

वार्षिक प्रतिवेदन ANNUAL REPORT 2017 - 18



कृभा.कृ.अ.प - कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान
ICAR-Agricultural Technology Application Research Institute
Zone XI, Hebbal, Bengaluru- 560 024



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Annual Report
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P R E F A C E

Krishi Vigyan Kendras (KVKs) are in the forefront of agricultural development in India, primarily due to their strategic relevance at the district level. As knowledge and resource centres of the district agriculture, KVKs performance is closely watched and appreciated by all stakeholders. Forty eight KVKs in the states of Karnataka, Kerala and UT of Lakshadweep are coordinated and monitored by ICAR-Agricultural Technology Application Research Institute (ATARI), Bengaluru. Increased number and diverse nature of activities performed by the KVKs every year stand testimony to the growing importance of KVKs.

During 2017-18, KVKs assessed 398 technologies, implemented 10803 frontline demonstrations and conducted capacity development for 121994 participants. KVKs organized frontline extension activities reaching all sections of the farming community and development departments. Agricultural technology introduction and uptake is further facilitated by providing the critical inputs in the form of 3414 q seeds, 31.28 lakh planting materials and 2.2 lakh livestock. Cluster frontline demonstrations on pulses and oilseeds benefited 5232 farmers and the eight seed hubs produced 2579.2 q pulse seeds. National Innovations for Climate Resilient Agriculture implemented in seven critically vulnerable districts demonstrated the multi-dimensional nature of sustainability in farming. Kisan mobile advisories were provided through text and voice messages to the registered users. Besides KVKs, ATARI Bengaluru also monitors the ARYA, Farmer FIRST, Mera Gaon & Mera Gaurav and Agricultural Technology Information Centres. Strengthening of Directorate of Extension in State Agricultural Universities is supporting the field level technical back-up and supervision of KVKs.

KVKs celebrated science with farmers through soil health day and distribution of soil health cards. Sankalp se Siddi organized during August 2017 initiated a movement towards achieving doubling of farmers income by 2022 through seven critical areas like micro-irrigation, soil health, quality inputs, post-harvest processing and value addition, agri-marketing, crop insurance and integrated farming. Swatchta Hi Sewa was celebrated during 15 September to October 2, 2017.

I am happy to present the annual report 2017-18 reflecting a wide gamut of activities performed by the Krishi Vigyan Kendras in the states of Karnataka, Kerala and UT of Lakshadweep.

(CHANDRE GOWDA M.J)

Place: Bengaluru

Date : 13 July 2018



CONTENT

Preface	
Executive Summary (Hindi)	i - vii
Executive Summary (English)	viii - xiv
1. About ICAR Agricultural Technology Application Research Institute	1 - 4
1.1 ICAR-ATARI	1
1.2 ICAR- ATARI, Zone –XI, Bengaluru	1
1.3 Budget	4
2. About Krishi Vigyan Kendras	5 - 7
2.1 Establishment of KVKs	5
2.2 Vision, Mission, Mandate	5
2.3 Manpower	5
2.4 Infrastructure of KVKs	6
2.5 Scientific Advisory Committee	7
2.6 Revolving Fund	7
2.7 Thrust Areas	7
3. Achievements	8 - 94
3.1 Krishi Vigyan Kendras	8
3.1.1 Technology Assessment	8
3.1.2 Location Specificity of Crop Technologies	10
3.1.3 Location Specificity of Livestock Technologies	15
3.1.4 Frontline Demonstrations	16
3.1.5 Capacity Development	50
3.1.6 Frontline Extension Programmes	59
3.1.7 Production of Technological Inputs	61
3.1.8 Kisan Mobile Advisory Services	65
3.1.9 World Soil Health Day Celebration and Soil, Water and Plant Analysis	66
3.1.10 Rain Water Harvesting Units	67
3.1.11 Convergence	67
3.1.12 Cases of Large Scale Adoption	69
3.1.13 Recognition and Awards	74

3.2 Special Programmes	
3.2.1 Cluster Frontline Demonstrations on Pulses under NFSM	75
3.2.2 Cluster Frontline Demonstrations on Oilseeds under NMOOP	77
3.2.3 Seed Hub	78
3.2.4 National Innovations in Climate Resilient Agriculture (NICRA)	79
3.2.5 Skill Development Programme	89
3.2.6 Attracting and Retaining Youth in Agriculture (ARYA)	89
3.2.7 Sankalp Se Siddi	89
3.2.8 Protection of Plant Varieties and Farmer's Rights Act (PPV & FRA)	90
3.2.9 Swacch Bharat Mission	90
3.2.10 Mera Gaon-Mera Gaurav (My Village- My Pride)	92
3.3 Farmer FIRST	92
3.4 Agriculture Technology Information Centre (ATIC)	94
3.5 Directorates of Extension	94
4. Human Resource Development	95
5. Publications	96-97
6. Workshops/Meetings/Conferences	98-101
7. Personnel	102

कार्यकारी सारांश

भारतीय कृषि अनुसंधान परिषद (ICAR) ने विभिन्न मेजबान संगठनों जैसे आईसीएआर संस्थानों, राज्य कृषि विश्वविद्यालयों (SAU), गैर-सरकारी संगठनों (NGO), डीम्ड विश्वविद्यालयों (DU) और राज्य कृषि विभाग (SDA) के तहत जिला स्तर पर कृषि विज्ञान केंद्रों (KVKs) का नेटवर्क स्थापित किया है। मार्च 2018 तक, देश में 690 KVKs स्थापित किए गए थे, जिनमें से 48 KVKs, जोन XI में काम कर रहे हैं। कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान (ATARI), कर्नाटक में स्थित (33) KVKs, केरल में स्थित (14) KVKs और लक्षद्वीप में स्थित (1) KVK का, तकनीकी हस्तक्षेप और फ्रंटलाइन विस्तार कार्यक्रमों का समन्वय, योजना, निगरानी और मूल्यांकन करता है। जिसमें, किसानों और अन्य हितधारकों के साथ साझेदारी में राज्य कृषि विश्वविद्यालयों (SAU) और आईसीएआर संस्थानों से तकनीकी बैकस्टॉपिंग के साथ KVK द्वारा प्रौद्योगिकियों का आकलन और प्रदर्शन किया जाता है। बेहतर कृषि प्रौद्योगिकियों और उद्यमशीलता विकास पर अपने हितधारकों के लिए क्षमता विकास कार्यक्रम चलाते हैं, फ्रंटलाइन विस्तार कार्यक्रम सम्बन्धित जागरूकता पैदा करते हैं और सभी KVK की गतिविधियों और कार्यक्रमों के बारे में हितधारकों को प्रशिक्षित करते हैं। गुणवत्ता के बीज, रोपण सामग्री, पशुधन नस्लों, पशु उत्पादों और जैव उत्पादों का उत्पादन और आपूर्ति, प्रौद्योगिकियों के उत्थान की सुविधा प्रदान करती है। इस प्रकार से, ये सभी KVK, जिले की कृषि अर्थव्यवस्था में सुधार के लिए, कृषि प्रौद्योगिकी के ज्ञान और संसाधन केंद्र के रूप में कार्य करते हैं। अनिवार्य गतिविधियों की ओर की जा रही पहल के अलावा, संकल्प से सिद्धि पर विशेष जोर दिया गया है, ताकि किसानों की आय को दोगुना करने के लिए जोरदार क्षेत्रों पर ध्यान केंद्रित किया जा सके। वर्ष 2017-18 के दौरान की प्रमुख उपलब्धियां संक्षेप में इस प्रकार रहीं :

ATARI की प्रमुख गतिविधियां

- दिनांक 04-06 May, 2017 के दौरान, आईसीएआर-सीसीएआरआई, गोवा और आईसीएआर-केवीके, उत्तरी गोवा के सहयोग से, केवीके, गोवा में जोन के KVKs की वार्षिक क्षेत्रीय समीक्षा कार्यशाला का आयोजन किया गया।
- दिनांक 16 - 17 फरवरी, 2018 के दौरान, ATARI और NIANP, बेंगलूरु के सहयोग से एनआईएएनपी कैम्पस में, किसान कॉन्क्लेव का संयुक्त रूप से आयोजन किया गया।
- दिनांक 16-18 मार्च 2018 के दौरान, नई दिल्ली में राष्ट्रीय केवीके सम्मेलन का आयोजन करने में आईसीएआर कृषि विस्तार प्रभाग का समर्थन किया गया। जिसमें, माननीय प्रधानमंत्री ने, दिनांक 17 मार्च, 2018 को राष्ट्रीय सम्मेलन का उद्घाटन किया और 25 कृषि विज्ञान केंद्र (KVKs) लॉन्च किए गए, जिसमें कर्नाटक के (विजयपुरा -II और यादगीर में) दो KVKs भी शामिल हैं।
- दिनांक 22 - 24 मार्च 2018 के दौरान, केवीके, कोडुगु (कर्नाटक) में, कर्नाटक, केरल और लक्षद्वीप सहित, जोन के, KVKs की कार्य योजना कार्यशाला का आयोजन किया गया था।

प्रौद्योगिकी आकलन और परिष्करण

- इन KVKs द्वारा, 139 स्थानों पर, 1092 OFT के माध्यम से, कुल 398 प्रौद्योगिकियों का मूल्यांकन किया गया। इनमें से 90.5% प्रौद्योगिकियां फसलों

की थीं और शेष प्रौद्योगिकियां, पशुधन, मुर्गी-पालन, मत्स्य-पालन और अन्य की थीं।

- फसलों के तहत, कुल 362 प्रौद्योगिकियों का आकलन किया गया, जिनमें, विविधता मूल्यांकन (159), एकीकृत कीट प्रबंधन (47), एकीकृत पोषक प्रबंधन (46), फसल प्रणाली (37), एकीकृत फसल प्रबंधन (21) और एकीकृत बीमारी प्रबंधन (21)। संसाधन संरक्षण प्रौद्योगिकियों (12), प्रसंस्करण और मूल्य वृद्धि (07), कठोर कमी (04)। मशरूम की खेती (03), कृषि मशीनरी (03) तथा बीज और रोपण सामग्री उत्पादन, अन्य क्षेत्रों के थे।
- पशुधन और मत्स्य पालन प्रौद्योगिकियों के तहत, KVKs ने फीड और चारा (08), नस्लों का मूल्यांकन (07), उत्पादन और प्रबंधन (07), कीट / रोग प्रबंधन (04) और पोषण प्रबंधन (02) सहित पांच विषयगत क्षेत्रों पर, 28 प्रौद्योगिकियों का मूल्यांकन किया गया।
- चना में GBM-2 ने, केवीके, बेलगाम-I में, 26.1 कुंतल / हेक्टेयर JAKI-9218 द्वारा 23.2 कुंतल / हेक्टेयर की उच्चतम उपज दी गई। JG-14 देर से बोए गए, सिंचित परिस्थितियों में 21.5 कुंतल / हेक्टेयर की उपज पाई गई, जोकि, विजयपुरा जिले में JG-11 किस्म की तुलना में, लगभग दोगुनी थी।
- तुर फसल में, बागलकोट जिले में, BSMR - 736 द्वारा, 19.1 कुंतल / हेक्टेयर की उच्चतम उपज दर्ज की गई। GRG-811 ने, तुमाकुरु -II में 12.5 कुंतल / हेक्टेयर,

और बागलकोट में 18.2 कुंतल / हेक्टेयर की उपज के साथ केंद्रों में बेहतर प्रदर्शन किया।

- चित्रदुर्ग जिले में, प्याज की विभिन्न किस्मों का परीक्षण किया गया, जिसमें, भीमा शक्ति द्वारा 329 कुंतल / हेक्टेयर की उच्चतम उपज दर्ज की गई, इसके बाद, अर्का निकेतन द्वारा (274 कुंतल / हेक्टेयर) की उपज पाई गई।
- बीदर में, अदरक की किस्म मारन के साथ 398 कुंतल / हेक्टेयर की उच्चतम उपज की सूचना पाई गई। हालांकि, वरदा किस्म ने, 3 स्थानों में, बेंगलुरु ग्रामीण में 301 कुंतल / हेक्टेयर, कोडागु में 197 कुंतल / हेक्टेयर और मैसूर में 179 कुंतल / हेक्टेयर की उच्चतम उपज दर्ज की गई।
- गोभी में, 500 कुंतल / हेक्टेयर की उपज के साथ त्रिशूर में हाइब्रिड ग्रीन चैलेंजर के साथ उच्चतम उपज प्राप्त की गई। हालांकि, इसका प्रदर्शन अन्य दो जिलों जैसे कोल्लम और पठानमथिट्टा में व्यापक रूप से भिन्न था। ग्रीन वॉयजर का प्रदर्शन 286 कुंतल / हेक्टेयर से 313 कुंतल / हेक्टेयर तक की पैदावार के साथ अधिक स्थिर पाया गया।
- केरल के तीन केवीके में, परीक्षण किए गए कसावा की विभिन्न किस्मों में से, इडुक्की जिले में, सुवर्ण ने 350 कुंतल / हेक्टेयर के साथ उच्चतम उत्पादन किया गया। अगली सबसे अच्छी उपज, इडुक्की जिले में ही, विभिन्न प्रकार के वेल्थानीहास (300 कुंतल / हेक्टेयर) के साथ भी प्राप्त की गई थी। अलप्पुझा जिले में, श्रीजया किस्म से 278 कुंतल / हेक्टेयर की उपज के साथ सर्वश्रेष्ठ पायी गई।
- आयर, केले में KAV द्वारा जारी एक माध्यमिक और सूक्ष्म पोषक तत्व मिश्रण के परिणामस्वरूप उच्चतर उपज (अधिकतम 350 कुंतल / हेक्टेयर) होती है। कोट्टायम में किसानों के सतत अभ्यास के कारण, उपज में वृद्धि दोगुनी से अधिक पायी गई।
- गोभी में डायमंड बैक मॉथ (DBM) के खिलाफ प्रबंधन प्रथाओं का मूल्यांकन कोलार, रामनगर और बेंगलुरु ग्रामीण जिलों में किया गया। रामनगर में किसानों की प्रथाओं पर उपज में वृद्धि 13.8% और बेंगलुरु ग्रामीण जिले में 18.9% पायी गई।
- नवंबर 2017 के दौरान छिड़काव के साथ जैस्मीन फसल प्रबंधन और पोषक प्रबंधन हस्तक्षेपों ने दक्षिणी कन्नड़ और उडुपी जिलों में उच्चतम उपज प्राप्त करने में मदद की गई।
- कर्नाटक के बल्लारी, कोप्पल और विजयपुरा जिलों में, बेहतर चारा किस्मों का मूल्यांकन किया गया। चारा किस्म CoFS 31 ने बल्लारी और कोप्पल जिलों में COFS 29, DHN -6 और CO -5 पर उच्चतर उपज प्राप्त की गई।

फ्रंटलाइन प्रदर्शन

- अनाज और बाजरा पर 1423, तिलहन पर 190, दालों पर 217, वाणिज्यिक फसलों पर 142, चारा फसलों पर 130, सब्जियों की फसलों पर 835, कंद की फसलों पर 84, फलों की फसलों पर 505, फूलों पर 106, मसाले और औषधीय फसलों पर 180, वृक्षारोपण फसलों पर 131, पशुधन पर 591, एंटरप्राइज़ पर 320, मत्स्यपालन पर 88 और कृषि उपकरणों पर 81, सहित कुल 10803 फ्रंटलाइन प्रदर्शन आयोजित किए गए। इसके अलावा, तिलों पर, 3025 क्लस्टर प्रदर्शन और तिलहन पर 2207 प्रदर्शन, कर्नाटक और केरल के चुनिंदा जिलों में NFSM और NMOOP के तहत कृषि सहयोग और किसान कल्याण विभाग के प्रायोजित कार्यक्रम के रूप में आयोजित किए गए।
- धान में, औसत उपज को लेकर, कर्नाटक में 24.7 से 85.0 कुंतल / हेक्टेयर और केरल में 12.9 से 82.0 कुंतल / हेक्टेयर के साथ उनकी संबंधित जांच (कर्नाटक में 28.4 से 61.7 और केरल में 10.3 से 60.1 कुंतल / हेक्टेयर) की तुलना में फ्रंटलाइन प्रदर्शनों के तहत पाई गई। मक्का में, प्रौद्योगिकियों के प्रदर्शन के कारण औसत उपज, कर्नाटक में 35.4 कुंतल / हेक्टेयर से 82.5 कुंतल / हेक्टेयर पाई गई, जबकि उनकी संबंधित जांच में 29.7 कुंतल / हेक्टेयर से 70.5 कुंतल / हेक्टेयर थी। बाजरा के तहत, 20.2%, 20.5% और 24.0% तक बढ़ी हुई उपज, कर्नाटक में क्रमशः रागी, फॉक्सटेल बाजरा और छोटे बाजरा में दर्ज की गई।
- कर्नाटक में (172) और केरल में (18) प्रदर्शन सहित, KVKs द्वारा विभिन्न फसलों में तिलहनों पर 190 के प्रदर्शन आयोजित किए गए थे, जिनमें मूंगफली, safflower, सूरजमुखी, तिल और सरसों जैसी फसलों में 70.5 हेक्टेयर क्षेत्र शामिल था। कर्नाटक में मूंगफली के तहत 27.8 कुंतल / हेक्टेयर की उच्चतम उपज, किस्म G 2-52 द्वारा दर्ज की गई और जो कि किसानों की स्थानीय किस्म (24.5 कुंतल / हेक्टेयर) की तुलना में, 13.3% अधिक है। आईडीएम के तहत, तिल की किस्म GT-1 और safflower किस्म, PBNS -12 और A-1 के तहत, क्रमशः 27.3% और 21.4% की उच्चतर उपज दर्ज की गई। रबी मौसम में सरसों की फसल ने किसानों की स्थानीय किस्म के तहत 6.5 कुंतल / हेक्टेयर की तुलना में NRCHB-101 के साथ औसत 8.8 कुंतल / हेक्टेयर दर्ज की गई। सूरजमुखी में, एकीकृत खरपतवार प्रबंधन प्रौद्योगिकी ने किसानों के संरक्षण में 9.4 कुंतल / हेक्टेयर की तुलना में 13.4 कुंतल / हेक्टेयर की बेहतर उपज पाई गई। केरल में, तिल की किस्मों में, किसानों की स्थानीय जांच की तुलना में, किस्म

टीएमवी -7 (5.1 कुंतल / हेक्टेयर) और तिलारानी (4.1 कुंतल / हेक्टेयर) उच्चतर उपज दर्ज की गई।

- कर्नाटक में (202) और केरल में (15) प्रदर्शन सहित, KVKs द्वारा केवीके द्वारा विभिन्न फसलों में कुल मिलाकर 217 प्रदर्शन आयोजित किए गए, जिनमें चना, ब्लैक-ग्राम, ग्रीनग्राम, तुर, सोयाबीन, cowpea, horsegram और फील्ड-बीन जैसी फसलों में 82.8 हेक्टेयर का क्षेत्र शामिल किया गया। कर्नाटक में, DU -1 प्रकार के ब्लैकग्राम के साथ आईसीएम में 10.5 कुंतल / हेक्टेयर की उपज दर्ज की गई, जबकि आईसीएम प्रदर्शनों ने ग्रीन-ग्राम के साथ, किसानों के अभ्यास पर, 20.8% की वृद्धि पायी गई। तुर में, प्रौद्योगिकी प्रदर्शन के कारण कुल उपज वृद्धि, स्थानीय जांच पर 47.5% पाई गई। रबी सीजन के दौरान, चना में, आईसीएम और आईएनएम प्रौद्योगिकियों द्वारा की गई स्थानीय जांच पर, उपज में 21.1% की औसत वृद्धि पाई गई।
- सब्जी फसलों जैसे amaranthus, बैंगन, गोभी, फुलगोभी, मिर्च, field-bean, pole-bean क्लस्टर-बीन, फ्रेंच-बीन, प्याज, टमाटर, ridge-gourd, कड़वा गाढ़ा, भिंडी, गाजर, ग्रींस, yard-long-bean और सब्जी cowpea सम्मिलित किए गए। KVKs द्वारा, कर्नाटक में (170 हेक्टेयर में 569 प्रदर्शन) और केरल में (17.8 हेक्टेयर में 266 प्रदर्शन) द्वारा 187.8 हेक्टेयर क्षेत्र और 835 किसानों के खेतों में बेहतर प्रौद्योगिकियों के साथ प्रदर्शित किया गया।
- कर्नाटक में (144) और केरल में (361) प्रदर्शन सहित, 88.9 हेक्टेयर के क्षेत्र में, केले, अंगूर, नींबू, आम, पपीता, अनार, अंजीर, coorg-mandarin, lime, जुनून फल (passion fruit) और अमरूद जैसी फल फसलों पर कुल मिलाकर 505 प्रदर्शन आयोजित किए गए।
- विभिन्न फसलों में संकरों पर, कर्नाटक में (419) और केरल में (99) प्रदर्शन सहित, मक्का, टमाटर, बाजरा, सूरजमुखी, गोभी, कपास, मिर्च, बैंगन, ककड़ी पपीता, टमाटर, तरबूज, जुनून फल (passion fruit) और yard-long-bean जैसी फसलों पर, 159 हेक्टेयर के क्षेत्र में, कुल मिलाकर 518 प्रदर्शन किए गए। कर्नाटक में टमाटर हाइब्रिड अर्का सम्राट और केरल में गोभी संकर एनएस -160 किस्मों में बेहतर प्रदर्शन पाया गया।

विकास क्षमता

- रिपोर्टाधीन वर्ष के दौरान, 121994 लोगों के लिए, 3148 प्रशिक्षण पाठ्यक्रम आयोजित किए गए। इनमें से अधिकांश (2626 पाठ्यक्रम) किसानों / कृषि महिलाओं की श्रेणी के लिए थे, जिसमें 101930 किसान / कृषि महिलाओं को प्रशिक्षित किया गया।

- किसानों और कृषि महिलाओं के लिए, कुल मिलाकर 550 पाठ्यक्रम आयोजित किए गए, जिसमें प्रशिक्षण का प्रमुख क्षेत्र फसल उत्पादन रखा गया, जिसमें 19214 किसानों / कृषि महिलाओं को शामिल किया गया। सबसे अधिक मांग वाले अगले पाठ्यक्रमों में, पौध संरक्षण पर 453 पाठ्यक्रम और मृदा स्वास्थ्य एवं प्रजनन प्रबंधन पर 239 पाठ्यक्रम पर प्रशिक्षण कोर्स आयोजित किए गए। इसके बाद, पशुधन उत्पादन और प्रबंधन पर 214 पाठ्यक्रम आयोजित किए गए।
- ग्रामीण युवाओं के लिए, प्रसंस्करण और मूल्यवर्धन नामक विषय, 43 पाठ्यक्रमों में (1150 प्रतिभागियों) के साथ, प्रमुख प्रशिक्षण क्षेत्र था, इसके बाद उद्यमशीलता विकास पर, (24 पाठ्यक्रमों में, 459 प्रतिभागियों) और फसल-उत्पादन पर (22 पाठ्यक्रमों में, 654 प्रतिभागियों) ने अपनी प्रतिभागिता सुनिश्चित की।
- विस्तार कार्यकर्ताओं के अंतर्गत, 5432 कार्मिकों के लिए, कुल 124 पाठ्यक्रम आयोजित किए गए। 24 पाठ्यक्रमों में और 1452 प्रतिभागियों के लिए, पाठ्यक्रम का प्रमुख क्षेत्र, पोषण सुरक्षा रखा गया। 20 पाठ्यक्रमों में और 756 प्रतिभागियों के लिए, अगला प्रमुख प्रशिक्षण क्षेत्र, कृषि विस्तार रखा गया।
- 3515 प्रतिभागियों के लाभ के लिए, विभिन्न क्षेत्रों में घतघी द्वारा कुल 70 प्रशिक्षण कार्यक्रम प्रायोजित किए गए। क्षमता निर्माण और समूह गतिशीलता पर बड़ी संख्या में प्रशिक्षण पाठ्यक्रम (21) आयोजित किए गए। इसके अलावा, रिपोर्टाधीन वर्ष के दौरान, 4080 उभरते हुए उद्यमियों से सम्बन्धित, कुल मिलाकर 139 व्यावसायिक प्रशिक्षण पाठ्यक्रम आयोजित किए गए। 42 पाठ्यक्रमों में, 856 प्रतिभागियों के लिए, प्रशिक्षण का प्रमुख क्षेत्र, उद्यमशीलता विकास रखा गया। 29 पाठ्यक्रमों में, 858 प्रतिभागियों के लिए, पशुधन उत्पादन और प्रबंधन और 18 पाठ्यक्रमों में, 535 प्रतिभागियों के लिए, महिला सशक्तिकरण जैसे अन्य प्रमुख क्षेत्र रखे गए।

फ्रंटलाइन विस्तार कार्यक्रम

- KVKs ने कुल 85458 विस्तार कार्यक्रम आयोजित किए गए, जिनमें, कृषि के विभिन्न पहलुओं पर 17.80 लाख किसानों और विस्तार कर्मियों के बीच जागरूकता पैदा की गई और जिसके संबद्ध क्षेत्र थे : किस्मों प्रदर्शन, उत्पादन प्रौद्योगिकियों, एकीकृत कीट और रोग प्रबंधन, पशु स्वास्थ्य और पोषण, मुर्गी-पालन, मत्स्य पालन और मानव पोषण आदि। इसके अलावा, घतघी द्वारा, विस्तार साहित्य (740) प्रकाशित किया गया। इसके बाद समाचार पत्र

कवरेज (1193), लोकप्रिय लेख (338), रेडियो कार्यक्रम (269) और टी.वी. कार्यक्रम (191) सम्पन्न ।

तकनीकी इनपुट्स का उत्पादन

- KVKs द्वारा, विभिन्न फसलों की किस्मों के 3413.7 कुंतल बीज, विभिन्न फसलों और संकरों की 31.28 लाख रोपण सामग्री, 2.21 लाख पशुधन उपभेदों, मछली उंगली और अन्य जैव उत्पादों से 3.43 लाख किसानों को लाभ पहुंचाया गया और आपूर्ति की गई।
- KVKs द्वारा, 2650.4 कुंतल जैव उत्पादों का उत्पादन और आपूर्ति की गई, जिसके माध्यम से लगभग 1.56 लाख किसानों को रसायनों के उपयोग को कम करके बायो-कंट्रोल को अपनाने के लिए प्रेरित किया गया।

किसान मोबाइल सलाहकार सेवाएं

- KVKs द्वारा, विभिन्न विषयों से सम्बन्धित, 13213 पाठ्य-संदेश और 294 वाणी-संदेश, 15.90 लाख किसानों को भेजे गए। जिनमें से, फसलों से सम्बन्धित सन्देश (7537), मौसम से सम्बन्धित सन्देश (4542), जागरूकता से सम्बन्धित सन्देश (939), अन्य उद्यम से सम्बन्धित सन्देश (269), पशुधन से सम्बन्धित सन्देश (170) और विपणन से सम्बन्धित सन्देश (50) सम्मिलित हैं।
- कर्नाटक और केरल के 20 KVKs द्वारा, दिनांक 05 दिसंबर 2017 को, विश्व मृदा स्वास्थ्य दिवस मनाया गया था। जिसमें 17202 किसानों ने भाग लिया। इसके अलावा, उसी दिन, किसानों को, 5498 मृदा स्वास्थ्य काइर्स भी वितरित किए गए।
- सम्बन्धित अंचल (क्षेत्र) में, किसानों को विश्लेषणात्मक सेवाएं प्रदान करने के लिए, 42 KVKs में मृदा, पानी और पौधों की परीक्षण प्रयोगशालाएं स्थापित की गई हैं। वर्ष के दौरान, 26232 गांवों के 43726 किसानों से प्राप्त मिट्टी, पानी, पौधे, खाद और पत्ती के ऊतकों के कुल 46957 नमूनों का विश्लेषण किया गया जिसमें, रूपये 49.83 लाख की लागत रहा। 30033 मृदा स्वास्थ्य काइर्स वितरित किए गए। राज्यवार आंकड़ों से यह पाया गया कि कर्नाटक में KVKs द्वारा, 42676 नमूनों का विश्लेषण किया और केरल में घतघी द्वारा, 42814 नमूनों का विश्लेषण किया।

वर्षा जल संचयन इकाइयां

- ग्यारहवीं योजना तक 16 KVKs में स्थापित माइक्रो सिंचाई प्रणाली के साथ वर्षा जल संचयन इकाइयों का उपयोग करके, कुल 31 प्रशिक्षण पाठ्यक्रम और 132 प्रदर्शन आयोजित किए गए। इसके अलावा, 2533 किसानों और 112 कार्मिकों द्वारा, इन इकाइयों का दौरा किया गया और वर्षा जल संचयन तकनीकों से परिचय प्राप्त किया गया।

KVKs के अभिसरण और संबंध

- KVKs ने सम्बन्धित अंचल (क्षेत्र) के अधिकांश जिलों में कृषि प्रौद्योगिकी प्रबंधन एजेंसी (ATMA) के साथ निकट सहयोग में काम किया। वर्ष के दौरान, KVKs ने ATMA के 1406 कार्यक्रमों में भाग लिया और साथ ही, KVKs द्वारा एटीएमए के सहयोग से 416 कार्यक्रम आयोजित किए। ATMA के साथ संबंध का उपयोग करते हुए, 37 KVKs द्वारा प्रशिक्षण कार्यक्रम आयोजित किए गए। 13 घतघी द्वारा प्रदर्शन प्रदर्शित किए गए और 12 घतघी द्वारा प्रदर्शनी आयोजित की गई। अभिसरण प्रयासों के एक हिस्से के रूप में 43 बैठकें आयोजित की गईं।
- विभिन्न कार्यक्रमों और गतिविधियों का आयोजन करने के लिए, KVKs द्वारा बाहरी वित्त पोषण की व्यवस्था की गई। राष्ट्रीय कृषि विकास योजना (RKVY), राष्ट्रीय खाद्य सुरक्षा मिशन (NFSM), विभिन्न आईसीएआर संस्थानों और कृषि और ग्रामीण विकास नेशनल बैंक (NABARD) (नाबार्ड) की परियोजनाएं प्रमुख एजेंसियां आगे आईं, जिन्होंने KVKs की गतिविधियों को वित्त पोषित / समर्थित किया।

बड़े पैमाने पर गोद लेने के मामले

- वर्ष के दौरान, KVKs के अनेको प्रयासों में से, सबसे सफल प्रयास यह रहा कि टेक्नोलॉजीज क्षेत्र में स्थायी आधार पर उत्पादन और किसानों की आय बढ़ाने वाले मामलों में सफल रहा
 - (क) कर्नाटक के गडग जिले में, मक्का के साथ तुर एक अंतःफसल के रूप में,
 - (ख) बेलगावी में किस्म UAS 304 के गेहूं के बीजों का उत्पादन,
 - (ग) चित्रदुर्ग में मल्टीकूट चारा ज्वारीय किस्म COFS -31 का बड़े पैमाने पर प्रदर्शन,
 - (घ) बिदर में ग्रीनग्राम किस्म BGS -9,
 - (ङ) रायचूर में आईएफएस मॉडल,
 - (च) कोडागु में अर्का माइक्रोबियल कंसोर्टियम (AMC) की स्थापना,
 - (छ) धारवाड़ में फार्म तालाब में कटला, रोहू और आम कार्प मछली प्रजातियों की fingerlings की बहु-संस्कृति,
 - (ज) हावेरी में पिछवाड़े में मुर्गी-पालन और पठानमथिट्टा में मुर्गी-पालन
 - (झ) तुमाकुरु में हल्दी का मूल्यवर्धन,
 - (ञ) कोट्टायम में उपयोग-हीन nutmegrind से धन प्राप्ति, और
 - (ट) केरल के मलप्पुरम जिले में डेयरी में मूल्यवर्धन

पुरस्कार और मान्यता

- कृषि विज्ञान केंद्र, पठानमथिडा, केरल, को राष्ट्रीय KVKs सम्मेलन, नई दिल्ली में, दिनांक 17 मार्च, 2018 को माननीय प्रधान मंत्री द्वारा, पंडित दीनदयाल उपाध्याय कृषि विज्ञान प्रोत्साहन पुरस्कार और सर्वश्रेष्ठ KVKs के रूप में सम्मानित किया गया।

विशेष कार्यक्रम

- दालों में, क्लस्टर प्रदर्शनों के तहत, 1210 हेक्टेयर किसानों के क्षेत्र में कर्नाटक और केरल के KVKs द्वारा, प्रमुख दाल फसलों पर, कुल 3025 प्रदर्शन आयोजित किए गए।
- तिलहनों पर, क्लस्टर प्रदर्शन के तहत, 882.8 हेक्टेयर किसानों के क्षेत्र में कर्नाटक के KVKs द्वारा मूंगफली, सूरजमुखी, सोयाबीन और तिलहन/ linseed जैसे तिलहन फसलों पर कुल 2207 प्रदर्शन आयोजित किए गए।
- दालों के स्वदेशी उत्पादन में वृद्धि के लिए, 8 KVKs द्वारा बीज-हब स्थापित किए और वर्ष के दौरान नाड़ी के बीज के 2579.3 कुंतल का उत्पादन किया। सबसे ज्यादा बीज उत्पादन, चना का (1596.3 कुंतल) प्राप्त किया गया, इसके बाद तुर (513.5 कुंतल), ब्लैकग्राम (264 कुंतल) और ग्रीनग्राम (205.5 कुंतल) का उत्पादन प्राप्त किया गया।
- NICRA के तहत, कुल 264 हेक्टेयर क्षेत्र, एनआरएम से संबंधित हस्तक्षेपों के साथ उपयोगी बनाया, जिसमें 2710 किसानों को सात एनआईसीआरए क्लस्टर गांवों में जलवायु resilient बनाने के लिए शामिल किया गया। फसलों में, 1940 किसानों द्वारा, 753.5 हेक्टेयर क्षेत्र में जलवायु लचीली फसल प्रौद्योगिकियों का प्रदर्शन किया गया। वर्ष के दौरान लगभग 10049 पशुधन सहित पोल्ट्री पक्षियों को 258 प्रदर्शन इकाइयों के माध्यम से विभिन्न पशुधन हस्तक्षेपों के तहत कार्य किया गया। जलवायु लचीली प्रौद्योगिकियों पर, किसानों को क्षमता निर्माण के एक हिस्से के रूप में 3889 किसानों को लाभान्वित करने के लिए 122 प्रशिक्षण कार्यक्रम आयोजित किए गए। इसके अलावा, परियोजना के तहत 3593 किसानों और विस्तार कर्मियों को शामिल करते हुए 222 विस्तार गतिविधियां सम्पन्न की गईं।
- वर्ष के दौरान दो KVKs द्वारा, भारतीय कृषि कौशल परिषद के मार्गदर्शन में तीन कृषि कौशल प्रशिक्षण कार्यक्रम आयोजित किए गए, जिसमें 39 प्रतिभागियों में, 16 महिलाएं और 23 पुरुषों ने विभिन्न जाब्स भूमिकाओं के तहत भाग लिया।
- वर्ष के दौरान, 3 प्रसंस्करण इकाइयां स्थापित की गईं और 36 प्रशिक्षण कार्यक्रम आयोजित किए गए, 6 एक्सपोजर यात्राओं का आयोजन किया गया। जिसमें कृषि में युवाओं को आकर्षित करने और बनाए रखने (ARYA) कार्यक्रम के

तहत, 778 ग्रामीण युवाओं को कृषि उत्पादन के मूल्यवर्धन और विपणन पर प्रशिक्षित किया गया।

- नव-भारत-निर्माण के उद्देश्य से, केरल में 14 KVKs द्वारा और कर्नाटक में 26 KVKs द्वारा और के तहत संकल्प से सिद्धि कार्यक्रम का आयोजन किया है, जिसमें 3 केंद्रीय मंत्री, 28 माननीय सांसद, 3 राज्य मंत्रियों और 33 माननीय विधायकों द्वारा प्रतिज्ञा लेने में हिस्सा लिया। केरल के 2494 किसानों ने और कर्नाटक के 22663 किसानों ने इस कार्यक्रम में भाग लिया है और नव-भारत-निर्माण की प्रतिज्ञा ली।
- Zone-XI के तहत, केवल दो किसानों ने, KVKs तहत, PPV & FRA पुरस्कार जीते। एक पारंपरिक किसान, श्री सिद्देश्वर रेड्डी ने, पौधे जीनोम उद्धारकर्ता किसान पहचान पुरस्कार 2017 जीता। इसी तरह से, कुनई समाज अभर्षदी संघ ने, संयंत्र जीनोम उद्धारकर्ता सामुदायिक पुरस्कार 2017 जीता।
- स्वच्छता ही सेवा है, अभियान 15 सितंबर से 02 अक्टूबर, 2017 तक KVKs द्वारा आयोजित किया गया और विभिन्न सार्वजनिक स्थानों की सफाई के उद्देश्य से संबंधित 4091 विभिन्न गतिविधियों का आयोजन किया।
- ICAR-ATARI, बेंगलुरु ने वर्ष के दौरान कर्नाटक और केरल राज्य के क्षेत्रों में स्थित, 10 आईसीएआर-संस्थानों में, मेरा गांव - मेरा गौरव से सम्बन्धित गतिविधियों का समन्वय किया गया। भाग लेने वाले, आईसीएआर संस्थानों के वैज्ञानिकों ने, 126 टीमों का गठन किया और 0.71 लाख किसानों और अन्य हितधारकों से जुड़े 565 गांवों में विभिन्न प्रकार से हस्तक्षेप किए गए।

Farmer FIRST

- वर्ष के दौरान, 3 केन्द्रों द्वारा, फसल, बागवानी, पशुधन, एनआरएम, उद्यम और एकीकृत खेती परिवार प्रणाली मॉड्यूल में क्षेत्र के स्तर पर, कई प्रकार से हस्तक्षेप किए गए। इस कार्यक्रम के तहत 28 गांवों के कुल 5138 परिवारों को फायदा हुआ।

कृषि प्रौद्योगिकी सूचना केंद्र (ATIC)

- रिपोर्टाधीन अवधि के दौरान, 96934 किसानों, 11514 विस्तार कर्मियों, 1294 छात्रों और 4814 अन्य हितधारकों ने, क्षेत्र के कृषि प्रौद्योगिकी सूचना केंद्रों का दौरा किया। कुल मिलाकर, 114561 व्यक्तियों ने ATICs का दौरा किया, जिनमें से 52287 दर्शक, सूचना के लिए और 60979 प्रौद्योगिकी उत्पादों के लिए दौरे पर आए।
- कुल 64483 किसानों ने संचार के विभिन्न माध्यमों के माध्यम से ATICs संपर्क स्थापित किया।

- प्रकाशनों के तहत, ATICs आगंतुकों को 28846 पुस्तकें, 3000 तकनीकी बुलेटिन और 2190 तैयार की गई डीवीडी प्रदान की गई।

विस्तार निदेशालयों द्वारा प्रौद्योगिकी बैकस्टॉपिंग

- निदेशक (विस्तार) और उनके अधिकारियों द्वारा, 30 वैज्ञानिक सलाहकार समिति बैठकों में, 47 फील्ड विजिट्स में, 21 कार्यशालाओं / संगोष्ठियों में और कैम्पस कार्यक्रमों सहित 50 प्रशिक्षण कार्यक्रमों में भाग लिया।

मानव संसाधन विकास

- संस्थान ने, दिनांक 5 - 9 फरवरी, 2018 के दौरान, KVKs के विशेषज्ञों के लिए HRD सप्ताह के तहत 5 अभिविन्यास कार्यक्रम आयोजित किए।
- सार्वजनिक संस्थान प्रबंधन प्रणाली (PFMS) पर, KVKs के 7 संस्थानों में, कर्मचारियों के लिए प्रशिक्षण कार्यक्रम आयोजित किए गए।
- दक्षिण और उत्तरी कर्नाटक के KVKs के कार्यक्रम सहायक, (कंप्यूटर) के लिए रिफ्रेशर कोर्स क्रमशः 10-12 अक्टूबर 2017, 11-13 दिसंबर 2017 के दौरान आयोजित किए गए।

- सुजला -3 परियोजना पर, KVKs के विशेषज्ञ के लिए प्रशिक्षण कार्यक्रम, 11-12 जनवरी 2018 को आयोजित किए गए।

प्रकाशन

- वर्ष के दौरान, ATARI के वैज्ञानिकों द्वारा, अनुसंधान पत्र (8), राष्ट्रीय / अंतर्राष्ट्रीय सम्मेलनों में प्रस्तुत किए गए शोध-पत्र (7), पुस्तक अध्याय (4), तकनीकी बुलेटिन (1), रिपोर्ट (3), प्रकाशित किए गए। इसके अलावा, KVKs स्टाफ द्वारा प्रकाशित शोध पत्र (182), तकनीकी बुलेटिन (33), लोकप्रिय लेख (291), विस्तार साहित्य (265), किताबें (16), सीडी / डीवीडी (93) और समाचार पत्र (81) कृषि के विभिन्न तकनीकी पहलुओं और इसके संबद्ध उद्यमों पर प्रकाशित किए गए।

कार्यशालाएं और बैठकें

- रिपोर्टाधीन अवधि के दौरान, ATARI के वैज्ञानिकों द्वारा, वैज्ञानिक कार्यशालाओं (31), बैठकों (67) और सम्मेलनों (14) में प्रतिभागिता सुनिश्चित की गई।

Executive Summary

The Indian Council of Agricultural Research (ICAR) has established the network of Krishi Vigyan Kendras (KVKs) at district level under different host organizations viz., ICAR Institutes, State Agricultural Universities (SAUs), Non-Governmental Organizations (NGOs), Deemed Universities (DUs) and State Department of Agriculture (SDA). Till March 2018, 690 KVKs were established in the country, out of which 48 KVKs are functioning in Zone XI. The Agricultural Technology Application Research Institute (ATARI) coordinates, plans, monitors and evaluates the technological interventions and frontline extension programmes of KVKs in Karnataka (33), Kerala (14), and Lakshadweep (1). Assessment and demonstration of technologies are carried out by the KVKs with technological backstopping from SAUs and ICAR Institutes in partnership with farmers and other stakeholders. KVK undertake capacity development programmes for its stakeholders on improved agricultural technologies and entrepreneurship development. Frontline extension programmes create awareness and educate stakeholders about KVK activities and programmes. Production and supply of quality seeds, planting material, livestock breeds, animal products and bio-products facilitate uptake of technologies. Thus, KVKs serve as knowledge and resource centers of agricultural technology for improving agricultural economy of the district. In addition to the mandated activities and ongoing initiatives, special emphasis was laid on Sankalp Se Siddhi to focus on thrust areas for doubling farmers income. Salient achievements during the year (2017-18) are summarized as follows:

Activities at the ATARI

- Annual Zonal Review Workshop of KVKs of Zone XI was organized in collaboration with ICAR-CCARI, Goa and ICAR-KVK, North Goa, at CCARI, Goa during 04-06 May, 2017.
- Farmers Conclave was jointly organized in collaboration with ICAR-NIANP, Bengaluru during 16-17 February, 2018 at NIANP Campus.
- Supported the ICAR Agriculture Extension Division in organizing the National KVK Conference at New Delhi during 16-18 March 2018. Hon'ble Prime Minister inaugurated the Biennial National Conference on KVK, on March 17, 2018 and launched 25 Krishi Vigyan Kendra (KVKs), which included two KVKs of Karnataka, viz., Vijayapura-II and Yadgir.
- Annual Action Plan (2018-19) Workshop of KVKs of Zone XI consisting of Karnataka, Kerala and Lakshadweep was organized at KVK Kodagu during 22-24 March 2018.

Technology Assessment and Refinement

- A total of 398 technologies were assessed by KVKs through 1092 OFTs at 139 locations. Out of these, 90.5% of technologies were under crops and remaining were under livestock, poultry, fisheries and others.
- Under crops, a total of 362 technologies were assessed, major themes being varietal evaluation (159), integrated pest management (47), integrated

nutrient management (46), cropping systems (37), integrated crop management (21) and integrated disease management (21). Resource conservation technologies (12), processing and value addition (07), drudgery reduction (04), mushroom cultivation (03), farm machinery (03) and seed and planting material production were the other areas.

- Under livestock and fishery technologies, KVKs assessed 28 technologies on five thematic areas including feed and fodder (08), evaluation of breeds (07), production and management (07), pest/disease management (04) and nutrition management (02).
- Chickpea variety GBM-2 gave the highest yield of 26.1 q/ha followed by 23.2 q/ha by JAKI-9218 in KVK Belgaum I. JG-14 under late sown irrigated conditions gave a yield of 21.5 q/ha which was nearly double than the JG-11 variety at Vijayapura district.
- Among the pigeonpea varieties, the highest yield of 19.1 q/ha was recorded by BSMR 736 in Bagalkot district. GRG-811 performed better across the centers with a range in yield of 12.5 q/ha in Tumakuru -II to 18.2 q/ha at Bagalkot.
- Among the onion varieties tested, the highest yield was recorded by variety Bheema Shakthi with a yield of 329 q/ha followed by Arka Niketan (274 q/ha) both at Chitradurga district.

- In ginger, highest yield was reported with variety Maran at Bidar with a yield of 398 q/ha. However, variety Varada recorded higher yield in 3 locations – Bengaluru Rural (301 q/ha), Kodagu (197 q/ha) and Mysore (179 q/ha).
 - In cabbage, highest yield was obtained with hybrid Green Challenger at Thrissur with a yield of 500 q/ha. However, its performance varied widely in other two districts viz., Kollam and Pathanamthitta. The performance of Green Voyager was more stable with yields in the range of 286 q/ha to 313 q/ha.
 - Among the different varieties of cassava tested in three KVKs of Kerala, variety Suvarna yielded highest with 350 q/ha at Idukki district. The next best yield was also obtained at Idukki with variety VellayaniHraswa (300 q/ha). Variety Sree Jaya was the best in Alappuzha district with a yield of 278 q/ha.
 - Ayar, a secondary and micro nutrient mixture released by KAU in banana resulted in higher yield (max 350 q/ha). The increase in yield was more than double over farmers practice at Kottayam.
 - Management practices against Diamond Back Moth (DBM) in cabbage were assessed in Kolar, Ramanagara and Bengaluru Rural districts. Increase in yield over farmers' practices was 13.8% at Ramanagar and 18.9% in Bengaluru Rural District.
 - Jasmine crop management with pruning during November and nutrient management interventions helped in achieving highest yield in Dakshina Kannada and Udupi.
 - Performance of improved fodder varieties was assessed in Ballari, Koppal and Vijayapura districts of Karnataka. Variety CoFS 31 gave higher yield over CoFS 29, DHN-6 and Co-5 in Ballari and Koppal districts.
- 131 on plantation crops, 591 on livestock, 320 on enterprise, 88 on fisheries and 81 on farm implements. Besides, 3025 cluster demonstrations on pulses and 2207 on oilseeds were conducted as sponsored programmes of Department of Agriculture Cooperation and Farmers Welfare under NFSM and NMOOP in select districts of Karnataka and Kerala.
- In paddy, the average yield ranged from 24.7 to 85.0 q/ha in Karnataka and 12.9 to 82.0 q/ha in Kerala under frontline demonstrations as compared to their respective check (28.4 to 61.7 in Karnataka and 10.3 to 60.1 q/ha in Kerala). In maize, the yield due to demonstration of technologies was ranged from 35.4 q/ha to 82.5 q/ha in Karnataka as compared to 29.7 q/ha to 70.5 q/ha in their respective check. Under millets, 20.2%, 20.5% and 24.0% increased yield was recorded in finger millet, foxtail millet and little millet respectively over their control in Karnataka.
 - A total of 190 demonstrations on oilseeds were conducted by the KVKs in the states of Karnataka (172) and Kerala (18) covering 70.5 ha area in groundnut, safflower, sunflower, sesame and mustard. In Karnataka, under groundnut the highest yield of 27.8 q/ha was recorded by variety G2-52 which was 13.3% higher than the local variety (24.5 q/ha). Sesame variety GT-1 under IDM and safflower varieties PBNS-12 and A1 under ICM recorded 27.3% and 21.4% higher yield over their check, respectively. The mustard crop in rabi season has recorded an average of 8.8 q/ha with new variety NRCHB-101 as compared to 6.5 q/ha under farmers' local variety. In sunflower, integrated weed management technology gave better yield of 13.4 q/ha as compared to 9.4 q/ha in farmers' practice. In Kerala, sesame varieties TMV-7 (5.1 q/ha) and Thilarani (4.1 q/ha) recorded higher yield as compared to check.
 - A total of 217 demonstrations on pulses were conducted by the KVKs in the states of Karnataka (202) and Kerala (15) covering 82.8 ha area in chickpea, blackgram, greengram, pigeonpea, soyabean, cowpea, horsegram and field bean. In Karnataka ICM with DU-1 variety of blackgram has recorded 10.5 q/ha, whereas ICM demonstrations gave an increase of 20.8%

Frontline Demonstrations

- A total of 10803 frontline demonstrations were conducted including 1423 on cereals and millets, 190 on oilseeds, 217 on pulses, 142 on commercial crops, 130 on fodder crops, 835 on vegetable crops, 84 on tuber crops, 505 on fruit crops, 106 on flowers, 180 on spice and medicinal crops,

over farmers' practice with greengram. In pigeonpea, overall yield increase due to technology demonstration was 47.5% over check. During rabi season, ICM and INM technologies in chickpea gave an average increase of 21.1% in yield over check.

- Vegetable crops such as amaranthus, brinjal, cabbage, cauliflower, chilli, field bean, pole bean, cluster bean, french bean, onion, tomato, ridge gourd, bitter melon, bhindi, carrot, greens, yard long bean and vegetable cowpea were demonstrated with improved technologies under 835 farmers' fields covering an area of 187.8 ha by the KVKs of Karnataka (569 demonstration in 170.0 ha) and Kerala (266 demonstration in 17.8 ha) states.
- A total of 505 demonstrations in fruit crops like banana, grapes, citrus, mango, papaya, pomegranate, fig, coorg mandarin, lime, passion fruit and guava were conducted in Karnataka (144) and Kerala (361) states covering an area of 88.9 ha.
- 518 demonstrations on hybrids of various crops were conducted in the states of Karnataka (419) and Kerala (99) covering 159.0 ha area in crops like maize, tomato, bajra, sunflower, cabbage, cotton, chilli, brinjal, cucumber, papaya, tomato, watermelon, passion fruit and yard long bean. Tomato hybrid Arka Samrat in Karnataka and cabbage hybrid NS-160 in Kerala performed superior over the varieties.

Capacity Development

- During the year under report, 3148 training courses were organized for 121994 persons. Majority of these (2626 courses) were for farmers/farm women category in which 101930 farmers/farm women were trained.
- For farmers and farm women, the major area of training was crop production in which 550 courses were conducted involving 19214 farmers/farmwomen. Training courses on plant protection (453) and soil health and fertility management (239) were the next most demanded courses followed by livestock production and management (214 courses).

- For rural youth, processing and value addition was the major training area with 43 courses (1150 participants) followed by 24 courses on entrepreneurship development (459 participants) and crop production (22 courses, 654 participants)
- For extension functionaries, a total of 124 courses were organized for 5432 personnel. Nutritional security was the major area with 24 courses and 1452 participants. Agricultural extension was the next major training area with 20 courses and 756 participants.
- A total of 70 sponsored trainings were conducted by the KVKs in different areas for the benefit of 3515 participants. Large number of training courses (21) were organized on capacity building and group dynamics. In addition, 139 vocational training courses were organized during the year involving 4080 budding entrepreneurs. Entrepreneurship development was the major area of training with 42 courses and 856 participants. Livestock production and management (29 courses, 858 participants) and women empowerment (18 courses, 535 participants) were the other major areas.

Frontline Extension Programmes

- KVKs organized a total of 85458 extension activities and created awareness among 17.80 lakh farmers, extension personnel and public on various aspects of agriculture and its allied sectors like varietal performance, production technologies, integrated pest and disease management, animal health and nutrition, production technologies of poultry, fisheries and human nutrition. Further, KVKs published extension literature (740) newspaper coverage (1193), popular articles (338), besides radio coverage/talks (269) and T V coverage/talks (191).

Production of Technological Inputs

- KVKs produced and supplied 3413.7 q of seeds of different crop varieties, 31.28 lakh planting material of different crops and hybrids, 2.21 lakh of livestock strains, fish fingerlings and other bio products benefiting 3.43 lakh farmers.
- KVKs produced and supplied 2650.4 q of bio-products, through which nearly 1.56 lakh farmers

were motivated to adopt bio-control by reducing use of chemicals.

Kisan Mobile Advisory Services

- KVKs have sent 13213 text messages and 294 voice messages to 15.90 lakh farmers. Among these most messaging was related to crops (7537) followed by weather (4542), awareness (939), other enterprises (269), livestock (170) and marketing (50).

World Soil Health Day and Soil Water and Plant Testing Analysis

- World soil health day was celebrated on 5th December 2017 in 20 KVKs of Karnataka and Kerala. About 17202 farmers have participated in the event. Further, 5498 soil health cards distributed to the farmers on the day.
- Soil, water and plant testing laboratories have been established in 42 KVKs for providing analytical services to farmers in the zone. During the year, a total of 46957 samples of soil, water, plant, manure and leaf tissue received from 43726 farmers belonging to 26232 villages were analyzed with realization of Rs. 49.83 lakh. 30033 Soil Health Cards were distributed to farmers. State-wise data showed that KVKs in Karnataka analyzed 42676 samples and Kerala KVKs analyzed 42814 samples.

Rain Water Harvesting Units

- Using the rainwater harvesting units with micro irrigation system established in 16 KVKs till XI Plan, a total of 31 training courses and 132 demonstrations were conducted. Further, 2533 farmers and 112 officials visited these units and got acquainted with the rainwater harvesting techniques.

Convergence and Linkages of KVKs

- KVKs worked in close collaboration with Agriculture Technology Management Agency (ATMA) in most of the districts. KVKs participated in 1406 programmes of ATMA during the year and at the same time KVKs organized 416 programmes in collaboration with ATMA. Using the linkage with ATMA, 37 KVKs conducted training programmes, 13 KVKs conducted demonstrations, and 12 KVKs

conducted exhibitions. Forty-three meetings were organized as part of convergence efforts.

- External funding was received by the KVKs to organize various programs and activities. Rastriya Krishi Vikas Yojana (RKVY), National Food Security Mission (NFSM), projects of various ICAR Institutes and National Bank for Agriculture and Rural Development (NABARD) were the major agencies that funded/supported KVK activities.

Cases of Large Scale Adoption

- Out of the efforts of KVKs, following technologies have emerged as successful cases in augmenting production and farmers income on a sustainable basis in the zone;
 - a. Pigeonpea as intercrop with Maize at Gadag district of Karnataka
 - b. wheat seed production of variety UAS 304 at Belagavi
 - c. large scale demonstration of multicut fodder sorghum variety COFS -31 at Chitradurga
 - d. greengram variety BGS-9 at Bidar
 - e. IFS model at Raichur
 - f. establishment of Arka Microbial Consortium (AMC) at Kodagu
 - g. poly-culturing of fingerlings of catla, rohu and common carp fish species in form pond at Dharwad
 - h. backyard poultry at Haveri, Poultry at Pathanamthitta
 - i. Value addition of tamarind at Tumakuru
 - j. Wealth from wasted nutmeg rind at Kottayam and
 - k. Value addition in dairy at Malappuram district of Kerala.

Awards and Recognition

- Krishi Vigyan Kendra Pathanamthitta, Kerala received the Pandit Deen Dayal Upadhyaya Krishi Vigyan Protsahan Puraskar and best KVK for Zone XI from Hon'ble Prime Minister on March 17, 2018 at New Delhi during National KVK Conference.

Special programmes

- Under cluster demonstrations in pulses, 3025 demonstrations on major pulse crops were conducted by the KVKs of Karnataka and Kerala in an area of 1210 ha of farmers' field.
- Under cluster demonstration on oilseeds, 2207 demonstrations on oilseed crops such as groundnut, sunflower, soyabean and linseed were conducted by the KVKs of Karnataka in 882.8 ha of farmers field.
- To increase the production of pulses 8 KVKs established seed hubs and produced 2579.3 q of pulse seeds during the year. The highest seed production was achieved in chickpea (1596.3 q) followed by pigeonpea (513.5 q), blackgram (264.0 q) and greengram (205.5 q).
- Under NICRA, a total of 264 ha area was treated with NRM related interventions covering 2710 farmers in seven NICRA cluster villages. 1940 farmers demonstrated climate resilient crop technologies in an area of 753.5 ha, 10049 livestock including poultry birds have been covered under various livestock interventions through 258 demonstration units. As a part of capacity building on climate resilient technologies, 122 training programmes were organized benefiting 3889 farmers. In addition, 222 extension activities were carried out involving 3593 farmers and extension personnel under the project.
- Two KVKs organised three skill training programmes under the guidance of agricultural skill council of India benefitting 39 participants involving 23 male and 16 female under different job roles.
- Three processing units were established and 36 training programmes and 6 exposure visits were organized under the program Attracting and Retaining Youth in Agriculture (ARYA). 778 rural youths were trained on value addition and marketing of agriculture produces.
- KVKs organised the Sankalp Se Siddhi event in a befitting manner, in which 3 Union Ministers, 28 Hon'ble MPs, 3 State Ministers and 33 Hon'ble MLAs have taken part in the pledge taking. A total of 2494 farmers in Kerala and 22663 farmers in Karnataka participated in the event and took New India pledge.

- Two farmers won the PPV & FRA awards. Mr. Siddeswara Reddy won the plant Genome Savior Farmer Recognition Award 2017 and Kunai Samaj Abhivradhi Sangh, won the Plant Genome Savior Community Award 2017.
- Swachhta Hi Seva Hai Campaign was organized by KVKs from 15 September to 02 October, 2017 and conducted 4091 activities related to cleanliness of public places.
- The ICAR-ATARI Bengaluru coordinated the activities of Mera Gaon & Mera Gaurav in 10 ICAR institutes in the states of Karnataka and Kerala during the year. The scientists of these ICAR institutes formed 126 teams and carried out various interventions in 565 villages involving 0.71 lakh farmers and other stakeholders.

Farmers' FIRST

- Three Farmer FIRST centers have made several interventions at the field level in crop, horticulture, livestock, NRM, enterprise and Integrated Farming Family System modules. A total of 5138 households in 28 villages were benefited under this programme.

Agricultural Technology Information Centers (ATICs)

- A total of 96934 farmers, 11514 extension personnel, 1294 students and 4819 other stakeholders visited Agriculture Technology Information Centres in the zone. Altogether, 114561 persons visited the ATICs, out of which, 53589 visited for information and 60972 visited for technology products.
- A total of 64483 farmers contacted ATICs through various means of communication.
- Under publications, 28846 books, 3000 technical bulletins and 2190 DVDs were produced and provided to the visitors.

Technology Backstopping by Directorates of Extension

- Directors of Extension and their officials participated in 30 Scientific Advisory Committee Meetings, 47 field days, 21 workshops/seminars and 50 training programmes including off campus programmes.

Human Resource Development

- The Institute organized 5 orientation programmes under HRD week for the Subject Matter Specialists of KVKs during 5-9th February 2018.
- Training programmes for KVK staff on the Public Financial Management System (PFMS) were conducted in 7 institutes.
- Refresher course for the Programme Assistants (Computer) of KVKs from Southern and Northern Karnataka was organized during 10-12th October 2017 and 11-13th December 2017, respectively.
- Training for KVK Subject Matter Specialists to orient on Sujala-3 project was conducted on 11-12th January 2018.

Publications

- Scientists of ATARI published research papers (8), presented papers at national/international conferences (7) contributed, book chapters (4), technical bulletin (1) and reports (3) KVK staff published research papers (182), technical bulletins (33), popular articles (291), extension literature (265), books (16), CD/DVD (93) and newsletters(81) on various technological aspects of agriculture and its allied enterprise.

Workshops and Meetings

- The scientists of ATARI attended scientific workshops (67), meetings (31) and conferences (14) during the reporting period.



About ICAR Agricultural Technology Application Research Institute

The Agricultural Extension Division, one of the eight divisions of Indian Council of Agricultural Research (ICAR), New Delhi has established a network of Krishi Vigyan Kendras (KVKs) all over the country. The KVKs are hosted by ICAR institutes, SAUs, State Departments of Agriculture and NGOs. The Agricultural Extension

Division headed by the Deputy Director General (Agricultural Extension) monitors and review the progress of KVKs through 11 ICAR-Agricultural Technology Application Research Institutes (ATARI) located across the country. The jurisdiction of each ICAR-ATARI is illustrated in Table 1.

Table 1: States & UTs covered by Agricultural Technology Application Research Institutes

Zones	States/UTs (No.)	States/UTs
I	4	Punjab, Uttarakhand, Himachal Pradesh, Jammu & Kashmir
II	3	Rajasthan, Haryana, Delhi
III	1	Uttar Pradesh
IV	2	Bihar, Jharkhand
V	3	West Bengal, Odisha, Andaman & Nicobar
VI	3	Assam, Arunachal Pradesh, Sikkim
VII	5	Tripura, Nagaland, Manipur, Mizoram, Meghalaya
VIII	5	Maharashtra, Gujarat, Daman and Diu, Dadra & Nagar Haveli, Goa
IX	2	Madhya Pradesh, Chhattisgarh
X	4	Andhra Pradesh, Telangana, Tamil Nadu, Puducherry
XI	3	Karnataka, Kerala, Lakshadweep

1.1 ICAR-ATARI

The mandate of ICAR-ATARI are as follows

- Coordination and monitoring of technology application and frontline extension education programmes.
- Strengthening agricultural extension research and knowledge management.

1.2 ICAR-ATARI; Zone-XI, Bengaluru

1.2.1 Genesis

The ICAR established eight Zonal Coordinating Units (ZCUs) in 1979 to monitor and coordinate the Lab to Land Programme (LLP) launched on the occasion

of ICAR's Golden Jubilee (1979). To begin with, Zonal Coordinating Unit-Zone VIII functioned from its office at Tamil Nadu Agricultural University (TNAU), Coimbatore and was shifted to the campus of the Regional Station of National Dairy Research Institute (NDRI), Bangalore in September, 1981. The jurisdiction included Karnataka, Kerala, Tamil Nadu, Puducherry and Lakshadweep. The unit was converted as a Plan Scheme with additional staff in 1986 and additional objective of monitoring the other Transfer of Technology projects of ICAR viz., KVK, Trainers Training Centre (TTC), National Demonstration Scheme (NDS), Operational Research Project (ORP), Scheduled Caste and Scheduled Tribe Project and Special Project on Oilseeds. During 1990-91, another objective of implementing and monitoring of National Pulse Project was added, besides addition of Goa to the jurisdiction

of the zone. The ZCU was upgraded as Zonal Project Directorate (ZPD) in March, 2009 and as Agricultural Technology Application Research Institute (ATARI) since July 2015. As per the reorganization of Zones, ATARI Bengaluru became Zone XI w.e.f. April 2017, covering Karnataka, Kerala and Lakshadweep.

1.2.2 Staff

Total sanctioned staff strength of ICAR-ATARI, Zone XI, Bengaluru is 18, out of which 14 are currently filled (Table 2).

Table 2: Staff strength of ICAR-ATARI, Zone XI, Bengaluru (as on 31.03.2018)

Category	Sanctioned (No.)	Filled (No.)
Director (RMP)	1	*
Scientific	6	5
Technical	2	2
Administrative	8	6
SSS (Gr-II)	1	1
Total	18	14

*vacant since January 17, 2018

1.2.3 Organizational Structure

The organizational structure of ICAR-ATARI, Zone XI and KVKs functioning under this Institute is depicted in Fig.1.

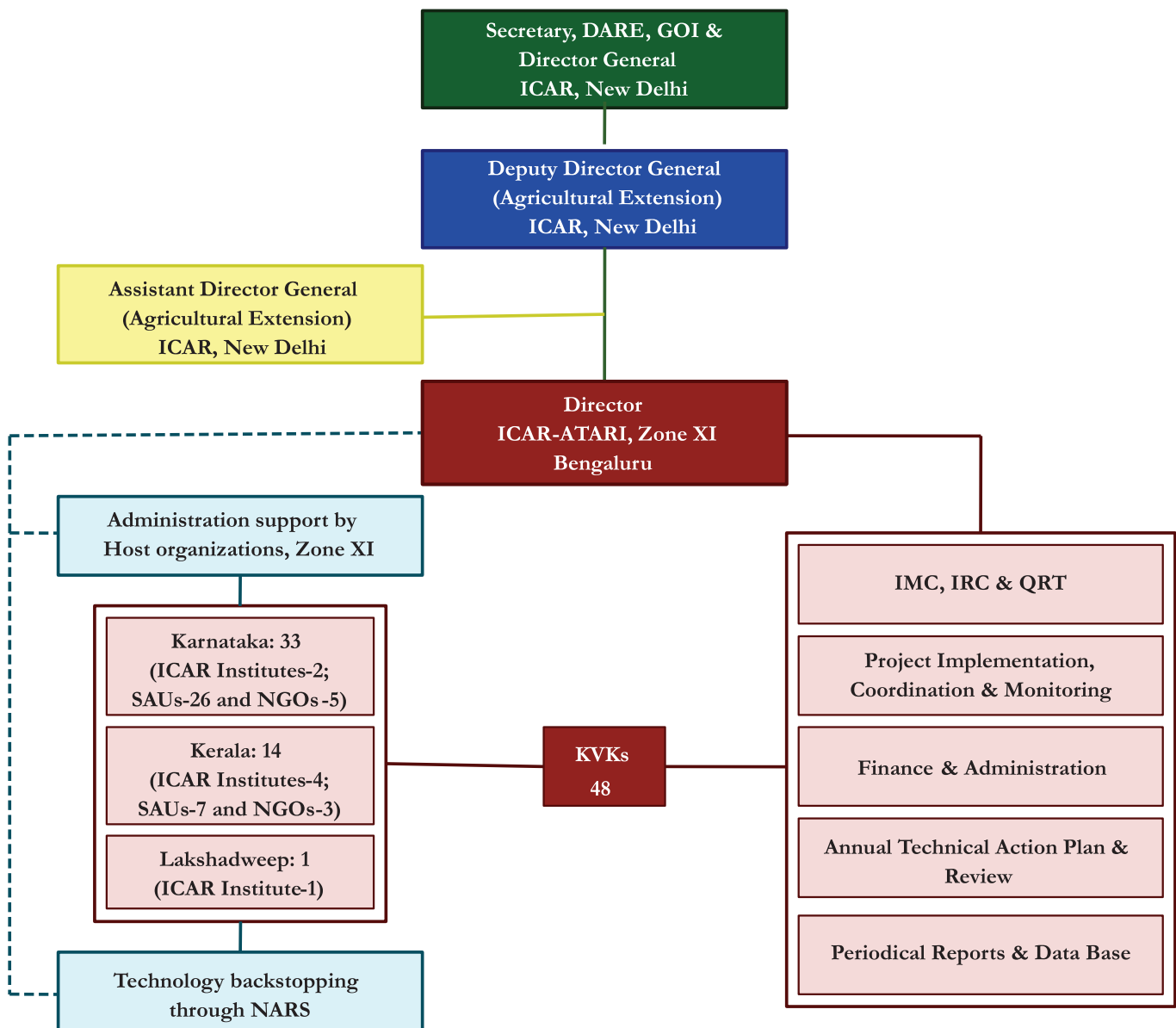


Fig 1: Organizational structure and nature of activities of ICAR-ATARI, Zone XI

1.2.4 Major Activities

Annual Review Workshop of KVKs

Annual Review Workshop of KVKs under ICAR-ATARI, Bengaluru was organized in collaboration with ICAR-CCARI, Goa and ICAR-KVK, North Goa during 04-06 May, 2017. KVKs of Karnataka, Tamil Nadu, Kerala, Goa, and Puducherry participated in the Workshop. The Review Workshop was inaugurated by Shri Vijay Sardesai, Hon'ble Minister of Agriculture, Govt. of Goa, on 04 May, 2017. Dr. Sreenath Dixit, Director, ICAR-ATARI, Bengaluru; Dr. Y.G.Prasad, Director, ICAR-ATARI, Hyderabad; Dr. Lakhan Singh, Director, ICAR-ATARI, Pune; Dr. Eaknath Chakurkar, Director, ICAR-CCARI, Goa; Directors of Extension Education of SAUs; Scientists of ICAR-ATARI, Bengaluru; Scientists of ICAR-CCARI, Goa and Heads of KVKs participated in the workshop. During the workshop, the heads of KVKs presented annual progress of their respective KVKs for the year 2016-17.

During the plenary session, Dr. Ashok Kumar Singh, Deputy Director General (Agricultural Extension), ICAR, New Delhi, highlighted the need for 'Doubling Farmers Income (DFI) by 2022'. He emphasized on integration of income augmenting technologies in different farming situations, crop diversification, linking farmers with the markets, exploring options for value addition to agricultural produce and encouraging participation of youth in agriculture on convergence mode. He briefed about four national priorities viz., doubling farmer's income, distribution of soil health card, market for produce and skill development in agriculture. Further, he appreciated the good work of KVKs at grassroots despite facing several constraints. He gave away certificates of appreciation to KVKs who made best presentations.

Farmers Conclave (February 16-17, 2018, Bengaluru)

Farmers Conclave was jointly organized in association with NIANP, Bengaluru during 16-17 February, 2018 at NIANP Campus. ATARI Bengaluru took the responsibility of putting up exhibition stalls and mobilizing farmers' participation on both the days. Exhibition was visited by the Union Ministers, Secretary, DARE and Director General, ICAR; Deputy Director General (AE), other dignitaries and farmers.



Union Ministers visiting exhibition stall at Farmers conclave

Shri Radhamohan Singh, Hon'ble Union Minister for Agriculture and Farmers Welfare inaugurated the Farmers Conclave in the presence of Hon'ble Union Minister Ananth Kumar, Cabinet Minister of Chemicals and Fertilizers; Shri D V Sadananda Gowda, Cabinet Minister for Statistics and Programme Implementation; Shri Ananth Kumar Hegde, Minister of State for Skill Development and Entrepreneurship.



During the event more than 2000 farmers participated from 13 districts of Southern Karnataka. During the conclave, farmers-scientists interface was arranged to enable farmers to get solutions and advisories.



Farmers from Hassan district participating in the farmers' conclave

National KVK Conference and Krishi Unnathi Mela

National KVK Conference was organised at New Delhi during 16-18 March 2018. Hon'ble Prime Minister inaugurated the National Conference on KVK, on March 17, 2018 and launched 25 KVKs, which included two KVKs of Karnataka, viz., Vijayapura-II and Yadgir. Hon'ble Prime Minister conferred National Level and Zonal Level Best KVK Awards viz., Pandit Deen Dayal Upadhyaya Krishi Vigyan Protsahan Puruskar.



Hon'ble Prime Minister at National KVK Conference

ATARI Bengaluru participated in the KVK Conference along with the KVKs, Directors of Extension of State Agricultural Universities of the Zone and progressive farmers. During the Conference, KVK Pattanamthitta was awarded the Zonal Best KVK for the year 2017. ATARI Bengaluru participated in the exhibition organised as part of the KVK conference and displayed the achievements of selected KVKs of the Zone.



View of exhibition stall of ATARI Bengaluru at KVK Conference

Annual Action Plan (2018-19) Workshop

Annual Action Plan (2018-19) Workshop of KVKs of Zone XI consisting of Karnataka, Kerala and Lakshadweep was organized at KVK Kodagu during 22-24 March 2018.

1.3 Budget

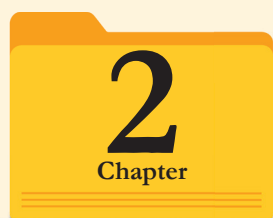
A total of Rs.5261.73 lakh was sanctioned for the year 2017-18 and Rs.5261.51 lakh of the sanctioned budget was incurred as expenditure. Head-wise details of budget and expenditure are furnished in Table 3.

Table 3: Head-wise budget and expenditure of Zone XI for 2017-18

(₹. in Lakh)

Heads	Sanction				Expenditure			
	ATARI	KVKs	Support to DEE at SAUs	Total	ATARI	KVKs	Support to DEE at SAUs	Total
Recurring								
Pay & Allowance	208.36	4237.14	0.00	4445.50	208.36	4237.14	0.00	4445.50
T.A	17.84	74.08	3.73	95.65	17.84	74.08	3.73	95.65
HRD	3.57	0.00	3.80	7.37	3.57	0.00	3.80	7.37
Contingencies	28.51	669.95	14.75	713.21	28.29	669.95	14.75	712.99
Total	258.28	4981.17	22.28	5261.73	258.06	4981.17	22.28	5261.51





About Krishi Vigyan Kendras

The Krishi Vigyan Kendras (KVK) are the agricultural knowledge and resource centres for farmers, farm women, rural youth and extension functionaries. KVKs are the district level institutions promoting science-based practices in agriculture and allied sectors in a problem-solving mode. KVKs accomplish this through assessment and demonstration of location specific technology modules. Besides, they also perform activities to meet the needs of farmers and other stakeholders.

2.1 Establishment of KVKs

Based on the recommendation of Education Commission (1964-66), consideration/review by Planning Commission and Inter-Ministerial Committee, and further recommendation by a committee headed by Dr. Mohan Singh Mehta appointed by ICAR in 1973, the idea of establishment of Farm Science Centre (Krishi Vigyan Kendra) was evolved. First KVK was established in 1974 at Puducherry on pilot basis under the administrative control of Tamil Nadu Agricultural University, Coimbatore. The XI Five Year Plan envisaged establishing additional KVK in larger districts. Zone VIII had the privilege of establishing the first additional KVK, in Tumakuru district, Karnataka. With effect from April 2017, reorganization of zones was implemented and ATARI Bengaluru became Zone XI with jurisdiction of Karnataka, Kerala and Lakshadweep. There are 48 KVKs in the Zone, the state and host organization-wise distribution is as given in Table 4.

Table 4: State and host organization-wise number of KVKs in Zone XI

States/UT	Host organization-wise KVKs (No.)			Total KVKs (No.)
	SAUs	NGOs	ICAR Institutes	
Karnataka	26	05	02	33
Kerala	7	03	04	14
Lakshadweep	-	-	01	01
Total	33	08	07	48

SAU - State Agricultural University; NGO - Non-Governmental Organization; ICAR - Indian Council of Agricultural Research

2.2 Vision, Mission, Mandate and Activities of KVKs

Vision

Science and technology-led growth leading to enhanced productivity, profitability and sustainability of agriculture

Mission

Farmer-centric growth in agriculture and allied sectors through application of appropriate technologies in specific agro-ecosystem perspective

Mandate

Technology assessment and demonstration for its application and capacity development

Activities

- On-farm testing to assess the location specificity of agricultural technologies under various farming systems.
- Organize frontline demonstrations to establish production potential of technologies on the farmers' fields.
- Capacity development of farmers and extension personnel to update their knowledge and skills on modern agricultural technologies.
- To work as knowledge and resource centre of agricultural technologies for supporting initiatives of public, private and voluntary sector in improving the agricultural economy of the district.
- Provide farm advisories using ICT and other media means on varied subjects of interest of farmers.

2.3 Manpower

The approved strength of manpower at each KVK is 16, which includes one Programme Coordinator, six Subject Matter Specialists, three Programme Assistants, two administrative staff, two drivers and two supporting staff. Accordingly, the total sanctioned staff for 48 KVKs of Zone VIII is 768, out of which 509 (66.28%) were in position. Details of state and category-wise staff strength of KVKs are furnished in Table 5.

Table 5: State wise and category wise staff strength of KVKs

Category	Karnataka (33 KVKs)		Kerala (14 KVKs)		Lakshadweep (1 KVK)		Total (48)	
	S	F	S	F	S	F	S	F
Programme Coordinator	33	27	14	12	1	0	48	39
Subject Matter Specialist	198	143	84	53	6	1	288	197
Programme Assistant	99	66	42	24	3	0	144	90
Administrative	66	38	28	25	2	0	96	63
Driver	66	43	27	17	2	0	95	60
Supporting	66	36	29	24	2	0	97	60
Total	528	353	224	155	16	1	768	509
Percentage filled	66.85		69.19		6.25		66.28	

S-Sanctioned posts (No.) F-Filled positions (No.)

2.4 Infrastructure at KVKs

In Zone XI, 43 KVKs have administrative building, 39 KVKs have farmers hostel, staff quarters are in 28 KVKs, 16 KVKs have established rain water harvesting units, 21 KVKs have e-connectivity, 38 KVKs have soil and water

testing labs, 7 KVKs have portable carp hatchery, 3 KVKs have minimal processing unit, 14 KVKs have plant health diagnostic labs and 44 KVKs have four-wheelers. There are 80 technology demonstration units and 94 two-wheelers.

Table 6: State wise details of infrastructure in KVKs

(No.)

Infrastructure	Karnataka	Kerala	Lakshadweep	Total
Administrative building	29	14	0	43
Farmers hostel	27	12	0	39
Staff quarters	19	09	0	28
Demo Units	49	31	0	80
Rainwater Harvesting Unit	10	06	0	16
E-Connectivity	11	10	0	21
Soil & Water Testing Lab	26	13	01	38
Portable Carp Hatchery	04	03	0	7
Minimal Processing Unit	01	02	0	3
Plant Health Diagnostic Lab	09	05	0	14
Four wheeler	31	13	0	44
Two Wheeler	63	28	03	94

2.5 Scientific Advisory Committee

Scientific Advisory Committee (SAC) is the advisory body, which guides and reviews KVK activities. Head of host organization is the Chairman and members include Director, ATARI, Director of Extension, officials from all development departments of the district, and representatives of farmers/farmwomen. SAC discusses the progress of work done as per mandate and provide guidance for future activities. A total of 34 KVKs conducted SAC meetings during the reporting period.

2.6 Revolving Fund

Revolving fund is in operation at 45 KVKs of the Zone. The KVKs are utilizing revolving fund for production of technological products and the net balance as on 31st March, 2018 was Rs.10.14 crore. Fourteen KVKs had closing balance of more than Rs.20 lakh, eleven KVKs had a balance in the range of Rs.10 to 20 lakh and eleven KVKs had closing balance in the range of Rs.4 to 10 lakh.

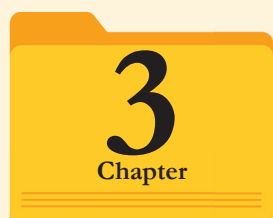
2.7 Thrust Areas

Based on the agro-ecological situation, prevailing cropping and farming systems, KVKs are broadly working on the following thrust areas:

- Introduction and up-scaling of improved varieties/hybrids of crops and livestock breeds through technical and quality input back-up.

- Sustainable crop production through integrated nutrient management and organic farming strategies.
- Integrated pest and disease management.
- Development and promotion of crop diversification and alternate land use systems.
- Empowerment of women and youth in terms of improved nutrition, income generation and drudgery reduction through technology intervention.
- Scientific management of large ruminants, small ruminants and poultry.
- Promotion of horticulture as a mechanism of crop diversification and augmenting family income.
- Value addition, processing and market facilitation of household and commercial enterprises.
- Soil health management, soil & water conservation for drought proofing and sustainable rainfed farming.
- Small scale mechanization for saving time and reducing cost and drudgery.
- Capacity building of rural youth and women to establish self-employment units.
- Human resource development in fishery sector through training and capacity building.





Achievements of Krishi Vigyan Kendras

3.1 Krishi Vigyan Kendras

Achievements made by the KVKs under the mandated activities are reported in this chapter under various heads and sub-heads. KVK Lakshadweep was under transition due to change of host organization from ICAR CCARI, Port Blair to ICAR CMFRI, Kochi. Hence, no progress was reported for 2016-17. Achievements related to KVKs of Karnataka and Kerala are presented below.

3.1.1 Technology Assessment

Crops and livestock together, 33 KVKs in Karnataka tested 224 technologies in 510 trials whereas 14 KVKs in Kerala tested 174 technologies in 582 trials. Among the 224 technologies tested in Karnataka, 209 technologies were related to crops (475 trials) and 15 technologies were related to livestock (35 trials). Out of the 174 technologies tested in Kerala, 153 were under crops (508 trials) and 21 were under livestock (74 trials).

Table 7: Summary of on farm trials conducted by KVKs in Zone XI

State	KVKs (No.)	Technologies (No.)	Trials (No.)
Karnataka	33	224	510
Kerala	14	174	582
Total	47	398	1092

Crops

KVKs in Karnataka and Kerala together assessed 362 technologies through 983 trials in 120 locations under various thematic areas related to crops. The details are provided in Table 8 and 9. More number of trials were conducted under Varietal Evaluation (159 technologies in 501 trials) followed by Integrated Pest Management (47 technologies) and Integrated Nutrient Management (46 technologies). The state wise break up of these trials is

provided in Table 9. In Karnataka 29 KVKs conducted 288 trials of 95 technologies. In integrated nutrient management, 13 KVKs tested 31 technologies in 55 trials. KVKs also assessed cropping systems with 37 technologies and 45 trials. In Kerala, 13 KVKs conducted technology assessment under the theme varietal evaluation wherein 64 technologies were tested in 213 trials. Under integrated pest management, 10 KVKs tested 34 technological options through 79 trials.

Table 8: Crops thematic-area wise details of on farm trials conducted in KVKs of Zone XI

Themes	KVKs (No.)	Locations (No.)	Technologies (No.)	Trials (No.)
Cropping Systems	10	10	37	45
Drudgery Reduction	2	2	4	25
Farm Machineries	1	1	3	3
Integrated Crop Management	8	8	21	44
Integrated Disease Management	8	8	21	60
Integrated Nutrient Management	21	21	46	122
Integrated Pest Management	14	14	47	100
Processing and Value Addition	5	5	7	18
Resource Conservation Technology	7	7	12	56
Storage Technique	0	0	0	0
Varietal Evaluation	42	42	159	501
Seed / Plant production	1	1	2	5
Mushroom cultivation	1	1	3	4
Total		120	362	983

Table 9: Crops thematic-area wise details of on farm trials conducted in KVKs of Karnataka and Kerala

Theme	Karnataka			Kerala		
	KVKs / Locations (No.)	Technologies (No.)	Trials (No.)	KVKs / Locations (No.)	Technologies (No.)	Trials (No.)
Cropping Systems	10	37	45	0	0	0
Drudgery Reduction	1	2	5	1	2	20
Farm Machineries	0	0	0	1	3	3
Integrated Crop Management	4	10	23	4	11	21
Integrated Disease Management	4	11	15	4	10	45
Integrated Nutrient Management	13	31	55	8	15	67
Integrated Pest Management	4	13	21	10	34	79
Processing and Value Addition	0	0	0	5	7	18
Resource Conservation Technology	3	5	14	4	7	42
Storage Technique	0	0	0	0	0	0
Varietal Evaluation	29	95	288	13	64	213
Seed / Plant Production	1	2	5	0	0	0
Mushroom Cultivation	1	3	4	0	0	0
Total		209	475		153	508

Livestock

Under livestock, 28 technologies were tested through 109 trials (Table 10). Technological assessment was carried out under feed and fodder thematic area wherein eight technologies were tested in 36 trials. This was followed by seven technologies each under evaluation of breeds and production and management of livestock. The state

wise break up indicates that more number of technologies related to livestock were tested in the state of Kerala (Table 11). Six technologies under the theme feed and fodder were tested by three KVKs, followed by five technologies under production and management theme. In Karnataka, eight technologies under the theme feed and fodder were tested through 20 trials. Altogether 28 technologies were tested under livestock category.

Table 10: Livestock thematic-area wise on farm trials conducted in KVKs of Zone XI

Theme	KVKs (No.)	Locations (No.)	Technologies (No.)	Trials (No.)
Evaluation of Breeds	5	5	7	20
Feed and Fodder	7	7	8	36
Nutrition Management	1	1	2	20
Pest/Disease Management	2	2	4	20
Production and Management	4	4	7	13
Total		19	28	109

Table 11: Livestock thematic-area wise on farm trials conducted in KVKs of Karnataka and Kerala

Theme	Karnataka			Kerala		
	KVKs (No.)	Technologies (No.)	Trials (No.)	KVKs (No.)	Technologies (No.)	Trials (No.)
Evaluation of Breeds	3	5	12	2	4	5
Feed and Fodder	4	8	20	3	6	16
Nutrition Management	0	0	0	1	2	20
Pest/Disease Management	0	0	0	2	4	20
Production and Management	1	2	3	3	5	13
Total	8	15	35	11	21	74

3.1.2. Location specificity of crop technologies

Varietal evaluation - chickpea

Very good results were reported from Belagavi district where variety GBM-2 gave highest yield of 26.1 q/ha as against 22.5 q/ha by JG-11 and 23.2 q/ha by JAKI-9218, JG-14 under late sown irrigated conditions gave a yield of 21.5 q/ha which was nearly double than JG-11 variety at Vijayapura District. The performance of GBM-2 varied across the locations with yield levels as low as 6.3 q/ha in Chitradurga district (Table 12).



Preparations to take up plant protection in OFT plots by KVK Davanagere

Table 12: Assessment of chickpea varieties by KVKs of Karnataka during rabi

KVK	Yield (q/ha)							
	Local (A1)	JG-11	JAKI-9218	GBM-2	BGD-103	NBeG-3	NBeG-4	JG-14
Ballari		9.3	15.4		17.5			
Kalaburagi-2	9.5	12.5					14.5	
Gadag		10.8	12.3	11.9		13.5		
Vijayapura-2		10.8						21.5
Belagavi-2	9.7	11.1	10.8	12.0				
Belagavi-1		22.5	23.2	26.1				
Chitradurga		8.1	7.9	6.3				
Dharwad		17.7	18.8	16.4				
Vijayapura-1		11.0	12.6	10.7				
Mysuru		8.4	10.6	10.6				
Tumkur-1	8.7	10.9	12.1	11.3				12.4
Bengaluru rural	8.3	9.1	10.3	8.6				
Chamarajanagara	11.8	12.6	13.4	14.0				
Davanagere		8.5	9.3	11.5				
Hassan	8.5	9.2	10.5	9.5				
Raichur	9.0	10.5		9.8		13.1		
Bagalkot		19.0	18.7	19.3				
Chikkamagaluru		17.5	15.5	15.0	18.0			

Varietal evaluation - pigeonpea

A total of eight pigeonpea varieties were assessed in six districts of Karnataka during 2017-18 (Table 13). Among the varieties tested, high yield was recorded at Bagalkot district wherein all the three varieties gave more than 17.6 q/ha grain yield, the highest being 19.1 q/ha by

BSMR-736. GRG-811 performed better across the centres with a range in yield of 12.5 q/ha in Tumakuru -II to 18.2 q/ha at Bagalkot.

Table 13: Assessment of pigeonpea varieties by KVKs of Karnataka during kharif

KVK	Yield (q/ha)						
	Local/ TS-3R	BSMR-736	GRG-811	BRG-2	BRG-5	GRG-152	PRG-176
Tumakuru-2	8.3		12.5		11.7		
Kalaburagi-1	11.9		13.3			14.4	12.7
Vijayapura-1	14.0		15.2			14.4	6.5
Vijayapura-2	12.0		16.0			14.0	7.0
Chitradurga		10.5		6.9	8.8		
Bagalkot	17.6	19.1	18.2				



Farmer explaining the crop condition to the KVK scientists in OFT plot at Tumakuru

Varietal evaluation - onion

Onion varieties for rabi season were assessed in 5 locations (4 in Karnataka and 1 in Kerala). Among the different varieties tested the highest yield was recorded at Chitradurga district by variety Bheema Shakthi with a yield of

329 q/ha. The second-best yield was also recorded at Chitradurga by Arka Niketan with a yield of 274 q/ha. Bheema Shakthi also emerged as the best variety in Tumakuru district with a yield of 271 q/ha (Table 14).



Recording observations in the OFT plot on onion by KVK Tumakuru

Table 14: Assessment of onion varieties by KVKs of Karnataka and Kerala during rabi

Varieties	Yield (q/ha)				
	Chitradurga	Dharwad	Kalaburagi II	Tumakuru II	Wynad
Satara Gurva (EP)	191.0	203.0	180.0		
Arka Niketan	274.0		222.0	222.0	
Bhima Shakti	329.0			271.0	
NHRDF-28 Red	256.0	230.0			
Bhima Super		221.0			
Bhima Kiran			262.0		
NHRDF 3 Red				262.0	
Agrifound Red					48.0
CO On 5					120.0

Varietal evaluation – ginger

Ginger varieties were tested in 4 locations in Karnataka and the details are given in Table 15. Among the varieties tested, highest yield was reported by variety Maran at Bidar with a yield of 398 q/ha. Variety varada recorded higher yield in 3 locations – Bengaluru Rural, Kodagu and Mysuru.



Field visit to the OFT plot on ginger at Mysuru

Table 15: Assessment of ginger varieties in different districts of Karnataka

Varieties	Yield (q/ha)			
	Bengaluru Rural	Bidar	Kodagu	Mysuru
Himachal	181.0		174.0	102.0
Riodegenerio	197.0			163.0
Maran	281.0	398.0		150.0
Varada	301.0		197.0	179.0
Mahima			191.0	
Humnabad		322.0		
Local				

Varietal evaluation – cabbage

Evaluation of different hybrids in cabbage during off season was taken up in 3 districts in Kerala (Table 16). The highest yield was obtained with hybrid Green Challenger at Thrissur district with a yield of 500 q/ha. However, its performance varied widely in other two districts viz., Kollam and Pathanamthitta. The performance of Green Voyager was more stable in the 3 districts with yields in the range of 286 q/ha to 312.5 q/ha. Green Voyager was also better in terms of head size (13.4 cm) and head weight (746 gm) compared to other hybrids.



Assessment of cabbage hybrids by KVK Thrissur

Table 16: Assessment of cabbage varieties in different districts of Kerala

Varieties	Yield (q/ha)			Head size (cm)	Head weight (gm)	
	Kollam	Pathanamthitta	Thrissur	Pathanamthitta	Pathanamthitta	Thrissur
NS-183	227.0	234.0	200.0	9.6	626	500
Green Voyager	293.0	286.0	312.5	13.4	746	590
Green Challenger	272.0	276.0	500.0	12.2	712	700

Varietal evaluation - cassava (tapioca)

Among the different varieties of cassava assessed by three KVKs of Kerala, variety Suvarna yielded highest with 350 q/ha at Idukki district (Table 17). The next best yield was also obtained at Idukki with variety Vellayani Hraswa (300 q/ha). Variety Sree Jaya was the best in Alappuzha district with a yield of 278 q/ha.



Field view of OFT plot on cassava varieties by KVK Kollam

Table 17: Assessment of cassava varieties by KVKs of Kerala

Varieties	Yield q/ha across the testing locations			
	Alappuzha-1	Alappuzha-2	Idukki	Thrissur
Farmers Practice	197.0		200.0	120.0
Sree Jaya	278.0	202.0	250.0	100.0
Vellayani Hraswa	229.0		300.0	120.0
Sree Vijaya		175.0		160.0
Sree Pavithra		144.0		
Suvarna			350.0	

Nutrient management

The secondary and micro nutrient mixture for banana was tested in 4 locations in Kerala and the results are presented in Table 18. Ayar, a secondary and micro nutrient mixture released by KAU resulted in higher yield at Kottayam. In Kannur district, Ayar gave lesser yield than the use of SOP + Boron spray and Urea + SOP + fresh cow dung.



Assessment of nutrient management in banana by KVK Kottayam

Table 18: Assessment of banana nutrient management by KVKs of Kerala

Treatments	Yield (q/ha)			
	Kottayam	Kollam	Alappuzha	Kannur
Farmer practice	150.0	148.0	134.0	230.0
RP: Fertilizers as per POP (190:115:300g NPK/ plant/ year)	280.0			
RP + Ayar (Secondary and Micro Nutrient Mixture)	350.0	206.0	216.0	330.0
RP + Sampoorna KAU multimix		183.0		
Soil test based INM practices			177.0	
SOP + Boron spray				352.0
Urea + SOP + fresh cow dung				355.0

Pest management

The best management practices against Diamond Back Moth (DBM) in cabbage were assessed in Kolar, Ramanagara and Bengaluru Rural districts (Table 19). The highest yield was obtained at Kolar district. The use of mustard trap crop + bio-pesticides + safe pesticides gave higher BC ratio in Ramanagara and Bengaluru Rural districts and the increase in yield over farmers’ practice was to the tune of 13.8% at Ramanagara and 18.9% in Bengaluru Rural District.



Assessment of cabbage pest management by KVK Ramanagara

Table 19: Assessment of cabbage pest management options by KVKs of Karnataka

Technology options	Yield (q/ha)		
	Kolar	Ramanagara	Bengaluru Rural
Farmer practice	515.0	363.0	387.0
Mustard trap crop, neem soap spray (10 g/l), spray with novuluron (0.075), Indaxacarb (0.05%), emamectin benzoate (0.05%)	533.0		367.0
Intercropping with Mustard (25:2), Spray the crop with Dichlorvos (0.05%) and 5% NSKE		346.0	326.0
Intercropping with Mustard (trap crop), Installation of WOTA-T sticky traps, Spray of Bt (1g/l), Neem Soap (5g/l), Entomopathogenic fungi (<i>Beauveria bassiana</i>) (0.2%), Emamectin benzoate 5 SG (0.05%), Spinosad 2.5SC (0.15%)		412.0	449.0
Spray with Spinosad @ 0.2 ml/l -Cover the crop with polypropylene cloth 15 days after transplanting	562.0		

Crop management

Major issues in jasmine crop management are pruning and nutrient management apart from pest and diseases. Pruning during November with supporting nutrient management interventions helped in achieving highest yield in both the locations tested (Table 20). Income and BC ratio was also better during November pruning.



Scientists-farmers interaction at OFT on jasmine pruning by KVK Udipi

Table 20: Assessment of crop management options for jasmine by KVKs of Karnataka

Pruning and nutrient management	Dakshina Kannada				Udipi			
	Yield q/ha	100 flower weight (g)	Net Return Rs. /ha	BC Ratio	Yield q/ha	100 flower weight (g)	Net Return Rs. /ha	BC Ratio
No Pruning + groundnut cake + FYM 20 kg/ plant	2.4	9.1	151314	2.80	2.3	5.2	190573	3.8
November pruning, 50 cm height + FYM 10 kg/plant + 120:240:240 g NPK/plant in 2 splits + Foliar spray of ZnSO ₄ 0.25% + MgSO ₄ 0.5% + FeSO ₄ 0.5%	3.5	11.0	301220	4.23	3.2	6.5	277028	4.6
December pruning, 90 cm height + FYM 10 kg/plant + 100:150:100 NPK g/plant in 3 splits	3.3	10.2	278500	4.01	3.1	6.3	264920	4.4
January pruning, 60 cm height + FYM 20 kg/plant + 120:240:240 NPK g/plant in 6 splits	3.0	10.0	264608	3.74	3.0	6.1	255082	4.3

Intercropping systems in mulberry

Different intercrops were tested under tree-mulberry cropping system in Karnataka and the results are given in Table 21. In terms of gross income, intercrop of field bean fetched highest returns, followed by mulberry+palak. However, best BC ratio was recorded in pure crop of mulberry in most of the places, followed by intercrop with field bean.



Assessment of intercropping in mulberry at Kolar

Table 21: Economics of mulberry cropping systems assessed by KVKs in Karnataka

KVK/District	Intercrops in tree mulberry	Income (Rs/ha)	KVK/District	Cropping system	BC ratio
Chikkaballapura	Field bean	218200	Chikkaballapura	Pure crop	7.17
Mandya	Palak	201844	Chikkaballapura	Mulberry + Field bean	6.12
Mandya	Methi	181510	Kolar	Mulberry + Field bean	5.26
Kolar	Field bean	175106	Kolar	Pure crop	5.18
Chikkaballapura	Ragi	170416	Mandya	Pure crop	4.69

3.1.3 Location Specificity of Livestock Technologies

Fodder production

The major constraints in livestock production are scarcity of fodder, non-availability of high yielding varieties of green fodder, low yield etc. Performance of improved fodder varieties was assessed by KVKs in Ballari, Koppal and Vijayapura districts. The trials indicated that the improved varieties of fodder performed better as compared to local, and CoFS 31 gave higher yield in Ballari and Koppal districts. (Table 22).



Farmer family involved in the assessment of fodder varieties by KVK Ballari

Table 22: Performance of fodder varieties in Karnataka

District/KVK	Yield (q/ha)					
	CoFS 29	CoFS 31	SSV-74	NB-21	DHN-6	Co-5
Ballari	1475	1525				
Koppal	1214	1555	714			
Vijayapura-1				400	1208	1344

3.1.4 Frontline Demonstrations (FLDs)

Frontline demonstrations on crops, livestock, fisheries, agriculture implements and other allied agriculture enterprises were taken up to demonstrate the production potential of newly released crop varieties, resource conservation technologies, crop production and protection technologies, improved technologies in livestock and fisheries and other allied activities. During 2017-18, 10803 demonstrations were conducted including 1423 on cereals and millets, 190 on oilseeds, 217 on pulses, 142 on

commercial crops, 30 on fibre crops, 130 on fodder crops, 835 on vegetable crops, 84 on tuber crops, 505 on fruit crops, 106 on flowers, 131 on plantation crops, 180 on spices and medicinal crops, 518 on hybrids of various crops. Further, 3025 cluster demonstrations on pulses and 2207 on oilseeds were conducted under NFSM and NMOOP respectively in Karnataka and Kerala. KVKs also conducted 81 demonstrations on agricultural farm implements, 591 demonstrations on livestock, 88 demonstrations on fisheries and 320 demonstrations on enterprises covering

an area of 202.2 ha in the states of Karnataka, and Kerala (Table 23). Apart from this, 841 demonstrations on crops and livestock were at different stages of implementation

at the time of compilation of results in the KVKs of Karnataka and Kerala.

Table 23: State-wise frontline demonstrations conducted during 2017-18

Crop Category	Karnataka		Kerala		Grand Total	
	Demonstrations (No.)	Area (ha)	Demonstrations (No.)	Area (ha)	Demonstrations (No.)	Area (ha)
Cereals and millets	1210	468.0	213	75.7	1423	543.7
Oilseeds	172	66.0	18	4.5	190	70.5
Pulses	202	77.8	15	5.0	217	82.8
Commercial crops	142	38.8	-	-	142	38.8
Fibre crops	30	12.0	-	-	30	12.0
Fodder Crops	120	29.6	10	1.0	130	30.6
Vegetable crops	569	170.0	266	17.8	835	187.8
Tuber crops	29	10.6	55	4.2	84	14.8
Fruit crops	144	51.6	361	37.3	505	88.9
Flower crops	106	35.1	0	0	106	35.1
Plantation crops	96	24.2	35	2.4	131	26.6
Spices and medicinal crops	100	26.0	80	15.1	180	41.1
Cluster FLD-pulses	2640	1056.0	385	154.0	3025	1210.0
Cluster FLD-oilseeds	2207	882.8	-	-	2207	882.8
Hybrids of crops	419	150.4	99	8.6	518	159.0
Farm implements	45	31.0	36	12.2	81	43.2
Livestock	446	691 animals, 17 units	145	79 animals, 62 units	591	770 animals, 79 units
Fisheries	78	61 units	10	10 units	88	71 units
Enterprises	240	73 units	80	52 units	320	125 units
Total	8995	3129.9	1808	337.81	10803	3467.7
FLDs under progress	573	-	268	-	841	-

3.1.4.1 Cereals and millets

A total of 1423 demonstrations were conducted in cereals and millets covering an area of 543.7 ha during the year by the KVKs, 1210 in Karnataka and 213 in Kerala. The state wise results are presented in the foregoing discussions.

Karnataka: A total of 290 demonstrations in paddy, 167 in wheat, 105 in maize, 192 in sorghum, 166 in finger millet, 180 in foxtail millet, 96 in little millet, 10 in kodo millet and 4 in proso millet crops were conducted covering an area of 468 ha in the farmers' fields during the year (Table 24). In paddy, technologies such as ICM, IPM, INM, IDM, planting methods, improved varieties viz. GNV-10-89 and KPR-1, salt tolerant varieties Gangavathi sona and GGV-05-01 and problematic soil management gave 6.1 to 37.3 % increase in grain yield over their respective check. BCR was higher with adoption of new methods of planting (2.99) and IPM (2.94) with higher net returns in paddy. The highest yield of

85.0 q/ha was recorded with GNV-10-89 variety and lowest was 24.7 q/ha under organic cultivation of Mugad Siri variety. In wheat, 46.3 q/ha grain yield was recorded under IPM by DWR-225 as compared to 22.2 q/ha under ICM with different varieties. The improved wheat variety DDK-1029 recorded 31.5 q/ha as compared to 28.3 q/ha in the check. The ICM technology in maize gave an increase of 19.6% (64.2 q/ha) in yield as compared to check (53.6 q/ha). In sorghum, SPV-2217 gave 20.9% higher yield in rabi as compared to 25.5% increase in yield in kharif over check. Method of planting in finger millet with KRM 301 variety gave 35.6% higher yield over check. The higher BCR of 3.41 was obtained with ICM technology with yield of 11.7 q/ha in little millet. The processing and value addition technology in foxtail millet gave higher net returns of Rs. 23458/ha as compared to check (18556/ha). The kodo millet variety RK 390-25 recorded 19.4 q/ha with 134% higher yield over check. Similarly the proso millet under ICM gave 16.8 q/ha as compared to 12.4 q/ha in check.



Table 24: Frontline demonstrations conducted by the KVKs of Karnataka on cereals and millet crops

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Paddy	ICM	Mugad Siri 1253, MO-4, Sona Masuri, PSB-68, Tunga-13901, Kaveri Sona	8	90	34.0	50.5	42.3	20.0	55564	2.66	40572	2.18
	INM	Sona masuri, CSR-22	2	15	6.0	61.7	51.7	19.2	80566	2.70	58306	2.18
	IPDM	JGL-1798	1	10	4.0	58.0	45.5	27.5	38800	2.55	23500	2.07
	IDM	KPR-1	1	10	4.0	51.9	37.8	37.3	24944	1.59	6426	1.17
	IPM	BPT-5205, BR-2655, Gangavati Sona	3	35	14.0	62.9	57.4	9.9	75733	2.94	58289	2.37
	Improved variety	GNV-10-89	1	10	4.0	85.0	74.5	14.1	96750	2.72	95250	2.56
	Improved variety	KPR-1	1	25	10.0	62.5	50.0	25.0	20248	2.37	8868	1.46
	Salt tolerant variety	GGV-05-01	1	10	4.0	63.1	54.8	15.2	26545	1.40	14027	1.22
	Salt tolerant variety	Gangavathi sona	1	17	6.8	56.2	46.5	20.9	63290	2.37	37300	1.84
	Method of planting	Kaveri Sona, BPT-5204, BR-2655	3	30	12.0	65.4	61.7	6.1	82610	2.99	66028	2.27
	Nutrient management	Kaveri Sona, BR-2655	2	18	6.4	59.8	52.5	16.3	65839	2.51	53205	2.10
	Organic cultivation	Mugad Siri	1	10	4.0	24.7	28.4	-13.1	27300	2.24	26327	2.06
	Problematic soil management	MO-4	1	10	4.0	60.7	50.8	19.6	37410	2.23	26593	1.90
	Sub total			290	113.2	58.6	50.3	16.8	53508	2.41	39592	1.95
Wheat	ICM	UAS-304, UAS-334, MAC-6222	4	62	25.0	22.2	19.3	16.2	28753	2.94	20178	2.42
	IPM	DWR-225	1	50	10.0	46.3	42.5	8.8	49750	3.05	43950	2.83
	IWM	MAC6222	1	10	4.0	28.2	25.1	12.4	44260	2.90	37551	2.66
	Varietal introduction	DDK-1029	1	10	4.0	31.5	28.3	11.3	24675	2.09	19875	1.88
	ICM	DDK-1029	3	35	13.6	29.7	23.8	24.6	40387	2.77	29565	2.35
		Sub total			167	56.6	31.6	27.8	14.7	37565	2.75	30224

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Maize	Intercropping	Prive Hybrid + BRG-5	1	30	12.0	35.4	29.7	19.2	4200	1.12	2600	1.09
	IPDM	CP 818	1	10	2.0	61.3	55.6	10.3	60547	2.46	48372	2.13
	ICM	Ganga Kaveri	2	20	8.0	64.2	53.6	19.6	47099	3.42	35769	3.15
	Micronutrient management	Kargil 627	1	15	8.0	57.8	53.8	7.3	44947	2.49	40985	2.42
	Nutrient Management	Arjun	1	10	4.0	75.1	63.7	17.9	57620	2.77	39800	2.22
	Natural resource management	CP-818	1	20	0.8	82.5	70.5	17.1	48589	2.15	36942	1.91
		Sub total			105	34.8	62.7	54.5	15.3	43834	2.40	34078
Sorghum	ICM	SPV-2217, GS-23, M 35-1	4	57	23.0	16.6	13.7	20.9	23422	2.33	17661	2.08
	Pest management	SPV- 2217	1	10	4.0	9.5	7.2	31.9	15900	2.81	9820	2.10
	Varietal introduction	SPV-2217	2	35	14.0	9.1	7.2	25.5	10011	1.84	5645	1.47
Rabi sorghum	ICM	SPV-2217,B-JV-44	3	40	16.4	14.4	11.9	21.8	17071	2.66	12307	2.25
	Drought management	M-35-1	1	10	4.0	10.7	9.4	13.8	10331	1.68	5085	1.29
	Resource conservation	CSV-29R	1	20	10.0	15.5	13.5	14.9	19896	2.58	16027	2.32
	Varietal demonstration	SPV-2217	1	10	4.0	12.0	10.0	20.9	10276	1.65	7232	1.49
	Varietal demonstration	BJV-44	1	10	4.0	11.2	9.2	20.9	8361	1.52	5686	1.39
	Sub total			192	79.0	12.4	10.3	21.3	14409	2.13	9933	1.80
Finger millet	ICM	ML-365, KMR-340	4	69	27.5	22.4	18.7	20.2	30007	2.25	19838	1.87
	Mechanization	ML-365	1	10	4.0	23.2	21.6	7.5	34529	3.10	27292	2.36
	Processing and value addition	ML-365, KMR-340	2	20	8.0	18.1	9.6	15.0	33450	2.44	21679	1.59
	Method of planting	KRM 301	1	10	4.0	31.9	23.5	35.6	32938	2.40	19432	1.85
	Varietal introduction	ML-365	3	57	23.0	27.5	22.6	22.7	42601	2.69	32103	2.42
	Sub total			166	67.0	24.6	19.2	20.2	34705	2.58	24069	2.02

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	In-crease (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Little millet	ICM	DHFT-109-3, Sukeshama, DHLM 36-3, OLM-203	5	71	29.2	11.7	9.2	26.2	23171	3.41	16660	2.82
	Processing and value addition	DHLM 36-3	1	10	4.0	10.8	0		11600	2.16		
	Varietal demonstration	DHLM-36-03	2	15	6.0	11.3	9.3	21.8	15454	2.54	11055	2.19
		Sub total			96	39.2	11.3	6.2	24.0	16742	2.70	13858
Foxtail millet	ICM	DHFt 109-3,SSIA-2644,SIA-326	5	50	20.2	15.3	12.2	25.5	21522	3.14	15555	2.66
	Processing and value addition	DHFT-109-3	3	35	14.0	13.3	6.7	28.2	23458	3.06	18556	2.69
	Variety introduction	DHFt-109-3	8	95	38.0	13.6	13.5	7.7	19059	3.11	15423	2.49
		Sub total			180	72.0	14.1	10.8	20.5	21346	3.10	16511
Kodo Millet	Crop production	RK 390-25	1	10	4.0	19.4	8.3	134.0	42968	2.74	7175	1.33
Proso millet	ICM	DHPm-2769	1	4	2.0	16.8	12.4	35.8	30896	2.90	19008	2.21
		Total		1210	468.0							

ICM - Integrated crop management; IPM - Integrated pest management; IPDM - Integrated pest and disease management; IDM - Integrated disease management; INM - Integrated nutrient management; IWM - Integrated weed management.



Pest and disease management in paddy by KVK Shivamogga



Finger millet variety KMR-340 demonstration by KVK Bengaluru Rural

Kerala: A total of 213 demonstrations in paddy covering an area of 75.7 ha in farmers' field were conducted during the year (Table 25). The technologies such as IPM, ICM, IWM, ICM, micronutrient, weed and water management and new varieties like Shreyas and Vaisakh gave an average 33.7 % increase in yield as compared to check. The yield was higher in Shreyas variety

(82 q/ha) followed by variety Uma with micronutrient management with 64.3 q/ha over check (Table 25). The Jaya variety under IDM technology recorded negative returns in spite of 30.8 q/ha grain yield. The new varieties Shreyas and Vaisakh recorded 13.7 % and 81.0 % increased yield as compared to check.

Table 25: Frontline demonstrations on cereals conducted by KVKs of Kerala

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Paddy	ICM	Shreyas	1	4	1.0	82.0	54.0	51.9	136060	3.47	70820	2.29
	ICM	Uma	1	10	1.0	12.9	10.3	24.8	10150	1.32	1125	1.03
	INM	Njavara, Ponni, Shreyas, Uma	4	25	11.4	48.1	40.3	23.1	31438	6.47	7787	1.73
	IDM	Jaya	1	10	3.0	30.8	25.0	23.0	20535	1.32	-4645	0.92
	IPM	Uma, Jyothi, Jaya, Shreyas	4	18	10.8	47.6	28.2	87.9	50167	2.43	18135	1.52
	Weed management	Uma, Jyothi	2	25	7.0	47.0	38.9	21.8	49534	1.73	25818	1.35
	Drought management	Uma, Jyothi, Matta Triveni	3	34	11.6	41.9	32.9	27.5	51941	1.91	32477	1.61
	Farm mechanisation	Jyothi	1	3	4.0	54.0	48.0	12.5	74390	2.27	43530	1.64
	Micro nutrient management	Uma	1	50	20.0	64.3	60.1	7.0	94750	2.44	85250	2.31
	New variety demonstration	Shreyas	3	22	3.8	65.2	57.6	13.7	39939	1.95	17873	1.80
	New variety demonstration	Vaisakh	1	10	2.0	38	21.0	81.0	40220	1.77	15487	1.30
	Water use efficiency	Uma	1	2	0.1	39.1	30.1	29.9	36125	1.61	2500	1.04
			Total		213	75.7	47.6	37.2	33.7	52937	2.39	26346



Hon'ble Minister for Port Shri. Ramachandran Kadannappally inaugurating the harvest of paddy in the demonstration plots of KVK Kannur

3.1.4.2 Oilseeds

During the year 190 demonstrations were conducted by KVKs of Karnataka and Kerala states on oilseeds covering groundnut, safflower, sunflower, sesame and mustard in an area of 70.5 ha in farmers' fields. The state wise and crop-wise results are presented in the foregoing discussion.

Karnataka: During the year, 101 demonstrations in groundnut, 41 in sesame, 15 in safflower, 10 in mustard and 5 in sunflower were conducted by KVKs of Karnataka under oilseeds in an area of 66 ha in farmers' field (Table 26). The groundnut crop performed better under varietal introduction of G2-52 and GKVK-5 as compared to check. The highest yield of 27.8 q/ha was recorded by variety G2-52 which was 13.3% higher than the local

variety (24.5 q/ha). This was followed by 16.7 q/ha under ICM demonstrations in groundnut. Sesame variety GT-1 under IDM recorded higher yield and BCR(5.6 q/ha and 2.61, respectively) as compared to check (4.4 q/ha and 2.0, respectively). Safflower varieties PBNS-12 and A1 recorded an average yield of 11.3 q/ha under ICM demonstrations,

which was 21.4% higher as compared to check (9.4 q/ha). The mustard crop in rabi season recorded an average of 8.8 q/ha with new variety NRCHB-101 as compared to 6.5 q/ha under farmers' local variety. In sunflower, integrated weed management technology gave better yield of 13.4 q/ha as compared to 10.9 q/ha in check.

Table 26: Frontline demonstration on oilseeds conducted in the state of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Groundnut	ICM	KCG-2, GKVK-5, KDG-123	4	44	17.6	16.7	13.4	22.9	47137	2.29	32948	1.94
	INM	GPBD-4	1	20	4.0	6.3	5.9	5.6	2300	1.23	1150	1.11
	IPDM	TMV2	1	5	2.0	9.0	7.1	27.2	22042	1.97	10053	1.51
	Varietal introduction	GKVK-5	1	20	10.0	15.8	11.9	33.1	30994	1.51	10379	1.21
	Variety introduction	G2-52	1	12	4.0	27.8	24.5	13.3	96920	4.85	82620	4.28
		Sub total			101	37.6	15.1	12.6	20.4	39879	2.37	27430
Sunflower	Integrated weed management	DSFH-3	1	5	2.0	13.4	10.9	22.4	29071	2.65	21285	2.26
Safflower	ICM	PBNS-12, A-1	2	15	6.0	11.3	9.4	21.4	21929	2.67	16150	2.21
Sesamum	ICM	GT-1, Local	2	16	6.4	3.3	3.2	8.3	10749	2.50	9797	2.56
	IDM	GT-1	1	15	6.0	5.6	4.4	27.3	25080	2.61	12050	2.00
	Variety introduction	DS-5	1	10	4.0	4.3	4.1	4.9	20700	2.15	6600	1.37
		Sub total			41	16.4	4.4	3.9	13.5	18843	2.42	9482
Mustard	Variety introduction	NRCHB-101	1	10	4.0	8.8	6.5	34.6	31375	4.92	15700	2.74
		Total		172	66.0							



ICM demonstration on groundnut at Chikkamagaluru district.



Demonstration on ICM in sunflower at Shivamogga district

Kerala: In rice fallows, 18 demonstrations on new varieties of sesame were conducted covering 4.5 ha area in Kerala. The varieties TMV-7 (5.1 q/ha) and Thilarani

(4.1 q/ha) recorded higher yield as compared to check (Table 27).

Table 27: Frontline demonstrations on oilseeds conducted by KVKs of Kerala

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Sesame	New variety demonstration	TMV 7	1	13	4.0	5.1			30974	2.53		
	New variety demonstration	Thilarani	1	5	0.5	4.1	1.6	162.8	38970	1.89	8145	1.35
		Total		18	4.5	4.6	1.6	162.8	34972	2.21	8145	1.35

3.1.4.3 Pulses

A total of 217 demonstrations were undertaken on major pulses in 82.8 ha area of farmers' field by the KVKs in Karnataka and Kerala states. The state wise and technology wise results are presented in the foregoing discussion.

Karnataka: A total of 50 demonstrations in chickpea, 35 in blackgram, 32 each in greengram and pigeonpea, 25 in soyabean, 15 in cowpea, 8 in horsegram and 5 in field bean were conducted by KVKs of Karnataka covering an area of 77.8 ha (Table 28).

The technologies such as ICM, disease management and resource management were demonstrated in black gram. Among these technologies, ICM with DU-1 variety has recorded 10.5 q/ha, which was followed by 9.1 q/ha under disease management in blackgram. In greengram, ICM demonstrations gave an increase of 20.8% over check. In pigeonpea, overall yield increase due to technology demonstration was 47.5% over check. The ICM with 11.8 q/ha and intercropping systems (18.3 q/ha) were superior over check in pigeonpea. The nutrient management

demonstration in cowpea has recorded 4.3 q/ha with BCR of 1.58. ICM technology in horse gram and IPM in field bean also performed superior over their local check with better economic returns. In soybean varietal evaluation with NRC-105 gave yield of 18.3 q/ha. During rabi season, ICM and INM technologies in chickpea gave an average increase of 21.1% in yield over their local check. The highest yield of 15.4 q/ha was recorded in INM followed by 13.4 q/ha in ICM technology in chickpea.



ICM demonstration in pigeonpea by KVK Bengaluru Rural

Table 28: Frontline demonstrations on pulses conducted by KVKs of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Pigeonpea	ICM	TS-3R	1	20	8.0	11.8	8.0	47.4	35616	3.21	20257	2.36
	Intercrop- ping sys- tem (P + Soyabean)	TS3-R + JS335	1	12	4.8	18.3	12.4	47.6	79622	3.64	46407	2.66
		Sub total		32	12.8	15.0	10.2	47.5	57619	3.43	33332	2.51
Blackgram	Disease manage- ment	Rashmi	1	15	6.0	9.1	6.4	42.2	32460	2.50	12000	1.66
	ICM	DU-1	1	10	4.0	10.5	8.9	18.0	32200	2.59	24400	2.21
	Resource conserva- tion	LBG – 625	1	10	4.0	5.8	5.3	9.5	17538	2.02	11947	1.76
		Sub total		35	14.0	8.5	6.9	23.2	27399	2.37	16116	1.88
Green- gram	ICM	BGS-9, DGGV-2	3	32	10.8	9.6	8.0	20.8	27065	2.42	21393	2.14
Cowpea	Nutrient manage- ment	C-152	1	15	6.0	4.3	-		7900	1.58	0	
Horseg- ram	ICM	GPM-6	1	8	3.2	7.9	6.3	25.4	51725	5.47	40026	4.86
Chickpea	ICM	JG-11	2	40	16	15.4	12.1	27.1	25262	2.44	16724	2.10
	INM	Jaki	1	10	4.0	13.4	11.6	15.1	68580	3.76	59400	3.56
		Sub total		50	20.0	14.4	11.9	21.1	46921	3.10	38062	2.83
Field bean	IPM	Local	1	5	1.0	6.5	5.0	30.3	27454	2.82	18257	2.27
Soybean	Varietal evalua- tion	NRC-105	1	25	10.0	18.3	-					
		Total		202	77.8							

Kerala: A total of 15 demonstrations were conducted in black gram during the year by the KVKs of Kerala (Table 29). Crop rotation technology demonstration recorded a

yield of 9.5 q/ha with BCR of 3.17. This was followed by INM technology and Vamban-8 variety with 5.3 q/ha in paddy fallows as compared to only 4.0 q/ha in check.

Table 29: Frontline demonstrations on pulses conducted by KVKs of Kerala

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Black gram	INM	Vamban 8	1	10	4.0	5.3	4.0	31.3	35155	3.34	20260	2.58
	Crop rotation	Pant Lobia 3	1	5	1.0	9.5	7.8	21.8	32500	3.17	24000	2.60
		Total		15	5.0	7.4	5.9	26.6	33828	3.26	22130	2.59

3.1.4.4 Commercial crops

A total of 142 demonstrations were organized on major commercial crops covering an area of 38.8 ha during the year by the KVKs on commercial crops like sugarcane, mulberry and betelvine during 2017-18 in of Karnataka (Table 30).

In sugarcane, technologies like ICM, INM, IPM, Sustainable Sugarcane Initiative (SSI) and varietal introduction have been demonstrated in the farmers' field. A record yield of 141.3 t/ha and BCR of 3.36 has been recorded in the SSI demonstration plots. Whereas, ICM demonstrations gave an average increase of 30.8% in yield as compared to check. Variety SNK-07680 gave

131.3 t/ha cane yield as compared to 115.8 t/ha in local variety. In mulberry, the results revealed that leaf yield increased by 4.9 % due to INM technology as compared to check. Silk worm rearing with bivoltine gave an average cocoon yield of 66.4 kg/100 DFLs under demonstrations leading to higher net returns of Rs. 20053/100 DFLs rearing as compared to Rs. 10765/100 DFLs in check. In betel vine the ICM technology demonstration gave 2734649 leaves/ha recording 25.6% higher yield as compared to check. The net return and BCR were Rs. 962060/ha and 6.56, respectively.

Table 30: Frontline demonstrations on commercial crops conducted by KVKs of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Sugarcane	ICM	CO-86032	2	20	8.0	116.5	83.6	46.8	153250	2.97	68800	1.69
	SSI	Co - 86032	1	2	0.8	141.3	116.3	21.5	165125	2.61	228,125	3.36
	IPM	Co-860032	2	30	12.0	105.6	96.9	9.2	205803	3.34	169670	2.83
	Varietal introduction	SNK-07680	1	10	4.0	131.3	115.8	13.4	249435	2.73	202935	2.41
	INM	CO 62175	1	10	4.0	88.8	72.8	22.0	76954	1.77	53910	1.59
	ICM (Ra-toon)	CO-8011	1	10	4.0	85.5	74.5	14.8	121650	2.62	100850	2.43
			Sub total		82	32.8	111.5	93.3	21.3	162036	2.67	137382
Betel vine (No./ha)	ICM	Local	1	5	2.0	2734649	2178090	25.6	962060	6.56	734300	5.30
Mulberry	INM	V1	1	10	4.0	663.0	632.0	4.9	38275	2.86	26473	2.26
Silk worm	Cocoon production (kg/100 DFL)	CSR-2x5, CSR-2 x4	4	45	0	66.4	58.7	13.3	20053	3.08	10765	2.20
		Total		142	38.8							

3.1.4.5 Fibre crops

During the year 30 demonstrations on cotton were organized by two KVKs in Karnataka covering 12.0 ha area. Twenty demonstrations on ICM technology and 10

on pest management covering 12.0 ha were conducted (Table 31). The seed cotton yield was 18.8 q/ha and 34.9 q/ha, respectively, leading to 25.4% and 20.6% increase in yield in ICM and pest management demonstrations as compared to check, respectively.

Table 31: Frontline demonstrations on fibre crops conducted by KVKs of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Cotton	ICM	Bt cotton	1	20	8.0	18.8	15.0	25.4	56180	2.98	40555	2.51
	Pest management	Bt cotton (Jadu)	1	10	4.0	34.9	29.0	20.6	91759	4.41	73430	3.94
		Total		30	12.0	26.9	22.0	23.0	73970	3.70	56993	3.23



Demonstration on pest management in cotton by KVK Mysuru

3.1.4.6 Fodder crops

During the year, 130 demonstrations were conducted on the production of fodder in 30.6 ha area in Karnataka and Kerala. The state wise and technology wise results are presented below:

Karnataka: A total of 120 demonstrations were conducted on fodder crops covering an area of 29.6 ha by 12 KVKs in Karnataka during the year (Table 32). The technologies like cultivation of improved varieties of fodder such as CoFS-29, DHN-6 and COFS-31, besides crop cafeteria and ICM were implemented. DHN-6 recorded higher yield with 1154.1 q/ha, followed by COFS 31 (814 q/ha). CoFS-29 and DGG-1 gave 763.2 q/ha green fodder yield while the local fodder variety yielded 716.9 q/ha. The fodder cafeteria demonstration gave a total of 872.7 q/ha green fodder with net returns of Rs. 66014/ha.

Table 32: Frontline demonstrations on fodder crops conducted in the state of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Fodder	ICM	CoFS-29, DGG-1	2	26	4.0	763.2	716.9	25.5	315336	5.65	226086	3.85
	Varietal evaluation	CoFS-29	1	5	2.0	420.0	280.0	50.0	30000	3.50	18500	2.95
	Varietal introduction	DHN-6	1	5	4.0	1154.1	715.4	61.3	57180	1.98	13310	1.23
Fodder sorghum	Variety introduction	COFS-31	1	10	2.0	814.0	623.0	30.7	15406	2.18	10567	1.94
Forage crops	Fodder cafeteria	COFS-29, Hedge Leucerne & Hybrid Napier- DHN-6	7	74	17.6	872.7	502.4	119.4	66014	2.40	15229	1.47
		Total		120	29.6	658.3	455.4	57.4	96787	3.14	56738	2.29



Demonstration on hydroponic fodder production by KVK Udupi

Kerala: A total of 10 demonstrations were organized by one KVK of Kerala on fodder production technology covering an area of 1.0 ha (Table 33). The results indicated an increased fodder yield to the



Fodder sorghum (CoFS-31) demonstration by KVK Chitradurga

extent of 7.0% in Co-5 fodder grass with average green fodder yield of 2740 q/ha under demonstration over check (2560 q/ha).

Table 33: Frontline demonstrations on fodder crops conducted by KVKs of Kerala

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Fodder	Fodder production	CO-5	1	10	1	2740	2560	7.0	428450	2.67	383450	2.49

3.1.4.7 Vegetable crops

Vegetable crops such as amaranthus, brinjal, cabbage, cauliflower, chilli, field bean, pole bean, cluster bean, french bean, onion, tomato, ridge gourd, bitter gourd, bhindi, carrot, greens, yard long bean, watermelon and vegetable cowpea were demonstrated with improved technologies under 835 farmers' fields covering an area of 187.8 ha by the KVKs of Karnataka and Kerala. The state wise and technology wise results are presented below:

Karnataka: A total of 569 demonstrations were conducted in major vegetables covering an area of 170.0 ha by the KVKs of Karnataka (Table 34).

Cultivation of amaranthus recorded 30.8% increased green leaf yield (148.5 q/ha) with BCR of 2.99 as compared to check (BCR of 2.58 and yield of 113.5 q/ha). In okra, demonstration of Arka Anamika recorded 118.0 q/ha (32.6 % increased yield) as compared to check (89.0 q/ha). The INM demonstration has given 180.5 q/ha with BCR of 3.49 as compared to 151.9 q/ha under check. ICM in bitter gourd recorded an average yield of 131.7 q/ha with BCR of 3.92. In brinjal, ICM technology gave 460.0 q/ha

leading to 22.7% increased yield over their check. Similarly, ICM in cabbage gave an average yield of 404.0 q/ha as compared to check. IDM demonstration in carrot and crop production in cauliflower gave 62.3% and 13.0% increased yield over their checks, respectively. In chilli, technology demonstrations gave an average 24.3 q dry chilli/ha over check (19.7 q/ha). INM in Byadagi dry chilli has given yield of 29.9 q/ha with BCR of 5.68 as compared to 25.1 q/ha in check. Whereas, ICM in green chilli gave 206.4 q/ha yield over check (152.6 q/ha). ICM demonstration in cluster bean gave 42.6 q/ha yield as compared to 39.0 q/ha in the check. Varietal introduction of DC-15 in cowpea gave yield of 18.8 q/ha, which is 44.2 % higher than the check. In cucumber, ICM technology gave lower yield of 2.2% (215.2 q/ha) over its check (232.7 q/ha). In french bean, INM and ICM gave an increased yield to the extent of 25.0% and 19.9% over their check. Similarly, ICM in field bean gave higher yield to the extent of 41.6 q/ha as compared to 36.3 q/ha in check. In onion, IDM, ICM, nutrient and pest management and improved variety (Bheema Shakti and Bheema Super) technologies were demonstrated through

116 farmers' fields. All the technologies gave higher yield ranging from 13.8% to 42.7%. IDM practice has given yield of 461.2 q/ha with BCR of 5.12 in onion as compared to 352.0 q/ha in the check. IPM in pole bean gave of 347.9 q/ha, which is 9.6 % higher over check. In tomato, ICM and INM technologies resulted an increased yield by 13.1% over check. ICM and IPDM technologies demonstrated in ridge gourd has given increased yield of 45.8% and 17.5% as compared to check, respectively. The nutrition garden demonstrated in schools by nine KVKs through 46 demonstrations gave an average vegetable yield of 2.8

q/ha per annum. The ICM and pollination improvement technologies demonstrated in watermelon recorded an average of 576.5 q/ha as compared to check (448.0q/ha). The BCR was higher with pollination improvement at 3.68 as compared to ICM (2.70). In yardlong bean, variety Arka Mangala gave an average of 163.4 q/ha yield compared check (137.9 q/ha). The BCR was 3.54 with varietal introduction of Arka Managala demonstrations as compared to 3.20 in check variety.

Table 34: Frontline demonstrations on vegetables crops conducted by KVKs of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	In-crease (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Amaranthus Okra	IPDM	-	1	5	2.0	148.5	113.5	30.8	49450	2.99	34750	2.58
	ICM	Phule Vimukta, Halubhendi	2	15	3.0	70.0	58.0	34.0	164656	3.00	96782	3.00
	Nutrient management	Mahyco	1	10	4.0	180.5	151.9	18.8	193098	3.49	152864	3.04
	Varietal Introduction	Arka Anamika	1	5	1.0	118.0	89.0	32.6	134000	2.31	87000	1.96
		Sub-total		30	8.0	122.8	99.6	28.5	163918	2.93	112215	2.67
Bittergourd	ICM	Palee	1	10	4.0	131.7	103.4	27.4	264864	3.92	181417	2.86
Brinjal	ICM	Arka Anandh	1	5	1.0	460.0	375.0	22.7	88200	1.92	34100	1.29
	INM	Arka Harshita, MEH-11	2	20	6.0	304.0	258.0	19.0	228899	4.00	173248	3.00
	Pest management	local	1	5	2.0	280.0	220.0	27.3	355000	6.46	112000	2.49
		Sub total		30	9.0	348.0	284.3	23.0	224033	4.13	106449	2.26
Cabbage	ICM	Saint, Bayer-118	3	25	12.0	404.0	365.0	9.9	172865	4.12	143486	3.38
Carrot	IDM	Belamagi local	1	10	4.0	231.2	142.5	62.3	184200	4.92	100500	3.39
Cauliflower	Crop production	Bayer-119	1	5	2.0	128.5	113.8	12.9	63528	1.85	88032	2.84
Chilli (dry)	ICM	Byadagi Dabbi	3	30	12.0	16.0	13.0	22.0	21375	2.63	9809	2.17
	INM	Byadagi	1	5	2.0	29.9	25.1	19.0	221570	5.68	177480	4.65
	Disease incidence	Namdhari	1	5	2.0	27.0	21.0	28.6	154500	3.06	76000	1.93
		Sub total		40	16.0	24.3	19.7	23.2	132482	3.79	87763	2.92
Chilli (green)	ICM		2	15	6.0	206.4	152.6	31.7	302006	4.40	203289	3.40
Cluster bean	ICM	PUSA Nau-bahar	1	10	2.0	42.6	39.0	9.2	78506	1.99	64131	1.92
Cowpea	Varietal introduction	DC-15	1	10	4.0	18.8	13.0	44.2	40200	2.29	18350	1.59
Cucumber	ICM	Kareena, Hasan local	3	25	7.0	215.2	232.7	-2.2	156871	3.50	118899	3.00
Fieldbean	ICM	Arka Jay, HA-4	4	39	11.4	41.6	36.3	12.6	32462	2.30	25283	2.00

French bean	INM	Arka Suvidha	1	5	2.0	4.5	3.6	25.0	84,500	5.83	58500	3.72	
	Inter-cropping system	ICM	Arka Sharath	1	20	2.0	146.4	122.1	19.9	121626	2.46	73506	2.01
			Arka Suvidha	1	5	1.0	11.1	10.2	8.8	149,050	3.04	131,050	2.80
		Sub total			30	5.0	78.8	66.2	14.4	135338	2.75	102278	2.405
Polebean	IPM	NZ	1	10	4.0	347.9	317.5	9.6	346540	3.12	291730	2.58	
Ridge Gourd	ICM	Arka Sujatha	1	12	5.0	10.5	7.2	45.8	117500	3.94	74000	3.18	
	IPDM	Naga	1	5	2.0	310.7	264.5	17.5	313296	3.57	204936	2.82	
		Sub total			17	7.0	160.6	135.8	31.7	215398	3.755	139468	3.00
Tomato	ICM	Arka Samrat, Pvt varieties	5	38	11.4	528.5	462.5	13.9	207609	3.00	138807	2.30	
	INM	NS 501	1	5	1.0	71.0	63.2	12.3	224368	2.72	181072	2.34	
		Sub total			43	12.4	299.8	262.9	13.1	215989	2.86	159940	2.32
Onion	ICM	Arka Kalyan, Bheema Super, Bheema Shakti	7	53	21.2	237.9	203.6	19.8	243056	3.70	195108	3.20	
	IDM	Bheema Super	1	12	5.0	461.2	352.0	31.0	185600	5.12	133500	4.14	
	Nutrient management	Arka Kalyan	2	25	7.0	101.8	87.8	13.8	97547	2.50	80423	2.30	
	Pest management	Bhima Shakti	1	5	2.0	312.4	240.3	30.0	195822	4.62	145094	4.08	
	Varietal introduction	Bhima Shakti	2	11	4.2	243.0	203.5	19.7	124230	3.70	89920	2.80	
	Varietal introduction	Bhima Super	2	10	4.0	253.4	177.6	42.7	73482	2.70	48115	2.10	
		Sub total			116	43.4	268.3	210.8	26.2	153290	3.72	115360	3.10
Small onion	INM	Local	1	5	2.0	157.2	137.6	14.2	109600	2.39	84600	2.15	
Nutritional garden at schools	Nutritional security	Bhendi, Amaranthus, Field bean, Chilli, Tomato, brinjal, bottle-gourd	9	46	0.4	2.8							
Terrace Nutrition garden	Vegetable Terrace Gardening	Palak, Amaranthus, Cowpea, Bhendi, Chilli, Brinjal, Bottle gourd, Ridge gourd, Bitter gourd,	2	15	0	0.7							
Yard long bean	Improved variety	Arka Mangala	1	15	5.0	149.9	122.0	23.0	112622	2.53	64221	1.98	
	Varietal Introduction	Arka Mangala	1	10	1.0	176.8	153.8	15.0	317000	3.54	264500	3.20	
		Sub total			25	6.0	163.4	137.9	19.0	214811	3.04	164361	2.59
Watermelon	ICM	Sugar queen	1	3	0.4	515.0	460.0	12.0	243250	2.70	205000	2.46	
		Sugar queen	1	5	2.0	638.0	436.0	46.3	182600	3.68	-62400	0.71	
		Sub total			8	2.4	576.5	448.0	29.2	212925	3.19	71300	1.59
	Total			569	170.0								



Demonstration on Arka Mangala variety of yard long bean by KVK Mysuru

Kerala: A total of 266 demonstrations were implemented in vegetable crops like amaranthus, greens, okra, bitter gourd, brinjal, cabbage, cauliflower, chilli, cowpea, pea, cucumber, tomato, water melon and yard long bean including mixed vegetables covering an area of 17.8 ha mostly in the homestead farming situation (Table 35).

Amaranthus with IPDM demonstrations in 10 farmers' field gave a yield of 100.6 q/ha green leaf with BCR of

2.58. Similarly, IPDM in red amaranthus has given 20.3 q/ha leading to 69.4% higher yield than the check. In bitter gourd, precision farming technology performed superior to check and recorded 21.6% increased yield over check. INM and water use efficiency technologies in okra led to 26.1% and 82.5% increased yield over check, respectively. High yielding variety Ponny in brinjal gave 320 q/ha yield as compared to only 250 q/ha in local variety. The protected cultivation of cabbage and cauliflower has given 165.5 q/ha and 136.3 q/ha yield, respectively. The organic farming technology in salad cucumber gave 400 q/ha with BCR of 5.26. The vegetable cowpea performed better with ICM, IPM, INM, IPDM, precision and organic farming demonstrations. Among these ICM and IPDM practices resulted in 175 q/ha and 160 q/ha yield, respectively. The IPM in tomato recorded 189.2q/ha as compared to 145.6 q/ha in check. The watermelon variety Shonima gave 375 q/ha as compared to check yield 300 q/ha. The protected cultivation of yard long bean recorded 259.7 q/ha, which is 105.3% higher as compared to check (126.5 q/ha). KVKs in Kerala have also successfully demonstrated the vertical farming and grow bag technologies in vegetables.

Table 35: Frontline demonstrations on vegetables conducted by KVKs of Kerala

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Amaranthus	IPDM	Arun	1	10	0.4	100.6	87.0	15.7	118750	2.58	97255	2.33
Red Amaranthus	IPDM	Arun	1	5	0.1	20.3	12.0	69.4	18583	2.05	4291	1.26
Greens production	Waste management	Mixed vegetables	1	20	0	150.0			21980	3.74		
	Urban waste management (kg/tray)	Local	1	10	0	29.0			153	1.36		
		Sub total		30	0	89.5			11067	2.55		
Okra	INM	Arka Anamika	1	21	4.0	149.5	118.6	26.1	524160	8.08	397280	6.16
	Water use efficiency	Anakomban	1	7	0.5	185.0	101.4	82.5	245437	1.72	18701	1.04
		Sub total		28	4.5	167.3	110	54.3	384799	4.90	207991	3.60
Bitter gourd	IPDM	Preethi	1	5	0.2	106.3	50.1	112.1	246225	2.07	12700	1.08
	Precision farming	Bitter gourd (Preethi)	1	3	0.1	152.0	125.0	21.6	81750	0.63	58250	0.69
	IPM	Preethi	1	2	5.0	184.4	160.5	14.9	241000	2.1	186150	1.87
		Sub total		10	5.3	147.6	111.9	49.5	189658	1.60	85700	1.21

Brinjal	HYV	Ponny	1	10	0.1	320.0	250.0	28.0	495000	2.62	330000	2.12
	Precision farming (Wick irrigation in 30 bags (kg))	Haritha	1	1	0.001	262.5			600	0.71		
	Sub total			11	0.101	291.3	250.0	28.0	495000	2.62	330000	2.12
Mixed vegetables	Resource conservation	Haritha, Arka Anamika, Arun	1	5	0.2	141.0	105	34.3	-261000	0.38	-100500	0.68
Cabbage	Protected cultivation	Green Challengier	1	3	0.01	165.5	63	162.7	284000	2.34	-23500	0.89
Cauliflower	Water conservation (Wick irrigation-10 bags-kg)	NS 60	1	5	0	21.6			372	1.53		
	Protected cultivation	NS 60 N	1	3	0.01	136.3	54.5	150.1	214000	2.09	-32000	0.84
	Sub total			8	0.01							
Chilli	Crop production	Keerthi	1	10	0.5	121.5			99875	1.49		
	Organic Farming	Anugraha	1	4	0.6	100.0	81.3	23.1	75000	1.60	44500	1.38
	Sub total			14	1.1							
Cowpea	ICM	Geethika, ArkaMangala	3	30	2.2	175.0	120.0	60.0	288816	2.25	87250	1.38
	Drought mitigation	PGCP-6	1	10	1.0	12.8			-17200	0.66	0	
	INM	Jyothika, Lola	3	35	1.1	106.0	83.0	28.0	335701	2.61	160090	2.22
	Organic farming	Anaswara	1	4	0.4	82.5	74.5	10.7	49000	1.98	34400	1.63
	Precision farming	anaswars	1	2	0.008	124.0	87.5	41.7	28000	0.94	150000	0.57
	IPM	local	1	10	0.2	153.4	130.0	18.0	393900	1.75	325000	1.71
	IPDM	Geethika, Lola	2	15	0.5	160.0	125.0	27.0	80259	2.27	57189	1.82
	Sub total			106	5.4	116.2	103.3	30.9	165497	1.78	116276	1.56
Salad cucumber	Organic farming		1	5	0.06	400.0	380.0	5.3	381000	3.74	240000	2.71
Tomato	IPM	Manulekshmi	1	10	0.25	189.2	145.6	30.0	236530	2.00	127530	1.54
Mixed vegetables	Vertical farming	Anagha, Anaswara	1	5	0	29.2	21.7	34.6	52	1.03	-427	0.73
	Growbags	Lola, Arun, Haritha, Anugraha	1	1	0.016	166.0	142.0	16.9	403125	2.10	228125	1.90
Water melon	HYV	Shonima	1	5	0.06	375.0	300.0	25.0	2.37	2.11	1.29	1.75
Yard long Bean	Protected cultivation	Geethika	1	10	0.3	259.7	126.5	105.3	520588	3.01	102873	1.37
Total				266	17.8							



Demonstration on precision farming in vegetable cowpea by KVK Kollam

3.1.4.8 Tuber crops

A total of 84 demonstrations were conducted on major tuber crops like potato, sweet potato, elephant foot yam and tapioca covering an area of 14.8 ha by the KVKs of Karnataka and Kerala during 2017-18. The state wise and technology wise results are discussed below:

Karnataka: In potato, 24 demonstrations were conducted on ICM and IDM technologies covering an area of 8.6 ha in three districts of Karnataka. The results indicated that demonstrated technologies out yielded check to the extent of 24 % in IDM and 19.2 % in ICM. The average tuber yield obtained with the IDM technology was 241 q/ha as compared to check (195 q/ha). Whereas, 14.1 % lower yield was obtained with ICM demonstration in sweet potato as compared to check.

Table 36: Frontline demonstrations on tuber crops conducted by KVKs of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	In-crease (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Potato	IDM	Kufri Jyothi	2	15	5.0	241.0	195.0	24.0	216191	3.00	140076	2.00
	ICM	Kufri Jyothi	1	9	3.6	240.4	201.7	19.2	143485	1.90	98781	1.64
	Sub total			24	8.6	240.7	198.4	21.6	179838	2.45	119428.5	1.82
Sweet potato	ICM	Sri Bhadra	1	5	2.0	15.9	18.5	-14.1	18261	1.41	15900	1.34
	Total			29	10.6							

Kerala: A total of 55 technologies were demonstrated in tuber crops like elephant foot yam and tapioca in 4.2 ha area by 6 KVKs of Kerala (Table 37). The demonstrations on IPM, organic farming, crop management and varietal introduction of Gajendra in elephant foot yam recorded an average yield of 497.8 q/ha with better BCR (2.93) as

compared to their check. In tapioca Sree Pavitra and Sree Swarna a mosaic resistant variety resulted in higher yield of 388 q/ha and 341.5 q/ha and net return of 281700/ha and 67493/ha, respectively as compared to their respective check (Table 37).

Table 37: Frontline demonstrations on tuber crops conducted by KVKs of Kerala

Crop	Themat-ic Area	Variety	KVKs (No.)	Farm-ers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	In-crease (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Ele-phant foot yam	IPM	Local	1	10	0.04	736.0	420.0	75.2	1483700	5.16	767000	3.71
	Crop management	Local	1	10	1.00	437.0	46.1	847.9	538811	2.16	-267200	0.28
	Organic farming	Gajendra	1	10	0.08	443.0	348.0	27.3	483647	2.20	297300	1.75
	Varietal introduction	Gajendra	1	10	0.04	375.0	300.0	25.0	120000	2.20	51000	1.52
	Sub total			40	1.16	497.8	278.6	243.9	656540	2.93	212025	1.82

Tapioca	Varietal introduction	Sree Pavitra	2	10	2.00	388.0	281.0	38.0	281700	2.29	134250	1.59
	Mosaic resistant variety	Sree Swarna	1	5	1.00	341.5	275.7	23.9	67493	1.49	28013	1.20
Sub-total				15	3.00	364.8	278.4	31.0	174597	1.89	81132	1.40
Total				55	4.16							



Demonstration on organic cultivation of elephant foot yam by KVK Thiruvananthapuram

3.1.4.9 Fruit crops

A total of 505 demonstrations on major fruit crops like banana, grapes, citrus, mango, papaya pomegranate, fig, coorg mandarin, lime, passion fruit and guava were conducted in Karnataka and Kerala states covering an area of 88.9 ha during the year. The state wise and technology wise results are discussed in the foregoing discussions.

Karnataka: A total of 144 demonstrations on various fruit crops were conducted in farmers' field covering 51.6 ha area (Table 38). The results indicated that the yield was higher under demonstration of ICM, IPDM and disease management technologies in banana with BCR as high as 7.02 in Nendran banana. Among the technologies demonstrated in banana, ICM technology demonstration registered highest yield of 364 q/ha. INM and ICM in guava demonstrated gave 23.1% and 15.7% higher yield over check, respectively. ICM demonstration in mango and fig resulted in 51.3% and 17.8% increase in yield over check. In grapes the management of stem borer in Thompson seedless has given 26.5 q/ha yield than the check (22.0 q/ha). IPM and ICM in lime (citrus) also performed superior under demonstrations with better economic returns. Demonstration of INM in coorg mandarin gave an average fruit yield of 84.1 q/ha with better economic returns. In pomegranate, IPM, IDM and ICM technologies demonstration proved superior over check by recording 33.8%, 30.6% and 19.8% higher yield over check, respectively. The average yield under technology demonstration in pomegranate was 122.4 q/ha as compared to only 92.5 q/ha in the check. Demonstration of Arka Prabhat variety in papaya performed superior to the check by recording 26.6 % increased yield.

Table 38: Frontline demonstrations on fruit crops conducted by KVKs of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	In-crease (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Banana	ICM	Elakki	1	10	4.0	364.0	319.0	14.1	517000	3.45	405000	2.74
	ICM	Nendran	1	10	2.0	363.0	228.0	59.2	474910	7.02	268480	4.61
	IPDM	Yelakki	1	5	2.0	304.2	254.3	19.7	848836	3.76	686988	3.46
	Disease management	Elakki	1	15	6.0	254.0	188.0	35.1	382000	4.03	221900	2.90
Sub total				40	14.0	321.3	247.3	32.0	555687	4.57	395592	3.43
Mango	ICM	Alphanso	2	20	8.0	71.7	48.6	51.3	171058	3.33	74831	2.17



Guava	ICM	L-49	1	1	0.4	220.3	190.5	15.6	219360	5.87	178350	4.55
	INM	Allahabad Safed	1	3	1.2	280.1	227.6	23.1	287700	2.22	179940	1.72
		Sub total		4	1.6	250.2	209.1	19.4	253530	4.05	179145	3.14
Fig	ICM	Ballari local	1	10	4.0	92.0	78.1	17.8	211828	3.43	168515	2.98
Grape	Stem borer	Thomsan Seedless	1	5	2.0	26.5	22.0	20.4	365880	1.98	214850	1.55
Coorg Mandarin	INM	Coorg Mandarin	1	10	1.0	84.1	60.8	38.2	76275	2.63	48730	2.15
Lime	IPM	Kazgi	1	5	2.0	17.6	15.2	15.8	89150	3.09	61884	2.30
	ICM	Kagzi	1	5	2.0	17.0	14.4	18.4	113,772	3.79	73,156	2.64
		Sub total		10	4.0	17.3	14.8	17.1	101461	3.44	67520	2.47
Papaya	Variety introduction	ArkaPrabhath	1	5	1.0	663.2	523.8	26.6	412478	3.09	294769	2.58
Pomegranate	ICM	Bhagava	1	5	2.0	9.6	8.0	19.8	396,675	4.10	260,935	2.88
	IDM	Kesar	4	25	10.0	187.4	142.3	30.6	678341	6.71	466501	4.18
	IPM	Bhagwa	1	10	4.0	170.2	127.2	33.8	516035	3.06	342514	2.49
		Sub total		40	16.0	122.4	92.5	28.1	530350	4.62	356650	3.18
		Total		144	51.6							

Kerala: A total of 361 demonstrations were implemented by KVKs of Kerala on banana, mango, guava and passion fruit covering 37.3 ha area during the year. The technologies such as bio intensive pest management, ICM, INM, IDM, IPM, management of BPSW and resource conservation technologies both in irrigated and rainfed conditions were demonstrated in Nendran banana have performed better with an average yield of 672.5 q/

ha as against their check (526.8 q/ha). In mango, IPM demonstrations were conducted across 216 homesteads gave an average yield of 111.0 q/ha with higher BCR of 7.14, which is 185.3% higher than the check (56.3 q/ha). Demonstrations conducted on ICM in guava gave 131.0 q/ha yield as compared to check (69.0 q/ha). Passion fruit demonstrations with Kavery variety gave 175.5 q/ha fruit yield as compared to only 146.2 q/ha with check.

Table 39: Frontline demonstrations on fruit crops conducted by KVKs of Kerala

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Banana	ICM	Nendran	1	15	0.8	297.5	240.0	24.0	715000	2.51	510000	2.13
	INM	Nendran	5	36	11.2	274.5	206.5	33.4	538237	2.90	352868	2.15
	Resource Conservation Technologies (Irrigated)	Nendran	1	3	0.3	225.0	162.4	38.6	8891768	13.24	337524	1.53

	Resource Conservation Technologies (rainfed)	Nendran	1	3	0.3	266.4	196.1	35.9	550363	2.07	161000	1.32
	IPM	Nendran	5	65	5.7	210.6	124.8	102.4	393300	2.25	112260	1.37
	Biointensive Pest Management	Nendran	1	1	5.0	179.5	159.0	12.9	439709	1.96	315748	1.66
	Management of BPSW	Nendran	1	4	5.0	294.4	241.5	21.9	513552	2.19	360112	1.88
	IDM	Nendran	2	10	1.1	672.5	526.8	25.9	470000	2.36	358500	2.06
		Sub total		137	29.4	302.6	232.1	36.9	1563991	3.69	313502	1.76
Guava (home-steads)	ICM	Allahabad Safed	1	3	0.01	131.0	69.0	89.9	231500	2.02	56500	1.31
Mango (home-stead)	IPM	Sindhoo-ram, Ben-ganappilly, Local	1	216	7.4	111.0	56.3	185.3	88540	7.14	96125	2.37
Passion fruit	Crop pro-duction	Kavery	1	5	0.5	175.5	146.2	88.0	395000	1.82	248500	1.52
		Total		361	37.3							



Demonstration on IPM in homestead mango plants by KVK Alappuzha

3.1.4.10 Plantation crops

A total of 131 demonstrations were undertaken by the KVKs of Karnataka and Kerala states on major plantations like arecanut, coconut and cashew covering an area of 26.6 ha during the year. The state wise and technology wise results are discussed below.

Karnataka: A total of 96 demonstrations on plantation crops like arecanut, coconut and cashew were conducted



Demonstration on INM in Nendran banana by KVK Thiruvanthapuram

in 24.2 ha area by 10 KVKs of Karnataka (Table 40). The yield increase in demonstrations as compared to check was 19.0% with 14q/ha chali yield due to ICM in arecanut. In coconut, ICM technology demonstrated in 45 farmers' field have given 20% higher nut yield with 6367 nuts/ha/year. IPM, ICM and INM technologies demonstrated in cashew gave an average yield of 9.8 q/ha as compared to 7.8 q/ha under check.

Table 40: Frontline demonstrations on plantation crops conducted by KVKs of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Coconut	ICM	Tiptur-tall, Arsekeri tall,	5	45	14.0	6367	5386	20.0	54614	2.30	31811	2.00
Areca nut	ICM	Local	2	20	6.0	14.0	12.0	19.0	273578	3.30	205160	2.70
Cashew	IPM	Local	1	11	1.2	3.41	2.4	42.7	39746	4.49	25863	3.60
	ICM	Ullal-1	1	10	1.0	12.7	10.5	20.4	134584	3.48	103646	3.11
	INM	Ullal-1	1	10	2.0	13.3	10.3	28.5	148713	3.97	86445	2.87
		Sub-total		31	4.2	9.8	7.8	30.5	107681	3.98	71985	3.19
		Total		96	24.2							

Kerala: The important plantation crop of Kerala i.e coconut was demonstrated with IDM and soil health management practices in 35 fields covering an area of 2.4 ha during the year (Table 41). The IDM technology demonstration gave an average yield of 17440 nuts/ha/year over check (7680 nuts/ha/year) leading to positive

net returns in demonstrations. Whereas, in check, the net returns were negative in IDM demonstrations. The soil health management resulted in remunerative returns with BCR 1.71 as compared to 1.26 in check.

Table 41: Frontline demonstrations on plantation crops conducted by KVKs of Kerala

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Coconut	IDM	Kuttiyady, TxD	1	15	1.3	17440	7680	127.1	93385.3	1.54	-37622	0.76
	Soil health management	WCT	2	20	1.1	10988	9796	12.2	330245	1.71	104903	1.26
		Total		35	2.42	14214	8738	69.63	211815	1.63	33641	1.01

3.1.4.11 Spice crops

A total of 170 demonstrations were undertaken on major spices like black pepper, cardamom, ginger, turmeric, garlic and coriander covering an area of 37.1 ha in Karnataka and Kerala. The state wise and technology wise & results are discussed below:

Karnataka: In spices, a total of 90 demonstrations were conducted in black pepper, coriander, garlic, ginger and turmeric covering an area of 22 ha during the year (Table

42). The yield recorded in IDM and ICM technologies was 4.8 q/ha and 4.2 q/ha as compared to check with 3.1 q/ha and 2.3 q/ha in black pepper, respectively. Varietal introduction of Arka Isha in coriander has given 30.8% higher yield (83.7 q/ha) as compared to check (64.0 q/ha). Pest management in curry leaf and INM in garlic also gave superior yield under demonstrations as compared to check. ICM technology in garlic, ginger and turmeric

gave an overall increase of 43.9%, 18.0% and 16.8% over their check, respectively. The average yield recorded under

demonstrations was 55.2 q/ha in garlic, 295.1 q/ha in ginger and 56.1 q/ha in turmeric.

Table 42: Frontline demonstrations on spice crops conducted by KVKs of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	In-crease (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Black pepper	ICM	Panniyur-1	2	30	9.0	4.8	3.1	53.5	148522	3.10	63868	1.97
	IDM	Panniyur-1	1	10	1.0	4.2	2.3	87.2	115190	2.53	22240	1.33
	Sub total			40	10.0	4.5	2.7	70.3	131856	2.815	43054	1.65
Coriander	Variety introduction	Arka Isha	1	10	2.0	83.7	64.0	30.8	50816	2.55	35136	2.22
Garlic	ICM	Rajelli Gaddi	1	10	2.0	55.2	43.9	25.8	109745	1.99	69045	1.65
Ginger	ICM	Himachal	1	5	1.0	295.1	250.1	18.0	396854	3.22	322343	2.95
Turmeric	ICM	Salem, Roma	2	25	7.0	56.1	47.9	16.8	379577	3.79	275779	3.13
		Total		90	22.0							



Director IIHR visiting foot rot management demonstration on black pepper by KVK Kodagu

Kerala: A total of 80 demonstrations were implemented in black pepper, cardamom, ginger and turmeric crops by 9 KVKs of Kerala covering 15.1 ha area (Table 43). In black pepper, technology demonstration gave 50% increase in yield (7.5 q/ha) over the check (5.0 q/ha). The BCR of demonstration was 2.8 as compared 2.4 in the check in black pepper. The cardamom yield was higher with INM technology with 9.9 q/ha as compared to 8.0 q/ha in check. The ICM demonstration in cardamom gave 8.5 q/ha as against 5.7q/ha in the check. In ginger, IDM demonstrations gave higher yield of 164.9 q/ha over check (130.6 q/ha). Organic production of ginger has given less yield as compared to check, but the BCR was higher (2.5) as compared to check (2.3) due to premium market price. In turmeric, ICM demonstration led to 300.4 q/ha as compared to check (180 q/ha).

Table 43: Frontline demonstrations on spice crops conducted by KVKs of Kerala

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Black pepper	Stress management	Panniyur 1	1	10	2.0	7.5	5.0	50.0	181250	2.81	107500	2.34
Cardamom	INM	Njallani	1	10	1.0	9.9	8.0	23.8	403600	2.61	196200	1.90
	ICM	Njallani	1	5	3.0	8.5	5.7	49.1	719800	21.45	290000	1.76
	Sub total				15	4.0	9.2	6.9	36.4	561700	12.03	243100
Ginger	INM	Varada, Maran	2	10	0.7	274.5	204.3	31.0	542625	2.33	305250	1.76
	IIDM	Varada	2	20	8.2	164.9	130.6	28.0	726301	1.85	158424	1.31
	Organic production	Varada	1	25	0.2	160.0	173.0	-7.51	962500	2.51	987500	2.33
	Sub total				55	9.1	199.8	169.3	17.2	743809	2.23	483725
Turmeric	ICM	IISR Pragati	1	5	0.05	300.4	180.0	66.9	358000	2.43	119600	1.52
Total				80	15.1							



Demonstration of INM in ginger by KVK Kollam

3.1.4.12 Medicinal crops

A total of 10 demonstrations were taken in ashwagandha covering an area of 4.0 ha in Karnataka. The results are discussed below:

Karnataka: Demonstration of Jawahar variety in ashwagandha has given 61.8% lower yield than check. Whereas, the BCR was higher in demonstration (1.75) than the check (1.59) due to good quality produce from the improved variety and premium market price.

Table 44: Frontline demonstrations on ashwagandha conducted by KVKs in Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
Ashwagandha	Varietal demonstration	Jawahar	1	10	4	3.2	8.3	-61.8	18285	1.75	14163	1.59



Demonstration on ashwagandha variety Jawahar by KVK Gadag

3.1.4.13 Flower crops

A total of 106 demonstrations on flower crops covering an area of 35.1 ha were implemented by KVKs of Karnataka during the year. Demonstrations were implemented in flower crops

such as china aster, chrysanthemum, jasmine, marigold, rose and tube rose by the KVKs of Karnataka (Table 45). In china aster, ICM in Arka Kamini variety gave 39.7% higher yield (44.7 q/ha) as compared to check (34.8 q/ha). The ICM technology in chrysanthemum led to 19.7% increased flower yield (67.0 q/ha) with BCR of 2.91 as compared to 55.9 q/ha and BCR of 2.5 in check. The ICM in jasmine (kakada) gave 73.5 q/ha flower yield as compared to 63.8 q/ha flower yield with check leading to better BCR of 1.54. The IPDM demonstration in Udupi jasmine also recorded 45.5% higher yield (34.2 q/ha) as compared to check (23.5 q/ha). In marigold, crop production demonstration led to 29.4% higher flower yield as compared to check. Whereas, demonstration of Arka Bangara variety in marigold failed to give higher yield as compared to the check. But the BCR for Arka Bangara variety was higher (5.46) than the check (4.54) due to higher market price. ICM technology in rose and tube rose has given 20.0% and 34.2% higher yield as compared to their check. The yield in rose was 73.5 q/ha and tuberose was 111.8 q/ha under ICM demonstrations as compared to 62.5 q/ha in rose and 82.8 q/ha in tuberose under check.

Table 45: Frontline demonstrations on flower crops conducted by KVKs of Karnataka

Crop	Thematic Area	Variety	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of demonstration		Economics of check	
						Demo	Check	Increase (%)	Net Return (Rs./ha)	BCR	Net Return (Rs./ha)	BCR
China Aster	ICM	ArkaKamini	2	11	3.4	44.7	34.8	39.7	57330	3.48	39450	2.74
Chrysanthemum	ICM	Dundivariety, Chandani local	2	14	5.0	67.0	55.9	19.7	458935	2.91	348716	2.50
Jasmine	INM	<i>Jasmin umariculatum</i>	1	10	4.0	61.0	53.0	15.1	570000	2.65	434000	2.20
	IPDM	Udupi Mallige	1	5	0.5	34.2	23.5	45.5	282040	4.03	178430	3.10
	ICM	Kakada	1	15	3.0	73.5	63.8	15.2	101814	1.54	64550	1.34
Sub total				30	7.5	266.5	231.1	25.3	317951	2.74	225660	2.21

Marigold	ICM	Arka Alan- kar	1	5	2.0	8.2	6.3	29.4	22.86	4.89		
	Varietal demo	Arka Ban- gara	1	6	1.2	150.9	175.2	-13.9	320523	5.46	273283	4.54
		Sub total		11	3.2	79.5	90.8	7.8	160273	5.18	273283	4.54
Rose	ICM	Charisma, Bullet, Gladiator	3	25	10.0	73.5	62.5	20.0	469163	4.07	377777	3.27
Tube rose	ICM	Sugandhraj, Prajwal	2	15	6.0	111.8	82.8	34.2	664327	7.23	445253	5.42
		Total		106	35.1							

3.1.4.14 Demonstrations on hybrids

During the year, 518 demonstrations on hybrids in various crops were conducted by the KVKs in the states of Karnataka (419) and Kerala (99) covering 159 ha area in crops like maize, tomato, bajra, sunflower, cabbage, cotton, chilli, brinjal, cucumber papaya, tomato, watermelon, passion fruit and yard long bean. The State-wise, crop and hybrid wise results are presented in the foregoing discussion.

Karnataka: A total of 419 demonstrations were conducted by KVKs of Karnataka in various crop hybrids covering 150.4 ha area as presented in the Table 46. In maize private hybrids NK-666 and CP-818 were demonstrated, which gave 15.1% and 23.7% higher yield over check. In bajra, Pioneer 86M 52 hybrid gave 13.1 q/ha, which was 5.5% higher in 38 ha area performed superior (23.1%) to check varieties with better BCR (2.85). The average yield in Bt hybrids was 23.5 q/ha under demonstrations as against 19.1 q/ha in check. In sunflower Cauvery Champ hybrid recorded 21.3 % higher yield (14.3 q/ha) over farmers' variety (11.8 q/ha). Arka Prabhat hybrid

of papaya recorded very less yield of 153.5 q/ha under demonstrations as compared to 238.4 q/ha in the check. The cucumber hybrid chitra gave higher yield of 265 q/ha, which was 21.6% higher over local variety.

The Brinjal hybrids MEBH 9 (21.3%) and Sungro (14.6%) performed superior to check by registering an average yield of 498 and 297 q/ha, respectively with higher economic returns. In cabbage, NS 160 hybrid recorded 23.7% higher yield (292 q/ha) as compared to check (236 q/ha). In chilli, hybrids US 344, Arka Kyathi, Arka Meghana, Byadgi kaddi and Byadgi dabbi also performed better. The tomato hybrids, Arka Samrat (45.3%), US 800 (26.8%), Arka Rakshak (19.8%), Abhilash (18.6%), Namdhari (11.4%), Lakshmi (11.7%) and Utsav (8.7%) performed better than varieties and gave better economic returns to the farmers. In watermelon, hybrid NS 294 gave 661 q/ha and Kiran hybrid gave 436.5 q/ha. However, net returns and BCR was less in Kiran hybrid due to low market price.

Table 46: Frontline demonstrations on hybrids conducted by KVKs of Karnataka

Check	Name of hybrid	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)			Economics of hybrid		Economics of Check	
					Demo	Local check	% change	Net Returns (Rs/ha)	BCR	Net Returns (Rs/ha)	BCR
Maize	CP-818	2	35	12.0	56.0	44.1	23.7	51063	2.31	32822	1.83
	NK-666	2	18	8.2	56.8	51.3	15.1	52230	2.61	43632	2.32
Bajra	86M 52	1	25	10.0	13.1	12.4	5.5	2434	1.26	2081	1.23
Cotton	Bt. Hybrids	7	115	38.0	23.5	19.1	23.1	57614	2.85	60775	2.96
Sunflower	Cauvery Champ	1	8	4.0	14.3	11.8	21.3	34576	3.07	26379	2.66
Brinjal	MEBH 9	2	20	8.0	497.9	418.3	21.0	334123	3.98	245934	3.42
	Sungro	1	10	4.0	297.2	259.4	14.6	37368	1.72	16032	1.26
Cabbage	NS 160	1	10	4.0	292.0	236.0	23.7	69650	2.44	103450	3.43
Chilli (green)	ArkaKyathi	1	10	1.0	203.6	163.4	24.6	227280	3.91	177060	3.60
	ArkaMeghana	3	14	5.6	196.5	171.6	14.0	320800	4.07	289032	3.81
	US344	1	10	4.0	254.6	188.2	35.3	162290	2.76	102100	2.19

Chilli (dry)	ByadgiDabbi	1	5	2.0	35.0	33.5	4.5	206250	3.63	225500	4.13
	ByadgiKaddi	1	10	4.0	34.6	32.2	7.45	214070	3.83	241950	4.48
Cucumber	Chitra	1	5	1.0	265.0	218.0	21.6	97704	2.06	65749	1.73
Papaya	ArkaPrabhat	1	10	1.0	153.5	238.4	-35.6	38700	1.27	154820	2.00
Tomato	Abhilash	3	20	7.0	611.7	517.0	18.6	501337	3.20	434747	3.13
	ArkaRakshak	2	10	3.0	593.0	497.5	19.8	318988	3.35	190429	2.45
	ArkaSamrat	2	18	7.2	408.3	268.5	45.3	571438	3.02	435525	2.89
	Lakshmi	1	10	4.0	517.0	463.0	11.7	190888	3.24	190888	3.24
	Namadhari	1	10	4.0	353.0	317.0	11.4	75620	3.50	60150	2.72
	US 800	1	10	4.0	345.1	272.1	26.8	42840	1.71	26890	1.49
	Utsav	1	5	2.0	563.0	518.0	8.7	304400	3.77	348000	4.41
Watermelon	Kiran	1	11	4.4	436.5	366.8	19.0	324000	3.88	257291	3.35
	NS-294	1	15	6.0	661.0	612.0	8.0	167830	1.92	248300	2.50
Total			419	150.4							

Kerala: Demonstrations on hybrids in cabbage, chilli, cucumber, passion fruit, tomato and yard long bean in 8.61 ha area revealed higher yield by 29.3 to 38.3% in cabbage hybrids such as NS 43 and NS-160, 10.4% increase in cauliflower hybrid NS 40N and 8.1% increase in chilli hybrid Keerthi. The average yield was 112.8 q/ha in cabbage hybrid NS-160, 172 q/ha in cabbage hybrid NS-43, 170.0 q/ha in cauliflower hybrid NS 40N and 153.6 q/ha in chilli Keerthi hybrids. The tomato hybrids Arka

Rakshak and Manu lakshmi recorded an average yield of 261.6 q/ha and 189.2 q/ha, respectively as compared to their respective check variety. In cucumber KPCH-1 has given 43 q/ha yield with BCR of 3.00. Kavery hybrid of passion fruit performed better under Kerala condition with 23.6% higher yield (18.6 q/ha) and BCR of 3.30 over farmers' check variety (15.0 q/ha). In yard long bean, hybrid Geethika gave highest yield of 260 q/ha followed by NS-621 with 216 q/ha as compared to 126 q/ha and 158 q/ha in their respective local check varieties.

Table 47: Frontline demonstrations on hybrids conducted by KVKs of Kerala

Crop	Name of hybrid	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (kg/ha)			Economics of Hybrid		Economics of Check	
					Demo	Local check	Change (%)	Net Returns (Rs/ha)	BCR	Net Returns (Rs/ha)	BCR
Cabbage	NS-160	2	15	5.4	112.8	92.0	38.4	245000	1.93	163000	1.51
	NS 43	1	2	0.01	172.0	133.0	29.3	35500	1.07	186500	1.88
Cauliflower	NS 40 N	1	10	0.4	170.0	154.0	10.4	309000	1.83	245000	1.66
Chilli	Keerthi	1	5	0.5	153.6	142.1	8.1	53875	1.36	48000	1.32
Cucumber	KPCH – 1	1	10	0.2	43.0			120000	3.00	0	
Passion fruit	Kavery	1	5	0.5	18.6	15.0	23.6	336300	3.30	302500	2.68
Tomato	Arka Rakshak	4	30	1.0	261.6	150.5	82.8	301370	2.50	71505	1.32
	Manulakshmi	1	10	0.3	189.2	145.6	30.0	236530	2.00	0	
Yard long bean	NS-621	1	2	0.1	216.0	158.0	36.7	222500	1.70	96500	1.32
	Geethika	1	10	0.25	260.0	126.0	106.4	520588	3.01		
Total			99	8.61							

3.1.4.15 Frontline demonstrations on farm implements and tools

Farm mechanization demonstrations (81) of various farm implements covered an area of 43.2 ha during the year by KVKs of Karnataka and Kerala. Of which, 45 demonstrations on farm implements were conducted by KVKs of Karnataka and 36 demonstrations in Kerala. The state-wise details of implements demonstrated are presented below:

Karnataka: During the year five farm implements/machinery were demonstrated in five districts covering 31 ha and 45 farmers in Karnataka (Table 48). Use of power operated paddy weeder has reduced the time required to cover 1 ha to 20 hours,labour requirement to 5 man days as

against 20 man days and overall cost reduced by 75% over check. Similarly, spiral separator in chickpea demonstrated in 5 farmers' field was found to reduce labour requirement by 50% and cost also by 50% as compared to check. The demonstration of hand operated cocoon deflosser has saved the time required for removal of flossy layer for 100 kg cocoons by 75% and reduced 50% labour and cost involved besides fetching higher market price. Low cost mango harvester was demonstrated in Kalaburagi district and results revealed that 516 fruits (58% higher) can be harvested per hour in comparison with 327 fruits in traditional practice. Functional clothing kit for threshing and winnowing of maize was also found effective in reducing drudgery in harvest at Gadag district.

Table 48: Frontline demonstrations on farm implements conducted by KVKs of Karnataka

Name of KVK	Implement	Crop	Farmers (No.)	Area (ha)	Parameter or unit	Field observation			Labour (man days)			Cost (Rs./ha or Rs./Unit)		
						Demo	Check	Change (%)	Demo	Check	Change (%)	Demo	Check	Change (%)
Dakshina Kanna-da	Power operated paddy weeder	Paddy	5	2.0	Time required to cover 1 ha (hrs)	20	80	75.0	5	20	75.0	1500	6000	75.0
Gadag	Spiral separator	Bengal-gram	5	5.0	kg/man hr	100	50	100.0	1.5	3	50.0	195	390	50.0
Kolar	Hand operated cocoon deflosser	Sericulture	5	1000	dfls Time required for removal of flossy layer for 100 kg cocoons (hrs)	8	32	75.0	2	4	50.0	500	1000	50.0
Kalaburagi	Low cost mango harvester	Mango	10	4.0	No of fruits/hr	516	327	58.0	17	27	37.0			
Gadag	Drudgery reduction	Functional clothing kit for threshing and winnowing of Maize	20	20.0	4.7 weighted mean score for drudgery	2.0								
Total			45	31.0										

Kerala: Demonstrations on paddy mechanization and climber for harvest in arecanut were implemented by 4 KVKs in Kerala during the year (Table 49). Disc plough, helical blade puddler for uncultivated paddy lands involving only 2 man days gave 43 q/ha yield. In labour scarcity areas, use of paddy drum seeder increased the area covered/day/labour for seeding by 98.6% along with

95% reduction in labour as compared to check. Single wheel rotary weeder in paddy improved the area coverage by 51.1%, saved the labour and cost by 62% and 86%, respectively as compared with check. Arecanut climber for harvesting of nuts saved the labour requirement by 50% over the normal practice, besides cost saving by 15%.

Table 49: Frontline demonstrations on farm implements conducted by KVKs of Kerala

Name of KVK	Implement	Crop	Farmers (No.)	Area (ha)	Parameter or unit	Field observation			Labour (man days)			Cost (Rs./ha or Rs./Unit)		
						Demo	Check	Change (%)	Demo	Check	Change (%)	Demo	Check	Change (%)
Kasaragod	Disc plough, helical blade puddler for uncultivated paddy lands	Paddy	6	5.0	Yield (q/ha)	43			2	-	-	79343		
Palakkad	Arecanut climber for harvester	Arecanut	10	4.0	No of labour/ha	40	30	33.0	3	6	50.0	25150	29650	15.0
Trivandrum	Paddy drum seeder	Paddy	10	1.6	Area covered/day/labour	1	0.01	98.6	2	42	95.0	1500	18900	9.0
Trivandrum	Single wheel rotary weeder	Paddy	10	1.6	Area covered/day/labour	0.18	0.01	51.1	5	62	92.0	3750	27900	86.0
Total			36	12.2										



Demonstration on drum seeder in paddy by KVK Thiruvananthapuram



Demonstration of arecanut palm harvester by KVK Malappuram

3.1.4.16 Enterprises:

A total of 320 demonstration units were organized on other enterprises such as sericulture, handicrafts, processing and value addition in crops, mushroom and vermicompost through establishment of 125 units. Demonstrations were also conducted on different enterprises for income generation by the KVKs of Karnataka and Kerala.

Karnataka: A total of 240 demonstration units were established under various small scale income generating enterprises such as sericulture, handicraft, processing and value addition (millets, tamarind, coconut, amla and dried flower), vermicompost and mushroom production (Table 50). In sericulture, silk worm growth enhancer, G-4 mulberry, tree mulberry cultivation and silk worm

rearing in Kolar, improved cocoon hybrid (FC-1 X FC-2) in Chamarajanagara and silkworm rearing in Mandya (50 farmers) led to better economic returns and employment generation. Entrepreneurship development in handicrafts using pierced cocoons was conducted in Chickaballapura Chamarajanagara, Mandya and Kolar for women SHGs. Branding and market linkage to coconut copra was taken by farmers in Tumkur district. In millets, small scale enterprises on value added products were established under seven KVKs of Karnataka and value added products such as ragi malt, ragi hurihittu, ragi pappad, ragi burfi with date syrup, cookies, chakali, nippattu, kodabale and millet holigeare being prepared by 94 women SHGs. Value added

products in tamarind such as slab and candy are being prepared and marketed by 10 tribal farm women under KVK Chamarajanagara. In amla, various value added products are being developed and promoted under the guidance of KVK Ramanagara. Dried flower technology including making of book marks, table mats and photo frames was practiced by 6 farm women under the KVK, Tumkur-II. In Gadag, organic manure production using sorghum crop residues and wastes was undertaken and manure applied to rabi sorghum realizing higher yields by 10 farmers. Oyster mushroom production as enterprise is being promoted by 39 farmers under four KVKs namely Chikkaballapura, Chikkamagaluru, Tumkur-I and Koppal.

Table 50: Frontline demonstrations on enterprises conducted by KVKs of Karnataka

Name of KVK	Category	Technology demonstrated	Farmer (No.)	Units (No.)	Data on major parameters	Economics of demonstration		
						Gross cost (Rs.) or Rs./unit	Gross return (Rs.) or Rs./unit	BCR
Kolar	Sericulture	Silkworm growth enhancer for higher cocoon yield	5	2	550 kg/ha	61475	254156	4.13
Kolar	Sericulture	Tree mulberry for rain-fed sericulture	10	4	232.4 kg/ha	29087	106904	3.67
Chamarajanagara	Sericulture	Improved silkworm hybrid FC-1 X FC-2 (100 DFLs)	10	10	82.0 kg/100 dfl	13500	24800	1.83
Mandya	Sericulture	Silkworm rearing (100 DFLs)	15	15	72.3 kg/100 DFLs	15450	32512	2.10
Kolar	Sericulture	Mulberry G-4 for yield maximization and cocoon rearing	10	4	214.0 kg/ha/year	40538	98449	2.43
Chikkaballapura	Handicrafts	Entrepreneurship development in handicrafts (garlands) using pierced cocoons (EDP)	5	1	Garlands, Flower bouquets/month	12460	23510	1.88
Chamarajanagara	Handicrafts	Entrepreneurship development in handicrafts using pierced cocoons	10	2	5.0 kg pieced cocoons	9000	22500	2.50
Mandya	Handicrafts	Cocoon bio crafts by using pierced cocoon	1	1	3.0 kg pieced cocoon	5250	13800	2.63
Kolar	Handicrafts	Entrepreneurship development through cocoon bio craft	1	1	120 Garlands/month	108000	180000	1.66
Tumakuru I	Value Addition	Branding and market linkage to coconut copra	1	1	1.0 qtl processed	15500	22000	1.41

Bagalkot	Value Addition	NavanePeda	12	1	160.0 kg/week	7810	20935	2.70
Mysuru	Value Addition	Value addition to ragi by tribal women SHG members - malt, hurihittu, papad	5	1	300.0 kg products	32000	50500	1.70
Tumkur-II	Value Addition	Dried flower technology (book marks, table mats, photo frame)	6	2	320.0 pices/month	45590	63,500	2.37
Chamarajanagara	Value Addition	Home scale enterprise in foxtail millet (navane)	10	2	300.0 kg	25500	64600	2.53
Chamarajanagara	Value Addition	Home scale enterprise in tamarind for tribal farm-women-slab, candy	10	2	100.0 kg	8000	22250	3.53
Dharwad	Value Addition	Processed millets	12	1	8.0 q	36500	64000	1.75
Ramanagara	Value Addition	Processing and value addition in amla for economic security	1	1	246.0 kg	6127	12613	2.05
Dharwad	Value Addition	Ragi burfi with date - syrup	10	1	50.0 kg	3000	10000	3.33
Mandya	Value Addition	Small scale enterprise in foxtail millet -navane rice, diabetic mix	21	1	11.1 q	19333	72150	3.73
Belagavi-2	Value Addition	Value added products from foxtail millet-cookies	16	1	20.0 kg	3000	5250	1.75
Belagavi-2	Value Addition	Value added products from minor millets-chakali, nippattu, lodabale, holige	20	1	145.0 kg	27750	34800	1.28
Gadag	Vermicompost	Organic manure production -Rabi sorghum	10	10	11.4 q/ha/crop	17960	29072	1.61
Chikkaballapura	Oyster Mushroom	Mushroom as a subsidiary income for farm families	5	1	500 bag/batch	40000	100000	2.50
Tumakuru I	Oyster Mushroom	Mushroom cultivation-IGA activity in SHG group	3	1	26.6 kg/batch	2940	4160	1.41
Chikkamagaluru	Oyster Mushroom	Oyster mushroom cultivation as income generating activity	29	1	280.0 kg/month/unit	1200	4770	3.97
Koppal	Oyster Mushroom	Production, processing, value addition & market led extension in mushroom	2	5	8.3 kg/day/unit	795	3735	4.69
Total			240	73				

Kerala: A total of 80 demonstration units were established by KVKs of Kerala under various small scale enterprises on processing and value addition, production of biocontrol agents, mushroom cultivation for higher income generation during 2017-18 (Table 51).

Product diversification in jack fruit by jam, jelly, squash, chips, tender jack fruit pickle was undertaken by 14 farmers in Idukki and Palakkad districts. Red rice and jack fruit seed based 'Nutrimix' is being produced and marketed by two farmers in Pathanamthitta district. Similarly, arrowroot starch extraction and marketing has been taken up by

five farmers in Pathanamthitta district. In Thrissur, two farmers were engaged in minimal processing of vegetables this year. A unit for on farm production of biocontrol agents was established in Palakkad district. Production of milky mushroom was taken up in 8 units by 18 farmers' in Trivandrum, Malappuram, Pathanamthitta and Wynad districts. In Alappuzha, 25 farmers established 25 units for oyster mushroom cultivation and they are assured of making profit with 2.50 BCR. Oyster mushroom production using banana pseudostem waste was practiced by 5 farmers in Idukki district with 2.57 BCR.

Table 51: Frontline demonstrations on enterprises conducted by KVKs of Kerala

Name of KVK	Category	Technology demonstrated	Farmer (No.)	Units (No.)	Data on major parameters	Economics of demonstration		
						Gross cost (Rs.) or Rs./unit	Gross return (Rs.) or Rs./unit	BCR
Idukki	Value addition	Product diversification in jack fruit- Jam, jelly, squash, chips	12	3	160.0 kg products	32000	59000	1.84
Thrissur	Value addition	Minimal processing of vegetables	2	2	100.0 kg	5750	9750	1.70
Palakkad	Value addition	Value addition in Jackfruit (tender jack fruit pickle)	2	2	93.6 kg	23456	37452	1.59
Pathanamthitta	Value addition	Red rice and jack seed based 'Nutrimix'	10	2	9.8 kg from 10 kg raw material	103/Kg	210/kg	2.03
Pathanamthitta	Value addition	Arrowroot starch extraction	5	2	1.5 kg from 10 kg raw material	550/kg	1000/kg	1.80
Palakkad	Bio control agents	On farm production of biocontrol agents	1	2	400.0 kg	23180	42000	1.81
Trivandrum	Milky mushroom	Milky mushroom for economic returns	2	2	35.3 kg/100 bed	9340	21150	2.26
Malappuram	Milky mushroom	Milky mushroom 'Bheema'	10	1	0.697 kg/bed	80	315	3.94
Pathanamthitta	Milky mushroom	Milky mushroom Var. Kumarakam local	5	5	24.1 kg/unit	4500	8470	1.80
Wayanad	Milky mushroom	Milky mushroom Bheema	1	1	137.5 kg/batch/unit	30087	41250	1.37
Alappuzha	Oyster mushroom	Calocybagambosa cultivation	25	25	24.4 kg/batch/unit	98/bed	244/bed	2.50
Idukki	Oyster mushroom	Oyster mushroom production using banana pseudostem waste	5	5	0.7 kg/bed	63	163	2.57
Total			80	52				



Demonstration on milky mushroom production unit by KVK Malappuram

3.1.4.17 Livestock

A total of 591 demonstrations were conducted covering 820 livestock or units (770 animals, 79 units in case of poultry) during the year by the KVKs of Karnataka and Kerala. The state wise break up includes 446 in Karnataka and 145 in Kerala. The state wise and enterprise wise results are as under:

Karnataka: A total of 324 in dairy, 99 in sheep & goat and 17 demonstrations in poultry were conducted covering 691 animals and 17 units in case of poultry in the farmers' fields during the year (Table 52). In dairy, technologies such as rumen bypass fat, area specific mineral mixture, fodder enrichment, azolla, hydroponic fodder, silage gave higher milk yield of 13.6, 10.8, 14.6, 8.4, 9.9, 10.4 L./anim./day over local check i.e. 11.5, 9.1, 8.0, 6.5, 8.0, 8.8, respectively. In case of sheep & goat, technologies such as nutrition management in sheep, goat, disease management in sheep & goat gave higher body weight of 22.2, 50.6, 32.0 kg/animal over local check i.e. 16.4, 23.9, 22.3, respectively. In case of poultry, technology disease management controlled 100% ranikhet disease prevalence and scientific backyard management gave higher body weight of 1.5 kg/bird over check i.e. 0.9 kg/bird. In case of piggery, technology such as vaccination and feeding practices gave higher body weight of 106.0 kg/animal over check i.e. 92.0. The details are given in Table 52.

Table 52: Frontline demonstrations on livestock conducted by KVKs of Karnataka

Category	Thematic area	Farmer (No.)	Animals/ Units (No.)	KVKs (No.)	Unit	Demo	Check	Change (%)
Dairy	Nutrition Management-Rumen bypass fat	67	67	5	Milk yield L/day	13.6	11.5	18.3
	Nutrition management-Area specific mineral mixture	30	28	3	Milk yield L/animal/day	10.8	9.1	22.0
	Nutrition management-fodder enrichment	30	45	3	Milk yield L/animal/day	14.6	7.9	42.6
	Disease management-Ectoparasite	10	10	1	Disease prevalence after treatment(%)	Nil	60.5 (before)	
	Disease Management	25	22	3	Milk yield L/animal/day	15.8	11.8	41.1
	Clean milk production	30	26	4	Milk yield L/animal/day	11.9	9.6	21.5
	Reproductive management	40	40	1	Onset of oestrus (days)	83.1	110.0	
	Azolla	10	10	1	Milk yield L/animal/day	8.4	6.5	25.4
	Hydroponic fodder	17	17	4	Milk yield L/animal/day	9.9	7.9	43.8
	Silage	25	25	3	Milk yield L/animal/day	10.4	8.8	16.9
	Calf management	10	10	1	Body wt (kg/animal)	841.5	612.0	37.8
	Cattle management	15	15	1	Body wt (kg)	441.0	392.0	11.1
		Sub total	309	315				
Sheep and Goat	Nutrition management in sheep	14	14	2	Body wt (kg)	22.2	16.4	18.5
	Nutrition management in goat	60	60	3	Body wt (kg)	50.6	23.9	88.3
	Disease management in sheep and goat	5	10	1	Body wt (kg)	8.0	5.5	45.0
	Disease management	20	190	3	Body wt (kg)	32.0	22.3	26.8
		Sub total	99	274				

Poultry	Disease management	5	5	1	Ranikhet Disease prevalence (%)	After Nil	Before 60.5	
	Cage system of poultry	2	2	1		122.0	63.0	92.9
	Scientific backyard poultry management	10	10	1	Body wt (kg)	1.5	0.9	58.0
Sub total		17	17					
Piggery	Disease Management	3	3	1	Piglet mortality (%)	16.4	9.8	67.6
	Vaccination and feeding practices	3	75	1	Body wt (kg/animal)	106.0	92.0	15.2
	Sub total	6	78					
Fodder	Green fodder production	15	15	2	Green fodder (q/ha)	285.5	43.0	0
Total		446	699					



Demonstration of piggery unit by KVK Hassan

Kerala: A total of 78 in dairy, 5 in sheep & goat and 62 demonstrations in poultry were conducted covering 79 animals and 62 poultry units in the farmers' fields during the year (Table 53). In dairy, technologies such as azolla, hydroponic fodder and nutrition management gave milk yield of 20.0, 22.8, 15.0 L./animal/day as compared to check i.e. 18.0, 20.0, 14.0, respectively. In case of sheep & goat, technology nutrition management gave higher body weight of 11.0 kg/animal over check i.e. 7.0. In case of duckery, small-scale poultry production and varietal evaluation gave higher body weight of 2.0 and 3.3 kg/bird over check i.e. 0.9, 2.8, respectively. The details are given in Table 53.

Table 53: Frontline demonstrations on livestock conducted by KVKs of Kerala

Category	Thematic area	Farmer (No.)	Animals/ Units (No.)	KVKs (No.)	Unit	Demo	Check	Change (%)
Dairy	Assisted reproductive techniques	16	16	1	Conception rate (%)	47.0	25.0	46.8
	Fertility management	10	1	1	Estrus sign	10.0 out of 10.0	0	100.0
	Azolla	10	10	1	Milk yield L./animal/day	20.0	18.0	11.1
	Home made feed ration	8	1	1	Feed production (kg)	172.5	-	-
	Hydroponic fodder	4	5	5	Milk yield L./animal/day	22.8	20.0	7.0
	Nutrition management	20	20	1	Milk yield L./animal/day	15.0	14.0	7.1
	Green fodder	10	1	1	Green fodder yield (q/ha/year)	2467.0	1969.0	25.3
	Sub total		78	54				
Sheep and goat	Nutritional management	5	5	1	Body wt at 5th month (kg)	11.0	7.0	36.0

Poultry	Backyard poultry	10	10	1	Body wt (kg/unit)	840.0	672.0	25.0
	Nutrient management in backyard poultry	20	20	1	Body wt (kg/unit)	202.0	191.0	5.0
	Sub total	30	30					
Duckery	Small scale poultry production	2	2	1	Body wt (kg/duck)	2.0	0.9	45.0
	Breed Evaluation	10	10	1	Body wt (kg/duck)	3.3	2.8	19.6
	Sub total	12	12					
Quail	Demonstration of Japanese quail rearing	20	20	2	Net returns (Rs/unit)	5290		
Total		145	121					



Demonstration on small scale duckery by KVK Kollam

3.1.4.18 Fisheries

A total of 88 demonstrations were conducted in case of fisheries covering 71 units during the year by the KVKs of Karnataka and Kerala. The state wise break up includes 78 in Karnataka and 10 in Kerala. The state wise results are as under.

Karnataka: A total of 78 demonstrations in fisheries were conducted through 61 units in the farmers' fields during the year (Table 54). Technologies such as Tilapia under feed-based aquaculture in Chikkamagaluru, common carps in Kodagu, Belagavi-I, Hassan and Vijayapura-I, mixed carp seed rearing in pens in Udupi gave fish yield of 213, 66.7, 41.2, 9.7, 30.9, 2.4 q/ha over check i.e. 97.5, 34.6, 23.5, 7.3, 22.5, 0.9, respectively with net return of Rs. 903000, 373274, 234257, 67800, 13810, 409325, respectively. The details are given in Table 54.

Table 54 : Frontline demonstrations on fisheries conducted by KVKs of Karnataka

Category	Name of KVK	Technology demonstrated	Farmer (No.)	Units (No.)	Unit of yield parameter	Major parameters			Economics of demonstration			
						Demo	Check	Change (%)	Gross cost (Rs.)	Gross Returns (Rs.)	Net Returns (Rs.)	BCR
Common Carps	Belgavi	Floating Pelleted Feed for Carps	20	19	Fish yield (q/ha)	41.2	23.5	19.0	54000	288257	234257	5.33
	Davana-gere	Integrated Management of Fish culture in big ponds	5	5	Fish yield (q/ha)	80.5			190500	637500	447000	3.20
	Dharwad	Promotion of inland fisheries in farm pond	10	10	q/ha	22.6			50000	192000	142000	3.84

	Hassan	High yielding varieties(2:1:1:1) Catla, Rohu, Grass carp	5	2	Fish yield (q/ha)	9.7	7.3	33.7	13500	77600	67800	5.70
	Kodagu	Integrated farming system	15	1	Fish yield (q/ha)	66.7	34.6	92.8	185461	558735	373274	3.01
	Mysuru	Quality fish seed rearing in farmers fish ponds	5	6	Survival rate (%)	40.0	26.0	53.9	40600	104000	63200	2.50
	Vijayapua-1	Scientific fish culture in farm pond	10	10		30.9	22.5	39.1	14000	27810	13810	1.99
	Sub total		70	53								
Compos-ite fish culture	Udupi	Mixed carp seed rearing in pens	3	3	Fish yield (q/ha)	2.3	0.9	160.0	58675	468000	409325	7.98
Tilapia	Chikkamagaluru	Introduction of Tilapia under feed based aquaculture	5	5	Fish wt (q/ha)	213.0	97.5	68.4	375000	1278000	903000	3.40
Total			78	61								



Demonstration on mixed carp seed rearing in pens by KVK Udupi

Kerala: A total of 10 demonstrations in fisheries were conducted through 10 units in the farmers’ fields during the year (Table 55). Common carps in Kozhikode gave yield of 25.9 q/ha over local check (24.9 q/ha) with net return of Rs. 298940. The details are given in Table 55.

Table 55: Frontline demonstrations on fisheries conducted by KVKs of Kerala

Category	KVK	Technology demonstrated	Farmer (No.)	Units (No.)	Unit	Yield (q/ha)			Economics of demonstration			
						Demo	Check	Change (%)	Gross cost (Rs.)	Gross Returns (Rs.)	Net Returns (Rs.)	BCR
Common carps	Kozhikode	Culture of freshwater fishes using formulated feed	10	10	q/ha	25.9	24.9	4.2	260588	559528	298940	2.15

3.1.5 Capacity development

During the year under report, 3148 training courses were organized in which 121994 persons belonging to different categories (Table 56). Majority of these (2626 courses) were for farmers/farm women category in which 101930 farmers/farm women were trained. KVKs in the two states organized 189 programmes for rural youth and

124 programmes for extension functionaries. It may be noted that 70 sponsored training courses were organized by involving 3515 participants. KVKs also gave importance to vocational training with 139 programmes. State-wise break-up indicates that more number of training courses was organized in Karnataka (2040) followed by Kerala (1108). Details are given below:

Table 56: State and category wise participants of training courses organized by of Zone XI

State	Farmers / Farm Women (No.)		Rural Youth (No.)		Extension Functionary (No.)		Sponsored Programmes (No.)		Vocational Programmes (No.)		Total	
	TC	P	TC	P	TC	P	TC	P	TC	P	TC	P
Karnataka	1736	68463	96	3065	89	4393	59	3191	60	1768	2040	80880
Kerala	890	33467	93	3972	35	1039	11	324	79	2312	1108	41114
Total	2626	101930	189	7037	124	5432	70	3515	139	4080	3148	121994

TC = Training courses P = Participants

3.1.5.1 Farmers and Farmwomen

Training organized for farmers/farmwomen covered different areas (Table 57). The major area of training was crop production with 550 courses and 19214 participant farmers/farm women. Training courses on plant protection (453) and soil health & fertility management (239) were important areas followed by livestock production & management (214 courses for 7371 farmers). More number of training courses were also organized on processing and value addition (202 courses 7193 participants).



Training on plant protection by KVK Davanagere

Table 57: Area wise training courses organized for farmers and farmwomen by KVKs of Zone XI

Training Area	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		M	F	T	M	F	T	M	F	T
Agricultural Extension	76	2097	1004	3101	448	210	658	2545	1214	3759
Agro-forestry	17	357	144	501	74	170	244	431	314	745
Capacity Building and Group Dynamics	88	1431	1411	2842	239	246	485	1670	1657	3327
Crop Diversification	29	518	319	837	121	43	164	639	362	1001
Crop Production	550	12191	4246	16437	1988	789	2777	14179	5035	19214
Entrepreneurship Development	100	1759	1525	3284	470	523	993	2229	2048	4277
Farm Implements	63	1020	493	1513	72	87	159	1092	580	1672
Fisheries	28	708	148	856	148	47	195	856	195	1051
Flower	15	395	212	607	34	38	72	429	250	679
Fruits	51	1272	382	1654	170	81	251	1442	463	1905
Livestock Production and Management	214	3853	2151	6004	737	630	1367	4590	2781	7371
Medicinal and Aromatic Plants	5	225	35	260	48	5	53	273	40	313
Natural Resource Management	47	1038	496	1534	218	84	302	1256	580	1836
Nutrition security	87	1094	1789	2883	349	463	812	1443	2252	3695
Ornamental Plants	3	28	55	83	6	10	16	34	65	99
Plant Protection	453	11469	3514	14983	2168	827	2995	13637	4341	17978
Plantation crops	46	1655	362	2017	202	49	251	1857	411	2268
Problematic Soil Management	15	502	267	769	85	71	156	587	338	925
Processing and Value addition	202	2221	3793	6014	347	832	1179	2568	4625	7193
Production of Inputs at Site	72	1439	936	2375	234	184	418	1673	1120	2793
Soil Health & Fertility Management	239	7144	2221	9365	1449	700	2149	8593	2921	11514
Spices	21	435	182	617	28	13	41	463	195	658
Tuber Crops	1	30	6	36	2	0	2	32	6	38
Vegetable Crops	136	2622	1563	4185	617	294	911	3239	1857	5096
Women Empowerment	68	393	1680	2073	65	385	450	458	2065	2523
Total	2626	55896	28934	84830	10319	6781	17100	66215	35715	101930

M = Male; F = Female; T = Total

State-wise data presented in Table 58 reveals that out of 1736 courses were organized in Karnataka (68463 participants) and 890 courses were organized in Kerala (33467 participants). Out of the 101930 participants, 17100(16.8%) were from SC/ST category and 35715 (35%) were women participants.

Table 58: State-wise training programmes conducted for farmers and farmwomen by KVK of Zone XI

State	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		M	F	T	M	F	T	M	F	T
Karnataka	1736	39556	16609	56165	7747	4551	12298	47303	21160	68463
Kerala	890	16340	12325	28665	2572	2230	4802	18912	14555	33467
Total	2626	55896	28934	84830	10319	6781	17100	66215	35715	101930

M = Male; F = Female; T = Total

3.1.5.2 Rural Youth:

Training courses were organized in different areas for rural youth (189 courses, 7037 participants). Among these, processing and value addition was the major training area with 43 courses (1150 participants) followed by 24 courses on entrepreneurship development (459 participants). The relative popularity of these courses reflects the preference of rural youth in areas representing secondary agriculture and self-employment (Table 59). Crop production (22 courses, 654 participants), plant protection (12 courses, 661 participants) and agricultural extension (12 courses, 614 participants) were the other important training areas for rural youth.



Training on intercropping in arecanut by KVK Shivamogga

Table 59: Area wise training courses organized for rural youth

Training Area	Courses (no.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		M	F	T	M	F	T	M	F	T
Agricultural Extension	12	341	214	555	31	28	59	372	242	614
Agro-forestry	1	55	39	94	0	0	0	55	39	94
Bee-Keeping	3	404	147	551	51	27	78	455	174	629
Capacity Building and Group Dynamics	6	62	86	148	9	21	30	71	107	178
Crop Diversification	1	2	0	2	49	4	53	51	4	55
Crop Production	22	258	334	592	36	26	62	294	360	654
Entrepreneurship Development	24	179	193	372	29	58	87	208	251	459
Farm Implements	7	64	126	190	4	3	7	68	129	197
Fisheries	4	37	18	55	11	2	13	48	20	68
Flower	1	18	0	18	0	0	0	18	0	18
Fruits	3	51	66	117	34	15	49	85	81	166
Integrated Farming Systems	2	45	15	60	9	3	12	54	18	72
Livestock Production and Management	9	174	35	209	39	10	49	213	45	258

Mushroom Production	1	52	67	119	9	10	19	61	77	138
Natural Resource Management	2	40	0	40	0	0	0	40	0	40
Nursery Management	1	2	25	27	1	4	5	3	29	32
Nutrition Security	6	60	117	177	4	11	15	64	128	192
Plant Protection	12	390	170	560	65	26	91	455	196	661
Plantation Crops	1	13	12	15	0	0	0	13	12	15
Post Harvest Technology and Value Addition	3	18	283	301	5	10	15	23	293	316
Processing and Value addition	43	264	590	854	103	193	296	367	783	1150
Production and use of organic inputs	1	43	24	67	12	7	19	55	31	86
Production of Inputs at Site	7	184	84	268	30	23	53	214	107	321
Soil Health & Fertility Management	6	101	83	184	12	12	24	113	95	208
Spices	1	16	20	36	0	0	0	16	20	36
Vegetable Crops	5	102	98	200	27	20	47	129	118	247
Women Empowerment	5	1	94	95	8	30	38	9	124	133
Total	189	2976	2940	5916	578	543	1121	3554	3483	7037

M = Male; F = Female; T = Total

KVKs of Karnataka conducted 96 courses for rural youth and Kerala KVKs conducted 93 courses (Table 60). Nearly half of the participants (49.5 %) were women. This is a positive note as women are equally eager to acquire knowledge and skills in these areas. Youth belonging

to SC/ST also participated in good number (15.9%) reassuring that the capacity building efforts of KVKs are equally valuable in mainstreaming the youth of socially disadvantaged sections.

Table 60: State wise training programmes conducted for rural youth by the KVKs in Zone XI

State	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		M	F	T	M	F	T	M	F	T
Karnataka	96	1365	1025	2390	382	293	675	1747	1318	3065
Kerala	93	1611	1915	3526	196	250	446	1807	2165	3972
Total	189	2976	2940	5916	578	543	1121	3554	3483	7037

M = Male; F = Female; T = Total

5.1.5.3 Extension Functionaries:

A total of 124 courses were organized for 5432 extension functionaries. Among the different training areas, nutrition security was the major area with 24 courses and 1452 participants. Agricultural extension was the next major training area with 20 courses and 756 participants. Details of number of courses organized in different training areas along with the number of participants categorized under general, SC/ST, men and women for each of the training areas are given in Table 61.



Extension functionary training at KVK Bengaluru Rural

Table 61: Training courses organized for Extension Functionaries

Training Area	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		M	F	T	M	F	T	M	F	T
Agricultural Extension	20	692	24	716	29	11	40	721	35	756
Agro-forestry	1	25	0	25	11	0	11	36	0	36
Capacity Building and Group Dynamics	5	240	65	305	10	5	15	250	70	320
Crop production	13	353	104	457	23	20	43	376	124	500
Entrepreneurship Development	1	14	3	17	0	0	0	14	3	17
Farm Implements	3	23	44	67	0	22	22	23	66	89
Fisheries	2	19	16	35	0	0	0	19	16	35
Fruits	1	29	16	45	0	0	0	29	16	45
Livestock Production and Management	11	217	63	280	41	14	55	258	77	335
Natural Resource Management	3	135	6	141	4	2	6	139	8	147
Nutrition Security	24	19	1028	1047	28	377	405	47	1405	1452
Ornamental Plants	2	20	40	60	1	1	2	21	41	62
Plant Protection	14	340	101	441	33	7	40	373	108	481
Problematic Soil Management	2	80	0	80	0	0	0	80	0	80
Processing and Value Addition	8	43	180	223	14	61	75	57	241	298
Production of Inputs at Site	2	32	36	68	0	0	0	32	36	68
Soil Health & Fertility Management	5	207	53	260	17	6	23	224	59	283

Spices	1	24	0	24	10	0	10	34	0	34
Vegetable Crops	3	71	34	105	1	1	2	72	35	107
Women Empowerment	3	0	232	232	0	55	55	0	287	287
Total	124	2583	2045	4628	222	582	804	2805	2627	5432

M = Male; F = Female; T = Total

Details of training courses organized for extension functionaries have also been categorized state-wise (Table 62). KVKs in Karnataka organized 89 courses in which 4393 extension functionaries participated. In Kerala, 35 courses were organized for 1039 participants.

Table 62: State-wise training courses conducted for extension functionaries by KVKs of Zone XI

State	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		M	F	T	M	F	T	M	F	T
Karnataka	89	2089	1576	3665	198	530	728	2287	2106	4393
Kerala	35	494	469	963	24	52	76	518	521	1039
Total	124	2583	2045	4628	222	582	804	2805	2627	5432

M = Male; F = Female; T = Total

3.1.5.4 Sponsored Programs

Besides the regular training courses, 70 sponsored trainings were conducted by the KVKs in different areas for the benefit of 3515 participants (Table 63). More number of training courses (21) were organized on capacity building and group dynamics with the participation of 1554 farmers/rural youth/extension functionaries. In the areas of agricultural extension and soil health & fertility management, 11 programmes each were organized under sponsored training category.



Demonstration of spiral separator at KVK Ramanagara

Table 63: Area wise sponsored training courses organized by KVKs in Zone XI

Training Area	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		M	F	T	M	F	T	M	F	T
Agricultural Extension	11	264	116	380	8	6	14	272	122	394
Capacity Building and Group Dynamics	21	1384	170	1554	0	0	0	1384	170	1554
Crop Production	3	61	9	70	0	0	0	61	9	70
Entrepreneurship Development	2	41	88	129	1	1	2	42	89	131
Fisheries	1	54	0	54	15	0	15	69	0	69
Livestock Production and Management	4	78	42	120	16	6	22	94	48	142
Nutrition Security	2	20	9	29	10	2	12	30	11	41
Plant Protection	3	159	28	187	6	7	13	165	35	200

Problematic Soil Management	2	39	49	88	0	9	9	39	58	97
Processing and Value addition	9	47	133	180	8	104	112	55	237	292
Soil Health & Fertility Management	11	325	17	342	92	55	147	417	72	489
Vegetable Crops	1	26	10	36	0	0	0	26	10	36
Total	70	2498	671	3169	156	190	346	2654	861	3515

The State-wise break-up of sponsored programs is provided in Table 64. A total of 59 courses were organized in Karnataka benefiting 3191 participants, followed by 11 in Kerala with 324 participants. The proportion of women participation was better (80%) in Kerala reflecting the participation of women in farming.

Table 64: State wise sponsored training programmes organised by KVKs in Zone XI

State	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		M	F	T	M	F	T	M	F	T
Karnataka	59	2438	523	2961	151	79	230	2589	602	3191
Kerala	11	60	148	208	5	111	116	65	259	324
Total	70	2498	671	3169	156	190	346	2654	861	3515

3.1.5.5 Vocational Programmes

This is an important training where the focus is to impart skills and enable the trainees to earn or supplement his/her livelihood. A total of 139 training courses were organized during the year involving 4080 budding entrepreneurs. Among the different vocations, entrepreneurship development was the major area of training with 42 courses and 856 participants. Livestock production and management (29 courses, 858 participants) and women empowerment (18 courses, 535 participants) were the other major areas. Details are provided in Table 65.



Vocational training on spawn production at KVK Alleppy

Table 65: Vocational training courses organized by KVKs in Zone XI

Training Area	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		M	F	T	M	F	T	M	F	T
Agricultural Extension	11	150	165	315	27	22	49	177	187	364
Agro-forestry	1	20	3	23	5	0	5	25	3	28
Capacity Building and Group Dynamics	3	39	12	51	0	0	0	39	12	51
Crop Diversification	1	14	2	16	0	0	0	14	2	16
Crop Production	4	82	70	152	3	0	3	85	70	155
Entrepreneurship Development	42	139	405	544	49	263	312	188	668	856
Farm Implements	5	36	25	61	3	5	8	39	30	69
Flower	2	30	9	39	0	0	0	30	9	39
Fruits	1	38	0	38	12	0	12	50	0	50
Livestock Production and Management	29	460	140	600	194	64	258	654	204	858



Natural Resource Management	1	20	11	31	0	0	0	2	11	31
Ornamental Plants	3	21	26	47	1	3	4	22	29	51
Plant Protection	6	187	117	304	25	35	60	212	152	364
Plantation Crops	1	340	12	352	18	0	18	358	12	370
Processing and Value addition	8	86	76	162	0	2	2	86	78	164
Production of Inputs at Site	2	21	7	28	3	2	5	24	9	33
Vegetable Crops	1	0	39	39	0	7	7	0	46	46
Women Empowerment	18	11	241	252	0	283	283	11	524	535
Total	139	1694	1360	3054	340	686	1026	2034	2046	4080

Vocational training conducted by the KVKs is presented state-wise in Table 66. Large number of vocational courses was conducted in Kerala (79 courses with 2312 participants) than in Karnataka (60 courses with 1768 participants). Out

of the total of 4080 participants, 1026 were from SC/ST category (25 %). Extent of women participation was better in Kerala (1396 out of 2312, 60.4%).

Table 66: State-wise vocational training courses organised by KVKs in Zone XI

State	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		M	F	T	M	F	T	M	F	T
Karnataka	60	853	528	1381	265	122	387	1118	650	1768
Kerala	79	841	832	1673	75	564	639	916	1396	2312
Total	139	1694	1360	3054	340	686	1026	2034	2046	4080

M = Male; F = Female; T = Total

The summary of state-wise number of training courses under different categories of participants is given in

Table 67 and the participation details of these courses based on gender are given in Table 68.

Table 67: State-wise training courses organized for different category of participants by KVKs in Zone XI

Farmers and Farm Women (On+Off)	Courses (No.)	Participants (No.)		
		General	SC/ST	Total
Karnataka	1736	56165	12298	68463
Kerala	890	28665	4802	33467
Total	2626	84830	17100	101930
Rural Youth (On+Off)				
Karnataka	96	2390	675	3065
Kerala	93	3526	446	3972
Total	189	5916	1121	7037
Extension Functionaries (On+Off)				
Karnataka	89	3665	728	4393
Kerala	35	963	76	1039
Total	124	4628	804	5432
Sponsored Programmes				
Karnataka	59	2961	230	3191
Kerala	11	208	116	324
Total	70	3169	346	3515

Vocational Programmes				
Karnataka	60	1381	387	1768
Kerala	79	1673	639	2312
Total	139	3054	1026	4080
All Programmes				
Karnataka	2040	66562	14318	80880
Kerala	1108	35035	6079	41114
Grand Total	3148	101597	20397	121994

Table 68: State-wise gender representation in different categories of training courses organized by KVKs in Zone XI

Farmers and Farm Women (On+Off)	Courses (No.)	Participants (No.)		
		Male	Female	Total
Karnataka	1736	47303	21160	68463
Kerala	890	18912	14555	33467
Total	2626	66215	35715	101930
Rural Youth (On+Off)				
Karnataka	96	1747	1318	3065
Kerala	93	1807	2165	3972
Total	189	3554	3483	7037
Extension Functionaries (On+Off)				
Karnataka	89	2287	2106	4393
Kerala	35	518	521	1039
Total	124	2805	2627	5432
Sponsored Programmes				
Karnataka	59	2589	602	3191
Kerala	11	65	259	324
Total	70	2654	861	3515
Vocational Programmes				
Karnataka	60	1118	650	1768
Kerala	79	916	1396	2312
Total	139	2034	2046	4080
All Programmes				
Karnataka	2040	66299	14581	80880
Kerala	1108	34278	6836	41114
Grand Total	3148	100577	21417	121994

3.1.6. Extension activities

KVKs in Karnataka and Kerala organized a total of 85458 extension activities and created awareness among farmers extension personnel and public on varietal performance, production technologies, Integrated Pest and Disease Management, animal health and nutrition, production technologies of poultry, fisheries and human nutrition.

Organization of extension activities is carried out by the KVKs to create awareness among farmers, extension personnel and other stakeholders about various technologies in agriculture and allied sectors. Extension activities carried out by KVKs during the reporting year are presented in Table 69. Data shows that 85458 extension activities were

organized by KVKs through different methods and means where in 1684166 farmers and 95550 extension personnel participated. State-wise split-up indicates that 62316 extension activities were organized by KVKs of Karnataka and 23142 activities by the KVKs of Kerala.

Table 69: State wise frontline extension programmes organized by KVKs of Zone XI and distribution of participants

States	Extension activities (No.)	Farmers (No.)			Extension Personnel (No.)		
		Male	Female	Total	Male	Female	Total
Karnataka	62316	1081527	287403	1368930	55817	14592	70409
Kerala	23142	177651	137585	315236	14392	10749	25141
Total	85458	1259178	424988	1684166	70209	25341	95550

Individual and group oriented extension activity details furnished in Table 70 indicate that KVKs provided 36408 advisory services, made 6509 visits to farmers field, delivered 2074 lectures as resource persons, made 1643 diagnostic visits, conducted 1070 method demonstrations and organized 594 group meetings, 515 film shows, 348 exposure visits and 309 field days. Celebration of important days (336), exhibitions (256), farmers seminars

(203), animal/plant health camps (156), soil health/ test campaigns (115), SHG conveners meetings (103), workshops (89), Kisan Ghosthi (76), kisan melas (76), farm science club conveners meet (35), and ex-trainees sammelan (24) were the other important activities. Besides these, 34225 farmers visits to KVKs were reported during the period.

Table 70: Activity wise extension programmes organized by KVKs of Zone XI and distribution of participants

Extension activity	Programmes (No.)	Farmers (No.)			Extension personnel (No.)		
		Male	Female	Total	Male	Female	Total
Advisory Services	36408	46301	18064	64365	2941	1276	4217
Farmers visit to KVK	34225	52721	22126	74847	2307	861	3168
Scientists visit to farmers field	6509	17876	3598	21474	1882	455	2337
Lectures delivered as resource persons	2074	82802	31925	114727	6775	1380	8155
Diagnostic visits	1643	4716	1113	5829	804	239	1043
Method demonstrations	1070	13412	5792	19204	1019	430	1449
Group meetings	594	9088	3142	12230	1629	1393	3022
Film shows	515	13842	3393	17235	676	242	918
Exposure visits	348	5950	1970	7920	474	136	610
Celebration of important days	336	37242	11144	48386	2967	1027	3994
Field days	309	13989	3679	17668	917	342	1259
Exhibitions	256	306820	150507	457327	24526	8683	33209
Farmers seminars	203	11011	5983	16994	1273	842	2115

Animal/plant health camps	156	6864	2211	9075	679	347	1026
Soil health/test campaigns	115	3697	1288	4985	352	202	554
Self help group conveners meetings	103	411	1401	1812	20	1054	1074
Workshops	89	3204	1141	4345	586	353	939
Kisan ghosthi	76	8857	2917	11774	438	151	589
Kisan melas	76	602759	148357	751116	17656	4898	22554
Farm science club conveners meet	35	1136	248	1384	93	60	153
Ex-trainees Sammelan	24	361	312	673	8	237	245
Any others	294	16119	4677	20796	2187	733	2920
Total	85458	1259178	424988	1684166	70209	25341	95550

Further, KVKs organized of 3063 extension activities of mass contact and the details are presented in Table 71. Data shows that large number of KVK activities were covered through 1193 news items published in local and national dailies. KVK scientists published 740 extension literature, 338 popular articles and 12 research papers during the year. KVKs also participated in radio talks (269), exhibitions (256), and TV talks (191). The state-wise

analysis of the mass-contact methods adopted indicated that KVKs in Kerala published more number of extension literature, whereas Karnataka KVKs published more popular articles and research papers. In addition, KVKs in Karnataka have participated in agricultural exhibitions and kisan melas organized as mega events annually by their respective host organizations wherein lakhs of farmers, extension personnel and other stakeholders take part.

Table 71: Extension programmes organized for mass contact by KVKs of Zone XI

Activity/ Media type	Activities (No.)		
	Karnataka	Kerala	Total
Newspaper Coverage	739	454	1193
Extension Literature	291	449	740
Popular Articles	279	59	338
Radio Talks	196	73	269
Exhibitions	177	79	256
TV Talks	137	54	191
Kisan Melas	61	15	76
Research Papers	12	0	12
Total	1892	1183	3075



Animal health camp by KVK Davanagere



Krishi Unnati Mela- live telecast at KVK Dharwad



Exhibition and Jack fest at KVK Wayanad



Field day by KVK Tumakuru-I

3.1.7. Production of technological inputs

To achieve the potential yield in agriculture and allied sectors, timely availability of good quality seeds, planting material, livestock breeds and bio-products are the

primary requirement. In this direction, KVKs are actively involved in production of quality seeds, planting material, livestock, bio-products and supplying them to the needy farmers.

Quality technological products

During the year, KVKs of ICAR-ATARI, Bangalore produced and supplied 3413.74 q of seeds of different crop varieties, 31.28 lakh planting material of different crops and hybrids, 2650.44 q of bio-products and 2.21 lakh of livestock strains and fish fingerlings benefiting 4.99 lakh farmers.

During the period under report, KVKs produced 3413.74 q seeds of crop varieties, 2650.44 q bio-products, 26.67 lakh number of planting material, 4.61 lakh number

of planting materials of hybrids and 2.21 lakh number of livestock and fish and supplied to 4.99 lakh farmers (Table-72).

Table 72 : Production and supply of technological inputs by KVKs of Zone XI

Category	Quantity	Worth (Rs.in lakh)	Farmers (No. in lakh)
Seeds of crop varieties (q)	3413.74	267.68	0.79
Bio-products (q)	2650.44	239.30	1.56
Planting materials of crops (No. in lakh)	26.67	356.30	2.18
Planting materials of crop hybrids (No. in lakh)	4.61	10.87	0.37
Livestock and fisheries (No. in lakh)	2.21	124.64	0.09
Total	-	998.79	4.99

A) Seeds: State and crop category wise details pertaining to seed production by KVKs is presented in Tables-73 and 74, respectively. Data in Table-73 indicates that KVKs in Zone XI produced a total of 3413.74 q of seeds of different crops of which KVKs in Karnataka produced 3277.56 q and KVKs in Kerala produced 136.18 q and supplied to

79260 farmers. Data in Table-74 shows that more quantity of seed was produced on pulses (1659.08 q) followed by cereals (1102.75 q), millets (297.80 q), vegetables (119.48 q), oilseeds (106.75 q), spices (83.59 q), fodder (22.95 q), tuber (16.00 q) and green manure (5.34 q).

Table -73: State wise production and supply of seeds by KVKs of Zone XI

State	Seeds		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Karnataka	3277.56	22214667	9172
Kerala	136.18	4553453	70088
Total	3413.74	26768120	79260

Table -74 : Crop category wise production of seeds by KVKs of Zone XI

Crop category	Seeds		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Pulses	1659.08	8334075	4584
Cereals	1102.75	3630591	3132
Millets	297.80	970380	1063
Vegetables	119.48	11319095	66036
Oilseeds	106.75	763230	1471
Spices	83.59	647644	1117
Fodder	22.95	1007065	230
Tubers	16.00	64000	1600
Green manure	5.34	32040	27
Total	3413.74	26768120	79260

(B) Planting material: State and crop category wise details pertaining to production of planting materials by KVKs of ICAR-ATARI, Bangalore is presented in Tables-75 and 76, respectively. Data in Table-75 indicates that KVKs in Zone XI produced a total of 2666977 numbers of planting materials of which KVKs in Karnataka

produced 1674061 and KVKs in Kerala produced 992916. Data in Table-76 shows that the maximum quantity of planting material was fodder slips (981026) and the rest was seedlings of vegetables (832589), spices (459258), plantation (188205), fruits (136514), flowers (40672), forest (13708), ornamental (9780), medicinal & aromatic (3725) and commercial (1500).

Table-75: State wise production and supply of planting materials by KVKs of Zone XI

State	Planting materials		
	Quantity (No.)	Value (Rs.)	Farmers (No.)
Karnataka	1674061	18945831	13870
Kerala	992916	16684719	204313
Total	2666977	35630550	218183

Table-76: Crop category wise production of planting materials by KVKs of Zone XI

Crop category	Planting materials		
	Quantity (No.)	Value (Rs.)	Farmers (No.)
Fodder	981026	1847239	6224
Vegetables	832589	3086844	147401
Spices	459258	9129762	31705
Plantation	188205	6351385	5714
Fruits	136514	12871705	18909
Flowers	40672	280595	1236
Forest Species	13708	1076855	3094
Ornamental	9780	713195	2124
Medicinal and aromatic	3725	257970	1756
Commercial	1500	15000	20
Total	2666977	35630550	218183

(C) Hybrid planting material: State and crop wise details pertaining to production of planting material of hybrids by KVKs is presented in Tables-77 and 78, respectively. Data in Table-77 indicates that KVKs produced 461276 number of hybrid planting material of which KVKs in Karnataka produced 207060 and KVKs in

Kerala produced 254216. In the case of crops, produced more number of hybrid seedlings of cauliflower (129146) followed by cabbage (125070), chillies (71500) tomato (52500), marigold (39750), brinjal (21200), papaya (20110) and sapota (2000) (Table-78).

Table-77: State wise production of planting material of hybrids by KVKs of Zone XI

State	Planting material of hybrids		
	Quantity (No.)	Worth (Rs.)	Farmers (No.)
Karnataka	207060	472725	2526
Kerala	254216	614965	34458
Total	461276	1087690	36984

Table-78: Crop category wise production of planting material of hybrids by KVKs of Zone XI

Crops	Planting material of hybrids		
	Quantity (No.)	Worth (Rs.)	Farmers(No.)
Cauliflower	129146	322725	16236
Cabbage	125070	292240	18222
Chillies	71500	122000	662
Tomato	52500	78750	921
Marigold	39750	59625	116
Brinjal	21200	31800	310
Papaya	20110	100550	347
Sapota	2000	80000	170
Total	461276	1087690	36984

(D) Bio-products: State and category wise details pertaining to production of bio products by KVKs is presented in Tables-79 and 80, respectively. Data in Table-79 indicates that during the year KVKs in Zone XI produced a total of 2650.43 q of bio-products of which KVKs in Karnataka produced 799.81 q and KVKs in Kerala produced 1850.62 q. Data in Table-80 shows

that largest quantity of bio products produced was bio-fertilisers (683.95 q) followed by bio-fungicides (635.26 q), bio-pesticides (523.88 q), organic manures (434.67 q), micro nutrient mixtures (285.37 q), mushroom spawn (83.85 q) and bio-agents (3.45 q). Further, KVKs produced 28035 number of pheromone traps, 20961 EPN (Entomopathogenic Nematode), and 1742 tricho cards (Table 81).

Table-79: State wise production of bio products by KVKs of Zone XI

State	Bio products		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Karnataka	799.81	7179903	11098
Kerala	1850.62	16750445	145160
Total	2650.43	23930348	156258

Table-80: Category wise production of Bio products by KVKs of Zone XI

Category	Bio products		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Bio-fertilizers	683.95	6828799	14281
Bio-fungicides	635.26	5834725	50591
Bio-pesticides	523.88	5266011	56926
Organic manures	434.67	1147130	6454
Micro nutrient mixtures	285.37	3032472	23619
Mushroom spawn	83.85	1694622	3779
Bio-agents	3.45	126590	608
Total	2650.44	23930348	156258

Table-81 : Production of other bio products by KVKs of Zone XI

Category	Bio products		
	Quantity (No.)	Value (Rs.)	Farmers (No.)
Pheromone traps	28035	2419870	7450
EPN	20961	121217	128
Tricho cards	1742	62675	240
Total	50738	2603762	7818

(E) Livestock and fisheries: State and category wise details pertaining to production of livestock and fisheries by KVKs is presented in Tables-82 and 83, respectively. Data in Table-82 indicates that KVKs in Zone XI produced 221039 number of livestock materials and fisheries of which KVKs in Karnataka produced 30244 and KVKs

in Kerala produced 190795. Out of total production, maximum number (108449) was under fish fingerlings followed by poultry (103357), poultry-egg (8751), sheep and goat (278), piggery (140), dairy animals (59), and rabbitary (5) (Table-83).

Table 82: State wise production of livestock and fishlings by KVKs of Zone XI

State	Livestock materials and fisheries		
	Quantity (No.)	Worth (Rs.)	Farmers (No.)
Karnataka	30244	3436144	1634
Kerala	190795	9027657	7990
Total	221039	12463801	9624

Table 83: Categorywise production of livestock and fishlings by KVKs of Zone XI

Category	Livestock materials and fisheries		
	Quantity (No.)	Worth (Rs.)	Farmers (No.)
Fish fingerlings	108449	768018	1426
Poultry	103357	9097600	7316
Poultry eggs	8751	74683	555
Sheep & goat	278	1078000	185
Piggery	140	420000	92
Dairy animals	59	1024000	47
Rabbitary	5	1500	3
Total	221039	12463801	9624



Nursery unit at KVK, Davanagere



Pepper nursery unit at KVK, Udupi



TC Banana hardening at KVK, Kollam



Backyard poultry unit at KVK, Haveri



Nursery unit at KVK, Mysuru



Chick rearing unit at KVK, Kottayam

3.1.8 Kisan Mobile Advisory Services (KMAS)

Kisan Mobile Advisory Service is one of the Information and Communication Technology (ICT) tools for dissemination of requisite and need based information at the right time to the needy people. KVKs are sending information via text and voice messaging to registered farmers advising them on the issues of agricultural importance. During the reporting period, 40 KVKs have advised farmers regularly on the areas of crops, livestock, other enterprises, weather, marketing and awareness of

latest agricultural technologies through text messages as well as voice calls depending on the expertise available with them. Altogether, 13213 text messages and 294 voice messages were sent to 15.90 lakh farmers. Among these, most messaging was related to crops (7537) followed by weather (4542), awareness (939), other enterprises (269), livestock (170), and marketing (50). The details are presented in Table 84.

Table 84: State-wise SMS/Voice calls sent on various priority areas by KVKs of Zone XI

State	KVKs (No.)	Message Type	Number of farmers	Crop	Lives-tock	Weather	Market-ing	Aware-ness	Other enterprise	Total
Karnataka	32	Text	1370237	2919	131	117	47	903	180	4297
Kerala	7	Text	220129	4444	6	4425	2	24	15	8916
	2	Voice	16	174	33	0	1	12	74	294
	Sub Total		220145	4618	39	4425	3	36	89	9210
Zone XI Total	39	Text	1590366	7363	137	4542	49	927	195	13213
	2	Voice	16	174	33	0	1	12	74	294
	Total		1590382	7537	170	4542	50	939	269	13507

3.1.9 World soil health day celebration and Soil, Water and Plant Analysis

A total of 42 KVKs have established soil, water and plant analyzing laboratory and are carrying out the analysis of soil, water and plant samples for the benefit of farming community. Further, KVKs are also utilizing this facility for carrying out the soil test based nutrient recommendation for demonstrations and on farm trials besides, rendering

advisory services on nutrient based recommendations to the farmers. During the year, a total of 46957 samples of soil, water, plant, and organic manure received from 43726 farmers belonging to 26232 villages were analyzed with realization of Rs. 49.83 lakh (Table 85). A total of 30033 Soil Health Cards were distributed to farmers. State-wise data showed that KVKs in Karnataka analyzed 42676 samples followed by 4281 samples in Kerala (Table 86).

Table 85: Details of samples analyzed by KVKs of Zone XI

State	Samples (No.)	Farmers (No.)	Villages (No.)	Amount realized (Rs.)
Soil	30120	28168	15324	3530164
Water	16762	15489	10861	1450310
Plant	72	66	44	1400
Organic Manure	3	3	3	800
Total	46957	43726	26232	4982674

Table 86: State-wise soil, water, plant analysis undertaken by KVKs of Zone XI

State	Samples (No.)	Farmers (No.)	Villages (No.)	Amount realized (Rs.)
Karnataka	42676	39827	25783	4656934
Kerala	4281	3899	449	325740
Total	46957	43726	26232	4982674

World Soil Day Celebration

The World Soil Day was celebrated on 5.12.2017 at 44 KVKs involving 17202 participants. During the occasion public representatives graced the celebration function

organised at 20 KVKs and distributed 5498 soil health cards to farmers. The details are presented in the following table 87.

Table 87 : World soil health day celebrated by KVKs of Zone XI

KVKs (No.)	Name of VIP and Chief Guest with designation	Participants (No.)	Soil Health Cards distributed (No.)
1	Prof. P.J. Kurien, Hon'ble Deputy Chairman, Rajya Sabha	175	75
5	Honorable Member of Parliament	2268	363
1	Sri. Ramachandran Kadannappally, Hon. Minister for Ports, Museums, Archaeology and Archives, Government of Kerala	526	597
13	Honorable Member Legislative Assembly	4901	1017
24	Other VIPs	9332	3446
	Total	17202	5498

3.1.10 Rainwater Harvesting Units

Rainwater harvesting units with micro irrigation system were established in 16 KVKs. A total of 31 training courses and 132 demonstrations were conducted and 91 planting materials were produced utilizing this facility. Further, 2533 farmers and 112 officials visited these units and got acquainted with the rainwater harvesting techniques.

3.1.11 Convergence

During the period under report, KVKs continued their linkage with various organizations and agencies while discharging their responsibilities as agricultural science centres at the district level.

Nature of linkages: KVKs worked closely with most of the development departments for sharing technology and information through bi-monthly workshops, seminars, technology weeks, frontline demonstrations, field days, farmers-scientists interface and kisangoshti/mela. Capacity development of extension personnel was ensured through training, farm schools and farmers field schools. Extension activities involved all stakeholders including

media, local institutions, district administration and people's representatives. Diagnostic field visits and joint field visits with development departments to problematic fields and helped to identify emerging problems. Technical backstopping required for successful implementation of various schemes and programmes was the major responsibility of the KVKs.

Convergence through Agricultural Technology Management Agency (ATMA): Convergence with ATMA enabled KVKs to promote various technologies in their respective districts. Details given in Table 88 substantiate the activities through which ATMA platform was used to achieve convergence. Altogether, KVKs participated in 1406 programmes organized by ATMA during the year and at the same time KVKs organized 416 programmes in collaboration with ATMA. Using the linkage with ATMA, 37 KVKs conducted training programmes, 33 KVKs conducted various meetings, 14 KVKs organized soil-health camps, 13 KVKs each conducted demonstrations and technology weeks, and 12 KVKs each conducted exhibitions and Kisan melas.

Table 88 : Details of linkages with ATMA by KVKs of Zone XI

Programmes	KVKs (No.)	Programs attended by KVK staff (No.)	Programs organized by KVK (No.)
Training programmes	37	449	122
Meetings	33	267	39
Soil health camps	14	31	23
Demonstrations	13	167	122
Technology week	13	24	24
Exhibition	12	60	11
Kisan mela	12	15	7

Exposure visit	10	104	8
Extension programmes	10	76	31
Extension literature	7	29	3
Publications	5	23	3
Research projects	5	9	8
Animal health campaigns	4	9	0
Field visit	4	71	0
Watershed approach	4	9	6
Agripreneurs development	3	8	3
Farmers field school	3	12	0
Integrated farm development	3	29	0
Diagnostic visit	1	5	0
Farmer scientist interface	1	1	1
Farmers day	1	1	1
Kisan goshti	1	3	0
MDDT visit	1	4	4
Total		1406	416

External funding was received by the KVKs to organize various programs and activities. In terms of total amount received, support from the State Governments was high in both Karnataka and Kerala, which included development departments also. In terms of number of KVKs supported, Rashtriya Krishi Vikas Yojana (RKVY), National and

State Horticultural Mission, projects of various ICAR Institutes and National Bank for Agriculture and Rural Development (NABARD) were the major agencies that funded/supported KVK activities as detailed in the Table 89. Various against like Planning Board, Directorates etc. were also supported the KVK activities.

Table 89: Details of external funding received by KVKs of Zone XI through convergence and linkages

Name of external funding Agency	KVKs (No.)	Amount Received (Rs. Lakh)
Government of Karnataka	4	175.22
State Department of Agriculture	5	114.55
National Mission for Sustainable Agriculture (NMSA)	1	75.00
State Planning Board	2	59.43
Government of Kerala	3	50.86
National Horticultural Mission	6	47.09
State Horticultural Mission	3	36.18
Karnataka Agricultural Price Commission, Bangalore	2	35.00
National Bank for Agriculture and Rural Development (NABARD)	4	34.32
State Department of Animal Husbandry	1	33.00
Rashtriya Krishi Vikas Yojana(RKVY)	7	30.60
MANAGE, Hyderabad	3	23.00
Agricultural Technology Management Agency (ATMA)	3	18.14
National Fisheries Development Board	1	12.85
State Agricultural Universities	3	11.70

CSS-Mission for Integrated Development of Horticulture	2	7.40
Directorate of Cashewnut & Cocoa Development, Kochi	2	3.30
Karnataka State Department of Horticulture	1	3.00
M/s Maghamani organics Ltd. Ahmedabad	1	2.00
M/s. Bharat Rasayan Ltd., New Delhi	1	2.00
EID Parry Ltd.	1	1.66
ICAR Institutes	1	1.00
Coffee Board, Hassan	1	0.40
Total		777.70

3.1.12 Cases of large scale adoption

Pigeonpea as intercrop with Maize-a boon for rainfed farmers in Gadag

Maize is cultivated as a sole crop in Gadag district over an area of 30,000 hectares under rainfed situation. Climate variability has severely affected the productivity of the crop sown during June-July. Delayed onset of monsoon and long dry spells have affected the vegetative stage as well as tassel initiation stage resulting in poor productivity of crop. District average productivity was 24.0 q/ha at an average cost of cultivation is Rs.15000/ha. Maize cultivation had become non-remunerative to the farmers under rainfed ecosystem.

To minimize the risk, KVK Gadag demonstrated intercropping of pigeonpea with TS-3R variety, a medium duration variety (140-150 days). The crop is sown in ratio of 5:1. Pigeonpea escapes moisture stress during mid season drought as the crop growth is steady in initial stage. Assured rains during September and October coincides with flowering, pod initiation and pod development stage. Integrated crop management practices like seed priming with calcium chloride (20gms), seed treatment with *Trichoderma* @ 10gms/kg, nipping at 50-60 days after sowing, foliar spray of pulse magic (a micronutrient mixture) @ 2.5 kg/ha during flowering and pod initiation stage were also demonstrated.



Maize+Pigeonpea intercropped field in Gadag

Demonstrations resulted an average net income of Rs.32000/ha as against Rs.14500/ha under sole crop of maize. In fact, the sole crop of maize fetched gross income of Rs.34500/ha with cultivation cost of Rs.20000/ha where as intercropped with maize, cost of cultivation was Rs.28000/ha with gross income of Rs.60000/ha and thus the additional net income obtained from intercropping system is Rs.18500/ha. With the joint efforts of KVK and department of agriculture through training and different extension activities, intercrop technologies have been spread in more than 500 ha during 2016-17. These demonstrations have created awareness in Mahalingapur and Nabhapur villages of Gadag block and Kochalapur village in Ron block as well as diffusing to other villages in the district.

New variety of wheat enabled farmers to earn higher income

Occurrence of rust disease in wheat reduces yield upto 60% in almost 70-75% of the area under wheat in Belagavi district. This is due to the fact that the variety grown is DWR-162 (released 1993) has become susceptible for the disease over the years. KVK demonstrated rust resistant and high yielding variety UAS - 304 released by UAS, Dharwad (2009) since 2012-13. UAS-304 escaped from rust and gave net income of Rs.3275020/ha with productivity of 20.0 q/ha which is 33.3% increase over check. Varietal change gave an additional income of Rs. 9875/ha. Joint efforts of KVK and Department of Agriculture resulted seed production and dissemination of UAS 304 for the past five years. On demand from the farmers, Raith Sammpark Kendra of Department of Agriculture located at Muragod had provided 50.0 q seeds of UAS 304 during 2016-17 and farmers adopted this variety in an area of 66.4 ha that gave on an average 23-26% more yield than existing variety with 1328 q seeds. Area under cultivation by UAS 304 was 136 ha during 2016-17.



A view of wheat seed production field

Shri Nagaraj. I Desai, wheat farmer, belonging to Chachadi village has initiated the seed production of UAS 304 variety in 1.6 ha during 2013-14 and produced 65.0 q seeds. He continued the seed production and produced 30.0 q seeds in an area of 0.8 ha and sold the seeds to Karnataka State Seed Corporation. Apart from Shri Desai, 10 farmers in neighbouring villages, initiated seed production of UAS-304 in 2015-16 and produced a total of 102.0 q of seed. As per Shri Desai the farmers gained 25-30% higher yield than the existing variety. Further, seed production activity provided additional employment.

Multicut fodder sorghum changed the scenario of fodder production in Chitradurga

Chitradurga district comes under central dry zone of Karnataka and receives less and uneven distribution rainfall throughout the year. Dairy is one of the important alternative components for economic security of the farmers. Total livestock population of Chitradurga is 18.47 lakh which includes 341000 cattle, 193000 buffalo, 369000 goat and 931000 sheep. Frequent drought seasons led to shortage of 8 Mt fodder that had a major constraint on dairy farmers. KVK Chitradurga has addressed the issue through large scale demonstration of multicut fodder sorghum variety COFS -31 followed by organization of training and various extension activities.



Field day on performance of COFS-31 in Chitradurga

The variety COFS-31 produced 81.4 t/ha fodder, an increase of 30.7 per cent over Napier hybrid bajra (62.3 t/ha). Better palatability of COFS -31 (88.9 %) over Napier hybrid bajra (81.4 %) reduced the wastage. Area under COFS-31 increased from 1 ha to 80 ha and is an alternate crop for fodder Napier hybrid bajra CO-3. Around 800 farmers of the district have adopted this variety within the span of two years.

New variety of greengram changes productivity in Bidar district

KVK, Bidar demonstrated greengram variety BGS-9, which is high yielding, tolerant for pod shattering and moderately resistant to foliar diseases. Maximum yield of 15.0 q/ha and an increase of 33.3% over farmers practice was recorded during demonstrations. BGS-9 occupied 75.0% of greengram area in Vaddankera village where the first demonstrations were conducted. An additional income of Rs.20 lakh was obtained by the farmers of this village.



A view of performance of greengram variety BGS-9

Joint efforts of KVK and Department of Agriculture through various extension activities created large-scale awareness among farmers and resulted increasing area under this variety year by year. Variety was also well suited for mechanical harvest.

Integrated Farming System-provides sustainable year round income

Shri Ramakrishna, 27 years, Ganamuru village in Raichur Taluk and District, though born with physical disability, completed agriculture diploma from University of Agriculture Sciences, Raichur. He joined with his father for continuing agriculture as his profession. He participated in various programmes conducted by KVK Raichur especially training on IFS and component technologies. He has implemented technologies viz., introduction of horticultural components, crop diversity, propagation and nursery management, introduction and establishment of

vermicompost unit, water management practices, integrated nutrient management practices, integrated pest and disease management approaches, scientific management of dairy and sheep rearing, value addition and marketing etc. under the guidance of KVK. He planted 300 lemon plants with intercrops like palak, coriander, amaranthus, and other leafy vegetables throughout the year. In mango and sapota orchard, vegetables like ashgourd, pumpkin etc are being cultivated depending on the market demand. Vegetables like chilli, tomato, cauliflower, bhendi is flourishing in the extended land. Curry leaf, drumstick and fodder grass is grown all along the bunds without keeping the land fallow. Seedlings required to the land are grown by themselves and also generates profits from selling seedlings to needy fellow farmers. He has two buffaloes, five dairy animals, Kenguri and Shiroye sheeps and poultry birds through which recycling the farm waste. Establishment of vermicompost and utilizing the same to own land enhanced the fertility status in the soil. In the recent years, the percentage of organic carbon status in the soil has increased. Introduced farm mechanization for the first time in the area by adopting seed sowing machine, power-sprayer, drip irrigation system, fodder chopper, tractor and own vehicle for transportation of farm produce to market. Irrigation is done only by means of drip irrigation system to the entire cultivated land from two borewells and one traditional well. He also established fish unit as one of the components of IFS. Direct marketing of organic mango, papaya, lemon, drumstick etc. given assured market and reliable income. He provides employment to nearly 30 farm labours every day along with the family members. Shri Ramakrishna and his family earns 33 to 36 lakhs income every year and also the family received several awards –best farmer award (2009, UAS Dharwad), best Horticulture farmer award (2014, UHS Bagalkot) and Dr. G.K.Veeresh Endowment best farmer award (2017, UAS Bengaluru).



Different components of IFS of Shri Ramakrishna

Arka Microbial Consortium (AMC) – a boon for coffee based black pepper planters

KVK Gonikoppal has established Arka Microbial Consortium (AMC) lab at its campus with a production capacity of 20 t of AMC per year. Drenching of AMC @ 20 g/l three times in a year as one of the integrated pepper management practices found to be effective against yellowing of leaf, collar infection and wilted wines. With

the intervention of AMC, pepper yield was increased to 10.75 q/ha with income of Rs.505250/ha from 7.20 q/ha with income of Rs.324400/ha. KVK is producing about 20 t of AMC at present and supplying to about 2786 farmers annually. KVK has organized 12 capacity development programmes (trained 675 planters), 17 frontline demonstrations besides wide coverage through newspaper articles (12), radio talks (8), doordarshan coverage (2), videos of 3 successful farmers.

In the plantation owned by Shri Theethamada Ramesh, a planter of Kunda village of Virajpet Taluk, Kodagu District, two years ago 12 to 15 vines of black pepper were severely affected causing financial loss of up to Rs 11000. Chemicals-based management of the disease only added to the cost (Rs.33/vine), but disease could not be properly controlled. He had decided to uproot all the affected 4-year-old vines. His contact with KVK Kodagu changed the entire thing as he adopted AMC. During this crucial period he underwent training on AMC at KVK. Ramesh started with drenching of lignite-based AMC as one of the technology options during June, September and November at the rate of 4 kg in 200 l of water and drenching 5-10 l of AMC solution to each black pepper vine coupled with spraying of Potassium Phosphonate @ 3ml/l. This intervention boosted the pepper vines with healthy growth and produced good yield. More than 1215 farmers, farmwomen, rural youth and extension functionaries have visited and interacted with Shri Ramesh.



Shri Theethamada Ramesh showing pepper vines drenched with Arka Microbial Consortium

Farm pond fetched income with inland fish

Shri Mohamad Khilledar, Gudageri village of Kundagol taluk in Dharwad district was cultivating sorghum, chilli, wheat and greengram in his 2.5 ha sloppy land. KVK Dharwad team guided him with several technologies suited to his farm. One of the technologies is to renovate the existing farm pond, improve rain water harvesting and

utilize the collected water for irrigation to crops as well as inland fish farming. In the farm pond of 25 m X 20 m X 3.5 m, he practiced poly-culturing of about 6000 fingerlings of catla, rohu and common carp fish species. Locally available feed containing rice husk, groundnut husk and sorghum flour was fed daily for three times a day for eight months. With a weight of 0.6 to 0.8 kg at the time of harvest, 2000 kg fish was produced and sold at the rate of Rs. 75/kg and thus, he gained an additional income of Rs.1.5 lakh in a year. Further, he obtained farm income of Rs.72000 as farm pond served as ware reservoir with increasing ground water recharge. Since, the farm activities carried out throughout the year, he provided year round employment to average of 3 men labourer.



Inland fish farming in farm pond

Backyard poultry endowed year round income

Shri Honnappa Honnappalavar belonging to the Village Medleri of Ranebennur taluk in Haveri district established home-scale enterprise on backyard poultry under the technical guidance of KVK Haveri. He established a backyard house measuring 50 ft X 20 ft with locally available material for rearing poultry. He reared 500 Swarnadhara birds per batch and the birds were fed with commercial poultry feed along with vegetable residues. He reared 2 batches of Swarnadhara /year without allowing them to scavenge freely. Birds gained body weight of 4kg/bird in 4 months of age and they were sold @ of 160/kg live weight. Thus, he earned around Rs.2 lakh from rearing the Swarnadhara birds in one year.





Backyard poultry unit with Swarnadhara

Poultry provides livelihood for intellectually-disabled Shri Lipin K Abraham

Shri Lipin K Abraham, 30 year old, a resident of Kozhenchery taluk in Pathanamthitta district of Kerala suffers from intellectual disability. He commenced his education at the age of 7 and since then has attended many special schools. During the year 2012, he joined MCRD, Navajyothi School at Thelleyoor, which is just 500 meters away from KVK campus. He attended skill development trainings organized by KVK, Pathanamthitta. Then he was motivated towards home scale enterprise. He initiated poultry unit with 25 birds at home under the technical guidance of KVK and support of his family. He earns income Rs.100/day from the unit. With this he gained confidence of earning for his livelihood and wants to expand enterprise with the savings step by step. He bagged best special kuttikarshakan award during farmers day celebration at KVK.

Value added tamarind sustained livelihood of dry land farm family

Smt T.B. Parvatamma w/o Siddaramaiah aged 46 years belonging to Eralager village, Kibbanahalli hobli of Tiptur taluk established homescale enterprise on value added products of tamarind under the technical guidance from KVK, Tumakuru-I during 2014-15. She is using her own 30 tamarind trees for raw material, otherwise they were given lease for only Rs 3000/year. She got FSSAI registration for branding and packaging. She prepares tamarind products like slab making, chigali, toffees etc. and marketing them in local market, Tiptur and Bangalore shops. Presently she

is earning about Rs 50000 to Rs 75000 net returns from 30 tamarind trees. She used to participate in exhibitions and melas with tamarind products for exhibition as well as for sale.



Small scale processing unit on tamarind in Tumakuru

Wealth from wasted nutmeg rind-experiences of women entrepreneur

Smt Beena James, 52 years, belonging to Peruvanthanam village of Peerumedu panchayat in Kottayam district initiated home scale enterprise on nutmeg rind products under the technical guidance of KVK, Kottayam. She attended training on value addition of nutmeg rind conducted by KVK during 2017. The wasted rind in her farm was utilized as the raw material and she started production of value added products from nutmeg rind viz., pickle and squash. She earned a monthly income of Rs. 7250 by producing an average of 10 kg pickle and 50 liters of squash. In addition to this, four exhibitions per year fetched an additional income of Rs. 40000. Before the enterprise, she earned an income of Rs. 5000 by taking tuition for the nearby students. Few farm women belongs to peerumedu panchayat who are interested in value addition of nutmeg rind gathered and formed as Women Self Help Group under her guidance. She is giving training to women from nearby panchayats. About 25 women farmers from nearby villages are now doing value addition of nutmeg rind and earning Rs.5000/month.



Smt. Beena James with nutmeg - rind products



Smt Beena James with nutmeg rind pickle and squash

Value addition on dairy multiplied income fourfold

Shri Latheef, coming from a farm family and a committed central government employee resigned the job after 20 years and adopted systematic IFS under the technical guidance of KVK, Malappuram. He integrated paddy cultivation with existing dairy farming, mechanized various operations in the dairy unit in turn helped to reduce the drudgery and to spare enough time to extend the activities of the farm by adding newer components. Over the years, he added additional components like goat, duck, quail and ornamental birds. Automatic drinking bowls provided by KVK for the dairy unit proved very efficient in this context. He scaled up his dairy unit with 20 milch cows with a daily output of 200 l of whole milk over the last fifteen years. Hike in production of milk resulted in marketing problems. The established methods of whole milk sale were less profitable for a high producing unit leading to an initiative to market value added products from milk. Initially manual processing procedures were adopted and the consumer acceptance was monitored. The high consumer acceptance and market value gained by these ‘farm to home’ products

made the farmer courageous enough to intensify the production of value added products and market them under the own brand name ‘Royal Farms’. The next leap was to mechanize value addition process by establishing a cream separator for production of butter, ghee and curd. For this a cream separator was purchased with the help of KVK Malappuram in a beneficiary cost sharing manner as part of the efforts to empower a model IFS farm. The value addition has increased the income fourfold from the dairy unit alone by obtaining net income of Rs. 131500 against Rs. 28000 earned earlier with whole milk.



Shri Latheef with his dairy unit

3.1.13 Recognition and Awards

The Zonal Best KVK Award 2017 Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protsahan Puraskar 2017 was awarded to KVK Pathanamthitta. The award was presented by Hon’ble Prime Minister Shri Narendra Modi on 17th March 2018, during the inaugural function of Krishi Unnati Mela of IARI, Pusa, New Delhi.

3.2 Special programmes

3.2.1 Cluster Frontline Demonstrations on Pulses under NFSM

The ICAR-ATARI, Bengaluru implemented the Cluster Frontline Demonstrations (CFLDs) on pulses under NFSM with financial support from Department of Agriculture, Co-operation & Farmers Welfare through ICAR, New Delhi with an aim to enhance the production of pulses in the country.

Under the project, 3025 demonstrations on different pulse crops viz., blackgram, greengram, pigeonpea, chickpea and cowpea were conducted through KVKs of

Karnataka and Kerala in an area of 1210 ha and details are presented in Table 90. During kharif, 1305 demonstrations were conducted by KVKs of Karnataka in 522 ha, out of which, 150 demonstrations were on blackgram (60 ha), 475 demonstrations on greengram (190 ha) and 680 demonstrations on Pigeonpea (272 ha). During rabi, 1185 demonstrations were conducted by KVKs of Karnataka in 474 ha, out which 150 demonstrations were on blackgram (60 ha), 150 on greengram (60 ha) and 885 on chickpea (354 ha). In summer, 535 demonstrations (214 ha) were conducted by KVKs of the Zone, which included 200 demonstrations on blackgram (80ha), 260 demonstrationson greengram (40 ha) and 75 demonstrations on cowpea (30 ha).

Table 90: CFLDs organised by KVKs of Zone XI on pulses under NFSM

Sl. No.	Seasons/ Crops	States	Achievements	
			Demostrations (No.)	Area (ha)
1	Kharif			
	Blackgram	Karnataka	150	60.0
	Greengram	Karnataka	475	190.0
	Pigeonpea	Karnataka	680	272.0
	Total kharif		1305	522.0
2	Rabi			
	Blackgram	Karnataka	150	60.0
	Greengram	Karnataka	150	60.0
	Chickpea	Karnataka	885	354.0
	Total rabi		1185	474.0
3	Summer			
	Blackgram	Karnataka	50	20.0
		Kerala	150	60.0
	Greengram	Karnataka	100	40.0
		Kerala	160	64.0
	Cowpea	Kerala	75	30.0
	Total summer		535	214.0
	Total (kharif + rabi + summer)		3025	1210.0
	Karnataka total		2640	1056.0
	Kerala total		385	154.0
	Zone XI total		3025	1210.0



Blackgram variety DU-1 (KVK Gulabarga-I) during Kharif



Blackgram variety DU-1 (KVK Uttara Kannada) during rabi



Greengram variety BGS-9 (KVK Dharwad) during Kharif



Greengram variety DGGV-2 (KVK Gadag) during kharif



Pigeonpea variety BRG-5 (KVK Kolar) during kharif



Pigeonpea variety BRG-5 (KVK Tumakuru-II) during kharif



Chickpea variety BGD-103 (KVK Bidar) during rabi



Chickpea variety JAKI-9218 (KVK Chamarajanagar) during rabi

A view of cluster FLDs on Pulses under NFSM

3.2.2 Cluster Frontline Demonstrations on Oilseeds under NMOOP

The ICAR-ATARI, Bengaluru implemented the Cluster Frontline Demonstrations (CFLDs) on oilseeds under NMOOP 2017-18 sanctioned by Department of Agriculture, Co-operation & Farmers Welfare through ICAR, New Delhi with an aim to enhance the production of Oilseeds in the country.

During the period, 2207 demonstrations on groundnut, soybean, sunflower, niger, castor, linseed and rapeseed & mustard crops were conducted through KVKs of Karnataka in 882.8 ha area and details are presented in Table 91. During kharif, 920 demonstrations were

conducted in 368 ha, out of which, 570 demonstrations were on groundnut (228 ha), 150 each on soybean and sunflower (60 ha each) and 25 demonstrations each on niger and castor (10 ha each). During rabi, 1112 demonstrations were conducted in 444.8 ha covering 652 demonstrations on groundnut (260.8 ha), 235 demonstrationson sunflower (94 ha), 200 demonstrationson linseed (80 ha) and 25 demonstrationson rapeseed & mustard (10 ha). During summer, 175 demonstrations were conducted in 70 ha, which included 125 demonstrations on groundnut (50 ha) and 50 demonstrations on sunflower (20 ha).

Table 91: CFLDs organised by KVKs of Karnataka on oilseeds under NMOOP

Sl. No.	Seasons/ Crops	States	Demonstrations (No.)	Area (ha)
1	Kharif			
	Groundnut	Karnataka	570	228.0
	Soybean	Karnataka	150	60.0
	Sunflower	Karnataka	150	60.0
	Niger	Karnataka	25	10.0
	Castor	Karnataka	25	10.0
	Total kharif		920	368.0
2	Rabi			
	Groundnut	Karnataka	652	260.8
	Sunflower	Karnataka	235	94.0
	Linseed	Karnataka	200	80.0
	Rapeseed & Mustard	Karnataka	25	10.0
	Total rabi		1112	444.8
3	Summer			
	Groundnut	Karnataka	125	50.0
	Sunflower	Karnataka	50	20.0
	Total summer		175	70.0
Zone XI total (kharif + rabi + summer)			2207	882.80



Groundnut variety GPBD-4 (KVK Koppal)



Groundnut variety GKVK-5 (KVK Kolar)



Groundnut variety G2-52 (KVK Dharwad)



Soyabean variety DSB-21 (KVK Dharwad)



Sunflower hybrid Kaveri Champ(KVK Gadag)



Sunflower hybrid KBSH 53 (KVK Haveri)

A view of cluster FLDs on Oilseeds under NMOOP

3.2.3 Creation of seed hubs for increasing indigenous production of pulses in India

Timely availability of adequate quantity of quality seed is one of the most crucial factors to enhance productivity of pulses. In this direction the Department of Agriculture, Cooperation and Farmers' Welfare, Government of India has sanctioned a project on 'Creation of Seed Hubs for Increasing Indigenous Production of Pulses in India' under National food Security Mission (NFSM) for three years from 2016-17 to 2018-19 with ICAR-Indian Institute of Pulses Research (IIPR), Kanpur as Nodal Agency for its implementation at 150 Seed Hub centers across the

country in State Agricultural Universities/Krishi Vigyan Kendras/ICAR Institutes. As a part of it, 8 KVKs viz., Bagalkot, Bidar, Belagavi-II, Dharwad, Kalaburagi-II, Mysuru, Vijayapura-I and Mandya established seed hubs and started functioning from Kharif 2016-17. Crop and variety wise details of seed production through Seed Hubs are presented in Table 92. Data indicate that highest seed production was achieved in chickpea (1596.3 q) followed by pigeonpea (513.5 q), blackgram (264.0 q) and greengram (205.5 q). Thus, 2579.3 q of pulses seeds were produced during the reporting year.

Table 92: Seed production of pulses through seed hubs under NFSM

Crop	Variety	Quantity (q)
Greengram	BGS-9	155.3
	DGGV-2	50.2
	Total	205.5
Pigeonpea	TS-3R	363.5
	GRG-811	150.0
	Total	513.5
Blackgram	Rashmi	240.0
	MDU-1	24.0
	Total	264.0
Chickpea	BGD - 103	205.0
	JAKI-9218	374.5
	JG-11	976.8
	GBM-2	40.0
	Total	1596.3
Grand total		2579.3



Inauguration of Seed Processing Unit at KVK, Mysuru by Sri. D. H. Shankaramurthy, Speaker, Karnataka Legislative Council, Govt. of Karnataka



Seed processing unit established at KVK, Belagavi-II



A view of seed production of Chickpea variety GBM-2 (KVK, Kalaburagi-II)



A view of seed production of Chickpea variety JAKI 9218 (KVK, Dharwad)

3.2.4 National Innovations in Climate Resilient Agriculture (NICRA)

The scheme on National Innovations in Climate Resilient Agriculture (NICRA) is being implemented in the country to develop improved technologies through short term and long term research as well as to demonstrate the existing technologies on farmers' fields for enhancing climate resilience. In ATARI, Zone-XI, technology demonstration was implemented in seven most vulnerable districts, namely Belagavi (drought/heat), Davanagere (drought/heat), Chikkaballapur (drought/heat), Tumakuru (drought), Gadag (drought/heat) and Kaluburagi (drought/heat) in Karnataka and Alleppey (water inundation/drainage) in Kerala. The interventions being implemented are based on four modules, i.e. (1) Natural resources management, (2) Crop production, (3) Livestock and fisheries and (4) Institutional interventions including capacity building and extension activities. The summary of activities under each of these modules carried out by KVKs during 2017-18 is presented in Table 93.

Table 93: The summary of activities carried out by the KVKs under NICRA

KVK	NRM		Crop production		Livestock & Fisheries			Capacity Building		Extension Activities	
	Demonstrations (No.)	Area (ha)	Demonstrations (No.)	Area (ha)	Demonstrations (No.)	Animals (No.)	Area (ha)	Trainings (No.)	Farmers (No.)	Programmes (No.)	Farmers (No.)
Belgavi	2	46.0	607	151.5	23	1341	0.3	8	302	87	538
Davangere	34	15.0	205	81.0	189	3899	9.4	21	772	55	860
Gadag	100	35.0	145	58.0	18	358	0	23	629	56	1372
Kalaburagi	10	5.0	154	98.0	17	779	0	7	1034	7	266
Chikkaballapur	143	121.0	570	217.0	116	2752	15.5	37	546	8	303
Tumkur	154	16.0	198	130.0	16	0	4.0	5	213	5	207
Alleppey	25	26.0	61	18.0	80	920	0.4	21	393	4	47
Total	468	264.0	1940	753.5	459	10049	29.64	122	3889	222	3593

The module-wise technologies implemented in the NICRA cluster villages are discussed in the foregoing discussions.

Module I: Natural Resources Management

This module consists of interventions related to resource conservation technologies-composting, soil test based nutrient application, in-situ moisture conservation such as sowing across the slope, deep tillage, water harvesting and recycling for supplemental irrigation,

water saving technology such as micro irrigation, moisture conservation technologies such as trench and bunding, strengthening of water storage structures-desilting and repair, bore well/open well recharge and agroforestry (saplings planting). A total of 264 ha area has been treated with NRM related treatments covering 2710 farmers' fields in order to build climate resilience in seven NICRA cluster of villages through 468 demonstrations. The details are presented in Table 94.

Table. 94: NRM activities undertaken in the NICRA villages

KVK	Interventions	Demo (No.)	Area (ha)	Farmers benefitted (No.)
Alleppey	Resource conservation technologies (Composting of aquatic weeds and utilization for crop production)	20	1.0	20
	Resource conservation-Soil health cards	0	25.0	200
	Mushroom production utilizing paddy straw	5	5 units	0.6 kg/bed
	Sub total	25	26.0	220
Belagavi	De silting of Nalas	2	1580 cum	9
	Resource conservation-Soil test based nutrient application	0	46.0	1786
	Sub total	2	46.0	1795
Chikka-ballapura	Conservation tillage where appropriate	50	20.0	50
	Ground water recharge	5	37.5	20
	In-situ moisture conservation practices	5	37.5	22
	Water saving technology-Micro irrigation systems	5	5.0	25
	Resource conservation technologies	70	20	22
	Water harvesting and recycling for supplemental irrigation	8	1.0	8
	Sub total	143	121	147

Davan-agere	Community farm pond (Hullumane Gurusiddappa Katta)	1	3510 m ³	15
	Check dam-desilting and deepening	1	1,536 m ³	13
	In-situ moisture conservation practices /sowing across the slope in maize	30	15.0	30
	Water harvesting and recycling for supplemental irrigation : Agasankatte border check dam (Desilting and deepening)	1	6,075 m ³	26
	Water harvesting and recycling for supplemental irrigation: Badappara Katta check dam (Desilting and deepening)	1	10,530 m ³	50
Sub total		34	15.0	134
Gadag	Desilting of existing community water harvesting body	1	2400 m ³	150
	Ground water recharge -bore well recharge	12		12
	In-situ moisture conservation practices	87	35.0	87
Sub total		100	35.0	249
Kalabu-ragi	Ground water recharge (Open well recharge)	5	-	5
	Improved drainage in flood prone areas (Bunding and Leveling)	5	5.0	5
Sub total		10	5.0	10
Tumkur	Widening and desilting of check dams	5	-	5
	Widening and desilting of farm ponds	10	-	10
	Gunney bags lining of farm ponds	20	-	20
	In-situ moisture conservation practices in Cow pea (C-152)	25	5.0	25
	In-situ moisture conservation practices in Horse gram (PHG-9)	15	3.0	15
	In-situ moisture conservation in Drumstick	15	0.6	15
	Forest saplings plantation-Jamun	12	0.4	12
	Forest tree plantation-Melia dubia	40	2.0	41
	Soil moisture conservation-Trench cum bunding	12	5.0	12
Sub total		154	16.0	155
Total		468	264.0	2710



Demonstration on recharging of borewell at Gadag



Trench cum bunding and groundnut cultivation at Tumakuru

Module II: Crop Production

This module consists of introducing drought/high temperature tolerant varieties, improved varieties and drought tolerating measures, short duration varieties, crop diversification, high yielding varieties, location specific intercropping systems with high sustainable yield index, cultivation practices to overcome flooded situations,

resource conservation and ecofriendly management practices and water saving cultivation methods (SRI, aerobic, direct seeding). A total of 1940 farmers' demonstrated these in 753.5 ha area spread over in seven cluster of villages. The district wise and technology-wise details are presented in Table 95.

Table 95: Performance of climate resilient crop production technologies in NICRA villages

KVK	Interventions	Farmers (No.)	Area (ha)	Yield (q/ha)		Increase (%)	B.C ratio		
				Demo	Check		Demo	Check	
Belagavi	Rabi Jowar (M,35-1)	170	68.0	15.8	11.9	31.38	2.84	2.21	
	Chick pea (JG-11)	100	20.0	11.2	9.3	20.06	2.19	1.80	
	Chick pea (JAKI-9218)	17	3.2	12.5	9.8	28.20	2.50	1.80	
	Black gram (DBGV-5)	100	32.0	8.8	7.5	16.67	2.71	2.38	
	Fox tail millet (DHFT-109-3)	60	12.0	4.9	3.8	29.28	1.55	1.39	
	Proso millet	16	0.6	Demo vitiated due to occurring of dry spell after sowing up to 34 days continuously (23 rd July to 25 th August, 2017).					
	Barnyard millet	16	0.6	Demo vitiated due to occurrence of dry spell after sowing up to 34 days continuously (23 rd July to 25 th August, 2017).					
	Little Millet	16	1.0	Demo vitiated due to occurring of dry spell after sowing up to 34 days continuously (23 rd July to 25 th August, 2017).					
	Kodo millet	16	0.8	Demo vitiated due to occurring of dry spell after sowing up to 34 days continuously (23 rd July to 25 th August, 2017).					
	Brown top millet	16	0.8	Demo vitiated due to occurring of dry spell after sowing up to 34 days continuously (23 rd July to 25 th August, 2017).					
Kagzi lime	80	12.5	On going						
	Sub total	607	151.5						
Chikka-ballapura	Crop diversification	15	5.0	7.0	5.0	40.0	1.40	1.20	
	Drought tolerant varieties	160	58.0	15.0	12.0	25.0	1.60	1.30	
	Drudgery reduction	50	20.0	8.0	7.0	14.0	1.30	1.10	
	Location specific intercropping systems with high sustainable yield index	140	55.0	10.0	6.0	60.0	1.20	1.10	
	Low water requiring crops	25	15.0	8.0	6.0	33.0	1.30	1.13	
	Nutrient management	15	5.0	10.0	8.0	25.0	1.40	1.20	
	Short duration varieties	160	57.0	14.0	12.0	16.0	1.30	1.20	
	Varietal evaluation	5	2.0	8.0	6.0	33.0	1.40	1.30	
		Sub total	570	217.0					

Davan-agere	Intercropping of Redgram(BRG-2) in Hybrid Maize	120	45.0	47.4	35.40	34.12	1.33	1.10
	Drought tolerant varieties - Finger millet (ML-365)	32	13.0	26.5	22.5	17.51	1.87	1.59
	Nutrient management-Hybrid maize	25	10.0	52.8	48.3	9.31	1.52	1.42
	Nutrient management-Tomato	25	10.0	322.3	298.7	7.90	1.78	1.66
	Nutrient management in Banana (Yellakki)	3	3.0	283.0	162.0	74.6	2.14	1.83
	Sub total	205	81.0					
Gadag	Crop diversification-Dryland Horticulture with cashew	5	2.0	On-going				
	Crop diversification-Planting <i>Meliadubia</i> for popularization of Agro-forestry system for dryland	10	4.0	On-going				
	Location specific intercropping systems - Maize+Pigeon pea (5:1)	40	16.0	29.6	24.5	-	1.38	1.09
	Varietal evaluation-Charcoal root rot resistant Rabi Sorghum variety SPV-2217.	80	32.0	11.5	9.0	27.8	1.57	1.44
	Varietal evaluation - Wilt tolerant chick pea variety JAKI-9218.	10	4.0	5.5	4.2	29.4	1.37	1.18
	Sub total	145	58.0					
	Kalaburagi	Drought tolerant varieties-Sorghum M-35-1	62	40.0	15.7	13.5	16.0	5.60
Location specific Intercropping-Pigeon pea TS-3R+Pumpkin		10	4.0	14.5	12.0	20.0	3.90	3.30
Location specific intercropping-Pigeon pea TS-3R+Black-gram		50	20.0	12.2	10.7	14.0	3.30	2.90
Nutrient management-Redgram (TS-3R)		14	24.0	15.2	12.9	17.0	3.80	3.07
Short duration varieties : Chickpea (JG-11)		18	10.0	15.4	12.9	19.0	3.30	2.70
Sub total		154	98.0					

Tumkur	Contingency crop planning - Finger millet ML-322	10	3.0	23.8	19.5	22.1	2.20	1.80
	Contingency crop planning - Finger millet Indaf-7	8	4.0	22.3	19.5	14.3	2.10	1.80
	Contingency crop planning-Finger millet Indaf-9	8	4.0	21.6	19.5	10.8	2.0	1.80
	Crop diversification-China aster	10	2.0	74.1			3.10	
	Crop diversification - Marigold	10	2.0	46.8			3.60	
	Crop diversification-Tamarind- Gottipura grafted	21	5.0	126.1			2.40	
	Crop diversification-Amla- NA-6, NA7, Banaras	15	5.0	213.5			2.60	
	Drought tolerant varieties-Finger millet ML-365	30	75.0	26.8	19.5	32.4	2.50	1.80
	Water management-Aerobic Paddy MAS-26	26	10.0	31.5	25.8	22.1	1.98	1.70
	Short duration varieties- Red gram BRG-2	60	20.0	13	10.0		2.30	1.80
Sub total		198	130.0					
Alleppy	Resource conserving and eco-friendly technologies in paddy cultivation	11	15.0	64.3	59.0	8.9	2.57	2.05
	Climate resilient integrated crop management practices in coconut	50	400 palms (3 ha)	On-going				
	Sub total	61	18.0					
Total		1940	753.5					



Demonstration on chick pea at NICRA village of KVK Belagavi



Drought tolerant ML 365 ragi + pigeon pea intercropping at Tumakuru

Module III: Livestock and Fisheries

Animal health camps, preventive vaccination, heat stress management in livestock through nutrition and improved shelter, breed upgradation through AI, improved fodder/feed storage methods, improved shelters for reducing heat stress in livestock, model dairy unit for stress and feed management and management of fish ponds/tanks during water scarcity and excess water etc. are the activities carried out under this module. The details are furnished in Table 96. During year, about 10049 livestock including poultry birds have been covered under various livestock

interventions through 258 demonstration units to tackle the adverse climatic conditions in the NICRA villages. Under general health checkup, preventive vaccination and deworming programme covered 7507 livestock and poultry birds during the year. About 705 animals were covered under breed upgradation through AI and improved bucks. In poultry, backyard poultry breeds, slated poultry shelter for floods and feed supplementation were implemented. In order to enhance the fodder availability to livestock during lean period, 5 silage demonstrations were implemented. In fisheries, common carp fish rearing was introduced in six farm ponds during the year.

Table. 96: Climate resilient technologies for sustainable production of livestock and fisheries.

Interventions	KVKs (No.)	Demonstrations (No.)	Animals/ birds treated (No.)
A) Livestock			
Animal health checkup camp	5	8	2842
Preventive vaccination	4	9	3032
De-worming in livestock	3	7	1633
Artificial Insemination	2	0	543
Breed up gradation (Sheep and Goat)	2	14	62
Calf Registration	1	0	50
Improved shelters for reducing heat stress in livestock -Rubber mats, Mineral mixture, Slated floor in small ruminants	4	19	70
Insurance coverage for livestock	2	0	29
Mitigation of mineral deficiencies in animals	3	97	631
Popularization of backyard poultry (climate resilient poultry shelter, breeds, feed)	3	60	550
Feed supplement to poultry	1	39	585
Silage making	1	5	22
Total		258	10049
B) Fisheries			
Management of fish ponds/ tanks during water scarcity and excess water	1	3	0.2
Fish production	1	3	0.3
Total		6	0.5



Upgradation of local female goats with Sirohi buck at Kalaburagi



Intensive goat rearing in improved shelter in flood prone Alleppey district of Kerala

Fodder production: 195 demonstrations were organized in the area of fodder production covering 29.14 ha area and 6 units of hydroponic fodder production. The details are presented in table 97.

Table. 97: Climate resilient technologies for sustainable fodder production under NICRA villages

KVK	Interventions	Demonstrations (No.)	Area (ha)	Total Production (Quintal)
Belagavi	Improved fodder production : Lucerene	17	0.3	Green fodder- 1.36 ton/ha/year Dry fodder-3.4 Qtl./ha/year
Chikkaballapura	Improved fodder production	32	5.0	15
	Improved fodder/ feed storage methods	30	10.0	5
Davanagere	Improved fodder/ feed storage methods-Multi cut fodder production (CoFs-29)	44	4.4	77,000
	Improved fodder/ feed storage methods- Enrichment of Poor quality dry fodder	40	5.0	80,000
Tumkur	Improved fodder production Fodder Sorghum CoFS-29	16	4.0	1300 q/ha
Aleppy	Improved fodder production	10	0.4	1050 q/ha
Davanagere	Improved fodder production - Hydroponic fodder production	5	32 trays/farmer	35-40 kg/day
Aleppy	Fodder production through hydroponics	1	15 trays/farmer	20 -22 kg/day
	Total	195	29.1	



Fodder crop demonstration at Davanagere

Module IV: Institutional Interventions

The module consists of institutional mechanisms relating to seed bank, fodder bank, custom hiring centre, introduction of weather index based insurance and climate literacy through a village weather station. The NICRA implementing centres have established six units of fodder banks and 3 units of community nursery and one unit of seed banks to meet the drought and flood related issues. In respect of custom hiring centres, 456 farmers of NICRA cluster villages have used various implements to cultivate 317.1 ha area for timely sowing and other cultural operations (Table 98).

Table. 98: Details of Institutional Interventions implemented under NICRA

KVK	Interventions	Demo/activities (No.)	Farmers (No.)	Area (ha)
Chikkaballapura	Climate literacy through a village level weather station	4	127	58.0
	Climate literacy through a village level weather station	4	160	0
	Community nursery	2	10	2 units
	Community nursery	1	10	1 unit
Belagavi	Seed bank	1	25	0
Davanagere	Fodder bank	2	32	6.0
	Fodder bank (CO-4, Lucerne, SF tall maize)	4	4	2.0
Alleppy	Post-harvest losses	8	10	0
Gadag	Mechanization through custom hiring for timely planting		50	60.0
Davanagere	Mechanization through custom hiring for timely planting		51	63.9
Kalaburagi	Mechanization through custom hiring for timely planting		290	168.2
Tumkur	Mechanization through custom hiring for timely planting		65	25.0
	Total	26	834	383.1

Capacity building to farmers: During the year, NICRA implementing KVKs have conducted 122 trainings related to climate resilient agriculture benefiting

3889 farmers including 924 women farmers. The details are provided in Table 99.

Table. 99: Details of capacity building programmes organized by KVKs under NICRA

KVK	Trainings (No.)	Participants (No.)		
		Male	Female	Total
Belagavi	8	268	34	302
Chikkaballapura	37	473	73	546
Davanagere	21	572	200	772
Gadag	23	466	163	629
Kalaburagi	7	875	159	1034
Tumakuru	5	180	33	213
Alleppy	21	131	262	393
	122	2965	924	3889

Extension Activities: During the year, 222 extension activities were carried out to create awareness among the community about the climate related impacts on the agriculture and related sector through 10 different activities. A total of 3593 farmers were benefitted through

their participation in these programmes including 644 women farmers (Table 100). About 330 farmers including 89 women farmers were taken on exposure visits to various places/intuitions by the NICRA KVKs during the year.

Table. 100: Details of extension activities organized under NICRA

Title of the programme	KVKs (No.)	Activities (No.)	Participants (No.)		
			Male	Female	Total
Agro advisory and awareness programmes	7	113	962	164	1132
Diagnostic visits	2	36	133	30	163
Exposure visit	6	11	241	89	330
Field day	7	14	642	120	762
Group meeting	5	22	369	32	401
Kisan Mela	2	3	140	15	155
Method demonstrations	5	15	352	42	394
Visitors to NICRA village	1	4	141	14	155
Women awareness programmes	3	3	0	138	56
World soil day	1	1	45	0	45
Total		222	3025	644	3593



Method demonstration on silage preparation at Belagavi



Gadag farmers exposure visit to UHS Bagalkot

3.2.5 Skill development programme

Agriculture Skill Council of India (ASCI) under the aegis of Ministry of Skill Development & Entrepreneurship (MSDE) in collaboration with ICAR has taken upon the responsibility of coordinating the task of developing the skills of country’s manpower in emerging areas of agriculture.

During the year two KVKs organised three training programmes benefitting 39 participants involving 23 male and 16 female under different job roles. The details of the same are provide in Table 101.

Table 101: Skill training organised by KVKs of Zone XI

KVK	Job	Start date	End date	General Participants (No.)		SC/ST Participants (No.)		Total (No.)	Expenditure (Rs.)
				Male	Female	Male	Female		
Gadag	Agricultural Extension Service Provider	24-02-2018	24-03-2018	10	3	3	4	20	165200
Mallapuram	Agricultural Extension Service Provider	05-03-2018	31-03-2018	9	8	1	1	19	165200
Total				19	11	4	5	39	330400

3.2.6 Attracting and Retaining Youth in Agriculture (ARYA)

ICAR has initiated a programme on “Attracting and Retaining Youth in Agriculture (ARYA)” to empower youth in rural areas to take up agriculture, allied and service sector enterprises for sustainable income and gainful employment in selected districts. It enables youth to establish network groups to take up resource and capital-intensive activities like processing, value addition and marketing. The main agenda of the project was to provide complete knowledge and skill on processing, value addition and marketing of agriculture products through capacity building programmes involving research and development organizations.

In Zone XI, KVK Bengaluru Rural in Karnataka and KVK Kannur in Kerala implemented the ARYA programme. Under this programme, 36 training programmes were organized, in which 778 rural youth were trained on processing, value addition and marketing of agriculture produces like finger millet, banana and coconut. Three processing and value addition units were established at Permagondanahalli, Kachahalli, Tapasihalli clusters

in Karnataka on nutri-millet, jack fruit and mushrooms, respectively. Six exposure visits were organized to motivate the budding entrepreneurs on various vocational opportunities.

3.2.7 Sankalp Se Siddhi

Hon’ble Prime Minister, Shri Narendra Modi ji has appealed that the country should celebrate the period from 9 August, 2017 to 15 August, 2022, when the country attained 75 years of independence. The period was celebrated as Sankalp Se Siddhi – New India Movement and a pledge to be made for the all-round development of the country. For the making of New India, 40 KVKs, 14 in Kerala and 26 in Karnataka, under ATARI, Zone-XI, organised the Sankalp Se Siddhi event in a befitting manner, in which 3 Union Ministers, 28 Hon’ble MPs, 3 State Ministers and 33 Hon’ble MLAs took part in the pledge taking. A total of 2494 farmers in Kerala and 22663 farmers in Karnataka participated in the event and taken the New India pledge. The details of participants is provided in the Table 102.

Table 102: Sankalp Se Sidhi programme organized by KVKs of Zone XI

State	KVKs organised the program (No.)	Union Ministers attended the programme (No.)	Hon'ble MPs (Loksabha/Rajyasabha) participated (No.)	State Govt. Ministers (No.)	Participants (No.)							Coverage by Door Darshan (No.)	Coverage by other channels (No.)
					MLAs Attended the programme	Chairman Zila Panchayat	Distt. Collector/DM	Bank Officials	Farmers	Govt. Officials, PRI members etc.	Total		
Kerala	14	Nil	6	3	5	25	1	16	2494	542	3098	5	13
Karnataka	26	3	22	0	28	15	2	54	22663	683	23347	18	66
Total	40	3	28	3	33	40	3	70	25157	1225	26445	23	79



Sankalp Se Siddhi programme at Belagavi district attended by Shri Anant Kumar Hon'ble Union Minister of Chemicals & Fertilizer, and Parliamentary Affairs on 28-8-2017

3.2.8 Protection of Plant Varieties and Farmers Rights Act (PPV & FRA)

The Ministry of Agriculture and Farmers Welfare encourage registration of farmers' varieties of crops under Protection of Plant Varieties and Farmers Rights Act 2001 (PPV & FRA). During the reporting period, KVK Bengaluru Rural has organized awareness programmes. The major agenda of these programmes includes exhibition of

farmers' varieties in various crops, seminars from eminent scientists, group discussions and registration of farmers' varieties under PPV and FR Act.

These programmes created awareness amongst farmers, Plant Breeders and researchers about the Farmers' Rights, conservation, protection and preservation of plant genetic resources for sustainable use under PPV and FR Act 2001. These awareness programmes have further resulted in receipt of applications from farmers for grant of IPR to their varieties and also help in facilitating farmers in applying for Plant Genome Saviour Community Award, Reward and Recognition. Mr. Siddeswara Reddy a traditional farmer from Challakere, Karnataka won the plant Genome Saviour Farmer Recognition Award 2017. Similarly, Kunabi Samaj Abhivraddi Sangh, Uttara Kannada, Karnataka won the Plant Genome Saviour Community Award 2017.

3.2.9 Swachh Bharat Mission

The ICAR-ATARI, Bengaluru been implemented Swachh Bharat Mission- a nationwide programme for promoting cleanliness of the country since 02 October, 2014. Since then, the Institute and all KVKs of the Zone consisting of states viz., Karnataka, Tamil Nadu, Kerala, Goa, Puducherry and Lakshadweep are carrying out various activities towards Swachhata Abhiyan.

- (a) **Swachhata Abhiyan:** During the year different activities are carried out under the main themes of (i) Cleaning drive, (ii) Digitization of office records, e-office and procurement, (iii) Awareness about Swachhata, (iv) Waste management, (v) Natural Resource Management and (vi) Sanitation, health and hygiene. Specific activities includes – cleaning of office premises, individual rooms, terrace/roof top; dusting of windows and doors; sprucing up work stations, almirah, wardrobes etc.; cleaning of notice boards, car shed, store rooms etc.; cleaning of furniture, equipments etc.; collection of bio-degradable waste for recycling; providing new dust

bins; e-tenders; housekeeping for corridors, floor, toilets, etc at the Institute and cleaning of KVK campuses; cleaning drive in public places and in cluster villages of KVKs; sprucing up work stations/almiarh/wardrobes; cleaning of notice boards, car sheds, store rooms, furniture, equipments etc.; weed removal campaign especially in public places and office premises; awareness programmes on swachhta for school children, college students/youth, farmers, tribal and staff of different organizations; training and demonstrations on composting/recycling of farm waste as well as eco friendly technologies and organic farming; rain water harvesting programmes; training and demonstrations on eco friendly technologies; safe usage of pesticides; animal health care including shed cleaning drive; sanitation and nutrition programmes for better health; yoga and positive thinking; housekeeping of cleanliness of buildings, toilets, etc. at KVKs.



Cleaning drive by ICAR-ATARI, Bengaluru



Training-cum-demonstration on vermi-composting organized by KVK, Kalaburagi under Swachh bharath Abiyan

(b) Swachhta Hi Seva Hai Campaign : As a part of implementing Swachh Bharat Mission, Swachhta Hi Seva Hai Campaign was initiated by the ICAR-ATARI, Zone XI, Bengaluru and its KVKs on 15.09.2017 by taking oath and conducted related activities from 15 September to 02 October, 2017. All staff members were actively involved in the Swachhta activities covering all districts of Karnataka, Kerala and Lakshadweep. A total of 1565 activities were organized on 5 special days viz., 17th, 24 - 25 September and 01 - 02 October fixed by the Government of India and overall 4091 activities during the period.

The activities under taken are given below:

- Digitization of office records/ e-office
- Basic maintenance of office buildings
- Sanitation and solid waste management
- Cleaning and beautification of surrounding areas
- Vermicomposting/composting of biodegradable waste management & other activities and generate wealth from waste
- Used water for agriculture/ horticulture application
- Swachhta awareness at local level
- Swachhta workshops/seminars/group discussions
- Swachhta pledge
- Display and banner
- Foster healthy competition
- Involvement of print and electronic media
- Involving and with the help of the farmers, farm women and village youth in their adopted villages
- Involvement of all staff members in the activities
- Involvement of VIP/VVIPs in the activities
- Cleaning drive at public toilets, maintaining hygiene and developing toilets in disadvantaged areas/ schools etc
- Cleaning drive at tourist spots
- Planting of trees/saplings
- Awareness to school children about swachhta
- Recording of videos/audio on activities
- Weeding and parthenium removal in instructional farms
- Award ceremony/public function/meetings



A view of activities during Swachhta Hi Seva Hai Campaign

3.2.10 Mera Gaon – Mera Gaurav (My Village – My Pride)

The ICAR-ATARI, Bengaluru is coordinating the activities under Mera Gaon - Mera Gaurav (MG-MG) in Zone XI. Ten ICAR Institutes in the zone viz., ICAR-IIHR,

Bengaluru; ICAR-NIANP, Bengaluru; ICAR-NBAIR, Bengaluru; ICAR-NIVEDI, Bengaluru; ICAR-DCR, Puttur in Karnataka, ICAR-CPCRI, Kasaragod; ICAR-CTCRI, Trivandrum; ICAR-IISR, Calicut; ICAR-CMFRI, Cochin and ICAR-CIFT, Cochin in Kerala implemented the MG-MG programme through formation of multi-disciplinary teams of scientists. The available strength of 552 scientific manpower was grouped into 126 teams (Table 103) to execute the MGMG programme. Scientists teams extended advisory services as well as disseminated latest technologies in agriculture and allied sectors through organisation of different extension activities like mobile based advisories, extension literature, team visit to villages, interface meeting/*goshthies*, Awareness programmes, method demonstrations, training programmes, linkages with other agencies, introduction of new technologies, introduction of new varieties, introduction of new crops were carried out in 565 adopted villages involving 71338 farmers/farmwomen.

Table 103: Scientist Teams of ICAR Institutes in Zone XI under MG-MG

Sl. No.	Institutes	Scientists in position (No.)	Teams formed (No.)	Villages adopted (No.)	Farmers participated (No.)
Karnataka					
1	IIHR, Bengaluru	125	25	103	3651
2	NIANP, Bengaluru	41	10	51	8350
3	NBAII, Bengaluru	29	6	30	1807
4	NIVEDI, Bengaluru	19	5	23	684
5	DCR, Puttur	8	2	10	306
Total		222	48	217	14798
Kerala					
6	CPCRI, Kasaragod	63	17	70	41061
7	CTCRI, Thiruvananthapuram	42	10	50	7694
8	IISR, Calicut	25	5	10	3917
9	CMFRI, cochin	130	32	149	3137
10	CIFT, Cochin	70	14	69	731
Total		330	78	348	56540
Grand total		552	126	565	71338



Awareness of zoonotic diseases amongst the public and children of farmer's family in Kodihalli village of Doddaballapura taluk under MG-MG by NIVEDI, Bengaluru

3.3 Farmer FIRST Programme

The Farmer FIRST (Farm, Innovations, Resources, Science and Technology) initiative was launched by ICAR to move beyond production and productivity; to privilege the smallholder agriculture; and complex, diverse and risk prone realities of majority of the farmers through enhancing farmers-scientists interface. In this approach, the farmer is in a centric role for research problem identification, prioritization, conduct of experiments and its management in farmers' field conditions. It emphasizes on resource management, climate resilient agriculture, production management including storage, marketing,

supply chains, value chains, innovation systems and information systems.

The Farmer FIRST project was sanctioned by the Division of Agricultural Extension, ICAR, New Delhi and it was implemented through ICAR-ATARI, Bengaluru at 3 Institutes viz. ICAR-IIHR, Bengaluru, ICAR-NIANP, Bengaluru and ICAR-CPCRI, Kayankulam Regional Station.

During the year, a meeting was organized to review Farmer FIRST project (FFP) on 13.02.2018 at ICAR-ATARI, Bengaluru. All the 3 FFP under Zone XI were reviewed by Director (Acting), ICAR-ATARI, Zone XI,

Bengaluru along with Scientists. Annual Review Workshop of Farmer FIRST Programme was held at New Delhi on 21st & 22nd February, 2018. In this workshop, Technical Session (Zone XI), was chaired by Dr. N.K. Sudeep Kumar, DEE, TANVASU, Chennai and Co-Chaired by Dr. M.J. Chadre Gowda, Director ATARI, Bengaluru.

During the year, the 3 FFP centres made several interventions at the field level on crop, horticulture, livestock, NRM, enterprise and Integrated System (IFS) modules, covering 28 villages/wards and 5138 households (Table 104).

Table 104: Farmer FIRST budget, villages and households covered under the programme

Institutes	Villages/wards covered (No.)	Households covered (No.)	Budget allocated during 2017-18 (Rs. In lakhs)
ICAR-IIHR	6	2627	42.15
ICAR-NIANP	3	800	37.00
ICAR-CPCRI	19	1711	47.07
Total	28	5138	126.22

IIHR Bengaluru project is implemented in 6 cluster of villages at Kanakapura Taluk, Ramnagara district. In order to overcome the identified production constraints, ICAR-IIHR project team organized sensitization programmes in the adopted villages of the project area. Database of 1300 farmers with geo-tagging of their production site, land area, crop, soil inventory etc., was completed. Data on production constraints of various crops and enterprises along with cropped area and type of animals, management practices, input availability and their management, adoption level of improved packages, existing organizations and their programmes in various sectors of agriculture and other programmes were completed. About 20 vermi-composting units were promoted with the help of organic farming programme of department of horticulture and agriculture in the selected villages. A total of 25 awareness programmes were organized with the help of all the stakeholder institutions of ICAR, SAU and developmental departments.

ICAR NIANP, Bengaluru is implementing the project in 3 cluster of villages in Doddaballapur taluk, Bengaluru Rural district. A database of farmers, existing problems and practices followed by the farmers were developed. Suitable combinations of technologies were identified for different resource levels and management capacity of

farmers, to address the identified and prioritized problems of the existing production system. In the livestock sector, problems related to quality milk production, mastitis and lameness management, animal fertility management, ration balancing, hydroponic fodder cultivation and fodder production, area specific mineral mixture and silage production were attempted. Enterprise based farmer groups were formed at the rural level for goat farming, Mushroom production and fodder banks as group enterprises also promoted, which were further linked to other interventions, where the output of onegroup became the resource material for another interventions.

In Alleppey district, ICAR-CPCRI is working in the 19 Panchayat wards. The project introduced HYVs of sesamum, finger millet, cowpea, turmeric and paddy. Under the livestock module, high yielding fodder crops, hydroponics, azolla, mastitis prevention campaign, value addition of local cow products, small scale incubators and cow mat were introduced in the project villages. Turmeric clusters, coconut producer's societies, tuber farmer clusters and sesamum women grower group were formed. ICAR-CPCRI released fertilizer calculator mobile app for coconut growers under Farmer FIRST project. A total of 54 extensions programmes were organized to create awareness among the farmers about the interventions.

3.4 Agriculture Technology Information Centre (ATIC)

Farmers / Extension personnel / Stakeholders visits to ATICs: During the period under report, a total of 96934 farmers, 11514 extension personnel, 1294 students and 4819 other stakeholders visited Agriculture Technology Information Centres in the zone. Altogether, 114561 persons visited the ATICs, out of which, 53589 visited for information and 60972 visited for technology products.

Communication with stakeholders: A total of 64483 farmers contacted ATICs or were contacted by ATICs through various means of communication like phone calls from farmers (including Kisan Call Centre escalated calls), video shows, letters received and letters replied and participation in training.

Publications: Under publications, 28846 books, 3000 technical bulletins and 2190 DVDs were produced and provided to the ATIC visitors or those requested by mail. A total of, 24196 farmers and other stakeholders were benefited by these publications and documents.

Technology services provided: During the reporting period, 1026 soil and water testing samples were tested by the ATICs.

Technology products provided: Among different technology products, 5461 quintals of seeds and 724361 numbers of planting materials were provided to farmers.

Revenue generated: A total amount of Rs. 46680246 was generated through various technology products/publications and services provided by the ATICs. Details of item-wise revenue generated are given in Table 105.

Table 105: Income generated by ATICs in Zone XI

Product	Income generated (Rs.)
Seeds/ Planting materials	39236543
Publications/ CDs / services	7443703
Total	46680246

3.5 Technological backstopping by Directorate of Extension

Krishi Vigyan Kendras act as district level knowledge and resource centres for agriculture and its allied sectors. They serve as a bridge between the source of technologies and their stakeholders. In this process, the Directorate of Extension under various State Agricultural Universities play an important role by providing technological backstopping to the KVKs under their jurisdiction. The Directors of Extension also play a major role in coordinating and

monitoring of KVK activities. There are seven State Agricultural Universities *viz.*, University of Agricultural Sciences, Bengaluru; University of Agricultural Sciences, Dharwad; University of Agricultural Sciences, Raichur; Karnataka Veterinary Animal and Fisheries Sciences University, Bidar; University of Horticultural Sciences, Bagalkot; University of Agricultural and Horticultural Sciences, Shivamogga and Kerala Agricultural University, Thrissur which are providing adequate technology support to the KVKs in various forms, which helps them to carry out their mandated activities more efficiently and effectively.

During the year, the Directors of Extension monitored the activities of KVKs through various programmes including workshops/review meetings, action plan meetings, sensitization meetings, regional committee meeting, scientific workers conference, crop specific awareness programmes *etc.* During 2017-18, the Directorates of Extension conducted 34 workshops/meetings exclusively for KVK staff, in which 264 staff participated. The major programmes include crop plan meet, budget plan meet, contingency plan meet, organic vegetable cultivation, value chain management, farm development meeting, world soil day celebration, world water day celebrations, pulse day celebration, monthly review meetings, quarterly review meeting and pre-action plan meeting.

Directors of Extension and their officials participated in 30 Scientific Advisory Committee meetings, 47 field days, 21 workshops/seminars and 50 training programmes. They also attended 37 other programmes including interface meetings, group discussion with KVK officials, farmers meet, animal health camp, inauguration of farmers group / society in villages, krishimela *etc.* In addition they made field visits to 53 plots wherein on farm trials were conducted, 75 plots of frontline demonstration and participated in 50 training programmes conducted by the KVKs and 4 Farmers Field School programmes. Further, they have provided guidance to KVKs for preparing 20 documents on success stories / case studies.

In order to provide backstopping on latest technologies in agriculture and its allied sectors, the Directorates of Extension organized 66 training programmes in which 80 KVK staff participated. The thematic areas in these training programmes included women empowerment, changing management strategies in agricultural extension, convergence mechanisms, weed management, farmer's producers organization, financial literacy and agricultural production, soil analysis, rural livelihood security, integrated farming system, scientific goat rearing, poultry rearing, fish culture, skill development in horticulture for rural youth and mushroom production.

Human Resource Development

4

Chapter

The Indian Council of Agricultural Research has the largest network of research institutes and scientific manpower. KVK scientists need to be equipped with the latest technologies developed by National Agricultural Research System. Considering this, Agricultural Technology Application Research Institute, Zone XI, organized Human Resource Development programmes to develop the capacity of KVK scientists.

Orientation programme for the newly recruited staff of KVKs under UAS Dharwad and NGO Belagavi was organized at KVK Gadag during 10-12 August, 2017. In this programme, 31 scientists of 7 KVKs viz., Dharwad, Vijayapura I & II, Bagalkot, Haveri, Uttara Kannada and Belagavi I participated. Another programme for the scientists of KVKs under UAS Raichur, UHS Bagalkot, KVAFSU Bidar, NGOs of Karnataka and Kerala was organized at KVK Mysuru during 17-19 August, 2017. In this programme, 20 scientists of 10 KVKs viz., Ballari, Belagavi II, Dakshina Kannada, Kalaburagi I & II, Kolar, Koppal, Mysuru, Raichur and Thiruvananthapuram participated. The officials of ATARI and resource persons from other KVKs were invited to orient the newly recruited scientists of KVKs. Participatory rural appraisal, organizing mandated activities, communication strategies, administrative and financial matters were covered during the orientation programme.

Agricultural Technology Application Research Institute, Zone XI, organized a HRD Week for the Subject Matter Specialists of KVKs in the Zone, during 5-9 February, 2018. This is to empower KVK scientists of the zone to test and demonstrate latest technologies in farmer's fields during 2018-19. The programme was organized with the support of various ICAR institutes. The orientation programme on latest technologies for plant protection SMSs was organised at ICAR-NBAIR on 05.02.2018 for soil science/agronomy SMSs at ICAR-NBSS & LUP on 06.02.2018, animal science/ veterinary/fishery SMSs at ICAR-NIANP on 06.02.2018 for horticulture SMSs at ICAR-IIHR and home science SMSs at KVK, Hirehalli, Tumakuru on 09.02.2018. A total of 130 trainees from KVKs participated in the training programme during HRD week. The programme provided latest information about soil fertility management, management of degraded soils, land resource inventory, invasive pest management,

pheromone technology, fruit crop technologies for higher productivity, new varieties and technologies for year round production of vegetables through open and protected cultivation, value added products and mechanization in horticultural crops, innovative plant protection technologies in horticultural crops, identifying potential technologies for demonstration, breeds in freshwater aquaculture, livestock feed technologies for field application, livestock production and management, technologies related to fodder cultivation and conservation, and important animal diseases and their management.

Refresher course for the Programme Assistants (Computer) of KVKs from Sothern Karnataka was organized at KVK Mysuru during 10-12 October, 2017. In this programme, computer personnel of 15 KVKs (Chamarajanagara, Chikkaballapura, Chikkamagaluru, Chitradurga, Dakshina Kannada, Davanagere, Hassan, Kolar, Mandya, Mysuru, Ramanagara, Shivamogga, Tumakuru I & II and Udupi) participated. The Heads of these KVKs also participated on the second day of the programme to sort out the issues in the database management.

The training for KVK staff on the Public Financial Management System (PFMS) were conducted in 7 institutes. The primary objective was to establish an efficient fund flow system and expenditure network. Training programme covered topics on EAT module, mapping of agencies, bank module, creation of vendor, maker and checker, customization of vendors using excel file for salary and release of funds.

The training for KVK subject matter specialist to orient on Sujala-3 project was conducted on 11-12 January, 2018 at NBSS & LUP, Hebbal Campus, Bengaluru. A total of 16 Subject Matter Specialists from 8 different KVK's and 9 resource persons were attended. The resource persons oriented the KVK Subject Matter Specialists on how to educate the farmers and village based organization representatives of Sujala-3 project villages on utilization of scientific data for watershed management and crop production. The detailed presentations on different topics like introduction of Sujala-3 and its implementation, watershed development, land resource inventory, hydrological assessment, software application on digital library, preparation of action plans and scientific data



PUBLICATIONS

5.1 Research Articles

Chandre Gowda M.J. Shrishail Dolli, M.V.Durga Prasad, D.Saravanan and Sreenath Dixit, 2018; Pooled innovativeness and learning-pattern based adopter categorization, Rural Extension and Innovation Systems Journal, 14(1):41-51.

Mahantesh Shirur, N.S. Shivalingegowda, M.J. Chandre Gowda, Sunil and Rajesh K. Rana, 2017; An Exemplary Story of Growing Temperate Mushroom in Tropical Climate of Rural India: Lessons for Other Startups, International Journal of Current Microbiology and Applied Sciences. 6(9):1-11.

Mahantesh Shirur, N.S. Shivalingegowda, M.J. Chandre Gowda, and Rajesh K. Rana, 2017; Entrepreneurial behaviour and socio-economic analysis of mushroom growers in Karnataka, Indian Journal of Agricultural Sciences, 87(6): 840-5.

Chandre Gowda M.J. and Sreenath Dixit, 2017; Gender Mainstreaming of Farmer Producer Organizations: Perspective from Karnataka, Economic and Political Weekly (accepted for publication).

Mahantesh Shirur, and M.J. Chandre Gowda, 2017; Ensuring success in Oyster (*Pleurotus Sp.*) mushroom cultivation through marketing strategies - A case study and SWOT analysis, Journal of Agricultural Economics and Rural Development Vol. 3(1), pp. 184-189, July, 2017. © www.premierpublishers.org. ISSN: 2167-0477.

Srinivasa Reddy, D.V., Sreenath Dixit, N. Loganandhan, Manjunath Gowda, B. Mohan, S. Sheeba, Mallikarjuna, B.O. and M. Anitha, 2017. Short and medium duration varieties of cereals and millets to mitigate monsoon vagaries in rainfed agriculture. Indian J. of Ecology, 44(Special issue-4): 292-297.

Rayudu, B.T., Akshatha, M.K., Prabhuswamy, Y.H., Reddy, D.V.S., and Sreenath Dixit, 2018. An impressive turnout of greengram variety Co (Gg) 8 under cluster frontline demonstrations through KVKs of Tamil Nadu. Res. J of Agril Sci. (Accepted).

Raju R., Thimmappa K., Pathan A.L and Siddayya, 2017. Saline soil reclamation through subsurface drainage in Karnataka - An economic impact analysis. Journal of Farm Science, 30(1): (74-78).

5.2 Papers presented in international/national conferences

Chandre Gowda, M.J., 2018. Information and Communication Technology in Agricultural Extension: Status and prospects. Lead Paper, In: Proceedings of the National Conference. Eds. Patil P.L., Dasog G.S., Biradar, D.P., Patil V.C. and Aladakatti Y.R., National Conference on Application of Geo-Spatial Technologies and ICTs in Smart Agriculture, UAS Dharwad.

Srinivasa Reddy D.V., Dixit S., Chandre Gowda M.J., Rayudu B.T., Sairam C.V. and Vidya C., 2017. Scaling-up ICM Strategies through Frontline Demonstrations in Vegetable crops, Abstracts National Conference on Food and nutritional security through vegetable crops in relation to climate change, Indian Society of Vegetable Science, ICAR-IIVR Varanasi, Dec 9-11, 2017.

Srinivasa Reddy, D.V., Sreenath Dixit, M.J. Chandre Gowda, B.T. Rayudu, C.V. Sairam and C. Vidya, 2017. Scaling-up IPDM Strategies through Frontline Demonstrations in Vegetable crops, Abstracts National Conference on Food and nutritional security through vegetable crops in relation to climate change, Indian Society of Vegetable Science, ICAR-IIVR Varanasi, Dec 9-11, 2017.

Kolekar D.V. and M.J. Chandre Gowda, 2018. Contribution of Indigenous Cattle in the Economic Security of Farm Households in Southern Karnataka, Abstracts International Conference on Invigorating Transformation of Farm Extension Towards Sustainable Development: Futuristic Challenges and Prospects, TNAU Coimbatore, March 9-10, 2018.

Srinivasa Reddy, D.V., Sreenath Dixit, M.J. Chandre Gowda, B.T. Rayudu, C.V. Sairam and C. Vidya, 2017. Scaling-up IPDM Strategies through Frontline Demonstrations in Vegetable crops, Proceedings National

Agronomy Congress 2018 on Redesigning Agronomy for Nature Conservation and Economic Empowerment, GB Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, February 20-22, 2018.

Srinivasa Reddy D.V., Sreenath Dixit, N. Loganandhan, Manjunath Gowda, B. Mohan, S. Sheeba, B.O. Mallikarjuna and M. Anitha, 2017. Short and medium duration varieties of pulses and oilseeds to mitigate monsoon vagaries in rainfed agriculture. Proc. Of the National Conference on Climate Change and Agricultural Production: Adopting crops to climate variability and uncertainty. (Edited: Dhawan, A.K., Mahdi, S.S., Ghosh, M., Dutta, S.K., Chauhan, S.K. and Chowdhury, A.R.). Organised by Bihar Agricultural University, Sabour, Bhagalpur, Bihar in Collaboration with Indian Ecological Society, Ludhiana, Punjab, 6-8 April 2017.

Srinivasa Reddy, D.V., Sreenath Dixit, Manjunath Gowda, D.C. Chougala, L.G. Hiregouder, T.N. Devaraj, N. Loganandhan and C. Vidya, 2018. Location specific intercropping systems to sustain production and economic returns in rainfed farming. International Conference on Sustainability of smallholder Agriculture in Developing Countries under Changing Climatic Scenario, 14-17th February 2018 at Chandra Shekhar Azad University of Agriculture & Technology, Kanpur, India. Poster No.429.

5.3 Book/ Chapters

Symbols of Success: Pathways to Prosperity, 2017; Singh AK, Chandre Gowda MJ, Sreenath Dixit, Randhir Singh, Srinivasa Reddy DV, Rayudu BT, ICAR Agricultural Extension Division, ISBN: 978-81-7164-175-8.

Chandre Gowda M.J. 2018; Skilled and Smart Farmers Organizations Driving Farm and Rural Development, In: Sustainable Horticulture Development and Nutrition Security Vol.III Ed. Prem Nath, Iyer C.P.A., Dutta O.P., Swamy K.R.M., Prabhakar, B.S., Krishnamoorthy P.N. and Gadagimath P.B., Scientific Publishers ISBN: 978-93-8665-23-86.

Chandre Gowda M.J. 2018; Farmers Organizations: An overview from KVK Perspective, In: Farmer Organizations: Status and Prospects, Ed. Ayyappan S., Letha Devi G and Sreenath Dixit, Satish Serial Publishing House, ISBN: 978-93-8620-077-8.

Thimmappa K., Y.P. Singh and R. Raju. (2017). Reclamation of Sodic Soils in India: An Economic Impact Assessment, *In: Bioremediation of Salt Affected Soils: An Indian Perspective*, Sunjay Arora, A.K. Singh and Y.P. Singh (Eds): pp 257-274.

5.4 Technical Bulletins

Policy Paper on Farmer Organizations: Status and Prospects, 2017, Ayyappan S., Dixit S., Chandre Gowda M.J., Letha Devi G., Devi M.C.A., Subash S and Dixit P.K. NABARD Chair Professor, ICAR-NDRI SRS, Bengaluru.

5.5 Report

Annual Report 2016-17; ICAR Agricultural Technology Application Research Institute (ATARI), Published by Sreenath Dixit, Director, ATARI, Bengaluru (Eds: M.J. Chandre Gowda, D.V.Srinivasa Reddy, B.T.Rayudu, K.Thimmappa and Mallikarjun B.Hanji), ICAR Agricultural Technology Application and Research Institute, Zone XI, Bengaluru, India, pp.1-111.

Srinivasa Reddy, D.V. and Sreenath Dixit, 2017. Enhancing Resilience and Adaptive Capacity of Farmers to Climate Variability-An Experience of NICRA, 2017. ICAR-ATARI, Bengaluru - Karnataka, India. 170p.

5.6 Publications by KVKs

KVK staff published 182 research papers, 33 technical bulletins and 291 popular articles; KVKs have documented 265 extension literature, 16 books, 93 CD/DVD and 81 newsletters on various technological aspects of agriculture and its allied enterprise.



WORKSHOPS / MEETINGS / CONFERENCES

The Director/Officials of this Institute participated in the following meetings/workshops/conferences/seminars/ training programmes held during the period under report:

Dr. Sreenath Dixit, Director

Discussion about the 'Role of Subject Matter Specialists (Agrl.Ext.) in KVKs' organized by ICAR ATARI, Hyderabad on 28 April 2017

Discussion & arrangements for interaction of Hon'ble MOS at Muttur on 4 May 17 with the Director, CMFRI, Cochin.

Annual Review Workshop of KVKs of Zone VIII on 5-6 May 2017 at Goa.

NFSM Pulses Cluster Demonstration meeting at Krishi Bhavan, New Delhi on 22 May 2017.

Project Advisory Committee for establishing seed hub under NFSM at KVK Mysore on 27 May 17.

Mango Mela of UHS, Bagalkot on 31st May 2017.

National Workshop on Tribal Agriculture on 7-8 June 2017.

Joint Review meeting of IFAD Grant Portfolio Project in India on 13 June 2017.

ICAR Award Ceremony, Foundation Day Celebrations and Directors Conference at ICAR, New Delhi on 16 July 2017.

Participated in the "Consultative Meeting on Promotion of Horticultural Technologies in Karnataka" on August 16, 2017 at IIHR, Bangalore

Meeting Chaired by the Hon'ble Director General ICAR on Doubling Farmers Income with respect of Karnataka on 10 October 2017

Presentation on Behalf of State Co-ordination Committee for doubling farmers Income in a meeting Chaired by Prof MS Swaminathan & DG ICAR on 3rd November 2017

Meeting on Commercialization of Arecanut Tissue culture plants with selected KVK of Arecanut growing region of Karnataka & Kerala at CPCRI Kasaragod on 9.11.17

Brain storming session organised for enlisting ideas as well as feedback on technologies for doubling farmers income at UAS Dharwad on 14.11.17

SMD Meeting regarding progress in PFMS issues related to Direct Benefit transfer to KVK Beneficiaries and RE 2017-18 on 17 November 2017

11th International Fisheries and Aquaculture Conference at Kochi and Co-chair a Session on Socio Economics gender and livelihood on 24 November 2017.

Brief presentation about activities of KVK at KVK Ramnagar on 8 July 2017 during the visit of ATARI Directors & DDG (AE) to KVK Ramanagara.

Chaired a session and participated in Panel Discussion "Role of Agricultural Information delivering in sustainably increasing farm income in India" on 8th August 2017 in the XII Annual International Conference on Public Policy and Management.

Lecture on Media and Communication Strategy for KVKs in the Orientation Training Programme conducted for the newly recruited staff of the KVK at Gadag on 12 August 2017. Also delivered address to the participants regarding importance of career in KVK in valedictory session.

Presentation on 'Communication and Media Strategy for KVKs' in the Kisan Mela at KVK Suttur on 19 August 2017.

Lecture in the Model Training Course about the Scope of Plantation Based Cropping Systems for Doubling Farmers Income on 19 December 2017 at CPCRI, Kasaragod, Kerala

Recorded and broadcast on 17.6.17 at 6.50 pm about Role of KVK in Development of Agriculture in Uttara Kannada District. (Prasar Bharati, Broadcasting Corporation of India, All India Radio, FM, Karwar)

Conducted DPC meeting at MCAER, Pune on 2.5.2017
133rd Academic Council Meeting of TNAU on 9 June 2017

Accompanied Dr.V.N.Sharda, Member, ASRB to visit KVK Dharwad, farmer fields, NMOOP field and meeting with VC, UAS, Dharwad during 2-3 April 2017

SAC meeting of KVK Bagalkot & Mango Mela of UHS, Bagalkot on 31st May 2017

SAC meeting of KVK Uttara Kannada and field visit on 1st June 2017

SAC meeting of KVK Dharwad on 2nd June 2017

Facilitate the visit of DDG (AE) and Directors of ATARI to KVK Ramanagara on 8 July 17

Discussion with the PC Mysore and its host organization regarding feedback to ICAR Review Committee on 12 July 17

Discussion with the PC Davanagere and its organization regarding feed back to ICAR Review Committee and review of the seed programme 14 July 17

Selection Committee meeting at KVK Belgaum on 21.07.17

CFLD Field visit, KVK farm visit and interaction with Chairman of KVK Belgaum I on 22.07.17

SAC Meeting at KVK Pathanamthitta during 3-5 Oct. 2017

Tuber Crops Technology Conclave & Agri Start up event 2017 at CTCRI Thiruvananthapuram during 27-28 Oct. 2017

Discussion with FPO regarding Doubling Farmers income on 8.11.17 at Kannur

Visit to KVK Haveri & discussion with PC and Staff of KVK on 13.11.17

Visit Demo Units and farmers fields of KVK Dakshina Kannada at Puttur & Bantwal on 20.12.2017

SAC Meeting of KVK Davanagere on 27-28 Oct. 2017

SAC Meeting of KVK, Konehalli, Tumkur I on 29 Dec. 2017

SAC Meeting of KVK, Hirehalli, Tumkur II on 4 Jan. 2018

Dr. M.J. Chandre Gowda, Principal Scientist (Agricultural Extension) Director (Acting) w.e.f. 17 Jan 2018

Participated in the Directors Conference at NASC New Delhi during 8-9 March 2018

Jointly Organized the Farmers Conclave on 16-17 February 2018 at NIANP, Bengaluru. Hon'ble Union Agriculture Minister inaugurated the Conclave in the presence of 3 Hon'ble Union Ministers representing Karnataka.

As Member of IMC of NIANP Bengaluru, participated in the meeting on December 18, 2017.

Under Farmer FIRST, participated in the national meeting at Delhi during 21-22 Feb 2018.

As chairman of ZPMC on Farmer FIRST, conducted a preliminary review on 13 Feb 2018.

As member of the NICRA Zonal Management Committee, visited NICRA centres at Gadag and Kalaburagi in Karnataka.

Participated as Invited panel member in the 1st International Extension Congress 2018, New Horizons of Extension: Challenges and Opportunities, at ICAR-CIWA, Bhubaneswar, Odisha, INDIA, Feb 1-3 2018.

Participated as Invited Lead Speaker in the National Conference on Application of Geo-Spatial Technologies and ICTs in Smart Agriculture, UAS Dharwad on 24 Jan 2018.

Served as Expert to identify the agency for the CABES Project of UAS Dharwad and participated in its meeting during April 2017 at Dharwad.

Participated in the pre-action plan meetings to discuss the proposals of KVKs for the action plan 2018-19, at KVK Chikkamagaluru on 05 March 2018 and at Directorate of Extension UAS B on 12 March 2018.

Participated in the Action Plan Meeting at KVK Kodagu during 22-24 March 2018.

For "orientation training to newly recruited KVK staff", organized two training programmes at KVK Gadag (10-12 August 2018) and at KVK Mysuru (17-19 August 2018).

Organized one-day orientation training to Horticulture Scientists of KVKs at IIHR Bengaluru on 9 February 2018.

As part of the HRD Week for the Staff of KVKs in the Zone participated in the following orientation programmes:

1. NBAIR – Feb 5, 2018
2. NBSSLUP – Feb 6, 2018
3. NIANP - Feb 6, 2018
4. IIHR - Feb 9, 2018
5. IIHR KVK Tumakuru - Feb 9, 2018

Designed refresher courses for digitalization of KVK activities and trained 15 “Computer Programme Assistants” during 10-12 October 2017 at KVK Mysuru.

As part of the Monitoring of KVKs, participated in the Scientific Advisory Committee meetings of the following 9 KVKs:

1. Malappuram – 22 May 2017
2. Bijapur – 5 June 2017
3. Haveri – 6 June 2017
4. Kolar – 4 November 2017
5. Kodagu – 23 November 2017
6. Chitradurga – 11 December 2017
7. Shivamogga – 12 December 2017
8. Chikkamagaluru – 13 December 2017
9. Udupi – 14 December 2017

Supervised organization of Sankalp Se Siddi activities by the KVKs in Karnataka and participated in the events organized in 4 districts:

1. Davanagere – August 28 2017
2. Hassan – August 30 2017
3. Shivamogga – September 4 2017
4. Chikkamagaluru – September 5 2017

Promoted the Swatch Bharat initiative by guiding KVKs in organizing appropriate activities

1. Kolar – September 25, 2017
2. Mysuru – October 1, 2017
3. Mandya – October 2, 2017

Participated in the World Soil Health Day organized at KVK Udupi on December 5, 2017

Dr. D.V. Srinivasa Reddy, Principal Scientist (Agronomy)

As resource person for the Technology orientation training to Plant Protection SMSs of KVKs of Karnataka at ICAR-NBAI, Bengaluru on 5-2-2018.

As resource person for the KVK Staff Orientation training at KVK Gadag, Karnataka for KVKs of Northern Karnataka and Kerala during 10-12th August 2017.

Attended as resource person for the KVK Staff Orientation training at KVK Mysuru, Karnataka for the Southern Karnataka KVKs during 17-19th August 2017.

NICRA-Work Plan finalization Workshop at ICAR-CRIDA, Hyderabad on 18th May 2017.

Action plan workshop 2018-19 for the KVKs of Zone-XI at KVK Gonikkoppal, Karnataka during 22-24th March 2018.

Attended as chief guest the International Symposium on orchids, strawberry, minor fruits and flowers, at KAU, Regional Agricultural Research Station, Ambalavayal, Wayanad, Kerala during 12-16 Jan 2018.

Annual Review meeting for KVKs of Zone-VIII (Old) at CCARI, Goa during 4-6th May 2017.

NICRA review cum Action plan meeting for the KVKs of Zone-XI at ATARI, Bengaluru on 29-7-2017.

Review meeting for the KVKs of Kerala at KAU, Thrissur on 4-8-2017.

Seed Hub review meeting for the KVKs of Zone-XI at Mangala Raitha Bhavan, UAS, Hebbal, Bengaluru on 15-09-2017.

Review meeting of IFS project implementation by the KVKs under Karnataka Agriculture Price Commission project at the office of the Karnataka Agricultural Price Commission, Bengaluru on 20-09-2017.

IMC meeting of ICAR-Directorate of Cashew Research, Puttur as an ICAR nominee member of IMC on 25-09-2017.

Administrative review meeting for the KVKs of KAU along with Shri Kanhaiya Chaudhary Director (AE) ICAR, New Delhi at KAU, Thrissur on 24-11-2017.

World Soil Health Day celebration at KVK Mandya on 5-12-2017.

Pre-action plan meeting for the year 2018-19 for the KVKs of Kerala state at KAU, Thrissur on 1-3rd March 2018.

Sujala-3 watershed meeting convened by the Project Director, KWDP-II at the office of the Commissioner, Watershed Development Department, Govt. of Karnataka on 6-03-2018.

National KVK Conference 2018 at IARI, New Delhi and Krishi Unnati Mela during 16-18th March 2018.

ICAR-CGIAR interaction workshop on the NICRA project chaired by DG, ICAR at NASC, New Delhi on 20-03-2018.

Meeting of handing over and taking over of charge of Tamil Nadu KVKs at TNAU, Coimbatore on 4-7-2017.

Dr. B.T. Rayudu, Principal Scientist (Agricultural Extension)

Meeting on Progress of Cluster FLDs on Pulses organized by Division of Agricultural Extension, ICAR, New Delhi at Krishi Bhavan, New Delhi on 22 May, 2017.

Review-cum-Planning Meeting on seed hubs and Cluster FLDs (pulses) Organized by DAC & FW, Government of India, New Delhi at IIPR, Kanpur during 07-08 November, 2017.

National Conference of KVKs organized by Division of Agricultural Extension, ICAR, New Delhi at IARI Campus, New Delhi during 16-17 March, 2018.

Dr. Thimmappa K., Senior Scientist (Agricultural Economics)

Organized one day orientation training programme as Co-ordinator for Home Science Subject Matter Specialists of KVKs on 09.02.2018 at KVK Tumkur, Hiehalli.

Organized one day orientation training programme as Co-ordinator for Plant Protection Subject Matter Specialists of KVKs to empower KVK scientists on latest technologies on 05.02.2018 at NBAIR Conference hall, Hebbal campus.

Assisted as HRD Nodal Officer to organize three day orientation training programme for newly recruited staff of KVKs on 10-12th August 2017 held at KVK Gadag.

Assisted as HRD Nodal Officer to organize a group discussion on farmers organization held on 25th July 2017 in Bengaluru.

Organized a workshop on 'Development of short video films on successful technologies' to 13 KVK officers on 01.12.2017 at ATARI, Zone XI, Bengaluru.

Organized Farmer First Project review meeting on 13.02.2018 at ATARI, Zone XI, Bengaluru.

Organized ATARI Directors meeting under the Chairmanship of DDG (AE) on 08.07.2017 at ATARI, Zone XI, Bengaluru.

Organized a meeting to discuss DFI Strategies with UAS Bengaluru DE, DR and HOD's on 23.10.2017. Participated in Annual Workshop of KVKs of Zone VIII held at ICAR-CCARI, Goa during 02/05/2017 to 07/05/2017.

Participated in Annual Review Workshop of Farmer FIRST Programme held at ICAR-IARI, New Delhi during 21/02/2018 to 22/02/2018.

Participated in workshop on development of short video films on successful technologies held at ICAR-ATARI, Zone XI and Bengaluru on 01 December, 2017.

Participated in Write-up Workshop on Success stories and impact studies of KVKs held at ICAR-ATARI, Zone XI and Bengaluru on 17 June, 2017.

Participated in Vigilance Review Meeting at National Institute of Animal Nutrition and Physiology, Bengaluru on 24/08/2017.

Participated in Doubling Farmers Income Meeting at UAS, Bengaluru on 23 October, 2017.

Participated in PPV&FRA Meeting Professor at Jayashankar Telangana State Agricultural University, Hyderabad on 22 January, 2018.

Participated in Farmer FIRST Project Review Meeting at ICAR-ATARI, Zone XI, Bengaluru on 13 February, 2018.

Participated in Sankalp se Siddhi programme at KVK Uttara Kannada, Sirsi on 29 August, 2017.

Participated in Sankalp se Siddhi Programme at KVK Haveri, Hanumanamatti on 4 September, 2017.



PERSONNEL

Existing staff position of the Agricultural Technology Application Research Institute, Zone XI, Bengaluru as on March 31st, 2018 is presented below

Research Management Position	Dr. M.J. Chandre Gowda	Director (Acting)
Scientific	Dr. D.V. Srinivasa Reddy	Principal Scientist (Agronomy)
	Dr. B.T. Rayudu	Principal Scientist (Agricultural Extension)
	Dr. Thimmappa K	Senior Scientist (Agricultural Economics)
	Dr. D.V. Kolekar	Scientist (Agricultural Extension)
Technical	Dr. Mallikarjun B.Hanji	Chief Technical Officer (Computer)
	Shri. Hemanth Kumar	Driver
	Shri B.N. Ramachandrappa	Assistant. Finance & Accounts Officer
Administrative	Shri. J. Mathew	Assistant Administrative Officer
	Shri. J. Prabu Kumar	Assistant
	Mrs. Ramola Pinto	Junior Stenographer
	Shri. N. Vinod Kumar	LDC
	Ms. K. Roopakala	LDC
	Shri. Chennakeshava	SSS (Gr.II)



हर कदम, हर डगर
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ICAR-Agricultural Technology Application Research Institute
Zone XI, Hebbal, Bengaluru- 560 024