm. Observation were recorded for 9 yield and yield attributing characters. Data revealed that all 3 developed lines were found superior for fruit yield/plant over the hybrid check. CARI Brinjal 3 gave highest fruit yield/plant (362.96 g), compared to the best hybrid check variety (163.70g). However bacterial wilt disease incidence was recorded at fortnightly interval from 15 days of planting to 120 days. CARI Brinjal 2 and CARI Brinjal 3 were found resistant, while CARI Brinjal 4 was found to be medium susceptible.

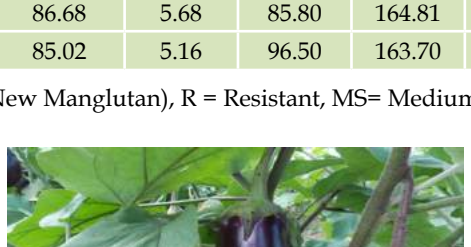
Table: Performance of Bacterial wilt resistant brinjal lines

Variety	Days of flowering (50%)	Plant height (cm)	No of Fruits/ plant	Fruit weight (g)	Fruit yield /plant (g)		Disease index (%)		Category
					L1	L2	L1	L2	
CARI Brinjal 1 (Resistant check)	77	96.98	2.59	206.62	314.81	596.91	7.14	4.94	R
CARI Brinjal 2	76	90.37	6.85	76.25	227.78	758.33	9.52	6.17	R
CARI Brinjal 3	76	94.54	7.89	80.93	362.96	760.80	14.28	6.17	R
CARI Brinjal 4	78	86.68	5.68	85.80	164.81	756.17	40.47	18.52	MS
Hybrid(Susceptible Check)	72	85.02	5.16	96.50	163.70	713.58	88.08	39.51	S

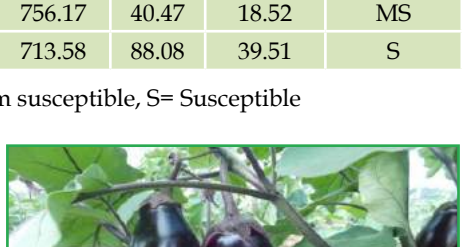
L1= Location (Lal Pahad), L2 = Location 2 (New Manglutan), R = Resistant, MS= Medium susceptible, S= Susceptible



CARI BRINJAL-1



CARI BRINJAL-2



CARI BRINJAL-3

North and Middle Andaman KVK

Thematic area: Fishery

Effect of different management practices on fish pond

Incidence of fish diseases due to poor water quality and mortality of fishes in freshwater ponds are common during onset of winter, commencement of first rain and peak summer period. Become onset of diseases due to poor quality water, farmer suffers a lot due to nonavailability of proper fish medicines in the market. Taking it into the consideration, KVK pond cleaner was formulated to serve preventive and curative requirements in fish ponds. Ponds were selected with regard to poor water quality as determined by fish mortality and water colour i.e., transparent/turbid/yellow/brown. Among different technical options, the technical option 2 i.e KVK pond cleaner formulation 1 was found to be suitable for improving the water quality. Technical option-1 improves water quality within short time and found very effective in controlling motile hemorrhagic septicemia and EUS with a span of 1-3 days with almost nil mortality.

Feedback of 10 randomly selected farmers those used pond cleaner were collected through a pretested questionnaires from Billiground to R. K. Gram, Diglipur. Majority of farmers responded that pond cleaner improves water quality. Those farmers, who used Technical option-1 to treat fish disease reacted that it effectively controls disease with reduced fish mortality from first day itself and nil mortality on third day of application. Normally two dose of treatment on alternate days as applicable in technical option 1 is effective against fish diseases due to poor water quality, EUS and Hemorrhagic septicemia whereas in exceptional cases it goes for three to four doses. Almost all farmers responded that quality of pond water turn green within seven to ten days of treatment. Respondents also rated effectiveness of KVK pond cleaner as good to very good when they had to rate as poor, average, good and very good

Table: Study on pond management practices for fishery

Technology option	No. of trials/ replication	Water quality parameters		Survival (%)	Nos of incidence of fish disease.	Effective in treating motile hemorrhagic septicemia	Effective in treating EUS/ poor water quality
		On day of application	On 13th week of application				
Technical option 1 Farmers practice	5	pH- 6.3 - 7.5 Alkalinity- 20-40 ppm Hardness- 20-35 ppm Water colour- transparent/ turbid/yellow/brown DO- 5.0-5.5 ppm	pH- 6.1 -7.6 Alkalinity- 20-40 ppm Hardness- 20-35 ppm Water colour- turbid/ yellow/brown DO- 5.0-5.5 ppm	72	18	-	-
Technical option 1 KVK pond cleaner formulation 1.	5	pH-6.0-7.6 Alkalinity- 20-40 ppm Hardness- 20-35 ppm Water colour- transparent/ turbid/yellow/brown DO- 5.0-5.5 ppm	pH-7.5- 8.5 Alkalinity- 35-60 ppm Hardness- 25-50 ppm Water colour- Light green/green DO- 5.0-6.0 ppm	100	Nil	Above 14 cases were effectively treated with nil mortality on 3rd day of treatment.	07 cases effectively treated.
Technical option 2 KVK pond cleaner formulation 2.	5	pH-6.0-7.6 Alkalinity- 20-40 ppm Hardness- 20-35 ppm Water colour- transparent/ turbid/yellow/brown DO- 5.0-5.5 ppm	pH-7.1 -7.8 Alkalinity- 25-45 ppm Hardness- 25-35 ppm Water colour- Light green/green DO- 5.0-6.0 ppm	100	Nil	-	-

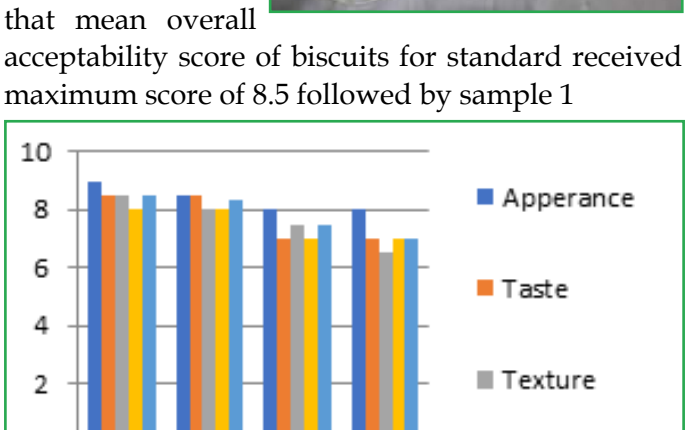
North and Middle Andaman KVK

Thematic area: Value addition

Study on development of fiber enriched herbal biscuit

Technical Option FP Standard	Technical Option 1 Sample 1	Technical Option 2 Sample 2	Technical Option 3 Sample 3
(Maida -500 g, Sugar powder – 150g,dalda 100 g, skim milk powder 60 g, egg white 60)	(Whole wheat flour 240g ,maida 240 g, sugar powder150g ,vegetable oil 100 ml, skim milk powder 60g ,egg white 60g,tulsi leaves 10 g, moringa leaves 10 g)	(Whole wheat flour 280g, maida 90g, ragi 90 g,sugar powder150g,vegetable oil 100 ml, skim milk powder 60g ,egg white 60g,tulsi leaves 20 g, moringa leaves 20 g)	(Whole wheat flour 200 g , maida 100 g, ragi 70 g ,rice flour 70 g, sugar powder150g ,vegetable oil 100 ml, skim milk powder 60g ,egg white 60g,tulsi leaves 30 g, moringa leaves 30 g)

On-farm trial conducted on development of fiber enriched herbal biscuits with the help of different ingredients like maida sugar vegetables, moringa and tulsi etc showed that mean overall acceptability score of biscuits for standard received maximum score of 8.5 followed by sample 1



Odisha

Jharsuguda KVK

Thematic area : Breed evaluation

Assessment of improved backyard poultry breeds

In Jharsuguda district Aseel breed is common poultry breed reared by the farmers as backyard poultry. However, new breed Kadaknath which is available in the state of Madhya Pradesh are also suitable for rearing in the district which has similar agro-climatic condition and framing situation. In similar rearing conditions, Kadaknath birds showed better with body weight of 2.2 kg/bird/6month. Rearing of Kadaknath gives high return of Rs.520 / bird. Kadaknath breed is preferred for high return and less mortality rate.

FP: Traditional rearing of Aseel

TO1: Brooding, vaccination (R.D ,IBD, RD booster) and feeding of Aseel breed for 1 month

TO2: Brooding, vaccination (R.D ,IBD, RD booster) and feeding of Kadaknath birds for 1 month

Title: Assessment of improved backyard poultry breeds

Technology option	No. of trials	Yield component	Body wt. kg/bird/6month	Cost of rearing/bird (Rs.)	Gross return (Rs/bird)	Net return (Rs./bird)	BC ratio
		Mortality rate (%)					
Farmers' Practice	7	30	1.6	90	320	230	3.5
Technology Option I	7	14	2.5	120	450	330	3.8
Technology Option II	7	18	2.2	140	660	520	4.7

Jharsuguda KVK

Thematic area : Small-scale income generation

Assessment of high yielding species of oyster mushroom in extreme cold (below 20^0 C)

Low yield during extreme cold due to non-availability of suitable cold tolerant species/varieties of mashroom is the problem faced by the mashroom growers in Jharsuguda district. To overcome the problem KVK Jharsuguda assessed the high yielding species of oyster mushroom which withstands extreme cold (below 20^{0}C). Mashroom growers are presently growing. *Pleurotus sajarcaju* which does not give good yield and return in cold situation. mashroom sp. *Pleurotus florida* and sp. *Pleurotus sajarcaju* are producing good yield of 1.9 and 2.1 kg yield /bed. Cultivation with sp. *Hyspigygu sulmarius* gives more net return of Rs 210/bed along with higher yield i.e 2.1 kg/bed in extreme cold condition. Therefore, the spices may be recommended in cold condition.

Farmers Practice (FP) : Cultivationwith sp. *Pleurotussajarcaju*

Technology option-I (TO-I) : Cultivation with sp. *Pleurotusflorida*

Farmers Practice (FP) : Cultivationwith sp. *Pleurotussajarcaju*

Table: Assessment of high yielding species of oyster mushroom in extreme cold (below 20^{0}C)

Technology option	No. of trials	Yield component		Gross return (Rs/Bed)	Net Income/ month/ animal (Rs.)	BC ratio
		Yield/bed in kg	Bio Efficiency (%)			
Farmers Practice (FP)	7	1.3	43.3	130	90	3.25
Technology option-I (TO-I)	7	1.9	63.3	190	150	4.75
Farmers Practice (FP)	7	2.1	70.0	210	170	5.25

Sundargarh-I KVK

Thematic area: Varietal evaluation

Evaluation of rice varieties against brown plant hopper

Brown plant hopper is an emerging problem in rice crop in the state of Odisha. Suitable varieties are not available which can minimize the loss of yield due to brown plant hopper damage. CR Dhan-300 (CR 2301-5) [suitable for irrigated/shallow low land, 140 days duration, Avg. yield:5-5.5 t/ha, Tolerant to WBPH, gall midge, leaf folder, neck blast, sheath rot.] and variety Hasanta (OR-2328-5) [suitable for rainfed/irrigated shallow low land, 145 days duration, Avg. Yield: 5-5.5 t/ha, Tolerant to BPH, WBPH, Blast, Leaf folder] are available in the state. To assess the suitability of variety resistant to brown plant hopper, KVK Sundargarh I conducted on farm trial in 7 locations. The variety Hasanta recorded lowest disease incidence 3% followed by variety CR Dhan 300 having disease incidence of 5% and yield of 45.51 q/ha . Net returan was Rs 30065/ha in Hasanta Variety and Rs 26620/ha in CR Dhan 300

Table: Evaluation of rice varieties against brown plant hopper

Technology option	No. of trials	Yield component		Disease/ insect pest incidence (%)	Yield (q/ha)	Cost of cultiva-tion (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
		No. of effective tillers/hill	Test wt. (100 grain wt.)						
FP- Pratikshya-140 days duration	07	15	2.17	8%	38.09	36500	57135	20635	1.56
TO-1- CR Dhan-300 (CR 2301-5)		17	2.31	5 %	42.88	37700	64320	26620	1.7
TO-2- Hasanta (OR-2328-5)		19	2.39	3 %	45.51	38200	68265	30065	1.78

Malkangiri KVK

Thematic area: Varietal evaluation

Assessment of Finger millet varieties in Odisha

Finger millet is an important crop in Malkangiri district. However suitable varieties are not available which resulted low yield and income from the crop. Farmers variety Dasraberi (Local)/ Nali Mandia gave only 8.62 q/ha yield. Therefore, a varietal on-farm trial was initiated with 2 new varieties Bhairabi and Arjun (OEB526) by Malkangiri KVK. Variety Arjun (OEB526) showed strongest yield parameters of panicle length (8.08) and number of fingers/ panicle (10.8) and recorded highest yield of 18.8 q/ ha. The variety Bhairabi recorded yield of 15.33 q/ ha. The net return was Rs 31332/ha was also highest with the variety. Farmers had given the positive feedback of Arjun variety of finger millet due to the higher yield potential.

Title: Assessment of Finger millet varieties

Technology option	No. of trials	Yield component			Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
		No. of effec-tive tillers/ hill	Panicle length (cm)	Nos of fin-gers/panicle					
FP- Dasraberi (Lo-cal)/ Nali Mandia	7	1.4	5.88	5.0	8.62	18000	24926	6926	1.4
TO1-Bhairabi		2.0	7.24	6.0	15.33	23000	44289	21289	1.9
TO2- Arjun (OEB526)		2.4	8.08	10.8	18.80	23000	54332	31332	2.4

Gajapati KVK

Thematic area: Integrated crop management

Assessment of drip and fertigation in Okra for enhancing yield and water productivity in rabi

Water stress and imbalanced use of fertilizer causes low yield in okra in Gajapati district of Odisha. Okra is a principal vegetable crops in Gajapati district. As the water is limited in the district modern irrigation methods like surface irrigation and deep irrigation will help to optimize the water use efficiency and increase yield of the crop. On-farm trial conducted in this regard at Gajapati district showed increase in water productivity with drip irrigation system with fertigation (35.79 kg/ha). The treatment increased the yield to 102 q/ha. Drip irrigation with fertigation helped to reduce cost of cultivation and optimize net return to Rs 61489/-

FP- Surface Irrigation + RDF (Soil application)

TO_1 - Drip irrigation+100:60:80 (N:P:K) soil application

T O_2- Drip irrigation +100:60:80 (N:P:K) fertigation

Table: Assessment of drip and fertigation in Okra for enhancing yield and water productivity in rabi

Technology option	No. of trials	Water productivity (kg/ha mm)	Irrigation (mm)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
Farmers Practice	7	12.96	571	74	34715.3	74271.4	39556	2.14
Technology Option I	7	28.86	298	86	42312.1	98654.5	56342	2.41
Technology Option II	7	35.79	285	102	40367.5	101857.1	61489	1.70

Nuapada KVK

Thematic area: Integrated pest management

Assessment on management of fall army worm in maize

Fall army warm is major pest of maize in Odisha. recently there was an outbreak of the pest in North East of India. KVK Nuapada conducted on farm trial on the management of fall army worm in maize. Results indicated that application of 5% active ingradient of azadiractin, release 20,000 *Trichogramma chilonis* parasite at 4-5 days interval in a week, need based spraying with Thiometoxam 12.6%+ Lamda cyhalothrin9.5%@ 200ml/ acre helped to minimize army warm incidence to 7.9 %, as compared to 18.2%

incidence in farmer's field. This pest management system helped to increase yield to 50.8 q/ha and net return to Rs 41671 /ha.

FP: No application

TO1: Apply 5% active ingradient of azadiractin, Release 20,000 *Trichogramma chilonis* parasite at 4-5 days interval in a week interval. need based spraying with Thiometoxam12.6%+ Lamda cyhalothrin9.5%@ 200ml/ acre

TO2: Apply *Beauveria bassiana* @ 400 gm/acr. Apply 1.5% chloropyriphus dust thickly in the field bund for avoiding migrating from one field to another field.

Table: Assessment on management of fall army worm in maize

Technology option	No. of trials	Disease/ insect pest incidence (%)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
Farmers Practice	12	18.2	43.4	34250	76384	42134	2.0
Technology Option I		7.9	50.8	38300	89408	51108	2.3
Technology Option II		11.3	45.2	37881	79552	41671	2.1

Nuapada KVK

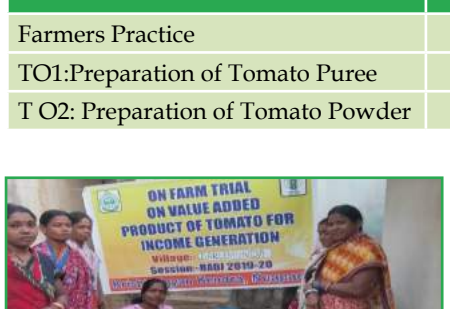
Thematic area: Value addition.

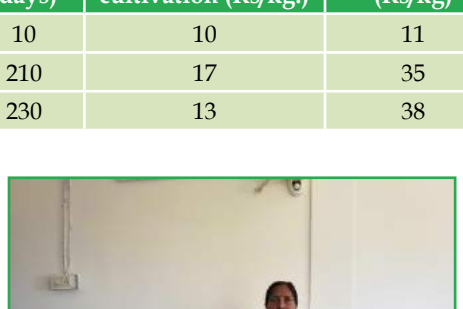
Value addition in tomato through preparation of tomato puree/ tomato powder

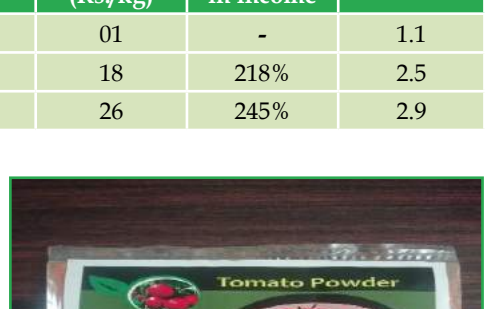
Loss due to distress sell during the peak production period can be met through value added products in vegetables like tomato. Preparation of tomato puree/tomato powder was considered as the value added product that can be prepared from tomato. The value addition increased the shelf-life of tomato to 210 to 230 days from 10 days in fresh tomato. Net return was Rs 26/kg in tomato powder. Value addition of tomato increased income by 218 to 245%.

Table: Value addition in tomato through Preparation of tomato puree/ preparation of tomato powder

Situation	Self life (days)	Cost of cultivation (Rs/kg.)	Gross return (Rs/kg)	Net return (Rs./kg)	% change in income	BC Ratio**
Farmers Practice	10	10	11	01	-	1.1
TO1:Preparation of Tomato Puree	210	17	35	18	218%	2.5
T O2: Preparation of Tomato Powder	230	13	38	26	245%	2.9







West Bengal

Kalimpong (Darjeeling) KVK

Thematic area : Varietal evaluation

Varietal assessment of strawberry in Kalimpong hills

Strawberry is newly introduced in Kalimpong hills. The crop is being popular in the district. But due to lack of suitable variety, the same is not profitable to the farmers. Keeping it in the view the KVK Kalimpong evaluated different varieties of strawberry in 6 locations. Results showed that variety Navella was most promising variety of strawberry with 77.43 q/ha yield. The yield was 15 % higher than the variety Camarosa. Net return was also almost double than Camarosa variety with a net return of 7.13 lakh/ha

Tech. option I: use of Camarosa variety with FYM 25 t/ha and N:P:K 88:80:60 kg/ha

Tech. option II: use of Navella variety with FYM 25 t/ha and N:P:K 88:80:60 kg/ha

Tech. option III: use of Sweet Charlie variety with FYM 25 t/ha and N:P:K 88:80:60 kg/ha

Farmers' practice - use of local variety with FYM 10 tonnes/ha.

Table: Varietal assessment of strawberry in Kalimpong hills

Technology option	No. of trials	Yield component			Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ ha)	Net return (Rs./ha)	BC ratio
		No. of fruits per plant	No. of runners/ plant	Average weight of fruits(g)					
Tech. option I	6	13.66	5.27	12.29	67.15	9,18,000/-	13,03,900/-	3,85,900/-	1.42
Tech. option II		15.88	7.14	12.19	77.43	9,18,000/-	16,31,100/-	7,13,100/-	1.77
Tech. option III		10.13	7.43	12.75	51.68	9,18,000/-	14,08,400/-	4,90,400/-	1.53
Farmers' practice		9.58	5.23	10.52	40.31	8,05,000/-	8,21,500/-	16,500/-	1.02

South 24 Parganas (Nimpith) KVK

Thematic area: Integrated Disease Management

Management of collar rot disease of betel vine

Betel Vine (*Piper betle* L.) is an important cash crop of the coastal saline zone under South 24 Parganas district of West Bengal. The moist, humid and shady microclimate offered to this perennial vine for its optimum growth also invites a series of aerial and soil borne pathogens. *Sclerotium rolfsii* is such a devastating soil borne fungal pathogen, causing collar rot disease in betel vine. Dasgupta *et. al.* (2000) reported 30-100% crop loss in West Bengal due to *S. rolfsii* infestation. The symptom starts as darkening of the stem at the foot of the plant near ground level. The leaves soon turn yellow, become flacid and drop off. Whole vine ultimately wilts and dries up. White, ropy, fan-shaped mycelial strands creeps over the stern portion, developing small light brown to dark-brown sclerotia on the infected portion. The fungi survives in the soil through these sclerotia. Maiti and Sen (1982) reported that sclerotia survived 225 days under 50% moisture level in natural soil.

In the present trial, two sources of *Trichoderma harzianum* were used to compare their relative efficacy against the farmers practice. The talc

formulation of *Trichoderma harzianum* available in the local market (trade name: Taglife, Manufactured and marketed by Tropical Agrosystem India Pvt. Ltd.) was used as Technology option – 1. On the other hand, KVK isolated native strain of *Trichoderma harzianum* was mass multiplied by the farmers themselves with the help of KVK demonstrated low cost technology and used as Technology option – 2**.** Treatment with *Trichoderma* in both the technological options provided better protection to the crop over the farmers practice. But the yield was more in technology option-2. This may be due to some growth promoting effect of the native strain of the *Trichoderma*, used in the technology option-2. Also the cost of cultivation was less in technology option-2, as the *Trichoderma* was prepared by the farmers themselves, involving least expenditure in plant protection. The benefit-cost ratio was highest in this option (technology option-2).

Farmer practice: Soil drenching with copper oxy-chloride @ 4g/L + Need based foliar spray of Carbendazim + Mancozeb @ 2g/L

Technology Option 1: Soil treatment with Taglife (market available product of *Trichoderma harzianum)*@ 10 kg/ha + soil drench with Taglife@ 5g/L at 30 days interval + foliar spray with Taglife@ 5g/L at 30 days interval

Technology Option 2: Soil treatment with **home produced***Trichoderma harzianum* @ 10 kg/ha + soil drench with **home produced***Trichoderma harzianum* @ 5g/L at 30 days interval + foliar spray with **home produced***Trichoderma harzianum* @ 5g/L at 30 days interval

Table: Management of collar rot disease of betel vine

Technology option	No. of trials	Disease incidence (% of wilted plants)	Yield (lakh leaves/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
Farmer practice	10	18.7 (25.62)	21.96	1960000	3074400	1114400	1.57
Technology Option 1		6.9 (15.23)	26.07	1805000	3649800	1844800	2.02
Technology Option 2		4.7 (12.52)	28.3	1780000	3962000	2182000	2.23

South 24 parganas (Nimpith)KVK

Thematic area: Production management

Study on management system of pekin duck

Among various species of poultry, ducks are sturdy and prolific in nature. Indigenous ducks of our country constitute more than 90% of the total duck population and the second largest species contributing towards egg production in India. Duck rearing is still in the hands of poor rural farmers, who depend mainly on ducks for their livelihood and employment. Duck is a water loving bird reared by the farmer since century under traditional system with local low productive non-descript breed. Ducks have ability to lay more egg, larger egg, require lesser attention and thrive well in scavenging conditions, eat fallen grains in rice fields, insects, snails, earthworms, small fishes and other aquatic materials, stand hardy against common diseases without any elaborate housing.

Pekins are the fastest growing domestic duck and the most common to be kept as a meat bird. (They are also good layers if you are thinking about duck eggs

but eggs won't start showing up until 5-6 months of age.) Pekins reach full size at 7-8 weeks and would most commonly be butchered then. If you want your birds a bit larger wait another 3 weeks or so.

Results showed that if the ducks are allowed 4 hours free range system; 2 hours in the morning and 2 hours in the evening. Average food consumption per duck per week increased to 150 and the body weight increased to 1.6 kg. All the basic parameters were also in favour of the treatment.

Technology Option-1 Complete intensive farming, where the birds will not be allowed to roam in the free range system

Technology Option-II :1 hour in free range system is allowed in the morning during cleaning of the house

Technology Option-III :4 hours free range system is allowed; 2 hours in the morning and 2 hours in the evening

Table: Study on management system of penking duck

Group	Indicators of performance							
	Average Feed consumed per duck per week (0-60 days)	Body weight gain (FCR)	Dressing percent-age	BC ratio	Hours involved for manage-ment	Avg. Pulse rate (/minute)*	Avg. Heart rate (/minute)	Angle of devia-tion
Farmers' practice	125	1.2	57.5	1.98	11	105	105	50
Technology Option-I	145	1.4	60.5	1.95	6	95	95	50
Technology Option-II	135	1.5	60.0	2.00	4	90	90	50
Technology Option-III	150	1.6	65.5	2.10	2	80	80	50



Purulia KVK

Thematic area: Farm mechanization

Assessment of the 4-Row multicrop planter in maize under rainfed condition

Farmer are using traditional method of broadcasting for Maize sowing during kharif season. The method resulted in poor germination and low yield of maize. 4-Row mult-icrop planter can help to maintain ideal plant population, improve germination and yield of maize as it helps to sow the crop in proper distance. The trial laid out in 10 farmers field. Results revealed that using of 4 Row Multicrop Planter gives better result compared to farmer practices and T.O.–I in terms of increasing yield and drudgery reduction. In this case using 4 Row Multicrop Planter gave significantly higher yield (38%), reduction drudgery (88%) and monetary return (93%) over farmers practice. Therefore, 4-Row Multicrop Planter for Maize cultivation was proved most efficient, productive and remunerative under Purulia condition.

Farmers Practice: Farmer using Traditional method of broadcasting for Maize sowing during Kharif season

Technology option–I: Line sowing method by traditional way for Maize (60cm X 20cm) cultivation duringKharif season.

Technology option–II: Use of 4-Row Multicropplanter, for Maize (60cm X 20cm) cultivation during Kharif season

Table: Assessment of the 4-Row multicrop planter for in maize under rainfed condition

Technology option	No. of trials	Plant Height (Cm.)	Labor (Man hour/ ha)	Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ ha)	Net return (Rs./ha)	BC ratio
Farmers Practice	10	135	21	39.47	36387	67099	30712	1.84
Technology option – I		173	19	45.43	35137	77231	42094	2.19
Technology option – II		159	2.5 (-88%)	54.7 (38%)	33712	92990	59278	2.75

Purulia KVK

Thematic area: Disease management

Assessment of bio-effectiveness of low cost eco-friendly pesticide against diseases of tasar silk worm

Trial of results revealed that all the technology options put into assessment reduced disease infection of tasar silkworms significantly over farmers practice and thereby increased yield of cocoons. Technology option I (**Foliar spray of Jeevan Sudha only on branches where larvae are feeding once in each 1st , 2nd and 3rd instar+ Dusting with Tasar Keet Ousadh (T.K.O) on silkworm body during transfer of worms)** was found to be the best with an yield of 28560 number of cocoons with low infection of silkworms viz., 23.25% and thereby causing a disease reduction by 60.96% over that of existing farmers practice. This Technology option is closely followed by Technology option II (Foliar dusting of branches and below growing bushes with Jeevan Suraksha once in 2nd and 3rd instar+ T.K.O application on body of silkworm during transfer of worms) and Technology option III (Foliar spray of Jeevan Sudha only on branches where larvae are feeding once in each 1st , 2nd and 3rd instar+ Dusting with Jeevan Suraksha during transfer of worm during 4th and 5th instar) respectively. These disease management options are inexpensive and can be prepared using botanicals or kitchen items and thus are highly effective and remunerative for tasar cultivation. Thus Technology option I can be recommended and promoted further in areas of tasar cultivation in Purulia

Farmers Practice: No disease management intervention

Technology option–I: Foliar spray of Jeevan Sudha only on branches where larvae are feeding once in each 1st , 2nd and 3rd instar+ Dusting with TasarKeetOusadh (T.K.O) on silkworm body during transfer of worms

Technology option – II: Foliar dusting of branches and below growing bushes with Jeevan Suraksha once in 2nd and 3rd instar+ T.K.O application on body of silkworm during transfer of worms

Technology option – III: Foliar spray of Jeevan Sudha only on branches where larvae are feeding once in each 1st , 2nd and 3rd instar+ Dusting with Jeevan Suraksha during transfer of worm during 4th and 5th instar

Table: Assessment of bio-effectiveness of low cost eco-friendly pesticide against diseases of Tasar silk worm

Technology option	No. of trials	Yield of cocoon (no./ha)	% infection of silkworms	% reduction in disease	Gross Cost of cultivation (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)	BC ratio
Farmers Practice	10	15230	54.69	-	24240	43540	19300	1.80
Technology option – I		27420	25.82	58.50	27350	94280	66930	3.45
Technology option – II		24250	28.35	51.25	27820	87950	60130	3.16
Technology option – III		22685	31.20	49.90	27450	81870	54420	2.98
CD at 5%		2.76						

Coochbehar KVK

Thematic area: Resource Conservation Technology

Resource Conservation with Zero tillage and mulching in lentil

The highest yield (10.40 q/ha) was obtained from the TO_2 which is statistically higher than Farmers Practice and TO_1 followed by TO_3 (9.90 q/ha), may be due to higher conservation of moisture at initial level and lower crop weed competition. TO_1 recorded lowest yield followed by Farmers Practice which may be due to higher crop weed competition. Due to lower cost of cultivation and higher yield TO_2 recorded highest B:C ratio whereas Farmers Practice recorded lowest B:C ratio due to higher cost of cultivation. Although TO_2 and TO_3 recorded statistically at par yield but considering the B:C ratio, non-availability of Zero tillage machine in remote village, advantage of RCT , TO_2 (Surface seeding of lentil and mulching with rice straw in rice harvested field) may be recommended.

Farmers' Practice: Cultivation of lentil with normal sowing practice in rice harvested field

Technology Option I : Paira/ Utera cropping of lentil in standing rice field 15 days before harvesting

Technology Option II : Surface seeding of lentil and mulching with rice straw in rice harvested field

Technology Option III : Lentil sown in zero tillage condition with ZT machine in rice harvested field

Table: Resource Conservation with Zero tillage and mulching in lentil

Technology option	No. of trials	Yield component		Yield (q/ha)	Cost of culti-vation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
		No. of pods per plant	'000 grain wt (g)					
Farmers' Practice	5	166	21.60	8.90	20250	37380	17130	1.84
Technology Option I	5	158	19.20	7.80	11500	32760	21260	2.84
Technology Option II	5	172	25.40	10.40	15750	43680	27930	2.77

Technology option	No. of trials	Yield component		Yield (q/ha)	Cost of cultivation (Rs./ha)	Gross return (Rs/ha)	Net return (Rs./ha)	BC ratio
		No. of pods per plant	'000 grain wt (g)					
Technology Option III	5	170	24.20	9.90	15500	41580	27080	2.68
CD at 5%		16.0	NS	1.43				

KVK North 24 Parganas (Ashokenagar)

Thematic area : Feed management of livestock

Assessment of Rice Distiller's Dried Grains with Solubles (RDGS) supplementation on performance of Black Bengal goats under rural production system

Grazing of goats without any feed supplement causes nutrient deficiency and low growth of the animal. Result showed that supplementation of RDGS increased body weight of the goats significantly than the non-supplemented group. Among the three supplemented groups the technology option II i.e. supplementation of RDGS @30g/animal/day is having maximum B:C ratio as well as highest net return. So among the three doses of RDGS supplementation, the second group (TO II) showed best result. Moreover, the age at first kidding also less for the supplemented groups and no of kids per kidding also increased in supplemented groups.

Farmers Practice (FP): Grazing without any supplementation resulting deficiency in required protein

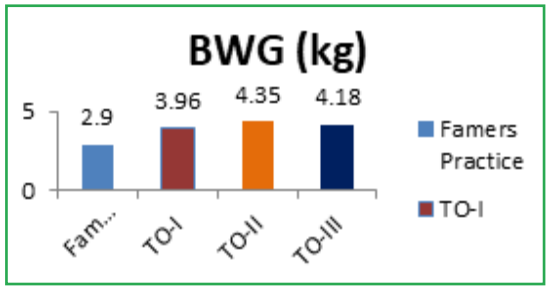
Technology option-I (TO-I): Farmers' practice + RDGS @ 20 gm/animal/day

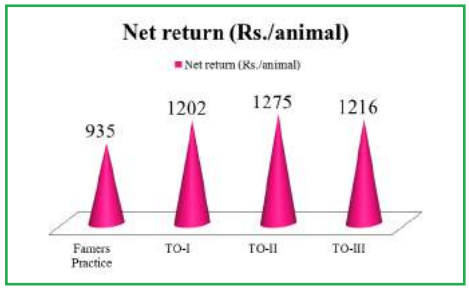
Technology option-II (TO-II): Farmers' practice + RDGS @ 30 gm/animal/day

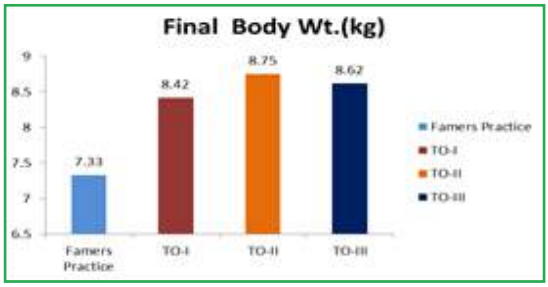
Table: Effect of Rice Distiller's Dried Grains with Solubles (RDGS) supplementation on performance of Black Bengal goats under rural production system

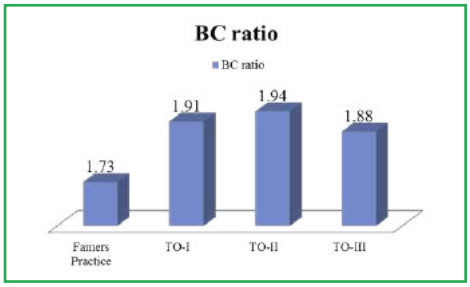
Technology options	No. of trials	Parameter(s)					Cost of production (Rs./animal)	Gross return (Rs./animal)	Net return (Rs./animal)	BC Ratio
		Initial Body Wt.(kg) (before feeding)	Final Body Wt.(kg) (After 5 months of feeding)	Body Wt. Gain (kg) (After 5 months of feeding)	Age at first kidding (days)	Ave. No of kids per kidding				
Farmers' practice	40	4.43 ± 0.18	7.33 ± 0.22a	2.90 ± 0.11a	433.67 ± 4.34a	1.19	1264.00	2199.00	935.00	**1.73**
Technology Option I		4.46 ± 0.13	8.42 ± 0.13b	3.96 ± 0.20b	409.67 ± 2.70b	1.65	1324.00	2526.00	1202.00	**1.91**
Technology Option II		4.40 ± 0.20	8.75 ± 0.12b	4.35 ± 0.22b	406.00 ± 2.59b	1.80	1350.00	2625.00	1275.00	**1.94**
Technology Option III		4.44 ± 0.15	8.62 ± 0.22b	4.18 ± 0.18b	408.67 ± 4.24b	1.64	1370.00	2586.00	1216.00	**1.88**

Technology option-III (TO-III): Farmers' practice + RDGS @ 40 gm/animal/day









4.2 Technology Demonstration:

Frontline Demonstrations:

Frontline demonstration is the concept popularized by Indian Council of Agricultural Research ICAR to demonstrate latest technologies in the areas of pulses and oilseeds. The demonstration is taken up in district supervision of the NARS scientists. The programme is very popular with the farmers as the latest techniques like new varieties, cultivation methods, plant protection measures etc. are demonstrated in their field. Further it helps to diversify their traditional crop with oilseeds and pulses. Later on the frontline demonstrations was extended to other crops – rice, wheat, vegetables etc. Livestock and fishery are also the areas where demonstrations are done to update the latest technologies to the farmers.

In the year 2019, KVKs of Zone V took the programme of frontline demonstration in 1580.82 ha covering 7819 farmers. In oilseeds the coverage 118 ha, pulses 146.5 ha and 1316.32 ha was covered with crops like rice, wheat, vegetables etc. State-wise performance is given below.

Table: State-wise details of Frontline Demonstration on Oilseeds, Pulses and Other Crops

State	Oilseeds		Pulses		Other Crops		Total	
	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)	No. of Farmers	Area (ha)
A & N Islands	0	0	9	0.5	83	57.62	92	58.12
Odisha	171	25	250	39	2300	317.36	2721	381.36
West Bengal	534	93	509	107	3963	941.34	5006	1141.34
Total	**705**	**118**	**768**	**146.5**	**6346**	**1316.32**	**7819**	**1580.82**

4.2.1 Oilseeds

The oilseeds demonstration was conducted 118 ha covering 705 farmers. Groundnut was covered in 13 ha in Odisha and 15 ha in West Bengal. The demonstration yield of groundnut was 34.1 q/ha in West Bengal with an increase in yield of 28.4%. In Odisha, the demonstration yield was 19.78 q/ha which is 23.6% higher than traditional variety. In mustard coverage was 33 ha. The demonstrated yield was 11.2 q/ha in West Bengal while it was 9.1 q/ha in Odisha. The increase in yield was 30.3% in West Bengal and 35.3% in Odisha.

Oilseeds crops like sesame, linseed, sunflower were also demonstrated by the KVK. In sesame yield increase was 46.6% in Odisha, 18.3% in West Bengal. In linseed yield increase was 52.3% in West Bengal and 27.2% in Odisha. Sunflower was demonstrated only in West Bengal where yield increase was 21.4%. The coverage and yield performance are provided in below table.

Table: Frontline Demonstration on Oilseeds in kharif 2019 and rabi 2019-20

Sl. No.	Crop	State	No. of KVKs	No. of Farmer	Area(ha)	Yield Demonstration	Yield Check	% change in yield
1	Mustard	Odisha	3	30	5	9.07	6.70	35.32
		West Bengal	3	108	28	11.15	8.56	30.31
		Total	**6**	**138**	**33**			
2	Groundnut	Odisha	11	95	13	19.78	16.19	23.56
		West Bengal	2	182	15	34.10	26.85	28.43
		Total	**13**	**277**	**28**			
3	Sesame	Odisha	4	36	5	6.71	4.58	46.63
		West Bengal	2	70	15	12.15	10.30	18.27
		Total	**6**	**106**	**20**			
4	Linseed	Odisha	1	10	2	4.35	3.42	27.19
		West Bengal	1	39	10	9.9	6.5	52.31
		Total	**2**	**49**	**12**			
5	Sunflower	West Bengal	3	135	25	17	14	21.43
		Total	**3**	**135**	**25**			
Grand Total			**30**	**705**	**118**			

CFLD on Groundnut (Rabi)

CFLD on mustard (Rabi)

4.2.2 Pulses

In pulses, demonstration was conducted in 146.5 ha covering 768 farmers. The major pulses demonstrated was blackgram (40 ha) and greengram (55.5 ha). In blackgram increase in yield (6.64 q/ha) was 35.5% in Odisha and 52.7% (11.48 q/ha) in West Bengal. Lentil was demonstrated in West Bengal is 33 ha and average demonstrated yield was recorded 10.2 q/ha which was higher by 28.5% of check yield. Chickpea and pigeon pea were also demonstrated in 8-10 ha under this programme. The yield performance and coverage of frontline demonstration are given below table.

Table: Frontline demonstration on pulses

Sl. No.	Crop	State	No. of KVKs	No. of Farmer	Area (ha)	Yield Demonstration	Yield Check	% change in yield
1	Black Gram	Odisha	4	40	6	6.64	4.90	35.46
		West Bengal	2	105	34	11.48	7.53	52.72
		Total	**6**	**145**	**40**			
2	Green Gram	Odisha	17	160	25	6.75	5.00	35.15
		West Bengal	5	129	30	10.50	7.40	41.89
		A & N Islands	1	9	0.5	4.70	3.60	30.60
		Total	**23**	**298**	**55.5**			

Sl. No.	Crop	State	No. of KVKs	No. of Farmer	Area (ha)	Yield Demonstration	Yield Check	% change in yield
3	Lentil	West Bengal	6	215	33	10.245	8.085	28.49
		Total	**6**	**215**	**33**			
4	Pigeon pea	Odisha	5	50	8	13.36	10.12	33.18
		Total	**5**	**50**	**8**			
5	Chick pea	West Bengal	4	60	10	11.35	7.15	58.74
		Total	**4**	**60**	**10**			
Grand Total			**44**	**768**	**146.5**			

FLD on Greengram

FLD on Blackgram

4.2.3 Other Crops

Field crops like rice, wheat, maize, sweet corn, vegetable like brinjal, broccoli, cabbage, capsicum, cauliflower, okra, onion etc. were demonstrated under the programme of frontline demonstrations programme of other crops. Coverage of 1077.3 ha was made under this programme which benefitted 5755 farmers of the zone.

Rice being the major crop in the states of West Bengal and Odisha. The crop was taken for demonstration in an area of 519.69 ha. The average yield of demonstrations were 41.9 to 45.8 q/ha across the states of Odisha, West Bengal and A&N Islands. Improvement was in the range of variety demonstrated were like Hasanta, Sahabhagi dhan in Odisha. In West Bengal rice varieties Gontra Bidhan-3, IET-7029 etc were demonstrated. Demonstration was conducted in 61.5 ha in maize in 161 farmers' field. The crop was covered in 47.5 ha in West Bengal and 14.0 ha in Odisha. Yield improvement was 16.1% in West Bengal and 39.02% in Odisha. Wheat was also demonstrated in 14.57 ha in West Bengal. Demonstrated yield was 32.4 q/ha.

Sweet corn variety Sugar-75 demonstrated in 3 KVKs of Odisha which gave 122 q/ha yield and improvement of 22.2%. Demonstration on vegetables like brinjal, broccoli, cabbage, capsicum, cauliflower, chilli, cucumber etc was made. In brinjal yield improvement was 20-40%, broccoli yield improvement was 11-50%. In bittegourd yield improvement was 23.4 to 31.4%, cabbage yield improvement was 16 to 22%, capsicum yield increased to 41-46%. In cauliflower, yield of improvement of 12.8% only recorded in Odisha while 48.8% recorded in West Bengal. Chilli yield improvement was 22.4 to 30.5%. Cucumber, okra, onion etc are showed 16-32% increase yield over their check yields. Tomato is an important vegetable crop. Tomato hybrids were demonstrated through the programme. In Odisha demonstrated yield of tomato was 289 q/ha and in West Bengal it was 354 q/ha. Increase in yield over check was 20-30%.

Mango, an important fruit crop in Odisha and West Bengal. Different technologies of mango cultivation were demonstrated by the KVKs. In West Bengal, demonstration yield in mango was 344 q/ha, 16.6% increase over farmers practice. In Odisha, demonstration yield of mango was 111 q/ha which was 78% higher than farmers practice. Banana another fruit crop was demonstrated in 19.5 ha. Demonstrated yield was 648 q/ha in West Bengal, 17.8% increase and 414 q/ha in Odisha, 19.8% increase.

The coverage and performance of different field crops are given in below table.

Table: Demonstration on crops other than oilseeds and pulses

Sl. No.	Crop	State	No. of KVKs	No. of Farmer	Area (ha)	Yield Demonstration	Yield Check	% change in yield
1	Rice	A&N	2	15	5	43.18	36.18	19.35
		Odisha	29	596	107.6	41.9	36.23	15.65
		West Bengal	19	1797	407.09	45.8	38.94	17.62
		Total	**50**	**2408**	**519.69**			
2	Wheat	West Bengal	4	102	14.57	32.36	25.98	24.56
		Total	**4**	**102**	**14.57**			
3	Maize	Odisha	7	85	14	59.61	42.88	39.02
		West Bengal	4	76	47.5	166.99	143.82	16.11
		Total	**11**	**161**	**61.5**			
4	Sweet Corn	Odisha	3	48	4.4	122	99.88	22.15
		Total	**3**	**48**	**4.4**			
5	Bitter gourd	Odisha	4	50	6	109.72	88.9	23.42
		West Bengal	2	77	3.07	241.41	183.67	31.44
		Total	**6**	**127**	**9.07**			
6	Brinjal	A&N	1	2	0.04	210	149	40.94
		Odisha	16	165	23	288.49	228.21	26.41
		West Bengal	7	116	13.16	381.72	315.63	20.94
		Total	**24**	**283**	**36.2**			
7	Broccoli	Odisha	1	10	1	243	162	50.00
		West Bengal	3	55	2.27	234.33	209.7	11.75
		Total	**4**	**65**	**3.27**			
8	Cabbage	Odisha	4	40	4.4	208.15	170.07	22.39
		West Bengal	2	27	2.13	425.25	366.3	16.09
		Total	**6**	**67**	**6.53**			
9	Capsicum	Odisha	1	10	1	365.4	249.5	46.45
		West Bengal	2	14	1.033	163.25	115.65	41.16
		Total	**3**	**24**	**2.033**			
10	Cauliflower	Odisha	8	77	7.6	230.64	204.46	12.80
		West Bengal	3	29	2.273	226	151.93	48.75
		Total	**11**	**106**	**9.873**			
11	Chilli	Odisha	11	125	16.4	126.81	103.6	22.40
		West Bengal	3	58	4.5	102.53	78.57	30.50
		Total	**14**	**183**	**20.9**			
12	Cucumber	Odisha	2	20	3	327.95	282.3	16.17
		West Bengal	6	194	17.96	295.77	242.33	22.05
		Total	**8**	**214**	**20.96**			
13	Okra	A&N	1	4	0.08	110	87	26.44
		Odisha	9	95	12.8	136.83	112.002	22.17
		Total	**10**	**99**	**12.88**			
14	Onion	Odisha	7	71	8.02	247.84	187.16	32.42
		Total	**7**	**71**	**8.02**			

Sl. No.	Crop	State	No. of KVKs	No. of Farmer	Area (ha)	Yield Demonstration	Yield Check	% change in yield
15	Pointed Gourd	Odisha	3	23	1.9	162.73	129.17	25.98
		West Bengal	1	40	5	220	165	33.33
		Total	**4**	**63**	**6.9**			
16	Tomato	Odisha	22	237	26.2	377.35	289.41	30.39
		West Bengal	5	100	7.03	426.63	354.51	20.34
		Total	**27**	**337**	**33.23**			
17	Marigold	Odisha	7	68	5.8	140.4	107.28	30.87
		West Bengal	2	11	0.486	160	138.5	15.52
		Total	**9**	**79**	**6.286**			
18	Banana	Odisha	7	66	9	414.97	346.26	19.84
		West Bengal	3	106	10.5	648.83	550.83	17.79
		Total	**10**	**172**	**19.5**			
19	Mango	Odisha	6	58	11.4	111.35	62.31	78.70
		West Bengal	2	54	16.95	344.23	295.15	16.63
		Total	**8**	**112**	**28.35**			
20	Turmeric	Odisha	1	10	0.4	210.05	150.5	39.57
		West Bengal	4	51	1.9	168.19	128.98	30.40
		Total	**5**	**61**	**2.3**			
21	Azolla	Odisha	1	20	0.1	2300	1800	27.78
		West Bengal	1	21	21	1.65	1.46	13.01
		Total	**2**	**41**	**21.1**			
22	Jute	Odisha	2	20	3	21.7	20.5	5.85
		West Bengal	6	280	144.5	31.23	26.23	19.06
		Total	**8**	**300**	**147.5**			
23	Others	A&N	3	21	2.25	2.5	1.9	31.58
		Odisha	19	231	38.5	102.92	82.93	24.10
		West Bengal	21	421	62.59	190.82	153.32	24.46
		Total	**43**	**673**	**103.338**			
Grand Total			**277**	**5796**	**1098.4**			

Demonstration of Drought tolerant rice variety – Sahabhagidhan

Demonstration of Sweet Corn variety –Sugar 75

4.2.4 Details of selected frontline demonstration on crops

Table : Front line demonstration on ragi and brinjal, Gangam I Odisha

Sl. No.	Title (FLD)	Farmer practice	Intervention	RP (q/ha)	FP (q/ha)	% change
1	Demonstration of Integrated Nutrient Management in Ragi	No lime application Fertilizer dose : NPK (40:20:20)kg/ha	Application of lime @ 0.25 LR (applied 15 days before sowing) along with 50% N-P2O5-K2O (40-20-20)Kg/ha	19.4	15.0	29.3
2	Demonstration on management of wilt complex in Brinjal	No seed treatment, spraying of carbandzim @ 1kg/ha	Seed treatment with Metalaxyl+Mancozeb 72% WP @ 2gm/kg +soil application of Carbofuran @ 1kg /ha + soil drenching of Carbendazim 0.15%+ Streptocycline 0.015% at 30 and 45 days after transplanting	232.8	204.2	14.0

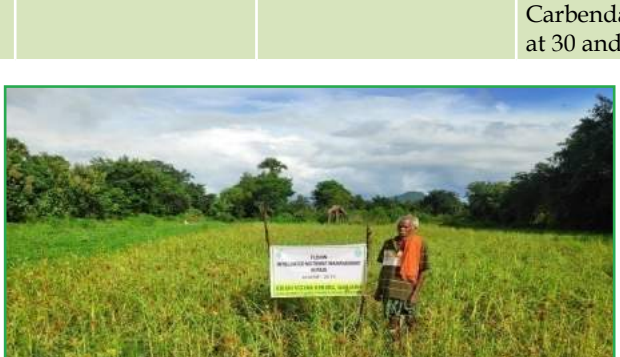


Table : Demonstration on weed management on rice, Ganjam II Odisha

Title of FLDs	Farm Practice	Details of Technologies	Yield over local	Incremental income
Demonstration of weed management in rice.	No use of weedicide in rice, hand weeding at 21 DAT.	Application of Bensulfuron methyl+ pretilachlor (Londax power) @60+600g/ha at 3 DAT for broad spectrum weed management.	4.72	Rs. 6938.00 (11 %)

Table : Demonstration on tomato, Ganjam II Odisha

Title of FLDs	Farm Practice	Details of Technologies	Yield over local	Incremental income
Demonstration of tomato variety- Arka Rakshak.	Cultivation of hybrid tomato variety Laxmi.	Cultivation of triple disease resistant tomato F_1 hybrid Arka Rakshak to LCV, (tomato leaf curl virus) BW (bacterial wilt) & EB (early blight), Fruits square round, large size (80-100g), fruits suitable for fresh market and processing, potential yield 75-80 t/ha.in 140 days.	121.07	156109.00 (49%)

4.2.5 Livestock

Demonstration on livestock and fishery was organized by the KVKs of Zone-V. In the state of Odisha, 70 units in dairy, 95 units in duckery, 154 units in sheep and goat, 4451 units in poultry, 94 units in common carps, 52 units on other areas were developed for demonstration which benefitted 2477 farmers. In the state of West Bengal, 255 units in diary, 519 units in duckery, 136 units in goatery, 42 units in piggery, 906 units in poultry, 124 units in common carps, 43 units in ornamental fishery and 147 units in other areas were developed which benefitted 1047 farmers in the state.

In the Union Territory of Andaman & Nicobar Islands, 12 poultry units, 2 duckery units, 21 fishery units, 4 ornamental fishery units were developed which benefitted 45 farmers in the Islands.

Table: Frontline demonstration on Livestock and Fishery

Sl. No.	Category	State	No. of KVKs	No. of Farmer	No. of units /No.
1	Dairy	Odisha	6	57	70
		West Bengal	3	55	55
		Total	**9**	**112**	**125**
2	Cow	West Bengal	3	190	200
		Total	**3**	**190**	**200**
3	Duckery	A&N	1	2	2
		Odisha	7	665	95
		West Bengal	5	159	519
		Total	**13**	**826**	**616**
4	Sheep and goat	Odisha	6	76	154
		West Bengal	4	166	136
		Total	**10**	**242**	**290**
5	Piggery	West Bengal	2	42	42
		Total	**2**	**42**	**42**
6	Poultry	A&N	3	12	12
		Odisha	20	1469	4451
		West Bengal	8	346	906
		Total	**31**	**1827**	**5369**
7	Others	A&N	1	9	9
		West Bengal	1	194	194
		Total	**2**	**203**	**203**
Total Livestock			**70**	**3442**	**6845**

Sl. No.	Category	State	No. of KVKs	No. of Farmer	No. of units /No.
8	Common carps	A&N	2	21	21
		Odisha	9	105	94
		West Bengal	9	124	124
		Total	**20**	**250**	**239**
9	Ornamental fishes	A&N	1	4	4
		West Bengal	4	32	43
		Total	**5**	**36**	**47**
10	Others	A&N	1	1	1
		Odisha	7	105	52
		West Bengal	7	144	147
		Total	**15**	**250**	**200**
Total Fishery			**40**	**536**	**486**

Demonstration of feeding management in cattle

4.2.6 Fishery

Table: Frontline demonstration on stocking density

Sl. No.	Title (FLD)	Farmer practice	Intervention	RP (q/ha)	FP (q/ha)	% change
3	Demonstration on yearling stocking for yield enhancement in community pond	Stocking of Fish fry and without maintaining the stocking ratio	Stocking density :- Yearling @ 5,000 Nos./ha Stocking ratio :- Surface : Column : Bottom feeder :: 3 : 4 : 3 (Animal origin feeder)- 10-20% Soil & Water quality mgmt..- Application of suitable Aquifers	40.6	26.7	52.0

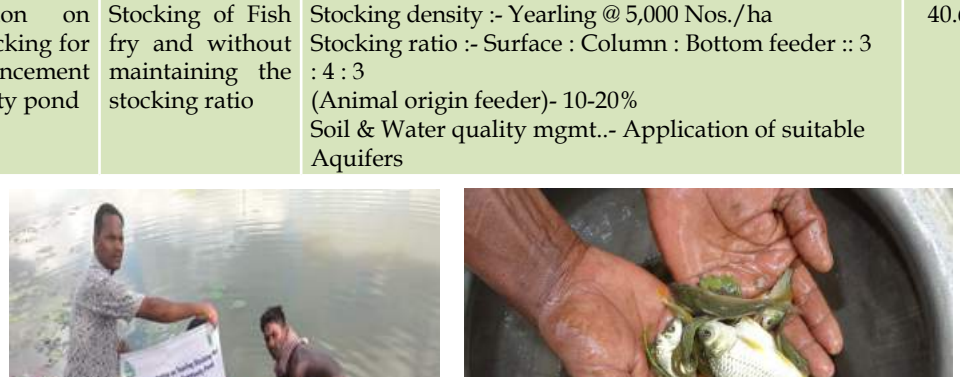


Table : Frontline demonstration on sea weed extract on carp Ganjam II Odisha

Title of FLDs	Farm Practice	Details of Technologies	Yield over local	Incremental income
Demonstration on use of Sea Weed Extract for better growth and survivability of carp Fry in Nursery.	Indiscriminate use of raw Cow dung to fertilise the pond.	Use of sea weed extract @ 1 Kg/ ac/month+ Mineral Mixture 1kg/ ac/month in two split doses at fortnight interval for better natural productivity of pond.	Survival - 18%	27000 (15%)



4.2.7 Enterprise

Frontline demonstrations were also organized involving different enterprises. In Odisha, 1435 mushroom units were developed, 505 rice straw mushroom units were developed, 69 vermicompost units, 118 apiculture units and 390 units on other enterprises were developed benefitted 932 farmers in the state of Odisha. In the state of West Bengal, 780 in mushroom, 148 units in vermicomposting, 30 units in apiculture and 276 units in other enterprises were developed which benefitted 936 farmers in the state of West Bengal. In the Union Territory of A&N Islands, 3 units in Oyster mushroom, 14 units in vercicomposting, 35 units in apiculture and 3 units in other enterprise were developed where benefitted 100 farmers in the Islands.

Table: Frontline demonstration on Enterprise

Sl. No.	Category	State	No. of KVKs	No. of Farmer	No. of units /No.
1	Oyster Mushroom	A&N	1	3	3
		Odisha	9	300	1435
		West Bengal	8	370	780
		Total	**18**	**673**	**2218**
2	Rice Straw Mushroom	Odisha	11	145	505
		Total	**11**	**145**	**505**
3	Vermicompost	A&N	2	32	14
		Odisha	6	64	69
		West Bengal	9	148	148
		Total	**17**	**244**	**231**
4	Apiculture	A&N	1	35	35
		Odisha	5	28	118
		West Bengal	3	18	30
		Total	**9**	**81**	**183**

Sl. No.	Category	State	No. of KVKs	No. of Farmer	No. of units /No.
5	Others	A&N	1	30	3
		Odisha	18	395	390
		West Bengal	7	400	276
		Total	**26**	**825**	**669**
Total Enterprise			**81**	**1968**	**3806**

Demonstration on mushroom in Hooghly

Demonstration on poultry in Hooghly

4.2.8 Implements

Agriculture tools and implements which are widely used are put under demonstrations which increase awareness among the farmers. Implements like zero tillage machine, drum seeder, maize sheller etc. were demonstrated to the farmers. In 2019-20, 94 demonstrations were made in Zone V benefitted to 645 farmers. In the state of Odisha, 40 demonstrations were made while in the state of West Bengal 53 demonstrations were made.

Table: Frontline demonstration on Implements

Category	State	No. of KVKs	No. of Farmer	No. of units /No.
Implement	A&N	2	50	1
	Odisha	14	307	41
	West Bengal	4	288	53
	Total	**20**	**645**	**95**

4.3 Training

Continuous updating of knowledge and skill of the farmers is required in the field of agriculture and allied sectors to maintain sustainability in agricultural development. Various organizations come forward with their proposal of training programme to update skills of their farmers/ rural youths. KVKs took the lead role to train the farmers at district level with their expertise on different fields of agriculture and allied vocations. The farmers approach to the KVKs to get trained in the area of crop production, horticulture, water management, off-season vegetable cultivation, soil health and fertility management, post-harvest technology, plant protection, fishery and value addition etc.

4.3.1.1 Consolidated achievement

The KVKs of Zone V organized 2943 training courses for the benefit of 85913 farmers and farm women during 2019. Out of total beneficiaries, 57272 was male (66.6%) and 28641 (33.38%) was female. A good number (39944) of SC/ST farmers were also trained in the programme which constituted 46.5% total trainees. The details are given in the table below.

Table: State-wise training programme conducted for farmers and farmwomen in Zone V

State/UT	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
A & N Islands	37	248	548	796	121	147	268	369	695	1064
Odisha	1425	13038	7368	20406	9471	7432	16903	22509	14800	37309
West Bengal	1481	18769	5998	24767	15625	7148	22773	34394	13146	47540
Total	**2943**	**32055**	**13914**	**45969**	**25217**	**14727**	**39944**	**57272**	**28641**	**85913**

The KVKs of Zone V organized 604 training courses for the benefit of 13432 rural youth in 2019. Out of total rural youth, 9250 was male (68.8%) and 4182 (31.13%) was female. A good number (6422) of SC/ ST farmers were also trained in the programme which constituted 47.81% total trainees. The details are given in the table below.

Table: State-wise training programme conducted for rural youth and girls in Zone V

State/UT	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
A & N Islands	12	183	160	343	0	0	0	183	160	343
Odisha	257	1637	499	2136	1379	544	1923	3016	1043	4059
West Bengal	335	3278	1253	4531	2773	1726	4499	6051	2979	9030
Total	**604**	**5098**	**1912**	**7010**	**4152**	**2270**	**6422**	**9250**	**4182**	**13432**

The KVKs of Zone V organized 451 training courses for the benefit of 13810 extension functionaries during 2019. Out of total beneficiaries, 13810 was male (74.9%) and 3465 (25.1%) was female. A good number (4245) of SC/ST farmers were also trained in the programme which constituted 30.73% of total trainees. The details are given in the table below.

Table: State-wise training programme conducted for extension functionaries in Zone V

State/UT	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
A & N Islands	6	42	87	129	0	0	0	42	87	129
Odisha	157	1098	495	1593	573	328	901	1671	823	2494
West Bengal	288	6365	1478	7843	2267	1077	3344	8632	2555	11187
Total	**451**	**7505**	**2060**	**9565**	**2840**	**1405**	**4245**	**10345**	**3465**	**13810**

State-wise analysis of training for farmers and farmwomen showed that Union Territory of A&N Islands conducted 55 courses for 1536 participants. In Odisha, 1839 courses were conducted for 43862 beneficiaries while in West Bengal 2104 courses were taken up for training of 67757 beneficiaries.

Skill development through training of rural youth was one of the most important objectives of the KVKs to generate rural employment. Mushroom production, bee keeping, seed production, value addition, dairy farming, poultry farming, fish seed production, repair and maintenance of farm machines were the most preferred areas for rural youth training. The KVKs conducted those training programme generally on on-campus mode. Farmers got trained in the latest technologies in those programmes.

State-wise analysis of the rural youth trained showed that West Bengal trained maximum rural girls 2979 which constitute about 33.0% total trainees. The percentage of the rural girls was 46.7% in the Union Territory of A&N Islands and 25.7% in the state of Odisha. A significant number of training programme was organized by the states for rural youth and girls. Union territory of A & N Islands organized 12 courses for 343 beneficiaries. Odisha organized 257 courses for 4059 beneficiaries and West Bengal organized 335 courses for 9030 beneficiaries.

The extension functionaries in state level were interested in obtaining training from the Krishi Vigyan Kendras. Those extension functionaries were mainly VLWs, Krishi Prayukti Sahayak and other block level workers of the state government. State-wise analysis of the programmes showed that West Bengal organized maximum number of training programme of 288 courses involving 11187 extension functionaries while Odisha organized 157 courses for 2494 extension functionaries and A&N Islands organized 6 courses for 129 beneficiaries. Respective state government sent their employees in groups to get training from KVKs.

4.3.1.2 On- and Off-Campus training

The training programmes conducted by the KVKs of Zone V were in both on-campus and in off-campus mode. Out of total training programmes (3998) conducted in all categories, around 45% was in on-campus mode and 55% in off-campus mode. While 48152 participants received training on on-campus mode (42.5%) and 65003 (57.5%) received training on off-campus mode.

Farmers and Farm Women

State/UT	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
ON	888	9745	3482	13227	8335	4104	12439	18080	7586	25666
OFF	2055	22310	10432	32742	16882	10623	27505	39192	21055	60247
Total	**2943**	**32055**	**13914**	**45969**	**25217**	**14727**	**39944**	**57272**	**28641**	**85913**

Rural Youth and Girls

State/UT	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
ON	500	4205	1508	5713	3226	1834	5060	7431	3342	10773
OFF	104	893	404	1297	926	436	1362	1819	840	2659
Total	**604**	**5098**	**1912**	**7010**	**4152**	**2270**	**6422**	**9250**	**4182**	**13432**

Extension Functionaries

State/UT	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
ON	403	6639	1531	8170	2512	1031	3543	9151	2562	11713
OFF	48	866	529	1395	328	374	702	1194	903	2097
Total	**451**	**7505**	**2060**	**9565**	**2840**	**1405**	**4245**	**10345**	**3465**	**13810**

4.3.1.3 Thematic area-wise training programme

Further classification of training programme on thematic area basis showed that under crop production category, training on integrated crop management was conducted for 128 courses involving 3850 participants while in resource conservation technologies, 23 courses were organized for 682 beneficiaries. In Horticulture, important areas of training included off-season vegetable cultivation in which 41 trainings were organized for 1143 beneficiaries. In fruits cultivation, 98 trainings were organized for 2757 beneficiaries. Trainings were also organized on ornamental plants cultivation (27), plantation crops (10), tuber crops (9), spices (12), medicinal and aromatic plants (5). In soil health and fertility management, a large number (332) of training programmes were organized involving 10225 beneficiaries to address the issues of efficient fertilizer use and integrated nutrient management. In Livestock Production and Management, 333 courses were organized for 9848 beneficiaries which included dairy management, poultry management, piggery management etc. It showed the importance of those issues for the farmers in the districts. In Home Science, 229 courses were organized for 6233 beneficiaries which included courses like value addition of fruits and vegetables. In Agricultural Engineering, 111 courses were organized for 2910 beneficiaries. In plant protection, 417 courses were organized for 12334 beneficiaries in the areas of IPM, IDM and bio-control. Other important areas of training for the farmers were fishery, production of input, capacity building, agro-forestry to create alternative evenness of employment generation. In Fisheries, 254 courses were conducted involving 7336 farmers. In production of input, 51 courses were organized for 1575 farmers. In capacity building, 98 courses involving 2623 farmers and in agro-forestry, 52 courses for 1443 farmers were organized. A total of 2943 courses were organized in different thematic areas covering 85913 beneficiaries in Zone V in the year 2019.

Table: Thematic area wise training programme for farmers and farm women

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
I. **Crop Production**	0	0	0	0	0	0	0	0	0	0
Weed Management	90	1289	202	1491	942	285	1227	2231	487	2718
Resource Conservation Technologies	23	352	44	396	251	35	286	603	79	682
Cropping Systems	25	241	74	315	259	154	413	500	228	728
Crop Diversification	37	554	78	632	290	152	442	844	230	1074
Integrated Farming	22	387	99	486	179	45	224	566	144	710
Micro irrigation/irrigation	30	408	96	504	170	177	347	578	273	851
Seed production	73	1465	276	1741	778	112	890	2243	388	2631
Nursery management	34	560	120	680	242	103	345	802	223	1025
Integrated Crop Management	128	1479	453	1932	1400	518	1918	2879	971	3850
Soil & water conservation	19	363	48	411	351	45	396	714	93	807
Integrated nutrient Management	64	974	215	1189	576	203	779	1550	418	1968
Production of organic inputs	22	315	51	366	198	123	321	513	174	687
Others	53	596	99	695	483	83	566	1079	182	1261
Total	**620**	**8983**	**1855**	**10838**	**6119**	**2035**	**8154**	**15102**	**3890**	**18992**
II. **Horticulture**	0	0	0	0	0	0	0	0	0	0
a) Vegetable Crops	0	0	0	0	0	0	0	0	0	0
Production of low volume and high value crops	39	351	113	464	375	210	585	726	323	1049

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Off-season vegetables	41	458	102	560	408	175	583	866	277	1143
Nursery raising	53	571	180	751	429	253	682	1000	433	1433
Exotic vegetables	12	134	51	185	98	28	126	232	79	311
Export potential vegetables	9	134	15	149	79	7	86	213	22	235
Grading and standardization	6	47	80	127	18	20	38	65	100	165
Protective cultivation	46	572	97	669	469	186	655	1041	283	1324
Others	79	697	401	1098	802	386	1188	1499	787	2286
Total (a)	**285**	**2964**	**1039**	**4003**	**2678**	**1265**	**3943**	**5642**	**2304**	**7946**
b) Fruits	0	0	0	0	0	0	0	0	0	0
Training and Pruning	4	18	2	20	55	25	80	73	27	100
Layout and Management of Orchards	14	134	67	201	157	63	220	291	130	421
Cultivation of Fruit	30	351	143	494	237	133	370	588	276	864
Management of young plants/orchards	12	98	53	151	127	24	151	225	77	302
Rejuvenation of old orchards	6	26	22	48	85	17	102	111	39	150
Export potential fruits	1	18	12	30	15	5	20	33	17	50
Micro irrigation systems of orchards	3	16	8	24	44	26	70	60	34	94
Plant propagation techniques	17	135	61	196	194	91	285	329	152	481
Others	11	131	31	162	110	23	133	241	54	295
Total (b)	**98**	**927**	**399**	**1326**	**1024**	**407**	**1431**	**1951**	**806**	**2757**
c) Ornamental Plants	0	0	0	0	0	0	0	0	0	0
Nursery Management	6	37	12	49	69	44	113	106	56	162
Management of potted plants	0	0	0	0	0	0	0	0	0	0
Export potential of ornamental plants	2	33	3	36	8	6	14	41	9	50
Propagation techniques of Ornamental Plants	6	93	21	114	35	6	41	128	27	155
Others	13	153	63	216	94	33	127	247	96	343
Total (c)	**27**	**316**	**99**	**415**	**206**	**89**	**295**	**522**	**188**	**710**
d) Plantation crops	0	0	0	0	0	0	0	0	0	0
Production and Management technology	8	72	19	91	122	41	163	194	60	254
Processing and value addition	0	0	0	0	0	0	0	0	0	0
Others	2	32	2	34	50	14	64	82	16	98
Total (d)	**10**	**104**	**21**	**125**	**172**	**55**	**227**	**276**	**76**	**352**
e) Tuber crops	0	0	0	0	0	0	0	0	0	0
Production and Management technology	9	78	26	104	110	25	135	188	51	239
Processing and value addition	0	0	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0
Total (e)	**9**	**78**	**26**	**104**	**110**	**25**	**135**	**188**	**51**	**239**

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
f) Spices	0	0	0	0	0	0	0	0	0	0
Production and Management technology	11	104	28	132	90	23	113	194	51	245
Processing and value addition	1	0	16	16	0	9	9	0	25	25
Others	0	0	0	0	0	0	0	0	0	0
Total (f)	**12**	**104**	**44**	**148**	**90**	**32**	**122**	**194**	**76**	**270**
g) Medicinal and Aromatic Plants	0	0	0	0	0	0	0	0	0	0
Nursery management	0	0	0	0	0	0	0	0	0	0
Production and management technology	2	10	15	25	6	19	25	16	34	50
Post-harvest technology and value addition	2	10	12	22	3	20	23	13	32	45
Others	1	24	1	25	0	0	0	24	1	25
Total (g)	**5**	**44**	**28**	**72**	**9**	**39**	**48**	**53**	**67**	**120**
Total(a-g)	**446**	**4537**	**1656**	**6193**	**4289**	**1912**	**6201**	**8826**	**3568**	**12394**
III. **Soil Health and Fertility Management**	0	0	0	0	0	0	0	0	0	0
Soil fertility management	54	790	234	1024	525	179	704	1315	413	1728
Integrated water management	3	33	1	34	26	0	26	59	1	60
Integrated Nutrient Management	104	1093	289	1382	896	532	1428	1989	821	2810
Production and use of organic inputs	58	938	215	1153	817	214	1031	1755	429	2184
Management of Problematic soils	19	246	73	319	171	65	236	417	138	555
Micro nutrient deficiency in crops	18	192	91	283	112	74	186	304	165	469
Nutrient Use Efficiency	23	229	80	309	246	138	384	475	218	693
Balance Use of fertilizer	14	138	62	200	104	57	161	242	119	361
Soil & water testing	30	345	103	448	380	137	517	725	240	965
Others	9	221	92	313	49	38	87	270	130	400
Total	**332**	**4225**	**1240**	**5465**	**3326**	**1434**	**4760**	**7551**	**2674**	**10225**
IV. **Livestock Production and Management**	0	0	0	0	0	0	0	0	0	0
Dairy Management	62	425	318	743	373	410	783	798	728	1526
Poultry Management	64	423	423	846	456	545	1001	879	968	1847
Piggery Management	16	87	37	124	171	214	385	258	251	509
Rabbit Management	2	21	9	30	7	0	7	28	9	37
Animal Nutrition Management	16	166	113	279	120	90	210	286	203	489
Disease Management	54	500	427	927	479	330	809	979	757	1736
Feed & fodder technologies	44	524	233	757	332	202	534	856	435	1291
Production of quality animal products	12	81	57	138	60	217	277	141	274	415

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Others	63	601	392	993	513	492	1005	1114	884	1998
Total	**333**	**2828**	**2009**	**4837**	**2511**	**2500**	**5011**	**5339**	**4509**	**9848**
V. **Home Science/Women empowerment**	0	0	0	0	0	0	0	0	0	0
Household food security by kitchen gardening and nutrition gardening	39	46	487	533	53	460	513	99	947	1046
Design and development of low/minimum cost diet	6	0	130	130	0	22	22	0	152	152
Designing and development for high nutrient efficiency diet	7	0	143	143	0	94	94	0	237	237
Minimization of nutrient loss in processing	7	20	103	123	0	46	46	20	149	169
Processing & cooking	3	0	66	66	0	9	9	0	75	75
Gender mainstreaming through SHGs	8	0	164	164	0	81	81	0	245	245
Storage loss minimization techniques	13	5	226	231	30	94	124	35	320	355
Value addition	27	9	424	433	42	274	316	51	698	749
Women empowerment	43	38	694	732	41	394	435	79	1088	1167
Location specific drudgery reduction technologies	14	2	174	176	32	155	187	34	329	363
Rural Crafts	4	0	76	76	0	24	24	0	100	100
Women and child care	15	10	229	239	24	156	180	34	385	419
Others	43	58	401	459	160	537	697	218	938	1156
Total	**229**	**188**	**3317**	**3505**	**382**	**2346**	**2728**	**570**	**5663**	**6233**
VI. **Agril. Engineering**	0	0	0	0	0	0	0	0	0	0
Farm machinery & its maintenance	36	265	23	288	358	288	646	623	311	934
Installation and maintenance of micro irrigation systems	15	167	29	196	111	58	169	278	87	365
Use of Plastics in farming practices	3	35	21	56	12	7	19	47	28	75
Production of small tools and implements	4	35	17	52	17	36	53	52	53	105
Repair and maintenance of farm machinery and implements	20	305	64	369	129	65	194	434	129	563
Small scale processing and value addition	0	0	0	0	0	0	0	0	0	0
Post Harvest Technology	12	89	24	113	94	117	211	183	141	324
Others	21	224	166	390	92	62	154	316	228	544
Total	**111**	**1120**	**344**	**1464**	**813**	**633**	**1446**	**1933**	**977**	**2910**
VII. **Plant Protection**	0	0	0	0	0	0	0	0	0	0
Integrated Pest Management	229	2670	851	3521	2022	1006	3028	4692	1857	6549
Integrated Disease Management	124	1581	524	2105	1185	555	1740	2766	1079	3845

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Bio-control of pests and diseases	18	212	57	269	148	47	195	360	104	464
Production of bio control agents and bio pesticides	10	116	16	132	90	31	121	206	47	253
Others	36	414	146	560	433	230	663	847	376	1223
Total	**417**	**4993**	**1594**	**6587**	**3878**	**1869**	**5747**	**8871**	**3463**	**12334**
VIII. **Fisheries**	0	0	0	0	0	0	0	0	0	0
Integrated fish farming	25	246	177	423	207	165	372	453	342	795
Carp breeding and hatchery management	12	122	13	135	168	58	226	290	71	361
Carp fry and fingerling rearing	31	316	154	470	387	124	511	703	278	981
Composite fish culture	67	688	165	853	514	230	744	1202	395	1597
Hatchery management and culture of freshwater prawn	6	83	17	100	51	12	63	134	29	163
Breeding and culture of ornamental fishes	10	46	67	113	74	103	177	120	170	290
Portable plastic carp hatchery	1	22	1	23	0	2	2	22	3	25
Pen culture of fish and prawn	3	19	19	38	40	2	42	59	21	80
Shrimp farming	4	42	13	55	58	1	59	100	14	114
Edible oyster farming	1	9	11	20	4	1	5	13	12	25
Pearl culture	1	3	0	3	9	13	22	12	13	25
Fish processing and value addition	0	0	0	0	0	0	0	0	0	0
Others	93	1080	248	1328	1150	402	1552	2230	650	2880
Total	**254**	**2676**	**885**	**3561**	**2662**	**1113**	**3775**	**5338**	**1998**	**7336**
IX. **Production of Input at site**	0	0	0	0	0	0	0	0	0	0
Seed Production	21	309	26	335	289	55	344	598	81	679
Planting material production	0	0	0	0	0	0	0	0	0	0
Bio-agents production	0	0	0	0	0	0	0	0	0	0
Bio-pesticides production	0	0	0	0	0	0	0	0	0	0
Bio-fertilizer production	0	0	0	0	0	0	0	0	0	0
Vermi-compost production	9	117	48	165	60	59	119	177	107	284
Organic manures production	7	147	11	158	53	1	54	200	12	212
Production of fry and fingerlings	0	0	0	0	0	0	0	0	0	0
Production of Bee0colonies and wax sheets	0	0	0	0	0	0	0	0	0	0
Small tools and implements	0	0	0	0	0	0	0	0	0	0
Production of livestock feed and fodder	0	0	0	0	0	0	0	0	0	0
Production of Fish feed	0	0	0	0	0	0	0	0	0	0
Mushroom production	13	67	143	210	42	128	170	109	271	380
Apiculture	0	0	0	0	0	0	0	0	0	0

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Others	1	0	0	0	17	3	20	17	3	20
Total	**51**	**640**	**228**	**868**	**461**	**246**	**707**	**1101**	**474**	**1575**
X. **Capacity Building and Group Dynamics**	0	0	0	0	0	0	0	0	0	0
Leadership development	6	62	91	153	25	17	42	87	108	195
Group dynamics	23	371	84	455	90	50	140	461	134	595
Formation and Management of SHGs	12	104	89	193	45	106	151	149	195	344
Mobilization of social capital	4	33	6	39	41	22	63	74	28	102
Entrepreneurial development of farmers/youths	21	281	84	365	145	56	201	426	140	566
WTO and IPR issues	4	47	28	75	21	4	25	68	32	100
Others	28	353	102	455	177	89	266	530	191	721
Total	**98**	**1251**	**484**	**1735**	**544**	**344**	**888**	**1795**	**828**	**2623**
XI. **Agro forestry**	0	0	0	0	0	0	0	0	0	0
Production technologies	27	277	199	476	133	201	334	410	400	810
Nursery management	3	37	41	78	3	9	12	40	50	90
Integrated Farming Systems	8	84	19	103	71	21	92	155	40	195
Others	14	216	43	259	25	64	89	241	107	348
Total	**52**	**614**	**302**	**916**	**232**	**295**	**527**	**846**	**597**	**1443**
Grand Total	**2943**	**32055**	**13914**	**45969**	**25217**	**14727**	**39944**	**57272**	**28641**	**85913**

4.3.2 Rural Youth

Considering the employment generation of the rural youth and girls in the rural areas, training progammes for rural youth and girls were organized by the KVKs of this Zone during 2019. The KVKs of Zone V conducted 604 courses for 13432 beneficiaries for rural youth and girls in A & N Islands, West Bengal and Odisha. Trainings were organized both on- and off-campus mode. In mushroom production 52 courses were organized for 1146 beneficiaries while in nursery management 32 courses were organized for 643 youths. Other courses organized were for planting material production (17), bee keeping (34), vermiculture (20), sericulture (1), diary (16), piggery (2), poultry production (21), ornamental fisheries (12), and others. The details are given in the following table.

Table: Thematic area wise training programme for rural youth and girls

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Nursery Management of Horticulture crops	32	188	92	280	217	146	363	405	238	643
Training and pruning of orchards	7	61	19	80	66	14	80	127	33	160
Protected cultivation of vegetable crops	14	142	43	185	144	20	164	286	63	349
Commercial fruit production	5	39	11	50	61	10	71	100	21	121
Integrated farming	14	105	27	132	84	26	110	189	53	242
Seed production	53	538	74	612	485	148	633	1023	222	1245

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Production of organic inputs	33	325	43	368	187	68	255	512	111	623
Planting material production	17	167	50	217	122	64	186	289	114	403
Vermi-culture	20	161	59	220	144	50	194	305	109	414
Mushroom Production	52	283	244	527	265	354	619	548	598	1146
Bee-keeping	34	280	55	335	250	61	311	530	116	646
Sericulture	1	7	4	11	4	5	9	11	9	20
Repair and maintenance of farm machinery and implements	17	171	17	188	118	40	158	289	57	346
Value addition	12	27	85	112	32	81	113	59	166	225
Small scale processing	2	3	33	36	8	4	12	11	37	48
Post-Harvest Technology	11	19	38	57	55	123	178	74	161	235
Tailoring and Stitching	2	3	31	34	1	2	3	4	33	37
Rural Crafts	1	0	11	11	0	9	9	0	20	20
Production of quality animal products	0	0	0	0	0	0	0	0	0	0
Dairying	16	191	33	224	78	31	109	269	64	333
Sheep and goat rearing	20	152	76	228	193	149	342	345	225	570
Quail farming	2	3	0	3	5	47	52	8	47	55
Piggery	2	19	15	34	6	0	6	25	15	40
Rabbit farming	2	17	0	17	21	2	23	38	2	40
Poultry production	21	117	125	242	151	180	331	268	305	573
Ornamental fisheries	12	82	58	140	72	18	90	154	76	230
Composite fish culture	23	360	146	506	111	21	132	471	167	638
Freshwater prawn culture	0	0	0	0	0	0	0	0	0	0
Shrimp farming	0	0	0	0	0	0	0	0	0	0
Pearl culture	1	0	0	0	30	0	30	30	0	30
Cold water fisheries	0	0	0	0	0	0	0	0	0	0
Fish harvest and processing technology	6	49	5	54	50	1	51	99	6	105
Fry and fingerling rearing	24	221	18	239	160	6	166	381	24	405
Other	148	1368	500	1868	1032	590	1622	2400	1090	3490
Total	**604**	**5098**	**1912**	**7010**	**4152**	**2270**	**6422**	**9250**	**4182**	**13432**

4.3.3 Extension Functionaries

Extension functionaries of state department of agriculture and veterinary and extension workers of other government departments approached KVKs for updating of their knowledge and skills. In the area, KVK played an important role in updating knowledge of the state departments. Sometimes, NGO people also approached for training of their staffs. In the year 2019, a total of 451 courses were organized for 13810 extension functionaries under Zone V. The areas of training were productivity enhancement in field crop (70), integrated nutrient management (24), protective cultivation (32), management of farm animals (16), formation of SHGs (7), capacity building of ICT (18), gender mainstreaming through SHGs (4) etc. To extend the benefit to large number of extension workers, apart from line department staffs, teachers, NGO staffs, agricultural workers of the districts, were also included in the training programmes.

Table: Thematic area wise training programme for extension functionaries

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Productivity enhancement in field crops	70	1833	513	2346	467	202	669	2300	715	3015
Integrated Pest Management	68	1499	141	1640	352	37	389	1851	178	2029
Integrated Nutrient management	24	499	76	575	145	44	189	644	120	764
Rejuvenation of old orchards	8	120	29	149	26	14	40	146	43	189
Protected cultivation technology	32	504	110	614	278	150	428	782	260	1042
Production and use of organic inputs	16	176	51	227	82	55	137	258	106	364
Care and maintenance of farm machinery and implements	12	120	38	158	126	22	148	246	60	306
Gender mainstreaming through SHGs	4	9	42	51	27	40	67	36	82	118
Formation and Management of SHGs	7	46	92	138	21	73	94	67	165	232
Women and Child care	4	4	65	69	0	61	61	4	126	130
Low cost and nutrient efficient diet designing	4	0	37	37	0	26	26	0	63	63
Group Dynamics and farmers organization	17	179	65	244	43	92	135	222	157	379
Information networking among farmers	32	754	55	809	332	21	353	1086	76	1162
Capacity building for ICT application	18	195	53	248	95	28	123	290	81	371
Management in farm animals	16	152	79	231	40	42	82	192	121	313
Livestock feed and fodder production	11	80	56	136	78	44	122	158	100	258
Household food security	12	65	133	198	22	51	73	87	184	271
Other	96	1270	425	1695	706	403	1109	1976	828	2804
Total	**451**	**7505**	**2060**	**9565**	**2840**	**1405**	**4245**	**10345**	**3465**	**13810**

4.3.4 Sponsored Training Programme

During the period under report, KVKs of this Zone trained farmers on various aspects of agriculture and allied sectors using their own resources as well as the resources received from the different organizations. A number of government and other non-government organizations were associated to conduct different kinds of trainings for different clienteles. Even different state governments, central government boarders, NABARD, ATMA were working in collaboration with the KVKs to reach the farmers at district level. In those programmes, experts were provided by the KVKs. In the year 2019, the KVKs conducted 307 sponsored training programmes for 8950 beneficiaries with the fund support from different organizations. Out of these 8950, 55% were male and 45% were female beneficiaries. The composition of SC/ST in those training programme was 46.6%.

The major courses covered in these programmes were crop production (32) for 1018 participants, soil health management (16) for 413 participants, livestock management (32) for 803 participants, fish nutrition (5) for 75 participants, fishery management (24) for 868 participants, and capacity building (5) for 211 participants.

State-wise analysis showed that Union Territory of A&N Islands organized 8 courses for 542 participants, while West Bengal organized 198 courses for 5537 participants and Odisha organized 101 courses for 2871 participants. It indicated that sponsoring organization preferred KVKs for getting their clientele trained.

Table: Sponsored training programmes conducted by KVKs of Zone V

State	No. of Courses	No. of Participants								
		Other			SC/ST			Grand Total		
		M	F	T	M	F	T	M	F	T
A& N Islands	8	313	229	542	0	0	0	313	229	542
Odisha	101	559	928	1487	396	988	1384	955	1916	2871
West Bengal	198	1906	840	2746	1775	1016	2791	3681	1856	5537
Total	**307**	**2778**	**1997**	**4775**	**2171**	**2004**	**4175**	**4949**	**4001**	**8950**

Table: Thematic area-wise sponsored training programmes conducted by KVKs of Zone V

Area of training	No. Of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Crop production and management										
Increasing production and productivity of crops	18	298	79	377	117	62	179	415	141	556
Commercial production of vegetables	14	89	265	354	73	35	108	162	300	462
Total	**32**	**387**	**344**	**731**	**190**	**97**	**287**	**577**	**441**	**1018**
Production and value addition	0	0	0	0	0	0	0	0	0	0
Fruit Plants	6	113	34	147	53	20	73	166	54	220
Ornamental plants	0	0	0	0	0	0	0	0	0	0
Spices crops	2	40	18	58	17	3	20	57	21	78
Soil health and fertility management	16	104	51	155	101	157	258	205	208	413
Production of Inputs at site	7	44	31	75	81	54	135	125	85	210
Methods of protective cultivation	9	72	19	91	92	19	111	164	38	202
Other	55	540	253	793	543	375	918	1083	628	1711
Total	**95**	**913**	**406**	**1319**	**887**	**628**	**1515**	**1800**	**1034**	**2834**
Post-harvest technology and value addition										
Processing and value addition	5	60	40	100	25	20	45	85	60	145
Other	1	3	2	5	11	4	15	14	6	20
Total	**6**	**63**	**42**	**105**	**36**	**24**	**60**	**99**	**66**	**165**
Farm machinery										
Farm machinery, tools and implements	10	195	20	215	201	19	220	396	39	435
Other	8	74	122	196	17	73	90	91	195	286
Total	**18**	**269**	**142**	**411**	**218**	**92**	**310**	**487**	**234**	**721**

Area of training	No. Of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Livestock and fisheries										
Livestock production and management	32	312	286	598	73	132	205	385	418	803
Animal Nutrition Management	10	80	30	110	45	25	70	125	55	180
Animal Disease Management	14	88	32	120	63	89	152	151	121	272
Fisheries Nutrition	5	25	20	45	18	12	30	43	32	75
Fisheries Management	24	279	80	359	348	161	509	627	241	868
Other	26	115	291	406	80	245	325	195	536	731
Total	**111**	**899**	**739**	**1638**	**627**	**664**	**1291**	**1526**	**1403**	**2929**
Home Science										
Household nutritional security	3	21	22	43	0	37	37	21	59	80
Economic empowerment of women	20	0	206	206	0	191	191	0	397	397
Other	5	41	20	61	6	127	133	47	147	194
Total	**28**	**62**	**248**	**310**	**6**	**355**	**361**	**68**	**603**	**671**
Agricultural Extension										
Capacity Building and Group Dynamics	5	103	22	125	53	33	86	156	55	211
Other	12	82	54	136	154	111	265	236	165	401
Total	**17**	**185**	**76**	**261**	**207**	**144**	**351**	**392**	**220**	**612**
Grant Total	**307**	**2778**	**1997**	**4775**	**2171**	**2004**	**4175**	**4949**	**4001**	**8950**

4.3.5 Vocational Training Programme

Vocational training are the much needed training programme at KVK level as these programmes are directed to employment generation and much focus are given on rural based employment generation techniques like repair and maintenance of farm machines, commercial floriculture, commercial fruit production, value addition, tailoring & stitching, dairy farming, composite fish culture, rural craft. After obtaining training in these areas rural youth/ farm women can take up self-employment in their field. Vocational training being a longer duration course farmers enriched by knowledge and skill both and reach in a position to take up self-employment.

In the year 2019, 102 vocational training programmes were conducted by the KVKs of Zone V for benefit of 2788 beneficiaries. Among these West Bengal organized 67 courses for 2106 beneficiaries and Odisha conducted 32 courses for 615 beneficiaries. Among the courses was most sought by the beneficiaries. A total of 6 such courses were organized for 155 beneficiaries out of which 120 farmers were employed. Mushroom cultivation was also popular. A total of 16 courses were organized for 362 beneficiaries in these training. Other courses gained popularity were animal camps (150 participants), piggery (40 participants), poultry (285 participants), vegetable cultivation (38 participants), fruit production (32 participants) and seed production (20 participants).

In these training programmes a good number (1510) of SC/ST got trained which constitute 54.2% of the total beneficiaries.

Table: Vocational training conducted by KVKs of Zone V

State	No. of Courses	No. of Participants								
		Other			SC/ST			Grand Total		
		M	F	T	M	F	T	M	F	T
A& N Islands	3	37	20	57	7	3	10	44	23	67
Odisha	32	216	83	299	216	100	316	432	183	615
West Bengal	67	616	306	922	696	488	1184	1312	794	2106
Total	**102**	**869**	**409**	**1278**	**919**	**591**	**1510**	**1788**	**1000**	**2788**

Table: Thematic area-wise Vocational training program conducted by KVKs of Zone V

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Crop production and management										
Commercial floriculture	2	23	11	34	10	1	11	33	12	45
Commercial fruit production	1	20	0	20	12	0	12	32	0	32
Commercial vegetable production	2	22	8	30	3	5	8	25	13	38
Integrated crop management	0	0	0	0	0	0	0	0	0	0
Organic farming	4	29	0	29	133	60	193	172	60	222
Other	3	23	0	23	17	0	17	40	0	40
Total	**12**	**117**	**19**	**136**	**175**	**66**	**241**	**292**	**85**	**377**
Post-harvest technology and value addition										
Value addition	2	0	20	20	0	0	0	0	20	20
Other	1	10	0	10	0	0	0	10	0	10
Total	**3**	**10**	**20**	**30**	**0**	**0**	**0**	**10**	**20**	**30**
Livestock and fisheries										
Dairy farming	2	5	5	10	21	20	41	26	25	51
Composite fish culture	6	73	8	81	44	30	74	117	38	155
Sheep and goat rearing	4	34	20	54	35	35	70	69	55	124
Piggery	2	11	0	11	18	11	29	29	11	40
Poultry farming	9	68	68	136	70	79	149	138	147	285
Other	13	138	34	172	135	90	225	273	124	397
Total	**36**	**329**	**135**	**464**	**323**	**265**	**588**	**652**	**400**	**1052**
Income generation activities										
Vermi-composting	9	60	24	84	178	98	276	238	122	360
Production of bio-agents, bio-pesticides,	0	0	0	0	0	0	0	0	0	0
bio-fertilizers etc.	1	0	17	17	0	3	3	0	20	20
Repair and maintenance of farm machinery &imlements	3	32	0	32	3	0	3	35	0	35
Rural Crafts	0	0	0	0	0	0	0	0	0	0

Area of training	No. of Courses	No. of Participants								
		General			SC/ST			Grand Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Seed production	1	16	1	17	2	1	3	18	2	20
Sericulture	1	7	4	11	4	5	9	11	9	20
Mushroom cultivation	16	99	102	201	74	87	161	173	189	362
Nursery, grafting etc.	4	35	11	46	16	3	19	51	14	65
Tailoring, stitching, embroidery, dying etc.	0	0	0	0	0	0	0	0	0	0
Agril. para-workers, para-vet training	1	5	10	15	3	12	15	8	22	30
Other	10	108	42	150	116	40	156	224	82	306
Total	**46**	**362**	**211**	**573**	**396**	**249**	**645**	**758**	**460**	**1218**
Agricultural Extension										
Capacity building and group dynamics	3	35	22	57	13	11	24	48	33	81
Other	2	16	2	18	12	0	12	28	2	30
Total	**5**	**51**	**24**	**75**	**25**	**11**	**36**	**76**	**35**	**111**
Grand Total	**102**	**869**	**409**	**1278**	**919**	**591**	**1510**	**1788**	**1000**	**2788**

4.4 Extension Activities

Technology refined through different programmes of assessment, refinement and demonstration programmes is taken to the doorstep of the farmers through the extension activities like field day, exhibition, group meetings, exposure visit, farmers club meeting and through organizing different celebration days in the KVK campus. In creating awareness of the latest technologies in crop production, livestock farming, horticultural production, fishery production and other allied technologies, the KVKs of Zone-V organized 52796 number of activities involving 13961449 farmers and extension officials in the state of West Bengal, Odisha and A&N Islands. Among these beneficiaries 13928897 were farmers and 32900 were extension officials. A large number of extension officials (32900) paid visit to the KVKs and interacted with them regarding the latest technologies. Farmers in large number (33183) visited the KVKs and took knowledge about the latest technologies available in the KVK farm and nearby villages. Scientists of the KVK also regularly visited the farmers field. A total of 10442 visit were made by the scientists and during the course of visit 76697 farmers consulted with the scientists. KVKs conducted Kisan Goshties for creating awareness of the different technologies and 157 such kishan goshties were organized for 8412 beneficiaries.

KVKs also participated in 150 Kisan Melas and 229 numbers which benefited about 180225 and 63131 beneficiaries, respectively. Different technologies and successful case were also exhibited through arranging film show for 33174 participants. Farmers seminar, workshop were also organized for creating awareness about different programmes and government schemes. In the year 2019, 103 seminars and workshops were organized to cover 7368 farmers. Advisory services is one of the most popular item sought by the farmers. In the year, 13649 such services were offered by the KVK staff for the interest of 13240052 beneficiaries. Camps and clinics are also organized to show the farmers about the latest technologies, about 821 soil health camps, 1502 animal health camps and 147 agricultural clinics were organized to benefit 10603, 80628 and 3787 beneficiaries. Farm Service Club Group Meeting, Self help group meeting and Mahila Mandals meetings were organized to make contact of large numbers of farmers, rural youth to the KVKs. 430 such meetings were organized for benefits of 10092 rural people. Involving farmers and rural people with the KVKs by observation of different celebration days, mahila divas, swachhta seva, programme were the objective

of the KVK to create awareness regarding the government programmes 596 mela were organized involving 57634 beneficiaries.

The KVKs of Zone V also gave extensive coverage of their programme through social network and print media. A total of 789 news coverage in newspaper, 296 radio talks and 315 TV talks were provided to highlight the KVK programme and on-going projects. About 424 extension literature were distributed among the farmers and visitors.

4.4.1 State-wise details of extension activities conducted

State-wise analysis of the extension activities showed that the KVKs of A&N Islands conducted 1602 activities for the benefit of 12378 participants. Maximum number of participants (1450) benefitted was from events of Kisan Mela. Advisory service attended by 527 participants, kisan gosthies attended by 862 participants, diagnostic units attended by 377 participants, soil health camp attended by 798 participants, ex-trainee sammelan attended by 2099 participants and farmers seminar attended by 79 participants. About 908 farmers interacted with the scientists during their field visit.

West Bengal with 23 KVKs organized 27150 extension activities for benefit of 1614690 farmers, farm women, rural youth and extension functionaries. Major extension activities include scientist visit to farmers field (3385), advisory service (11232), group meeting (142), Soil test campaign (1266), diagnostic and (1298) exposure visit (444), workshop (80) and field days (472).

Odisha KVKs carried out 24095 extension activities involving 1299148 farmers and extension officials. Out of which 1282174 was farmers and 16974 was extension officials. Female participant was 16.3%. KVKs organized 182 field days to show the activities and demonstrations which benefitted 8669 beneficiaries, exhibition (4147), method demonstration (294), seminar and workshop (53), group meeting (586), advisory service (1404), scientist visit (5180), and exposure visit (203) was organized for the benefit of more than 12 lakh farmers and other beneficiaries. Different camps like, animal health camp (368), were also organized for the benefit of the farmers.

Table: Extension activities organised by KVKs of Zone-V

Nature of extension Activities	No. of programmes	No. of farmers	No. of Extension Personnel	TOTAL
Advisory Services	12969	2215113	10163	2236508
Diagnostic visits	3918	65159	1559	66718
Field Day	674	18445	976	19421
Group discussions	722	21877	1127	23004
Kisan Ghosthi	217	11349	882	12231
Film Show	837	29271	748	30019
Self-help groups	289	34213	299	34512
Kisan Mela	344	107093	2798	109891
Exhibition	4939	71429	2283	73712
Scientists' visit to farmers field	9231	74511	1674	76185
Plant/animal health camps	2455	100179	3725	103904
Farm Science Club	663	5137	193	5330
Ex-trainees Sammelan	1053	4174	574	4748
Farmers' seminar/workshop	134	7892	502	8394
Method Demonstrations	610	18837	799	19636
Celebration of important days	346	25644	1054	26698
Special day celebration	342	20593	883	21476

Nature of extension Activities	No. of programmes	No. of farmers	No. of Extension Personnel	TOTAL
Exposure visits	651	22177	689	22866
Others (Soil Health Camp, No. of farmers visit to KVK, Lectures delivered as resource person, Leaflets, Newsletter, Mahila Kisan Diwas, Swatchta Hi Sewa)	12453	55711	1896	57607
Total	**52847**	**2908804**	**32824**	**2952860**

Table: State-wise extension activities organised by KVKs of Zone-V

Activities	A & N Islands				Odisha				West Bengal				Total			
	No. of prog.	No. of farmers	No. of Extn. Person-nel	Total	No. of prog.	No. of farmers	No. of Extn. Per-sonnel	Total	No. of prog.	No. of farmers	No. of Extn. Per-sonnel	Total	No. of prog.	No. of farmers	No. of Extn. Person-nel	Total
Advisory Services	333	525	2	527	1404	987943	7748	995691	11232	1226645	2413	1240290	**12969**	**2215113**	**10163**	**2236508**
Diagnostic visits	292	377	0	377	2328	23213	927	24140	1298	41569	632	42201	**3918**	**65159**	**1559**	**66718**
Field Day	20	411	54	465	182	8268	401	8669	472	9766	521	10287	**674**	**18445**	**976**	**19421**
Group discus-sions	12	285	10	295	568	13300	974	14274	142	8292	143	8435	**722**	**21877**	**1127**	**23004**
Kisan Ghosthi	12	855	7	862	100	4606	262	4868	105	5888	613	6501	**217**	**11349**	**882**	**12231**
Film Show	19	514	7	521	455	12963	487	13450	363	15794	254	16048	**837**	**29271**	**748**	**30019**
Self-help groups	20	350	0	350	166	31057	202	31259	103	2806	97	2903	**289**	**34213**	**299**	**34512**
Kisan Mela	1	1400	50	1450	262	14134	467	14601	81	91559	2281	93840	**344**	**107093**	**2798**	**109891**
Exhibition	2	570	40	610	4147	46828	1013	47841	790	24031	1230	25261	**4939**	**71429**	**2283**	**73712**
Scientists' visit to farmers field	666	908	3	911	5180	46482	1156	47638	3385	27121	515	27636	**9231**	**74511**	**1674**	**76185**
Plant/animal health camps	16	355	13	368	486	26672	461	27133	1953	73152	3251	76403	**2455**	**100179**	**3725**	**103904**
Farm Science Club	1	25	0	25	168	2505	65	2570	494	2607	128	2735	**663**	**5137**	**193**	**5330**
Ex-trainees Sammelan	0	0	0	0	310	1704	71	1775	743	2470	503	2973	**1053**	**4174**	**574**	**4748**
Farmers' sem-inar/workshop	1	77	2	79	53	2176	170	2346	80	5639	330	5969	**134**	**7892**	**502**	**8394**
Method Demonstra-tions	17	234	2	236	294	4883	247	5130	299	13720	550	14270	**610**	**18837**	**799**	**19636**
Celebration of important days	8	295	16	311	174	12258	692	12950	164	13091	346	13437	**346**	**25644**	**1054**	**26698**
Special day celebration	5	161	21	182	182	12527	506	13033	155	7905	356	8261	**342**	**20593**	**883**	**21476**
Exposure visits	4	19	3	22	203	5550	239	5789	444	16608	447	17055	**651**	**22177**	**689**	**22866**
Others (Soil Health Camp, No. of farmers visit to KVK, Lectures delivered as resource per-son, Leaflets , Newsletter , Mahila Kisan Diwas, Swatch-ta Hi Sewa)	173	4579	208	4787	7433	25105	886	25991	4847	26027	802	26829	**12453**	**55711**	**1896**	**57607**
Total	**1602**	**11940**	**438**	**12378**	**24095**	**1282174**	**16974**	**1299148**	**27150**	**1614690**	**15412**	**1641334**	**52847**	**2908804**	**32824**	**2952860**

4.4.2 Other Extension Activities

Besides all these activities coverage through media newspaper (789), radio (296) and TV (315) were also made to create awareness of the technologies.

Table: Other extension activities organised by KVKs of Zone-V

Nature of Extension Activity	No. of activities			
	A & N Islands	Odisha	West Bengal	Total
Electronic Media (CD/DVD)	0	67	23	**90**
Extension Literature	16	255	153	**424**
Newspaper coverage	77	484	228	**789**
Popular articles	4	128	61	**193**
Research papers	8	46	49	**103**
Radio Talks	18	218	60	**296**
TV Talks	18	206	91	**315**
Others (Technical bulletins, Technical report, Training material)	39	1122	447	**1608**
Total	**180**	**2526**	**1112**	**3818**

5. Production of Seeds, Planting Materials and Bio-products

5.1 Seed Production:

Seed is the most important input to the farmers. There is shortage of quality seed in all the states. The KVKs of Zone V took initiative to produce good quality seed with the aim to provide farmers and to assess quality seeds of new varieties. Major crops under the seed production programme were maize, rice, wheat, mustard, blackgram.

In the year 2019, KVKs of Zone-V produced 8820 q of seed having value of Rs.32476544/- in the KVK farm. These seeds were supplied to 15051 farmers. State-wise analysis showed that Union Territory of A&N Islands produced 290.14 q of seed with Rs.83964/- and supplied to 200 farmers. In the state of Odisha, 3829.72 q of seeds were produced by the KVKs in their KVK farms with worth of Rs.13505933/- and distributed to 1822 farmers. In the state of West Bengal KVK produced 4700. q of seeds in KVK farm worth of Rs.18886647/- and distributed among 13030 farmers. The state-wise production of seeds are provided in below table.

Table: State-wise total Seed production by KVKs

Sl. No.	State/UT	Quantity of seed (q)	Value (Rs.)	Distributed to no. of farmers	No. of KVKs
1	A&N Islands	**290.14**	**83964**	**200**	3
2	Odisha	**3829.72**	**13505933**	**1822**	31
3	West Bengal	**4700.14**	**18886647**	**13030**	21
Total		**8820.0**	**32476544**	**15052**	**55**

Under the seed production programme different seeds varieties are used are given in the below table.

Table: Varieties of major crop used for seed production

Varieties		
Crop	**Odisha**	**West Bengal**
Rice	Mrinalini, MTU 1001, Pratiksha, Swarna Sub-I, CR 1009, Swarna, Swarnasherya, Hasnta, Pooja	IET 4786, DRR-47, Ajit, Chiarang Sub-I, MTU-1010, Sabita, Pratikhya, Dhiren, Satabdi, Sahabhagi, GB-3, SS-1, GB-`, MTU-7029, Lalat, Super Shymoli, Sampriti, Swarna Sub-I, R. Bhagawati
Maize	Kanchan	Kanchan
Grengram	IPM-02-14 ,IPU-02-14, IPU-02-43,IPM -02-03	IPM-02-03, IMP-205-7, IPM-02-14
Lentil	WBL-77, HUL-57	IPL-316, IPL 220, IPL-526, IPL-406, PL-8, WBL-77, HUL-57
Blackgram	PU 31	Sarada, PU-35,Uttara, Goutam
Chickpea	Ujjwal	Anuradha, Bidisha, RVG-202, RVG-203, CR-204
Mustard	Sushree, Anuradha, Parbati	Pusa Mustad-25, Pusa Mustard-30, YSH 0401, Shivani, B-9, NRCHB-101, PM-30, Pusa Jagannath
Sesame	TKG308 Shubra Smarak Amriti Sabitri	YSH-0401, G-2, CUMS-17 Sabitri
Groundnit	Dharani ,Devi (ICGV91114), TAG 24	Devi (ICGV91114), TAG 24
Redgram	RRG-176, BRD-5	ICPL 87129, RRG-176, PA-29
Jute	JRO 2407	JRO 2407
Ragi	Arjun	

Table: State-wise seed production in 2019

		A&N Islands			Odisha			West Bengal			Total Zone			
Cate-gory	**Name of Crop**	**Quantity of seed (q)**	**Val-ue (Rs.)**	**No. of farmers**	**Quan-tity of seed (q)**	**Value (Rs.)**	**No. of farmers**	**Quan-tity of seed (q)**	**Value (Rs.)**	**No. of farmers**	**Quantity of seed (q)**	**Value (Rs.)**	**Distrib-uted to no. of farmers**	**No. of KVKs**
Cereal	Maize	25	25000	25	0	0	0	4.95	29550	15	29.95	54550	40	2
	Rice	11.14	28964	150	3245.7	8551167.4	851	2410.97	6884201	7986	5667.81	15464332	8987	41
	Wheat	0	0	0	28	86800	54	153	454650	208	181	541450	262	3
	Finger millets	0	0	0	4.36	11366	10	0	0	0	4.36	11366	10	2
	Total	**36.14**	**53964**	**175**	**3278.06**	**8649333.4**	**915**	**2568.92**	**7368401**	**8209**	**5883.12**	**16071698**	**9299**	**48**
Oil-seed	Brown Sarson	0	0	0	0	0	0	39	25400	200	39	25400	200	2
	Ground-nut	0	0	0	0.7	3500	9	4.06	22860	5	4.76	26360	14	3
	Sesame	0	0	0	2.94	23874	25	2.1	21000	83	5.04	44874	108	5
	Linseed	0	0	0	0	0	0	5.5	61500	74	5.5	61500	74	2
	Niger	0	0	0	4.24	26138	76	0	0	0	4.24	26138	76	2
	Toria	0	0	0	6	37980	143	0	0	0	6	37980	143	1
	Sesamum	0	0	0	0	0	0	7.36	72904	206	7.36	72904	206	2
	Mustard	0	0	0	0	0	0	29.57	235220	826	29.57	235220	826	9
	Yellow Sarson	0	0	0	0	0	0	3	36000	175	3	36000	175	1
	Total	**0**	**0**	**0**	**13.88**	**91492**	**253**	**90.59**	**474884**	**1569**	**104.47**	**566376**	**1822**	**27**
Green Ma-nure	Sunhemp	30	6000	10	4.8	27360	5	0	0	0	34.8	33360	15	3
	Dhaincha	0	0	0	4.5	13900	43	5.82	31100	59	10.32	45000	102	10
	Total	**30**	**6000**	**10**	**9.3**	**41260**	**48**	**5.82**	**31100**	**59**	**45.12**	**78360**	**117**	**13**

		A&N Islands			Odisha			West Bengal			Total Zone			
Category	Name of Crop	Quantity of seed (q)	Value (Rs.)	No. of farmers	Quantity of seed (q)	Value (Rs.)	No. of farmers	Quantity of seed (q)	Value (Rs.)	No. of farmers	Quantity of seed (q)	Value (Rs.)	Distributed to no. of farmers	No. of KVKs
Pulse	Black-gram	10	2000	2	44	402578	294	282.1	3868950	609	336.1	4273528	905	12
	Cowpea	5	5000	3	0	0	0	0	0	0	5	5000	3	1
	French-bean	3	5500	3	0	0	0	0	0	0	3	5500	3	1
	Gram	0	0	0	0	0	0	19.5	0	0	19.5	0	0	1
	Cluster-bean	4	4500	3	0	0	0	0	0	0	4	4500	3	1
	Lentil	0	0	0	0	0	0	508.3	3612728.8	692.5	508.3	3612728.8	692	6
	Green-garm	0	0	0	208.17	2068140	0	345.7	3254335	1311	553.87	5322475	1311	12
	Pigeon-pea	0	0	0	154.31	1836480	268	0	0	0	154.31	1836480	268	5
	Dolichos	2	2000	2	0	0	0	0	0	0	2	2000	2	1
	Others	0	0	0	0	0	0	2.016	10880	25	2.016	10880	25	2
	Total	**24**	**19000**	**13**	**406.48**	**4307198**	**562**	**1157.616**	**10746894**	**2637.5**	**1588.096**	**15073092**	**3212**	**42**
Commercial Crop	Sugar-cane	0	0	0	9.07	23130	15	0	0	0	9.07	23130	15	1
	Potato	0	0	0	0	0	0	25.2	26910	8	25.2	26910	8	1
	Total	**0**	**0**	**0**	**9.07**	**23130**	**15**	**25.2**	**26910**	**8**	**34.27**	**50040**	**23**	**2**
Vegetables	Onion	0	0	0	0	0	0	27	1890	49	27	1890	49	1
	Spinach	0	0	0	0	0	0	2.7	5400	57	2.7	5400	57	1
	Tomato	0	0	0	0	0	0	2.1	3354	31	2.1	3354	31	2
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**31.8**	**10644**	**137**	**31.8**	**10644**	**137**	**4**
Spices	Ginger	0	0	0	0	0	0	53	26000	29	53	26000	29	2
	Turmeric	200	5000	2	119	416500	34	106	161100	78	425	582600	114	10
	Total	**200**	**5000**	**2**	**119**	**416500**	**34**	**222.6**	**208388**	**381**	**541.6**	**629888**	**417**	**20**
Fodder Crop	Napier Grass	0	0	0	3	150	10	0	0	0	3	150	10	1
	Fodder slips	0	0	0	0	0	0	0.5	900	5	0.5	900	5	1
	Fodder Maize	0	0	0	0	0	0	50	8480	9	50	8480	9	1
	Subabul	0	0	0	0	0	0	600	3600	35	600	3600	35	1
	Total	**0**	**0**	**0**	**3**	**150**	**10**	**650.5**	**12980**	**49**	**653.5**	**13130**	**59**	**4**
Fibre Crops	Jute	0	0	0	0	0	0	1.1	11000	50	1.1	11000	50	1
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**1.1**	**11000**	**50**	**1.1**	**11000**	**50**	**1**
Medicinal Plant	Rehume-modi	0	0	0	0	0	0	3	33000	75	3	33000	75	1
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**33000**	**75**	**3**	**33000**	**75**	**1**
Grand Total		**290.14**	**83964**	**200**	**3829.72**	**13505933**	**1822**	**4700.146**	**18886647**	**13030**	**8820.006**	**32476544**	**15051**	

5.2 Planting Material Production

Supply of planting materials to the farmers is one of the important functions of the KVKs for many years. KVK act as source to supply good quality planting materials of new varieties of vegetables, fruits, forest sapling, ornamental plants, spices, plantation crops etc. During the year 2019, efforts of the KVKs made it possible to produce a large number of plating materials of about 50 lakh in number. Out of these 50 lakh planting materials, A&N Islands produced about 1.33 lakh, planting materials, Odisha KVKs produced 34.01 lakh. West Bengal KVKs produced 14.76 lakh. It helps the KVKs of the zone to earn about Rs.87.93 lakh income during the year. The materials are sold to the farmers and 105158 farmers were benefitted from these planting materials. The statewise planting materials produces in 2019 in the zone are provided in below table.

Table: Planting materials production by KVKs

Category	Name of Crop	Number	Value (Rs.)	Distributed to No. of farmers	Number	Value (Rs.)	Distributed to No. of farmers	Number	Value (Rs.)	Distributed to No. of farmers	Number	Value (Rs.)	Distributed to No. of farmers
		A & N Islands			Odisha			West Bengal			Total		
Vegetable Seedling	Tomato	5500	10350	11	461039	732406.5	3258	231396	188961	6367	**697935**	**931717.5**	**9636**
	Cauliflower	0	0	0	145011	213341	1969	112684	123124	2234	**257695**	**336465**	**4203**
	Brinjal	11440	20864	29	253383	339986	2613	177188	135176	3220	**442011**	**496026**	**5862**
	Bell Pepper	0	0	0	10142	15213	225	1000	2000	5	**11142**	**17213**	**230**
	Chilli	15850	25510	23	114911	200263.5	1669	205485	127453	2056	**336246**	**353226.5**	**3748**
	Onion	0	0	0	1720681	197336	496	86040	22602	2656	**1806721**	**219938**	**3152**
	Broccoli	0	0	0	10401	14043	78	92962	161560	457	**103363**	**175603**	**535**
	Bottle Gourd	5	15000	15	398	597	154	2625	8521	1207	**3027.5**	**24118**	**1376**
	Cucumber	4	18000	12	4487	6731	2540	5266	3588	2500	**9756.5**	**28319**	**5052**
	Capsicum	0	0	0	27259	58338	182	22760	67361	926	**50019**	**125699**	**1108**
	Cabbage	1	7000	4	77096	94071	1157	133639	130142	2396	**210735.5**	**231213**	**3557**
	Knol-khol	0	0	0	2570	6140	23	11600	6650	20	**14170**	**12790**	**43**
	Parsley	0	0	0	50	100	2	0	0	0	**50**	**100**	**2**
	Celery	0	0	0	50	100	2	2500	2500	21	**2550**	**2600**	**23**
	Lettuce	0	0	0	1010	1510	25	5000	8250	42	**6010**	**9760**	**67**
	Kale	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
	Cucurbits	0	0	0	0	0	0	13500	18500	44	**13500**	**18500**	**44**
	Radish	0	0	0	0	0	0	20000	30000	8	**20000**	**30000**	**8**
	Colocassia	40	8000	7	150	3000	10	0	0	0	**190**	**11000**	**17**
	Total	**32838.5**	**104724**	**101**	**2828638**	**1883176**	**14403**	**1123645**	**1036388**	**24159**	**3985121.5**	**3024288**	**38663**
	Others	**16204**	**170500**	**133**	**131008**	**858713**	**4364**	**52452**	**140045**	**4304**	**199664**	**1169258**	**8801**
	Garnd Total	**49042.5**	**275224**	**234**	**2959646**	**2741889**	**18767**	**1176097**	**1176433**	**28463**	**4184785.5**	**4193546**	**47464**
Commercial	Mulberry	0	0	0	0	0	0	6000	15000	60	**6000**	**15000**	**60**
	Others	0	0	0	200	400	5	0	0	0	**200**	**400**	**5**
	Total	**0**	**0**	**0**	**200**	**400**	**5**	**6000**	**15000**	**60**	**6200**	**15400**	**65**

Category	Name of Crop	Number	Value (Rs.)	Distrib-uted to No. of farmers	Number	Value (Rs.)	Distrib-uted to No. of farmers	Number	Value (Rs.)	Distrib-uted to No. of farmers	Number	Value (Rs.)	Distrib-uted to No. of farmers
		A & N Islands			Odisha			West Bengal			Total		
Fruits	Mango	105	10500	4	10259	121175	149	27884	574860	6267	**38248**	**706535**	**6420**
	Pineapple	2500	25000	15	425	2125	12	2200	20750	1056	**5125**	**47875**	**1083**
	Lemon	195	16000	7	10	1000	10	20578	106740	1305	**20783**	**123740**	**1322**
	Jack fruit	50	2500	4	0	0	0	5000	50000	1500	**5050**	**52500**	**1504**
	Aonla	0	0	0	0	0	0	2000	20000	1500	**2000**	**20000**	**1500**
	Lime	125	12500	4	3427	86660	681	5660	100500	1460	**9212**	**199660**	**2145**
	Lasora	0	0	0	0	0	0	3000	30000	1000	**3000**	**30000**	**1000**
	Ber	0	0	0	0	0	0	720	15750	107	**720**	**15750**	**107**
	Papaya	3500	35000	20	5065	95850	471	7680	44300	994	**16245**	**175150**	**1485**
	Pomegran-ate	0	0	0	0	0	0	70	0	0	**70**	**0**	**0**
	Strawberry	0	0	0	0	0	0	7200	51000	32	**7200**	**51000**	**32**
	Banana	0	0	0	15800	338753	992	6300	21000	69	**22100**	**359753**	**1061**
	Litchi	0	0	0	0	0	0	625	19000	394	**625**	**19000**	**394**
	Guava	200	22500	5	28	1040	16	6239	172315	396	**6467**	**195855**	**417**
	Woodapple	0	0	0	0	0	0	270	10800	30	**270**	**10800**	**30**
	Cashewnut	50	4000	2	65	3600	0	0	0	0	**115**	**7600**	**2**
	Sapota	50	8000	2	0	0	0	890	31150	83	**940**	**39150**	**85**
	Citrus Lemon	0	0	0	0	0	0	1428	46560	76	**1428**	**46560**	**76**
	Causterd Apple	0	0	0	702	10530	142	0	0	0	**702**	**10530**	**142**
	Coconut	350	14000	7	1205	20730	33	0	0	0	**1555**	**34730**	**40**
	Sweet orange	0	0	0	0	0	0	1000	30000	2	**1000**	**30000**	**2**
	Total	**7125**	**150000**	**70**	**36986**	**681463**	**2506**	**98744**	**1344725**	**16271**	**142855**	**2176188**	**18847**
	Others	3100	50000	23	2045	40735	191	556	34600	34	**5701**	**125335**	**248**
	Grand Total	**10225**	**200000**	**93**	**39031**	**722198**	**2697**	**99300**	**1379325**	**16305**	**148556**	**2301523**	**19095**
Ornamen-tal plants	Mari gold	2000	20000	5	160843	196834.8	30681	2700	7300	0	**165543**	**224134.8**	**30686**
	Ornamental	0	0	0	0	0	0	4810	27366	9	**4810**	**27366**	**9**
	Tuberose	5000	30000	10	0	0	0	0	0	0	**5000**	**30000**	**10**
	Chrysenthe-mum	0	0	0	309	1545	3	800	2500	20	**1109**	**4045**	**23**
	Daheliya	0	0	0	10	50	4	0	0	0	**10**	**50**	**4**
	Aster	0	0	0	7500	9000	11	0	0	0	**7500**	**9000**	**11**
	Bamboo	250	25000	10	0	0	0	0	0	0	**250**	**25000**	**10**
	Boganvelia	0	0	0	200	1000	0	0	0	0	**200**	**1000**	**0**
	Others	0	0	0	251	1295	2	0	0	0	**251**	**1295**	**2**
	Anthurium	150	4000	2	0	0	0	0	0	0	**150**	**4000**	**2**
	Coleus	0	0	0	0	0	0	4700	7050	12	**4700**	**7050**	**12**

Category	Name of Crop	Number	Value (Rs.)	Distributed to No. of farmers	Number	Value (Rs.)	Distributed to No. of farmers	Number	Value (Rs.)	Distributed to No. of farmers	Number	Value (Rs.)	Distributed to No. of farmers
		A & N Islands			Odisha			West Bengal			Total		
	Heliconia	1000	10000	10	0	0	0	0	0	0	**1000**	**10000**	**10**
	Others	700	14000	30	530	1060	6	0	0	0	**1230**	**15060**	**36**
	Total	**9100**	**103000**	**67**	**169643**	**210784.8**	**30707**	**13010**	**44216**	**41**	**191753**	**358000.8**	**30815**
Medicinal and Aromatic	Lemon grass	5000	10000	5	18	0	6	500	1000	25	**5518**	**11000**	**36**
	Others	0	0	0	800	9000	100	13550	62900	85	**14350**	**71900**	**85**
	Total	**31331**	**54965**	**21**	**2018**	**50000**	**68**	**12700**	**190000**	**693**	**46049**	**294965**	**782**
Plantation	Arecanut	26331	44965	16	2000	50000	62	12200	189000	668	**40531**	**283965**	**746**
	Coconut	350	1400	7	0	0	0	4892	147650	270	**5242**	**149050**	**277**
	Fodder	0	0	0	300	150	10	0	0	0	**300**	**150**	**10**
	Teak	0	0	0	925	9250	15	0	0	0	**925**	**9250**	**15**
	Acacia	0	0	0	600	4500	105	0	0	0	**600**	**4500**	**105**
	Neem	0	0	0	900	5800	140	8000	16000	30	**8900**	**21800**	**170**
	Drumstick	0	0	0	202	3030	166	30100	150500	193	**30302**	**153530**	**359**
	Others	0	0	0	4000	8000	0	7180	33720	11	**11180**	**41720**	**11**
	Total	**26681**	**46365**	**23**	**8927**	**80730**	**498**	**62372**	**536870**	**1172**	**97980**	**663965**	**1693**
Spices	Chilli	0	0	0	5021	5021	26	0	0	0	**5021**	**5021**	**26**
	Black peppg-per	1500	1500	10	0	0	0	400	8000	64	**1900**	**9500**	**74**
	Cinnamon	2000	20000	10	0	0	0	0	0	0	**2000**	**20000**	**10**
	Ginger	150	50000	2	0	0	0	50	8000	14	**200**	**58000**	**16**
	Onion	0	0	0	204800	40960	22	0	0	0	**204800**	**40960**	**22**
	All Spices	0	0	0	0	0	0	500	5000	26	**500**	**5000**	**26**
	Cinnamon	2000	20000	10	0	0	0	0	0	0	**2000**	**20000**	**10**
	Curry Leaf	0	0	0	0	0	0	1800	5200	0	**1800**	**5200**	**0**
	Nutmeg graft	200	20000	10	0	0	0	1600	5600	0	**1800**	**25600**	**10**
	Others	0	0	0	200	2000	0	305	9700	30	**505**	**11700**	**30**
	Total	**5850**	**111500**	**42**	**210021**	**47981**	**48**	**4655**	**41500**	**134**	**220526**	**200981**	**224**
Tuber	Tapioca	0	0	0	480	18800	70	0	0	0	**480**	**18800**	**70**
	Others	0	0	0	280	11200	31	11005.5	352000	329	**11285.5**	**363200**	**360**
	Total	**0**	**0**	**0**	**760**	**30000**	**101**	**11005.5**	**352000**	**329**	**11765.5**	**382000**	**430**
Forest Species	Forest Sp	0	0	0	0	0	0	30500	105000	73	**30500**	**105000**	**73**
	Accacia	0	0	0	2788	16516	364	0	0	0	**2788**	**16516**	**364**
	Bamboo	250	25000	10	1716	22970	111	0	0	0	**1966**	**47970**	**121**
	Casurina	0	0	0	220	4400	172	0	0	0	**220**	**4400**	**172**
	Neem	0	0	0	1900	28000	475	16200	75000	1500	**18100**	**103000**	**1975**
	Teak	0	0	0	950	5300	283	0	0	0	**950**	**5300**	**283**

Category	Name of Crop	Number	Value (Rs.)	Distributed to No. of farmers	Number	Value (Rs.)	Distributed to No. of farmers	Number	Value (Rs.)	Distributed to No. of farmers	Number	Value (Rs.)	Distributed to No. of farmers
		A & N Islands			Odisha			West Bengal			Total		
	A mangium	0	0	0	100	1000	100	0	0	0	**100**	**1000**	**100**
	Magagony	0	0	0	150	1050	19	11020	50000	900	**11170**	**51050**	**919**
	Mangium	0	0	0	306	2154	38	0	0	0	**306**	**2154**	**38**
	Others	0	0	0	225	4500	78	600	3000	200	**825**	**7500**	**278**
	Total	**250**	**25000**	**10**	**8355**	**85890**	**1640**	**58320**	**233000**	**2673**	**66925**	**343890**	**4323**
Fodder crop	Napier	0	0	0	2600	2220	18	31700	24000	48	**34300**	**26220**	**66**
	Subabul	50	1000	4	0	0	0	600	3600	35	**650**	**4600**	**39**
	Total	**50**	**1000**	**4**	**2600**	**2220**	**18**	**32300**	**27600**	**83**	**34950**	**30820**	**105**
Others	Others	0	0	0	0	0	0	400	8000	162	**400**	**8000**	**162**
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**400**	**8000**	**162**	**400**	**8000**	**162**
Forest Species	Poplar	0	0	0	0	0	0	10000	50000	1000	**10000**	**50000**	**1000**
	Tun	0	0	0	0	0	0	15000	75000	1000	**15000**	**75000**	**1000**
	Total	**0**	**0**	**0**	**0**	**0**	**0**	**25000**	**125000**	**2000**	**25000**	**125000**	**2000**
		0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
GRAND TOTAL		**132530**	**817054**	**494**	**3401201**	**3972093**	**54549**	**1476160**	**4003944**	**50115**	**5009890**	**8793091**	**105158**

5.3 Production of Bio-product

Bio products like bio-fertilizers, earthworkms, azolla, rhizobium are in demand in rural areas. Besides bio-pesticides– neem extract, trichoderma and mushroom spawn etc. were produced in KVKs of Zone V. The total bio product production was 311929 nos. which amounts to about 2973 q of bio product having value of Rs.30.91 lakh. From the said programme 108758 farmers were benefitted in 2019. The state-wise and item-wise bio product production is given in table below.

Table: Production of bio-product by KVKs

Bio Product	Name of the Bio-Product	Quantity (No.)	Quantity (Kg.)	Value (Rs.)	Number of farmers	Quantity (No.)	Quantity (Kg.)	Value (Rs.)	Number of farmers	Quantity (No.)	Quantity (Kg.)	Value (Rs.)	Number of farmers	Quantity (No.)	Quantity (Kg.)	Value (Rs.)	Number of farmers
Bio Fertilisers		A & N Islands				Odisha				West Bengal				Total			
Non Symbiotic Azotobacter	Non Symbiotic Azotobacter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vermicompost	Vermicompost	0	0	0	0	0	59667.2	451928	3118	155	106145	1018220	535	155	165812.2	1470148	3653
Azolla		45	500	10000	15	2	730	3800	84	5	5566	125522	838	52	6796	139322	937
Earthworms		0	0	0	0	100000	277	116400	159	42500	53	89450	360	142500	330	205850	519
Compost		0	0	0	0	2	5000	50000	99985	0	5775	25300	50	2	10775	75300	100035
Worms		0	0	0	0	0	11	5500	8	0	0	0	0	0	11	5500	8
Blue green algae		0	0	0	0	0	10	50	5	0	0	0	0	0	10	50	5
NADEP		0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
Azatobactor		0	0	0	0	0	0	0	0	0	108	11664	52	0	108	11664	52

Bio Product	Name of the Bio-Product	Quantity (No.)	Quantity (Kg.)	Value (Rs.)	Number of farmers	Quantity (No.)	Quantity (Kg.)	Value (Rs.)	Number of farmers	Quantity (No.)	Quantity (Kg.)	Value (Rs.)	Number of farmers	Quantity (No.)	Quantity (Kg.)	Value (Rs.)	Number of farmers
Bio Fertilisers		**A & N Islands**				**Odisha**				**West Bengal**				**Total**			
Azospirillum		0	0	0	0	0	0	0	0	0	15	1620	10	0	15	1620	10
PSB		0	0	0	0	0	0	0	0	0	125	13500	70	0	125	13500	70
Rhizobium		0	0	0	0	0	0	0	0	0	300	45000	290	0	300	45000	290
Azolla culture		0	0	0	0	2	1160	4200	40	1	205	1690	7	3	1365	5890	47
Total		**45**	**500**	**10000**	**15**	**100006**	**66855.2**	**631878**	**103399**	**42662**	**118292**	**1331966**	**2212**	**142713**	**185647.2**	**1973844**	**105626**
Bio Pesticides		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neem extract		0	0	0	0	0	0	0	0	0	37.5	5825	43	0	37.5	5825	43
Tobacco extract		0	0	0	0	0	0	0	0	0	7	0	1	0	7	0	1
Trichodermaviride		0	0	0	0	0	0	0	0	0	275	50750	348	0	275	50750	348
Panchagavya		0	0	0	0	0	0	0	0	0	142	0	2	0	142	0	2
Trichoderma		0	0	0	0	0	0	0	0	0	97	0	15	0	97	0	15
Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**558.5**	**56575**	**409**	**0**	**558.5**	**56575**	**409**
Worms		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eudriluseugeniae		0	0	0	0	0	0	0	0	0	23.5	47000	8	0	23.5	47000	8
Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**23.5**	**47000**	**8**	**0**	**23.5**	**47000**	**8**
Earth Worm		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eiseniafoetida		0	0	0	0	100012	723	97500	46	47000	2.5	52000	47	147012	725.5	149500	93
Earth worm		25	50	25000	4	0	10	5000	10	0	6	3600	28	25	66	33600	42
Total		**25**	**50**	**25000**	**4**	**100012**	**733**	**102500**	**56**	**47000**	**8.5**	**55600**	**75**	**147037**	**791.5**	**183100**	**135**
Bio-Fungicides		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichodermaviridae		0	0	0	0	0	0	0	0	0	97	0	15	0	97	0	15
Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**97**	**0**	**15**	**0**	**97**	**0**	**15**
Others		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vermiculture	Eiseniafoetida	12	5000	150000	12	0	8	4000	3	0	2.5	5000	1	12	5010.5	159000	16
Mushroom spawn		25	150	25000	15	18742	2645	339967	1464	3000	198	60550	390	21767	2993	425517	1869
Cuelure		0	0	0	0	0	45	2250	20	0	0	0	0	0	45	2250	20
Mineral Mixture		0	0	0	0	0	0	0	0	400	400	40000	400	400	400	40000	400
Cow dung (dry)		0	0	0	0	0	0	0	0	0	35600	28000	10	0	35600	28000	10
Cow dung (wet)		0	0	0	0	0	0	0	0	0	66139	175560	250	0	66139	175560	250
Total		**37**	**5150**	**175000**	**27**	**18742**	**2698**	**346217**	**1487**	**3400**	**102339.5**	**309110**	**1051**	**22179**	**110187.5**	**830327**	**2565**
Grand Total		**107**	**5700**	**210000**	**46**	**218760**	**70286.2**	**1080595**	**104942**	**93062**	**221319**	**1800251**	**3770**	**311929**	**297305.2**	**3090846**	**108758**

5.4 Livestock and Fishery

Livestock materials like poultry chicks, Japanese quail, ducklings, turkey, eggs, breeds of cow, sheep, goat, piglets, fish fingerlings. Total livestock materials produced by KVKs of Zone –V was 73. 74 lakh which helped an earning of Rs.120.7 lakh. These inputs were supplied/sold to 2923 farmers.

In Odisha, 5 dairy animals fetched Rs.43400/-, 39206 poultry fetched Rs.2438849/-, 3707 Japanese quail earned Rs.298450/-. 1179 J. Quail eggs earned Rs.94202/-2487 ducklings earned Rs.91700/- Thus poultry resulted in earning of Rs.3113361/- in Odisha. There was also earning from fish fingerlings of 20.79 lakh about Rs.722460/-.

In West Bengal, 80 breeds of livestock helped to earn 12.82 lakh, 632 goat breed helped to earn Rs.1411750/-, 118 sheep breed helped to earn Rs.340500/- while in poultry earning was Rs.757425/- for 12980 birds, Japanese quail helped to earn Rs.45144/- from 1716 birds, 6544 duck gave a value of Rs.332886/-, 1053 turkey gave value of Rs.150360/-. From fish and fish fingerlings KVKs of West Bengal earned Rs.30.72 lakh. Total earning by West Bengal KVKs from livestock was about Rs.80.37 lakh. In the Union Territory of A&N Islands, 589 poultry birds, 337 ducklings, 18250 fish fingerlings was produced which helped the KVKs to earn Rs.1.61 lakh.

Table: Production of livestock and fishery by KVKs

Particulars of livestock	A & N Islands			Odisha			West Bengal			Zone Total		
	Number	Value (Rs)	No. of farmers	Number	Value (Rs)	No. of farmers	Number	Value (Rs)	No. of farmers	Number	Value (Rs)	No. of farmers
Dairy animals												
Cow	0	0	0	2	35000	1	56	975000	7	58	1010000	8
Calves	0	0	0	0	0	0	24	307000	1	**24**	**307000**	**1**
Goats	0	0	0	3	8400	2	632	1411750	229	**635**	**1420150**	**231**
Sheep	0	0	0	0	0	0	118	340500	42	**118**	**340500**	**42**
Breeding bull	0	0	0	0	0	0	1	30000	0	**1**	**30000**	**0**
Total	**0**	**0**	**0**	**5**	**43400**	**3**	**831**	**3064250**	**279**	**836**	**3107650**	**282**
Poultry												
Poultry	589	7756	16	39206	2438849	22	12980	757425	901	**52775**	**3204030**	**939**
Japanese quail	0	0	0	3707	298450	5	1716	45144	66	**5423**	**343594**	**71**
J quail eggs	0	0	0	1179	94202	2	652	1456	12	**1831**	**95658**	**14**
Ducks	337	24562	28	2487	153020	6	6544	332886	302	**9368**	**510468**	**336**
Turkey	0	0	0	1137	91700	2	1053	150360	120	**2190**	**242060**	**122**
Others	1512	65880	10	500	37000	1	4450	258360	78	**6462**	**361240**	**89**
Others	0	0	0	35	140	2	2000	100000	100	**2035**	**100140**	**102**
Total	**2438**	**98198**	**54**	**48251**	**3113361**	**40**	**29395**	**1645631**	**1579**	**80084**	**4857190**	**1673**
Piggery												
Piglets	0	0	0	0	0	0	48	117600	18	**48**	**117600**	**18**
Boar	0	0	0	0	0	0	3	65000	0	**3**	**65000**	**0**
Sow	0	0	0	0	0	0	4	72000	0	**4**	**72000**	**0**
Total	**0**	**0**	**0**	**0**	**0**	**0**	**55**	**254600**	**18**	**55**	**254600**	**18**
Fisheries												
Indian carp	15750	55250	36	2052827	626960	9	4003110	970536	357	**6071687**	**1652746**	**402**
Exotic carp	0	0	0	3870	65100	3	175942	80994	49	**179812**	**146094**	**52**

Particulars of livestock	A & N Islands			Odisha			West Bengal			Zone Total		
	Number	Value (Rs)	No. of farmers	Number	Value (Rs)	No. of farmers	Number	Value (Rs)	No. of farmers	Number	Value (Rs)	No. of farmers
Other	2500	8000	6	22590	30400	5	1016371	2021230	485	**1041461**	**2059630**	**496**
Total	**18250**	**63250**	**42**	**2079287**	**722460**	**17**	**5195423**	**3072760**	**891**	**7292960**	**3858470**	**950**
Grand Total	**20688**	**161448**	**96**	**2127543**	**3879221**	**60**	**5225704**	**8037241**	**2767**	**7373935**	**12077910**	**2923**

6.0 Soil, Water and Plant Sample analysis

KVKs under ATARI Kolkata encouraged farmers through conducting various awareness and training programmes for testing soil before cultivation in their land to decrease indiscriminate use of fertilizers. To control environmental pollution and other health hazards, the plant and water samples were also tested. So the scientists tested a large number of water samples in their KVK laboratories taken by the farmers for quality analysis. A total of 17109 soil, 21 plant and 1884 water samples were tested from 1454 villages which benefitted total 43645 farmers in this Zone. Number of Soil Health Cards issued to farmers across the Zone was 28007. Besides, a total of 13 manure samples were tested at various KVKs. A minimum amount was charged from farmers for testing each soil sample. Thus, KVKs of ICAR-ATARI Kolkata earned about Rs. 8.49 lakh during the period.

Table: Soil and water analysis by the KVKs of Zone V

State	Samples	No. of Samples	No. of Farmers	No. of Villages	Amount realized (Rs.)	No. of Soil Health Card issued
A&N Islands	Soil	141	88	7	0	133
Odisha	Soil	6375	14435	603	21070	12085
West Bengal	Soil	10593	27174	452	802850	15025
Total	**Soil**	**17109**	**41697**	**1062**	**823920**	**27243**
A&N Islands	Plant	0	0	0	0	0
Odisha	Plant	0	0	0	0	0
West Bengal	Plant	21	21	15	0	0
Total	**Plant**	**21**	**21**	**15**	**0**	**0**
A&N Islands	Water	0	0	0	0	0
Odisha	Water	950	1083	203	0	575
West Bengal	Water	934	831	162	25840	189
Total	**Water**	**1884**	**1914**	**365**	**25840**	**764**
A&N Islands	Manure	0	0	0	0	0
Odisha	Manure	0	0	0	0	0
West Bengal	Manure	13	13	12	0	0
Total	**Manure**	**13**	**13**	**12**	**0**	**0**
Grand Total		**19027**	**43645**	**1454**	**849760**	**28007**

7.0 Publication

KVK scientists were actively engaged in preparing and publishing research papers, technical bulletins, newsletters, popular articles, leaflets/ pamphlets, DVD/CD etc. to highlight the achievements of research and other related activities and to make it available to other KVKs, SAUs, ICAR institutes, line departments, ATMA, NABARD, other agencies, farmers and other stake holders. During the year 2019, a total of 3400 publications comprising of 92 research papers, 4 symposia papers, 409 newsletters, 157 popular articles, 17 books, 588 extension pamphlets/ literature, 27 bulletins, 636 technical reports and 79 electronic publications were made by the KVK personnel of this Zone. The Andaman & Nicobar Islands KVKs have published 180 publications while KVKs of Odisha and West Bengal state published 2218 and 1002 publications, respectively.

Table: Publication by KVKs under ICAR-ATARI, Kolkata

Sl. No.	Particulars	State	Number	No. of KVKs
1	Abstract of Research Paper	West Bengal	6	1
		Total	**6**	**1**
2	Book/ Booklet	Odisha	12	4
		West Bengal	5	2
		Total	**17**	**6**
3	Electronic Media (CD./DVD)	Odisha	67	19
		West Bengal	12	5
		Total	**79**	**24**
4	Extension Literature	A & N Islands	16	3
		Odisha	252	28
		West Bengal	138	17
		Total	**406**	**48**
5	Leaflets	Odisha	10	3
		Total	**10**	**3**
6	Newsletters	Odisha	9	5
		West Bengal	400	1
		Total	**409**	**6**
7	Newspaper coverage	A & N Islands	77	3
		Odisha	440	29
		West Bengal	206	16
		Total	**723**	**48**
8	Popular articles	A & N Islands	4	1
		Odisha	117	25
		West Bengal	36	12
		Total	**157**	**38**
9	Poster/Flex	Odisha	172	5
		Total	**172**	**5**
10	Radio Talks	A & N Islands	18	3
		Odisha	170	25
		West Bengal	55	14
		Total	**243**	**42**

Sl. No.	Particulars	State	Number	No. of KVKs
11	Research papers	A & N Islands	8	2
		Odisha	46	14
		West Bengal	38	9
		Total	**92**	**25**
12	Seminar/conference/symposia papers	West Bengal	4	1
		Total	**4**	**1**
13	Technical bulletins	Odisha	25	2
		West Bengal	2	1
		Total	**27**	**3**
14	Technical report	Odisha	616	7
		West Bengal	20	2
		Total	**636**	**9**
15	Training material	Odisha	81	5
		Total	**81**	**5**
16	TV Talks	A & N Islands	18	3
		Odisha	189	25
		West Bengal	75	13
		Total	**282**	**41**
17	Others	A & N Islands	39	1
		Odisha	12	3
		West Bengal	5	1
		Total	**56**	**5**
	Grand Total		**3400**	**310**

8.0 Scientific Advisory Committee Meeting (SAC)

Scientific Advisory Committee (SAC) Meeting is a very important event being organized by the KVKs every year to review the achieved targets and to finalize the Action Plan for the coming year. As per the guidelines of ICAR, the committee comprises of representatives from ICAR-ATARI Kolkata, 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. It was assured that all nominated members were present in the meeting. During the year 2019, the 59 KVKs of ICAR-ATARI Kolkata conducted 54 SAC meetings. Thirty three KVKs of Odisha state conducted 35 SAC meetings and 23 KVKs of West Bengal state conducted 16 SAC meetings, whereas 3 KVKs of Andaman & Nicobar Islands conducted 3 meetings during the period. The meetings were attended by 1530 participants.

Sl. No.	State/UT	No. of SAC meeting	No. of participants
1	A & N Islands	3	114
2	Odisha	35	1069
3	West Bengal	16	347
	Total	**54**	**1530**

9.0 Revenue Generation

(Amount in Lakh)

Sl. No.	State	Fund received	Name of organization
1	A & N Islands	26.95	IIOR, IIPR, NABARD, ATMA, ASCI, MANAGE, Coconut Board, IFFCO, RKVY etc
2	Odisha	341.577	
3	West Bengal	314.249	
Total		**682.775**	

10.0 Revolving Fund Status

(Amount in Lakh)

Sl. No.	State	As on 31.03.2020	Fund generated	Fund in hand (cash and kind)
1	A & N Islands	0	0	0
2	Odisha	62.910	196.932	84.643
3	West Bengal	861.945	207.642	873.244
Total		**924.855**	**404.574**	**957.887**

11. Technology backstopping by Directorate of Extension Education

Directors and Dean, Extension Education (DEEs) of State Agricultural Universities (SAUs) under ICAR-ATARI Kolkata had important role in transferring latest agricultural technologies available at the Research Institutes/ SAUs by conducting on-farm trials (OFTs), front line demonstrations (FLDs), training programmes, hands-on-trainings and other related activities through their KVKs during the period 2019. With the objective of effective transfer of technologies to the farmers/ end users, all fifty nine KVKs under ATARI Kolkata have been distributed under the jurisdiction of four DEEs irrespective of any host organizations. The Extension Directorate of Odisha University of Agriculture and Technology (OUAT), Bhubaneswar has been allotted with 33 KVKs; Bidhan Chandra Krishi Viswavidyalaya (BCKV), Mohanpur with 17 KVKs; Uttar Banga Krishi Viswavidyalaya (UBKV), Pundibari with 6 KVKs and West Bengal University of Animal and Fishery Sciences (WBUAFS), Belgachhia with 3 KVKs.

All the Directorates conducted HRD programme, meetings, workshops, exposure visits and interface meetings during 2019 considering the demands of KVK personnel for improving their skills in working with the KVK system.

During 2019, different Directorates under ICAR-ATARI Kolkata organised 35 workshops/ meetings for 3844 participants covering various aspects i.e. ASCI ToT, PFMS, agro-met advisories, entrepreneurship development, dairy farming, bio-flocs in fisheries, resource conservation technologies, seed production technologies, intervention planning and action plan development, agro-ecosystem analysis for participatory planning, ICT application in agriculture and so on. Maximum programme (18) was conducted by OUAT, Bhubaneswar followed by WBUAFS, Kolkata (10 programmes) and UBKV, Pundibari (6 programmes). A total of 454 KVK personnals from different Directorates under ICAR-ATARI Kolkata participated in different programmes.

During 2019, the DEEs and/ or their officials visited their KVKs for 308 occasions to attend different programmes like SAC meeting, field day, technology week, inaugurating training programme/ workshop, *'World Soil Day'* celebration, '*Swachh Bharat*' programme, '*World Women Day*' celebration, DAESI programme, *Rabi/ Kharif* campaign etc. organized by their KVKs. The DEE of Odisha state visited their KVKs for 99 times and DEEs of West Bengal state for 209 times (BCKV, Nadia- 98 times; UBKV, Pundibari-57 times and WBUAFS, Belgachhia- 54 times). A total of 169 KVK staff (OUAT-79, BCKV-36, WBUAFS-26 and UBKV-28) participated in those programmes during the year 2019.

The officials of the Directorates frequently visited OFT and FLD experimental fields pertaining to their KVKs including farmers' field to oversee KVK field activities, to provide technical advices and to enrich knowledge and skill of KVK personnel. The Directorate officials from BCKV, Mohanpur visited OFT fields for 23 occasions and FLD for 51 occasions to check the performance of new crop varieties under various cropping systems, to know the performance of different soil based experiments, to control different pest problems in the field, to assess various new technologies and so on. Similarly, UBKV officials visited OFT and FLD fields for 12 and 25 times, respectively to see the performance of crops under different micro-nutrient applications, to implement farmers' feedback etc. The respective numbers of field visit by the officials of WBUAFS, Belgachhia were 10 and 8 to check whether the OFTs and FLDs were being conducted as per SAC recommendations or not, to know the performance of crops/ animals/ fishes under different technological options, to assess the adoptability of farmers in applying new technologies in the field of agriculture. A substantial number of visits i.e. 66 for OFTs and 97 for FLDs were made by the Dean, Extension Education and/ or other officials of OUAT, Bhubaneswar for overseeing KVK activities e.g. to see the performance of newly released varieties, to check whether the KVKs were maintaining the proper records or not, to check whether SAC recommendations were being properly implemented or not and many others. In addition, OUAT officials visited 6 occasions for conducting meetings/ interactions with officials of line departments and farmers, whereas, WBUAFS officials also visited 2 occasions for such purposes.

In the year 2019, the Directorate of BCKV, Mohanpur evaluated 27 technologies in 27 KVKs. Out of those, the technologies relating to the performance of new variety jutes, post-emergence herbicides, bio-products evaluation, blast management in rice, evaluation of seed storage containers for improving keeping quality, applications of organic inputs for enhancing production, use of LCC for nitrogen application, spawn production technologies, performance of flower crops, use of Arka microbial consortium in summer tomato, micronutrient application in lentils, use of multistrain probiotics and multivitamins as feed supplements in livestock ration etc. are important. The UBKV, Pundibari also implemented 27 technologies in 27 KVKs e.g. assessment of integrated plant nutrient supply system (IPNS) in *Aman* rice using organic nutrients, efficacy of organic fish farming, different combinations of poly-culture of fish, use of agro-chemicals in weed control of pineapple, nutritional management of Darjeeling Mandarin (*Citrus reticulata*), suitable housing system for backyard poultry rearing, value addition in ginger, sensor base smart irrigation systems, evaluation of multi-storied cropping by planning arecanuts, black pepper and turmeric on same field etc.

Similarly, OUAT, Bhubaneswar Directorate implemented 25 technologies in total 697 KVK programmes. Important technologies were- assessment of new crop varieties, assessment of drought tolerant/ BPH tolerant rice variety, low-cost poly tunnel for seedling raising, *Kharif* onion cultivation, introducing trellis system of vegetables cultivation feeding management in cattle, weed management in cotton and groundnut, offseason vegetable cultivation backyard poultry farming, value addition and many others. Ten technologies i.e. preparation of value added products from small animals and poultry, brooding management in poultry, restoring soil health and mass production of vermicompost, seasonal fodder cultivation technology, ornamental fish rearing under pond ecosystem, area specific integrated farming system model development, climate smart animal husbandry practices etc. were evaluated and implemented by WBUAFS, Begachhia in 31 KVK programmes.

All the Directorates under ICAR-ATARI Kolkata published and updated many technology inventories. In addition, they published a large number of literatures e.g. newsletter, magazine, booklet, diary, bulletin etc. in English and local languages (Bengali and Odia) related to agriculture for the farmers. The Directorate of BCKV, Mohanpur published maximum (16) technology inventories followed by OUAT (4), WBUAFS (2) and UBKV (1) during the period. Both BCKV and WBUAFS updated 7 technology inventories each whereas OUAT and UBKV updated 2 and 1 technology inventory, respectively during the period.

Supply of updated technologies and technological products viz. seeds, planting materials, bio-products, livestock/ poultry breeds, mineral mixture for animals, fish spawn/ fingerlings, mushroom spawn etc. to the KVKs were also the part of activities of all the Extension Directorates under ATARI Kolkata. During the year 2019, 43 KVKs received various products from the Directorates.

12.0 Agriculture Technology Information Centre

The main objectives of establishing Agricultural Technology Information Centre (ATIC) at the institutes are to provide solution to the location specific problems, to make available recent technological information along with technology inputs and products on agriculture, livestock and fishery sciences, and to help the farmers/ other stakeholders at one place. It is usually established at the entrance of the institute. This centre forges a better interaction between researcher and technology users, and serves as a '*single window*' delivery system for services and products of research for the areas in which the concerned institutes are involved. In ICAR-ATARI Kolkata Zone, ATICs are being operated in the Union Territory of Andaman and Nicobar Islands under ICAR-Central Island Agricultural Research Institute (ICAR-CIARI), Port Blair; in Odisha state under ICAR-Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar and Odisha University of Agriculture and Technology (OUAT), Bhubaneswar; and in West Bengal state under Bidhan Chandra Krishi Viswavidyalaya (BCKV), Mohanpur and Uttar Banga Krishi Viswavidyalaya (UBKV), Pundibari. It is facilitated with reception counter, exhibition/ technology museum, touch screen kiosk, sales counter, farmers' feedback register, video conferencing facility, library, cafeteria etc. A total of 21355 farmers from different parts of ATARI Kolkata visited ATICs during 2019 to get technology information (10548 persons), technology products (1275 persons), technology services (2782 persons) and other purposes (6750 persons).

A total of 7198 farmers were benefitted from receiving information on various agricultural technologies. Out of which, Kisan Call Centre was used for 2807 farmers to give the information mainly on varieties/ hybrids (757 farmers), pest management (490 farmers), disease management (468 farmers), agro-techniques (435 farmers), soil and water conservation (197 farmers), post-harvest technology and value addition (180 farmers), and animal husbandry including fisheries (280 farmers) during the year 2019. Thirty seven farmers were benefitted from video showing and 48 farmers from receiving letters from the concerned persons of ATICs. A number of need based training programmes were organized in the ATICs for 2302 persons. Among total trainee participants, maximum (1286) persons took training on agricultural techniques, followed by pest management (362), disease management (215), animal husbandry including fisheries (166), post-harvest technology including value addition (115), varieties (100) and soil and water conservation (58) during this period. In addition to those, 315, 200, 200, 114, 361, 707, 15 and 38 farmers got benefit from attending field day, interaction meet, World Coconut Day, field demonstrations, awareness camp, exposure visits, Radio Talks and Door Darshan Talk, respectively.

The literature on agriculture, livestock and fishery sciences was provided to the farmers and other stakeholders from ATICs. Majority of the farmers got literatures at free of cost, but, in some cases, they were charged nominal prices. During 2019, 2767 books and 9500 technical bulletins were sold from

different ATICs of this Zone which benefitted 15040 farmers for improving their knowledge. Around Rs. 0.71 lakh revenue was generated from the sale of those publications.

The sales counter of different ATICs were stored with various technological products viz. Quality seeds of various crops, planting materials, table fishes, poultry birds, mushrooms, vegetables etc. for sale. During the year 2019, around 946 quintals seeds, 0.36302 lakh planting materials, 0.16709 lakh poultry birds, 0.01 lakh fish fingerlings, 0.0642 lakh table fishes, 172 packets mushrooms and 1500 kg bio-products were sold from ATICs. In addition, a substantial amount of arecanut, aromatic rice, mustard oil, capsicum strawberry, lemon, gerbera, green coconut, mango, banana were also supplied to the farmers. From the sale of those technological products, 14417 farmers were benefitted and Rs. 41.89 lakh revenue was generated during the year 2019.

From ATICs, farmers got their soil and water samples tested. Moreover, ATIC has also the facility to diagnose plant diseases, to provide livestock vaccines/ treatment of animal diseases and to provide information on facility available with line departments about various campaigning programmes launched by state governments and so on. During the year 2019, 721 soil and water samples were analysed which benefitted 771 farmers and 227 plant samples were diagnosed for diseases which benefitted 425 farmers. About 85 farmers got service from treating their diseased animals/ fishes in the centres.

13.0 Flagship Programmes / Projects

A number of flagship programmes funded by DAC & FW and other organizations were implemented through KVKs in 2019. The report of this projects are summarized below.

13.1 Clustered frontline demonstration in pulses (NFSM)

Nodal Officer : Dr S K Roy

Frontline demonstrations in pulses was planned in kharif, rabi and summer season in the state of Odisha, West Bengal and A&N Islands. The project was funded by NFSM, New Delhi. In the year 2019, an area of 1300 ha was covered through 3175 demonstrations. An amount of Rs lakh was sanctioned and Rs lakh was received and Rs lakh was released to KVKs. Out of these 1300 ha, 1195 ha was achieved and 3018 demonstrations were conducted. In kharif 630 ha was covered by crops of pigeonpea, blackgram and greengram. In rabi, lentil chickpea, fieldpea, hoursegram, greengram and blackgram was demonstrated in 340 ha. In summer season the demonstration was taken up in 330 ha. The details on statewise coverage of area are given below table.

The results of the frontline demonstration in pulses showed that in pigeon pea, the demonstrated yield was 12.09 q/ha in Odisha, which recorded 39% increase in yield. In West Bengal pigeon pea recorded 10.14 q/ha of yield which is also 39% higher than local checks. The pigeon pea variety PRG176, LRG-41 was put under demonstration and technology like seed treatment, bio-fertilizers etc. were demonstrated in this crop. Net return from the crop were in the range of Rs.23722 to Rs.28435/ha.

In blackgram demonstrated yield was 6.98 q/ha in Odisha and 11.17 q/ha in West Bengal. The yield improvement was 33% in Odisha and 48% in West Bengal. In blackgram varieties like PU-31, Sulata (WBU-109), IPU-02-43 were demonstrated in kharif. Technologies like seed treatment, micronutrient, bio-fertilizers were demonstrated under the programme. Net return was in the range of Rs.19593/ha to Rs.47325/ha depending upon varieties. B:C ratio was in the range of Rs.17700/ha to Rs.38240/ha in this crop.

In rabi season, major crop was lentil, the crop was demonstrated in 325 ha only in West Bengal. The average demonstrated yield was 9.92 q/ha against 7.40 q/ha in local check, the increase was 34.1%. The lentil mainly WBL 77 (Moitree) was the ruling variety in these demonstrations. Full package, micronutrients (Zn, Boron) etc. were demonstrated

in the demonstrations. The demonstrations showed Rs.29473/ha net return with B:C ratio of 2.25.

Chickpea is another important rabi pulse which was demonstrated in Odisha 50 ha and 75 ha in West Bengal. The average demonstrated yield in Odisha was 10.25 q/ha and in West Bengal 12.92 q/ha. The increase in yield was 38% in Odisha and 27% in West Bengal. Economics of demonstration showed that the net return were Rs.31210/ha to Rs.54280/ha in varieties like JU-14 and JAKI-9218. Seed treatment, bio-fertilizers etc. were the components of demonstration in chickpea. Fieldpea, horsegram in 25 ha each in the state of Odisha and West Bengal. Increase in yield in field pea was 24-25%. In horsegram increase was 42%. In field pea variety Prakash and Pusa Pragati were demonstrated.

Greengram demonstration was achieved in 225 ha in Odisha in rabi season. Blackgram was demonstrated in 100 ha in Odisha in rabi season. In greengram increase in yield was about 4%. The average demonstrated yield in greengram was 7.2 q/ha which is almost double than local check. The varieties IPM-02-03, IPM-02-14 were demonstrated. In blackgram demonstrated yield was 6.39 q/ha and yield increment was 30%. Blackgram variety PU31, IPU-02-43 was demonstrated. In summer season, greengram was demonstrated in 250 ha in Odisha, 250 ha in West Bengal. The large area coverage by these crop resulted in popularization of varieties like IPM-02-03, IPM-02-14, IPM 250-7 (Virat), PUsa Vishal. In blackgram varieties like PU 31, WBU-109 were demonstated which increased 10.24 q/ha yield in West Bengal and 5.4 q/ha yield in Odisha. The improvement was 42% in Odisha and 57% in West Bengal.

A&N Islands took up demonstration on 30 ha in greengram and 20 ha in blackgram. The average demonstrated yield was 9.5 q/ha in greengram and 8.1 q/ha in blackgram in A&N Islands. The improvment was 59% in greengram and 4% in blackgram. Greengram variety CARI-1,2,3,4 and blackgram variety CARI-1, 82 were used in the demonstration.

Table : Frontline demonstration conducted under NFSM

Sl. No	Crops	State	Target of FLDs approved		Achievements of FLDs		Average yield (q/ha)		Yield increase (%)	Difference of yield between demo and local (q/ha)
			No. of Demos	Area (ha)	No. of Demos	Area (ha)	Demo	Local		
Kharif season										
1	Pigeon pea	Odisha	575	230	575	230	12.09	8.7	39.02	3.39
		West Bengal	50	20	50	20	10.14	7.29	39.09	2.85
2	Black gram	Odisha	475	190	475	190	6.98	5.24	33.21	1.74
		West Bengal	375	150	338	135	11.17	7.57	47.6	3.6
3	Green gram	Odisha	75	30	75	30	6.9	4.85	42.27	2.05
		West Bengal	25	10	25	10	8.45	5.5	54.54	2.95
Total (kharif)			**1575**	**630**	**1538**	**615**				
Rabi season										
1	Lentil	West Bengal	325	130	325	120	9.92	7.4	34.14	2.41
2	Chick pea	Odisha	50	20	50	20	10.25	7.41	38.26	2.84
		West Bengal	75	30	75	20	12.92	10.15	27.29	2.99
4	Field pea	Odisha	25	10	25	10	13.65	11	24.1	2.65
		West Bengal	25	10	25	10	23.69	18.95	25	4.74
5	Horse gram	Odisha	25	10	25	10	5.71	4.01	42.39	1.7
6	Green gram	Odisha	225	90	225	90	7.22	4.93	46.45	1.66
7	Black gram	Odisha	100	40	100	40	6.39	4.91	30.14	1.3
Total (Rabi)			**850**	**340**	**850**	**320**				

Sl. No	Crops	State	Target of FLDs approved		Achievements of FLDs		Average yield (q/ha)		Yield increase (%)	Difference of yield between demo and local (q/ha)
			No. of Demos	Area (ha)	No. of Demos	Area (ha)	Demo	Local		
Summer Season										
1	Green gram	Odisha	250	100	250	100	7.55	5.38	40.31	2.17
		West Bengal	250	100	250	100	11.43	8.31	37.5	3.12
		A& N Islands	150	60	30	12	9.5	5.97	59.13	3.53
2	Black gram	Odisha	50	20	50	20	5.4	3.8	42.11	1.6
		West Bengal	50	20	50	20	10.24	6.5	57.46	3.74
		A& N Islands	75	30	20	8	8.1	5.54	46.21	2.56
Total (Summer)			**750**	**330**	**630**	**260**				
Grand Total (Kharif+Rabi+Summer)			**3175**	**1300**	**3018**	**1195**				

Table : Result of CFLD on Pulses during 2019

S. No.	Crop/ Season	Variety	Technology demonstrated	Area (ha)	No. of farmers	Farmer Practice (q/ha)	Yield		Economics of Local Check (Rs./ ha)				Economics of Demo (Rs./ha)		
							Demo (q/ha)	Gross Cost	Gross return	Net return	BC ratio	Gross Cost	Gross return	Net Return	B C ratio
Kharif season															
1	Pigeon-pea	PRG 176	Seed treatment, biofertilizer, (*Rhizobium*) and PSB	230	3718	8.70	12.09	24229	41619	17390	1.75	28435	58609	30174	2.15
2	Pigeon-pea	LRG-41	line sowing , seed treatment Rhizobium culture,Vermicompost 2t /ha,	20	77	7.29	10.14	18111	34719	16608	1.92	23722	51967	28245	2.19
1	Black-gram	PU 31 (Odisha)	Seed treatment, Rhizobium Culture, premergence weedicide, RDF & IPM	190	466	5.24	7.0	18834	31256	12423	2	21043	40709	19593	1.93
2	Black-gram	PU-31 (WB)	Seed treatment with Rhizobium @ 1.5 kg/ha,application of pre emergence herbicide,	104	398	7.96	11.22	21839	44538	22700	2.03	25888	61686	41799	2.40
		Sulata(WBU-109)	Micronutrient sprayof Boron at 25 and 45 DAS	10	61	5.60	10.95	17325	33600	16275	1.94	18375	65700	47325	3.58
		IPU-02-43	Variety, Seed treatment, Bio-fertilizer, PSB, Micronutrient	21	100	10.80	12.00	29500	48600	20100	1.64	30250	57600	27350	1.90
2	Green-gram	IPM-02-03 (Odisha)	Line sowing 30cmx10cm, Seed treatment with Rhizobium culture,STBF,	10	25	5.5	6.7	27650	37100	9450	1.34	20200	46900	17700	2.32

S. No.	Crop/ Season	Variety	Technology demonstrated	Area (ha)	No. of farmers	Farmer Practice (q/ha)	Yield		Economics of Local Check (Rs./ha)				Economics of Demo (Rs./ha)		
							Demo (q/ha)	Gross Cost	Gross return	Net return	BC ratio	Gross Cost	Gross return	Net Return	BC ratio
		IPM-02-14 (Odisha)	Seed treatment with chemicals, application of plant protection chemical	20	81	4.2	7.32	13690	25660	11970	1.84	18780	37800	18720	2.01
3	Green-gram	IPM-02-14 (WB)	Seed Treatment-Trichderma viride @200g/ha and Pseudomonas @ 200g/ha; Biofert. Rhizobium @2kg/ha; and PSB @ 2kg/ha; Fertilizer-30kg N and 100 kg P2O5/ha, Micronutrient- Zn @25kg/ha Full package	10	50	5.5	8.45	17030	32820	15790	1.92	25660	63900	38240	2.49
Total (kharif)				**615**	**1538**										
Rabi season															
1	Lentil	WBL 77 (Moitree)	Zinc and Boron application , RDF Zinc sulphate incorporated @ 20 Kg / ha and Borax @ 10kg / ha at the time of final land preparation ,	120	545	7.39	9.92	20837	37839	17001	1.82	22976	50131	29473	2.25
1	Chick pea	Ujjawala	Basal application of Rhizobium& PSB and Soil test based fertilizer application, IPM	20	50	7.41	10.245	19848	31337	11490	1.58	25150	44136	19536	2.00
2	Chick-pea	JG-14,	Variety-JG-14	10	34	12.00	14.06	29250	72000	42750	2.46	30095	84375	54280	2.80
		JAKI-9218	JAKI-9218 15:40:20 N:P:K and 30 kg S/ha; two foliar spray of boron	10	71	8.30	11.78	18200	40095	21895	2.20	21800	53010	31210	2.43
2	Field pea	Prakash	Seed treatment with chemical & bio fertiliser, Line sowing 30X10 cm – full package	10	27	11.00	13.65	26750	49500	22750	2	30600	65700	35100	2.15
3	Field pea	Pusa Pragati	Seed treatment with bio fertilizer Rhizobium , application of organic manure spectrum @ 500gm/bigha with FYM	10	52	18.95	23.69	20000	28350	8350	1.40	20650	34686	14036	1.68

S. No.	Crop/ Season	Variety	Technology demonstrated	Area (ha)	No. of farmers	Farmer Practice (q/ha)	Yield		Economics of Local Check (Rs./ ha)				Economics of Demo (Rs./ha)		
							Demo (q/ha)	Gross Cost	Gross return	Net return	BC ratio	Gross Cost	Gross return	Net Return	BC ratio
3	Green gram	IPM 02-03	Full package	30	90	4.47	5.94	16960	26660	9700	1.57	19400	36505	17105	1.88
		IPM-02-14	Line sowing 25cmx10cm,seed treatment spraying of Sulphur .	60	130	5.17	7.86	17358	29605	12246	1.71	20550	44697	24147	2.18
4	Black gram	PU 31	PU-31 , Seed treatment with Imidachlo-prid(Gauch) @5ml/kg of seed and Rhizobium@20 gm/kg of seed), IPM	10	20	4.95	5.50	13250	24200	10950	1.83	20533	38138	17605	1.86
		IPU-02-43	Seed treatment of Bio-fertilizer & plant protection measure	30	82.00	4.72	5.96	14450	27633	13183	1.91	16900	36073	19173	2.13
5	Horse gram	Chakapada Local	Seed treatment with chemicals, Line spacing 30x10 cm, Seed inoculation with Rhizobium,	10	36	4.01	5.71	10100	17243	7143	1.71	12200	24553	12353	2
	Total (Rabi)			**320**	**1137**										
Summer season															
1	Green gram	Green gram CARI-1,2,3,4	Improved variety with bioinputs	12	64	5.97	9.5	35700	47760	12700	1.34	42300	76000	33700	1.80
		IPM-02-03 (Odisha)	Line planting 30 cm row spacing, seed treatment with Rhizobium, Soil application of biofertiliser, foliar spray of Boron t 30 ,45DAS	10	25	5.48	7.5	15800	32400	17900	2.0	17000	45000	28000	2.6
		IPM-02-14 (Odisha)	line sowing(25cm x10cm) , seed treatment with chemicals	90	134	5.63	8.04	20025	36563	16538	1.83	23111	49138	26527	2.13
		IPM 205-7 (Virat)	Variety IPM 205-7(Virat),-Seed inoculation with Rhizobium @1.5 kg/ ha, Foliar spray of Micro nutrient (B, Mo & Zn) @ 2g/lit.of	50	274	7.53	9.52	23473	42548	19075	1.78	24340	56992	32652	2.33
		Pusa Vishal	Variety Pusa Vishal, Seed treatment with bio fertilizer Rhizobium @ 10gm/kg of seed	10	25	13.8	18.19	39000	55200	16200	1.41	42500	72760	30260	1.70

S. No.	Crop/ Season	Variety	Technology demonstrated	Area (ha)	No. of farmers	Farmer Practice (q/ha)	Yield		Economics of Local Check (Rs./ ha)				Economics of Demo (Rs./ha)		
							Demo (q/ha)	Gross Cost	Gross return	Net return	BC ratio	Gross Cost	Gross return	Net Return	BC ratio
		IPM 2-14 (WB)	Varietal replacement (IPM 2-14), Bio-stimulant 0.3 ml/L, Micronutrient @ 1.5 gm/L at 30 & 50 DAS	30	75	7.11	10.65	23430	41316	14793	1.7	24617	56173	32633	2.32
		IPM-02-3(WB)	Summer -Green gram Var: IPM-02-3+ Herbicides pendimethalin as pre emergences @ 3lt/ha+ Micronutrient spray Boron-20 @2gm/lt water in 25 and 45 DAS	10	62	8.0	10.82	19700	48000	28300	2.44	20900	73500	52600	3.51
				212	**659**										
2	Black gram	CARI-1, CARI-2	Improved variety of Black Gram CARI-1,CARI-2 with bio inputs	8	40	5.54	8.1	35700	44320	8620	1.24146	42300	64800	22500	1.53
		PU 31 (Odisha)	Variety: PU-31,Line sowing ,25x10 cm,Seed inoculation with Rhizobium @ 20 gm/ kg seed,RDF 20:40:20 kg NPK / ha	20	30	3.8	5.4	6500	19000	12500	2.92	7900.0	27800.0	19900	3.52
		PU 31(WB)	Var: PU-31+ pendimethalin as pre emerg @ 3lt/ha+ Micronutrient spray Boron-20 @2gm/lt water in 25 and 45 DAS	10	47	6.2	11.25	16450	34100	17650	2.07	17500	67100	49600	3.83
		WBU-109(WB)	WBU-109,Integrated nutrient management	10	25	6.8	9.22	24380	35866	11486	1.47	27479	58332	30853	2.12
Total (Summer)				**48**	**142**										

13.2 Creation of Seed Hub for increasing indigenous pulses in India

Nodal Officer : Dr S K Roy

The project on creation on pulse seed hub implemented through ICAR-IIPR. The fund for each seed hub is Rs.150 lakh. Under Zone-V, 10 seed hubs are in operations in KVKs. Each KVK allotted Rs.100 lakh as revolving fund and Rs.50 lakh for creating seed processing unit and infrastructure. The project is directly monitored by the ICAR-IIPR, Kanpur. The 3 seed hubs under West Bengal are CISH-Malda, S-24 Parganas (additional), Narendrapur, Uttar Dinajpur. Seven seed hubs in Odisha are, Baragarh, Bhadrak, Cuttack, Deoghar, Kalahandi, Keonjhar and Mayurbhanj-I. In the year 2019, 10 KVKs of Zone-V, produced 1675 q of seeds in kharif, rabi and summer season, 153.9 q seed of peigonpea, 1172.8 q

seed of greengram, 250 q seed of lentil, 198.1 q seed of blackgram, 11.5 q of chickpea was produced.

Table: Performance of sub hub in KVKs during 2019

Sl. No	State	Crop	Seed produced (q)
1	Odisha	Black Gram	130
2		Green Gram	470.44
3		Red Gram	157.9
4		Chick pea	11.5
		Total	**769.84**
1	West Bengal	Black Gram	68.1
2		Green Gram	586.8
3		Lentil	250
		Total	**904.9**
Grand Total			**1674.74**

Table: Progress of seed hubs of Odisha and West Bengal shows seed production, procurement & sale and status of infrastructure 2019

Sl. no.	Seed centre name	Season	Crop & season (kharif, Rabi & Summer)	Variety	Target (q)	Production (q)	Seed details		Infrastructure status		Remarks
							Procurement from farmer (q)	Sale(q)	Seed storage	Seed processing plant	
1	Bargarh	Kharif	Pigeon pea	PRG -176	64	12.8	12.8	0	95%	95%	
		Rabi	Greengram	IPM-02-14	300	14.44	14.44	0			
					364	27.24	27.24	0			
2	Bhadrak	Summer	Greengram	IPM 02-14	500	270	270		completed	functional	Seed processing is under progress
					500	270	270	0			
3	Cuttack	Rabi	Green gram	IPM-02-3	500	80			completed (finishing work in progress)	Purchase of processing is completed	
				IPU -2-43		130					
			Black gram	IPU -2-43	500	130					
					1000	210					
4	Deogarh	Kharif	Pigeonpea	PRG-176	80	4	4.0	4.0	Complete	Complete (Eletrification pending)	
		Summer	Greengram	IPM 2-14	100	26	26.0	26.0			
					180	30	30.0	30.0			
5	Kalahandi	Kharif-	Pigeonpea	PRG 176	300	141.11	141.11	141.11	functioning condition	functioning condition	All stocks have been diverted

Sl. no.	Seed centre name	Season	Crop & season (kharif, Rabi & Summer)	Variety	Target (q)	Production (q)	Seed details		Infrastructure status		Remarks
							Procurement from farmer (q)	Sale(q)	Seed storage	Seed processing plant	
6	Keonjhar	kharif	Pigeonpea	PRG-176	160	0	0	0	Finishing work of building is going-on	Already purchased	yield was very low due to heavy rainfall
		Rabi	Chickpea	Ujjawal	150	11.5	11.5	0			The crop damaged due to continuous rain at harvesting
		Spring/ summer	Blackgram	IPU 02-43	150	0	0	0			
					460	11.5	11.5	0			
7	Mayurbhanj I	Summer	Greengram	IPM02-14	1000	80	60	Nil	Completed	Seed processing plant has been installed	Crop has been damaged due to Heavy rainfall / Amphan cyclone in 21st May 2020
8	CISH Malda										
9	Uttar Dinajpur	kharif	Blackgram	Sulata , PU -31, IPU - 243	400	68.1	20	17.16	Completed	Completed	
		Rabi	Lentil	HUl – 57, KLS-320	200	nil	Nil	nil			Crop damage due to early rain
		summer	Greengram	IPM – 2-03, IPM – 2-14,	400	26.8	yet to be lifted				damaged for dry followed by high rainfall.
					1000	94.9	20	17.16			
10	South 24 Pgns. (Additional) Narendrapur	Rabi	Lentil	IPL-316	100	250		-	Completed	Completed	
		Spring/ summer	Green gram	Virat (IPM-205-7)	400	560	200	0			Under the process of certification
					500	810	200				
Grand total					5304	1675	760	188			

13.3 Clustered Frontline Demonstrations in Oilseeds

Nodal Officer: Dr. P.P. Pal

During 2019, Cluster Frontline Demonstration (CFLD) on oilseed crops (sesame, groundnut and sunflower) was conducted by ICAR-ATARI, Kolkata in the states of Odisha and West Bengal. A total of 1450 no. of demonstrations (580 ha) were conducted. All these demonstrations were conducted by various KVKs in their respective districts. In Odisha, 100 no. of demonstrations each on groundnut & sunflower and 50 no. of demonstrations on sesame were conducted. In West Bengal, a total of 1100 no. of demonstrations (sesamum-670 no., groundnut -325 no. and sunflower-200) covering a total area of 480 ha were conducted. The main objective of CFLD was to compare the yield performance of demonstrations with farmers' practices. During summer, CFLD on sesame, groundnut and sunflower were conducted in states of Odisha & West Bengal through KVKs. There was an increase yield percentage of 20 to 50 in

CFLD. In Odisha, CFLD sesame recorded 54 percent increase over farmers' practice whereas groundnut recorded 30% and sunflower 19% increase. Percentage increase in yield of sesame, groundnut and sunflower was 30%, 33% & 27%, respectively in West Bengal. The benefit cost ratio of sesame was 2.42 in Odisha and 1.52 in West Bengal. In the case of groundnut and sunflower the benefit cost ratio was 1.5 in both the states. Varieties demonstrated under CFLD Oilseeds (Regular): Groundnut- TCGS-1043, TG-37A, Devi. Sesame- G-2, Savitri, Rama, Amrit. Sunflower - KA 501, KBSH-51, MSFH-17.

Table: State and crop wise performance of CFLD Oilseeds during 2019: (CFLD Regular programme)

State	Crop	Area (ha)		Yield (q/ha)		% Increase	Net Returns (Rs.)		B:C Ratio
		Target	Achieve.	Demo	FP		Demo	FP	
Odisha	Sesame	20	20	5.51	3.57	54.34	15028	6198	2.42
	Groundnut	40	40	19.27	14.79	30.31	32320	20548	1.57
	Sunflower	40	40	20.06	16.81	19.30	24010	16711	1.44
West Bengal	Sesame	270	270	10.15	7.81	29.91	29820	19680	1.52
	Groundnut	130	130	22.14	16.62	33.20	45391	25316	1.79
	Sunflower	80	80	15.59	12.26	27.14	32206	21131	1.52
Total		**580**	**580**						

Action photographs of CFLD on Oilseeds (Regular)

For promotion of sustainable agriculture practices (SAP), DAC & FW has come up with Additional CFLD on Oilseeds under NFSM–Oilseeds. Accordingly, ICAR ATARI-Kolkata was allotted 10175 no. of demonstrations on oilseeds (Groundnut and Rapeseed & Mustard). Demonstrations were conducted by various KVKs in states of Odisha and West Bengal. Under groundnut, 2200 no. of demonstrations (880 ha) were conducted in Odisha whereas in West Bengal 1025 no. of demonstrations (410 ha) were conducted. A total of 3225 and 3725 no. of demonstration on Rapeseed and Mustard were demonstrated in Odisha and West Bengal, respectively. Additional CFLD on Oilseeds (Groundnut & Mustard) was conducted by various KVKs in states of Odisha and West Bengal. The yield

performance of the demonstrations was compared with the farmers' practices to obtain the cost benefit ratio. It was observed that there was an increase of yield to the extent of 34 to 50 percent in respect of groundnut demonstration whereas in rapeseed & mustard it was 35 to 49 percent. Farmers have fetched a good net return due to increase in yield (groundnut –Rs. 17000 to 22000 and rapeseed & mustard- Rs. 8000 to 11000). The benefit cost ratio of groundnut was 1.59 to 1.92 and in rapeseed & mustard it was 1.76 to 2.02. Varieties demonstrated under Addi. CFLD Oilseeds under SAP : Groundnut- Dharani, Devi, ICGV-00350 Rapeseed & Mustard- Uttara, Anuradha, Pusa Mustard 26, NRCHB- 101, YSH- 401, PM 28, PM 30.

Table: State and Crop Wise Performance of CFLD Oilseeds under SAP during 2019: (CFLD Additional programme)

State	Crop	Area (ha)		Yield (q/ha)		% Increase	Net Returns (Rs.)		B:C Ratio
		Target	Achieve.	Demo	FP		Demo	FP	
Odisha	Groundnut	880	880	22.54	16.72	34.81	59161	37153	1.59
	Rapeseed & Mustard	1290	1290	6.76	4.54	48.90	16847	8332	2.02
West Bengal	Groundnut	410	330	18.66	12.38	50.73	37426	19483	1.92
	Rapeseed & Mustard	1490	1490	12.85	9.48	35.55	25571	14561	1.76
Total		**4070**	**3990**						

Different activities under CFLD Oilseeds (Additional)

Table: Technology use in different Oilseed crops during 2019

Sl. No.	Crop Name	Main Technology use for demonstration
1	**Groundnut**	Line sowing, Seed treatment with chemicals and seed inoculation with bio fertilizers, application of soil ameliorants, selective used of herbicides
2	**Sesame**	Use of HYV, seed treatment, application of soil test based fertilizer, basal & foliar application micronutrient and spray of need based plant protection chemicals
3	**Rapeseed & Mustard**	Seed treatment , application of sulphur , basal application of micronutrient
4	**Sunflower**	Seed treatment, soil test based fertilizer application, Soil application of Borax and use of PP Chemical

13.4 Farmers First Programme

Nodal Officer: Dr. K.S. Das

Farmer FIRST Programme (FFP) is a prestigious programme of the Agricultural Extension Division under ICAR, New Delhi. After successful implementation of Phase-I (2016-18), the Council decided to extend this programme for next two years i.e. 2018-19 and 2019-20. Three ICAR Institutes and one State Agricultural University were selected and carried out the projects during the period under report. The details of the projects are given in the following table. During 2019, field visits were conducted and Review Meeting at OUAT, Bhubaneswar was also organized to monitor the progress of the projects and to finalize the Action Plans considering the target of Doubling Farmers' Income. During 2019, a total of 2013 farm families involving 5625 farmers got direct benefit from this project. Highlighting the significant achievements of FFP during last three years (2017-20), one document entitled '*Inspiring farmers through farmers FIRST*' was also prepared and published from ICAR-ATARI Kolkata.

Details of Farmer FIRST Programme under ICAR-ATARI Kolkata during the year 2019-20

Sl. No.	*Name of the project (Institute/ University)*	*Name of the PI of the project*	*Fund allottedduring 2019-20 (Rs. in lakh)*	*Fund utilized during 2019-20 (Rs. in lakh)*
11.	Promoting improved agriculture & allied sector technologies in Khordha district *(ICAR-Central Institute Freshwater Aquaculture, Bhubaneswar)*	Dr. H. K. De Pr. Scientist	16.50	13.83

Sl. No.	Name of the project (Institute/ University)	Name of the PI of the project	Fund allottedduring 2019-20 (Rs. in lakh)	Fund utilized during 2019-20 (Rs. in lakh)
2.	Increasing productivity and sustainable the rice based production system through Farmer First approach (*ICAR-National Rice Research Institute, Cuttack*)	Dr. S. K. Mishra Pr. Scientist	17.75	16.39
3.	Enhancing water & livelihoods security (*ICAR-Indian Institute of Water Management, Bhubaneswar*)	Dr. P. Nanda Pr. Scientist	16.50	8.82
4.	Enhancing Farm Productivity & Profitability with 'Farmer-First' focus in Khordha district of Odisha (*OUAT, Bhubaneswar*)	Dr. R. K. Paikray Professor	14.65	9.46
5.	ICAR-Agricultural Technology Application Research Institute (ATARI) Kolkata	-	5.87	5.18
Total			**71.27**	**53.68**

Salient achievements of projects:

The salient achievements of the projects different institutes have been given as under.

ICAR-CIFA, Bhubaneswar

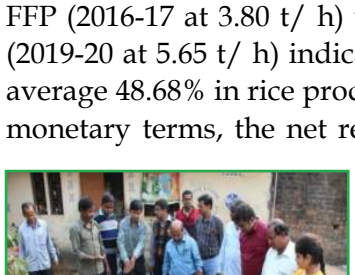
Under Farmer FIRST project, a study was conducted to assess the impact of improved agricultural practices on the livelihood of adopted farmers. A structured interview schedule based on the DFID framework (1999) was developed and data were collected from 86 randomly selected beneficiaries by personal interview method. The same interview schedule was introduced before i.e. in 2016-17 and after the intervention i.e. in 2019-20. Farmer FIRST project covered four villages in Khordha district and involved more than 450 beneficiaries that included small, marginal, landless and women headed households. During the year 2019, improved technologies were demonstrated. Twenty-five field days and thirteen scientist-farmer interfaces were organized involving 472 farmers and 284 farmers, respectively. Improved technology practices were demonstrated in the adopted villages. The *IPM-02-03* cultivar of green gram in rice fallow was demonstrated which had 62.5% higher yield than the local check. Composite fish farming was practiced in 6 ponds with an average yield of 3.0 t/ ha per year. Fish yield increased by 87% compared to the pre-adoption period. A brochure (Odia) on "*Farmer FIRST parijojana madhyamare unnata krushi ebong anusangika krushi khetraku proschahana*" was prepared and same was released by Director, ICAR-ATARI during the review meeting held at OUAT, Bhubaneswar. The Bhargabi Fish Farmers Producers Company Limited, an FPO, was promoted by ICAR-CIFA. Darbar Sahitya Sansad (DSS), NGO, was formally launched on 20th November, 2019. The launching ceremony was attended by 150 farmers and representatives from NFDB, OUAT, bank and other stakeholders. The gain was found maximum in the financial assets (25%), followed by natural assets (21%), human assets (19%), physical assets (15%) and social assets (14%). The overall gain in livelihood was worked out to be 18%. By applying the paired t-test, it was found that the project had a positive and highly significant impact on the livelihood of the beneficiaries. Under ICAR-CIFA, a total of 396 farm families involving 581 farmers got direct benefit from this project.

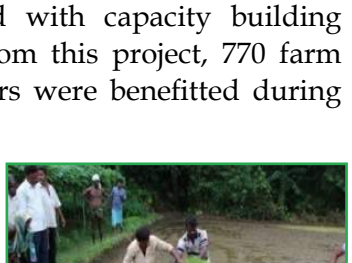
ICAR-NRRI, Cuttack

The NRRI-Farmer FIRST Programme was implemented in a rice-based cluster comprising four villages viz. Biswanathpur, Satyabhamapur, Laxminarayanpur and Ganeswarpur of Salipur block in Cuttack district of Odisha. Out of total 1800 odd families in the cluster, over 800 farm families have been adopted for technological interventions and backstopping in four modules (Crop-based, Horticulture-based, Animal Science-based and Enterprise-based) for improving the cropping system and doubling farmers' income. During *Kharif* 2019, six most promising rice varieties i.e. *Pooja*, *CR Dhan 307* (*Maudamani*), *CR Dhan 409* (*Pradhan dhan*), two hybrids (*Rajalaxmi* and *CR Dhan 701*) and one BPH pest resistant variety (*Hasant*) were demonstrated involving 420 participating farmers covering over 100 ha land area. The crop cutting experiment results of these varieties showed that the grain yield was found to be highest in variety *CR Dhan 701* (hybrid) with a maximum of 7.92 t/ h and average of 6.92 t/ ha as against *Swarna* local check (5.42 t/ ha) with an average grain yield advantage of 27.68%, followed by *Rajlaxmi* (hybrid) with 23.99%, *Hasant* with 14.39%, and *CR Dhan 307* (*Maudamani*) with 13.65% grain yield advantage respectively. A comparative analysis of average grain yield of rice during the pre-FFP (2016-17 at 3.80 t/ h) was made with post-FFP (2019-20 at 5.65 t/ h) indicating a quantum jump of average 48.68% in rice productivity in the cluster. In monetary terms, the net return has increased from Rs. 32230/- per hectare to Rs. 90045/- per hectare with an increase in income by over 179 percent from rice alone among the beneficiary rice growers. Similarly, under farm mechanization initiatives, out of over 20 types of farm implements introduced and demonstrated in the cluster, the power-operated rice thresher-cum-winnower had shown highest acceptability and adaptability among the rice growers.

The improved trellis system of growing 4-5 climber vegetables crops with locally available resources like bamboo twigs by about 50 vegetable growers in a relay sequence, e.g. bitter gourd (Feb-May), cucumber (May-Aug), cow pea (Aug-Nov), and lab-lab bean/ French bean (Nov-Feb) had multiplied farmers' income from a single piece of land in a year. The B:C ratio of brinjal was found to be the highest with 4.87 closely followed by tomato (4.22) and pumpkin (3.36).

Under the animal science components, composite demonstrations on pond-based aquaculture in the fish ponds of 25 farmers by providing 55000 fingerlings of Indian Major Carps, on backyard and commercial poultry demonstrations by 60 farmers, farm women and rural youths by providing 1200 improved and immunized poultry chicks (*Vanaraja*-500, *Rhode Island Red*-500, *Kadaknath*-200) were conducted coupled with capacity building training programmes. From this project, 770 farm families with 2410 farmers were benefitted during the period.



ICAR-IIWM, Bhubaneswar

During the year 2019, interventions like sprinkler irrigation for water conservation was used in 20 hectares of land in three villages for vegetable cultivation ensuring water saving up-to 50% in comparison to flood irrigation. Line transplanting under SRI for increasing water use efficiency in transplanted rice and scientific fertilizer management in SRI rice in 25 hectares of land ensured the increase in net rice income by 20%. Polythene mulching in vegetable cultivation was adopted for conservation of moisture, prevention of weeds and better nutrient management. Three trainings each in three project villages on improving farm income, water use efficiency, integrated farming system, improved methods of rice and vegetable cultivation, increasing

cropping intensity through winter vegetables, improved livestock rearing trainings etc. were conducted for 370 farmers. Vegetable cultivation was promoted in three villages covering more than 300 farmers. Scientific pisciculture was taken up in 3 community ponds with help of three farmer groups consisting of 30 members. Fish fingerlings released during 2018-19 were harvested in 2019-20 with production of fish worth Rs. 497600/- rupees in three villages. The interventions under NRM, crop, horticulture and IFS ensured the increase farmers' net income up-to 175% in different cases in comparison to 2015-16 when the project was initiated. In some of the cases where mono-crop rainfed rice was practiced, adoption of improved vegetable cultivation increased net income by more than 200% in comparison to 2015-16. The project benefitted 357 farm families involving 484 farmers during the period.




OUAT, Bhubaneswar

Under crop based module, demonstrations were done for high yielding rice variety '*Mrinalini*' (150 days) and '*Swarna Sub-1*' (140 days) were grown in 16 and 8 ha, respectively involving 170 and 80 farmers during *Kharif* 2019. Green manuring with incorporation of Sesbania was undertaken in the demonstrated plots to improve soil fertility and land productivity. Farmers raising rice *var.* '*Mrinalini*' got average grain yield of 4.68 t/ ha, gross return of Rs. 84240/-, net return of Rs. 31240/- and B:C ratio of 1.59 with an investment of Rs. 53000/-. Farmers raising rice *var.* '*Swarna Sub-1*' got average grain yield of 4.25 t/ ha, gross return of Rs. 76500/, net return of Rs. 25000/- and B:C ratio of 1.48 with an investment of Rs. 51500/-. Farmers were motivated to raise green gram *var. IPM 02-14* after harvesting of rice. They got average grain yield of 0.46 t/ ha, gross return of Rs.36800/-, net return of Rs.11800/- and B:C ratio of 1.47 with an investment of Rs. 25000/-. The Hybrid pumpkin (Tokita hybrid-*Vimal*) was grown in an area of 3.2 ha involving 16 households. The farmers realized an average fruit yield of 17.97 t/ ha and net return of Rs. 108438/- per ha with an expenditure of Rs. 107188/- per ha. Hybrid cucumber (Arnnapurna hybrid- *Rajmata*) was grown in an area of 2.36 ha involving 15 households. Farmers realized an average fruit yield of 21.83 t/ ha and net return of Rs. 268546/- per ha with an expenditure of Rs. 168121/- per ha. Four numbers of greenhouses (each size- 10m×5m, Shape- Arch) were constructed during 2018-19 which were utilized for raising healthy seedlings of cauliflower and cabbage towards the end of *Kharif* season to get early produce. The members of women SHG achieved recovery of 77-78% from greengram and blackgram with pre-milling treatment with oil and water. A total of 490 farm families which involved 2150 farmers got direct benefit from this project.



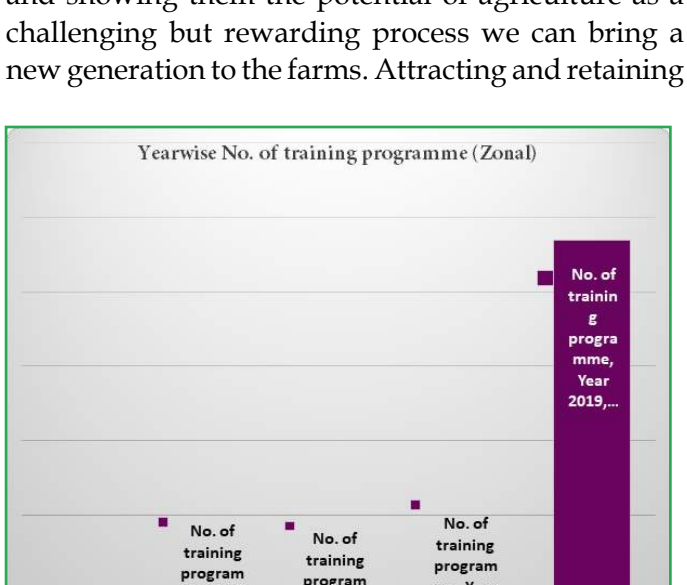

13.5 Attracting and Retaining Youth in Agriculture (ARYA)

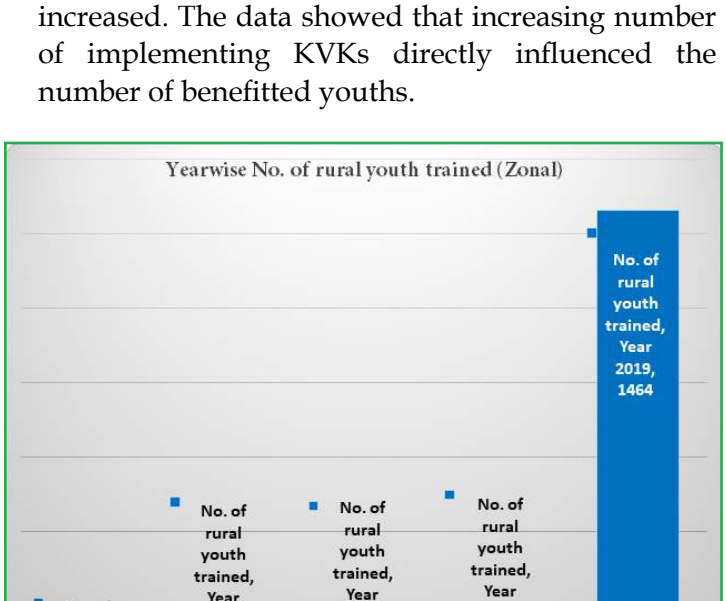
Nodal scientist: Dr P.P. Pal

As per the UN World health organisation, by 2030 six out of every 10 people will live in a city and by 2050 this proportion will increase to 7 out of 10 people meaning that more young people than ever before are moving to cities and towns to find jobs. In this situation, engaging rural youth in agriculture has been prominent topic recently and has risen of the development agenda as there is growing concern on the said issues. In a country like India where most young people are living in rural areas, youth force must be involved in agriculture for the betterment of the country, generate employment and equilibrate population density in rural and urban areas.

In that regard, challenging the mind-set of youth that agriculture is not at all a life of toil, hardship and poverty, but a noble profession to secure our future food security and generate employment, has become necessary. By identifying young people and showing them the potential of agriculture as a challenging but rewarding process we can bring a new generation to the farms. Attracting and retaining youth in agriculture is a flagship programme of Indian Council of Agricultural Research New Delhi to promote and empower the rural youth in various agriculture and allied sector enterprises in the entire country. This project was launched with the objective to attract and retain the rural youths to take up various enterprises from agriculture and allied sectors. It is also aimed to establish network groups to take up capital and resource intensive activities like processing and value addition. Establishing functional linkage with different institutions and stakeholders is also a fundamental purpose of this project.

In this zone, during 2019 altogether 9 KVKs including Nimpith from West Bengal and Nayagarh from Odisha and seven newly sanctioned KVKs namely, Hooghly, Uttar Dinajpur, Purulia, Sambalpur, Ganjam-1, Puri and Cuttack. Thay are carrying out this project under this institute. The outcome of this project can be identified through different parameters. There was a huge increase in total number of trainings conducted during this year; as a result the number of benefitted youths was also increased. The data showed that increasing number of implementing KVKs directly influenced the number of benefitted youths.



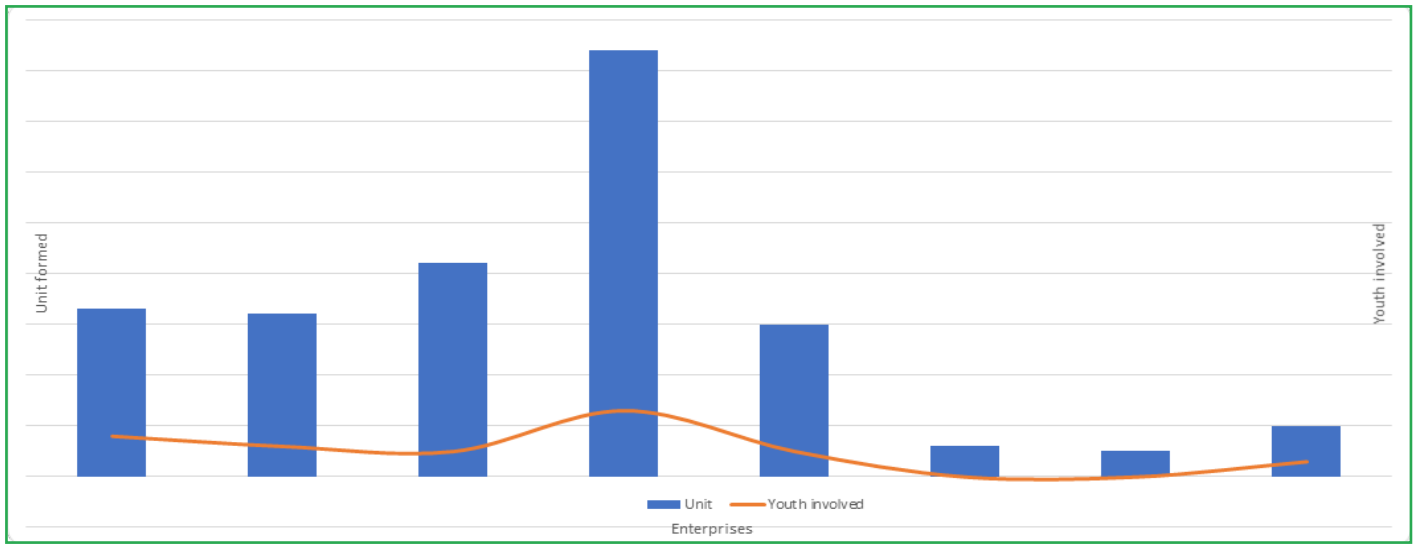


Moreover, the impact of this initiative was clear from the improvement in their livelihood, in most of the beneficiaries it was seen that the youth were able to earn more than their past conditions.

Table: Impact of implementing ARYA during 2019

Enterprise	Income (Rs)	
	Before ARYA	After ARYA
Fishery enterprise	60000	216000
Horticulture Nursery	65000	150000
Backyard poultry	48000	198000
Mushroom cultivation	72000	270000
Vermicompost production	42000	110000
Goatery	30000	185000
Value addition and processing in pineapple	46000	_
Apiary	0	12088
scientific Lac Cultivation	50000	145000

This benefit to the youth was made possible through the regular training, fund support and other activities from the concerned KVKs. These results are also accompanied by formation of new units of enterprises through which the youth could earn more.



KVK Nimpith promoted enterprises like fishery unit, horticulture nursery under ARYA project, they have trained more than 200 youths through several trainings. KVK Nayagarh helped about 100 rural youth to set up enterprises on poultry, mushroom, fingerling production etc. Hooghly KVK selected nursery, backyard poultry mushroom and vermicompost production. A KVK from North Bengal, Uttar Dinajpur KVK is working on mushroom production, fingerling production and very innovatively value addition to pineapple.

A review workshop was also conducted to follow up the progress of the KVKs by this institute. All the KVK heads participated in that workshop and discussed their experiences in this programme. They were guided by the Chairpersons, Nodal Scientists and Director of ATARI to work with the youths in a group. A total of Rs. 161 lakh was received by ATARI Kolkata for this project out of which Rs. 124 lakh was utilized by different KVKs.

13.6 Tribal Sub Plan (TSP)

Nodal Officer: Dr. K.S. Das

The aim of Tribal Sub-Plan (TSP) was to channelize the flow of outlays and benefits from the general sectors in the Central Ministries/ Departments for the development of Schedules Tribes at least in proportion to their population, both in physical and financial terms. Keeping those things in mind, Ministry of Tribal Affairs, GoI identified tribal dominated districts in our country to provide the tribal people a better quality of life. Under ICAR-ATARI Kolkata, such 10 tribal dominated districts i.e. one district (Nicobar) from Andaman & Nicobar Islands and nine (Gajapati, Kandhamal, Mayurvanj-I and II, Malkangiri, Nabarangapur, Raygada, Sundergarh-I and II) from Odisha state were identified under this scheme during the year 2019. A sum of Rs. 201.78 lakh fund was allotted to those 10 KVKs to conduct different activities e.g. agricultural farming, horticulture, animal husbandry, dairy development, fish production, kitchen gardening, vocational training and many others for tribal people. The achievements of physical output and outcome under TSP by the KVKs of ATARI Kolkata during 2019 have been presented in the following table. As per achievements of physical output was concerned, a substantial number (721) of assets e.g. sprayer, ridge maker, pump set, weeder, store bins, drip irrigation set, poultry feeder/ drinker etc. were created for the benefit of tribal farmers during the period. The KVKs of tribal districts conducted 87 OFTs and 2001 FLDs for overall agricultural development in the districts. About 19000 farmers were trained and 60324 farmers took participation in various extension activities conducted by the KVKs. The KVKs produced 90.5 tonnes seed, 3.50 lakh planting materials and more than 43000 livestock strains and fish fingerlings.

Table: Achievements of physical output/outcome under TSP during 2019

Sl. No.	*Achievements of physical output*		*Achievements of physical outcome*	
1.	Asset creation (in number; Sprayer, ridge maker, pump set, weeder etc.)	721	Number of technologies identified after assessment	12
2.	On-farm trials (in number)	87	Upgraded skills and knowledge of farmers (in number)	18079
3.	Frontline demonstrations (in number)	2001	Oriented extension personnel in frontier areas of agricultural technology (in number)	645
4.	Farmers training (in lakh)	0.18983	Increased availability of quality seed (in quintal)	1052.3
5.	Extension personnel training (in lakh)	0.01491	Increased availability of quality planting material (in number)	366557
6.	Participants in extension activities (in lakh)	0.60324	Increased availability of live-stock strains and fingerlings (in number)	49198
7.	Seed production (in tonnes)	90.5	Testing of soil & water samples for balance fertilizer use (in number)	3082

Sl. No.	Achievements of physical output		Achievements of physical outcome
8.	Planting material production (in lakh)	3.50232	
9.	Livestock strains and fingerlings production (in lakh)	0.43178	
10.	Soil, water, plant, manures samples testing (in lakh)	0.03049	
11.	Provision of mobile agro – advisory to farmers (in lakh)	5.79506	
12.	No. of other programmes (Swachha Bharat Abhiyaan, agriculture knowledge in rural school, planting material distribution, vaccination camp, animal health camp etc.)	266	

In addition, ten KVKs under ATARI Kolkata conducted 266 programmes on '*Swachha Bharat Abhiyaan*', '*Agriculture knowledge in rural school*', '*Planting materials distribution*', '*Vaccination camp*', '*Animal health camp*' etc. Considering the achievements of physical outcome of TSP during the year 2019, more than 18000 farmers upgraded their knowledge and skills, and 3082 farmers were benefitted from testing soil and water samples to use balanced fertilizer in their fields. It also increased the availability of quality seed (1052 q), planting materials (3.67 lakh), livestock strains and fish fingerlings (>49000) in the tribal districts. The district and village-wise beneficiary details have been shown in the following table. A total of 17420 tribal farmers from 184 villages under ATARI Kolkata were benefitted from TSP during this period.

Table: Location and beneficiary details during 2019

Name of KVK/ state	District	Sub-district	No. of Villages	Village-wise total amount spent (Rs.)	ST population benefitted (No.)	Description of activity
A & N Islands	1	1	12	287000	1120	Conducting OFT/ FLD/ trainings, supplying planting materials/inputs/livestock strains, analysis of soil samples, providing mobile agro-advisory services etc.
Odisha	9	37	172	7286395	16300	
Total	***10***	***38***	***184***	***7573395***	***17420***	

13.7 National Innovation on Climate Resilient Agriculture - Technology demonstration component (NICRA –TDC)

Nodal Officer : Dr. F H Rahman

Climate change impacts on agriculture are being witnessed all over the world, but countries like India are more vulnerable in view of large population depending on agriculture and excessive pressure on natural resources. It has become an important area of concern for India to ensure food and nutritional security for growing population. Indian farmers have evolved various coping mechanisms over time, but these mechanisms are not enough to cope with the extreme weather aberrations witnessed in the recent years. Therefore, there is a need to use modern science combined with indigenous knowledge of farmers to enhance the resilience of Indian agriculture to climate change. In order to deal with climate change and its impacts, the Indian Council of Agricultural research (ICAR) initiated National Innovation in Climate Resilient Agriculture (NICRA), a multi-institutional, multi-disciplinary network project in 2011. The rationale for Technology Demonstration Component (TDC) is based on the premise that an array of technologies is available to cope with different types of climate related vulnerabilities in National Agricultural Research System. The component TDC of the project has been implemented through Krishi Vigyan Kendras

at district level regionally coordinated by ICAR-Agricultural Technology Application Research Institutes (ATARIs). The overall focus of NICRA is on adaptation to climate variability which entails appropriate response to contingency situations. The central objective of technology demonstrations in such regions is not on enhancing productivity but on interventions related to coping with vulnerability as well as improvement in natural resource use efficiency for sustaining the productivity gains. In the context of climate variability, farmers need to adapt quickly to increasing frequency of drought, flood and other extreme events to stabilize crop yields and farm income. Over the years, the National Agricultural Research System has developed an array of practices and technologies to foster stability in agricultural production against the onslaught of seasonal variations.

Climatic vulnerability of selected 9 KVK districts of West Bengal, Odisha and Union Territory of A & N Islands at district level regionally coordinated by ICAR-Agricultural Technology Application Research Institute Kolkata (ATARI) forward definite requirement in terms of technological support, human resource development and overall empowerment of farming community to enable them to cope up with climate vulnerabilities like droughts, erratic rainfall, heat wave, flood, cyclonic storm. Enhancing the adaptive capacity and building resilience of the farming communities is important in the context of climate variability and to cope with these extreme events effectively. The NICRA village was selected based on vulnerability of agriculture to climatic variability. The multidisciplinary team of KVK analyzed the constraints related to climatic variability based on secondary weather data, resource situation, farming systems and agricultural yields in the past few years. Thus the interventions executed in NICRA villages by the NICRA-KVKs through the intervention like Natural Resource Management, Crop Production, Livestock, Institutional Intervention, Capacity Building and Extension Activities have not only enabled the farmers to cope up climatic vulnerability as well as it plays a key role in farmers' adaptive capacity along with sustainable agricultural production.

NATURAL RESOURCE MANAGEMENT

Total 1117 numbers of farmers were benefited covering 247 ha land from this module. Different demonstration like summer ploughing, green manuring, zero tillage, organic mulching etc. under *In-situ* moisture conservation technologies have been demonstrated in 9 NICRA adopted villages covering 87.2 ha among 472 no. of farmers. The technologies followed mainly were zero tillage operation. More than 35 ha have been brought under Broad Bed and Furrow intervention with significant impact among the farmers in A&N Island. Ridge and furrow method sowing of maize was to increase water use efficiency and to avoid water logging. Water harvesting and recycling for supplemental irrigation through renovation of pond, well and canal, sand check dam, making bund, 5% model *etc.* were demonstrated in adopted villages by the different KVKs involving 311 numbers of farmers. Zero tillage technology successfully implemented in more than 51.2 ha area of 157 numbers of farmers under wheat, lentil and chickpea as Resource Conservation means. Water saving irrigation methods like sprinkler irrigation, LEWA in rice, RBF in brinjal, micro-lift irrigation in rice were demonstrated in NICRA adopted villages covering an area of 38 ha in 132 farmers fields. There were 25 new rainwater harvesting structures have been developed and 32 numbers renovated which could store 294565 cu m of water having protective irrigation potential 345 ha. This intervention increased the cropping intensity to the maximum extent upto 250%. Around 223 q compost prepared from solid wastes was added to the soil through which 34 thousand carbon sequestrations was done during 2019. Artificial ground water recharge was done by field bunding, water management and through SRI by sub soiler in rice covering 29.1 ha area in 44 farmers' fields. Ground water recharge through SRI by sub-soiler recorded highest rice yield (53.5 q/ha) and benefit:cost ratio (2.25). Land shaping with *ail* cultivation and rain water harvesting structure have been constructed covering 2.51 ha area during post *kharif* to mitigate the scarcity of irrigation water, increase in soil carbon and reduce soil salinity.

CROP PRODUCTION

Under Crop Production module different area specific interventions were taken up *viz*; demonstration of drought, salt and flood tolerant/

resistant varieties, advancement of planting dates of *rabi* crops to avoid terminal heat stress, water saving rice cultivation methods like SRI, aerobic, direct seedling, community nurseries for delayed monsoon, location specific intercropping systems with high sustainable yield index, introduction of new crops/ crop diversification, custom hiring centres for timely planting, low temperature tolerance, promotion of pulses utilizing post-monsoon rainfall, integrated crop/pest/disease management, growing vegetables as contingency crop, integrated crop management, integrated disease management, contingency crop, which benefitted 2189 farmers. Drought tolerant rice varieties like *Sahbhagi*, *Anjali, Naveen*, *Abhishek* were demonstrated in 74.3 ha areas of 615 number of farmers' field. Salt tolerant varieties of rice like *Gosaba 5*, *CARI Dhan-5, Usar Dhan-5, Jarava, Geetanjali, SR-26B, Amalmona* were demonstrated in 13.1 ha area in 116 farmers' fields. *Javarva, Geetanjali and Amalmona* varieties proved maximum salt tolerant potential by giving highest yield of 44.8 q/ha and more economic return (BC ratio of 2.23). Flood tolerent varieties of rice like *Swarna sub 1, Sabita, Dudheswar* were demonstrated in 24 ha area in 119 farmers' field by giving yield of 44.0 q/ha with an economic return 2.33. To avoid terminal heat stress in crops like rice, wheat, lentil, mustard, potato, etc. were sown in 12 days advance during *rabi* season. These demonstrations were carried out in adopted villages involving 191 number of farmers' fields with an area of 31.6 ha land. An area of 34.3 ha was covered for staggered community nurseries of rice, brinjal, cauliflower, tomato which benefitted 175 numbers farmers. Introducing different crops like Ol (var. *HYV Gajendra*); Cauliflower (var. *MSN-16*) Rice (var. *Pusa Bold, Pusa 362*); Tomato (var. *Param F1*); etc. in Kendrapara, Jharsuguda as less water requiring crop as contingent crop planning during deficit rainfall in *kharif*. An area of 138.2 ha was covered for crop diversification of rice, brinjal, cauliflower, lentil, cabbage which benefitted 855 numbers of farmers. In Jharsuguda, Sonepur and Ganjam ridge and furrow practice is followed in large scale. Cabbage, cauliflower, brinjal, tomato, chili, cowpea, bottle gourd were grown in total areas around 50 ha with an average annual income is Rs.40, 000/ha of land. From cauliflower and cabbage cultivation, they got a profit of Rs.22,000 from 22 ha of area. Crop diversification by hybrid maize is carried out. Near about 118 farmers have adopted in those districts. Various intercropping systems were demonstrated in regions which are prone to drought. Intercropping systems are considered as one of the important adaptation mechanism for variable rainfall situations. Intervention on location specific intercropping was demonstrated in almost all adopted villages. Total 2189 numbers of farmers were benefitted covering 387.5 ha of land.

LIVESTOCK AND FISHERIES

Livestock and Fisheries module comprising various livestock centric interventions were carried out which include use of community lands for fodder production during drought/flood, improved fodder/feed storage methods, improved shelters for reducing heat stress in livestock, management of fish ponds/tanks during water scarcity and excess water, breed up-gradation, balanced feed and fodder management through mineral mixture, feed blocks and silage making, azolla feeding, breed animal health management through deworming and vaccination, fish pond cleaning and fish farming, pig farming, clean milk and fodder production. These interventions benefitted 465 livestock owner with

4097 animals in vaccination programme. Adequate supply of fodder, either green or dry, is crucial to the livelihoods of livestock in rainfed areas. Delayed onset and deficit rainfall conditions were experienced in several states. There was reduction in area under millets and pulses, which are important to meet the fodder requirements in the rainfed areas. Short and medium duration fodder cultivars of several crops and fodder species both in *kharif* and *rabi* seasons were demonstrated in farmers' fields under rainfed and limited irrigation conditions to support income and cash flow from animal husbandry. Improved fodder of rice bean and silage making were demonstrated in farmers fields. Community lands of an area of 189.3 ha involving 363 number of farmers utilized for different fodder production were demonstrated in different adopted villages. Berseem, oat, sudan chari, maize, hybrid napier were the major fodder produced in the programme. Of all these demonstration legume Sudan grass showed maximum benefit return (B: C-5.59). Silage making for 285 numbers and 7 ha of units showed very promising results. Vaccination camps were organized against FMD of cattle, PPR against goat, Ranikhet of poultry, BQ vaccine, deworming etc. in adopted villages. Mortality rate reduced up to the extent of 90% and average increase in cattle milk yield up to 40% had been recorded after the vaccination camps organized. Demonstrations of rural backyard poultry (*kuroiler, Nicobari fowl*), *Vanraja, Kadaknath*, *Khaki Campbell* duck, T X D breed of pig, mineral mixture and *azolla* as cattle feed were carried out. Improved ornamental bird was introduced through this intervention which also showed very promising results. Improved Poultry shed recorded low mortality rate and shady area reduced heat stress. Standard spacing in improved shed resulted better performance in poultry and dairy animals. Interventions to reduce heat stress for higher survivability of backyard poultry and dairy animals were demonstrated of improved shelter.

INSTITUTIONAL INTERVENTION

Institutional interventions including seed bank, fodder bank, commodity groups, custom hiring for timely operations, community nursery raising, irrigation, collective marketing, climate literacy through a village level weather station and awareness developed in almost all NICRA villages. A total of 54 units have been developed covering of 198 ha area of 1785 number of farmers. Custom Hiring Centre has the provision of various farm implements like Power tiller, Thresher, Reaper, Water pump, Zero- till Drill, Raised bed planter, Sprayer, Weeder etc. There is a provision of Mini-Automatic Weather Station (AWS) through which farmers are provided weather forecasting data.

VILLAGE CLIMATE RISK MANAGEMENT COMMITTEE (VCRMC)

Village Climate Risk Management Committee (VCRMC) was constituted after in-depth discussion with the villagers about the mitigation of the climatic vulnerabilities of the villages and the strategies to be adopted under this programme. VCRMC became operational with opening of a bank account in their name being jointly handled by the President

of VCRMC and the Head of the KVK concerned. VCRMC manages the custom hiring centre for farm implements and micro-irrigation systems, seed and fodder bank, community nurseries, collection of farmers share in planting material and inputs, establishment of small weather station in the village, participation of farmers in capacity development programms and exposure visits to learning sites. Institutional interventions including seed bank, fodder bank, commodity groups, custom hiring for timely operations, community nursery raising, irrigation, collective marketing climate literacy through a village level weather station and awareness developed among the farmers in the Zone.



Custom hiring of farm implements and machinery at nicra adopted villages

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. It has now become immensely popular among the farmers and substantial amount has also been generated. Timeliness of agricultural operations is crucial to cope with climate variability, especially in case of sowing and intercultural operations. Access to implements for planting in ridge-furrow, broad bed furrow and raised beds is essential for widespread adoption of resilient practices for *in situ* soil moisture conservation and drainage of excess water in heavy soils. In rainfed areas, availability of such farm implements to small and marginal farmers is important. Similarly in irrigated areas, residue management of *kharif* crops through zero till cultivation of *rabi* crops reduces the problem of burning of residues and adds to the improvement of soil health and increases water use efficiency. The rates for hiring the machines / implements are decided by the members of VCRMC. This committee also uses the revenue generated from hiring charges and deposits in a bank account opened in the name of VCRMC. The revenue is used for repair and maintenance of the implements and 25% share is earmarked as a sustainability fund. Different types of farm machinery are stocked in the CHCs, the most popular being Zero till drill, Happy seeder, BBF planter, drum seeder, multi crop planter, power weeder, mechanical weeder, chaff cutter, conoweeder, duster, sprayer, levelier, FIRB planter, sub-soiler, zero-till ferti-seed dull, disc harrow, bucket levelier, reaper, thresher, cultivator, rotavator, pumpset etc.

Table: Status of Custom Hiring Centres

Name of KVK	Revenue generated (Rs.)	
	From Custom Hiring Centres	Total under VCRMC
Cooch behar	43900	62000
Malda	5235	57215
Port Blair	17500	54500
South 24 Parganas (Nimpith)	23100	223000
Kendrapara	6800	6800
Sonepur	5000	33000
Jharsuguda	11000	47952
Ganjam - I	-	14620
Kalahandi	No CHC has been established yet	
Total	**112535**	**499087**


Capacity building

A total 113 courses were conducted under Capacity Building on various thematic areas benefitting 3127 farmers and farmwomen (2514 males and 613 females) during 2019. Thematic areas covered crop management, natural resource management, nutrient management, integrated crop management, crop diversification, resource conservation technology, pest and disease management, livestock and fishery management, nursery raising, employment generation, nutrient garden, repair and maintenance of farm machineries and implements, integrated farming system, fodder and feed management, lac cultivation, drudgery reduction with farm implements for woman, value addition, human nutrition and child care, rodent control etc.



Extension activities

A total of 299 Extension Activities on various thematic areas benefiting 13134 practicing farmers (7854 males and 5280 females) during the reporting period. The extension activities were conducted on method demonstrations, agro advisory services, awareness animal health camp, Kishan Chaupal, Kishan Gosthi, resource conservation technologies, celebration field and farmers' days, diagnostic visits, school student visit, group discussion, World Earth Day, technology week, kishan mela etc. December 5, 2019 was observed as World Soil Day in the respective KVK and distributed a total of 645 soil health cards among the farmers of NICRA villages.

Convergence by nicra with ongoing development programmes

Resource Generation through Convergence with ongoing other development schemes is one of the most significant activities achieved by all the NICRA KVKs since the inception of the project. A good number of convergence programmes was carried out by each of the NICRA implementing KVK with ongoing development schemes. The prominent development schemes are MGNREGA, National Micro and Minor Irrigation Scheme, Pradhan Mantri Gram Sadak Yojana, Backward Rural Grant Fund, Sunderban Development Board, NFSM, IWMP, IVRI, ICAR-DWR, Forest Department etc. NICRA KVKs being a part of the different convergence programmes during the period of 2019.

13.8 Gramin Krishi Mausam Seva (GKMS) Through District Agomet Unit (DAMU)

Nodal Officer : Dr. F H Rahman

Agrometeorology is an important multidisciplinary subject. Hence, ICAR maintains Agromet observatories as well as Automated Weather

Stations (AWS) and record Agromet observations at its Institutions, National Research Centres, Project Directorates, Krishi Vigyan Kendras (KVK) etc. to generate agrometeorological information for use in studies of crops, pests and diseases, soil, agro-forestry, livestock, horticulture, Agricultural Physics, Soil Science etc. Such data will help ICAR Institutes to study crop-weather relationship, relationship between crop-weather and pest/disease and develop region/location specific agromet predictive models. In view of that, sixteen KVKs of which 10 from Odisha and 6 from West Bengal, have been selected in Phase-1 to establish DAMU. As of now six KVKs of West Bengal and one from Odisha have been functioning. The KVKs with DAMUs are providing weather forecast bulletins to the farmers since the inception of the Project. Weather forecast bulletins/ special bulletins are generated in English and local languages and communicated to the farmers well in advance. Agromet Advisory Bulletins are prepared twice a week and circulated among all the farmers of the district. WB-KVKs with DAMUs prepared Special Bulletins in English and regional languages as per the forecast issued by IMD, RMC, Kolkata and circulated to the farmers of the district well in advance of devastating cyclone AMPHAN. This has tremendously helped the farmers to a great extent in minimizing the loss during the severe cyclonic storm. KVKs took initiatives in popularizing of 'Meghdoot' and 'Damini' mobile Apps for outreach of Agromet Advisories and to help individuals keep updated about thunderstorm/ lightning likely to strike in their locations. Initially Orientation programme on Preparation and Dissemination of Agromet Advisories at Block Level under GKMS for Nodal Officers of KVKs of WB & Odisha was organized at ATARI Kolkata in August 9-10, 2018.

The main activity of a District AgroMet Unit (DAMU) is aimed at lending support to the farm planers and farmers by disseminating advance information related to weather condition through block level agromet advisory bulletin for day to day agricultural operations, minimizing crop loss and proper utilization of land and natural resources. In Phase-I of Gramin Krishi Mausam Sewa (GKMS), a total of 16 KVKs (6 in West Bengal and 10 in Odisha) were selected to set up DAMUs. At present five KVKs in West Bengal and one in Odisha (Cuttack) are functioning and providing weather forecast bulletins to the farmers since FY 2018-19. A Six days training programme on 'Preparation and Dissemination of Agromet Advisories at block level' for SMS (Agromet) & Agromet Observer in DAMUs at KVKs of West Bengal, Odisha, Bihar and Jharkhand was organized at WBUAFS Kolkata during August 6-11, 2019. Weather forecast bulletins and special bulletins are generated in English and local languages by DAMUs and communicated to the farmers well in advance. Agromet Advisory Bulletins are prepared twice a week by each DAMU and circulated among all the farmers of the district. The KVKs are enhancing outreach and dissemination of Agromet advisories using new and effective means of communication i.e. Emails, WhatsApp, KVK facebook page and SMS (in m-Kisan portal) are used to deliver Agromet advisory bulletins to registered members of different farmers clubs, FPOs, line departments and ultimately to reach the farmers. With the help of RMC/MCs, DAMUs are also using social media and whatsapp groups consisting of AMFUs (Nodal Officer, Technical Officer), DAMUs (Nodal officer, SMS-Agromet) and concerned officials viz DAOs etc. for quick dissemination of weather forecast, nowcasts, alerts & warnings, and agromet content to farmers at village level. They are utilizing this channel effectively for sending information on very high impact weather events like thunderstorm & lightening to farmers to reduce the casualities and other losses. Popularization of "Meghdoot" and "Damini" mobile Apps for outreach of Agromet Advisories and to help individuals keep updated about thunderstorm/lightening likely to strike in their locations. To acquaint the farmers with the importance of the weather based agro advisories, DAMUs organize several Farmers Awareness Programme (FAP) and Trainings are conducted to cover all the blocks and Farmers and Farmwomen of the district. India Meteorological Department (IMD) and Rajmata Vijaraje Scindhia Krishi Viswavidyalaya, Gwalior jointly organized 13th Annual Review Meeting (ARM) under 'GKMS Scheme in the country' in Dec 18-19, 2019. All SMSs (Agromet) of DAMUs participated in the meeting.
Different activities conducted by DAMU-KVKs under the Project are mentioned below:

Table: Activities conducted by the DAMU-KVKs during 2019

Sl. No	Activities	No. of programmes	No. of Beneficiaries
1	Agromet Advisory Bulletins Preparation and distribution	534	
2	Farmers Awareness programme (FAP)	101	3287
3	Field visits and trainings	132	4250
4	Krishi Mela	4	1200
5	Workshop organized	6	580
6	Messages through SMS/Whattsapp on weather forecast	624	45000
7	Success stories documented	5	5
8	Publications on the activities during the year	20 nos.	-



13.9 Skill development training programme (ASCI)

Nodal Officer: Dr. S K Mondal

A collaborative approach of Agriculture Skill Council of India and Indian Council of Agricultural Research has been taken for carrying out entrepreneurship development programmes through imparting skill training by KVKs. During 2019, 36 KVKs alongwith 4 SAUs and 5 ICAR Institutes of this Zone were assigned with the job of undertaking the training programmes in the line of ASCI norms. In general, all of these KVKs/ SAUs/ Institutes had undertaken 2 Skill Development Training Programme (each) for a total of 1202 participants. During the year, a fund of Rs. 183.53 lakh was allocated to ATARI Kolkata for this purpose. The details have been presented in the Table.

Table: Skill development training programme (ASCI) conducted in Zone V during 2019

State/ UT	No. of KVKs	No. of SAUs	No. of ICAR Institutes	No. of Job roles	Number of Skill Development programs organized	Total number of farmers trained	Number of farm women trained
A & N Islands	1	0	1	4	2	35	4
Odisha	21	1	3	39	45	783	92
West Bengal	15	3	1	21	32	265	23
Total	**36**	**4**	**5**	**64**	**79**	**1083**	**119**

13.10 Doubling Farmers' Income

Nodal Scientist: Dr. Avijit Haldar

Indian economy is predominantly dependent on agriculture and other allied activities with more than 60% population dependent onagriculture as their principal means of livelihood. During the period of last 50 years from 1965 to 2015, since the adoption of green revolution, India's food production multiplied 3.7 times while the population multiplied by 2.55 times. The net result has been a 45% increase in per person food production, which has made India not only food self-sufficient, but also an exporting country. So far the strategy for development of agriculture sector in India has focused primarily on raising agricultural output and improving food security. During last five decades, agricultural research has focused on the development of higher productivity of crop varieties and animal breeds, better farm implements and machinery, increased fertilizer use and other production technologies which enabled the farmers to grow more food, but at the same time it overexploited the resources and resulted in decreasing farm productivity and profitability. While the country achieved commendable position in food production, farming itself turned non-profitable over time due to rising costs and uneconomical holdings. Farmers' income remains low in relation to income of those working in the non-farm sector. Low level of absolute income as well as deteriorating disparity between income of a farmer and non-agricultural worker constitute an important reason for the emergence of agrarian distress and farmers' unrest in the country. In this background, the goal set to double farmers' income by 2022 is central to promote farmer's welfare, reduce agrarian crisis and bring parity between income of farmers and those working in non-agricultural professions. Hence, the paradigm has been changed from food security to income security for the farmers. The Government of India (GoI) announcement of doubling farmers' income by 2022 and its implementation must have a direct impact on almost half of the population to realize a sense of income security to farmers in a time bound manner, to reduce agrarian distress and promote farmers' welfare. The subject has attracted a lot of attention, generating thoughts and debates on policy, strategy and implementation to achieve the goal. However, the government's intension seems to be to double the income of the farmers from farming in real terms. In this context, efforts have been undertaken at various levels to make strategic plans and prepare road map for doubling the farmers' income at the district level. Accordingly, KVKs of Andaman and Nicobar Islands, Odisha and West Bengal have selected two villages and collected baseline data on natural resources, agricultural farming, farm produces, marketing etc and made fund proposal. Till the fund is allocated and sanctioned, all KVKs under ICAR-ATARI, Kolkata, Zone V have undertaken various routine activities like FLD, OFT and Training in the selected two villages of a particular block of the district covering a total of 118 villages in this zone. A number of technologies have been made available at the farmer's field to figure out how the income could be doubled or more. Technological interventions covered 2 ha land with the involvement of 225 farmers of which 197 small and marginal farmers in Andaman & Nicobar Islands, 375 ha land with the participation of 1363 farmers of which 836 small and marginal farmers in Odisha and 464 ha land with the involvement of 2889 farmers of which 2648 small and marginal farmers in West Bengal. Interestingly, 37.43% farm women were present, while a total of 136 SHGs were actively involved in this programme. A total of 315 numbers of training programmes were organized to build up the capacity of the farmers. Many technological interventions like farm mechanization, natural resource management, resource conservation technologies, integrated crop management, integrated farming system, integrated nutrient management, crop diversification, cultivation of high-value crops, protected cultivation practices, varietal replacement, scientific livestock management and health care, scientific aquaculture etc. have been implemented at the selected villages under the study. The most significant fifteen technologies have been enumerated in the table to understand the effect of technology in doubling income of the farmers.

Table: Doubling Farmers' Income Programme undertaken under ICAR- ATARI, Kolkata

Name of State	No. of Villages	Area Covered (Ha)	Total Farmers Involved (Number)		Total Small and Marginal Farmers Involved (Number)		Total Women Farmers Involved (Number)	SHG Involved, if any (Number)	Capacity Building Programme Done (Number)
			Male	Female	Male	Female			
Andaman & Nicobar Islands	6	2	93	132	81	116	132	5	8
Odisha	66	375	821	542	506	330	542	46	119
West Bengal	46	464	1887	1002	1674	974	1002	85	188
Total	**118**	**841**	**2801**	**1676**	**2261**	**1420**	**1676**	**136**	**315**

Table: Technologies enhancing income double or more under ICAR- ATARI, Kolkata

Sl. No.	Technology	Productivity of Agri Produces under Intervention		Income under Intervention	
		Check	Demo	Before	After
1	Cultivation of Submergence tolerant Rice	37.3 q/ ha	39.4 q/ ha	Rs. 20000/ ha	Rs. 50675/ ha
2	Popularisation of Aromatic rice production Var.NuaAcharmati	39.0 q/ha	42.0 q/ha	Rs. 2249/ ha	Rs. 4012/ ha
3	Seed production of Rice (Swarna Sub-1)	42.0 q/ha	58.0 q/ha	Rs. 63000/ ha	Rs. 131660/ ha
4	Popularisation of wilt resistant resistant tomato varieties. Eg. Arka Rakshak and Arka Samrat	265.0 q/ha	460.0 q/ha	Rs. 168000/ ha	Rs. 345000/ ha
5	Varietal replacement of local variety of Elephant foot Yam by Bidhan Kusum	340.0 q/ha	616.0 q/ha	Rs. 284000/ ha	Rs. 492800/ ha
6	Cultivation of improved variety turmeric Suguna	97.0 q/ha	120.0 q/ha	Rs. 119600/ ha	Rs. 246000/ ha
7	Use of zinc and boron for seed productionof onion	5.69 q/ha	6.39q/ha	Rs. 215000/ ha	Rs. 441630/ ha
8	Demonstration on use of homestead with nutritional garden	0.7 q/ 250 mt^2	1.15 q/ 250 mt^2	Rs. 548/ 250 mt^2	Rs. 1100/ 250 mt^2
9	Demonstration on oyster mushroom cultivation	55.0 kg from 60 beds	90.0 kg from 60 beds	Rs. 1400/ 60 beds	Rs. 4200/ 60 beds
10	Rearing of backyard poultry Kadaknath	1.2 kg/ bird	1.13 kg/ bird	Rs. 385/ bird	Rs. 775/ bird
11	Integrated fish–duck–dyke vegetables production technology	Fish: 17.1q/ ha, Duck: 52 no egg/yr, Vegetable: 423q/ha	Fish: 28.2 q/ ha, Duck: 150 no egg/yr, Vegetable: 453q/ha	Rs. 230000/ ha	Rs. 480000/ ha
12	Air breathing fish culture	9.0 q/ha	25.0 q/ha	Rs. 370000/ ha	Rs. 1050000/ ha
13	Shrimp (*Litopenaeus vannamei*) production using bio-phyton technology in semi intensive culture system	6.0q/ha	10.0q/ha	Rs. 105200/ ha	Rs. 205700/ ha
14	Pabda culture in composite fish culture system	25.7 q/ha	30.9 q/ha	Rs. 158775/ ha	Rs. 289500/ ha
15	Composite Fish Farming	7.86 q/ha	16.48 q/ha	Rs. 275100/ ha	Rs. 576800/ ha

Demonstration of Submergence tolerant Rice var. BinaDhan 11 in Balasore, Odisha

Integrated Farming System (Fish–Duck–Dyke Vegetables)in DakshinDinajpur, West Bengal

Demonstration on use of homestead with nutritional gardenin Koraput, Odisha

Shrimp (Litopenaeusvannamei) production in semi intensive culture system in South 24 Parganas, West Bengal

Use of zinc and boron for seed production of onion in Hooghly, West Bengal

Rearing of backyard poultry Kadaknathin Nuapada, Odisha

13.11 National Animal Disease Control Program for FMD and Brucellosis and Artificial Insemination

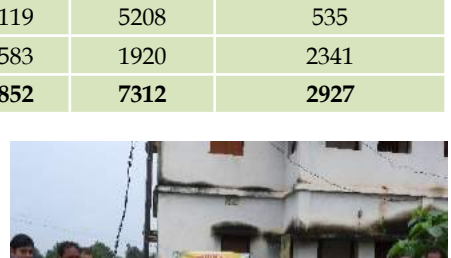
Nodal Scientist : Dr. Avijit Haldar

On the occasion of launch of National Animal Disease Control Programme (NADCP) for FMD and Brucellosis and National Artificial Insemination Programme (NAIP) by Hon'ble Prime Minister on 11-09-2019 in Mathura, Uttara Pradesh, an elaborative programme has been executed to kick start NADCP and NAIP, making India animal diseases free and genetic upgradation of indigenous cows.

Under ICAR-ATARI Kolkata, the same programme was implemented massively in two States namely West Bengal and Odisha and an Union Territory of Andaman & Nicobar Islands on 11-09-2019. The total 57 nos. of Krishi Vigyan Kendras (KVK) participated in this programme. In Odisha, 33 KVKs were involved in this NADCP and NAIP Programmes, while 22 KVKs in West Bengal and 2 KVKs in Andaman & Nicobar Islands participated in this programme. A total of 12 nos. of MPs was there in the programme as a chief guest to encourage the farmers and also discuss the importance of this programme. A total of 21 nos. of MLAs and other dignitaries were also present at different KVKs of this zone.

A total of 7312 nos of stakeholders including 5852 nos. of farmers joined in this programme and took benefits of this programme. A total of 2927 nos. of animals were used for vaccination and artificial insemination (AI) which comprised of 2341 nos. of animal in West Bengal, 535 and 51 nos. of animals in Odisha and Andaman & Nicobar Islands, respectively. In particular, KVKs of Purulia, Nadia (Addl.) under NDRI, Howrah, Malda and Uttar Dinajpur covered 1380, 248, 216, 134 and 123 animals, respectively.

State/ UT	No. of KVKs	No. of MP attended	No. of MLA attended	No. of VIPs attended	No. of officers of Line Department attended	No. of other people attended	No. of farmers attended	Total No of participants	Total no. of animals used for vaccination and AI
A & N Islands	2	-	-	3	12	19	150	184	51
Odisha	33	12	18	50	526	646	4119	5208	535
West Bengal	22	0	3	34	44	252	1583	1920	2341
Total	**57**	**12**	**21**	**87**	**582**	**917**	**5852**	**7312**	**2927**



13.12 Model Organic Farming under Paramparagat Krishi Vikas Yojana (PKVY) for Cluster demonstration

Nodal Scientist: Dr. Avijit Haldar

DAC&FW provided fund of Rs. 13,83,43,000/- for implementation of first year activity under Model Organic Farming- A Sub Scheme under Paramparagat Krishi Vikas Yojana (PKVY) Scheme for 411 clusters (covering 8220 ha area) through 411 KVKs in the country (one cluster of 20 hectare for each KVK) during the year 2019-20 and then subsequent year 2020-21 and 2021-22. The project aims at development of sustainable models of organic farming through a mix of traditional wisdom and modern science to ensure long term soil fertility build up, resource conservation and helps in climate change adaptation and mitigation. A total of 18 KVKs (12 KVKs of Odisha and 6 KVKs of West Bengal) under ICAR-ATARI, Kolkata were selected for the implementation of Model Organic Farming under PKVY Scheme for 18 clusters covering 360 ha (one cluster of 20 hectare for each KVK) in this zone. A total of Rs. 59.40 lakhs (Rs. 3.3 lakh for each KVK) was released to 18 KVKs during the year 2019-20 from ICAR-ATARI, Kolkata and Rs. 43.09364 lakhs (72.54%) was utilized by 18 KVKs. The number of clusters (21) was made more than the target (18) covering 366.7 ha land with the registration of 770 farmers of which 161 women in Odisha and 87 women in West Bengal participated in this programme. A total of 724 small and marginal farmers of Odisha (394) and West Bengal (330) participated in organic farming under the project in 21 clusters. Interestingly, 14 SHGs in Odisha and 11 SHGs in West Bengal were actively involved in this programme. As organic inputs, Farm Yard Manure, Vermi compost, Biofertilizer, Waste decomposer, Azolla, Neem oil, Neem cake, Neem seed kernel extract, Mustard oil cake, Trichoderma viridae, *Pseudomonas fluresence*, Azospirillium, Rhizobium, Extract of Tulsi, Bael leaf, Neem leaf, Kalmegh Leaf, Urine of cows, Pheromone trap with lure, Yellow sticky trap, Light trap with lure were used by the farmers in the clustered area. Rice, millet, mustard, sesame, moong, arhar, vegetables, turmeric etc were produced organically in the clusters. The production and productivity of organically produced agriculture produces in cluster demonstration were recorded higher than the check under PKVY programme.

Table: Cluster demonstration on Model Organic Farming under PKVY

Name of State	No. of KVKs covered	No. of clusters formed	No. of Farmers registered	Area covered (Ha)	No. of LRP identified	Number of clusters linked to certification agency	Number of clusters linked to markets	Training, Farmers meeting and awareness camp organized
Odisha	12	14	438	240	14	10	7	74
West Bengal	6	7	332	126.70	6	7	6	70
Total	**18**	**21**	**770**	**366.7**	**20**	**17**	**13**	**144**




13.13 Mera Gaon Mera Gaurav (MGMG)

Nodal scientist: Dr P.P. Pal

Hon'ble Prime Minister of India had launched this program in 2015 in order to strengthen the bond between scientific development and their implementing section of the nation, especially in the field of agricultural production. It is an innovative initiative planned to promote the direct interface of scientists with the farmers to hasten the lab to land

process. The objective of this scheme is to provide farmers with required information, knowledge and advisories on regular basis by adopting villages. The participation of small and marginal farmers in Indian agriculture is very important. Small farmers put forth their desire on various forums to have timely information on investment in agriculture, loans, availability of other basic amenities, market rates, extension activities and facilities provided by different agencies, new research findings and technologies, etc. Presently, various agencies are working in agriculture and farmers are keen to know about the services provided by them. The technologies developed and refined by research institutes, agricultural universities, private and other organizations are accepted and adopted to various extents by farming community. Therefore, the awareness among farmers about the organizations and their programmes need to be created on regular basis.

Under this scheme, scientists have selected villages as per their convenience and remain in touch with the selected villages. They provided information to the farmers on technical and other related aspects in a timely manner through personal visits or on telephonic and/or WhatsApp communication. Being a resource person for the village the scientist also monitors the process of adaptation of agricultural technologies by the farmers. The scientist took initiative to make use of community radio, local newspaper, mobile messages, video, exhibition and local media and make initiatives to have dialog with the farmers. The cooperation of KVKs, ATMA etc. is effective in demonstration of technologies to the farmers.

Besides providing information to farmers on market rates, market trends, the information on various agricultural organizations are also given so that the farmers can contact these organizations for finding solutions to their problems. Scientists have also created awareness among farmers about climate resilient agriculture, other customized services, protective measures and other issues of local and national importance. In this process of social transformation, scientists involved local Panchayats, development agencies, NGOs and private organizations. In addition, scientists encourage the ideology of good agricultural techniques for producing good quality agricultural products.

Scientists are provided with minimum necessary facilities by their organizations for travelling and conduct of the programmes. Under MGMG programme 15 ICAR institutes and 1 SAU are promoting direct interface of scientists with the farmers to faster the proces, of lab to land technology dissemination. For this purposes a total of 86 groups are formed. Altogether 372 scientists are involved in this programme and 385 villages were covered for strengthening interface with farmers. ICAR-ATARI, Kolkata as the Nodal Institute of this zone coordinates with the implementing institutes and SAU to get regular report of their activities for its timely submission to appropriate authority. The details of activities undertaken during 2019 under MGMG programme are given below.

Table: Activities undertaken under MGMG in 2019

2) State	3) Total No of Groups/team formed	4) No. of Scientists Involved	5) No. of villages covered	6) No. of field activities conducted	7) No. of messages/ advisory sent	8) Farmers benefited (No.)
9) West Bengal	10) 44	11) 196	12) 262	13) 354	14) 323	15) 20212
16) Odisha	17) 29	18) 120	19) 68	20) 175	21) 102	22) 7002
23) A&N Islands	24) 13	25) 56	26) 55	27) 112	28) 326	29) 5140
30) Total	31) 86	32) 372	33) 385	34) 641	35) 751	36)32354

13.14 CSISA-ICAR Collaboration Project Phase-III

Nodal Officer : Dr. S K Roy

The collaborative project of Cereal System Initiative for South Asia (CSISA) and Indian Council of Agricultural Research (ICAR) was first approved in December 2008 and it was subsequently approved as phase II in 2012-15 with close collaboration of Extension Division. Now the project is being implemented in Cuttack, Bhadrak and Mayurbhaj-I in Odisha in 2019-20.

(a) **Main project:** KVKs of Bhadrak , Cuttack and Mayurbhaj-I conducted field train in Kharif and rabi. The trials are 1) Comparing the performance of different crop establishment methods in low land ecology 2) Finding out suitable integrated weed management option in direct seeded rice in kharif. In rabi, the trials on 1) Performance of rabi crops in sequence with rice for comparing productivity and economics under irrigated ecology 2) Optimization of sowing time of summer greengram in rice-greengram cropping system under irrigated condition 3) Optimization of planting method and cultural operation in sunflower 4) Performance of sunflower as influenced by time of planting in coastal irrigated situation were conducted. KVKs Completed experiment and data analysis is going on

(b) **Landscape Diagnostic survey and Crop cut survey :** Under the landscape survey Open data Kit (ODK) was used by the KVK for collection of data. In this method, 30 villages are selected and 7 farmers are randomly selected from each villages, thus surveyed 210 farmers from each KVK. All data were stored as per GPS location online in CSISA site. The survey work observed following points :

1. Household economic and market information
2. Land holding characteristics
3. Site characteristics and crop establishment
4. Fertility management
5. Irrigation management
6. Production constraints
7. Weed control
8. Harvesting data -method & production
9. Actual field location by GPS

Crop cut survey has been conducted in 40 farmers' fields from 20 villages against a target of 42 plots from 21 villages.

Survey indicated that following practices are being followed:

- Farmers mostly follow manual transplanting method for rice crop establishment.
- Transplanting schedule of 9 to 23 July was found optimum resulting into higher grain yield of 4.63 t ha^{-1} compared to 24 June to 8 July (3.90 t ha-1) , 24 July to 7 August (3.47 tha-1) and 8 to 21 August (4.26 t ha-1).
- Young age rice seedlings recorded higher yields ie-4.78 t ha-1 with 17-23 days and 4.53 t ha-1 with 24-30 days older seedling. As the age of seedlings increased > 30 days, yield decreased drastically (2.98 t ha-1 for 31-44 days) and lowest yield of 2.51 t ha-1 recorded with 45-51 days old seedlings.
- Hand weeding at 50 DAT is mostly practiced for weed management in rice.
- Most of the farmers use their own seeds for sowing in the next year.
- In Rabi, farmers used to do extensive pulses cultivation. Still, 23 per cent of farmers are leaving their field as fallow during Rabi season in Jagatsinghpur, Odisha.
- Old varieties like MTU 7029 (long duration Variety) used by more than 60 percent of Farmer in our purulia district .
- It is found during this survey that more than 85% farmers in Purulia district are practicing transplanting whereas rest portion of farmers do broadcasting for rice establishment during *Kharif.*

Table: Status of landscape survey / production survey in KVKs

Sl No	Odisha	Status	Fund allocation in 2019-20 (Rs)	Sl No	West Bengal	Status	Fund allocation in 2019-20 (Rs)
1	Khorda	Completed in 2018-19		1	Hoogly	Completed in 2018-19	
2	Cuttack	Completed in 2018-19	342696	2	Cooch Behar	Completed in 2018-19	

Sl No	Odisha	Status	Fund allocation in 2019-20 (Rs)	Sl No	West Bengal	Status	Fund allocation in 2019-20 (Rs)
3	Mayurbhanj I	Completed in 2018-19	**60161**	3	W,Midnapore	Completed in 2018-19	
4	Keonjhar	Completed in 2019-20	**70000**	4	Uttar Dinajpur	Completed in 2019-20	
5	Jagatsinghpur	Completed in 2019		5	Malada	Completed in 2019-20	
6	Balasore	Completed in 2019		6	Burdwan	Completed in 2019-20	
7	Nuapada	Completed in 2019		7	Murshidabad	Completed in 2019-20	
8	Puri	Completed in 2019		8	Howrah	Completed in 2019-20	
9	Nayagarh	Completed in 2019		9	South 24 Pgs (Add)	Completed in 2019-20	100000
10	Jajpur	Completed in 2019		10	North 24 Pgs (Add)	Completed in 2019-20	
11	Bhadrak	Completed in 2019	**216903**	11	Nadia	Completed in 2019-20	**130000**
				12.	Purulia	Completed in 2019-20	**130000**




13.15 New Extension Methodologies and Approaches (NEMA)

Nodal scientist: Dr P.P. Pal

As per the foundational objectives of ATARIs, Division of Agricultural Extension, ICAR has conceptualized and involved the ATARIs in a purely academic research based project. This is one of the largest pan India based prestigious extension projects entitled NEMA or commonly called network project. ICAR-ATARI Kolkata is one of the stakeholders of this project along with 10 other ATARIs and 7 technology institutes distributed all over India. In this project, the prime objective for the 2019 was to assess the impact of the selected agricultural technologies developed by 7 ICAR institutes through existing extension methodologies and approaches. ICAR-ATARI Kolkata was assigned to collaborate with ICAR-CIFA and ICAR-IARI for collection of data to assess the impact of their technologies in this zone. ICAR-CIFA selected their technology composite carp culture and IARI selected a wheat variety HD 2967 for this purpose. The horizontal spread of the technologies was first assessed, and following specific sampling design the sampling locations were selected. For composite carp culture district of 24 Pgs (S), 24 Pgs (N), Mursidabad from West Bengal and Dhenkanal, Jagatsinghpur, Balasore from Odisha were selected for data collection. Nearly 600 farmers were planned to be surveyed from these sampling location. About 400 farmers were surveyed till now and the remaining 200 are being surveyed currently. On the other hand, for wheat variety HD 2976 Mursidabad district has been identified and the farmers will be surveyed in this year. With help of the KVKs all the surveys are being conducted. The primary data is being collected through face to face interview with utmost care. After tabulation of the data they are being sent to the technology partner for impact assessment calculations. A specialized training- cum-workshop was organized to conduct the surveys properly, design the experiments without introducing any bias and to finalize effective methods for impact assessment for this newly introduced academic project. In this 7-day workshop, Principal Investigators and Co-Principal Investigators and Senior Research Fellows took part. Different eminent economists and survey experts from IARI, IFPRI,

Tata-Cornell Institute and other ICAR institutes came to discuss different methodologies. The survey schedule of the technologies was also finalized in this workshop. A total of Rs.5 lakh was received and most of the fund was utilized in travel, data enumerator hiring and other miscellaneous expenses.

14.0 Success stories

Enterprise 1: Large scale adoption of mushroom cultivation improves nutritional security and transforms rural lives into economic empowerment

Source: KVK, Uttar Dinajpur, West Bengal

Mushroom cultivation is an emerging agri-business venture for creating employment and income generation opportunities, particularly upliftment of the status of women through earning additional income in India (Manju et al., 2012). Thus, the tribal women show the way of attaining socio-economic empowerment through mushroom cultivation in Uttar Dinajpur district of West Bengal. The tribal population of India constitutes 8.6% of total population of the country and majority (90%) of them resides in the remote and disadvantageous areas. In tribal communities, the role of women is substantial and crucial. Low levels of economic activity and living conditions below the poverty level are major problems faced by the tribal women. A practical way of dealing such problems is to develop skills on particular aspect for building up capacity and engagement in business. Weather of North Bengal is very much suitable for growing different types of mushrooms. Keeping in view, KVK Uttar Dinajpur has initiated providing vocational training on cultivation of oyster mushroom to 30 ST women each year since 2015-16, as a part of Tribal Sub Plan programme, for motivating them to adopt mushroom cultivation as an income generating activity. Since then 90 ST women of different villages belonging to SHGs have been trained. The training and demonstration cover many aspects related to straw sterilization, spawning, crop management practices, harvesting, packaging and marketing of oyster mushrooms. With technical and initial input support from KVK, 35% of trained women have adopted mushroom cultivation in successive years in their house backyard or in their home itself or in a locally available bamboo made thatched hut and earned a handsome amount of profit from it. The average cost of cultivation is recorded to be Rs. 22/ bag, while the sale price of mushroom in the local market varies from Rs. 60 to 90/ kg. Table shows that the main motive of mushroom growers is to learn the skill (82.2%) followed by economic independence (80%). Other motives to grow mushroomsare to take advantage of government schemes (68.9%), to get loans (58%), and recognition in family and society (54.4%). Mushroom cultivation has become boon for resource poor tribal farm families of Uttar Dinajpur district. Mrs. Shushila Tudu, one of the trained tribal woman, before adopting this cultivation was a tea garden labour. With her dedication and institutional

technical support, she is now earning monthly profit of Rs.12000- 15000/-. Mrs. Shushila Tudu shows the way of uplifting social and economic status. Thus, she became the winner of Mahindra Samridhi National Award in 2018.

Table: Motivation criteria for mushroom cultivation

Sl. No.	Reasons	Frequency	Percentage*
1.	To become economically independent	72	80.0
2.	For recognition in family and society	49	54.4
3.	To learn the skill	74	82.2
4.	For better future	52	57.8
5.	To take advantage of government initiatives	62	68.9
6.	To get loans	53	58.9

*Multiple responses N=90

A tribal woman is observing her mushroom unit

12Mrs.ShushilaTuduisreceiving Mahindra Samridhi National Award in 2018

Enterprise 2: Beekeeping- An income generating enterprise for smallholder farmers

Source: KVK, North 24 Parganas, West Bengal

A case study was made on three categories of bee keepers on the basis of number of colonies in North 24 Parganas district of West Bengal. KVK, North 24 Parganas, Ashokenagar conducted total seven numbers of training courses on beekeeping enterprise to train 120 rural youth and farmers from 10 different blocks of the district during the years 2016-19. Out of these 120 trainees, 25 continuous adopters of bee-keeping were selected randomly for the present study. Three categories of these selected bee keepers were prepared onthe basis of number of colonies, *i.e.* 10-50 colonies (small scale enterprise, n= 12), 51-100 colonies (medium scale enterprise, n= 7) and more than 100 colonies (large scale enterprise, n= 6). The majority (61.67 %) of bee keepers continued farming as major occupation along with beekeeping followed by only beekeeping (20.83%) and service +beekeeping (17.50%). Insufficient income from agriculture/ service as well as unemployment might be the cause for adopting beekeeping. Major expenditure was involved on the purchase of bee boxes, colonies, honey extracting machine, gloves, veil and other tools. Beekeepers got income from sale of honey, wax and pollen. Table shows that small scale bee keepers having average 28.75 colonies and medium scale bee keepers having average 83.57 colonies can fetch annual average net return of Rs. 52,163.33 and Rs. 1,50,157.14, respectively, while large scale beekee ping entrepreneurs with average 187.5 colonies can achieve annual average net return

of Rs. 2,75,525.00. The present study indicates that the net return of bee keepers increases with the increase in the number of colonies. Thus, beekeeping may be a highly profitable and sustainable agri-based enterprise for self-employment of the rural youth. The growing market potential for honey and its products has resulted emerging of bee keeping as an economically viable and socially acceptable agro-based enterprise, particularly for socio economic development of landless, small and marginal farmers as well as unemployed rural youth (Kumari and Laxmikant, 2015). Apiculture not only produces honey, but also enhances the productivity of agriculture sector, provides subsidiary income and reduces poverty (Heckle et al., 2018).

Table: Average net return per year for beekeepers under different categories

Respondents	Average Number of Colonies	Average Honey Production (kg/ colony)	Average Sell Rate (Rs/kg)	Average Gross Cost (Rs)	Average Gross Return (Rs)	Average Net Return (Rs)
Smallscale enterprise (n= 12)	28.75	31.50	94.08	32958.33	85121.67	52163.33
Medium scale enterprise (n= 7)	83.57	34.14	86.71	96107.14	246264.29	150157.14
Large scaleenterprise (n= 6)	187.50	35.17	73.83	215625.00	491150.00	275525.00

A rural youth is showing his bee hives

The rural youths are engaged with beekeeping activities

Source: KVK, Deogarh, Odisha

Aquaculture serves an important role in both income generation and family nutrition in many resource poor farm families of Eastern India (Ahmed, 2010). However, this small scale aquaculture needs some attentions on improved scientific management of pond, availability of quality fish fingerlings, improved practices of fish stocking rate and feeding, fish disease management and innovation in fish culture, if any. Hence, many KVKs in different districts of Eastern India are working in the line of implementing some interventions for augmenting both fish production and family income. The present study was carried out in a tribal dominated Village-Khilei, Block-Reamal of Deogarh district, Odisha in a small farm of Sri Debendra Dhal who has two small ponds covering a total area of 1 acre out of 3 acres of land. Sri Debendra Dhal himself and his family members are engaged in the farm. Before coming in contact with KVK, Deogarh in 2017, Sri Debendra Dhal did not have an idea of scientific method of fish farming and thus huge opportunity of earning money from his ponds. He took training on scientific aquaculture. Then, he removed water hyacinths from two ponds and undertook some soil reclamation measures in ponds by applying lime and fertiliser. Thereafter, he started to stock mono-sexed tilapia,

rohu, mrigal, carp, catla, chital and fresh water prawn in various seasons during the last 3 years. As feeds, he used floating feed, oil cakes of groundnut and mustard alongwith rice bran. Since weed fishes compete for feeds with cultured fish species which result in poor growth and low production of target species and thus economic loss, Sri Dhal eradicates weed fish species time to time by catching with hand net. He catches cultured fishes by seine net in several times and sells in the local market. Sri.Debendra Dhal is happy with his earning (Table) from aquaculture with a net income of Rs 4,46,700.00 from 1 acre of pond during 3 years period. The aquaculture success of Sri.Debendra Dhal is a beacon light for many farmers of Deogarh district. Sri Dhal is now master trainer for aquaculture in Deogarh district. Aquaculture has already been started in community ponds through SHGs, particularly women SHG members for earning income in the villages of Deogarh district.

Table: Recurring cost of aquaculture of Sri Debendra Dhal's pond

Item	First year (Rs.)	Second year (Rs.)	Third year (Rs.)
Fingerlings	22500.00	24000.00	31000.00
Feed	55500.00	65000.00	72000.00
Lime	7500.00	8600.00	9400.00
Fertiliser	6000.00	7500.00	8200.00
Medicine	2100.00	2250.00	2450.00
Labour	15500.00	16600.00	17800.00
Renovation	22000.00	24000.00	26800.00
Total	131100.00	147950.00	167650.00

Table: Income of Sri Debendra Dhal from two ponds during 3 years period

Item	First year (Rs.)	Second year (Rs.)	Third year (Rs.)
Fish sold (Kg)	3212	4224	4267
Gross income(Rs)	289080.00	337920.00	341360.00
Recurring cost (Rs.)	131100.00	147950.00	167650.00
Net income (Rs.)	157980.00	189968.00	173710.00

Scientific aquaculture by Sri Debendra Dhal

Harvested fishes of Sri Debendra Dhal's pond

Source: KVK, Narendrapur, South 24 Parganas, West Bengal

Ornamental fish farming has come up as an alternative livelihood option in a big way in smallholder farming system in South 24 Parganas district of West Bengal. More than 2000 people are engaged in ornamental fish culture in West Bengal. While India contributes only about less than 1% of the total global ornamental fish trade (Rs.2574.88 crores in 2016), 90% of the total export of ornamental fish occurs from Kolkata (Raja et al., 2019). Farmers from the districts in and around Kolkata like South 24 Parganas, North 24 Parganas, Howrah, Hooghly and Nadia are engaged in this culture for their livelihood. Of late around 300 farmers and farm women attached to different self-help groups (SHGs) are engaged in ornamental fish culture in South 24 Parganas district of West Bengal, because of its growing demand both in urban and rural folks. It provides not only aesthetic pleasure, but also financial openings.Sasya Shyamala Women Fish Farmers Group is one SHG group who are engaged in ornamental fish farming since 2015, after taking training from Sasya Shyamala KVK of South 24 Parganas, in the village Dakshin Raipur of Budgebudge II Block of South 24 Parganas district in West Bengal. The SHG members have developed 15 small size units each having an annual capacity of producing 1 lakh fingerlings and five medium size units each having an annual production capacity of 1.5 lakh fingerlings of different species of ornamental fishes. The total annual turnover of all the units comes to Rs. 45.00 lakhs. They are now supplying quality juvenile fishes to the new growers. Thus, Dakshin Raipur is now an ornamental fish hub in South 24 Parganas district.

Mrs. Mira Patra, a member of SHG is showing infrastructures for breeding and rearing of ornamental fishes

Gold fish quality juvelniles ready for supplying to the growers

Enterprise 5: Kadaknath poultry birds- Smallholder farmers show the way of doubling income in Odisha

Source: KVK, Ganjam, Odisha

Rural backyard poultry production plays a vital role in providing livelihood security and securing the availability of animal protein to the rural family (Padhi, 2016). Backyard poultry, one of the age old practices, is promising enterprise to improve the socio-economic status of farmers in rural areas with low-cost initial investment and high economic return alongwith guarantee for improving protein deficiency among the poor (Singh et al., 2018). The overall progress of backyard poultry farming is limited due to slow growth rate, poor laying capacity, high seasonal mortality and sub optimal management (Rawat et al.,2016). A farmer named Sri Jitu Nahak came forward to rear 100 numbers of Kadaknath birds for the first time under the technical guidance of KVK, Ganjam in the Sindhi nuagan village of Aska block in Ganjam district of Odisha. Kadaknath is an indigenous breed of Chabua in Madhypradesh (Thakur et al., 2006). The Kadaknath birds showed higher ($P<0.05$) degree of growth rate as compared to desi birds with higher returns

and thus offered entrepreneurship opportunities. At 180 days, mean body weight of Kadaknath bird (1227.11±2.416 g) was higher (P<0.05) than the desi birds (807.614±2.033 g). Overall mortality (19%) of Kadaknath birds was lower (P<0.05) as compared to the desi birds (30%). Kadaknath birds have good laying capacity in the climatic condition of Odisha (Jena et al., 2018). Kadaknath meat could have beneficial effects to increase blood cells and haemoglobin (Thalkar, 2019).

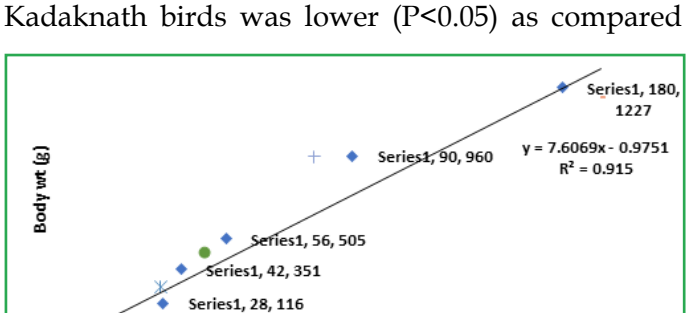


Figure 1: Body weight of Kadaknath birds in Ganjam of Odisha (X- axis: Age, Y-axis: Body weight)

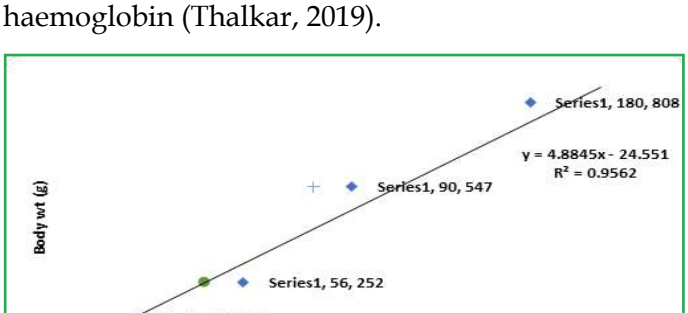
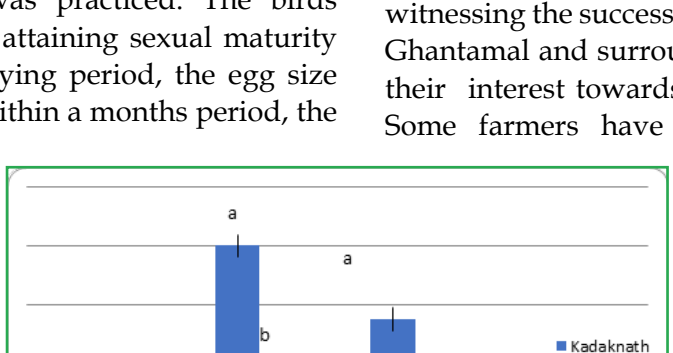


Figure 2: Body weight of Desi birds in Ganjam of Odisha (X- axis: Age, Y-axis: Body weight)

Source: KVK, Jharsuguda, Odisha

In 2018, KVK, Jharsuguda planned to test the performance of Kadaknath birds and its socio-economic impact on smallholder backyard poultry farmers in Ghantamal village of Jharsuguda district of Odisha. The backyard poultry farmers of Ghantamal were imparted with training on scientific poultry production, supplementary feeding, health management and marketing. Thereafter, each farmer's family was provided with 15 nos. of 21 days old Kadaknath birds. The birds were allowed to free range during the dayand confined in a small shed during the night. A handful of grain (broken rice) was given as feed supplement. Lately, cultivation and feeding of azolla was practiced. The birds started laying eggs upon attaining sexual maturity by 130 days. At initial laying period, the egg size was small (40-45 g), but within a months period, the eggs attained marketable size (55-58 g). The female and male birds attained average body weights of 1.8 kg and 2.2 kg respectively at 4 months of age which are higher (P<0.05) than that of desi birds at same age. The annual egg production (average 80 eggs per bird) was higher (P<0.05) than that of desi birds. Both the gross profit and net profit from Kadakak nath birds were found to be significantly higher (P<0.05) compared to those calculated from desi birds. A farmer, Shri. Susant Kumar Naik reported that his family members successfully utilised their leisure time for generating lucrative income with minimum expenditure. They sold birds @ Rs.500/kg live body weight and eggs @ Rs.10/egg. From 15 Kadaknath birds, he was able to earn Rs 12,000/- in a year. He further reported that daily food cost of his 5-member family was Rs 320 /-. So, the net income from the backyard rearing of 15 Kadaknath birds was sufficient to meet the food expenses of the entire family for 37.5 days. After witnessing the success of the family, other farmers of Ghantamal and surrounding villages have shown their interest towards rearing of Kadaknath birds. Some farmers have purchased fertileKadaknath eggs from Sri Susanta Kumar Naik and produced chicks by incubating with the help of their local hens. In recent times, many KVKs of Odisha situated in the districts of Jharsuguda, Angul, Ganjam, Sonepur, Keonjhar etc. are promoting Kadaknath poultry birds under backyard system.



The graph showing the benefit cost analysis of Kadaknath birds in backyard system of rearing

Kadaknath birds along with azolla cultivation in the backyard of Shri. Susanta Kumar Naik in Jharsugda district of Odisha

Rearing of Kadaknath birds by the farm women in Angul district of Odisha

15.0 Publication

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16.0 HRD

WORKSHOP/MEETING/TRAINING DURING 2019-20

Particulars	No. of participants
Quinquennial Review Team (QRT) Meeting	30
Short Term Training Course on Preparation & dissemination of Agromet Advisories at Block level under Gramin Krishi Mausam Seva (GKMS)	34
KVKs Review Meeting/Workshop on ARYA	47
Quinquennial Review Team (QRT) Meeting summing up and finalization of report	34
13th meeting of Institute Management Committee	11

17.0 Quinquennial Review Team for ICAR-ATARI and Patna for the period of 2011-12 to 2018-19

The ICAR has set up a very unique system of Quinquennial Review Teams with Members having vast knowledge of the research and technology transfer system in the country. The Team is expected to assess the quality of the demonstrations conducted, efforts made for transfer of technology, evaluate innovative extension methodology, examine existing manpower in KVKs and suggest roadmap along with changes in structure and organizational aspects to strengthen the KVK. The Quinquennial Review Team (QRT) for the KVKs of two ICAR-ATARIs of Kolkata and Patna spread over 4 states and 1 U.T. (West Bengal, Odisha, A&N Islands of ICAR-ATARI Kolkata, Bihar and Jharkhand of ICAR-ATARI Patna

not only reviewed the programme/activities of 127 KVKs (59 of Kolkata and 68 of Patna) but also dedicatedly assessed the impact of the selected KVKs through field visits, interactions with all stakeholders and by travel workshops, listening and witnessing the presentations of all KVKs by its Heads, depicting their achievements.

Composition of QRT

The Secretary, DARE and DG, ICAR vide F. No. A. Extn. 9/19/2019-AE-II dated 19.06.2019 and F. No. A. Extn. 9/19/2019-AE-II dated 25.11.2019 (Annexure I) constituted the present QRT for ATARI Kolkata and ATARI Patna under the Chairmanship of Dr. R. K. Samanta with the following composition:

Name	Designation	Chair/Member
Dr. R. K. Samanta	Former Vice Chancellor, BCKV, Mohanpur, West Bengal	Chairman
Dr. R. Parshad	Former Assistant Director General, Agril. Extension, ICAR	Member
Prof. C. Satapathy	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. F. H. Rahman	Principal Scientist, ICAR-ATARI, Kolkata	Member Secretary

Terms of reference of 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, 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.

***Modus operandi* of present QRT**

Consequent upon a meeting with DDG (Agril. Extension) and ADGs at ICAR headquarter, work presented by Directors ATARI, Director of Extension Education, Head of KVKs, visit of KVKs, interaction with farmers and different stakeholders were reviewed by team. The recommendation of earlier QRT was also reviewed to have an insight into evaluation of KVK activities carried out earlier so as to evaluate the progress and prepare recommendation. Travel workshop was organized between July 2019 to January 2020.

The QRT followed a defined structure for each travel workshop as stated below:

- Presentation by Director ATARI, Director of Extension Education and Heads of each KVKs.
- Presentation of KVK visited during workshop.
- Interaction with Heads of KVKs, heads of host organizations of KVKs, line departments, officials, FPO members, lead bank officials, farmers/ entrepreneurs and others.
- Project Director, ATMA of KVK districts, NABARD officials have also participated.
- State Directors, SAMETI have provided their inputs at University headquarter.
- Meeting was held with Vice-Chancellors of SAUs, Directors, ICAR organizations and Heads of NGO

KVKs during travel workshop.

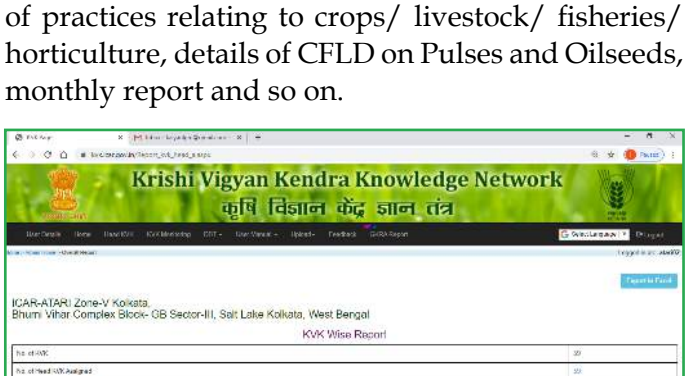
- The QRT also visited demonstration plots, farmers' field, SHG centres, farmers club and infrastructure of KVKs.

The Review Process

- The review process of the QRT started on 19.07.19 with an inaugural meeting at ICAR-ATARI Kolkata where Directors of both the ATARIs, i.e., ATARI Kolkata and ATARI Patna were present along with the Directors of Extension Education of BCKV, Mohanpur; UBKV, Coochbehar; WBUAFS, Kolkata from West Bengal, Dean Extension, OUAT from Odisha, Directors of Extension Education from BAU, Sabour and RPCAU, Pusa from Bihar and Directors of Extension Education of BAU, Ranchi from Jharkhand and all the scientists of ATARI Kolkata. In the meeting, Directors of both the ATARIs presented an overview of their respective ATARI's while all DEEs briefed the QRT about the KVKs and their working under their respective control.
- It was decided that the QRT will review the KVKs host institution wise and subsequently, Member Secretary, QRT finalized the visit schedule with concurrence of the Chairman and Members of QRT. Besides, the format for the report to be submitted was also blue printed.
- It was decided that KVKs under ATARI Kolkata will be visited first followed by those under ATARI Patna. Afterwards, host institution wise list of selected KVKs were finalized in consultation with the Directors of ATARIs and DEEs.
- QRT emphasized that the KVKs to be visited must ensure the presence of various stakeholders related to agriculture and allied aspects in the District, *viz.*, Line department and ATMA officials, NABARD, entrepreneurs, lead farmers and notable NGO personnel, FPOs, press/media to take part in interaction and suggest means for betterment of KVK functioning and more meaningful convergence among the KVK and the stakeholder towards the end of improvement of agricultural scenario of the district.
- After rigorous travelling, starting from August, 2019, and scrupulous scrutiny the review of the KVKs of the Zones concluded in January, 2020.
- Finally, the ATARIs were reviewed in the finalization workshop for the review exercise organized at ATARI, Kolkata with presence of all concerned. A Final Report with 17 recommendations based on the critical observations during the visit and interaction made by the QRT was prepared and submitted the ICAR Head Quarters, New Delhi.

18.0 KVK Portal

The Krishi Vigyan Kendra (KVK) has become a main centre of knowledge and resource in the field of agriculture and allied sectors at the district level. Most of the KVKs are situated in the rural part of the districts. Therefore, farmers faced problems to get information from the KVKs. To bridge the communication gap between KVKs and farmers, Government of India launched Krishi Vigyan Kendra (KVK) Portal (*http://kvk.icar.gov.in*) during 2016. This is also called *Krishi Vigyan Kendra Knowledge Network*. The main objectives are- a) to access information related to KVKs by the farmers and other stake-holders from one place at the National Level, b) to review and monitor the functioning of KVKs against the mandates and objectives, and c) to provide the information and advisory to the farmers. The features of the Portal include reporting of major events on regular basis and submission of monthly reports online, supplying information on different services being provided by KVKs, delivering weather and market related information, upcoming events of KVKs which will benefit farmers and rural youths in joining different training programmes being organized by KVKs, agriculture related information of the districts and the facility to register farmers and the Agricultural Officers to get various agriculture related information. During the period 2019, ICAR-ATARI Kolkata monitored 59 KVKs i.e. 3 of Andaman & Nicobar Islands, 33 of Odisha and 23 of West Bengal for uploading various information by the KVKs. All the KVKs under ATARI Kolkata uploaded information on facility details available at the KVKs, past and upcoming events, package of practices relating to crops/ livestock/ fisheries/ horticulture, details of CFLD on Pulses and Oilseeds, monthly report and so on.



19.0 Krishi Kalyan Abhiyan (KKA), Phase-III programme

The '*Rastriya Gokul Mission*' was launched during December, 2014 for developing and conserving indigenous breeds through selective breeding especially for genetic upgradation of more than 11 crore low milk non-descript bovine population. The progress of artificial insemination (AI) coverage of indigenous bovines was very slow. By that time, Krishi Kalyan Abhiyan I and II programmes were successfully implemented. Considering the success, Department of Animal Husbandry, Dairying and Fisheries, GoI in collaboration with Indian Council of Agricultural Research (ICAR) decided to extend the implementation of genetic upgradation programme through High Yielding Indigenous Breed (HY-IB) bovine semen and delivery of quality AI services in 8971 Indian villages among 112 aspirational districts from 15.01.2019 to 15.04.2019. It was decided that the number of AI which was scheduled for one year would be covered in 2-3 months. The following objectives were met out with the extended Krishi Kalyan Abhiyan programme-

- Providing doorstep reliable AI delivery system in Aspirational Districts
- Adoption of AI technology by large number of farmers
- Birth of genetically superior male and females of indigenous breeds
- Increase in milk production
- Increase in Farmers income

State Livestock Development Boards, State Animal Husbandry Departments, State Milk Federations and Reputed NGOs like BAIF and S K Trust were the main implementing agencies of the programme. At state level, the scheme was monitored by State Animal Husbandry Department and other players engaged in cattle and buffalo development. At district level, District Animal Husbandry Officer (DAHO) was given the responsibility to send daily AI report to the Senior Scientist and Head of KVKs for uploading in KVK Portal. Under ICAR-ATARI Kolkata, out of total 112 aspirational districts of India, 10 districts from Odisha state were covered under this programme. The brief achievements in terms of AI done for different Aspirational Districts are given in the following table.

Sl. No.	*Name of district*	*No. of villages covered*	*No. of AI done*
1	Bolangir	75	91
2	Dhenkanal	75	858
3	Gajapati	75	198
4	Kalahandi	75	2390
5	Kandhamal	75	816
6	Koraput	75	2073
7	Malkangiri	75	197
8	Nabarangpur	65	557
9	Nuapada	75	723
10	Rayagada	76	288
Total		***741***	***8191***

20.0 Training and Capacity Building

The exercise of Training Need Assessment (TNA) and preparation of Annual Training Plan (ATP) for all categories of employees were initiated in the year 2015-16. In continuation, ICAR-ATARI, Kolkata has performed TNA and prepared ATP for the year 2019-20. For a continuous Human Resource Development (HRD) in the institute, such plans became instrumental and category-wise trainings have also been planned and implemented. The completed trainings have successfully been uploaded in ERP system by individual employees. During the year 2019, out of 14 employees of the institute 3 persons were planned to be trained as per their identified skill deficiency areas like e-office implementation, Public Finance Management System (PFMS), Goods and Services Tax (GST) and MIS-FMS operating procedures etc.

Table: Details of employees undergone training during 2019

Category	Total employees (No.)	Employees undergone training (No.)	% employees undergone training as per ATP	% Utilization of allotted budget
Scientists	6	0	0	0
Technical	1	0	0	0
Administrative staff	6	1	33.33	100
SSS	1	0	0	0
Total	14	1	33.33	100

21.0 "हिन्दी पखवाड़ा. 2019" समारोह का आयोजन

डॉ. श्यामल कुमार मंडल

भा.कृ.अनु.प.–कृषि तकनीकी अनुप्रयोग संस्थान, कोलकाता में दिनांक 09.09.2019 से दिनांक 23.09.2019 तक "हिन्दी पखवाड़ा–2019" का समापन समारोह का आयोजन किया गया। इनमें संस्थान के सभी अधिकारी एवं कर्मचारी भाग लिया। संस्थान में 23.09.2019 को "हिन्दी पखवाड़ा–2019" का समापन समारोह आयोजित की गयी। इस समापन समारोह की अध्यक्षता संस्थान के निदेशक महोदय डॉ. एस.एस. सिंह ने की।

पखवाड़ा का समापन समारोह का शुभारंभ डॉ. एस. के. मंडल, प्रधान वैज्ञानिक के स्वागत भाषण एवं मुख्य अतिथि के परिचय से हुआ। तत्पश्चात डॉ. मंडल ने संस्थान में राजभाषा कार्यान्वयन की प्रगति प्रतिवेदन प्रस्तुत की। इस प्रतिवेदन में संस्थान से प्रकाशित हो रहे वार्षिक वैज्ञानिक पत्रिका "कृषि– पूर्वी किरण" का रद होना, हिन्दी में पत्राचार एवं सभी हिन्दी पत्रों में हिन्दी टिप्पणी देना इत्यादि के उल्लेख किए गए।

हिन्दी पखवाड़े के दौरान आयोजित हिन्दी काव्य पाठ प्रतियोगिता, हिन्दी अनुवाद प्रतियोगिता; तत्कालिकद्ध एवं हिन्दी टिप्पणी प्रतियोगिता; समूह मेंद्ध के विजेताओं को मुख्य अतिथि डॉ. एस. के. झा, प्रधान वैज्ञानिक, क्राईजाफ, वाराकपुर द्वारा पुरस्कार वितरित किए गए।

पखवाड़े के समापन समारोह के मुख्य अतिथि डॉ. एस. के. झा, प्रधान वैज्ञानिक, क्राईजाफ, वाराकपुर ने अपने संबोधन में संस्थान के सभी अधिकारी एवं कर्मचारी के प्रशंसा करते हुए हिन्दी को और तेजीसे बढ़ावा देने पर जोर दिए एवं सूचना प्रौद्योगिकी के सफल प्रयोग के साथ हिन्दी के प्रगति पर अपने विचार रखें। डा. के. एस. दास, प्रधान वैज्ञानिक के धन्यवाद ज्ञापन के उपरांत समारोह समाप्त हुया।



22.0 Personnel

Staff position of ICAR-ATARI Kolkata as on 31.12.2019 has been presented in the table below:

Sl. No.	Name	Designation
1	Dr. S.S. Singh	Director
2	Dr. S.K. Roy	Principal Scientist & Acting Director
3	Dr. P.P. Pal	Principal Scientist
4	Dr. S.K. Mondal	Principal Scientist
5	Dr. F.H. Rahman	Principal Scientist
6	Dr. K.S. Das	Principal Scientist
7	Dr. A. Haldar	Principal Scientist
8	Shri D. Debnath	Driver (T-2)
9	Shri B.D. Mallick	Asstt. Finance & Accounts Officer (upto 02.08.2019)
10	Shri S. Mukherjee	Junior Accounts Officer
11	Shri Prabhu Kumar	Asstt. Administrative Officer (upto 21.05.2019)
12	Shri Roshan Lal	Asstt. Administrative Officer (since 22.05.2019)
13	Smt. S. Pal	Private Secretary
14	Shri A.D. Banik	Assistant
15	Shri S. Saha	UDC
16	Smt. A. Roy	SSS
17	Shri J. Das	YP-II, MIS-FMS
18	Ms. J. Basak	SRF, CFLD-Pulse
19	Ms. S. Halder	SRF, ARYA
20	Ms. R. Bhattacharya	SRF, NICRA
21	Dr. S. Das	SRF, Farmers FIRST
22	Shri S. Ghosh	SRF, NEMA
23	Shri S. Khutia	DEO, CFLD-Pulse
24	Shri S. Nandi	DEO, GKMS
25	Shri S. Pal	DEO, CSISA

Joining/Relieving/Promotion/Demise

1. Shri B.D. Mallick passed away on 02.08.2019
2. Shri Jyotirmay Das joined on 16.06.2019
3. Shri Swayambhu Ghosh joined on 01.10.2019
4. Shri Sudipta Pal joinded on 23.09.2019
5. Shri S. Nandi joined in GKMS on 04.09.2019

भाकृअनुप
ICAR

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भाकृअनुप - कृषि तकनीकी अनुप्रयोग संस्थान कोलकाता

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