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**2016-17**



कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान  
भारतीय कृषि अनुसंधान परिषद  
बैंगलूरु - 560024

ICAR-Agricultural Technology Application Research Institute  
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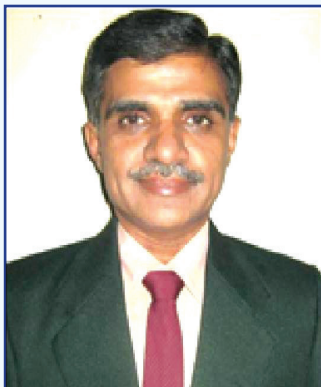
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## Preface

Krishi Vigyan Kendras (KVKs), the district level institutions established for providing Front line Extension Services to the farming community have been attaining more prominence by the day. These institutions are increasingly being recognized by the Government as well as other institutions in agriculture and rural development as the most potent connect to the last mile. The eighty-two KVKs functioning under ATARI, Bengaluru continued to offer their service to the farmers during the year adding several programmes to their ongoing activities. During the year under report, the KVKs implemented approved action plan by conducting 1143 on-farm trials, 15966 frontline demonstrations and 5500 capacity building activities. Besides, the KVKs of the Zone produced over 60 t of seeds, planting material numbering over 50 lakh, and about 3 lakh livestock strains and fish fingerlings to spread new varieties of crops and breeds of animals and fish rapidly among the farming community. The KVKs actively participated in nationally important programmes like Swachha Bharat Mission, Pradhan Mantri Fasal Beema Yojana (PMFBY), Digital India Programme, Pulse and Oilseed Production Mission, ARYA and other programs. Apart from these, select KVKs of the Zone are contributing to the Skill India Mission by conducting skill based training programmes in the field of agriculture and allied sectors. The initiative of organizing a symposium to provide a platform to Subject Matter Specialists of KVKs continued this year too.

The focus of KVKs work during the year ranged from varietal evaluation and cropping systems to integrated management of nutrients, pests, diseases and weeds. A major achievement of the KVKs during the year was their significant contribution to the Pulse Production Mission of the nation. KVKs took part in this national mission on a large scale and laid out demonstrations of pulses to show the productive potential through better management. The initiative of establishing Pulse Seed Hubs is also progressing at a fast pace in the Zone. KVK, Malappuram in Kerala bagged two awards during the year for its performance. Besides, several farmers mentored by KVKs of the Zone bagged State and National Awards during the year under report. ATARI, Bengaluru has also stepped up its efforts towards bringing out publications and publishing papers in peer reviewed journals. The year under report was particularly productive in terms of publications.

I am happy to present the Annual Report 2016-17 that summarizes a wide range of activities undertaken by the KVKs of the Zone. It also presents a glimpse of the significant role played by KVKs in agricultural development at the district level.

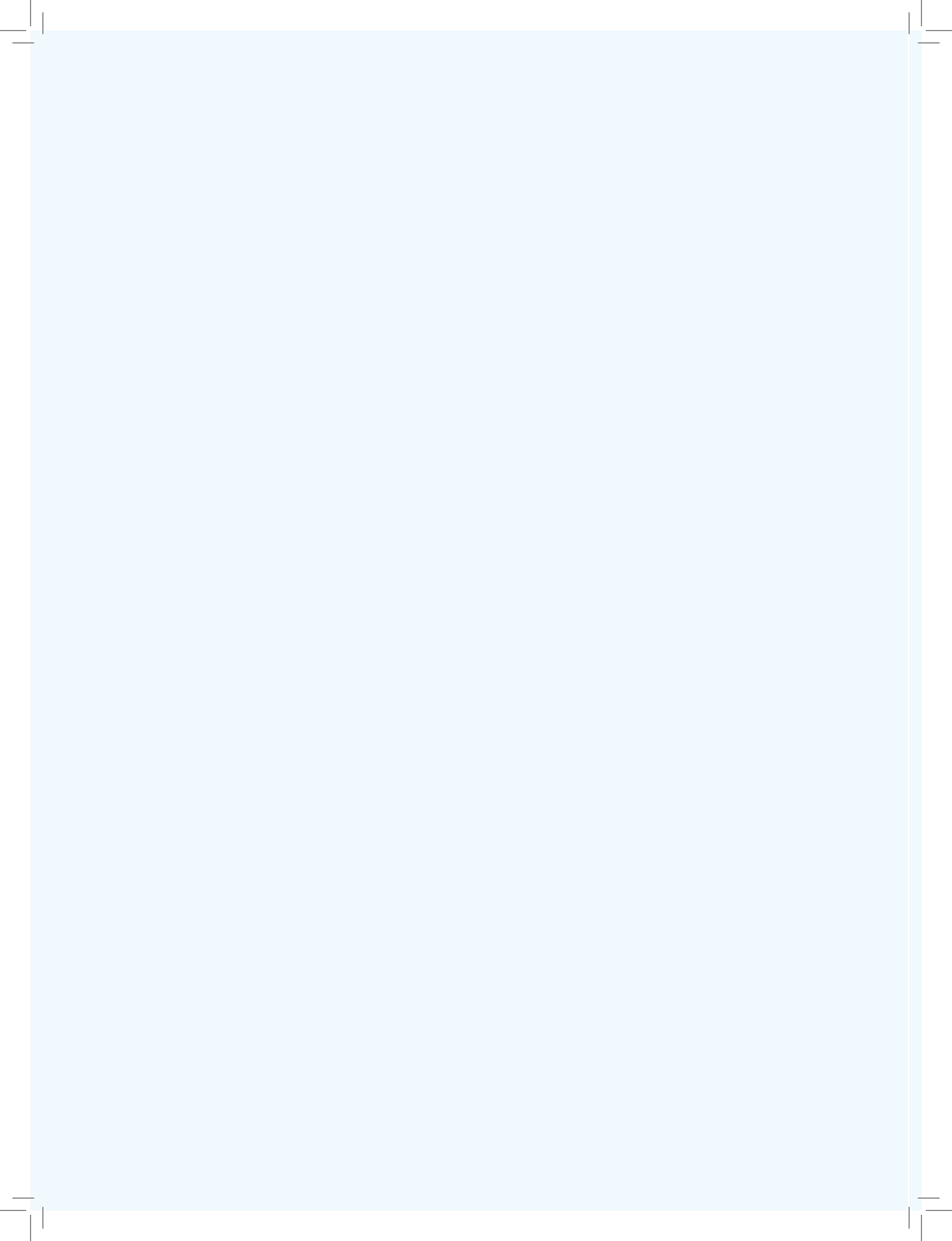
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**(Sreenath Dixit)**

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## कार्यकारी सारांश

भारतीय कृषि अनुसंधान परिषद (ICR) ने विभिन्न मेजबान संगठनों जैसे आई.सी.ए.आर. संस्थानों, राज्य कृषि विश्वविद्यालयों (SUs), गैर-सरकारी संगठनों (NGOs), डीम्ड यूनिवर्सिटी (DUs) एवं और राज्य कृषि विभाग (SDs) के तहत, जिला स्तर पर कृषि विज्ञान केंद्रों (KVKs) का नेटवर्क स्थापित किया है। दिनांक 31 मार्च 2017 तक, देश में 665 कृषि विज्ञान केंद्र (KVKs) स्थापित किए गए, जिनमें से 82 (KVKs) जोन VIII में हैं। कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान (एटीआरआई), कर्नाटक के (32), तमिलनाडु के (30), केरल के (14), पुदुचेरी के (3), गोवा के (2), लक्ष्यद्वीप का (1) (KVKs) के तकनीकी हस्तक्षेप और फ्रंटलाइन विस्तार कार्यक्रमों का समन्वय, उनकी योजना, मॉनिटरिंग और मूल्यांकन करता है। प्रौद्योगिकियों के आकलन, शोधन और प्रदर्शन इन्हीं (KVKs) द्वारा किए जाते हैं, जिनमें एस.ए.यू. और आई.सी.ए.आर. संस्थानों से तकनीकी बैकस्टॉप के साथ किसानों और अन्य हितधारकों के साथ साझेदारी की जाती है। इन (KVKs) द्वारा, अपने हितधारकों के लिए आवश्यक-आधारित क्षमता विकास कार्यक्रमों का आयोजन किया गया और उचित अग्रिम-प्रसार विस्तार कार्यक्रमों के माध्यम से बेहतर कृषि प्रौद्योगिकियों के बारे में जागरूकता पैदा की गई। प्रौद्योगिकियों की प्रारंभिक गति को सुविधाजनक बनाने के लिए गुणवत्ता वाले बीज, रोपण सामग्री, पशुधन नस्लों, पशु उत्पादों और जैव-उत्पादों का उत्पादन और आपूर्ति की गई। इस प्रकार से, ये (KVKs), जिले की कृषि अर्थव्यवस्था में सुधार लाने के लिए सार्वजनिक, निजी और स्वैच्छिक क्षेत्रों की पहल का समर्थन करने के लिए कृषि प्रौद्योगिकी के ज्ञान और संसाधन केंद्रों के रूप में सेवा प्रदान कर रहे हैं। प्रस्तुत वर्ष के दौरान, पूर्व खरीफ और प्री-रबी कैम्पिंग, मिट्टी का परीक्षण और मिट्टी-स्वास्थ्य कार्ड वितरण, तिलहनों और दालों के क्लस्टर प्रदर्शन जैसे विशेष पहल, इन्हीं केवीके (KVKs) द्वारा किए गए। किसान प्रथम और मेरा गाव, मेरा गौरव(एमजीएमजी) आईसीएआर संस्थानों और राज्य कृषि संबंधी विश्वविद्यालयों के माध्यम से शुरू किया गया। प्रधानमंत्री जागरूकता सृजन फसल बीमा योजना भी, इन्हीं (KVKs) द्वारा शुरू की गई। प्रस्तुत वर्ष (2016-17) के दौरान मुख्य उपलब्धियों का सारांश निम्नानुसार है:

### 1. तकनीकी मूल्यांकन और परिशोधन

- कुल 247 तकनीकों का केवीके (KVKs) द्वारा, 1357 ऑफिस के माध्यम से 255 स्थानों पर मूल्यांकन किया गया। इनमें से 90.3% प्रौद्योगिकियां फसलों से सम्बन्धित थीं

और शेष पशुओं, मुर्गीपालन, मत्स्य पालन और अन्य के तहत थीं।

- फसलों के तहत, कुल 223 तकनीकों का मूल्यांकन किया गया, जिसमें फसल प्रणालियां (17), कठिन परिश्रम की कमी (02); कृषि मशीनरी (08); एकीकृत फसल प्रबंधन (26); एकीकृत रोग प्रबंधन (26), एकीकृत पोषक प्रबंधन (15), एकीकृत कीट प्रबंधन (29), एकीकृत कीट और रोग प्रबंधन (02), एकीकृत घास प्रबंधन (04); प्रसंस्करण और मूल्य अतिरिक्त (06), संसाधन संरक्षण प्रौद्योगिकियों (01), बीज और रोपण सामग्री उत्पादन (01); भंडारण तकनीक (01), और विविधता मूल्यांकन (85), सम्मिलित हैं।
- पशुधन और मत्स्य टेक्नोलॉजीज के तहत, केवीके (KVKs) केंद्रों द्वारा बीमारी प्रबंधन (05) सहित चार विषयगत क्षेत्रों पर, तकनीकों का मूल्यांकन (24), नस्लों का मूल्यांकन (10), फीड प्रबंधन (07) और उत्पादन और प्रबंधन (02), का मूल्यांकन किया गया।
- चने की किस्म जेजी 14 से दो स्थानों (बेलगाम 1 और चिकम गलूरु) में 23.0 क्विंटल / हेक्टेयर की उच्चतम उपज 21.25 क्वि / हेक्टेयर, पैदावार दर्ज की गई। सूखा की स्थिति के तहत, हसन में, चने की किस्म जीबीएम 2 द्वारा 14.0 क्वि / हेक्टेयर की पैदावार दर्ज की गई। बेल्लारी में, विल्ट बीमार प्लॉट्स के तहत, बीजीडी -103 ने नंदीला सेनगा -1 (13.5 क्विंटल / हेक्टेयर) और जाकी 9218 (15.4 क्वि / हेक्टेयर) की तुलना में 17.5 क्वि / हेक्टेयर की उच्च पैदावार प्राप्त दर्ज की गई।
- बाघकोट जिले में, बीएसएमआर 736 द्वारा कबूतर की किस्मों में उच्चतम उपज (22.1 क्वि / हेक्टेयर) दर्ज की गई। बीजापुर जिले में, बीजीआर 811 द्वारा, उपज 17.3 क्वि / हेक्टेयर के साथ विल्ट और एसएमडी सहिष्णुता के लिए परीक्षण किए जाने पर उच्चतम उपज प्राप्त हुई।
- परीक्षण की गई जबरदस्त किस्मों में, एसपीवी 2217 द्वारा, सामान्य क्षेत्र की स्थिति में अधिक उपज (धारवाड़ में : 18.642 / हेक्टेयर) प्राप्त हुई और साथ ही रेत गीली घास की स्थिति (गड़ग में : 16.06 क्वि / हेक्टेयर) के तहत अधिक उपज दर्ज की गई।

- धान में, टीआरए -3 में त्रिची में (69.6 किं / हेक्टर) बेहतर प्रदर्शन किया गया, गंगावती सोना तिरुवल्लूर में बेहतर पाया गया। (55.1 किं / हेक्टेयर) और सीएसआर -43 शिवगंगाई जिले में बेहतर पायी गई। (45.0 किं / हेक्टेयर)। लघु अवधि सह -51 ने पुडुकोट्टई जिले में 63.8 किं / हेक्टेयर में उच्च उपज दर्ज की गई। परीक्षण किए गए संकरों में, केआरएच -4 (61.96 किंटल / हेक्टेयर) सीओआरएच -4 (61.4 किं / हेक्टर) के साथ गुणवत्ता में बेहतर पाए गए।
- मूंगफली के मामले में, सूखे की सहिष्णुता मुख्य मानदंड थी, जिसमें सबसे ज्यादा उपज सीओ -7 (24.96 किं / हेक्टेयर) की उपज दर्ज की गई; उसके बाद विल्लुपुरम जिले में, के -6 (24.04 किं / हेक्टेयर) पायी गई। शिवगंगाई में, बीमार सहिष्णुता के लिए किस्मों का परीक्षण किया गया जिसमें जी -2-52 में 20.92 किं/ हेक्टेयर) की उपज दर्ज की गई।
- उंगली बाजरा की किस्मों में, एमएल -365 ने विल्लुपुरम को छोड़कर सभी स्थानों पर उच्च उपज पायी गई। शिवगंगाई जिले में 31.36 किंटल / हेक्टेयर की उच्च उपज दर्ज की गई।
- क्रॉसब्रेड टेलिकेरी और बोअर नस्लों के आकलन से पता चला है कि बेहतर नस्लों के साथ कृत्रिम गर्भाधान का उपयोग बच्चों, जुड़वा-पशुओ और त्रयी प्रतिशत के जन्म के वजन में वृद्धि और गैर-वर्णनात्मक बकरियों से बच्चों का वजन बढ़ाने के लिए किया जा सकता है। इसके अलावा, प्रजनन के उद्देश्य से, हिरन बनाए रखने की लागत में सुधार नस्लों के साथ कृत्रिम गर्भाधान द्वारा लाया जा सकता है।
- कर्नाटक के बेल्लारी और कोप्पल जिलों में, डेयरी मवेशियों में रमनल एसिडोसिस मैनेजमेंट का परीक्षण किया गया, जहां पर, रमनल बफर 200 ग्राम रोज 4 दिनों के लिए उपयुक्त पाया - आवश्यक खनिजों के साथ गढ़वाल प्रोबायोटिक्स तटस्थता, रमनल पीएच को सुधारने का सबसे अच्छा विकल्प पाया गया।
- स्थानीय उत्पादों की तुलना में, मुर्गियां बेहतर नस्लों का प्रदर्शन कर रही है, लेकिन नस्ल नमकल चिकन-1 और नस्ल नंदनाम -4 के ऊपर, श्रीनिधि नस्ल के अतिरिक्त लाभ हैं।

## 2. फ्रंटलाइन प्रदर्शन

- एनएफएसएम और एनएमओओपी के तहत कृषि सहयोग और किसान कल्याण विभाग द्वारा प्रायोजित कार्यक्रमों के

तहत, कर्नाटक और तमिलनाडु के चयनित जिलों में, कुल 15730 फ्रंटलाइन प्रदर्शनों का आयोजन किया गया, जिनमें से अनाज एवं बाजरा पर 1522; तिलहनों पर 575; दाल पर 1125; वाणिज्यिक फसलों पर 83; चारा फसलों पर 358; सब्जी फसलों पर 1149; कंद फसलों पर 115; फल फसलों पर 710; फूल फसलों पर 145, मसाला फसलों पर 405: वृक्षारोपण फसलों पर 158 फ्रंटलाइन प्रदर्शन सम्मिलित हैं। इनके अलावा, कुल 7,562 क्लस्टर प्रदर्शनों का आयोजन किया गया, जिनमें से, दालों पर 3751 और तिलहन पर 3353 क्लस्टर प्रदर्शन सम्मिलित हैं।

- धान में, कर्नाटक, तमिलनाडु और केरल राज्यों में सामने वाले प्रदर्शनों में, 12.0 किं / हेक्टेयर से 56.43 किं / हेक्टेयर की तुलना में, 20.0 किंटल / हेक्टेयर से 67.6 किंटल / हेक्टेयर तक औसत उपज पायी गई। मक्का में, कर्नाटक और तमिलनाडु में, फ्रंटलाइन प्रौद्योगिकी प्रदर्शनों के तहत, 35.1 किं / हेक्टेयर से 59.38 किं / हेक्टेयर तक उपज की तुलना में, 43.88 किंटल / हेक्टेयर से 76.43 किंटल / हेक्टेयर तक की उपज अपने संबंधित-चेक के अनुसार पायी गई। कर्नाटक में कंट्रोल के अनुसार, बाजरा के तहत, उंगली बाजरा, फॉक्सलेट बाजरा और छोटे बाजरा में क्रमशः 23.2%, 26.2% और 40.5% वृद्धि हुई; जबकि तमिलनाडु राज्य में कंट्रोल के अनुसार, बाजरा के तहत, कोदो बाजरा, पर्ल बाजरा और बार्नयार्ड बाजरा में क्रमशः 31.6%, 32.93% और 25.63% तक की उपज में वृद्धि पायी गई।
- केवीके (KVKs) द्वारा आयोजित किए गए विभिन्न फसलों में संकरों पर कुल 912 प्रदर्शन किए गए, जिनमें से, कर्नाटक में (534), तमिलनाडु में (335) और केरल में (43), जोकि 282.86 हेक्टेयर क्षेत्र में, धान, मक्का, ज्वार, सेसमम, सूरजमुखी, अरंडी कपास, मिर्च, बैंगन, भेंडी, बैंगन, गोभी, फूलगोभी, टमाटर, बोतल लौकी, प्याज, टमाटर, तरबूज, कंद और रेशम उत्पादन प्रदर्शन किए गए। कर्नाटक में, धान में, केआरएच -4 संकर किस्मों पर किए गए प्रदर्शनों में, 10.0% तक की अधिक उपज दर्ज की गई। मक्का संकर में, ज्यादातर प्राइवेट मक्का संकर प्रदर्शित किए गए थे। तमिलनाडु में, आरसीएच2बीएस11, को(एचएम)6, वाईआरसीएच1 जैसे संकर, अपने चेक किस्मों से बेहतर प्रदर्शन करते हुए पाए गए।
- तमिलनाडु में किए गए सब्जी संकरों के प्रदर्शनों में, संकरों जैसे उ(इह)4 को भेंडी में, पल्ली- इन-बिडर गार्ड में, मिर्च



में खपर्वील-13, डपरज़श र्त्रीरिव में पोलो-एफ, टमाटर में अरका रक्षक और शिवम, के किए गए विभिन्न परीक्षण में बेहतर उपज एवं उनकी स्थानीय चेक किस्मों की तुलना में बेहतर रिटर्न पायी गई। कर्नाटक में, धनिया संकर अर्का-ईशा, भेंडी संकर अभय, टमाटर-हाईब्रिड-अर्का-रक्षक किस्मों द्वारा बेहतर उपज प्रदर्शन पाया गया और किसानों को बेहतर आर्थिक लाभ दिलाया गया।

### 3. क्षमता विकास

- रिपोर्टाधीन अवधि के दौरान, 203529 व्यक्तियों के लिए, 5549 प्रशिक्षण पाठ्यक्रम आयोजित किए गए, जिनमें से अधिकांश (4979 पाठ्यक्रम) जोकि किसानों / किसान-महिलाओं से सम्बन्धित थे, मे 156493 किसानों / किसानों को प्रशिक्षित किया गया।
- फार्मर्स एवं फार्मर्स-महिलाओं के लिए, प्रशिक्षण का प्रमुख क्षेत्र, फसल उत्पादन रखा गया जिसमें 43113 किसानों / किसान-महिलाओं के लिए 1141 पाठ्यक्रम आयोजित किए गए, जिनमें से, पौध संरक्षण के (719) और गृहविज्ञान के (622) प्रशिक्षण पाठ्यक्रम आयोजित किए गए। इनके अलावा, इसके बाद के, सबसे अधिक मांग वाले अगले पाठ्यक्रम थे - बागवानी के (63 पाठ्यक्रम)।
- ग्रामीण युवाओं के लिए, प्रशिक्षण का प्रमुख क्षेत्र था - मशरूम का उत्पादन, जिसपर कुल आयोजित किए गए 102 पाठ्यक्रमों में (3023 प्रतिभागियों) द्वारा प्रतिभागिता सुनिश्चित की गई। इनके अलावा, मूल्य वृद्धि पर 70 पाठ्यक्रम (2382 प्रतिभागियों), डेयरींग पर 46 पाठ्यक्रम (1838 प्रतिभागियों) और एकीकृत खेती पर 41 पाठ्यक्रम (1740 प्रतिभागियों) द्वारा प्रतिभागिता सुनिश्चित की गई।
- विस्तार कार्यकर्ताओं के लिए कुल 319 पाठ्यक्रम आयोजित किए गए, जिनमें कुल मिलाकर 11604 कर्मियों द्वारा प्रतिभागिता सुनिश्चित की गई। क्षेत्रीय फसलों में उत्पादकता में वृद्धि नामक प्रमुख क्षेत्र में 94 पाठ्यक्रमों में, 3714 प्रतिभागियों द्वारा प्रतिभागिता सुनिश्चित की गई। सक्षम खेती प्रौद्योगिकी नामक विषय, अगला प्रमुख प्रशिक्षण-क्षेत्र बनाया गया जिसमें 29 पाठ्यक्रम चलाए गए और 873 प्रतिभागियों द्वारा प्रतिभागिता सुनिश्चित की गई।
- 12133 प्रतिभागियों के लाभ के लिए विभिन्न क्षेत्रों में एक बड़ी संख्या में, केवीके द्वारा कुल 263 प्रायोजित प्रशिक्षण कार्यक्रम आयोजित किए गए। फसलों की बढ़ती

उत्पादन और उत्पादकता पर कुल मिलाकर (92) प्रशिक्षण पाठ्यक्रमों का आयोजन किया गया। इसके अलावा, 501 9 उभरते उद्यमियों को शामिल करते हुए वर्ष के दौरान 188 व्यावसायिक प्रशिक्षण पाठ्यक्रम आयोजित किए गए। 38 पाठ्यक्रमों के 763 प्रतिभागियों के लिए प्रशिक्षण का प्रमुख क्षेत्र था : ग्रामीण शिल्प प्रशिक्षण। इसके अलावा, प्रशिक्षण के अन्य प्रमुख क्षेत्र थे मूल्याधारित 32 पाठ्यक्रम ( जिनमें 845 प्रतिभागियों ने भाग लिया) और एकीकृत फसल प्रबंधन सम्बन्धित 21 पाठ्यक्रम (जिनमें 669 प्रतिभागियों ने भाग लिया) सम्मिलित थे।

### 4. फ्रंटलाइन विस्तार कार्यक्रम

- केवीके (KVKs) द्वारा कुल 0.99 लाख विस्तार कार्यक्रमों का आयोजन किया और 17.44 लाख किसानों और 1.10 लाख विस्तार कर्मियों और जनता के बीच कृषि के विभिन्न पहलुओं पर जागरूकता पैदा की गई, जिनमें विविधतापूर्ण प्रदर्शन, उत्पादन प्रौद्योगिकियों, एकीकृत कीट और रोग प्रबंधन, पशु स्वास्थ्य और पोषण, पोल्ट्री, मत्स्य पालन और मानव पोषण की उत्पादन तकनीक जैसे संबंधित विविध क्षेत्रों को शामिल किया गया। इसके अलावा, केवीके (KVKs) द्वारा विस्तारित साहित्य के (30338) के बाद अखबार कवरेज (2174), लोकप्रिय लेख (741), रेडियो कवरेज और वार्ता (616), और टी वी कवरेज और वार्ता (296) प्रकाशित की गई।

### 5. तकनीकी इनपुट का उत्पादन

- केवीके (KVKs) द्वारा विभिन्न फसलों के विभिन्न प्रकारों के 601.11 टन बीजों का उत्पादन और आपूर्ति की गई। विभिन्न फसलों और संकरों की 50.04 लाख रोपण सामग्री, 2.78 लाख पशुधन उपभेदों, मछली फिंगरलिंम्स और अन्य जैव उत्पादों को 5.15 लाख किसानों को लाभ पहुंचाया गया
- केवीके (KVKs) द्वारा 443.87 टन जैव-उत्पादों का उत्पादन और आपूर्ति की गई, जिसके माध्यम से करीब 1.52 लाख किसानों को जैव नियंत्रण को बढ़ावा देने के लिए प्रेरित किया गया ताकि रसायनों के उपयोग को कम किया जा सके।

### 6. मृदा जल और संयंत्र परीक्षण विश्लेषण

- क्षेत्र में किसानों को विश्लेषणात्मक सेवाएं प्रदान करने के लिए 70 केवीके में मृदा, पानी और पौधे परीक्षण प्रयोगशालाएं

स्थापित की गई हैं। वर्ष के दौरान, 32529 गांवों से संबंधित 64,228 किसानों से कुल मिलाकर 80327 नमक, मिट्टी, पानी, पौधे, खाद और पत्ती के ऊतक का विश्लेषण किया गया जो कि रुपये की प्राप्ति के साथ किया गया था। 50.76 लाख 4744 किसानों को मृदा स्वास्थ्य कार्ड वितरित किए गए थे। राज्यवार आंकड़ों के अनुसार कर्नाटक में केवीके ने 58396 नमूनों का विश्लेषण किया, तमिलनाडु केवीके ने 13382 नमूनों का विश्लेषण किया, केरल केवीके ने 3475 नमूनों का विश्लेषण किया, गोवा केवीके ने 455 9 नमूने और पुडुचेरी 515 नमूने का विश्लेषण किया।

## 7. वर्षा जल संचयन इकाइयां

- ग्यारहवीं योजना तक केवीके (KVKs) द्वारा सूक्ष्म सिंचाई प्रणाली के साथ वर्षा जल संचयन इकाइयां स्थापित की गईं, जिनमें कुल 41 प्रशिक्षण पाठ्यक्रम और 28 प्रदर्शन आयोजित किए गए और 3128 रोपण सामग्री का उत्पादन किया गया। इसके अलावा, 3128 किसानों और 209 अधिकारियों द्वारा इन इकाइयों का दौरा किया गया, जिन्हें वर्षा जल संचयन तकनीक का परिचय कराया गया।

## 8. केवीके (KVKs) के अभिसरण और संबंध

- केवीके (KVKs) द्वारा, जॉन (Zone) के अधिकांश जिलों में कृषि प्रौद्योगिकी प्रबंधन एजेंसी (एटीएमए) के करीबी सहयोग में काम किया गया। वर्ष के दौरान केवीके (KVKs) द्वारा एटीएमए के 2278 कार्यक्रमों में भाग लिया और उसी समय केवीके ने एटीएमए के सहयोग से 509 कार्यक्रमों का आयोजन किया। एटीएमए के साथ संबंध का उपयोग करते हुए, 52 केवीके (KVKs) ने प्रशिक्षण कार्यक्रम आयोजित किए गए। 24 केवीके (KVKs) द्वारा प्रदर्शन किए गए और 16 केवीके (KVKs) प्रदर्शनियों का आयोजन किया गया। अभिसरण प्रयासों के रूप में 43 बैठकें आयोजित की गईं
- विभिन्न कार्यक्रमों और गतिविधियों को व्यवस्थित करने के लिए केवीके (KVKs) द्वारा बाह्य वित्त पोषण प्राप्त हुआ। राष्ट्रीय कृषि सुरक्षा योजना (आरकेवीवाई), राष्ट्रीय खाद्य सुरक्षा मिशन (एनएफएसएम), विभिन्न आईसीएआर संस्थानों की परियोजनाएं और कृषि और ग्रामीण विकास के लिए नेशनल बैंक (नाबाई) प्रमुख एजेंसियां थीं, जोकि केवीके(घतधी) गतिविधियों को वित्त पोषित / समर्थित करती थीं।

## 9. सफल मामलों की एक झलक

वर्ष के दौरान आईवीएफ मॉडल जैसे किसानों के प्रयासों से केवीके के प्रयासों में से फसल को शामिल किया गया था कर्नाटक के रामनगर जिले में पशुधन के साथ संगमरमर में उंगली बाजरा, कबूतर मटर, मधुमक्खी और सोयाबीन दायर किया, पुडुचेरी में मछली संस्कृति, कर्नाटक के तुमकुर जिले के अंतर्गत प्याज के बीज उत्पादन, केरल के केवीके कासारगोड के तहत समुदाय दृष्टिकोण के माध्यम से ब्रिनिड जैक फलों के प्रसंस्करण की असाधारण तकनीक तमिलनाडु राज्य के केवीके ईरोड के अंतर्गत एक महिला किसान द्वारा सफल उद्यम के रूप में राज्य के उच्च तकनीकी कूपरोज की खेती, तमिलनाडु राज्य के के.वि.के. अरियालुर के अधीन खेती की जाती है और जोन में टिकाऊ आधार पर उत्पादन और किसानों की आय बढ़ाने में सफल मामलों के रूप में उभरा है।

## 10. पुरस्कार और मान्यता

- कृषि विज्ञान केंद्र मालापुरम ने वर्ष 2015 के लिए जोन आठवीं के लिए आईसीएआर बेस्ट केवीके पुरस्कार जीता। यह पुरस्कार, 16 जुलाई 2016 को नई दिल्ली में आईसीएआर फाउंडेशन दिवस के अवसर पर पुरस्कार प्रदान किया गया।
- माननीय केन्द्रीय कृषि और किसान कल्याण मंत्री, भारत सरकार श्री राधा मोहन सिंह द्वारा, नेपश-11 के लिए, दिनांक 25 सितंबर, 2016 को आईसीएआर-इंडियन इंस्टीट्यूट ऑफ मसाले अनुसंधान, कोझीकोड में आयोजित पंडित दीन दयाल उपध्याय की जन्म शताब्दी समारोह के दौरान, आयुषीय कृषि पुरस्कार 2016 के साथ, केरल के कोझीकोड जिले के एक एका किसान श्री बाबुराज का सत्कार किया गया।
- कृषि और किसान कल्याण और संसदीय मामलों के राज्य मंत्री श्री एस एस आहलुवालिया द्वारा, दिनांक 16-07-2016 को नई दिल्ली में आयोजित 88 वें आईसीएआर फाउंडेशन दिवस के संबंध में दावणगेरे जिले के लिंगाधहल्ली, चन्दनगरी तालुक से संबंधित श्री जगन्नाथ राम अभिनव किसान पुरस्कार 2015 को श्री शंकर मूर्ती एस एन को प्रदान किया गया।

## 11. कृषि प्रौद्योगिकी सूचना केंद्र (एटीआईसी)

- रिपोर्टाधीन अवधि के दौरान, कुल 70355 किसान, 311 एक्सटेंशन कर्मियों और 1904 अन्य हितधारकों में से, 72570 लोगों द्वारा सूचना की जानकारी के लिए और

50555 लोगों द्वारा प्रौद्योगिकी उत्पादों की जानकारी के लिए कृषि प्रौद्योगिकी सूचना केंद्र (एटीआईसी) का दौरा किया गया।

- कुल मिलाकर 8953 किसानों द्वारा एटीआईसी से या एटीआईसी द्वारा संचार के विभिन्न माध्यमों से संपर्क स्थापित किया गया।
- प्रकाशनों के तहत, 6929 पुस्तकें, 2500 तकनीकी बुलेटिन, और 87 डीडी का उत्पादन किया गया और एटीआईसी आगंतुकों को प्रकाशित साहित्य उपलब्ध कराया गया।

## 12. विस्तार निदेशालयों द्वारा टेक्नोलोजी बैक-स्टॉपिंग

- विस्तार के निदेशकों और उनके अधिकारियों ने 22 वैज्ञानिक सलाहकार समिति की बैठकें, 42 फ़िल्ड दिन, 34 कार्यशालाओं / सेमिनारों और 30 प्रशिक्षण कार्यक्रमों में प्रतिभागिता सुनिश्चित की गई, जिसमें कैपस से जुड़े कार्यक्रम शामिल किए गए।

## 13. विशेष कार्यक्रमों का विवरण

- दालों में क्लस्टर के प्रदर्शन के तहत प्रमुख पल्स फसलों पर कुल 3751 प्रदर्शन कर्नाटक, तमिलनाडु, केरल और पुडुचेरी के केवीके द्वारा 1500.4 हेक्टेयर के क्षेत्र में किसानों के हित-रक्षणार्थ आयोजित किए गए।
- तिलहनों पर क्लस्टर प्रदर्शन के तहत, तिलहन की फसलों जैसे मूंगफली, सूरजमुखी, सोयाबीन और अलसी की कुल संख्या में 3458 प्रदर्शन कर्नाटक और तमिलनाडु के केवीके द्वारा 1383 हेक्टेयर फार्म क्षेत्र में आयोजित किए गए।
- एनआईसीआरए के अंतर्गत, कुल 2135.2 हेक्टेयर क्षेत्र का एनआरएम संबंधित हस्तक्षेप के साथ इलाज किया गया, जिसमें 1115 एनआईसीआरए गांवों में जलवायु रजिस्टर बनाने के लिए 2615 किसानों को शामिल किया गया। फसलों में, 3308 किसानों द्वारा 1184.92 हेक्टेयर क्षेत्र में जलवायु लचीला फसल प्रौद्योगिकियों का प्रदर्शन किया गया। वर्ष के दौरान कुक्कुट पक्षियों सहित लगभग 11486 पशुधन विभिन्न पशुधन हस्तक्षेपों के तहत, 433 प्रदर्शन इकाइयों के माध्यम से, विषय को प्रस्तुत किया गया है। कस्टम भर्ती के तहत, एनआईसीआरए गांवों के 833 किसानों द्वारा, समय पर बुवाई और अन्य सांस्कृतिक कार्यों के लिए 664.41 हेक्टेयर क्षेत्र की खेती के लिए 36 विभिन्न औजारों

का इस्तेमाल किया गया। इसके अलावा, परियोजना के तहत 4644 किसानों और विस्तार कर्मियों को शामिल सम्मिलित करके, 247 विस्तार गतिविधियों का आयोजन किया गया।

## मेरा गांव - मेरा गौरव (मेरा गांव - मेरा स्वाभिमान)

- आईसीएआर-अटारी, बेंगलूरू द्वारा वर्ष के दौरान, कर्नाटक, तमिलनाडु, केरल और गोवा राज्यों में 14 आईसीएआर संस्थानों में, मेरा गांव-मेरा गौरव की गतिविधियों का समन्वय किया गया और आईसीएआर संस्थानों की वैज्ञानिक टीम द्वारा 0.98 लाख कृषक और अन्य हितधारकों से जुड़े 0.15 लाख गतिविधियों के संगठन के साथ विभिन्न हस्तक्षेप किए गए।

## 14. ATARI की गतिविधियां

- संस्थान द्वारा 20-23 अप्रैल, 2016 के दौरान वायानाड में जोन आठ (Zone-VIII) के केवीके (KVKs) की वार्षिक क्षेत्रीय समीक्षा कार्यशाला का आयोजन किया गया।
- दूसरी केवीके (KVKs) संगोष्ठी -2017 खेती में उच्च उत्पादकता और लाभप्रदता को साकार करने के लिए सीमावर्ती विस्तार कार्यक्रमों को टीएनएयू, कोयंबटूर में 07-08 मार्च, 2017 के दौरान आयोजित किया गया।
- आईसीएआर के कृषि विस्तार के प्रभाग के समन्वय से, संस्थान द्वारा, NRM हैदराबाद द्वारा आयोजित फाउंडेशन प्रशिक्षण में दो कार्यक्रम समन्वयकों की भागीदारी में मदद की गई।
- विभिन्न कृषि विज्ञान केन्द्र (KVKs) के आईसीएआर-अटारी, जोन -8 के तहत आने वाले वैज्ञानिकों के लिए पार्टिसिपेटरी इंपैक्ट मॉनिटरिंग एसेसमेंट पर दिनांक 21 से 25 फरवरी, 2017 तक प्रशिक्षण कार्यक्रम आयोजित किया गया।
- आईसीएआर-एटीआरआई, बेंगलूरू और भारतीय कृषि कौशल परिषद, नई दिल्ली द्वारा संयुक्त रूप से, दिनांक 26-28 अक्टूबर, 2016 के दौरान, बेंगलूरू में कौशल विकास कार्यक्रम पर केवीके प्रशिक्षकों के अभिविन्यास का आयोजन किया गया।
- कुल 15 लेख / रिपोर्ट / पत्र सम्मेलनों में प्रकाशित / प्रस्तुत किए गए और केवीके (घतधी) द्वारा आयोजित 57 एस.ए.सी. बैठकें आयोजित की गईं।

## 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). As on March 31, 2017, 665 KVKs were established in the country, out of which 82 KVKs are in Zone VIII. The Agricultural Technology Application Research Institute (ATARI) coordinates, plans, monitors and evaluates the technological interventions and frontline extension programmes of 82 KVKs in Karnataka (32), Tamil Nadu (30), Kerala (14), Puducherry (3), Goa (2) and Lakshadweep (1). Assessment, refinement 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. KVKs organized need-based capacity development programmes for its stakeholders and created awareness about improved agricultural technologies through appropriate frontline extension programmes. Production and supply of quality seeds, planting material, livestock breeds, animal products and bio-products have been undertaken to facilitate initial uptake of technologies. Thus, KVKs are serving as knowledge and resource centres of agricultural technology to support the initiatives of public, private and voluntary sectors for improving agricultural economy of the district. During the year, special initiatives like pre-kharif and pre-rabi campaigns, soil testing and soil-health card distribution, cluster demonstration of oilseeds and pulses were taken up by the KVKs. Farmer FIRST and *Mera Gaon Mera Gaurav* (MGMG) were initiated through ICAR Institutes and State Agricultural Universities. Awareness creation on the Prime Ministers Fasal Bima Yojana was also initiated by the KVKs. Salient achievements during the year (2016-17) are summarized as follows:

### 1. Technology Assessment and Refinement

- A total of 247 technologies were assessed by KVKs through 1357 OFTs at 255 locations. Out of these 90.3% of technologies were under crops and remaining were under livestock, poultry, fisheries and others.
- Under crops, a total of 223 technologies were assessed, which included cropping systems (17), drudgery reduction (02); farm machinery (08); integrated crop management (26); integrated disease management (26), integrated nutrient management (15), integrated pest management (29), integrated pest and disease management (02), integrated weed management (04); processing and value addition (06), resource conservation technologies (01), seed and planting material production (01); storage technique (01), and varietal evaluation (85).
- Under Livestock and Fishery Technologies, KVKs assessed 24 technologies on four thematic areas including disease management (05); evaluation of breeds (10), feed management (07) and production and management (02).
- Chickpea variety JG 14 gave the highest yield of 23.0 q/ha followed by 21.25 q/ha by GBM 2 in two locations (Belgaum I and Chikkamagaluru). Under drought conditions, yield of 14.0 q/ha was recorded by GBM 2 at Hassan. BGD-103 gave high yield of 17.5 q/ha as compared to Nandyala Senaga -1 (13.5 q/ha) and JAKI 9218 (15.4 q/ha) at Ballari in wilt sick plots.
- Among the Pigeonpea varieties the highest yield (22.1 q/ha) was recorded by BSMR 736 in Bagalkot district. GRG 811 gave highest yield when tested for wilt and SMD tolerance with a yield 17.3 q/ha in Vijayapura district.

- Among the Sorghum varieties tested, SPV 2217 recorded higher yield in normal field conditions (18.642/ha at Dharwad) as well as under sand mulch conditions (16.06 q/ha at Gadag).
- In paddy, TRY-3 performed better in Trichy (69.6 q/ha), Gangavathi Sona was better (55.1 q/ha) in Tiruvallur and CSR-43 was better (45.0 q/ha) in Sivagangai. Short duration Co-51 gave higher yield of 63.8 q/ha at Pudukottai District. Among the hybrids tested, KRH-4 (61.96 q/ha) was on par with CoRH-4 (61.4 q/ha).
- In the case of groundnut, drought tolerance was the major criteria where highest yield was recorded by CO-7 (24.96 q/ha) followed by K-6 (24.04 q/ha) at Villupuram district. At Sivagangai, varieties were tested for disease tolerance wherein G-2-52 recorded 20.92 q/ha.
- Among the finger millet varieties, ML-365 gave higher yield in all the locations except at Villupuram. The highest yield of 31.36 q/ha was recorded in Sivagangai District.
- Assessment of crossbred Tellicherry and Boer breeds indicated that artificial insemination with improved breeds can be used to increase the birth weight of kids, twins and triplet percentage and weaning weight of kids from non-descriptive goats. Also, cost for maintaining the buck for breeding purpose can be saved by artificial insemination with improved breeds.
- Ruminant Acidosis management in dairy cattle was tested in Ballari and Koppal districts of Karnataka where ruminant buffer 200 g daily for 4 days + probiotics fortified with essential minerals was the best option for correction of ruminant pH to neutrality.
- Improved breeds of poultry are performing better as compared to local, but Srinidhi has additional advantages over Namakkal chicken- 1 and Nandanam-4 breeds.

## 2. Frontline Demonstrations

- A total of 15730 frontline demonstrations were conducted including 1522 on cereals and millets,

575 on oilseeds, 1125 on pulses, 83 on commercial crops, 358 on fodder crops, 1149 on vegetable crops, 115 on tuber crops, 710 on fruit crops, 145 on flowers, 405 on spice crops and 158 on plantation crops, besides, 3751 cluster demonstrations on pulses and 3353 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 Tamil Nadu.

- In paddy, the average yield ranged from 20.0 q/ha to 67.6 q/ha under frontline demonstrations in Karnataka, Tamil Nadu and Kerala states as compared to 12.0 q/ha to 56.43 q/ha in their respective check. In maize, the yield due to technologies demonstration was ranged from 43.88 q/ha to 76.43 q/ha under frontline demonstrations in Karnataka and Tamil Nadu states as compared to 35.1q/ha to 59.38 q/ha in their respective check. Under millets, 23.2%, 26.2% and 40.5% increased yield was recorded in finger millet, foxtail millet and little millet respectively over control in Karnataka and 31.6%, 32.93% and 25.63% increased yield in Kodo millet, Pearl millet and Barnyard millet respectively over check in the state of Tamil Nadu.
- 912 demonstrations on hybrids in various crops were conducted by the KVKs in the states of Karnataka (534), Tamil Nadu (335) and Kerala (38) covering 282.86 ha area in crops like paddy, maize, sorghum, sesamum, sunflower, castor, cotton, chilli, brinjal, bhendi, brinjal, cabbage, cauliflower, tomato, bottle gourd, onion, tomato, watermelon, tuberoses and sericulture. In paddy KRH-4 hybrid recorded 10.0 % higher yield over farmers' variety in Karnataka. In maize hybrids mostly private hybrids were demonstrated. In Tamil Nadu, hybrids such as RCH2BG11 in cotton, Co (HM) in maize, YRCH1 in castor, performed better than their check varieties.
- Among the vegetable hybrids demonstrated in Tamil Nadu, hybrids such as Co(Bh)4 in bhendi, Palli in bitter gourd, Indus13 in chilli, Polo F1 in

snake gourd, Arka Rakshak and Shivam in tomato tested under demonstrations gave better yield and economic returns as compared to their local check varieties. In Karnataka, coriander hybrid Arka Isha, bhendi hybrid Abhaya and tomato hybrids, Arka Samrat, Arka Rakshak have performed better than varieties and gave better economic returns to the farmers.

### 3. Capacity Development

- During the year under report, 5549 training courses were organized for 203529 persons. Majority of these (4279 courses) were for farmers/farm women category in which 156493 farmers/farm women were trained.
- For farmers and farmwomen, the major area of training was crop production in which 1141 courses were conducted involving 43113 farmers/farmwomen. Training courses on plant protection (709) and home science (622) were the next most demanded courses followed by horticulture (63 courses).
- For rural youth, mushroom production was the major training area with 102 courses (3023 participants) followed by 70 courses on value addition (70 courses, 2382 participants), Dairying (46 courses, 1838 participants) and integrated farming (41 courses, 1740 participants)
- For extension functionaries, a total of 319 courses were organized for 11604 personnel. Productivity enhancement in field crops was the major area with 94 courses and 3714 participants. Potential cultivation Technology was the next major training area with 29 courses and 873 participants.
- A total of 263 sponsored trainings were conducted by the KVKs in different areas for the benefit of 12133 participants. Large number of training courses (92) were organized on increasing production and productivity of crops. In addition, 188 vocational training courses were organized during the year involving 5019 budding entrepreneurs. Rural craft training was the major area of training with 38

courses and 763 participants. Value addition (32 courses, 845 participants) and Integrated crop management (21 courses, 669 participants) were the other major areas.

### 4. Frontline Extension Programmes

- KVKs organized a total of 0.99 lakh extension programmes and created awareness among 17.44 lakh farmers and 1.10 lakh 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 (30338) followed by newspaper coverage (2174), popular articles (741), radio coverage and talks (616), and T V coverage and talks (296).

### 5. Production of Technological Inputs

- KVKs produced and supplied 601.11 t of seeds of different crop varieties, 50.04 lakh planting materials of different crops and hybrids, 2.78 lakh of livestock strains, fish fingerlings and other bio products benefiting 5.15 lakh farmers.
- KVKs produced and supplied 443.89t of bio-products, through which nearly 1.52 lakh farmers were motivated to adopt bio-control by reducing use of chemicals.

### 6. Soil Water and Plant Testing Analysis

- Soil, water and plant testing laboratories have been established in 70 KVKs for providing analytical services to farmers in the zone. During the year, a total of 80327 samples of soil, water, plant, manure and leaf tissue received from 64228 farmers belonging to 32529 villages were analyzed with realization of Rs. 50.76 lakh. A total of 4744 Soil Health Cards were distributed to farmers. State-wise data showed that KVKs in Karnataka analyzed 58396 samples, Tamil Nadu KVKs analyzed 13382

samples, Kerala KVKs analyzed 3475 samples, Goa KVKs analyzed 4559 samples and Puducherry 515 samples.

### 7. Rain Water Harvesting Units

Using the rainwater harvesting units with micro irrigation system established in 16 KVKs till XI Plan, a total of 41 training courses and 28 demonstrations were conducted and 3128 planting materials were produced. Further, 3128 farmers and 209 officials visited these units and got acquainted with the rainwater harvesting techniques.

### 8. Convergence and Linkages of KVKs

- KVKs worked in close collaboration with Agriculture Technology Management Agency (ATMA) in most of the districts of the Zone. KVKs participated in 2278 programmes of ATMA during the year and at the same time KVKs organized 509 programmes in collaboration with ATMA. Using the linkage with ATMA, 52 KVKs conducted training programmes, 24 KVKs conducted demonstrations, and 16 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. Rashtriya 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.

### 9. Successful Cases: A Glimpse

Out of the efforts of KVKs during the year technologies such as IFS model involving crops viz. finger millet, pigeon pea, field bean and soyabean in association with livestock at Ramanagar district of Karnataka, composite fish culture at Puducherry, onion seed production

under Tumakuru district of Karnataka, indigenous technology of brined jack fruit processing through community approach under KVK Kasaragod of Kerala state, high tech tuberose cultivation under KVK Ariyalur of Tamil Nadu state and goat rearing as a successful enterprise by a women farmer under KVK Erode of Tamil Nadu state have emerged as successful cases in augmenting production and farmers income on a sustainable basis in the zone.

### 10. Awards and Recognition

- Krishi Vigyan Kendra Malappuram won the ICAR Best KVK award for Zone VIII for the year 2015. Award was presented on the occasion of ICAR Foundation Day on 16<sup>th</sup> July 2016 at New Delhi.
- Hon'ble Union Minister of Agriculture and Farmers Welfare, Government of India Shri Radha Mohan Singh felicitated Shri Baburaj, an aqua farmer of Kozhikode district of Kerala, with First Deen Dayal Upadhyaya Anthonthayy Krishi Puraskar 2016 for Zone XI during birth centenary celebration of Pandit Deen Dayal Upadhyaya held at ICAR-Indian Institute of Spices Research, Kozhikode on 25 September, 2016
- Honorable Minister of State for Agriculture and Farmers Welfare and Parliamentary Affairs Dr. S.S. Ahluwalia presented Jagjivan Ram Abhinav Kisan Puraskar 2015 to Shri Shankara Murthy S.N. belonging to Lingadhahalli, Channagiri Taluk of Davangere district on the occasion of 88th ICAR Foundation Day held on 16-07-2016 at New Delhi

### 11. Agricultural Technology Information Centres (ATICs)

- During the period under report, a total of 70355 farmers, 311 extension personnel and 1904 other stakeholders visited Agriculture Technology Information Centres (ATICs). Altogether, 72570 visited for information and 50555 visited for technology products.

- A total of 8953 farmers contacted ATICs or were contacted by ATICs through various means of communication.
- Under publications, 6929 Books, 2500 Technical bulletins, and 87 DVDs were produced and provided to the ATIC visitors.

## 12. Technology Backstopping by Directorates of Extension

- Directors of Extension and their officials participated in 22 Scientific Advisory Committee Meetings, 42 field days, 34 workshops/seminars and 30 training programmes including off campus programmes.

## 13. Special Programmes

- Under cluster demonstrations in pulses, a total 3353 demonstrations on major pulse crops were conducted by the KVKs of Karnataka, Tamil Nadu, Kerala and Puducherry in an area of 1500.4 ha of farmers' field.
- Under cluster demonstration on oilseeds, a total of 3458 demonstrations on oilseed crops such as groundnut, sunflower, soyabean, and linseed were conducted by the KVKs of Karnataka and Tamil Nadu in 1341 ha of farmers' field.
- Under NICRA, a total of 2135.2 ha area was treated with NRM related interventions covering 2615 farmers to build climate resilient in eleven NICRA villages. In the crops, 3308 farmers demonstrated climate resilient crop technologies in an area of 1184.92 ha. During the year about 11486 livestock including poultry birds have been covered under various livestock interventions through 433 demonstration units. Under custom hiring, 833 farmers of NICRA villages have used 36 various implements to cultivate 664.41 ha area for timely sowing and other cultural operations. In addition, 247 extension activities were carried out involving 4644 farmers and extension personnel under the project.

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

- The ICAR-ATARI Bengaluru has coordinated the activities of Mera Gaon – Mera Gaurav in 14 ICAR institutes in the states of Karnataka, Tamil Nadu, Kerala and Goa of the zone during the year. The scientists teams of these ICAR institutes have carried out various interventions with organization of 0.15 lakh activities involving 0.99 lakh farmers and other stake holders.

## 14. Activities at the ATARI

- The Institute organized Annual Zonal Review Workshop of KVKs of Zone VIII at KVK, Wayanad during 20-23 April, 2016.
- Second KVK Symposium-2017 on “Frontline Extension Programmes for Realizing Higher Productivity and Profitability in farming” was organized during 07-08 March, 2017 at TNAU, Coimbatore.
- Institute in coordination with the Division of Agricultural Extension, ICAR facilitated the participation of two Programme Coordinators in the Foundation Training conducted by NAARM Hyderabad.
- The training programme on “Participatory Impact Monitoring Assessment” for the scientists of the various Krishi Vigyan Kendra (KVKs) coming under ICAR ATARI, Zone-VIII was organized from 21<sup>st</sup> to 25<sup>th</sup> February 2017.
- The ICAR-ATARI, Bengaluru and Agriculture Skill Council of India, New Delhi jointly organized orientation of KVK trainers on Skill Development Programme from 26-28 October, 2016 in Bengaluru.
- A total of 15 articles/reports/papers were published/presented in conferences, and 57 SAC meetings organized by the KVKs.



# ABOUT ICAR AGRICULTURAL TECHNOLOGY APPLICATION RESEARCH INSTITUTE

## 1.1 ICAR - ATARI

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 to assess, refine and demonstrate technologies in agriculture and allied sectors. The Agricultural Extension Division headed by the Deputy Director General (Agricultural Extension) monitors and reviews the progress of

KVKs through eight ICAR-Agricultural Technology Application Research Institutes (ATARI) headed by Directors located across the country. The jurisdiction of ICAR-ATARI's is illustrated in Table 1. The mandate of ICAR-ATARI's is as follows

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

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

Zones	No. of States/ UTs	States/UTs
I	5	Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir and Punjab
II	4	A & N Islands, Bihar, Jharkhand and West Bengal
III	8	Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura
IV	2	Uttar Pradesh and Uttarakhand
V	2	Andhra Pradesh and Maharashtra
VI	2	Rajasthan and Gujarat
VII	3	Chhattisgarh, Madhya Pradesh and Odisha
VIII	6	Karnataka, Tamil Nadu, Kerala, Goa, Puducherry and Lakshadweep

## 1.2 ICAR-ATARI; ZONE-VIII, BENGALURU

### 1.2.1 Genesis

The Indian Council of Agricultural Research (ICAR) established eight Zonal Coordinating Units in September 1979 to monitor and coordinate the Lab to Land Programme (LLP) launched on the occasion of ICAR's Golden Jubilee celebrations (1979). To begin with, Zonal Coordinating Unit-Zone VIII functioned from its office at Tamil Nadu Agricultural University

(TNAU), Coimbatore. It was shifted to the campus of the Regional Station of National Dairy Research Institute (NDRI) at Adugodi, Bangalore in September, 1981. The jurisdiction of Zone VIII 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. Thus, 6 states/UTs Viz., Karnataka, Tamilnadu, Kerala, Goa, Puducherry and Lakshadweep come under this zone.

**1.2.2 Staff**

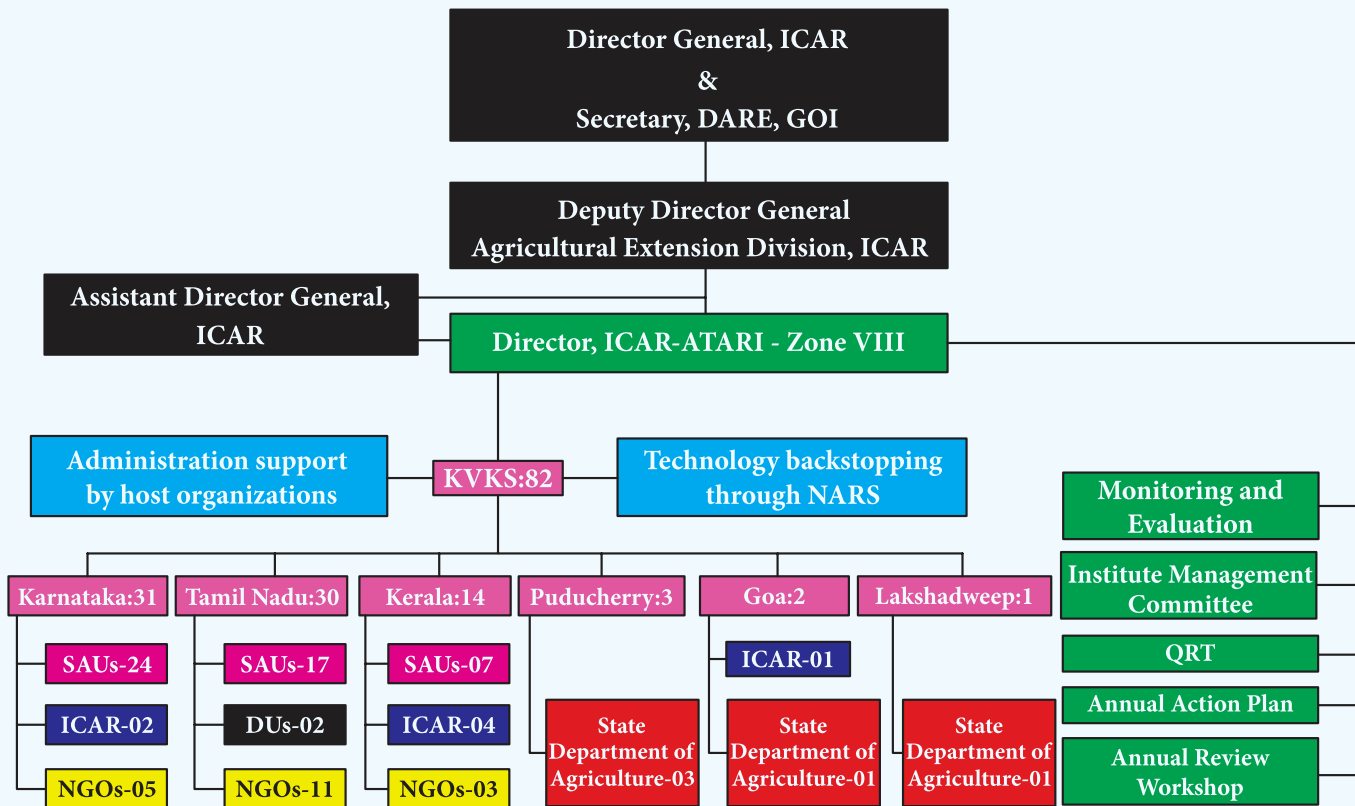
Total sanctioned staff strength of ICAR-ATARI-Zone VIII, Bengaluru is 18, out of which 15 are currently filled (Table 2).

**Table 2: Staff strength of ICAR-ATARI-Zone VIII, Bengaluru**

Category	Sanctioned	Filled
Director (RMP)	1	1
Scientific	6	5
Technical	2	2
Administrative	8	6
SSS (Gr-II)	1	1
<b>Total</b>	<b>18</b>	<b>15</b>

**1.2.3 Organizational Structure**

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



**Fig. 1 : Organogram – ICAR Agricultural Technology Application Research Institute, Zone VIII, Bengaluru**

**1.2.4 Major Activities**

The institute organized two major activities during the year and details are given below

**(a) Annual Zonal Review Workshop**

Annual Zonal Review Workshop of KVKs in Zone VIII was held at KVK, Wayanad during 20-23 April, 2016.

Invited dignitaries, experts, Directors of Extension of SAUs of Zone VIII, Programme Coordinators of KVKs, Scientists from ICAR-ATARI, Bengaluru and RARS, Wayanad and KVK staff attended the Workshop.

Dr. P.B.Pushpalatha, Director of Extension, Kerala Agricultural University, Thrissur welcomed

the dignitaries and participants. Dr. Sreenath Dixit, Director, ICAR-ATARI, Bengaluru briefed about the activities of KVKs in Zone VIII and action plan for the year ahead. Dr. A.K. Singh, Deputy Director General (Agril. Extn.), Agricultural Extension Division, ICAR, New Delhi inaugurated the Workshop. Dr. A.K. Singh, in his inaugural address, advised KVKs to showcase their potential in terms of magnitude of technology adoption by farmers, upscale technologies which have been tested across KVKs and agro-ecosystems, converge with line departments and network with private extension agencies like seed producers, document change in the cropping system of district and identify reasons for the change.



**DDG (AE) Dr. A.K.Singh inaugurating Annual Zonal Review Workshop**

A poster exhibition was organized in which each KVK presented a case study of a technology which was successfully disseminated during the last three years. Workshop was conducted with three concurrent sessions and KVKs from different states were allotted in each concurrent session. During the valedictory session, observations and suggestions made by the expert panel for improvement of KVKs were presented by the Chairman of each concurrent session. Certificate of appreciation was presented to 13 KVKs for their quality presentation.

### **(b) Second KVK Symposium - 2017 at Tamil Nadu Agricultural University, Coimbatore**

ICAR-ATARI, Bengaluru and Directorate of Extension Education, TNAU, Coimbatore jointly organized Second KVK Symposium (KVKSVM) 2017 on the theme of

“Frontline Extension Programmes for Realizing Higher Productivity and Profitability in farming” during 07-08 March, 2017 at TNAU, Coimbatore.



**Dr. K.Ramasamy, Vice Chancellor, TNAU inaugurating Second KVK Symposium**



**Dr. K.Ramasamy, Vice Chancellor, TNAU releasing CD on proceedings of first KVK Symposium**

Dr. K. Ramasamy, VC, TNAU, Coimbatore inaugurated the Symposium which was organized with sub-themes such as socio-economic aspects of technology dissemination, pest and disease management, crop production management, innovative technology delivery mechanisms, varietal evaluation and resource conservation technologies. A total of 24 oral presentations were made by Subject Matter Specialists (SMSs) of KVKs besides poster sessions. Scientists from ICAR-ATARI, Bengaluru, Directors of Extension of SAUs and about 100 SMSs of KVKs of the Zone participated in the Symposium. A CD on proceedings of first KVK Symposium held at Dharwad was released during the inaugural session.

**1.3 BUDGET**

A total of Rs. 8828 lakh was sanctioned for the year 2016-17 and 8827.72 lakh of the sanctioned budget was

incurred as expenditure. Head-wise details of budget and expenditure are furnished in Table 3.

**Table 3: Headwise budget and expenditure details of Zone VIII for 2016-17 (Rs. in Lakh)**

Heads	Sanction				Expenditure			
	ATARI	KVKs	Support to DEE at SAUs	Total	ATARI	KVKs	Support to DEE at SAUs	Total
<b>(A) Recurring</b>								
Pay & allowance	193.78	6656.22	0.00	6850.00	193.78	6656.22	0.00	6850.00
T.A	14.50	128.05	10.25	152.80	14.48	128.05	10.25	152.78
HRD	3.46	0.00	7.42	10.88	3.42	0.00	7.42	10.84
Contingencies	28.50	905.82	30.00	964.32	28.29	905.82	30.00	964.11
<b>Total</b>	<b>240.24</b>	<b>7690.09</b>	<b>47.67</b>	<b>7978.00</b>	<b>239.97</b>	<b>7690.09</b>	<b>47.67</b>	<b>7977.73</b>
<b>(B) Non Recurring</b>								
Works	4.00	161.63	0.00	165.63	3.99	161.63	0.00	165.62
Furniture & equipment	0.00	340.37	0.00	340.37	0.00	340.37	0.00	340.37
Vehicle	0.00	344.00	0.00	344.00	0.00	344.00	0.00	344.00
Library	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Revolving fund	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>4.00</b>	<b>846.00</b>	<b>0.00</b>	<b>850.00</b>	<b>3.99</b>	<b>846.00</b>	<b>0.00</b>	<b>849.99</b>
<b>(C) Special Programmes</b>								
Soil testing labs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Minimal processing units	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rain water harvesting units	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Portable carp hatchery	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Plant diagnostic centre	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Grand Total (A+B+C)</b>	<b>244.24</b>	<b>8536.09</b>	<b>47.67</b>	<b>8828.00</b>	<b>243.96</b>	<b>8536.09</b>	<b>47.67</b>	<b>8827.72</b>

## ABOUT KRISHI VIGYAN KENDRAS

### CHAPTER

# 2

The KVKs are agricultural knowledge centres for farmers, farmwomen, rural youth and extension functionaries. These are innovative district level institutions meant for promoting science-based practices in agriculture and its allied sectors in a problem-solving mode. KVKs accomplish this through assessment and demonstration of location specific technology modules. Besides, they also perform other activities keeping in view the needs of farmers and other stakeholders. As on 31.3.2017, the total number of KVKs in the country is 665.

### 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. Subsequently, the 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 first additional KVK in Tumakuru district, Karnataka under Indian Institute of Horticultural Research, Bangalore.

The ICAR-Agricultural Technology Application Research Institute-Zone VIII, earlier known as Zonal Project Directorate-Zone VIII, started with establishing 8 KVKs during V Five Year Plan. During VI, VII, VIII, X, XI and XII Five Year Plans, 7, 5, 20, 34, 6 and 1 KVKs were established respectively. At present, there are 82 KVKs in the Zone under different host organizations viz., ICAR, SAUs, NGOs, DUs and State Department of Agriculture. The state and host organization-wise distribution is presented in Table 4.

**Table 4: KVKs: State and host organization-wise**

States	Host organizations					Total
	SAUs	NGOs	ICAR Research Institutes	DUs	SDA	
Karnataka	25	5	2	-	-	32
Tamil Nadu	17	11	-	2	-	30
Kerala	7	3	4	-	-	14
Goa	-	-	1	-	1	2
Puducherry	-	-	-	-	3	3
Lakshadweep	-	-	-	-	1	1
<b>Total</b>	<b>49</b>	<b>19</b>	<b>7</b>	<b>2</b>	<b>5</b>	<b>82</b>

SAU - State Agricultural University

ICAR - Indian Council of Agricultural Research

SDA- State Department of Agriculture

NGO - Non-Governmental Organization

DU- Deemed University



## 2.2 MANDATE

The KVKs aim at technology assessment, refinement and demonstration of technology/products to cater to the needs of farming community, extension personnel and other stakeholders in the district.

In order to accomplish this, KVKs are carrying out the following activities:

- ◆ Conducting on-farm testing to identify the location specificity of agricultural technologies under various farming systems.
- ◆ Organizing frontline demonstrations to establish production potential of various crops and enterprises on the farmers' fields.
- ◆ Organizing need based training for farmers to update their knowledge and skills in modern agricultural technologies related to technology assessment, refinement and demonstration, and training of extension personnel to orient them in the frontier areas of technology development.

- ◆ Creating awareness about improved agricultural technologies among various clientele through appropriate extension programmes.
- ◆ Production of quality seeds, planting materials, livestock breeds, animal products, bio-products etc as per the demand and supply the same to different clientele.
- ◆ Work as knowledge and resource centre of agricultural technology to support the initiatives of public, private and voluntary sectors for improving the agricultural economy of the district.

## 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 82 KVKs of Zone VIII is 1312, out of which 959 (73.09%) are in position. Details of state and category-wise staff strength of KVKs are furnished in Table 5.

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

Category	Karnataka (32)		TamilNadu (30)		Kerala (14)		Goa (2)		Puducherry (3)		Lakshadweep (1)		Total (82)	
	S	F	S	F	S	F	S	F	S	F	S	F	S	F
Programme Coordinator	32	28	30	19	14	11	2	0	3	0	1	0	82	58
Subject Matter Specialist	192	155	180	155	84	51	12	9	18	5	6	1	492	376
Programme Assistant	96	78	90	64	42	26	6	3	9	6	3	0	246	177
Administrative	64	40	60	46	28	24	4	3	6	2	2	0	164	115
Driver	64	42	60	48	28	17	4	2	6	2	2	0	164	111
Supporting	64	42	60	52	28	25	4	3	6	3	2	0	164	125
<b>Total</b>	<b>512</b>	<b>385</b>	<b>480</b>	<b>384</b>	<b>224</b>	<b>154</b>	<b>32</b>	<b>20</b>	<b>48</b>	<b>18</b>	<b>16</b>	<b>1</b>	<b>1312</b>	<b>962</b>
Vacancy (%)	24.80		20.00		31.25		37.5		62.50		93.75		26.67	

S-Sanctioned; F-Filled

Figures in parenthesis is number of KVKs

## 2.4 INFRASTRUCTURE AT KVKs

Out of 82 KVKs in Zone VIII, 77 KVKs have administrative building, 68 KVKs have farmers hostel and there are staff quarters in 49 KVKs, 164 demonstration units in 58 KVKs, 20 KVKs have established rain water harvesting units, 37 KVKs have e-connectivity, 67 KVKs

have soil and water testing labs, 13 KVKs have portable carp hatchery, 4 KVKs have minimal processing unit and 31 KVKs have plant health diagnostic labs with regards to mobility, 78 KVKs have four-wheelers besides 161 two-wheelers. During the year, 43 four-wheelers were replaced (Table 6).

**Table 6 : State wise details of infrastructure in KVKs**

Infrastructure	Karnataka (32)	Tamil Nadu (30)	Kerala (14)	Goa (2)	Puducherry (3)	Lakshadweep (1)	Total (82)
Administrative buildings	29	30	14	02	02	0	77
Farmers hostel	27	29	12	02	01	0	71
Staff quarters	19	25	09	01	0	0	54
Demo units	49	72	31	08	04	0	164
Rainwater harvesting units	10	03	06	01	0	0	20
E-connectivity	11	14	10	01	01	0	37
Soil, water & plant testing labs	24	27	13	01	01	01	67
Portable carp hatcheries	04	04	03	0	02	0	13
Minimal processing units	01	01	02	0	0	0	4
Plant health diagnostic labs	09	16	05	0	1	0	31
Four wheelers	31	30	13	02	02	0	78
Two wheelers	63	60	28	02	05	03	161

Figures in parenthesis indicate number of KVKs



**Replacement with new vehicles for KVKs of UAS Bengaluru**

## 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 of ATARI, Director of Extension, officials from all development departments of the district, representatives from SHGs and progressive farmers. SAC discusses the progress of work done as per mandate and provide guidance for future activities. A total of 57 SAC meetings were conducted by 57 KVKs during the year.

## 2.6 REVOLVING FUND

Revolving fund is in operation at 74 KVKs of the Zone. The KVKs are utilizing revolving fund for production of technological products and the net balance as on 31<sup>st</sup> March, 2017 was Rs.9.50 crore. During the reporting period, a net balance of more than Rs.20 lakh was there with 10 KVKs. Another 21 KVKs had a balance in the range of Rs.10 to 20 lakh. Net balance in other 23 KVKs ranged from Rs.4 to 10 lakh, Rs.1 to 4 lakh in 19 KVKs and less than Rs. one lakh in one KVK.



## 2.7 THRUST AREAS

Based on the agro-ecological situation, prevailing cropping & 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

### 3.1 KRISHI VIGYAN KENDRAS

Achievements under each of the major activities carried out by the KVKs are described in this section.

#### 3.1.1 Technology Assessment and Refinement

Technologies evolved by National Agricultural Research System are tested by the KVKs for their location specificity

involving farmers as partners through the technology assessment and refinement process. On farm trials (OFTs) conducted in participatory mode involving farming community, extension personnel and scientists are used as the tool for this process. During the reporting year, a total of 247 technologies were assessed by KVKs through 1,357 OFTs conducted in 255 locations.

#### Technology Assessment and Refinement – Brief overview

- ❑ A total of 247 technologies were assessed by KVKs through 1,357 On Farm Trials in 255 locations.
- ❑ Of this, 90.30% of technologies were under crops and 9.70% technologies were under livestock, poultry and fishery enterprises
- ❑ Under crops, technologies were assessed mainly in Varietal Evaluation (85), Integrated Pest Management (29), Integrated Disease Management and Integrated Crop Management (26 each), followed by Integrated Nutrient Management (15).
- ❑ Crop technologies were assessed mainly in paddy, finger millet, chickpea, pigeonpea, groundnut, banana, chilli, onion, tomato, black pepper and ginger
- ❑ Livestock technologies were assessed mainly under Evaluation of Breeds, Feed Management and Disease Management themes.

#### 3.1.1.1 Technology assessment under crops

KVKs assessed 223 technologies through 1,143 OFTs in crops under various thematic areas. Details on number of trials and number of locations under each thematic area are presented in Table 7. Majority of the technologies

belonged to varietal evaluation (85 technologies in 112 locations) while 29 technologies were of Integrated Pest Management (25 locations). Integrated Crop and Integrated Disease management technologies (26 each) were tested in 22 locations each.

**Table 7: Thematic area wise of technology assessment under crops**

Thematic area	Technology (No.)	Trial (No.)	Location (No.)
Cropping systems	17	47	11
Drudgery reduction	2	8	2
Farm machinery	8	38	8
Integrated crop management	26	126	22
Integrated disease management	26	114	22
Integrated nutrient management	15	72	12
Integrated pest management	29	133	25
Integrated pest and disease management	2	10	2
Integrated weed management	4	17	3
Processing and value addition	6	24	6
Resource conservation technology	1	1	1
Seed and planting material production	1	5	1
Storage techniques	1	5	1
Varietal evaluation	85	543	112
<b>Total</b>	<b>223</b>	<b>1143</b>	<b>228</b>



State-wise details of OFTs conducted in crops reveals that 92 technologies were assessed through 358 trials in Karnataka while 85 technologies were assessed through 574 trials in Tamil Nadu. Whereas, in Kerala, 45 technologies were assessed through 201 trials (Table 8).

**Table 8: Crop technology assessment: State/UT-wise**

State	Technology (No.)	Trials (No.)	Location (No.)
Karnataka	92	358	86
Tamil Nadu	85	574	104
Kerala	45	201	37
Goa	1	10	1
<b>Total</b>	<b>223</b>	<b>1,143</b>	<b>228</b>

### 3.1.1.2 OFTs on livestock and fishery

Under livestock and fishery technologies, KVKs assessed 24 technologies on five thematic areas including disease management (5); evaluation of breeds (10); feed management (7) and production and management (2) through 214 on farm trials (Table 9).

**Table 9: Thematic areawise technology assessment under livestock and fishery**

Thematic areas	Technology (No.)	Trials (No.)	Locations (No.)
Disease management	5	81	7
Evaluation of breeds	10	90	11
Feed management	7	33	7
Production and management	2	10	2
<b>Total</b>	<b>24</b>	<b>214</b>	<b>27</b>

From Table 10, it could be observed that 12 technologies in livestock, poultry and fisheries sectors, were assessed through 110 trials in Tamil Nadu followed by 9 technologies assessed through 83 trials in Kerala and 4 technologies assessed through 21 trials in Karnataka.

**Table 10: Livestock and fishery technologies assessment: State-wise**

State	Technology (No.)	Trial (No.)	Location (No.)
Karnataka	4	21	5
Tamil Nadu	12	110	13
Kerala	9	83	9
<b>Total</b>	<b>25</b>	<b>214</b>	<b>27</b>

### 3.1.2 Location Specificity of Crop Technologies

Technologies identified in various thematic areas in a crop were assessed by more than one KVK in a State based on problem prioritization times. Successful assessments were considered for up-scaling through frontline demonstrations followed by large-scale demonstrations in convergence mode. During the reporting period nine interventions were undertaken for upscaling by KVKs in Karnataka, Tamil Nadu and Kerala, seven under varietal evaluation and one each in Integrated Pest Management and Integrated Disease Management. The details are furnished below:

#### 3.1.2.1 Chickpea

Chickpea varieties were tested for wilt and drought tolerance in three districts viz., Bangalore Rural, Hassan and Davangere. JG-11, JAKI-9218 and GBM -2 were tested wherein the highest yield of 14.00 q/ha was recorded by GBM-2 at Hassan. When varieties were tested for only wilt tolerance BGD-103 gave high yield of 17.50q/ha as compared to *Nandyala Senaga -1*(13.50 q/ha) and JAKI-9218 (15.40 q/ha) at Ballari. Among the varieties tested for mechanical harvesting at Belgaum district, GBM-2 gave higher yield (8.40 q/ha) compared to other varieties. Among the varieties tested for high yield, JG-14 gave highest yield of 23.00 q/ha followed by 21.25 q/ha by GBM-2 in two locations Belgaum I and Chikkamagaluru (Table 11).

Table 11: On farm trial of chickpea varieties in different locations of Karnataka

District/ KVK	Theme / focus	Yield (q/ha)						
		Farmers / recommended variety		Alternate technologies				
		A1	JG-11	JAKI-9218	GBM-2	JG-14	NBeG-3 Nandyala Senega-1	BGD-103
Bangalore Rural	Wilt and drought	4.09	5.60	6.51	-	-	-	-
Hassan		9.00	10.80	12.50	14.00	-	-	-
Davanagere		-	8.50	9.30	11.50	-	-	-
Ballari	Wilt tolerant	9.25	-	15.40	-	-	13.50	17.50
Belagavi-II	Mechanical harvesting	6.20	7.60	6.80	8.40	-	-	-
Tumakuru-I	Yield	8.75	10.87	12.10	11.25	12.37	-	-
Raichur		12.15	12.88	13.92	10.35	-	13.37	-
Bagalkot		-	17.50	17.25	17.50	-	-	-
Belagavi-I		-	19.50	20.80	21.25	-	-	-
Chikkamagaluru		-	-	18.75	21.25	23.00	-	-
Vijayapura-I	Yield under rainfed	-	11.54	9.61	9.54	-	-	-



Field impression of JG-14 in Chikkamagaluru district



Assessing the machine harvesting of GBM-2 in Belagavi district

### 3.1.2.2 Pigeonpea

Pigeonpea varieties were tested in five districts (Table 12). TS-3R and GRG-811 were tested in four districts whereas BSMR-736, BDN-711 and BRG-5 were tested in one district each. The highest yield

(22.1 q/ha) was recorded by BSMR-736 in Bagalkot district. However, GRG-811 gave highest yield when tested for wilt and SMD tolerance with a yield of 17.30 q/ha in Vijayapura district.

**Table 12: On farm trial of pigeonpea varieties in different locations in Karnataka**

District/ KVK	Theme / focus	Yield (q/ha)					
		Farmers / recommended variety		Alternate varieties			
		Gulyal local	TS-3R	GRG-811	BSMR-736	BDN-711	BRG-5
Bagalkot	Yield		17.20	17.30	22.10	-	-
Belagavi-I	Yield	15.48	16.85	18.27	-	-	-
Raichur	Yield	17.72	17.28		-	18.53	-
Vijayapura-I	Medium duration, wilt, SMD resistance and high yield	12.30	14.49	17.30	-	-	-
Tumakuru-II	Disease tolerance	8.64		12.92	-	-	12.14


**Vegetative and harvesting stages of pigeonpea variety GRG-811 demonstration in Belgaum district**

**Vegetative stage of BDN-711 variety of pigeonpea at Raichur district**

### 3.1.2.3 Sorghum

Among the sorghum varieties tested, SPV-2217 was common in all the three districts whereas Phule Suchitra, BGV-44, CSV-29R and GS-23 were tested in one location each. SPV-2217 recorded higher yield in normal field conditions (18.64 q/ha at Dharwad) and under sand mulch conditions (16.60 q/ha at Gadag). Details are given in Table 13.

**Table 13: On farm trial of sorghum varieties in different locations of Karnataka**

District/ KVK	Theme / focus	Yield (q/ha)					
		Farmers variety M 35-1	Alternate varieties				
			SPV-2217	Phule Suchitra	BJV-44 variety	CSV-29R	GS-23
Dharwad	Yield	15.30	18.64	17.26	-	-	-
Raichur	Yield	7.71	8.84	-	-	-	8.32
Gadag	Yield under sand mulched fields	11.68	16.06	-	13.37	12.37	-

**Assessment of sorghum varieties in Dharwad district****3.1.2.4 Onion**

Arka Niketan, Bhima Kiran, Bhima Shakti and Bhima Super were tested for yield during *rabi* season in three locations viz., Kalaburagi, Tumakuru and Mandya. Bhima Shakti gave highest yields) in Tumakuru district (29.00 t/ha) and Mandya (28.80 t/ha). When economics was compared, the highest net return was recorded for Bhima Kiran (Rs.1.33 lakh/ha) with a BC ratio of 3.53 at Kalaburagi (Table 14).

**Table 14: On farm trial of onion varieties in different locations of Karnataka**

District/ KVK	Theme / focus	Yield (t/ha)					
		Farmers / recommended variety		Alternate varieties			
		Local	Arka Kalyan	Arka Niketan	Bhima Kiran	Bhima Shakthi	Bhima Super
Kalaburagi	Rabi season	19.04	-	24.38	28.20	-	-
Tumakuru-II	Rabi	-	26.00	-	-	29.00	21.10
Raichur	Yield	22.60	-	25.00	-	28.80	-

District/ KVK	Theme / focus	Net Income (Rs/ha) and BCR					
		Farmers / recommended variety		Alternate varieties (Rs/ha)			
		Local	Arka Kalyan	Arka Niketan	Bhima Kiran	Bhima Shakthi	Bhima Super
Kalaburagi	Rabi season	63148 (2.01)	-	103188 (2.78)	133440 (3.53)	-	-
Tumakuru-II	Rabi	-	99290 (3.05)	-	-	117230 (2.75)	70780 (2.27)
Raichur	Yield	25310 (1.28)	-	50000 (1.66)	-	68750 (1.91)	-

Figures in parenthesis is BCR

### 3.1.2.5 Paddy

Different varieties and hybrids of paddy were tested in 10 districts of Tamil Nadu for addressing various issues. Their suitability for salinity conditions was assessed in Nagapattinam, Sivagangai, Tiruvallur and Trichy. TRY-3 was tested in all the locations whereas Gangavathi Sona was tested in three locations, CSR-36 in two locations and CSR-43 in one location. Different varieties performed differently in each of the four locations. TRY-3 performed better in Nagapattinam (51.50 q/ha) and Trichy (69.60 q/ha) whereas Gangavathi Sona was better (55.10 q/ha) in Tiruvallur and CSR-43 was

better (45.00 q/ha) in Sivagangai. When varieties were tested for short duration, Co-51 gave higher yield of 63.80 q/ha at Pudukottai followed by 57.62 q/ha at Tuticorin. Assessment of paddy varieties for pest disease tolerance was carried out in Villupuram and Ariyalur districts where Co-R-50 recorded higher yield of 56.15 q/ha compared to other varieties. Among the hybrids tested, KRH-4 gave 61.96 q/ha compared to CoRH-4 (61.40 q/ha). Variety RNR 15048 gave a yield of 63.04 q/ha at Cuddalore where glycemic index was the main criteria (Table 15).

**Table 15: On farm trial of paddy varieties in different locations of Tamil Nadu**

District/ KVK	Theme / focus	Yield (q/ha)							
		Farmers		Recommended variety			Alternate varieties		
		Local	BPT-5204	TRY-3	Co-51	Others	Gangavathi Sona	CSR-36	Others
Nagapattinam	Salinity	41.50	-	51.50	-	-	47.50	49.50	-
Sivagangai	Salinity	28.00	-	39.00	-	-	-	-	45.00 (CSR-43)
Tiruvallur	Salinity	-	46.75	52.30	-	-	55.10	-	-
Trichy	Salinity	43.60	-	69.60	-	-	48.70	55.80	-
Pudukottai	Late samba, Short duration	54.60	-	-	63.80	-	-	-	59.60 (NLR 34449)
Tuticorin	Short duration	51.53	-	-	57.62	-	-	-	52.50 (MDU6)
Villupuram	Pest disease	39.37	-	-	-	45.23 (ADT-49)	-	-	27.65 (Samba masuri)
Ariyalur	disease	46.64	-	-	56.15 (CoR 50)	53.60 (TKM-13)	-	-	-
Tiruvallur	Hybrids	-	49.56	-	61.40 (Co-RH 4)	-	-	-	61.96 (KRH-4)
Cuddalore	Low glycemic index	-	59.17	-	52.09 (Madhuraj 55)	-	-	-	63.04 (RNR 15048)



**Assessment of rice varieties at Cuddalore, Tamil Nadu**



**TRY-3 variety yielded maximum at Trichy, even under salinity conditions**

### 3.1.2.6 Groundnut

Different varieties of groundnut were tested for addressing various issues (Table 16). Drought tolerance and the yield were the major criteria in five districts where TMV-13, Co-7, K-9 VRI-8, ICGV 00350 and K-6 were the varieties tested. Among these, the highest yield was recorded by Co-7 (24.96 q/ha) followed by K-6

(24.04 q/ha) at Villupuram district. At Sivagangai, varieties were tested for disease tolerance wherein G-2-52 recorded 20.92 q/ha as compared to 18.98 q/ha by Co-7. In Cuddalore district, confectionary varieties were tested wherein VRI-8 gave the highest yield of 39.7 q/ha compared to Co-7 (36.6 q/ha). Details are given in Table 16.

**Table 16: On farm trial of groundnut varieties in different locations of Tamil Nadu**

District/ KVK	Theme / focus	Yield (q/ha)								
		Farmers / recommended variety		Alternate varieties						
		Local	TMV-13	Co-7	K-9	VRI-8	ICGV	K-6	Co-6	G2-52
Dharmapuri	Yield, and drought	12.30	-	-	-	13.80	15.20	-	-	-
Ariyalur		13.50	-	17.00	16.10	-	-	-	-	-
Perambalur	Yield	18.20	-	24.96	23.03	-	-	-	-	-
Vellore	Drought	11.43	14.83	-	-	-	16.67	-	-	-
Villupuram		18.06	23.72	-	-	-	-	24.04	-	-
Tuticorin	Short duration	13.78	18.46	-	-	-	-	-	16.64	-
Sivagangai	Disease	12.80	-	18.98	-	-	-	-	-	20.92
Cuddalore	Confectionary	27.00	-	36.60	-	39.70	-	-	-	-



**Finger millet variety ML-365 recorded highest yield at Sivagangai district**

### 3.1.2.7 Finger millet

Finger millet varieties were tested in 6 districts for their yield potential. Co-15 and ML-365 were tested in all six districts whereas KMR-204 and GPU 67 were tested in one district each. ML-365 gave higher yield compared to Co-15 in all the locations except at Villupuram. The highest yield of 31.36 q/ha was recorded in Sivagangai district. Details are given in Table 17.

**Table 17: On farm trial of finger millet varieties in different locations in Tamil Nadu**

Finger millet	Theme / focus	Yield (q/ha)				
		Farmers / recommended variety		Alternate varieties		
		Farmers variety	Co-15	ML-365	KMR-204	GPU-67
Cuddalore	Yield	16.86	21.31	23.74	-	-
Erode	Yield	19.21	23.13	28.93	-	-
Perambalur	Yield	19.18	24.54	28.96	-	-
Salem	Yield	19.60	23.80	24.30	22.70	-
Villupuram	Yield	16.20	20.91	18.81	-	17.75
Sivagangai	Yield	19.55	23.77	31.36	-	-

### 3.1.2.8 Chilli

Chilli hybrids CO-1 and Arka Haritha were tested in three districts viz., Kanyakumari, Pudukottai and Vellore.

The highest yield was recorded by CO-1 in all locations (Table 18).

**Table 18: On farm trial of chilli varieties in different locations in Tamil Nadu**

District/ KVK	Theme / focus	Yield (q/ha)		
		Farmers / recommended variety		Alternate varieties
		Farmers variety	Co-1	Arka Haritha
Kanyakumari	Hybrids	121.80	154.40	145.00
Pudukottai	Disease tolerant hybrid	152.00	221.60	193.00
Vellore	Green chilli hybrid	182.00	254.40	247.80

### 3.1.2.9 Cluster bean

Only two districts Ramanathapuram and Pudukottai tested cluster bean varieties Pusa Naubahar and MDU-1.

In both the districts MDU-1 performed better than Pusa Naubahar with a highest yield of 185 q/ha at Pudukottai (Table 19).



Table 19: On farm trial of cluster bean varieties in different locations in Tamil Nadu

District/ KVK	Theme / focus	Yield (q/ha)		
		Farmers / recommended variety		Alternate varieties
		Farmers variety	Pusa Naubahar	MDU-1
Ramanathapuram	Yield	68.20	85.80	133.20
Pudukottai	Yield	87.40	144.80	185.00

### 3.1.3 Location Specificity of Livestock Technologies

#### 3.1.3.1 Goats

The major constraints in goat production are low birth weight, low weaning weight, single or less number of kids per kidding etc. To address these problems, an OFT was taken up on assessing the performance of crossbred Tellicherry and Boer breed in Dharmapuri and Salem districts of Tamil Nadu. Technology included artificial insemination of local breeds with frozen semen

of Boer and Tellicherry breed. Results indicate that crossed progeny in both the breeds is performing better as compared to the local (Table 20). However, crossed progeny with Tellicherry had additional advantages. Artificial insemination with improved breeds could be used to increase the birth weight of kids, twins and triplet percentage and weaning weight of kids from non-descriptive goats. Further, the cost of maintaining the buck for breeding purpose can be saved by artificial insemination with improved breeds.

Table 20: Performance of crossbred Tellicherry and Boer breed in Tamil Nadu

Parameters	Dharmapuri			Salem		
	Local Local	Local Boer	Local Tellicherry	Local Local	Local Boer	Local Tellicherry
Conception rate (%)	45.00	40.00	60.00	46.00	60.00	40.00
Service per conception (No.)	2.00	1.75	1.66	2.00	1.72	1.82
Kids born/year	2.00	2.50	3.33	2.00	2.40	2.80
Birth weight (kg)	2.00	2.80	2.30	2.00	2.40	2.70
Weaning weight (kg)	9.50	14.50	12.50	9.500	12.50	14.20
Net return/animal (Rs.)	2023	2928	3114	2290	3136	3424
B:C Ratio	1.75	2.05	2.23	1.80	2.11	2.21



Assessment of goat kids of different parents in Salem district

#### 3.1.3.2 Dairy animals

Ruminal acidosis is a common metabolic disorder in dairy animals. Excess of concentrate feeding in high yielding cows leads to acidosis and subsequent drop in milk yield. To address this problem the Ballari and Koppal KVKs tested the following treatment options in farmer participatory mode.

- ◆ TO1: Soda bicarb 100 g- 200g orally twice daily for 3-4 days as a drench (based on extent of acidosis)

- ◆ TO2: Ruminal buffer fortified with yeast & metabolic boosters 200 g PO daily for 4 days as an electrolyte
  - ◆ TO3: Ruminal buffer 200 g daily for 4 days + probiotics fortified with essential minerals.
- The third option gave best results for correction of ruminal pH to neutrality, improving the health of ruminal microflora and in attaining potential milk yield in both the locations (Table 21).

**Table 21: Parameters to analyze ruminal acidosis in dairy animals in Karnataka**

Technology options	Parameters	Koppal		Ballari	
		1 <sup>st</sup> Day	4 <sup>th</sup> Day	1 <sup>st</sup> Day	4 <sup>th</sup> Day
TO1	Milk yield (L/day)	5.80	7.20	5.20	5.50
	Rumen pH	4.50	5.40	4.80	5.60
	Protozoal mortality	+	++	+	++
TO2	Milk yield (L/day)	6.00	7.75	4.80	10.50
	Rumen pH	4.80	6.00	4.50	6.50
	Protozoal mortality	+	++	+	+++
TO3	Milk yield (L/day)	5.70	8.50	5.00	14.00
	Rumen pH	4.40	6.30	4.50	6.80
	Protozoal mortality	+	++++	+	++++



**Initiation of treatments for ruminal acidosis among dairy cattle at Ballari**

### 3.1.3.3 Poultry

The major constraints in poultry production are low body weight, poor egg production and hatchability, high mortality etc. An OFT was taken up to assess the performance of improved chicken breeds under backyard condition in Dharmapuri and Salem districts of Tamil Nadu. Technology included the improved breeds of poultry viz., Srinidhi, Namakkal chicken-1 and Nandanam-4. The trial indicated that the improved breeds of poultry performed better as compared to local, but Srinidhi has advantage over Namakkal chicken- 1 and Nandanam-4 breeds (Table 22).

**Table 22: Performance of improved chicken breeds under backyard condition in Tamil Nadu**

Parameters of assessment	Salem			Dharmapuri		
	Native chicken	Srinidhi	Namakkal chicken- 1	Native chicken	Nandanam-4	Srinidhi
Body weight at 6 weeks (gm)	458	452	452	200	210	620
Age at first laying (days)	190	180	180	180	165	145
Survivability at 6 weeks (%)	95.00	91.80	91.80	84.40	96.40	94.80
Hatchability (%)	72.60	85.00	85.00	74.00	78.00	96.00
Adult body weight at 7 months (Kg)	2.45	2.81	2.32	1.42	1.52	2.99
Egg production (0-40 weeks in no.)	16	84	65	54.2	150	225
B:C Ratio	1.86	2.25	1.99	1.39	1.47	1.55



**Backyard poultry breeds assessment in Salem district**

### 3.1.4 Frontline Demonstrations

Frontline demonstrations (FLDs) on crops, livestock and fisheries, farm implements and other allied agriculture enterprises were taken up to demonstrate their production potential. In the process, newly released crop varieties, resource conservation technologies, crop production and protection technologies, improved technologies in livestock and fisheries and other allied activities were demonstrated in farmers' fields. During the year, 15,740 FLDs were conducted. These included 1522 on cereals and millets, 575 on oilseeds, 1125 on

pulses, 83 on commercial crops, 50 on fibre crops, 358 on fodder crops, 1149 on vegetable crops, 115 on tuber crops, 710 on fruit crops, 145 on flower crops, 158 on plantation crops, 405 on spice crops and 912 on hybrids of various crops. Besides, 3751 cluster frontline demonstrations on pulses and 3353 on oilseeds were conducted as sponsored programmes of Department of Agriculture Cooperation and Farmers welfare under NFSM and NMOOP, respectively in selected districts of Karnataka, Kerala, Puducherry and Tamil Nadu. KVKs also conducted demonstrations on farm implements (216), livestock and fisheries (962) and enterprises (141) covering an area of 5180.14 ha in the states of Karnataka, Tamil Nadu, Kerala, Goa and Puducherry (Table 23). Apart from this, 1144 demonstrations on crops and 103 demonstrations on livestock were at different stages of implementation at the time of compilation of results in the KVKs of Karnataka, Tamil Nadu, Kerala, Goa and Puducherry. During the year, 305 demonstrations on crops covering an area of 128 ha were vitiated due to failure of south-west monsoon in the states of Karnataka and failure of NE monsoon in Tamil Nadu.

**Table 23: State-wise frontline demonstrations conducted during 2016-17**

Crops Category	Karnataka		Tamil Nadu		Kerala		Puducherry		Goa		Grand Total	
	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)
Cereals & millets	680	267.00	716	284.40	111	16.95	15	2.40	-	-	1522	570.75
Oilseeds	450	175.00	119	41.80	6	2.00	-	-	-	-	575	218.80
Pulses	787	315.80	205	78.00	63	8.12	70	28.00	-	-	1125	429.92
Commercial crops	48	20.00	35	10.20	-	-	-	-	-	-	83	30.20
Fibre crops	10	4.00	40	16.00	-	-	-	-	-	-	50	20.00
Fodder crops	125	27.42	196	40.65	32	0.80	5	1.00	-	-	358	69.87
Vegetable crops	361	105.75	601	163.13	175	10.62	-	-	12	1.10	1149	280.60
Tuber crops	10	4.00	55	18.00	50	3.45	-	-	-	-	115	25.45
Fruit crops	160	57.80	210	71.00	340	22.11	-	-	-	-	710	150.91
Flower crops	50	13.90	95	23.00	-	-	-	-	-	-	145	36.90
Plantation crops	80	26.00	40	10.05	38	4.30	-	-	-	-	158	40.35
Spices	209	70.20	85	28.00	111	8.23	-	-	-	-	405	106.43
Cluster FLD- pulses	1866	746.40	1510	604.00	325	130.00	50	20.00	-	-	3751	1500.40
Cluster FLD- oilseeds	1820	728.00	1533	613.00	-	-	-	-	-	-	3353	1341.00
Hybrids of crops	534	188.60	335	92.20	38	1.06	-	-	5	1.00	912	282.86
Farm implements	10	10.00	186	62.50	20	3.20	-	-	-	-	216	75.70
Livestock & fisheries	252	822*	417	3128*	253	734*	30	120*	10	20*	962	4824*
Enterprises	57	146**	27	110**	45	68**	-	-	12	12**	141	336**
<b>Grand total</b>	<b>7509</b>	<b>2759.87</b>	<b>6405</b>	<b>2155.93</b>	<b>1607</b>	<b>210.84</b>	<b>170</b>	<b>51.40</b>	<b>39</b>	<b>2.10</b>	<b>15730</b>	<b>5180.14</b>
FLDs under progress in crops	565	220.40	286	75.40	268	78.68	-	-	25	7.50	1144	381.98
FLDs under progress in livestock	33	-	-	-	51	-	-	-	19	-	103	0.00
FLDs vitiated	270	113.50	35	14.50	-	-	-	-	-	-	305	128.00

\* No of animals and birds

\*\* No of units/SHGs

### 3.1.4.1 Cereals and millets

A total of 1522 demonstration (FLD) were conducted in various cereals and millets covering an area of 571 ha during the year by the KVKs of ATARI, Zone-VIII. These accounted for 680 in Karnataka, 716 in Tamil Nadu, 111 in Kerala and 15 in Puducherry. State-wise results are presented in the foregoing discussions.

**Karnataka:** A total of 226 FLDs in paddy, 32 in wheat, 11 in maize, 123 in sorghum, 143 in finger millet, 121 in foxtail millet and 14 in little millet were conducted covering an area of 267 ha in the farmers' fields during the year (Table 24). In paddy, technologies such as IDM, improved variety Gangavathy Sona, ICM, improved variety KPR-1 and problematic soil management gave 13.39 to 38.95% increase in grain yield over respective local check. BCR was higher with ICM (5.30), IPM (2.15) and salinity management (2.13). The highest yield of 62.70 q/ha was recorded with Gangavathy sona variety and lowest was 36.50 q/ha under weed management

technology with MO-4 variety. In wheat, an average of 30.27q/ha grain yield was recorded under irrigated condition by UAS-334 as compared to 26.50 q/ha in the local check. The wheat variety UAS-304 recorded 14.59 q/ha as compared to 12.32q/ha in the farmers' variety under rainfed condition. The ICM technology in maize gave an increase of 24.80% in yield as compared to farmers practice (35.10 q/ha). In sorghum, organic farming technology followed by ICM gave higher increase in yield by 24.23% and 18.61% respectively over their local check. The value addition technology, although gave 17.45% less yield as compared to check, the BCR (3.54) was marginally better as compared to local check (3.44). The technologies like drought management practices and ICM gave 18.40 to 35.23% higher yield in finger millet as compared to their local check. In minor millets, foxtail and little millets performed better under technology demonstrations with 26.20% and 40.50% increase in yield respectively over their local check.

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

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Paddy	ICM (Irri)	6	BPT-5204, KHP-2, Intan, MO-4, Mugad Siri-1253, PSB-68	72	28.50	55.29	43.92	27.15	58003	2.27	143272	5.30
	INM (Irri)	2	MO-4,IR-64	20	8.00	53.75	43.00	25.00	37425	1.79	26513	1.66
	IPM (Irri)	4	IR-64,BPT-5204, JGL-1798, Sone masuri	33	13.20	61.58	54.51	14.21	67522	2.69	51586	2.15
	IDM (Irri)	2	KPR-1	20	9.00	48.85	35.20	38.95	46197	2.24	16363	1.53
	Improved varieties (Irri)	1	Gangavathy sona	10	4.00	62.70	45.20	38.72	80265	2.91	33560	1.92
	Weed management (Irri)	1	MO-4	11	4.00	36.50	35.75	2.10	17906	1.55	13271	1.37
	Variety introduction (Rf)	1	KPR-1	25	10.00	58.15	47.50	22.42	87900	1.02	26375	1.51
	Mechanization (Irri)	1	Sona masuri	5	2.00	52.15	46.55	12.03	69300	2.98	48100	2.07
	Problematic soil management(Irri)	1	MO-4	10	4.00	60.60	50.50	20.00	37090	2.18	27594	1.93
	Salinity management (Irri)	1	GGV-05-01	20	4.00	50.47	44.51	13.39	57442.2	2.33	48386	2.13
<b>Sub total</b>				<b>226</b>	<b>86.70</b>	<b>54.00</b>	<b>44.66</b>	<b>21.40</b>	<b>47203</b>	<b>2.20</b>	<b>435025</b>	<b>2.16</b>

Contd.... P.21

Wheat	Improved variety (Rf)	2	DDK-1029	22	8.80	23.83	20.955	13.67	41702	2.89	33044	2.43
	New variety (Irri)	1	UAS-334	10	4.00	30.27	26.50	14.23	51475	3.13	38850	2.42
	ICM (Rf)	1	UAS-304	10	4.00	14.59	12.32	18.43	19040	2.09	12590	1.69
<b>Sub total</b>				<b>32</b>	<b>16.80</b>	<b>22.90</b>	<b>19.93</b>	<b>15.44</b>	<b>37406</b>	<b>2.70</b>	<b>28161</b>	<b>2.18</b>
Maize	ICM (Rf)	2	CP-818	11	4.40	44.05	35.10	24.80	27811	2.02	17834	1.71
Sorghum	Organic farming(Rf)	1	M 35-1	5	0.40	10.92	8.79	24.23	16063	1.78	8366	1.39
	ICM (Rf)	3	GSV-1, SPV-2217	33	13.40	11.45	9.67	18.61	111308	9.42	15639	2.24
	Improved variety (Rf)	1	CSV-29R	25	10.00	15.80	13.90	13.67	49997	5.22	42496	4.58
	Varietal evaluation (Rf)	3	SPV-2217	30	12.00	18.31	15.51	17.54	35132	3.41	27143	2.82
	Variety for Value addition (Rf)	2	AKJ-1, SMJ-1	30	12.00	8.08	9.77	-17.45	24089.0	3.54	23223	3.44
<b>Sub total</b>				<b>123</b>	<b>47.80</b>	<b>12.91</b>	<b>11.53</b>	<b>11.32</b>	<b>47318</b>	<b>4.67</b>	<b>23373</b>	<b>2.89</b>
Finger millet	ICM (Rf)	6	GPU-67, KMR-204, ML-365	111	44.40	12.53	10.44	18.40	18691	1.67	12235	1.46
	Drought tolerant variety (Rf)	2	ML-365	22	9.00	21.85	18.90	15.96	21938	2.01	16650	1.79
	Drought mitigation (Rf)	1	ML-365	10	5.00	11.90	8.80	35.23	10750	1.43	3900	1.17
<b>Sub total</b>				<b>143</b>	<b>58.40</b>	<b>15.43</b>	<b>12.71</b>	<b>23.20</b>	<b>17126</b>	<b>1.70</b>	<b>10928</b>	<b>1.47</b>
Foxtail millet	Improved variety (Rf)	3	DHFt 109-3	35	140.00	13.08	10.60	23.20	16023	3.86	5002	1.97
	Variety introduction (Rf)	3	HMT-100-1	38	15.30	8.83	6.58	33.98	20917	3.32	14260	2.75
	ICM (Rf)	3	SIA-2644, DHFT-109-3	48	18.00	14.17	11.73	21.43	15426	2.94	10008	2.35
<b>Sub total</b>				<b>121</b>	<b>47.30</b>	<b>12.03</b>	<b>9.64</b>	<b>26.20</b>	<b>17455</b>	<b>3.37</b>	<b>9757</b>	<b>2.36</b>
Little millet	Varietal introduction (Rf)	1	DHLM-36-3	4	1.60	10.35	6.53	58.50	28350	3.21	15100	2.37
	Variety introduction (Rf)	1	Sukhsma	10	4.00	6.75	5.51	22.50	15150	2.44	9748	1.87
<b>Sub total</b>				<b>14</b>	<b>5.60</b>	<b>8.55</b>	<b>6.02</b>	<b>40.5</b>	<b>21750</b>	<b>2.82</b>	<b>12424</b>	<b>2.12</b>
<b>Grand total</b>				<b>680</b>	<b>267.00</b>							

Irri.: Irrigated; Rf: Rainfed, ICM: Integrated Crop Management, IPM: Integrated Pest Management, INM: Integrated Nutrient Management, IDM: Integrated Disease Management



**Demonstration of wheat (DDK 1029) by KVK, Bagalkot**

**Tamil Nadu:** Out of 716 FLDs laid out in the state, 451 were on paddy, 45 on maize, 60 on sorghum, 10 on kodo millet, 100 on pearl millet and 50 on barnyard millet covering an area of 284.40 ha in farmers' fields (Table 25).

In paddy, technology demonstrations gave an average yield of about 57 q/ha as compared to 48 q/ha in farmers' practice. Among the technologies demonstrated, variety introduction (MDU-6) gave highest increase (40%) in



yield followed by biological control of pests, varieties TKM 13, CR 1009 sub-1, TRY-3, IPM, IDM, ICM and INM. The highest yield of 68 q/ha was recorded with variety CR 1009 sub-1 and lowest by variety MDU-6 (37 q/ha). The technologies such as IDM, ICM and mechanization in maize gave an increase of 22.% in yield as against the farmers practice. In sorghum, dual purpose

sorghum variety Co(s) 30 gave highest yield (29 q/ha) followed by variety K-12 (23 q/ha). ICM demonstration in pearl millet gave 17 q/ha as compared to local check (13 q/ha). The other minor millets like kodo millet and barnyard millets, improved varieties performed better under technology demonstration as compared to farmers' variety with better economic returns.

**Table 25: Frontline demonstrations on cereals and millets conducted by the KVKs Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Paddy	INM (Irri)	1	ADT-38	20	8.00	51.20	44.70	14.54	38425	2.00	29275	1.77
	ICM (Irri)	6	TPS-5, ADT-37, TKM-13, Co-51, ADT-16	70	28.00	62.06	53.60	16.46	49660	2.21	36444	1.85
	IDM (Irri)	3	BPT-5204, ADT-36, NLR-3	30	12.00	57.36	49.08	16.85	57205	2.24	39292	1.78
	IPM (Irri)	9	TKM-13, CR-1009, ADT-45, BPT-2231, Co-51, White Ponni	110	42.00	57.14	47.66	21.03	53903	2.18	36186	1.81
	Biological control of pests (Irri)	1	TKM-13	10	4.00	64.44	51.05	26.23	66605	2.82	42956	2.11
	Resource conservation (Irri)	1	BPT-5204	6	2.40	57.30	51.77	10.68	63285	2.06	48767	1.78
	Seed production (Irri)	2	TKM-13	40	16.00	44.64	37.90	17.87	51723	1.94	38527	2.07
	Variety introduction (Irri)	3	Co-51	40	16.00	67.04	56.43	18.91	63647	2.53	43734	2.10
	Variety introduction (Irri)	3	CR-1009 sub1	40	16.00	67.60	54.88	23.41	62451	2.15	37096	1.62
	Variety introduction (Irri)	1	MDU-6	10	4.00	36.50	26.00	40.38	38000	2.37	21400	1.84
	Improved variety (Irri)	3	TKM-13	35	14.00	60.96	54.14	12.78	61137	2.30	46603	2.01
	Variety introduction- (Irri)	1	TPS-5	20	8.00	58.35	49.37	18.19	45861	1.82	24455	1.40
	Variety introduction- (Irri)	1	TRY-3	20	8.00	55.40	45.40	22.03	39797	2.20	24423	1.77
<b>Sub total</b>				<b>451</b>	<b>178.40</b>	<b>56.92</b>	<b>47.84</b>	<b>19.95</b>	<b>53208</b>	<b>2.22</b>	<b>36089</b>	<b>1.84</b>
Maize	ICM (Irri)	2	Co-6, Co-10	20	8.00	49.30	39.71	28.41	42707	1.96	21616	1.55
	Farm mechanization (Rf)	1	Co-6	10	4.00	43.88	40.20	9.15	17530	1.41	11375	1.25
	IDM (Irri)	1	NK-6240	15	6.00	76.43	59.38	28.71	74135	2.83	37880	1.74
<b>Sub total</b>				<b>45</b>	<b>18.00</b>	<b>56.54</b>	<b>46.43</b>	<b>22.09</b>	<b>44791</b>	<b>2.07</b>	<b>23624</b>	<b>1.51</b>

Contd.... P.23

Sorghum	Variety introduction (Rf)	5	K-12	50	20.00	23.10	17.36	36.26	31374	2.29	16969	1.82
Dual purpose sorghum	ICM (Irri)	1	Co-(S) 30	10	4.00	29.06	26.10	11.34	-30448	0.26	51485	2.19
<b>Sub total</b>				<b>60</b>	<b>24.00</b>	<b>26.08</b>	<b>21.73</b>	<b>23.80</b>	<b>463</b>	<b>1.28</b>	<b>34227</b>	<b>2.01</b>
Kodo millet	Value addition (Rf)	1	Co-3	10	4.00	15.40	11.70	31.62	1890	4.71	990	3.41
Pearl millet	ICM (Rf)	8	Co(Cu)-10	100	40.00	17.32	13.14	32.93	22709	2.39	13971	1.96
Barnyard millet	Variety introduction (Rf)	4	Co(KV)-2	50	20.00	13.84	11.28	25.63	16126	1.96	11508	1.71
<b>Grand total</b>				<b>716</b>	<b>284.40</b>							

Irri.: Irrigated; Rf: Rainfed, ICM: Integrated Crop Management, IPM: Integrated Pest Management, INM: Integrated Nutrient Management, IDM: Integrated Disease Management

**Kerala:** A total of 111 FLDs in paddy were conducted covering an area of 16.95 ha in the farmers' fields during the year (Table 26). The technologies such as organic farming, IPM, ICM, IWM, IDM and ICM in paddy gave over 28 % increase in yield as compared to farmers'

practice. The BCR was higher in all the technology demonstrations as compared to farmers' practice. The Jyothi variety under farmers practice recorded negative returns as compared to positive returns under integrated weed management.

**Table 26: Frontline demonstrations on cereals and millets conducted by the KVKs of Kerala**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Paddy	ICM	2	Uma	20	2.20	58.27	52.405	11.19	55263	1.84	44462	0.67
	Improved variety	2	Shreyas	21	5.00	45.41	44.47	1.82	64676	2.68	57686	2.28
	INM	1	Uma	10	1.00	33.50	28.70	16.72	21454	1.35	15437	1.27
	IDM	3	Uma , Jyothi, Athira	25	4.75	42.02	34.25	20.48	29877	1.50	14297	1.39
	IPM	1	Uma	10	0.20	60.00	40.00	50.00	84750	1.69	40000	1.80
	Water management	1	Jyothy	15	3.00	33.10	25.00	32.40	8975	1.10	-575	0.99
	Organic farming	1	Njavara	10	0.80	20.00	12.00	66.67	110000	2.22	40000	1.50
<b>Grand total</b>				<b>111</b>	<b>16.95</b>	<b>41.76</b>	<b>33.83</b>	<b>28.47</b>	<b>53571</b>	<b>1.77</b>	<b>30187</b>	<b>1.41</b>

ICM: Integrated Crop Management, IPM: Integrated Pest Management, INM: Integrated Nutrient Management, IDM: Integrated Disease Management



**Demonstration on false smut management in paddy by KVK, Palakkad**

**Puducherry:** A total of 15 FLDs on paddy covering an area of 2.4 ha have recorded 70.4% increase in yield with INM and 24.40 % with IPM technologies as compared to farmers practice during the year (Table 27).

These technologies together gave 54 q/ha as compared to only 37.80 q/ha under farmers practice. The BCR was higher in both the technologies as against farmers' practice.

**Table 27: Frontline demonstrations on cereals conducted by the KVKs of Puducherry**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Paddy	INM (Irri)	1	TRY3	5	2.00	51.09	29.99	70.36	48454	2.49	26846	1.91
	IPM (Irri)	1	White ponni	10	0.40	56.64	45.55	24.35	113376	5.63	105703	4.72
<b>Grand total</b>				<b>15</b>	<b>2.40</b>	<b>53.87</b>	<b>37.77</b>	<b>47.36</b>	<b>80915</b>	<b>4.06</b>	<b>66275</b>	<b>3.32</b>

### 3.1.4.2 Oilseeds

During the year, 575 FLDs were conducted by KVKs of Karnataka, Tamil Nadu and Kerala states under ATARI, Zone-VIII covering groundnut, safflower, sesame, linseed and soybean in an area of 219 ha in farmers' fields. State wise and crop wise results are presented in the foregoing discussion.

**Karnataka:** During the year, 144 FLDs in groundnut, 85 in linseed, 15 in mustard, 20 in safflower, 29 in sesame, 92 in soybean, and 65 in sunflower were conducted by KVKs of Karnataka under oilseeds in an area of 175 ha in farmers' fields (Table 28). Groundnut crop performed better under technology demonstrations such as new variety G2-52, IPM, ICM and variety introduction (KCG-6) with better BCR as compared to farmers practice. The highest yield of 28.75 q/ha was recorded by

variety ICGV-91114 in rice fallow. Linseed variety NL-115 recorded 6.55 q/ha as compared to farmers variety with 5.30 q/ha. The mustard crop in rabi season has recorded an average of 6.40 q/ha under demonstrations as compared to 4.70 q/ha with farmers practice. In safflower, pest management technology gave better yield followed by variety demonstration with an overall yield of 12.50 q/ha under demonstrations as compared to 11.00 q/ha in farmers practice. The technologies like ICM and variety introduction in sesame gave better yield and economic returns as compared to their local check. In soybean, demonstration on ICM, IDM and IPM have outperformed local farmers practice with over 25.4% increase in yield and better BCR. The sunflower demonstrations with ICM gave 16.50 q/ha yield as compared to 11.30 q/ha in farmers' practice.

**Table 28: Frontline demonstrations on oilseeds conducted by KVKs of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Groundnut	ICM (P Irri)	7	G2-52, GPBD-4, K-6, GKVK-5	110	42	18.89	14.85	26.31	55900	3.21	54762	3.94
	Variety introduction (Rice fallow)	1	ICGV-91114	14	3	28.75	28.50	0.88	102433	5.26	101333	5.21
	Variety introduction (Rf)	1	KCG-6	5	2	8.38	7.20	16.39	18070	1.92	14900	1.85
	Variety Introduction (Rf)	1	G2-52	5	2	12.40	9.00	37.78	35700	2.78	20630	2.03
	IPM (Rf)	1	Local	5	2	3.84	2.98	28.86	5508	1.38	2544	1.20
	Nutrient management (Rf)	1	GPBD-4	5	2	6.20	5.50	12.73	7800	1.24	1250	1.04
<b>Sub total</b>				<b>144</b>	<b>53.00</b>	<b>13.08</b>	<b>11.34</b>	<b>20.49</b>	<b>37569</b>	<b>2.63</b>	<b>32570</b>	<b>2.55</b>

Contd.... P.25



Linseed	Improved variety (Rf)	2	NL-115	35	12.00	6.55	5.30	23.37	13060	2.09	8700	1.75
	ICM (Rf)	1	PKVNL 260	50	20.00	2.18	1.69	28.99	10780	2.39	5469	1.61
<b>Sub total</b>				<b>85</b>	<b>32.00</b>	<b>4.37</b>	<b>3.50</b>	<b>26.18</b>	<b>11920</b>	<b>2.24</b>	<b>7085</b>	<b>1.68</b>
Mustard	Importance of bee pollination (R fallow)	1	Local	5	2.00	5.50	3.52	56.25	16429	3286.80	7866	3.10
	Variety introduction (Rf)	1	NRCHB-101	10	4.00	7.34	5.91	24.20	8729	2.31	5936	1.92
<b>Sub total</b>				<b>15</b>	<b>6.00</b>	<b>6.42</b>	<b>4.72</b>	<b>40.23</b>	<b>12579</b>	<b>1644.56</b>	<b>6901</b>	<b>2.51</b>
Safflower	Improved variety (Rf)	1	A1	10	4.00	17.75	16.30	8.90	35380	2.98	31030	2.74
	IPM (Rf)	1	S-144	10	4.00	7.20	5.93	21.42	4564	1.26	2316	1.14
<b>Sub total</b>				<b>20</b>	<b>8.00</b>	<b>12.48</b>	<b>11.12</b>	<b>15.16</b>	<b>19972</b>	<b>2.12</b>	<b>16673</b>	<b>1.94</b>
Sesamum	Variety introduction (R fallow)	1	DS-5	7	3.00	4.20	4.00	5.00	14300	1.74	6000	1.33
	ICM (Rf)	2	GT-1, KAU-1	22	10.00	6.53	4.985	32.33	30791	3.04	22043	2.76
<b>Sub total</b>				<b>29</b>	<b>13.00</b>	<b>5.37</b>	<b>4.49</b>	<b>18.67</b>	<b>22546</b>	<b>2.39</b>	<b>14022</b>	<b>2.05</b>
Soybean	ICM (Rf)	2	Dsb-21, JS-335	22	9.00	20.17	15.90	26.75	24152	1.98	14616	1.65
	IDM (Rf)	1	Dsb-22	5	2.00	19.30	15.70	22.93	24576	1.83	15080	1.52
	IPM (Rf)	1	JS - 9305	65	26.00	17.60	13.92	26.44	35902	2.76	27078	2.56
<b>Sub total</b>				<b>92</b>	<b>37.00</b>	<b>19.02</b>	<b>15.17</b>	<b>25.37</b>	<b>28210</b>	<b>2.19</b>	<b>18925</b>	<b>1.91</b>
Sunflower	ICM (Rf)	1	MSFH-17	65	26.00	16.50	11.30	46.02	44670	2.63	25947	2.12
<b>Grand total</b>				<b>450</b>	<b>175.00</b>							

R fallow: Rice fallow, Irri.: Irrigated; Rf: Rainfed



**Demonstration of ICM in Sunflower by KVK, Shivamogga**

**Tamil Nadu:** A total of 112 FLDs in groundnut and 7 in sesame were organized by KVKs of Tamil Nadu covering a total area of 41.80 ha during the year (Table 29). The groundnut yield increased under demonstrations by 30.97% as compared to farmers practice due to various technologies like ICM, variety, mechanization, resource conservation technology etc. The average BCR under demonstrations was 2.41 as compared to only 1.90 under farmers practice. In sesame, crop management technology gave an increase of 14% in yield over farmers practice.

**Table 29: Frontline demonstrations on oilseeds conducted by KVKs of Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Groundnut	Farm mechanization (Irri)	3	ICGV 91114, Co-7	30	8.00	26.43	21.50	22.86	89655	2.90	67749	2.51
	ICM (Irri)	2	Co-2, VRI-8	20	8.00	22.11	17.29	28.75	62765	2.80	41915	2.39
	ICM (Rf)	1	Co 6	47	19.00	12.56	10.52	19.39	51478	2.71	30870	1.81
	Resource conservation technology (Rf)	1	Local	5	2.00	12.50	8.25	51.52	33250	1.94	15000	1.47
	Varietal introduction (Rf)	1	VRI 8	10	2.00	21.70	16.40	32.32	50830	1.69	21715	1.30
<b>Sub total</b>				<b>112</b>	<b>39.00</b>	<b>19.06</b>	<b>14.79</b>	<b>30.97</b>	<b>57596</b>	<b>2.41</b>	<b>35450</b>	<b>1.90</b>
Sesamum	ICM (Irri)	1	VRI 2	7	2.80	7.11	6.24	13.94	20081	1.89	15935	1.74
<b>Grand total</b>				<b>119</b>	<b>41.8</b>							

Irri.: Irrigated; Rf: Rainfed



**Kerala:** In rice fallows, 6 FLDs on sesame were conducted in 2 ha area in the state of Kerala. The varieties Thilak and

Thilarani recorded an average yield of 2.29 q/ha with net returns of Rs 8400/ha (Table 30).

**Table 30: Frontline demonstrations on oilseeds conducted by KVKs of Kerala**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Demo yield (q/ha)	Economics of demo	
							Net returns	BCR
Sesamum	Variety introduction	1	Thilak	3	1.00	2.38	8600	1.69
	Variety introduction	1	Thilarani	3	1.00	2.20	8200	1.66
<b>Grand total</b>				<b>6</b>	<b>2.00</b>	<b>2.29</b>	<b>8400</b>	

### 3.1.4.3 Pulses

A total of 1125 demonstrations were undertaken on major pulses in 430 ha area of farmers' fields by the KVKs of ATARI, Zone-VIII during the year. State and technology wise results are presented in the foregoing discussion.

**Karnataka:** A total FLDs of 228 in bengalgram, 75 in blackgram, 85 in greengram, 319 in pigeonpea, 60 in fieldbean and 10 each in cowpea and lentil were organized by KVKs of Karnataka covering an area of 316 ha (Table 31).

In bengalgram, INM, ICM, IPM and IPDM technologies gave an average increase of 21.12% in

yield over their local check. The highest yield of 13.70 q/ha was recorded in INM followed by 11.3 q/ha in ICM technology. The technologies such as ICM, INM and variety-Rasmi demonstration in blackgram gave an average higher yield of 9 q/ha as compared to local check (7.14 q/ha). The ICM technology has outperformed other technologies in blackgram with 28.50% increase over check. In greengram, ICM demonstrations gave an increase of 27.58% over farmers' practice. In pigeon pea, overall yield increase due to technology demonstration was 29% over local check. The technology like variety, IPM and intercropping systems gave superior yield over other technologies. The ICM demonstration in cowpea, lentil and fieldbean also performed superior over their local check with better economic returns.

**Table 31: Frontline demonstrations on pulses conducted in the state of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Bengalgram	ICM (Rf)	6	GBM-2, JAKI19018, JG-11	168	67.20	11.31	9.49	20.54	38283	2.82	27903	2.31
	IPDM (Rf)	1	JG-11	25	10.00	9.10	7.50	21.33	11735	1.63	7625	1.44
	IPM (Rf)	1	JG-11	25	10.00	9.20	7.39	24.49	31260	2.48	21975	2.09
	INM (Rf)	1	Jakie-9218	10	4.00	13.70	11.60	18.10	61110	2.76	49800	2.52
<b>Sub total</b>				<b>228</b>	<b>91.20</b>	<b>10.83</b>	<b>9.00</b>	<b>21.12</b>	<b>35597</b>	<b>2.42</b>	<b>26826</b>	<b>2.09</b>
Blackgram	ICM (Rf)	1	DU-1	25	10.00	10.28	8.00	28.50	54865	4.36	42379	3.79
	INM (Rf)	1	Rashmi	10	2.00	10.16	8.10	25.07	66000	2.10	30000	1.60
	Improved Variety (Rf)	2	Rashmi (LBG-625)	40	16.00	6.46	5.31	21.25	27893	2.41	19732	2.06
<b>Sub total</b>				<b>75</b>	<b>28.00</b>	<b>8.97</b>	<b>7.14</b>	<b>24.94</b>	<b>49586</b>	<b>2.96</b>	<b>30704</b>	<b>2.48</b>

Contd.... P.27

Greengram	ICM (Rf)	3	BGS-9, DGGV-2	85	34.00	8.79	6.90	27.58	26827	3.06	19582	2.60
Cowpea	ICM (Rf)	1	C-152	10	4.00	9.46	6.47	46.21	32338	3.47	18417	2.46
Lentil	ICM (Rf)	1	IGVV-3	10	4.00	6.75	5.51	22.50	15150	2.44	9748	1.87
Fieldbean	ICM (Rf)	6	HA-4	60	25.40	22.17	17.92	24.79	38432	2.92	27775	2.50
Pigeonpea	IPM (Rf)	2	BRG-1, BRG-2	85	34.00	3.73	3.19	17.43	-1837	0.92	-3190	0.83
	IFS (Rf)	1	BRG-5	1	0.40	6.80	4.30	58.14	21200	2.66	12600	2.42
	Variety introduction (Rf)	1	BRG-5	24	10.00	7.90	5.10	54.90	23508	2.70	12650	2.36
	ICM (Rf)	7	BRG-5, GRG-811, TS-3R	187	76.00	13.91	11.76	16.31	49133	3.23	37414	2.78
	Intercropping Pigeonpea+ soyaben	1	TS3R, JS335	12	4.80	18.90	16.50	14.55	84896	4.50	62932	4.11
	Intercropping Pigeonpea+maize	1	TS-3R	10	4.00	24.26	21.50	12.84	10328	1.35	6063	1.28
<b>Sub total</b>				<b>319</b>	<b>129.20</b>	<b>12.58</b>	<b>10.39</b>	<b>29.03</b>	<b>31205</b>	<b>2.56</b>	<b>21412</b>	<b>2.30</b>
<b>Grand total</b>				<b>787</b>	<b>315.80</b>							

Rf: Rainfed, ICM: Integrated Crop Management, IPM: Integrated Pest Management, INM: Integrated Nutrient Management, IDM: Integrated Disease Management



**Demonstration of INM in bengalgram by KVK, Chikkaballapur**

**Tamil Nadu:** A total of 35 FLDs in bengalgram, 50 in blackgram, 90 in greengram, 20 in pigeonpea and 10 in field bean were implemented in 78 ha area of farmers' field by the KVKs of Tamil Nadu during the year (Table 32). In general yield levels were lower in pulses this year due to deficient rainfall in the state of Tamil Nadu.

In Bengalgram, variety demonstration (JAKI-9218) gave 25.5% increase in yield over local check yield of 6.40 q/ha. The yield recorded was however, highest with ICM technology demonstration with 11 q/ha. In blackgram, technologies like intercropping system, variety VBN-8, ICM and mechanization gave an increase of 25% in yield over local check. The average yield under technology was 6.38 q/ha as compared to 5.30 q/ha under farmers practice. In greengram variety demonstration of Co-7, Co-8 and ICM technologies registered over 67% increase in yield over local check. The average yield under technology demonstrated was 6.90 q/ha as compared to only 4.90 q/ha under farmers practice. The technologies such as ICM and variety demonstration of BRG-4 in pigeonpea gave 35.60% increase in yield over farmers practice (7.2 q/ha). Fieldbean also recorded over 39% increase in yield under demonstrations as compared to farmers' practice.

**Table 32: Frontline demonstrations on pulses conducted by KVKs, Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Bengalgram	Variety introduction-(Rf)	1	JAKI-9218	10	4.00	7.98	6.36	25.47	25854	2.17	17691	1.87
	ICM (Rf)	1	Co-4	25	10.00	11.14	10.30	8.16	32900	1.53	24386	1.39
<b>Sub total</b>				<b>35</b>	<b>14.00</b>	<b>9.56</b>	<b>8.33</b>	<b>16.815</b>	<b>29377</b>	<b>1.85</b>	<b>21039</b>	<b>1.63</b>

Contd.... P.28

Blackgram	Farm mechanization (Irri)	1	VBN-8	10	4.00	8.72	7.59	14.89	58405	3.91	44864	2.91
	ICM (Rf)	2	VBN-6, ADT-3	20	8.00	5.39	4.51	22.22	31197	2.04	22085	1.75
	Intercropping (Irri)	1	VBN (Bg) 6	10	4.00	3.60	2.60	38.46	28689	2.59	0	
	Variety introduction (Rf)	1	VBN-8	10	4.00	7.80	6.30	23.81	24200	2.64	17520	2.25
<b>Sub total</b>				<b>50</b>	<b>48.00</b>	<b>6.38</b>	<b>5.25</b>	<b>24.85</b>	<b>35623</b>	<b>2.80</b>	<b>21117</b>	<b>2.30</b>
Greengram	ICM (Rf)	1	Co(gg) 6 &8	50	20.00	7.44	6.18	20.25	30388	2.68	21661	2.17
	Mechanization (Rf)	1	Co-8	10	4.00	2.60	0.99	162.63	-5511	0.72	-16349	0.25
	Variety introduction (Irri)	1	Co-7	10	4.00	9.00	6.10	47.54	34300	2.74	18100	1.98
	Variety introduction (Irri)	1	CO-8	20	4.00	8.53	6.21	37.41	33374	2.99	20343	2.54
<b>Sub total</b>				<b>90</b>	<b>88.00</b>	<b>6.89</b>	<b>4.87</b>	<b>66.96</b>	<b>23138</b>	<b>2.28</b>	<b>10939</b>	<b>1.74</b>
Pigeon pea	Variety introduction (Rf)	1	BRG-4	10	4.00	8.13	6.18	31.55	30200	2.63	20580	2.27
	ICM (Rf)	1	Co-7	10	4.00	11.39	8.16	39.58	35750	2.52	20041	1.96
<b>Sub total</b>				<b>20</b>	<b>8.00</b>	<b>9.76</b>	<b>7.17</b>	<b>35.56</b>	<b>32975</b>	<b>2.575</b>	<b>20311</b>	<b>2.115</b>
Field lab lab	IPM (Rf)	1	Co-2	10	4.00	11.70	8.40	39.29	32853.4	2.57	17754.1	1.89
<b>Grand total</b>				<b>205</b>	<b>78.00</b>							

Irri: Irrigated, Rf: Rainfed, ICM: Integrated Crop Management, IPM: Integrated Pest Management



**Demonstration of Co-7 greengram by KVK, Sivagangai**

**Kerala:** A total of 63 FLDs were conducted in blackgram and greengram during the year by the KVKs of Kerala state (Table 33). Crop production technology demonstration recorded a yield of 8.00 q/ha in blackgram, whereas in greengram, it was 9.28 q/ha. The overall yield due to technologies demonstration in greengram was 6.90 q/ha as compared to 5.30 q/ha in farmers practice under rice fallow lands.

**Table 33: Frontline demonstrations on pulses conducted in Kerala**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Blackgram	Crop production (R fallow)	1	LBG-752	10	1.00	8.07	-	-	31107	1.47	-	-
Greengram	Crop production (R fallow)	1	Co (gg) 8	10	1.00	9.28	6.89	34.76	15584	1.22	7942	1.15
Greengram	INM (Rf)	1	Co-8	13	4.00	5.38	3.63	48.21	6558	1.44	1674	1.13
Greengram	Introducing pulse crop (Rf)	1	Co-6	10	1.00	7.37	-	-	25968	1.64	-	-
Greengram	Variety introduction (R fallow)	2	Co-8	20	1.12	4.47	-	-	32406	2.72	-	-
<b>Sub total</b>				<b>53</b>	<b>7.12</b>	<b>6.91</b>	<b>5.26</b>	<b>41.49</b>	<b>22325</b>	<b>1.70</b>	<b>4808</b>	<b>1.14</b>
<b>Grand total</b>				<b>63</b>	<b>8.12</b>							

R fallow: Rice fallow, Rf: Rainfed

**Puducherry:** In blackgram and greengram, 35 FLDs each were conducted with ICM technology by the KVKs of Puducherry during the year which gave an average increase of 42% in yield over farmers practice (Table 34).

**Table 34: Frontline demonstrations on pulses conducted by KVKs of Puducherry**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Blackgram	ICM	2	VBN-6	35	14.00	8.475	6.17	39.61	33590	2.46	16525	1.77
Greengram	ICM	2	Co-8	35	14.00	7.12	5.26	43.33	21270	2.03	10380	1.52
<b>Grand total</b>				<b>70</b>	<b>28.00</b>	<b>7.80</b>	<b>5.72</b>	<b>41.47</b>	<b>27430</b>	<b>2.25</b>	<b>13453</b>	<b>1.65</b>

ICM: Integrated Crop Management



**Demonstration of crop management practices in green gram by KVK, Puducherry**

#### 3.1.4.4 Commercial crops

A total of 83 demonstrations were organized on major commercial crops covering an area of 30 ha during the year by the KVKs of Karnataka and Tamil Nadu under ATARI, Zone-VIII. State and technology wise results are presented below:

**Karnataka:** A total of 48 demonstrations were conducted by KVKs in commercial crops like sugarcane, mulberry and betelvine in about 20 ha area in the state of Karnataka (Table 35).

In sugarcane, non-flowering variety and ICM demonstrations could give an average increase of 19.20% in yield as compared to farmers' practice. In mulberry, the results revealed that mulberry leaf yield increased by 22.00% due to ICM and 16.30 % due to INM technology demonstrations as compared to local check. The BCR was highest in sugarcane (3.54) followed by mulberry with ICM technology (1.93) as compared to other crops and technologies in commercial crops. In betel leaf, the INM technology demonstration gave 7 lakh leaves/ha as compared to 5.75 lakh leaves/ha in check plot.

**Table 35: Frontline demonstrations on commercial crops conducted by KVKs of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Sugarcane	Non flowering variety introduction(Irri)	1	SNK07680	10	4.00	141.20	117.10	20.58	242359	2.34	176100	2.01
	ICM (Irri)	2	Co-86032	15	6.00	124.80	104.80	17.82	225625	3.54	171625	2.87
<b>Sub total</b>				<b>25</b>	<b>10.00</b>	<b>133.00</b>	<b>111.00</b>	<b>19.20</b>	<b>233992</b>	<b>2.90</b>	<b>173863</b>	<b>2.40</b>
Mulberry	ICM (Irri)	1	V1	3	4.00	530 (68 kg cocoon)	434 (58 kg cocoon)	22.12	322540	1.93	139510	1.46
	INM (Irri)	1	V1	10	4.00	115.40	99.20	16.33	59257	2.77	49387	2.52
<b>Sub total</b>				<b>23</b>	<b>8.00</b>							
Betelvine	INM (Irri)	1	Local	10	2.00	7 lakh leaves	5.75 lakh leaves	21.74	31900	1.83	9050	1.24
<b>Grand total</b>				<b>48</b>	<b>20.00</b>							

Irri.: Irrigated, ICM: Integrated Crop Management, INM: Integrated Nutrient Management



**Demonstration of ICM in mulberry leaf production by KVK, Belagavi-I**

**Tamil Nadu:** A total of 35 demonstrations were conducted by KVKs of Tamil Nadu in sugarcane covering an area of 10 ha during the year (Table 36).

The results revealed that the demonstration of crop production practices and IPM gave an average increase of 23.3% in cane yield besides higher net returns and BCR.

**Table 36: Frontline demonstrations on commercial crops conducted in Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Sugarcane	Crop production (Irri)	1	CoC 86032	10	0.20	926.00	720.00	28.61	5088	1.37	3197	1.21
	IPM (Irri)	2	CoC 86032	25	10.00	866.50	738.00	17.97	137584	2.97	105410	2.58
<b>Grand Total</b>				<b>35</b>	<b>10.20</b>	<b>896.00</b>	<b>729.00</b>	<b>23.30</b>	<b>71336</b>	<b>2.17</b>	<b>54304</b>	<b>1.90</b>

Irri.: Irrigated, IPM: Integrated Pest Management

### 3.1.4.5 Fibre crops

During the year, 50 demonstrations on cotton varieties were organized by one KVK in Karnataka and four KVKs in Tamil Nadu state covering 20 ha. State and technology wise results are discussed below:

**Karnataka:** Ten FLDs on ICM technology in cotton covering 4 ha were conducted during the year in Karnataka (Table 37). The seed cotton yield was 38.3% higher in the demonstration as compared to farmers practice with better BCR.

**Table 37: Frontline demonstrations on fibre crops conducted by KVKs of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
					Demo	Check		Net returns	BCR	Net returns	BCR
Cotton	ICM (Irrigated)	1	10	4.00	44.42	32.13	38.25	165401	2.79	100594	2.17

ICM: Integrated Crop Management

**Tamil Nadu:** Forty FLDs were conducted on cotton varieties during the year by the four KVKs of Tamil Nadu covering 16 ha area in the farmers' fields. Demonstration of IPM gave 35.3% higher seed cotton yield followed by crop production technology demonstration with 26%

increase in seed cotton yield as compared to their local check practices (Table 38). The average seed cotton yield obtained under demonstrations was 20 q/ha as compared to 15 q/ha under local check.

**Table 38: Frontline demonstrations on fibre crops conducted by KVKs of Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Cotton	Crop production (Irri)	1	SVPR2 & MDU1	10	4.00	16.45	13.07	25.86	32944	1.74	20739	1.51
	IPM (Irri)	3	RCH 659, Surabi, SVPR2	30	12.00	23.84	17.40	35.29	67989	2.31	28637	1.66
<b>Grand total</b>				<b>40</b>	<b>16.00</b>	<b>20.14</b>	<b>15.23</b>	<b>30.57</b>	<b>50466</b>	<b>2.02</b>	<b>24688</b>	<b>1.58</b>

Irri.: Irrigated, IPM: Integrated Pest Management

### 3.1.4.6 Fodder crops

During the year, 358 demonstrations were conducted on the production of fodder crops including mixed fodder production in about 70 ha in Karnataka, Tamil Nadu, Kerala and Puducherry.

The state wise and technology wise results are presented below:

**Karnataka:** A total of 125 demonstrations were conducted on fodder crops covering an area of 27.4 ha by KVKs in Karnataka during the year (Table 39). The technologies such as cultivation of improved varieties of fodder such as Co(fs)29, DHN-6, fodder cowpea variety KBC-2, fodder horse gram variety PHG-9, besides crop cafeteria, ICM and mixed fodder for enhanced nutritive value were implemented.

**Table 39: Frontline demonstrations on fodder crops conducted by KVKs of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Fodder	Improved varieties (Rf)	1	Co-FS (29)	10	4.00	560.00	506.00	10.67	29050	2.84	25530	2.71
Fodder	Improved variety of fodder (Irri)	4	CoFS 29	50	6.00	713.00	318.00	43.20	19851	2.87	17245	2.07
Fodder	Improved variety(Rf)	1	DHN-6	5	4.00	600.00	-	-	7040	3.64	-	-
Fodder crops	Fodder cowpea (Irri)	1	KBC-2	10	0.50	130.00	95.00	36.84	19000	1.95	12500	1.78
Fodder Horse gram	Fodder horse gram (Rf)	1	PHG-9	2	0.01	69.00	55.00	25.45	5475	1.41	4300	1.35
Fodder	Fodder cafeteria (Irri)	1	Co(FS)-29, Lucerne, multi cut sorghum, DHN-18, BH-18	5	2.50	800.80	-	-	-	-	-	-
Fodder	Fodder cafeteria (Irri)	1	Lucerne, Fodder maize, Ots, Styloxanthus, Hedge lucern	5	1.00	24.40	-	-	-	-	-	-
Fodder cafeteria	ICM in mixed fodder production (Irri)	1	Napier + MP Charry Jowar + Lucerne + Chogache	10	2.00	28.20	19.80	42.42	9415	1.50	5200	1.36
Fodder	ICM (Irri)	2	DHN-6	12	5.01	605.00	170.00	168.00	43312	1.96	8681	1.52
Fodder Crops	Seed material production (Irri)	1	DHN 6, Lucerne & Co(FS)-29	15	2.00	2670.00	2123.00	25.77	35213	2.24	23647	1.81
Fodder napier	Fodder crops in IFS (Irri)	1	DHN-6	1	0.40	63.00	45.00	40.00	15000	1.91	9300	1.70
<b>Grand Total</b>				<b>125</b>	<b>27.42</b>							

Irri: Irrigated, Rf: Rainfed, ICM: Integrated Crop Management



**Demonstration of multi-cut fodder DHN-6 by KVK, Bagalkot**

**Tamil Nadu:** A total of 196 FLD on fodder cowpea, mixed fodder, fodder, dual purpose sorghum, fodder grass, fodder lucerne, fodder sorghum and guinea grass were conducted in 40.65 ha farmers' fields during the year by KVKs of Tamil Nadu (Table 40).

The results on fodder crops revealed that the fodder sorghum gave 1000 q/ha green fodder with higher BCR (2.29).

**Table 40: Frontline demonstrations on fodder crops conducted in Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Fodder cowpea	Varietal introduction (Rf)	4	Co 9	50	12.00	123.05	110.40	26.80	21070	2.56	15324	2.16
Mixed fodder	Varietal introduction (Irri)	6	Co(FS)31, HL. CNC5. Sesbania grandiflora, Agathi	51	5.65	219.75	92.76	98.45	53628	2.64	42597	2.18
Dual purpose fodder sorghum	Fodder crops (P Irri)	1	K 12	10	1.00	214.00	184.00	16.30	29630	2.20	21915	1.89
Fodder grass	Production technology (Irri)	1	Co(BN)5	10	2.00	3101.00	2903.00	6.81	66010	2.14	56878	1.96
Fodder grass	Fodder production (Irri)	1	Co (FC)8	5	1.00	114.00	-	-	-	-	-	-
Fodder lucern	Fodder production (Irri)	1	Velimasal	5	1.00	235.40	-	-	-	-	-	-
Fodder sorghum	Varietal introduction (Irri)	6	Co(FS) 31	55	17	998.87	908.10	19.74	58380	2.78	41580	2.29
Guinea grass	Fodder cultivation (Rf)	1	Co(GG)3	10	1	148.20	117.40	26.24	74886	2.01	43014	1.58
<b>Grand total</b>				<b>196</b>	<b>40.65</b>							

Irri: Irrigated, Rf: Rainfed


**FLD on fodder sorghum Co(FS) 31 by KVK, Erode**

**Kerala:** A total of 32 FLDs were organized by two KVKs of Kerala on hydroponic fodder maize and Co-5 fodder grass production technologies covering an area of 0.80 ha mostly in the homesteads during the year (Table 41). The results indicated an increased fodder yield to the extent of 11% in Co-5 fodder grass obtained under demonstration over their local check. In hydroponic fodder production, 0.05 q/kg green fodder of maize was obtained per kg of maize seed with a BCR of 2.50.

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

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Fodder	Hydroponic fodder production	1	Maize	12		0.05	-	-	2878	2.50	-	-
Fodder	Introduction of fodder grass variety	1	Cumbu Napier- Co-5	20	0.80	1420.00	1280.00	10.94	124532	2.41	103532	2.17
<b>Grand total</b>				<b>32</b>	<b>0.80</b>							





**Hydroponic method of fodder production by KVK Alleppey**

**Puducherry:** A total of five demonstrations were implemented on fodder production technology in napier grass in Puducherry with an average yield of 1850 q/ha green grass (Table 42).

**Table 42: Frontline demonstrations on fodder crops conducted by KVKs of Puducherry**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Fodder	Fodder production technology (Irrigated)	1	Cumbu Naiper Co-5	5	1	1850	0	100.00	15326	3.37	0	0.00

**3.1.4.7 Vegetable crops**

Vegetable crops such as amaranthus, brinjal, cabbage, chilli, field bean, pole bean, cluster bean, french bean, dolichos bean, onion, tomato, lab lab, gourds, yard long bean, watermelon, carrot, cucurbits and vegetable cowpea were demonstrated with improved technologies in 1149 farmers’ fields covering about 281 ha by the KVKs of ATARI, Zone-VIII. State and technology wise results are presented below:

**Karnataka:** A total of 361 FLDs were conducted in major vegetables covering about 105.75 ha by the KVKs of Karnataka during the year (Table 43).

Cultivation of amaranthus in 5 farmers’ fields recorded 56% increased green leaf yield (BCR 4.04) as compared to

farmers practice (BCR 3.41). In bhendi, demonstration of ICM technology recorded on an average yield of 116 q/ha (33% higher) as compared their local check (87 q/ha). IPDM in bitter gourd recorded an average yield of 97.50 q/ha with BCR of 3.43. In brinjal, ICM technology gave 33.50% increase in yield over their local check. Similarly, IPM and ICM in cabbage gave an average yield of 347 q/ha as compared to local check with only 301.56 q/ha. ICM demonstration in carrot and cauliflower also gave 33 and 15% increased yield respectively over their local checks. Green chilli demonstrated under ICM practices gave 11% increase in green chilli yield over farmers’ practice. Cowpea variety arka garima gave 19.13% yield increase over the check.. In cucumber, ICM and INM technologies gave 29 and 18% increase in yield respectively

over their local checks. In french bean, ICM, variety and intercropping in arecanut plantation technologies gave an increased yield to the extent of 33.66% over their local check. Similarly, field bean intercropping in arecanut also gave higher yield to the extent of 18.50 q/ha as compared to sole crop with only 13.40 q/ha. In onion, INM, ICM, improved variety Bheema Shakti and Bheema super and seed production technologies were demonstrated through 99 FLDs. All the technologies gave higher yield ranging from 18 to 28% except in seed production technology. The seed production technology in onion resulted in less yield as compared to farmers' practice, but BCR was higher at 4.14. IPM in pole bean gave higher yield of 191 q/ha, which is 38% higher over check. In tomato,

ICM, improved variety and IPM technologies resulted in an increased yield by 13.4% over farmers' practice. The nutrition garden demonstrated in schools by six KVKs through 29 demonstrations gave on an average 150 q/ha mixed vegetable yield per annum. The integrated weed management and IPDM technologies demonstrated in watermelon recorded an average of 417 q/ha as compared to check (319 q/ha). The BCR was higher with IPDM at 3.6 as compared to weed management (3.15). In yard long bean, improved variety and ICM gave average of 60% increased yield over checks. The BCR was 3.18 with demonstrations as compared to 2.73 in farmers check variety and production practices.

**Table 43: Frontline demonstrations on vegetables crops conducted by KVKs of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Amaranthus	Variety evaluation (Irri)	1	Arka Suguna	5	1.00	202.16	129.70	55.87	380400	4.04	229250	3.41
Bhendi	ICM (Irri)	1	Halu bhendi	5	0.80	115.50	87.00	32.76	338530	3.74	234180	3.06
Bitter gourd	IPDM (P Irri)	1	Local	10	1.00	97.50	72.00	35.42	207780	3.43	121060	2.60
Brinjal	ICM (Irri)	1	MH- 9 & 10	10	2.00	351.05	262.90	33.53	201298	3.54	118905	2.52
Cabbage	IPM (Irri)	2	Guntur, Unnathi	7	7.00	388.61	314.62	20.51	206163	2.26	124296	1.62
	ICM (Irri)	1	Hari rani	10	4.00	305.50	288.50	5.89	28900	2.11	26730	2.06
<b>Sub total</b>				<b>17</b>	<b>11.00</b>	<b>347.06</b>	<b>301.56</b>	<b>13.20</b>	<b>117532</b>	<b>2.19</b>	<b>75513</b>	<b>1.84</b>
Carrot	ICM (Irri)	1	Belamagi Local	12	5.00	29.02	21.86	32.75	67816	3.87	43216	3.16
Cauliflower	ICM (Irri)	1	Golden 80	5	2.00	19.50	17.00	14.71	183093	6.81	152766	5.36
Chilli	ICM (Irri)	1	Sitara	5	2.00	179.82	162.32	10.78	100036	3.28	82976	2.77
Cowpea	Variety introduction (R fallow)	1	Arka Garima	10	1.00	173.10	145.30	19.13	216580	3.28	174040	2.99
Cucumber	ICM (Irri)	2	Dharwad green, Hassan local	15	8.00	90.60	75.93	28.80	88020	5.67	50060	4.11
	INM (Rf)	1	Local	10	2.00	7.30	6.20	17.74	11999	2.20	10007	1.83
<b>Sub total</b>				<b>25</b>	<b>10.00</b>	<b>48.95</b>	<b>41.07</b>	<b>23.27</b>	<b>50010</b>	<b>3.94</b>	<b>30034</b>	<b>2.97</b>
French bean	ICM (Irri)	2	Arka Jay, arka Anoop	11	3.20	93.15	80.95	14.48	131428	3.82	106095	3.50
	Intercropping in arecanut (Irri)	1	Arka Anoop	5	1.00	172.00	107.00	60.75	188800	3.12	141050	2.93
	Variety introduction (Irri)	2	Arka Sharath	15	3.00	190.75	152.75	25.74	236783	3.53	156760	2.86
<b>Sub total</b>				<b>31</b>	<b>7.20</b>	<b>151.97</b>	<b>113.57</b>	<b>33.66</b>	<b>185670</b>	<b>3.49</b>	<b>134635</b>	<b>3.10</b>

Contd.... P.35

Field bean	Intercropping in arecanut (Irri)	1	Hebbala Avare-4	13	5.20	18.49	13.44	37.57	31578	3.15	20492	2.56
Onion	INM (Irri)	1	Arka Kalyan	2	0.80	28.90	22.50	28.44	249180	5.59	189700	5.08
	ICM (Irri)	8	Arka Kalyan, Bheema Super, Bheema Shakti, Arka Niketan	82	31.00	161.22	136.10	19.31	62575	2.59	39277	2.05
	Improved variety(Rf)	1	Bhima Shakti	5	2.00	200.00	169.00	18.34	116500	4.49	93250	3.78
	Seed/plant production (Irri)	1	Bhima Super	5	2.00	931.00	2574.00	-63.83	694200	4.14	158900	2.61
	Improved variety(Rf)	1	Bhima Super	5	2.00	185.00	156.00	18.59	83650	3.54	48555	2.43
<b>Sub total</b>				<b>99</b>	<b>37.80</b>	<b>301.22</b>	<b>611.52</b>	<b>4.17</b>	<b>241221</b>	<b>4.07</b>	<b>105936</b>	<b>3.19</b>
Pole Beans	IPM (Irri)	1	Garuda	5	2.00	190.76	138.18	38.05	356700	3.97	192914	2.54
Tomato	ICM (Irri)	1	Arka rakshak	10	2.00	782.60	630.60	24.10	381912	4.70	282672	3.61
	New variety GPBT-08 (Irri)	1	GPBT-08	10	4.00	121.40	113.30	7.15	49307	2.38	35965	1.95
	IPM (Irri)	1	PTR-6	5	2.00	342.00	314.00	8.92	55983	1.77	35538	1.43
<b>Sub total</b>				<b>25</b>	<b>8.00</b>	<b>415.33</b>	<b>352.63</b>	<b>13.39</b>	<b>162401</b>	<b>2.95</b>	<b>118058</b>	<b>2.33</b>
Nutrition garden	Nutrition garden in schools (Irri)	6		29	1.75	150.00			3898	3.06		
Watermelon	Integrated weed management (Irri)	1	Namdhari 295	5	1.00	391.00	321.80	21.50	226700	3.15	123050	2.44
	IPDM (Irri)	1	NS - 295	5	2.00	443.14	317.00	39.79	223298	3.57	137400	2.63
<b>Sub total</b>				<b>10</b>	<b>3.00</b>	<b>417.07</b>	<b>319.40</b>	<b>30.645</b>	<b>224999</b>	<b>3.36</b>	<b>130225</b>	<b>2.54</b>
Yardlong bean	Variety introduction (Irri)	2	Arka Mangala	15	2.00	184.00	93.12	97.59	303000	3.96	218325	3.34
	ICM (Irri)	2	Arka Mangala	30	3.00	180.55	147.30	22.83	154381	2.40	118865	2.11
<b>Sub Total</b>				<b>45</b>	<b>5.00</b>	<b>182.28</b>	<b>120.21</b>	<b>60.21</b>	<b>228691</b>	<b>3.18</b>	<b>168595</b>	<b>2.73</b>
<b>Grand Total</b>				<b>361</b>	<b>105.75</b>							

Irri: Irrigated, Rf: Rainfed, ICM: Integrated Crop Management, IPM: Integrated Pest Management, IPDM: Integrated Pest & Disease Management, INM: Integrated Nutrient Management,



**Demonstration on IPDM in tomato by KVK, Bengaluru Rural**

**Tamil Nadu:** A total of 601 FLDs were taken up on major vegetable crops of the state covering 163.13 ha during the year (Table 44).

In amaranthus, high yielding cv. PLR-1 gave 28.50% higher green leaf yield with better BCR of 2.87 as compared local check with BCR of 2.34. Demonstration of ICM, disease management, IPDM, IPM, variety Co-4 of bhendi in 40 farmers' fields gave an average increased yield of 16% over local practice. In bitter gourd, ICM and IDM demonstrations gave 335 q/ha yield as compared to 261 q/ha in check plots. Eco-friendly pest and disease management, ICM, INM, IPDM, IPM and variety PLR-2 were the technologies demonstrated in brinjal by 113 farmers in the state of Tamil Nadu. The results showed

that these technologies performed superior to their local check practices. The variety Co (Gb)14 in bush type lab lab gave 107q/ha as compared to only 65 q/ha in the local variety. The technologies such as IDM and ICM demonstrated in the onion gave an average yield of 129 q/ha as compared to 111 q/ha in the farmers practice. In small onion, varieties Co-4 and Co-5 and ICM technologies demonstrated separately gave an increased yield ranging from 12 to 45% over their local checks. The cluster bean variety MDU-1 demonstration yielded 209.93 q/ha with higher BCR of 3.5 as compared to 169 q/ha and BCR of 2.59 in the local check. Ecological pest management and ICM technologies demonstrated in drumstick in 20 farmers' fields gave 18% higher yield over local check. ICM, improved variety-Co-14 and intercropping in plantation crops demonstrations on dolichos bean performed superior to local check by registering an increase of over 200%. In french bean, ICM and improved varieties Arka Suvidha and Arka

Sharath demonstrations gave 22% higher bean yield over their local checks. The average bean yield recorded under demonstrations was 123 q/ha as compared to 107 q/ha in the check. Organic farming in nutrition garden demonstrated in the schools gave 179 q/ha of mixed vegetables per annum. Demonstration of ICM in watermelon recorded 285 q/ha yield as compared to 233.5 q/ha in the farmers practice. Introduction of paprika as crop diversification resulted in higher net returns of Rs. 128512/ha as compared to farmers practice with only Rs. 82663/ha. ICM demonstration in ridge gourd gave 17.61% higher yield as compared to farmers practice. In snake gourd, crop management and as intercropping in drumstick were demonstrated by 18 farmers obtained an average of 411.85 q/ha yield as compared to 236.93 q/ha in the farmers practice. ICM demonstration in coriander leaf production gave 62.61 q/ha with BCR of 3.19. The sweet corn introduction of cv. Priya in 10 farmers' fields gave 77 q/ha with BCR of 2.43.

**Table 44: Frontline demonstrations on vegetables conducted by KVKs of Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Amaranthus	Introduction of new variety (Irri)	4	PLR -1	60	8.40	72.44	56.30	28.49	40707	2.87	26838	2.34
Bhendi	ICM (Irri)	1	Co-4	10	2.00	212.30	180.40	17.68	128036	2.75	97129	2.30
	IPDM (Irri)	1	Local	10	2.00	135.00	119.50	12.97	64638	1.92	45574	1.62
	IPM (Irri)	1	Sakthi	10	1.00	149.80	123.10	21.69	237018	4.06	171899	3.31
	Varietal introduction(Irri)	1	Co-4	10	4.00	250.00	223.10	12.06	113500	2.02	84100	1.72
<b>Sub total</b>				<b>40</b>	<b>9.00</b>	<b>186.78</b>	<b>161.53</b>	<b>16.10</b>	<b>135798</b>	<b>2.69</b>	<b>99676</b>	<b>2.24</b>
Bitter gourd	ICM (Irri)	1	Abhishek	10	2.00	423.48	326.75	29.60	578722	2.76	316137	1.93
	IDM (Irri)	1	Vivek	10	2.00	246.90	195.00	26.62	99112	1.67	38125	1.24
<b>Sub total</b>				<b>20</b>	<b>4.00</b>	<b>335.19</b>	<b>260.87</b>	<b>28.11</b>	<b>338917</b>	<b>2.22</b>	<b>177131</b>	<b>1.59</b>
Brinjal	Ecofriendly pest and disease management (Irri)	2	Local, PLR 2	25	7.00	293.43	246.35	22.93	146125	2.77	95918	2.29
	ICM (Irri)	2	Grafted Brinjal	10	3.12	336.45	225.37	30.86	236400	3.47	202043	3.43
	INM (Irri)	1	PLR(Br)-2	10	2.00	125.00	112.50	11.11	104280	2.38	85600	2.08
	IPDM (Irri)	1	VRM-1	10	2.00	343.97	285.08	20.66	267381	2.84	190635	2.26
	IPM (Irri)	5	Dhurva, PLR-2, Local, Ujala	50	15.00	174.38	140.73	28.00	282221	3.28	174698	2.52
	Variety introduction (Irri)	1	PLR-2	8	2.00	382.60	352.80	8.45	159325	3.27	126650	2.84
<b>Sub total</b>				<b>113</b>	<b>31.12</b>	<b>275.97</b>	<b>227.14</b>	<b>20.34</b>	<b>199289</b>	<b>3.00</b>	<b>145924</b>	<b>2.57</b>

Contd.... P.37

Bush type Lab lab	Varietal introduction-(Irri)	1	Co(Gb)-14	10	2.00	107.00	65.00	64.62	149465	3.37	38660	1.86
Onion	IDM (Irri)	1	Co-2	10	4.00	101.77	88.63	14.83	133173	2.89	107377	2.54
	ICM (Irri)	1	Local	10	4.00	155.60	132.50	17.43	232970	3.13	185150	2.74
<b>Sub total</b>				<b>20</b>	<b>8.00</b>	<b>128.69</b>	<b>110.57</b>	<b>16.13</b>	<b>183072</b>	<b>3.01</b>	<b>146264</b>	<b>2.64</b>
Samal onion	Varietal introduction (Rf)	1	Co-4	10	4.00	91.00	62.90	44.67	13019	2.83	5684.6	1.84
	Varietal introduction (Irri)	1	Co(On)-5	5	2.00	12.96	11.37	13.98	117130	2.43	83510	1.96
	ICM (Irri)	2	Co(On)-5	31	12.00	171.55	153.58	11.91	178573	2.81	142406	2.49
<b>Sub total</b>				<b>46</b>	<b>18.00</b>	<b>91.84</b>	<b>75.95</b>	<b>23.52</b>	<b>102907</b>	<b>2.69</b>	<b>77200</b>	<b>2.10</b>
Cluster bean	Varietal introduction and ICM (Irri)	8	MDU-1	82	18.00	209.93	169.21	27.53	80982	3.50	48425	2.59
Drumstick	Ecological pest management (Irri)	1	PKM-1	10	4.00	254.16	215.20	18.10	89500	2.85	62350	2.38
	ICM (Irri)	1	Aravakurichi local	10	2.00	120.78	102.24	18.13	125005	2.65	88487	2.07
<b>Sub total</b>				<b>20</b>	<b>6</b>	<b>187.47</b>	<b>158.72</b>	<b>18.12</b>	<b>107252</b>	<b>2.75</b>	<b>75419</b>	<b>2.23</b>
Dolichos bean	Intercropping (Irri)	1	Cov14	10	4.00	338.36	50.88	565.02	221970	2.53	37220	3.07
	Varietal introduction-(Irri)	2	Co(GB)-14	20	8.00	848.95	375.45	13.72	111905	2.16	37050	1.97
	ICM (Irri)	1	Co-14	10	4.00	83.89	64.91	29.24	56993	2.34	34033	1.79
<b>Sub total</b>				<b>40</b>	<b>16.00</b>	<b>423.73</b>	<b>163.75</b>	<b>202.66</b>	<b>130289</b>	<b>2.34</b>	<b>36101</b>	<b>2.28</b>
French bean	ICM (Irri)	2	Arka sharath, Arka Arjun	20	5.00	119.40	104.25	14.48	185773	3.59	142681	3.01
	Variety demonstration- (P Irri)	1	Arka Suvridha	10	4.00	82.20	56.60	45.23	6518	1.91	1680	1.23
	Varietal introduction-(Irri)	1	Arka Sharath	10	4.00	168.30	160.20	5.06	212851	3.91	145860	2.86
<b>Sub total</b>				<b>40</b>	<b>13.00</b>	<b>123.30</b>	<b>107.02</b>	<b>21.59</b>	<b>135047</b>	<b>3.14</b>	<b>96740</b>	<b>2.37</b>
Nutrition garden	Organic farming (Irri)	3	Mixed vegetables	24	0.21	178.60						
Watermelon	ICM (Rf)	2	Namdhari , Maharaja	20	8.00	285.05	233.46	22.00	367939	3.90	221744	2.65
Paprika	Crop diversification(Irri)	1	Hungarian Yellow wax	8	1.00	285.00	235.00	21.28	128512	2.72	82663	2.31
Ridgegourd	ICM (Irri)	1	MDU-2	10	4.00	167.00	142.00	17.61	71900	2.60	54400	2.21
Snake gourd	Crop management (Irri)	1	PLR-1	8	3.20	267.60	219.70	21.80	179196	2.78	118744	2.22
	Intercropping with drumstick (Irri)	1	Co(SG)-2, Drumstick-PKM-1	10	4.00	556.10	254.16	118.80	193900	2.80	89500	2.85
<b>Sub total</b>				<b>18</b>	<b>7.20</b>	<b>411.85</b>	<b>236.93</b>	<b>70.30</b>	<b>186548</b>	<b>2.79</b>	<b>104122</b>	<b>2.54</b>
Corianderleaf	ICM (Irri)	2	Arka Isha	20	5.20	62.61	45.00	46.15	67544	3.19	44063	2.35
Sweet Corn	Variety introduction-(Irri)	1	Priya	10	4.00	77.42	0		99132	2.43	0	
<b>Grand total</b>				<b>601</b>	<b>163.13</b>							

Irri: Irrigated, Rf: Rainfed, ICM: Integrated Crop Management, IDM: Integrated Disease Management, IPM: Integrated Pest Management, IPDM: Integrated Pest & Disease Management, INM: Integrated Nutrient Management



**Kerala:** A total of 175 demonstrations were laid out in vegetable crops like amaranthus, bhendi, bitter gourd, snake gourd, cowpea, pea, cucumber and winged bean covering an area of 10.60 ha mostly in the homestead farming (Table 45).

Amaranthus gave a yield of 494 q/ha green leaf with BCR of 3.47 when demonstrated as means to crop diversification. Disease management in amarathus was done organically in 20 farmers' fields, as leaves are consumed for vegetable purpose. IPM and organic farming technologies in bhendi led to 32% increased yield over check. In bitter gourd, farm mechanization technologies performed superior to farmers' practice and recorded 8.9% increased yield over check. IPM demonstration in brinjal

gave 413 q/ha as compared to only 237 q/ha in farmers' practice. The crop management technology in clove bean gave 15 q/ha with BCR of 1.29. The vegetable cowpea performed better with crop protection, INM, IPDM and organic disease management demonstrations by recording an average yield of 155.50 q/ha as compared to 124.50 q/ha in check. The varieties such as KPCH-1 and Subra, a new introduction in cucumber recorded 256 q/ha. The pea variety Arka Apoorva gave about 110 q/ha as compared to farmers variety with only 80.50 q/ha. Precision farming in terrace vegetable cultivation gave 2.75 q/ha of mixed vegetables for family use. Organic cultivation in winged bean recorded 216 q/ha as compared to only 188 q/ha in the farmers' practice.

**Table 45: Frontline demonstrations on vegetables conducted by KVKs of Kerala**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Amaranthus	Crop diversification (Irri)	1	Local	5	0.08	400.00			134645	3.92		
	Organic disease management (Rice fallow)	1	Arun	15	0.30	587.50			308750	3.01		
<b>Sub total</b>				<b>20</b>	<b>0.38</b>	<b>493.75</b>			<b>221698</b>	<b>3.47</b>		
Bhendi	IPM (homestead)	1	Arka anamika	10	0.20	20.00	16.20	23.46	-18000	0.31	39800	2.59
	IPM (irri)	1	Salkeerthi	12	4.00	126.00	90.00	40.00	193109	4.28	122930	3.20
	Organic farming (Irri)	1	Arka anamika	4	0.016	213.00	161.00	32.30	153000	1.22	44000	1.07
<b>Sub total</b>				<b>26</b>	<b>4.216</b>	<b>119.67</b>	<b>89.07</b>	<b>31.92</b>	<b>109370</b>	<b>1.94</b>	<b>68910</b>	<b>2.29</b>
Bitter gourd	Farm mechanisation (Irri)	1	Priyanka	2	0.20	193.00	177.40	8.79	89140	1.54	35000	1.30
Brinjal	IPM (Irri)	1	Haritha	10	0.04	413.00	237.00	74.26	230658	2.26	78733	1.50
Clove bean	Crop management (Rf)	1	Purple type	20	0.20	15.00	12.00	25.00	5000	1.29	500	1.03
Cowpea	Crop protection (Rf)	1	Lola	10	2.00	166.00	155.00	7.10	86500	1.19	52720	1.12
	INM (Irri)	1	Vellayani jyothika	10	0.40	168.00	150.00	12.00	2.22	1.79	1.70	1.61
	IPDM (Irri)	1	Anaswara	20	2.00	123.90	78.87	57.09	131884	2.17	48828	1.44
	Organic disease management (Rice fallow)	1	Lola	20.00	0.40	164.00	114.00	43.86	525000	2.40	257500	1.81
<b>Sub total</b>				<b>60</b>	<b>4.80</b>	<b>155.48</b>	<b>124.47</b>	<b>30.01</b>	<b>185847</b>	<b>1.89</b>	<b>89762</b>	<b>1.50</b>

Contd.... P.39

Cucumber	Variety introduction (Irri)	1	KPCH-1	5	0.20	340.00	345.00	-1.45	1202450	8.63	1186450	7.13
	Variety introduction (Irri)	1	Subhra	9	0.10	172.00	0.00		346167	3.03	0	
<b>Sub total</b>				<b>14</b>	<b>0.30</b>	<b>256.00</b>			<b>774309</b>	<b>5.83</b>		
Pea	Varietal evaluation (Irri)	1	Arka Apoorva	10	0.20	109.80	80.50	36.40	238000	1.76	3688000	12.82
Vegetable crops	Precision farming (terrace)	1	Haritha, Anaswara, Arun, Ujjwla	3	0.20	2.75			2670	0.34		
Winged bean	Organic cultivation (Irri)	1	Revathy	10	0.08	216.00	188.00	14.89	573572	1.93	471388	1.72
<b>Grand total</b>				<b>175</b>	<b>10.62</b>							

Irri: Irrigated, Rf: Rainfed, IPM: Integrated Pest Management, INM: Integrated Nutrient Management,



**Goa:** The nutrition garden in homesteads and IPM in sweet potato were demonstrated in 12 farmers' fields covering 1.1 ha area (Table 46).

The nutrition garden demonstration gave 10 q/ha mixed vegetables for the household use with BCR of 2. In sweet potato, IPM demonstration gave 186 q/ha as compared to 80 q/ha in the farmers practice.

#### Demonstration on parthenocarpic cucumber (KPCH 1) in poly houses by KVK, Palakkad

Table 46: Frontline demonstrations on vegetables conducted by KVKs of Goa

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Mixed vegetables	Nutrition garden	1	Local	2	0.10	10.00	5.00	100.00	3000	2.00	2000	3.00
Sweet potato	IPM	1	Local	10	1.00	185.70	79.60	133.29	116410	2.68	20460	1.35
<b>Grand total</b>				<b>12</b>		<b>1.10</b>						

IPM: Integrated Pest Management,



#### Demonstration on management of weevil in sweet potato by KVK, North Goa

#### 3.1.4.8 Tuber crops

A total of 115 demonstrations were conducted on major tuber crops like potato, sweet potato, cassava and coleus covering an area of 25.45 ha by the KVKs of Karnataka, Tamil Nadu and Kerala during the year. State and technology wise results are discussed below:

**Karnataka:** In potato, 10 demonstrations were conducted on ICM technology covering an area of 4 ha by one KVK during 2016-17 kharif season. The results indicated that demonstrated technology out yielded

its local check to the extent of 24% with a better BCR (Table 47). The average tuber yield obtained with the technology was 267 q/ha as compared to check (215 q/ha).

**Table 47: Frontline demonstrations on tuber crops conducted by KVK of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Potato	ICM (Irri)	1	Kufri Jyoti	10	4	266.70	214.70	24.22	186548	2.15	122326	1.77

Irri: Irrigated, ICM: Integrated Crop Management



**Demonstration of ICM in potato by KVK, Kolar**

**Tamil Nadu:** Tapioca was demonstrated with farm mechanization, IPM and improved varieties such as YTP-1 Vellayani, and Hraswa in 55 farmers' fields covering an area of 18 ha during the year (Table 48).

The results indicated that the superiority of demonstrated technologies by registering higher yield and economic returns in all technologies. The average yield increase due to demonstrations was 22% in tapioca with better BCR as compared to farmers' practice.

**Table 48: Frontline demonstrations on tuber crops conducted by KVKs of Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Tapioca	Farm mechanisation (Irri)	1	Mulluvadi	10	2.00	360.45	295.78	21.86	104961	2.39	82917	2.28
	IPM (Irri)	1	Mulluvadi, Whiterose	15	6.00	112.40	95.53	17.66	28450	2.03	20234	1.73
	Varietal introduction (Irri)	2	YTP 1	20	6.00	315.88	275.25	15.24	81485	2.58	59668	2.06
	Varietal demonstration (Irri)	1	Vellayani, Hraswa	10	4.00	32.99	24.47	34.82	103858	2.70	55732	1.84
<b>Grand total</b>				<b>55</b>	<b>18.00</b>	<b>205.43</b>	<b>172.76</b>	<b>22.40</b>	<b>79689</b>	<b>2.43</b>	<b>54638</b>	<b>1.98</b>

Irri: Irrigated, IPM: Integrated Pest Management

**Kerala:** A total of 50 FLDs on frontline technologies in tuber crops like amaraphophallus, cassava, greater yam, lesser yam and tania were under taken in 3.45 ha area by five KVKs of Kerala during the year (Table 49). The demonstration on organic farming technology in

amaraphophallus, improved varieties in tapioca, ICM in greater yam and lesser yam and INM in tania recorded superior yield with better BCR as compared to their local checks.



**Table 49: Frontline demonstrations on tuber crops conducted by KVKs of Kerala**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Amorphophallus	Organic farming (Protective Irrigation)	1	Sree Padma	5	1.00	456.40	367.10	24.33	331863	1.94	211637	1.62
Cassava	Varietal introduction (homestead)	1	Vellayani Hraswa	10	0.40	209.00	227.00	-7.93	106685	2.04	134916	2.47
Greater yam	ICM (homestead)	1	Sree Keerthi	5	1.00	237.50	201.60	17.81	224900	1.90	153200	1.61
Lesser yam	ICM (Homestead)	1	Sree Latha	5	1.00	88.20	73.71	19.66	102660	1.41	44840	1.18
Tania	INM (Garden land)	1	Local	25	0.05	157.00	112.50	39.56	451200	1.92	185000	1.38
<b>Grand total</b>				<b>50</b>	<b>3.45</b>							

ICM: Integrated Crop Management, INM: Integrated Nutrient Management

### 3.1.4.9 Fruit crops

A total of 710 demonstrations on major fruit crops like banana, grapes, citrus, mango, papaya pomegranate, pineapple, acid lime and guava were conducted in Karnataka, Tamil Nadu and Kerala states covering an area of 151 ha during the year. The state wise and technology wise results are discussed in the foregoing discussions.

**Karnataka:** A total of 160 demonstrations on various fruit crops were conducted in farmers' fields covering 58 ha area (Table 50). The results indicated that the yield was substantially higher under demonstration of NRM, INM, IDM and ICM technologies in banana with BCR as high as 6 in tissue cultured G9 banana. Among the technologies demonstrated in banana, NRM technology demonstration registered highest yield of

over 800 q/ha. In fig, ICM demonstration resulted in 23% increase in yield over farmers practice. INM and IPM in grapes demonstrated in 15 farmers' field gave 12% higher yield over farmers practice. Disease management and ICM in lime (citrus) also performed superior under demonstrations with better economic returns. Demonstration of IPDM and ICM were under taken in mango cultivated as rainfed crop during the year. Both these technologies performed superior to the local check by recording 34 % and 20% increased yield in IPDM and ICM technologies respectively. Demonstration of INM and ICM in guava gave an average fruit yield of 198 q/ha with better economic returns. In pomegranate, ICM, IDM, and IPM technologies demonstration proved superior over farmers practice by recording 24% higher yield over farmers practice.

**Table 50: Frontline demonstrations on fruit crops conducted by KVKs of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Banana	NRM (Irri)	1	G 9	2	0.80	808.40	529.60	52.64	458945	2.31	273445	2.07
	INM (Rf)	1	G 9	10	4.00	520.00	450.00	15.56	260000	6.00	222000	5.63
	IDM (Irri)	1	G 9	5	2.00	44.18	33.62	31.41	92128	2.09	45544	1.51
	INM in Putta bale (Irri)	1	Putta Bale	14	5.60	180.00	137.00	31.39	368456	3.04	214795	2.15
	ICM in yelakki (Irri)	1	Yelakki	5	2.00	295.24	252.12	17.10	768364	3.61	625932	3.22
<b>Sub total</b>				<b>36</b>	<b>14.40</b>	<b>369.56</b>	<b>280.47</b>	<b>29.62</b>	<b>389579</b>	<b>3.41</b>	<b>276343</b>	<b>2.92</b>
Fig	ICM (Irri)	1	Ballari local	10	4.00	91.70	74.40	23.25	289078	33.66	232938	27.77
Grapes	INM (Irri)	1	Bengaluru Blue	5	1.00	273.70	247.90	10.41	268180	2.88	186600	2.38
	IPM (Irri)	1	Thomson seedless	10	4.00	112.20	99.30	12.99	110727	2.92	91841	2.61
<b>Sub total</b>				<b>15</b>	<b>5.00</b>	<b>192.95</b>	<b>173.60</b>	<b>11.70</b>	<b>189454</b>	<b>2.90</b>	<b>139221</b>	<b>2.49</b>

NRM: Natural Resource Management, INM: Integrated Nutrient Management, IDM: Integrated Disease Management, ICM: Integrated Crop Management, IPM: Integrated Pest Management,

Contd.... P.42

Guava	INM (Irri)	2	Allahabad Safed	13	3.20	212.70	185.55	14.59	239692	2.30	195566	2.11
	ICM (Irri)	1	L-49 / Allahabad Safed	5	2.00	183.80	158.50	15.96	175560	4.90	101075	3.04
<b>Sub total</b>				<b>18</b>	<b>5.20</b>	<b>198.25</b>	<b>172.03</b>	<b>15.28</b>	<b>207626</b>	<b>3.60</b>	<b>148321</b>	<b>2.58</b>
Lime	Disease management (Irri)	1	Kagzi Lime	10	2.00	232.00	189.50	22.43	43970	3.09	28150	2.13
	ICM (Irri)	1	Kagzi	5	2.00	186.00	171.00	8.77	96800	3.27	75276	2.58
<b>Sub total</b>				<b>15</b>	<b>4.00</b>	<b>209.00</b>	<b>180.25</b>	<b>15.60</b>	<b>70385</b>	<b>3.18</b>	<b>51713</b>	<b>2.36</b>
Mango	IPDM (Rf)	1	Alphanso	5	1.00	24.32	18.20	33.63	208520	3.45	111634	2.05
	ICM (Rf)	2	Alphaso, Mallika, Bangalora	10	4.00	123.87	103.175	20.06	228940	2.67	159432	2.18
<b>Sub total</b>				<b>15</b>	<b>5.00</b>	<b>74.10</b>	<b>60.69</b>	<b>26.85</b>	<b>218730</b>	<b>3.06</b>	<b>135533</b>	<b>2.12</b>
Pomegranate	ICM (Irri)	2	Baghva	11	4.50	52.86	40.80	29.36	368577	5.58	199086	3.29
	IDM (Irri)	4	Bhagava, Kesar	35	13.70	135.88	107.68	26.90	396204	3.36	263411	2.98
	IPM (Irri)	1	Kesar	5	2.00	16.62	14.48	14.78	407749	4.29	320501	3.44
<b>Sub total</b>				<b>51</b>	<b>20.20</b>	<b>68.45</b>	<b>54.32</b>	<b>23.68</b>	<b>390843</b>	<b>4.41</b>	<b>260999</b>	<b>3.24</b>
<b>Grand total</b>				<b>160</b>	<b>57.80</b>							



**Demonstration of INM in grapes (Bengaluru blue) by KVK, Bengaluru Rural**

**Tamil Nadu:** A total of 210 demonstrations were laid out in acid lime, banana, guava, mango and papaya covering an area of 71 ha in the farmers' fields. (Table 51).

Demonstration of IDM, IPM and IPDM technologies in acid lime gave an average yield of

212 q/ha as compared to 177 q/ha in the check. In banana, technologies such as crop protection, IDM, ICM, IPM, post-harvest management, intercropping and soil fertility management demonstrations have resulted in an average yield increase of 19.88% with BCR of 2.87. Among the technologies demonstrated in banana IDM and intercropping of dolichos in banana recorded higher increase in yield. The crop protection and ICM technology demonstration in guava gave higher yield and economic returns as compared to farmers practice. Crop protection, eco-friendly management of pests and ICM technologies were demonstrated in 21 ha rainfed mango through 70 demonstrations. All these technologies have out yielded the farmers practice with increase ranging from 20 to 95%. In papaya, ICM demonstration gave 1153 q/ha as compared to 861 q/ha in the check with better BCR.

**Table 51: Frontline demonstrations on fruit crops conducted by KVKs of Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Acid lime	ICM (Irri)	1	Local	10	4.00	224.20	198.60	12.89	274520	2.58	140921	1.90
	IDM (Irri)	1	Local	10	2.00	171.90	139.70	23.05	14634	1.99	7926	1.47
	IPDM (Irri)	1	Balaji	10	4.00	240.79	194.35	23.90	231704	2.88	185679	2.52
<b>Sub total</b>				<b>30</b>	<b>10.00</b>	<b>212.30</b>	<b>177.55</b>	<b>19.95</b>	<b>173619</b>	<b>2.48</b>	<b>111509</b>	<b>1.96</b>

Contd.... P.43

Banana	Crop protection (Irri)	1	Local	10	4.00	246.35	206.50	19.30	85437	1.62	39281	1.29
	IDM (Irri)	2	Neipoovan/ Karpoorvali	20	6.00	680.25	490.29	38.88	382535	2.55	179882	1.79
	ICM (Irri)	1	Red banana	10	4.00	427.40	381.50	12.03	857360	3.43	659100	2.85
	Post- harvest management (Irri)	1	G-9	10	4.00	724.00	673.40	7.51	942099	3.62	612671	2.54
	Soil fertility management (Irri)	1	Poovan	10	4.00	347.20	290.60	19.48	220184	2.65	112857	1.87
	IPM (Irri)	1	Nendran	10	4.00	643.70	537.50	19.76	300587	3.80	230945	3.07
	Intercropping with dolichos (Irri)	1	Banana (local)+ Lablab-Var.Co14	10	4.00	501.00	410.10	22.17	205175	2.41	157000	2.21
<b>Sub total</b>				<b>80</b>	<b>30.00</b>	<b>509.99</b>	<b>427.13</b>	<b>19.88</b>	<b>427625</b>	<b>2.87</b>	<b>284534</b>	<b>2.23</b>
Guava	Crop protection (Irri)	1	Lucknow-49	10	4.00	59.40	47.20	25.85	34175	1.62	15712.5	1.29
	ICM (Irri)	1	Lucknow-49	10	4.00	343.12	280.30	22.41	486393	3.43	279135	2.24
<b>Sub total</b>				<b>20</b>	<b>8.00</b>	<b>201.26</b>	<b>163.75</b>	<b>24.13</b>	<b>260284</b>	<b>2.53</b>	<b>147424</b>	<b>1.77</b>
Mango	Crop protection (Rf)	1	Bengalura	10	4.00	35.00	17.90	95.53	79925	2.41	15370	1.27
	Eco friendly management of pests (Rf)	1	Alphonso	5	1.00	85.18	61.02	39.59	116079	3.54	62630	2.70
	ICM (Rf)	2	Banganapalli, Bangalora	25	10.00	62.67	53.12	20.23	77732	3.32	45631	2.30
	Pest management (Rf)	2	Banganapalli, Alphonso	30	6.00	110.05	77.35	46.83	258292	3.05	155220	2.38
<b>Sub total</b>				<b>70</b>	<b>21.00</b>	<b>73.23</b>	<b>52.35</b>	<b>50.55</b>	<b>133007</b>	<b>3.08</b>	<b>69713</b>	<b>2.16</b>
Papaya	ICM (Irri)	1	Co-8	10	2.00	1153.00	861.00	33.91	334000	2.65	241500	2.21
<b>Grand total</b>				<b>210</b>	<b>71.00</b>							

ICM: Integrated Crop Management, IDM: Integrated Disease Management, IPDM: Integrated Pest & Disease Management,

**Kerala:** A total of 340 demonstrations were laid out on banana and mango covering 22 ha area during the year. The technologies such as bio intensive pest management, ICM, INM, ecofriendly pest management, IPM and precision farming technologies demonstrated in Nendran

banana have performed better with overall increase of 31% in yield as against their local check. In mango, ICM and INM demonstrations gave 232% and 27% increase in mango yield over their local practice respectively (Table 52).

**Table 52: Frontline demonstrations on fruit crops conducted by KVKs of Kerala**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Banana	Bio intensive pest management (Irri)	1	Nendran	5	5.00	152.00	137.00	10.95	281700	2.09	140400	1.52
	ICM (Irri)	4	Nendran	40	3.10	202.52	174.76	23.89	545238	2.69	369008	2.33
	INM (Up land)	1	Nendran	5	0.20	166.16	135.60	22.54	308450	2.13	216350	1.84
	Eco – friendly pest management (homestead)	1	Nendran	20	0.40	23.70	19.70	20.30	456695	1.96	305261	1.66
	IPM (Garden land)	3	Nendran	30	6.40	225.26	176.01	28.20	459722	2.19	327250	1.84
	Precision farming (homestead)	2	Nendran	64	1.60	316.70	181.60	78.27	61850	0.95	190000	1.59
<b>Sub total</b>				<b>164</b>	<b>16.70</b>	<b>181.06</b>	<b>137.45</b>	<b>30.69</b>	<b>352276</b>	<b>2.00</b>	<b>258045</b>	<b>1.80</b>

Contd.... P.44

Mango	ICM (homestead)	3	Loca, Muvandan	153	1.41	66.00	29.60	231.86	73153	2.10	10115	1.28
	INM (Irri)	1	Alphonso, Neelum, Bnaganappally, Sindooram	23	4.00	86.02	67.70	27.06	439768	6.76	330720	5.38
<b>Sub Total</b>				<b>176</b>	<b>5.41</b>	<b>76.01</b>	<b>48.65</b>	<b>129.46</b>	<b>256461</b>	<b>4.43</b>	<b>170418</b>	<b>3.33</b>
<b>Grand Total</b>				<b>340</b>	<b>22.11</b>							

ICM: Integrated Crop Management, INM: Integrated Nutrient Management

### 3.1.4.10 Plantation crops

A total of 158 FLDs were undertaken by the KVKs of Karnataka, Tamil Nadu and Kerala states on major plantations like arecanut, coconut and cashew covering an area of 40 ha during the year. State and technology wise results are discussed below.

**Karnataka:** A total of 80 FLDs on plantation crops like arecanut and coconut were conducted in

26 ha area by KVKs of Karnataka (Table 53). The overall yield increase recorded in demonstrations as compared to farmers' practice was 37% due to ICM and 14% due to INM demonstration in arecanut. In coconut, ICM and disease management technologies were demonstrated in 50 farmers' fields have given an overall 28% higher nut yield/ha/year

**Table 53: Frontline demonstrations on plantation crops conducted by KVKs of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Arecanut	ICM (Irri)	4	Local, Mangala	25	8.00	21.64	16.20	36.58	376347	4.78	267109	4.11
	INM (Irri)	1	Local	5	2.00	15.10	13.20	14.39	302800	3.52	254600	3.21
<b>Sub total</b>				<b>30</b>	<b>10.00</b>	<b>18.37</b>	<b>14.70</b>	<b>25.49</b>	<b>339574</b>	<b>4.15</b>	<b>260855</b>	<b>3.66</b>
Coconut	ICM (Irri)	5	Tiptur tall, WCT, Arsikere tall	40	11.00	11229 nut/ha/yr	8689 nuts/ha/yr	28.50	65575	2.40	41626	2.10
	Disease management (Irri)	1	Local tall	10	5.00	17400 nut/ha/yr	13650 nuts/ha/yr	27.47	73633	3.02	24009	2.22
<b>Sub total</b>				<b>50</b>	<b>16.00</b>	<b>14315</b>	<b>11170</b>	<b>27.99</b>	<b>69604</b>	<b>2.71</b>	<b>32818</b>	<b>2.16</b>
<b>Grand total</b>				<b>80</b>	<b>26.00</b>							

ICM: Integrated Crop Management, INM: Integrated Nutrient Management



**Demonstration of ICM in arecanut by KVK, Shivamogga**

**Tamil Nadu:** A total of 40 demonstrations were implemented in cashew and coconut plantations by the KVKs of Tamil Nadu covering an area of 10 ha during the year (Table 54). In cashew, foliar nutrition, ICM and IPM demonstrations have led to yield increase to the extent of 8 to 35% as compared to their local check. The IPM technology recorded 10 q/ha cashew yield with BCR of 3.16. The INM technology demonstration in coconut led to yield increase of 22% by recording average of 21723 nuts/ha/year as compared to check with only 17836 nuts/ha/year under irrigation.

**Table 54: Frontline demonstrations on plantation crops conducted in the state of Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Coconut	INM (Irri)	1	West Cost Tall	10	0.05	21723 nuts/ha/yr	17836 nuts/ha/yr	21.79	47880	1.74	29610	1.47
Cashew	Foliar nutrition (Rf)	1	VRI-3	10	2.00	3.50	2.60	34.62	12800	2.56	6500	1.71
	ICM (Rf)	1	VRI 3	10	4.00	6.42	5.96	7.72	49122	2.62	38412	2.25
	IPM (Rf)	1	VRI 3	10	4.00	10.10	8.00	26.25	114144	3.16	60515	2.05
<b>Sub total</b>				<b>30</b>	<b>10.00</b>	<b>6.67</b>	<b>5.52</b>	<b>22.86</b>	<b>58689</b>	<b>2.78</b>	<b>35142</b>	<b>2.00</b>
<b>Grand total</b>				<b>40</b>	<b>10.05</b>							

INM: Integrated Nutrient Management, ICM: Integrated Crop Management, IPM: Integrated Pest Management

**Demonstration of INM in coconut by KVK, Karur**

**Kerala:** The important plantation crop of the state i.e coconut was demonstrated with frontline technologies such as ICM, IDM and organic farming practices in 38 fields of farmers covering an area of 4.3 ha during the year (Table 55). The technology demonstration gave an average yield increase of 164% over farmers practice leading to positive net returns. Whereas in farmers practice, the net returns were negative in ICM and IDM demonstrations. The organic farming has maintained remunerative returns even in farmers practice.

**Table 55: Frontline demonstrations on plantation crops conducted by KVKs of Kerala**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Coconut	ICM	1	WCT	20	1.00	3570	900	296.67	5221	1.11	-3390	0.73
	IDM	1	Local	15	1.30	16100	5600	187.50	22317	1.25	-33043	0.54
	Organic farming	1	WCT	3	2.00	11050	10200	8.33	11505	1.13	10620	1.11
<b>Grand Total</b>				<b>38</b>	<b>4.30</b>	<b>10240</b>	<b>5567</b>	<b>164.20</b>	<b>13014</b>	<b>1.16</b>	<b>-8604</b>	<b>0.79</b>

ICM: Integrated Crop Management, IDM: Integrated Disease Management

### 3.1.4.11 Spice crops

A total of 405 FLDs were under taken in major spices like black pepper, cardamom, ginger, turmeric, nutmeg, garlic and curry leaf covering an area of 106 ha in the states of Karnataka, Tamil Nadu and Kerala by the KVKs of ATARI under Zone-VIII. State and technology wise results are discussed below:

**Karnataka:** In spices, a total of 209 FLDs were conducted in black pepper, dry chilli, curry leaf, garlic, ginger and turmeric covering an area of 70 ha during the year (Table 56). The yield increase recorded as compared to farmers' practice was 37 % in black pepper due to IDM and ICM demonstrations. The ICM and IPM demonstrations in dry chilli gave 16 q/ha and 36q/ha respectively with overall increase of 16%

over their local check. Pest management in curry leaf and INM in garlic also gave superior yield under demonstrations as compared to their local checks. In ginger, INM, IPM and IDM technologies were

demonstrated in 55 farmers' field gave an overall increase of 28% over their local checks. Among the technologies demonstrated in turmeric, cv. PTS-24 gave higher yield (390 q/ha) followed by cv. Alleppy Supreme.

**Table 56: Frontline demonstrations on spice crops conducted by KVKs of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Black pepper	ICM (Irri)	3	Panniyur-1	35	8.50	13.28	9.68	41.14	412237	4.40	252385	3.36
	IDM (Irri)	2	Panniyur-1	25	3.00	7.97	6.77	32.31	368783	6.96	268575	5.71
<b>Sub total</b>				<b>60</b>	<b>11.50</b>	<b>10.63</b>	<b>8.23</b>	<b>36.73</b>	<b>390510</b>	<b>5.68</b>	<b>260480</b>	<b>4.54</b>
Chilli	ICM (Rf)	3	Byadagi, Sankeshwar	35	16.00	15.82	13.07	25.17	134970	4.32	106522	3.75
	IPM (Irri)	1	Local Var.	10	4.00	35.70	33.20	7.53	75000	1.67	41000	1.33
<b>Sub total</b>				<b>45</b>	<b>20.00</b>	<b>25.76</b>	<b>23.14</b>	<b>16.35</b>	<b>104985</b>	<b>3.00</b>	<b>73761</b>	<b>2.54</b>
Curry leaf	Pest management (Irri)	1	Suvasini	5	2.00	523.00	445.00	17.53	364900	7.82	255500	5.56
Garlic	INM (Irri)	1	Rajelli Gaddi	10	2.00	50.60	40.90	23.72	263920	2.87	189340	2.37
Ginger	IPM (Irri)	1	Himachal	10	4.00	289.00	230.00	25.65	200200	1.63	112600	1.37
	IDM (Rf)	1	Humnabad Local	10	4.00	195.11	126.09	54.74	246283	2.71	115918	1.85
	INM (Rf)	1	Humnabad Local	10	4.00	21.80	19.23	13.36	640828	5.43	546080	4.74
	Soil test based nutrient management (Irri)	1	Rio De Janero	25	10.00	145.00	122.00	18.85	252500	3.30	190000	2.65
<b>Sub total</b>				<b>55</b>	<b>22.00</b>	<b>162.73</b>	<b>124.33</b>	<b>28.15</b>	<b>334953</b>	<b>3.27</b>	<b>241150</b>	<b>2.65</b>
Turmeric	Improved varieties-(Irri)	1	Alleppy supreme	6	0.60	33.40	28.32	17.94	296300	3.15	177100	2.50
	Varietal evaluation-(Irri)	1	PTS-24	3	0.60	390.00	256.66	51.95	339500	3.64	165200	2.49
	ICM (Irri)	2	Salem local	25	11.50	10.14	8.02	26.12	285128	5.86	210385	4.82
<b>Sub total</b>				<b>34</b>	<b>12.70</b>	<b>144.51</b>	<b>97.67</b>	<b>32.00</b>	<b>306976</b>	<b>4.22</b>	<b>184228</b>	<b>3.27</b>
<b>Grand total</b>				<b>209</b>	<b>70.20</b>							

ICM: Integrated Crop Management, IDM: Integrated Disease Management, IPM: Integrated Pest Management, INM: Integrated Nutrient Management

**Tamil Nadu:** A total of 85 FLDs were conducted in spice crops like dry chilli, turmeric, black pepper and garlic covering an area of 28 ha during the year by KVKs of Tamil Nadu (Table 57). In chilli, demonstration of ICM, IDM, IPDM and variety introduction of Co-1 gave superior dry chilli yield over their local check to the extent of 13 to 32%.

In turmeric, ICM technology demonstration led to 17% increase in yield over control. In black pepper, IDM demonstration gave 36% increase in yield over farmers practice. The integrated crop management in garlic recorded higher yield of 84 q/ha as compared to check (79 q/ha).

Table 57: Frontline demonstrations on spice crops conducted by KVKs of Tamil Nadu

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Chilli	ICM (Irri)	2	Ramanathapuram mundu, Aadhimadayanur	20	6.00	18.85	16.31	15.27	211839	2.80	151898	2.21
	IDM (Irri)	1	K1	10	4.00	20.88	18.52	12.74	84626	2.65	72020	2.49
	Varietal introduction-(Irri)	1	Co (ch)1	10	4.00	30.99	27.53	12.57	259748	3.32	221660	3.04
Mundu chilli	IPDM (Irri)	1	PMK-1	5	2.00	20.00	15.20	31.58	32200	2.81	18600	1.96
<b>Sub total</b>				<b>45</b>	<b>16.00</b>	<b>22.68</b>	<b>19.39</b>	<b>18.04</b>	<b>147103</b>	<b>2.90</b>	<b>116045</b>	<b>2.43</b>
Turmeric	ICM (Irri)	2	Salem local	20	6.00	159.30	129.60	17.52	128513	2.93	92111	2.81
Black pepper	IDM (Rf)	1	Panniyur 1	10	2.00	20.20	14.90	35.57	79145	2.48	61860	2.11
Garlic	ICM (Irri)	1	Bhima purple	10	4.00	83.60	79.00	5.82	594869	2.83	509500	2.59
<b>Grand total</b>				<b>85</b>	<b>28.00</b>							

ICM: Integrated Crop Management, IDM: Integrated Disease Management, IPDM: Integrated Pest & Disease Management



**Demonstration of ICM in garlic by KVK, Erode**

**Kerala:** A total of 111 FLDs were implemented in turmeric, black pepper, cardamom, ginger and nutmeg crops by KVKs of Kerala covering 8 ha area (Table 58). In black pepper, crop protection technology demonstration

gave 18.5% increase in yield over farmers' practice. The BCR of demonstration was 1.58 as compared 1.43 in the farmers' practice. The cardamom yield was higher with nutrient management technology with 10 q/ha as compared to 8 q/ha in farmers' practice. The IDM demonstration in cardamom gave 7 q/ha as against 5.5 q/ha in the farmers' practice. In ginger, IDM, INM, micronutrient management demonstrations gave higher yield by 17% over their check. The IPDM demonstration in nutmeg led to 30% increase in yield of mace and nuts with BCR of 2.14 as compared to 1.87 in the farmers' practice. In turmeric, improved variety- Pratibha demonstration led to marginal increase in yield by 5.5%. However, the BCR was less as compared to farmers practice.

Table 58: Frontline demonstrations on spice crops conducted by KVKs of Kerala

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Black pepper	Crop protection (Rf)	1	Panniyur 1	5	0.20	10.50	8.56	18.48	231500	1.58	155000	1.43
	Vertical column method of propagation (homestead)	3	Karimunda, Thevam, Subhakara, Panniyur 5	50	2.42	5236.33	350.67	62.50	110973	2.09	8033.33	1.52
<b>Sub total</b>				<b>55</b>	<b>2.62</b>							



Cardomom	IDM (Irri)	1	Njallani	10	2.00	7.15	5.50	54.32	180000	1.63	94000	1.31
	INM (Irri)	1	Njallani	10	2.00	10.00	8.00	25.00	403600	2.61	196200	1.90
<b>Sub total</b>				<b>20</b>	<b>4.00</b>	<b>8.58</b>	<b>6.75</b>	<b>39.66</b>	<b>291800</b>	<b>2.12</b>	<b>145100</b>	<b>1.61</b>
Ginger	IDM (Irri)	1	Varada	10	0.20	122.10	135.50	22.10	442255	1.93	414926	1.74
	INM (Irri)	1	Varada	5	0.20	119.00	112.00	6.25	419260	2.01	387267	1.98
	Micro nutrient management (Rf)	1	Varada	8	1.00	51.75	42.10	22.78	180271	1.99	113971	1.63
<b>Sub total</b>				<b>23</b>	<b>1.40</b>	<b>97.62</b>	<b>96.53</b>	<b>17.04</b>	<b>347262</b>	<b>1.98</b>	<b>305388</b>	<b>1.78</b>
Nutmeg	IPDM (Irri)	1	Landraces	8	0.01	Nuts-8.1 q/ha mace 3.1q/ha	Nuts-6.15 q/ha mace- 2.38 q/ha	30.25	255750	2.14	155725	1.87
Turmeric	Varietal introduction-(Irri)	1	Pratiba	5	0.20	192.00	182.00	5.49	193370	1.51	201633	1.59
<b>Grand total</b>				<b>111</b>	<b>8.23</b>							

IDM: Integrated Disease Management, INM: Integrated Nutrient Management, IPDM: Integrated Pest & Disease Management

### 3.1.4.12 Flower crops

A total of 145 demonstrations on flower crops covering an area of 36.9 ha were implemented by KVKs of Karnataka and Tamil Nadu during the year. The state-wise and technology wise results are discussed in the foregoing discussion.

**Karnataka:** A total of 50 demonstrations were implemented in flower crops such as china aster, chrysanthemum, crossandra, gaillardia, jasmine and marigold covering 14 ha area by the KVKs of Karnataka (Table 59). In china aster, ICM in Arka Kamini variety demonstration gave 26% higher yield as compared to farmers' practice. The ICM technology in

chrysanthemum led to 22% increased flower yield with BCR of 5.15 as compared to 3.76 in farmers' practice. Improved variety (DGS-1) demonstration in gaillardia gave 44% increased yield over farmers' practice. Similarly, in crossandra variety Arka Shreeya recorded 25 q/ha flower yield as compared to 21 q/ha in the farmers' variety. The ICM in jasmine (kakada) gave 66 q/ha flower yield as compared to 41 q/ha flower yield with farmers practice leading better BCR of 3.71. The ICM demonstration Udupi jasmine also recoded 87% higher yield as compared to farmers' practice. In marigold, ICM and variety Arka Bangara demonstrations led to 26% higher flower yield as compared to farmers' practice.

**Table 59: Frontline demonstrations on flower crops conducted by KVKs of Karnataka**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
China Aster	ICM (Irri)	1	Arka Kamini	5	1.00	44.50	35.20	26.42	98250	3.79	67700	2.79
Chrysanthemum	ICM (Irri)	1	Garzia	2	5.00	203.00	165.80	22.44	981402	5.15	729893	3.76
Crossandra	Varietal introduction (Irri)	1	Arka Shreeya	8	2.00	25.00	21.20	17.92	12688	1.25	7300	1.21
Gaillardia	Varietal evaluation (Irri)	1	DGS-1	5	1.00	171.00	118.60	44.18	478500	4.99	237800	3.02
Jasmine (Kakada)	ICM (Irri)	1	Kakada	5	0.50	66.45	40.89	62.51	242804	3.71	107215	1.10
Jasmine	ICM (irri)	1	Udupi Jasmine	5	1.00	42.00	22.50	86.67	220260	4.06	78814	2.92
Marigold	Varietal introduction (Irri)	1	Arka Bangara	5	2.00	95.00	72.50	31.03	120500	2.23	64500	1.98
	ICM (Irri)	2	Arka Bangar-II	15	1.40	58.75	48.40	21.34	166825	4.64	126735	3.89
<b>Sub total</b>				<b>20</b>	<b>3.40</b>	<b>76.88</b>	<b>60.45</b>	<b>26.19</b>	<b>143663</b>	<b>3.44</b>	<b>95618</b>	<b>2.94</b>
<b>Grand total</b>				<b>50</b>	<b>13.90</b>							

ICM: Integrated Crop Management





**Demonstration of ICM in marigold by KVK, Tumakuru-II**

**Tamil Nadu:** A total of 95 FLDs were conducted on major flowers such as jasmine, marigold and tuberose covering an area of 23 ha during the year (Table 60). The crop protection, ICM and INM technologies in jasmine have enhanced the flower production by 250% over local check. Among the technologies demonstrated in jasmine, ICM gave higher yield and economic returns to the farmers. In marigold, ICM technology recorded 19 % higher yield over farmers' practice with net return as high as Rs 475271/ha. In tuberose, ICM technology adoption gave 17% increase in flower yield with higher BCR of 3.3 as against only 2.75 in local check.

**Table 60: Frontline demonstrations on flower crops conducted by KVKs of Tamil Nadu**

Crop	Thematic area & farming situation	KVKs (No.)	Variety	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of demo		Economics of check	
						Demo	Check		Net returns	BCR	Net returns	BCR
Jasmine	Crop Protection (Protective Irrigation)	1	Local	10	4.00	79.20	70.30	12.66	281245	2.44	222181	2.25
	ICM (Irri)	2	Ramanathapuram local, Sambac	20	4.00	80.72	73.38	9.71	583134	2.86	494070	2.44
	INM (Irri)	1	Local	20	2.00	2.90	0.35	728.57	56932	3.87	3900	1.77
<b>Sub total</b>				<b>50</b>	<b>10.00</b>	<b>54.28</b>	<b>48.01</b>	<b>250.31</b>	<b>307104</b>	<b>3.06</b>	<b>240050</b>	<b>2.15</b>
Marigold	ICM (irri)	1	Thovalai local	10	4.00	137.50	115.00	19.57	475271	3.24	374251	2.86
Tuberose	ICM (Irri)	3	Prajwal	35	9.00	98.61	83.44	17.12	349248	3.30	260080	2.75
<b>Grand total</b>				<b>95</b>	<b>23</b>							

ICM: Integrated Crop Management, INM: Integrated Nutrient Management

### 3.1.4.13 Demonstration of hybrids

During the year, 912 FLDs on hybrids in various crops were conducted by the KVKs in the states of Karnataka (534), Tamil Nadu (335), Puducherry (5) and Kerala (38) covering 283 ha area in crops like paddy, maize, sorghum, sesamum, sunflower, castor, cotton, chilli, brinjal, bhendi, brinjal, cabbage, cauliflower, tomato, bottle gourd, onion, tomato, watermelon, tuberose and sericulture. The State-wise, crop and hybrid wise results are presented in the foregoing discussion.

**Karnataka:** A total of 534 demonstrations were conducted on various crop hybrids covering 189 ha area (Table 61). In paddy, KRH-4 hybrid recorded 10% higher yield (81.5 q/ha) over farmers' variety. In maize mostly private hybrids such as Seed Tech 740, NK 6240, Kaveri and CP 818 were demonstrated, which gave 16

to 23% higher yield over farmers' variety. In bajra, a commercial hybrid gave lesser yield (by 4%) over check variety. In cotton, mostly Bt hybrids were demonstrated and all of them performed superior to farmers check varieties with better BCR. The yield in Bt hybrids ranged from 10.24 to 27.5 q/ha under demonstrations. In marigold, Arka Alankar hybrid gave 81 q/ha flower yield as compared to 72 q/ha in the farmers' variety. Taiwan red laddy papaya recorded 91.6 q/ha with BCR of 5.86 as compared to 60 q/ha and BCR of 3.98 in the farmers' variety. The castor hybrid DCH-177 gave marginally higher yield to the extent of 8.7% over local variety.

The sunflower hybrids SB-275 and KBSH-44 performed superior to their local check varieties with higher economic returns. In black pepper Paniyur-1 hybrid recorded 58.02% higher berry yield as compared to

local variety. In coriander Arka Isha and chilli hybrids NS 230, Arka Meghana, and Arka Khyathi also have performed superior to their local check varieties. In vegetable crops, bhendi hybrid Abhaya, cabbage hybrids such as Mahyco-118, Ganesh, Mahyco-99 have out yielded their local check varieties with higher economic returns. Capsicum hybrid Apoorva, cauliflower hybrids Synjanta, Suhasini and NS 60 have recorded higher yield as compared to their local check varieties. The pole bean hybrid Classic NZ recorded 302.8 q/ha fresh bean yield as compared to 265 q/ha in check variety. The tomato hybrids Arka Rakshak, Arka Samrat and private hybrids

like US-Agri, Indus 1030 and Abinav/Emerald hybrids have performed better than varieties and gave better economic returns to the farmers. Yard long bean hybrid Arka Mangala (63 q/ha) and brinjal hybrid MEH-11 (342 q/ha) gave superior yield as compared to their local check varieties. In watermelon, Sugar queen and Kiran hybrids recorded 10 and 22% higher yield over local check and gave better economic returns to the farmers. In sericulture, also the hybrids (FC1 & FC2) and reciprocal hybrid and PM x CSR2 rearing performed better than variety in terms of higher cocoon yield ranging from 5% to 18% and economic returns.

**Table 61: Frontline demonstrations on hybrids conducted by KVKs of Karnataka**

Crop	KVKs (No.)	Farming Situation	Hybrid	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of Demo (Rs/ha)		Economics of Check (Rs/ha)	
						Demo	Check		Net returns	BCR	Net returns	BCR
Paddy	2	Irri	KRH-4	15	7.00	81.50	73.90	10.28	96719	3.63	83061	3.11
Maize	1	Irri	Seed tech 740	20	8.00	80.10	69.30	15.65	77022	2.86	63254	2.61
	1	Rf	NK-6240	15	6.00	38.80	33.40	16.01	22456	1.63	16450	1.49
	1	P Irri	Kaveri champ	10	4.00	50.20	41.50	21.11	32157	1.90	25390	1.83
	1	Rf	CP-818	13	6.00	77.30	62.90	22.89	79620	3.78	61488	3.46
Bajra	1	Rf	Pioneer- 8652	15	6.00	15.60	16.30	-4.17	6782	1.65	7033	1.65
Cotton	1	Rf	RCH2 BG-II	11	4.00	23.80	20.60	15.12	80075	3.99	65285	3.37
	1	Rf	Vikram BG-II	20	8.00	15.40	14.00	10.24	46848	2.64	39163	2.34
	3	Irri	Jadoo jackpot	30	12.00	32.50	28.12	15.34	116864	4.21	91288	3.27
	1	Rf	Baahubali	5	2.00	18.10	14.70	23.01	54975	2.72	37204	2.11
	1	Rf	Ajit-155	10	4.00	24.40	19.20	27.09	51679	3.52	36129	2.69
	1	Rf	Minerva	12	4.08	15.00	11.70	27.54	53755	2.59	39207	2.30
Mari gold	1	Irri	Arka alankar	5	0.82	81.00	72.10	12.34	197450	4.20	158025	3.77
Papaya	1	Rf	Taiwan red laddy	2	0.80	91.60	59.80	53.22	607400	5.86	358000	3.98
Castor	1	Rf	DCH-177	12	5.00	6.30	5.80	8.70	14750	1.89	11380	1.66
Sunflower	1	Irri	SB-275	10	4.00	13.30	10.50	27.03	31980	3.19	23935	2.88
	1	Rf	KBSH-44	65	26.00	16.20	14.40	12.50	39046	3.21	30686	2.82
Blackpepper	1	P Irri	Panniyur-1	15	2.00	4.60	2.90	58.02	173706	3.28	65206	1.93
Coriander	1	Rf	Arka isha	5	2.00	3.20	1.20	179.13	8650	1.22	45750	2.16
Bhendi	1	Irri	Abhaya	10	4.00	7.90	5.50	44.18	57400	4.70	37320	3.99
Cabbage	1	Irri	Mahyco-118	5	2.00	162.0	150.0	8.00	61510	2.41	39942	1.99
	1	Irri	Ganesh	8	2.50	209.0	190.0	10.00	15425	1.42	5000	1.15
	1	Irri	Mahyco-99	5	2.00	255.0	215.0	18.60	167500	2.91	116500	2.18
Capsicum	1	Irri	Apporva	5	1.00	332.4	287.0	16.58	275206	2.73	175454	2.04

Contd.... P.51

Cauliflower	1	Irri	Synjanta-pavas	5	2.00	135.00	115.80	16.58	168500	4.27	135000	3.81
	1	Irri	NS 60	5	1.00	25.60	22.90	11.57	224750	2.42	167400	2.09
	1	Irri	Suhasini	5	2.00	398.70	350.10	13.88	137710	2.36	90050	1.75
Chilli	2	Irri	Arak meghana	20	6.00	218.00	181.00	20.42	128208	2.65	82360	2.09
	1	P Irri	Arka kyathi	10	1.00	328.50	273.00	20.33	468795	4.17	373095	3.59
	1	Irri	NS 230	10	4.00	404.90	311.10	30.15	451982	4.93	315692	3.63
Pole beans	2	Irri	Classic NZ	10	3.00	302.80	265.00	15.24	275832	2.87	200931	2.20
Tomato	5	Irri	Arka rakshak	45	10.00	595.10	495.50	20.66	287297	3.07	210571	2.45
	1	Irri	US-Agri	5	2.00	548.00	472.20	16.05	134700	2.56	102300	2.24
	2	Irri	Arka samrat	13	5.00	766.50	616.00	25.36	255775	3.65	180160	2.80
		Irri	Indus 1030	5	1.00	592.20	522.80	13.27	1062663	3.23	892326	2.91
	1	Irri	Abinav/Emarald	6	2.40	757.00	632.10	19.76	505249	3.36	334567	2.26
Yard Long Bean	1	Irri	Arka mangala	10	4.00	63.40	56.10	13.01	151340	2.48	115752	2.07
Brinjal	1	Irri	MEH-11	5	2.00	341.6	288.00	18.61	243943	3.50	181820	2.71
Onion	1	Irri	Rose onion	5	2.00	249.50	216.50	15.23	184428	3.84	136415	2.70
Watermelon	1	Rf	Sugar queen	10	5.00	65.30	59.20	10.36	251840	2.53	164450	1.90
	1	Irri	Kiran	12	5.00	375.00	308.00	21.75	217830	3.63	171923	3.31
Sericulture	2	Irri	FC-1 x FC-2	25	10.00	80.10	68.60	18.56	10020	1.72	5025	1.43
	1	Irri	FC2 x FC1	5	2.00	87.20	80.10	8.90	23538	2.82	17653	2.41
	1	Irri	PM x CSR2	10		78.90	75.00	5.32	5208	1.32	4537	1.32
<b>Total</b>				<b>534</b>	<b>188.60</b>							

Irri: Irrigated, Rf: Rainfed, P Irri.: Protective Irrigation



**Hybrid cabbage demonstration  
by KVK, Mandya**

**Tamil Nadu:** A total of 335 frontline demonstrations were conducted covering 92 ha area in various crop hybrids during the year (Table 62). In maize, CoHM-6 performed superior over local in four districts of the state. The highest yield obtained was 53 q/ha with

CoHM-6 hybrid in maize. In cotton, RCH 2 and RCH 20 Bt hybrids gave higher yield of 57% and 14% respectively as compared to their local check. The tuberos hybrid Prajwal recoded 11 q/ha flower yield as compared to 9.5q/ha in the farmers variety. Castor hybrid YRCH-1 and sunflower hybrid Co(SFH)2 gave 22 q/ha and 20 q/ha respective with better economic returns as compared to their local check. In chilli, hybrids Siera, Co-1 and Indus-13 were demonstrated by three KVKs recording superior yield over check varieties. The bhendi hybrid Co-4 was demonstrated by 14 KVKs in the district recorded an average of 210 q/ha yield as compared to only 165 q/ha in the check varieties. In tomato, hybrids such as Arka Rakshak, a public sector hybrid and Sagar and Shivam, a private sector hybrids performed superior to their check varieties. In bitter gourd, hybrids such as Indamtaj and Palli out yielded their check varieties. The snake gourd hybrid Polo F1 with 268 q/ha and cauliflower hybrid Snow white with 153 q/ha have found superior to their check varieties.

**Table 62: Frontline demonstrations on hybrids conducted in Tamil Nadu**

Crop	KVKs (No.)	Farming Situation	Hybrid	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of Demo (Rs/ha)		Economics of Check (Rs/ha)		
						Demo	Check		Net returns	BCR	Net returns	BCR	
Maize	4	Irri	Co(HM)6	40	10.60	52.60	42.20	23.70	67769	2.51	43812	2.06	
Cotton	2	Rf	RCH 2 BGII	20	8.00	15.50	9.90	56.85	59448	2.69	25361	1.74	
Cotton	1	Rf	RCH 20 Bt.	10	4.00	21.40	18.80	13.67	57656	2.28	38677	1.75	
Tuberose	1	Irri	Prajwal	10	4.00	11.10	9.50	16.44	230260	3.29	184150	2.85	
Castor	1	Rice fallow	YRCH 1	10	4.00	22.10	18.70	18.18	59280	3.40	32700	2.32	
Sunflower	1	Irri	Co(SFH)2	10	4.00	20.30	17.90	12.46	17865	1.38	10729	1.23	
Dry Chilli	1	P Irri	Siera	10	4.00	48.00	41.00	17.07	239595	2.16	176000	1.99	
Green Chilli	1	Irri	Co-1	15	0.60	265.80	234.00	13.59	306683	4.33	239167	3.52	
Green Chilli	1	Irri	Indus13	10	4.00	154.00	135.00	14.07	140050	2.54	110400	2.20	
Bhendi	14	Irri	Co(Bh)4	125	28.00	209.80	164.90	29.43	215664	3.26	130528	2.45	
Tomato	1	Irri	Arka rakshak	10	2.00	794.90	607.90	30.76	169070	2.31	95335	1.72	
Tomato	1	Irri	Sagar	10	4.00	684.00	558.00	22.58	324400	3.70	232045	2.78	
Tomato	1	Rf	Shivam	10	1.00	144.30	103.00	40.06	43469	1.82	19989	1.37	
Tomato	1	Irri	Shivam	10	1.00	191.30	158.70	20.52	47868	1.77	35705	1.55	
Bittergourd	1	Irri	Palli	10	4.00	226.20	175.90	28.61	54635	1.67	23043	1.28	
Bitter gourd	1	Irri	Indamtaj	10	4.00	352.60	257.60	36.88	188948	3.03	118591	2.36	
Snakegourd	1	Irri	Polo F1	5	1.00	268.20	215.20	24.64	132194	1.97	75926	1.55	
Cauliflower	1	Irri	Snow white	10	4.00	153.10	138.50	10.52	73393	2.39	52995	1.92	
<b>Total</b>				<b>335</b>	<b>92.20</b>								

Irri: Irrigated, Rf: Rainfed


**Demonstration of Co-4 hybrid bhendi by KVK, Cuddalore**

**Kerala:** A total 38 FLDs were conducted on hybrids in bhendi, vegetable cowpea, cucumber and tomato in about 1.06 ha area. Yields obtained were higher by 35 to 58% in bhendi hybrids such as Manjima and Samrat, 33% in vegetable cowpea hybrid NS621 and 29% in cucumber hybrid Multistar. The tomato hybrid Arka Rakshak recorded an average yield of 260 q/ha as compared to check with 180 q/ha. (Table 63).

**Table 63: Frontline demonstrations on hybrids conducted by KVKs of Kerala**

Crop	KVKs (No.)	Farming Situation	Hybrid	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of Demo (Rs/ha)		Economics of Check (Rs/ha)		
						Demo	Check		Net returns	BCR	Net returns	BCR	
Bhendi	1	Upland	Manjima	10	0.10	145.00	107.00	35.51	147250	1.68	53850	1.25	
Bhendi	1	Upland	Samrat	3	0.12	182.00	115.00	58.26	244480	1.81	60000	1.21	
Vegetable cowpea	2	Garden land	NS-621	13	0.52	224.70	167.50	32.79	533735	2.34	192501	1.86	
Cucumber	1	Irrigated	Multistar	2	0.02	484.50	375.00	29.20	39000	1.36	14998	1.17	
Tomato	1	Irrigated	Arka rakshak	10	0.30	260.30	180.00	44.61	363685	3.29	135200	2.87	
<b>Total</b>				<b>38</b>	<b>1.06</b>								

**Puducherry:** The chilli hybrid Sithara demonstrated in 5 farmers field in the state of Puducherry recorded an

average yield of 106 q/ha green chilli yield as compared to 85 q/ha in the check variety (Table 64).

**Table 64: Frontline demonstrations on hybrids conducted in Puducherry**

Crop	KVKs (No.)	Farming Situation	Hybrid	Farmers (No.)	Area (ha)	Yield (q/ha)		% increase over check	Economics of Demo (Rs/ha)		Economics of Check (Rs/ha)	
						Demo	Check		Net returns	BCR	Net returns	BCR
Chilli	1	Irrigated	Sithara	5	1.00	106.50	85.10	25.15	267985	11.84	184735	7.37

**3.1.4.14 Frontline demonstrations on farm implements and tools:**

Farm mechanization was popularized through 216 demonstrations of various farm implements covering an area of 76 ha during the year by KVKs of ATARI, Zone VIII. Of which 186 demonstrations on farm implements were conducted by KVKs of Tamil Nadu followed by 20 demonstrations in Kerala and 10 demonstrations in Karnataka. The state-wise details of implements demonstrated are presented in the foregoing discussion.

**Karnataka:** During the year ten demonstrations by two KVKs covering 10 ha and 10 farmers (Table 65). Protective clothing was demonstrated to promote comfort while performing the agricultural activities such as cotton picking, vegetable harvest, weeding etc involving five farmers. In another five farmers’ fields, vegetable transplanter was demonstrated. It was observed that by adopting vegetable transplanter, a farmer could save up to 9 labours in the vegetable planting as compared to conventional manual planting.

**Table 65: Frontline demonstrations on farm implements conducted by KVKs of Karnataka**

Crop	Implement/ Equipment demonstrated	Farmers (No.)	Area (ha)	Time (hr) saved to cover one ha	No. of labours saved to cover one ha	No. of rounds or operations in the crop period	Demo plot yield - Average (q/ha)	Check plot yield - Average (q/ha)	% increase over check	B:C ratio of Demo plot (Rs/ha)	B:C ratio of Check plot (Rs/ha)
Cotton	Protective clothing	5	5	3.0 (Most comfort)/ 2.8 (Good to Excellent Range)							
Vegetables	Vegetable transplanter	5	5		8.72	1.00					
<b>Grand Total</b>		<b>10</b>	<b>10</b>								



**Demonstration of vegetable transplanter by KVK, Koppal**

**Tamil Nadu:** A total of 15 implements were demonstrated in 186 farmer’s field covering 62.5 ha area (Table 66). Demonstration of seed cum fertilizer drill by two KVKs in 20 farmers’ fields indicated that on an average, 16 labours could be saved besides gaining 9% increased yield and higher BCR due to efficient utilization of applied fertilizer in the soil. Similarly, seed drill demonstration in maize could save 38 labours/ha/crop season besides 47% increase in maize grain yield. The groundnut stripper demonstration in 14 fields resulted in saving of 9 labours/ha in the groundnut stripping operation leading better returns to the farmer. Demonstration of castor thresher could save time, labour (21 labour/ha)



in the threshing operation leading to higher economic returns. The seed drill demonstration in the sowing of black gram crop in 15 fields could save 25 labours/ha in the sowing operation besides 59% increase in yield. Tractor drawn sorghum harvester and power operated rotary cutter in little millet harvesting could save 36 and 26 labour/ha respectively leading to higher economic returns to the farmers. Tractor operated coconut shredder demonstration in 5 locations resulted 1800 kg shredding/hr as against only 100 kg/hr in the manual shredding. Demonstration of arecanut de-husker in 10 locations resulted 85.92 kg dehusking/hr as against only 52 kg dehusking in the manual operation. Twin wheel hoe weeder for drudgery reduction in chilli cultivation was demonstrated in 10 locations. The results

showed that farmer can save 8.75 labours in weeding operation besides 15.07% increase in green chilli yield due to weed free plot. Tamarind de-seeder was demonstrated in 25 locations by three KVKs indicated 1.2 labour saving/100 kg deseeding operation. Tractor drawn TNAU turmeric rhizome planter demonstration in 10 locations indicated about 45 saving in the labour requirement in the planting operation of turmeric. Similarly, demonstration of TNAU Turmeric harvester in five locations indicated about 30 labour saving/ha in the harvesting of turmeric leading to higher economic returns. Onion storage structure was also demonstrated in two locations with higher economic returns to the farmers as compared to the conventional storage.

**Table 66: Frontline demonstrations on farm implements conducted by KVKs of Tamil Nadu**

Crop	Implement/ Equipment demonstrated	KVKs (No.)	Farmers (No.)	Area (ha)	Time (hr) saved to cover one ha	No. of labours saved to cover one ha	No. of rounds or operations in the crop period	Demo plot yield - Average (q/ha)	Check plot yield - Average (q/ha)	% increase over check	B:C ratio of Demo plot (Rs/ha)	B:C ratio of check plot (Rs/ha)
Paddy	Demonstration of seed cum fertilizer drill	2	20.00	8.00	2.50	16.00	7.00	41.20	37.75	9.25	2.25	0.70
Maize	Seed drill	1	10.00	4.00	17.50	38.00	10.00	37.53	25.54	46.95	2.84	1.06
Groundnut	Groundnut stripper	2	14.00	8.00		9.00	7.00	22.20	18.70	20.00	3.35	1.48
Groundnut	Groundnut decorticator	1	20.00	8.00	4 hrs 40 min	6.00	-	-	-	-	-	-
Castor	Castor thresher	1	10.00	4.00	35 min/tonne	21.00	6.00	21.00	16.80	25.10	3.70	2.45
Blackgram	Seed drill	1	15.00	6.00	14.00	25.00	13.00	9.63	6.05	59.17	2.93	0.93
Sorghum	TD sorghum harvester	1	20.00	8.00	218.70	36.00	1.00	93.90	90.10	4.20	2.75	0.69
Little millet	Power operated rotary cutter	1	10.00	4.00	204.96	25.60	1.00	9.42	9.20	2.39	1.71	0.42
Coconut	Tractor operated coconut shredder	1	5.00	2.50	-	2.00	-	1800 kg / hr	100 kg/hr	-	-	-
Areca nut	Areca nut dehusker	1	10.00	4.00				(Dehusking efficiency) 85.92 kg/hr	51.79 kg/hr			
Chilli	Twin wheel hoe weeder for drudgery reduction	1	10.00		50%	8.75	4.00	21.00	18.25	15.07	2.76	1.40
Tamarind	Tamarind deseeder	3	25.00		9.92	1.21 for 100 kg		0.00	0.00	0.00	2.05	
Turmeric	Tractor drawn TNAU turmeric rhizome planter	1	10.00	4.00	5.00	45.00	1.00	30 (Labour requirement)	75 (Labour requirement)	60.00	2.39	0.51
Turmeric	TNAU turmeric harvester	1	5.00	2.00	180.00	30.00	1.00				2.40	
Onion	Onion storage structure	1	2.00		-	-	-	-	-	-	3.16	1.86
<b>Grand Total</b>			<b>186</b>	<b>62.50</b>								



**Demonstration of tractor-drawn sorghum harvester by KVK, Coimbatore**

**Kerala:** A total of 20 FLDs on paddy mechanization were implemented by two KVKs in the state of Kerala during the year (Table 67). Complete mechanization in paddy was demonstrated in 5 locations could save on an average 66 labours/ha in the cultivation of paddy crop leading to higher BCR in the mechanization as compared to manual cultivation. Similarly, three-row power weeder in paddy weeding operation could save 43 labours/ha as against manual weeding.

**Table 67: Frontline demonstrations on farm implements conducted by KVKs of Kerala**

Crop	Implement/ Equipment demonstrated	Farmers (No.)	Area (ha)	Time (hr) saved to cover one ha	No. of labours saved to cover one ha	No. of rounds or operations in the crop period	Demo plot yield - Average (q/ha)	Check plot yield - Average (q/ha)	% increase over check	B:C ratio of Demo plot (Rs/ha)	B:C ratio of Check plot (Rs/ha)
Paddy	Demonstration of rotavator, paddy transplanter, paddy drum seeder, cono weeder, power weeder, combine harvester	5	2.00		66		32.00	28.00	14.30	1.65	1.19
	3- row power weeder	15	1.20	135	43	2					
<b>Grand total</b>		<b>20</b>	<b>3.20</b>								

#### 3.1.4.15 Other enterprises:

A total of 141 FLDs units were organized on other enterprises such as processing and value addition in crops, mushroom, and resource conservation technologies like drum composter for management of kitchen waste, nutri-composting etc. Demonstrations were also conducted on production and management of mushroom, sericulture, apiary, for income generation mainly for farm women by the KVKs of Karnataka, Tamil Nadu, Puducherry and Kerala through establishment of SHGs and production units during the year.

**Karnataka:** A total of 57 demonstration units were established under various small-scale income generating enterprise such as processing and value addition in millets, jack fruit, amla, banana, tamarind, sericulture and mushroom production (Table 68). In millets, 14

small scale enterprises on value added products were established under six KVKs of Karnataka. In jack fruit, value added products such as jam, chips, halwa, juice, jack manchurian, chutney powder etc. are being prepared by 65 farmers under three KVKs. Value added products in tamarind such as lollypops, candies, *puliyogare* powder are being produced and marketed by two farmers under KVK Gadag. In amla, various value-added products are being developed and promoted by 6 farmers under two KVKs namely Chamarajanagara and Tumakuru-I. In banana, one SHG is engaged in development and marketing of banana value added products under KVK Chamarajanagara. Mushroom production as enterprise is being promoted by 11 farmers under two KVKs namely Tumakuru-I and Koppal. Silkworm rearing and cocoon production has been undertaken as enterprise by 25 farmers under KVKs Belagavi and Chikkaballapur.

**Table 68: Frontline Demonstrations on Enterprises conducted by KVKs of Karnataka**

Category	KVK	Enterprise	Unit Size	No. of units	No. of farmers	Unit of measurement	Total production/ unit/year under demo	Total cost of Production of Demo (Rs/unit/year)	Gross returns of Demo (Rs/unit/year)	Net returns of Demo (Rs/unit/year)	B:C ratio
Finger millet	Tumakuru -I	Finger millet value added products- Branding and market linkage	1	1	1	kg/unit/year	3000	214500	480000	265500	1.23
Finger millet	Chikkaballapura	Entrepreneurship development through processing and value addition to finger millet (Flour, Finger millet Hurihittu, Malt)	1	1	1	kg/unit/month	2500	118125	18250	99875	0.84
Millets	Haveri	Millet vermicelli	1	5	5	kg	200	16000	20000	4000	1.25
Millets	Raichur	Entrepreneurship development on millets	6	2 SHG	12	q	10 q	27000	34000	7000	3.86
Finger millet	Chamarajanagara	Processing and value addition in finger millet	10	1 SHG	10	kg	125	25000	38750	13750	1.55
Finger millet	Bengaluru Rural	Value added products from white finger millet	1	4	4	kg/batch	197.50	27456	50500	23044	1.84
<b>Sub total</b>											
Jack fruit	Tumakuru-II	Jack fruit processing, Value addition and marketing linkage	15	1 SHG	15	kg	30	9,000	12,000	3,000	1.33
Jack fruit	Kolar	Value additon, branding & marketing of jackfruit products (EDP)	25/ group	1	25	kg	42.5 kg (jam, chips, halwa) 66.3 l(juice), 3.75 kg(jack manchurian)	8810	15920	7110	1.81
<b>Sub total</b>											
Jack fruit	Kolar	Value addition, branding & marketing of jackfruit products (EDP)	25/ group	1	25	kg	35.4 kg (jam, chips,halwa, chutney powder)	5430	7490	2060	1.38
Tamarind	Gadag	Value addition & marketing of tamarind products	1	1	2	kgs/No.	Tamarind lollypops-Rs.15000, Tamarind candies-Rs.5000, Puliogare powder-5 kg	50800	109000	58200	2.14
Amla	Chamarajanagara	Value addition and market linkage for Amla		1 SHG	5	kg	960	181500	226800	45300	1.24
Amla	Tumakuru -I	Processing, Value addition, branding and market linkages to Amla value added products	1	1	1	kg	60	10900	30000	19900	2.75
<b>Sub total</b>											
Banana	Chamarajanagara	Value addition, branding and marketing in banana		1 SHG	4	kg	840	100800	210000	109200	2.08

Contd.... P.57



Mushroom	Tumakuru -I	Mushroom cultivation – IGA activity in SHG group	5/ SHG	1	1	kg/ 10 kg spawn	26.66	5300	2940	2360	1.8
Mushroom	Koppal	Oyster mushroom	1	10	10	kg/ kg spawn	8.27	2650	10455	7805	3.94
	<b>Sub total</b>										
Sericulture	Belagavi-1	Sericulture rearing	100 DFLs	10	10	kg/100DFLs	70.95 kg/100DFLs	8025	21995	13970	2.74
Sericulture	Belagavi-1	Sericulture	1	10	10	kg cocoon/ha/year	1717.5	190125	542725	352600	1.85
Sericulture	Chikkaballapura	Sericulture	100 DFLs	5	5	kg/100 DFLs	93.35	11039	49642	38603	4.50
	<b>Sub total</b>										
	<b>Grand total</b>			<b>57</b>	<b>146</b>						



**Fig. Sericulture as enterprise at Belagavi district**

**Tamil Nadu:** A total of 27 FLDs units were organized by KVKs of Tamil Nadu under various small scale income generating enterprises such as processing and value

addition in millets, fruits, cashew, chilies, fish/prawn and waste management (Table 69).

Various value-added products from millets, groundnut, onion and maize are being developed and marketed by 46 farmers under KVKs such as Perambalur and Kancheepuram. KVK Coimbatore has promoted solar drier as enterprise through one farmer. Cashew apple juice production and marketing is promoted by four farmers in Cuddalore district. Value added products from chilli and farm waste recycling as enterprise are being produced and marketed by 10 farmers in Coimbatore district. A self help group of women consisting of 25 members is promoting value added products from fish and prawn in Nagapattinam district. In sapota, value added product sapota flakes is being produced and marketed by 5 farmers in Vellore district.

**Table 69: Frontline Demonstrations on Enterprises conducted by KVKs of Tamil Nadu**

Category	KVK	Enterprise	Unit Size	No. of units	No. of farmers	Unit of measurement	Total production/ unit/year under demo	Total cost of Production of Demo (Rs/unit/year)	Gross returns of Demo (Rs/ unit/year)	Net returns of Demo (Rs/ unit/year)	B:C ratio
Millets	Kancheepuram	Value addition to millets and groundnut	1 SHG Women	1	10	kg	200	30000	50000	20000	1.66
Millets	Perambalur	Value added products from maize	1	1	12	Maize puttu - kg	1056	26400	42240	15840	1.60
Millets	Perambalur	Value added products from ragi	1	1	12	Ragi murukku -kg	840	71400	151200	79800	2.11
Millets	Perambalur	Value added products from Onion	1	1	12	Onion vadagam - kg	540	54000	135000	81000	2.50
Fruits	Coimbatore	Solar drier	1	1	10	kg	65 kg fruits, 300 nuts	1412	3365	1952	2.37

Contd.... P.58



Cashew apple	Cuddalore	Preserved cashew apple juice		10	4	Litres	200 lit	1200	3200	2000	1.67
Chillies	Coimbatore	Value addition in chillies	1	1	10	kg	2510	234178	753300	519121	3.22
Fish	Nagapattinam	Value addition in fish and prawn	1 SHG Women	5	25	Kg	18000	276000	480000	204000	1.7
Composting	Coimbatore	Farm waste recycling	1	1	10	q	281.75	16800	83200	66200	4.90
Sapota	Vellore	Value Addition-Sapota flakes	5	5	5	kg	100	2620	6930	4310	2.65
	<b>Grand total</b>			<b>27</b>	<b>110</b>						

**Kerala:** A total of 45 demonstration units were organized under various small-scale enterprises on processing and value addition in millets and fruits, mushroom cultivation, ericulture (cultivation of eri silkworm) and waste management (Table 70).

Ragi based health mix in the brand name TEEN PLUS is being produced and marketed by two farmers in the Palakkad district. Similarly, cereal based nutri-bar production and marketing has been taken up by two farmers in Thrissur district. In jack fruit, dehydrated mature raw jack having low GI is being produced and marketed by 5 farmers in the Pathanamthitta district.

Osmo-dehydration of locally available fruits is being promoted as small scale enterprise by KVK Thrissur through two farmers. About 11 farmers of Calicut are producing and marketing herbal products from curcuma in the brand name KASTURI MANJAL soap and face pack. Minimal processing of tender coconut as enterprise is taken up by 16 farmers in Kasaragod district. Mushroom production and marketing as enterprise is being promoted by KVKs Malappuram and Alleppey through 25 farmers. Ericulture as enterprise is also taken up by 5 farmers in Kollam district.

**Table 70: Frontline demonstrations on enterprises conducted by KVKs of Kerala**

Category	KVK	Enterprise	Unit Size	No. of units	No. of farmers	Unit of measurement	Total production/ unit/year under demo	Total cost of Production of Demo (Rs/unit/year)	Gross returns of Demo (Rs/ unit/year)	Net returns of Demo (Rs/ unit/year)	B:C ratio
Finger millet	Palakkad	Ragi based health mix-Teen Plus		2	2	kg/month/unit	250	28125	32500	4375	0.16
Millets	Thrissur	Cereal based nutri-bar	Small scale	2	2	No. of nutri-bars of 30 g each	2500	Rs.810/100 nutri-bars of 30 g each	Rs. 1500 (Rs. 15/- per nutri-bar)	690	1.85
Jack fruit	Pathanamthitta	Demonstration of dehydrated mature raw jack having low GI (52.5)	1	5	5	kg. of dehydrated jackfruit/unit/year	36	7200	18000	10800	2.50
Fruits	Thrissur	Osmodehydration of locally available fruits	Small scale	2	2	quantity of dried fruit/ 100 kg of fresh fruit	300	36,000	67500	31500	0.88
Value addition	Calicut	Kasthuri Manjal Face pack	1	1	1	kg	12.5	63.25/kg	150/kg	86.75/kg	1.37
Value addition	Calicut	Production of herbal products from curcuma aromatica-Kasthuri Manjal soap	-	1	10	kg/month/unit	20 kg	7520	14080	6560	1.80

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Coconut	Kasaragod	Minimal processing of tendernut- Chopping machine for husk, shrink wrapping	Chopper with 250 nuts per week capacity	2	16	No. of tendernuts processed per month/unit	12000	257600	392000	134400	1.52
Mushroom	Malappuram	Mushroom	1	10	10	kg/bed	1.058	50	212	162	4.24
Mushroom	Alleppey	Oyster mushroom production using banana pseudostem waste		15	15	q	0.82	1120	2550	1430	2.20
Ericulture	Kollam	Ericulture	5	5	5	kg	389.29	163033	329582	166549	2.02
<b>Grand total</b>				<b>45</b>	<b>68</b>						

**Puducherry:** Twelve demonstration units were established by the KVK of Puducherry covering 12 farmers during the year (Table 71). Four units each in value addition of foxtail millet (Ready to cook foxtail millet *upma* mix, Instant foxtail millet *adaï* mix), value

addition in banana (Fig and fruit Jam) and value addition of greengram (Greengram *adaï* mix, greengram laddu ready mix) were developed. These units are producing the value-added products and marketing through KVK outlet and other market outlets in the Puducherry town.

**Table 71: Frontline demonstrations on enterprises conducted by KVKs of Puducherry**

Category	KVK	Enterprise	No. of units	No. of farmers	Unit of measurement	Total production/ unit/year under demo	Total cost of Production of Demo (Rs/unit/year)	Gross returns of Demo (Rs/unit/year)	Net returns of Demo (Rs/unit/year)	B:C ratio
Millets	Puducherry	Value addition of foxtail millet Ready to cook foxtailmillet <i>upma</i> mix and <i>adaï</i> mix	4	4	kg	10	955	1900	945	2.01
Banana	Puducherry	Value addition in Banana (banana fig and fruit Jam)	4	4	kg	10	1288	1650	363	1.28
Green gram	Puducherry	Value addition of Green gram -Green gram ( <i>adaï</i> mix , greengram laddu ready mix)	4	4	kg	10	885	1625	740	1.84
<b>Grand total</b>			<b>12</b>	<b>12</b>						

### 3.1.4.16 Livestock and fisheries

A total of 962 demonstrations were conducted in livestock and fisheries covering 4824 livestock or units (2004 animals, 2719 birds, and 101 units in fisheries) during the year. The state-wise break up includes 252 in Karnataka, 417 in Tamil Nadu, 253 in Kerala, 10 in Goa and 30 in

Puducherry. The state-wise and enterprise-wise results are as under:

**Karnataka:** A total of 252 demonstrations (143-dairy; 3- sheep & goat; 20- poultry and 26- fisheries) were conducted covering 822 livestock or unit (496 checks animals, 300 birds, 26 units in fisheries) in farmers' fields



during the year (Table 72). In dairy, technologies such as area specific mineral mixture, probiotics, silage, fodder, azolla, rumen bypass fat, TMR, urea treatment, chaff cutting, ration balancing etc., management of mastitis, and management of infertility gave higher yield over respective local check. In sheep & goat, technologies such as UMMB block, deworming, ration balancing, mineral mixture, parasite management etc., management of fasciolosis and IDM, and management of infertility

gave higher yield over respective local check. In case of poultry, technologies such as Swarnadhara breed gave higher yield over respective local check. In case of fishery, technologies such as Guppy, Molly, Platy, Swordtail, Mango platy, Neon platy, Copper platy and Red sword tail, Catla, Rohu, Grass carp, Common carp, IFS, lime, manure, composite culture gave higher yield over respective local check.

**Table 72: Frontline demonstrations on livestock & fisheries conducted by KVKs of Karnataka**

Enterprise	Thematic Area	KVKs (No.)	Demos (No.)	livestock/unit (No.)	Unit of Yield	Demo	Check	% increase over check
Dairy	Calf management	1	5	5	Age at sexual maturity in months	14.00	30.00	-53.33
	Disease management	2	35	35	Milk yield L/anim./day	12.83	10.24	25.40
	Nutrition management	10	95	111	Milk yield L/anim./day	10.35	8.59	21.94
	Production & management	1	3	45	No. of ectoparasites/inch <sup>2</sup>	1.31	14.44	-90.93
	Reproduction management	1	5	15	Fertility rate %	86.67	60.00	44.44
	<b>Sub total</b>		<b>143</b>					
Fishery	Ornamental fish production	1	4	4	No. of fingerlings	5825	3118	86.82
	Ornamental fish production (EDP)	1	1	1	No. of fingerlings	1200		
	Production & management	3	16	16	q/ha	36.68	21.14	92.44
	Housing management	1	5	5	Survival rate %	35.00	22.20	57.66
	<b>Sub total</b>		<b>26</b>					
Poultry	Disease management	1	10	200	Morbidity rate %	5.00	37.00	-86.49
	Production & management	1	10	100	Body weight in Kg/bird	2.86	0.63	353.97
	<b>Sub total</b>		<b>20</b>					
Sheep & Goat	Disease management	1	5	50	Morbidity rate %	10.00	80.00	-87.50
	Disease management	1	3	30	Mortality rate %	3.33	13.33	-75.02
	Nutrition management	2	25	85	Body weight in Kg/anim.	44.90	41.48	9.24
	Production & management	2	30	120	Body weight in Kg/anim.	37.35	30.55	24.35
	<b>Sub total</b>		<b>63</b>					
	<b>Grand total</b>		<b>252</b>	<b>822</b>				

**Tamil Nadu:** A total of 155 in dairy, 85 in sheep & goat, 114 in poultry and 63 demonstrations in fisheries were conducted covering a livestock/unit of 3128 (1195 animals, 1870 birds, 63 units in case of fisheries) in the farmers' fields during the year (Table 73). In dairy, technologies such as area specific mineral mixture, mixed fodder cultivation, TANUVAS GRAND supplement, IFD, forage based feeds, Co(CN)5, Co(FS) 31, fodder cowpea Co(FC) 8, Hedge lucerne under thematic area of nutrition management and

management of infertility, estrous synchronization, ration balancing under thematic area of reproduction management gave higher yield over respective local check. In case of sheep & goat, technologies such as IAM under thematic area of nutrition management, deworming and IDM under thematic area of disease management, prevention of internal and external parasite infestation, flock Health management, AI under thematic area of production and management, and estrous synchronization under thematic area of reproduction

management gave higher yield over respective local check. In case of poultry, technologies such as incubator, scientific feeding under thematic area of production & management, azolla under thematic area of nutrition management, and brooder under thematic area of housing management gave higher yield over respective local check. In case of fishery, technologies

such as freshwater prawn, Sea bass, Catla, Rogu, Mirgal, Grasscarp, GIFT Tilapia, Indian major carps stunted fingerlings, Jayanthi Rohu, Striped cat fish *Pangasianodon hypophthalmus*, *Pangasius pangasius*, IFS, lime, manure, composite culture under thematic area of production & management gave higher yield over respective local check.

**Table 73: Frontline demonstrations on livestock & fisheries conducted by KVKs of Tamil Nadu**

Enterprise	Thematic Area	KVKs (No.)	Demos (No.)	livestock/unit (No.)	Unit of Yield	Demo	Check	% increase over check
Diary	Nutrition management	8	120	245	Milk yield L/anim./day	8.97	7.31	23.12
	Reproduction management	3	35	60	Conception rate %	74.50	36.33	144.04
Fishery	Production & management	8	63	63	q/ha	34.74	18.96	56.05
Poultry	Broiler management	2	10	100	Body weight in kg/bird	3.63	2.18	47.49
	Housing management	2	30	200	Mortality rate %	3.51	11.14	-67.70
	Layer management	1	25	625	No. of eggs /bird/year	98.80	89.40	10.51
	Nutrition management	3	24	570	Body weight in kg/bird	1.42	1.08	33.60
	Production & management	3	25	375	Body weight in kg/bird	1.19	0.97	26.02
	<b>Sub total</b>		<b>332</b>					
Sheep & Goat	Disease management	2	30	450	Body weight in kg/anim.	16.15	13.54	18.96
	Housing management	1	10	100	Mortality rate %	2.22	9.94	-77.67
	Nutrition management	1	10	100	Body weight in kg/anim.	15.80	12.70	24.41
	Production & management	3	25	230	Body weight in kg/anim.	8.06	6.56	26.71
	Reproduction management	1	10	10	Conception rate %	52.00	41.10	26.52
	<b>Sub total</b>		<b>85</b>					
	<b>Total</b>		<b>417</b>	<b>3128</b>				



**Infertility treatment for repeat breeders by KVK, Thiruvarur**

**Kerala:** A total of 253 FLDs ( 174 in dairy, 6 in sheep & goat, 61 in poultry and 12 in fisheries) were conducted covering either a livestock or units (243 animals, 449 birds, 12 units in case of fisheries) in farmers' fields

during the year (Table 74). In dairy, technologies such as silage, fodder, anionic feed supplement, anionic mixture, GOFAMS, hydroponic fodder, azolla, ration balancing etc., ethnoveterinary herbal medicine under thematic area of disease management, management of infertility, cryoscope, GnRH, ovulation synchronization and dung cleaning pump & mist sprayer gave higher yield over respective local check. In the case of sheep & goat, technologies such as management of Floppy Kid Syndrome (FKS) gave higher yield over respective local check. In case of poultry, technologies such as Aseel, Nandanam quail, Vigova Super M duck breed, Krishi Bro & Chabro breed, and incubator & Kairali gave higher yield over respective local check. In case of fishery, technologies such as Catla, Rohu, Mrigal, Tilapia, Mullet, formulated feed, high density culture gave higher yield over respective local check.

**Table 74: Frontline demonstrations on livestock & fisheries conducted by KVKs of Kerala**

Enterprise	Thematic Area	KVKs (No.)	Demos (No.)	livestock/unit (No.)	Unit of Yield	Demo	Check	% increase over check
Dairy	Disease management	1	10	10	Morbidity rate %	0.00	20.00	-100.00
	Housing management	1	3	9	Labour use efficiency	13.00	28.33	-54.11
	Housing management	1	5	5	Milk yield L/anim./day	11.00	10.00	10.00
	Nutrition management	8	112	155	Milk yield L/anim./day	12.71	9.69	33.73
	Reproduction management	1	5	10	No. of inseminations for conception/anim.	1.00	4.00	-75.00
	Reproduction management	3	39	54	Conception rate %	64.09	10.67	296.09
	<b>Sub total</b>			<b>243</b>				
Fishery	Production & management	2	12	12	q/ha	21.42	13.03	72.71
Poultry	Disease management	1	10	80	No. of eggs /bird/year	192	168	14.29
	Hatching management	1	2	4	Hatchability rate %	80.00	45.00	77.78
	Housing management	2	9	65	No.	4972	3409	47.70
	Layer management	3	40	300	No. of eggs /bird/year	95.00	125.5	-1.41
	<b>Sub total</b>			<b>449</b>				
Sheep & Goat	Disease management	1	6	30	Morbidity rate %	0.00	100	-100.00
	<b>Total</b>		<b>253</b>	<b>734</b>				


**Demonstration of Aseel breed in backyard system of poultry rearing by KVK, Alleppey**

**Goa:** A total of 10 FLDs in dairy were conducted covering 20 animals in the farmers' fields during the year (Table 75).

In dairy, technologies such as area rumen bypass fat and clean milk production gave higher yield over respective local check.

**Table 75: Frontline demonstrations on livestock & fisheries conducted by KVKs of Goa**

Enterprise	Thematic Area	KVKs (No.)	Demos (No.)	livestock/unit (No.)	Unit of Yield	Demo	Check	% increase over check
Dairy	Nutrition management	1	5	10	Milk yield L/anim./day	12.73	11.71	8.71
	Production & management	1	5	10	Milk yield L/anim./day	11.68	10.54	10.82
	<b>Total</b>		<b>10</b>	<b>20</b>				

**Puducherry:** A total of 30 FLDs (20 in dairy and 10 in poultry) were conducted covering 120 livestock (20 animals, 100 birds) in the farmers' fields during the year (Table 76). In dairy, technologies such as area specific

mineral mixture and azolla gave higher yield over respective local check. In case of poultry, technologies such as azolla gave higher yield over respective local check.

**Table 76: Frontline demonstrations on livestock & fisheries conducted by KVKs of Puducherry**

Enterprise	Thematic Area	KVKs (No.)	Demos (No.)	livestock/unit (No.)	Unit of Yield	Demo	Check	% increase over check
Dairy	Nutrition management	2	20	20	Milk yield L/anim./day	6.99	5.13	31.46
Poultry	Nutrition management	1	10	100	Body weight in kg/bird	1.82	1.08	68.52
	<b>Total</b>		<b>30</b>	<b>120</b>				

### 3.1.5 Capacity Development

During the year under report, over 5500 training courses were organized in which more than 2 lakh persons (Table 77). Majority of these (4279 courses) were for farmers/farm women in which 156493 farmers/farm women were trained. It may be noted that 263 sponsored training courses were organized by

involving 12133 participants. This is a welcome trend and it indicates that KVKs are the preferred choice of different sponsoring agencies for organizing training courses. State-wise break-up indicates that more number of training courses was organized in Tamil Nadu (2193), followed by Karnataka (1941). Details are given below:

**Table 77: State-wise and category-wise programmes and participation in training courses organized:**

State / UT	Farmers / Farm Women (No.)		Rural Youth (No.)		Extension Functionary (No.)		Sponsored Programmes (No.)		Vocational Programmes (No.)		Total (No.)	
	C	P	C	P	C	P	C	P	C	P	C	P
Goa	54	1219	13	376	1	24	2	156	1	13	71	1788
Karnataka	1575	65788	148	5569	135	5144	48	2783	35	1035	1941	80319
Kerala	851	30606	217	8379	46	1356	57	1946	96	2590	1267	44877
Puducherry	66	1806	5	71	1	25	2	60	3	70	77	2032
Tamil Nadu	1733	57074	117	3885	136	5055	154	7188	53	1311	2193	74513
<b>Total</b>	<b>4279</b>	<b>156493</b>	<b>500</b>	<b>18280</b>	<b>319</b>	<b>11604</b>	<b>263</b>	<b>12133</b>	<b>188</b>	<b>5019</b>	<b>5549</b>	<b>203529</b>

C = No. of Courses P = No. of Participants

#### 3.1.5.1 Farmers and farmwomen

Training organized for farmers/farmwomen covered different areas (Table 78). The major area of training was crop production in which 1141 courses were conducted involving 43113 farmers/farmwomen. Training courses on plant protection (709) and home science (622) were the next most popular courses followed by horticulture (603 courses for 24367 farmers). Courses on soil health and fertility management (318 courses) also attracted 11275 participants. Livestock production and Management with 392 courses was also an important training area. Women

participants outnumbered men in home science/women empowerment training courses.



**Training on seed treatment**

**Table 78: Training courses organized and participation of different categories of farmers and farmwomen**

Training Area	Courses (No.)	General (No.)			SC/ST (No.)			Total (No.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Crop production	1141	28780	8103	36883	3871	2359	6230	32651	10462	43113
Horticulture	603	15179	5992	21171	2197	999	3196	17376	6991	24367
Plant protection	709	17494	4858	22352	2527	1067	3594	20021	5925	25946
Home science/ women empowerment	622	4599	10903	15502	948	2809	3757	5547	13712	19259

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Livestock production and management	392	6258	4096	10354	1362	1116	2478	7620	5212	12832
Soil health and fertility management	318	7634	2293	9927	933	415	1348	8567	2708	11275
Production of inputs at site	140	2774	1664	4438	447	365	812	3221	2029	5250
Capacity building and group dynamics	112	3484	1666	5150	392	539	931	3876	2205	6081
Agril. engineering	122	2722	1222	3944	368	259	627	3090	1481	4571
Fisheries	89	1524	727	2251	220	132	352	1744	859	2603
Agro-forestry	31	842	90	932	180	84	264	1022	174	1196
<b>Total</b>	<b>4279</b>	<b>91290</b>	<b>41614</b>	<b>132904</b>	<b>13445</b>	<b>10144</b>	<b>23589</b>	<b>104735</b>	<b>51758</b>	<b>156493</b>

A look at state-wise data reveals that out of 4279 courses, 1733 courses were organized in Tamil Nadu, 1575 courses in Karnataka and 851 courses in Kerala. Out of the 156493 participants, 65788 were from Karnataka. Of the

total number of participants, 23589(15%) were from SC/ST category and 51758 (33%) were women participants (Table 79).

**Table 79: State-wise break-up of the training programmes and participation of farmers and farmwomen**

State/UT	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Goa	54	407	440	847	64	308	372	471	748	1219
Karnataka	1575	39740	15298	55038	7220	3530	10750	46960	18828	65788
Kerala	851	15768	11026	26794	1963	1849	3812	17731	12875	30606
Puducherry	66	784	725	1509	131	166	297	915	891	1806
Tamil Nadu	1733	34591	14125	48716	4067	4291	8358	38658	18416	57074
<b>Total</b>	<b>4279</b>	<b>91290</b>	<b>41614</b>	<b>132904</b>	<b>13445</b>	<b>10144</b>	<b>23589</b>	<b>104735</b>	<b>51758</b>	<b>156493</b>

### 3.1.5.2 Rural youth

Training courses were also organized in different areas for rural youth (500 courses, 18280 participants). Among these, mushroom production was the major training area with 102 courses (3023 participants) followed by 70 courses on value addition (2382 participants), dairying (46 courses, 1838 participants), integrated farming (41 courses, 1749 participants). Bee-keeping (34 courses, 1312 participants) and production of organic inputs (30 courses, 1020 participants) were the other important training areas from rural youth. The relative popularity of these courses reflects the preference of rural youth in areas representing secondary agriculture (Table 80).



**Vocational training on production of *Trichoderma***



Table 80: Training courses organized and participation of rural youth

Training Area	Courses (No.)	General (No.)			SC/ST (No.)			Total (No.)		
		M	F	T	M	F	T	M	F	T
Mushroom production	102	1342	1276	2618	188	217	405	1530	1493	3023
Value addition	70	819	1195	2014	159	209	368	978	1404	2382
Dairying	46	991	431	1422	306	110	416	1297	541	1838
Integrated farming	41	855	579	1434	183	132	315	1038	711	1749
Bee-keeping	34	890	315	1205	76	31	107	966	346	1312
Production of organic inputs	30	396	474	870	72	78	150	468	552	1020
Nursery management of horticulture crops	17	231	281	512	72	40	112	303	321	624
Protected cultivation of vegetable crops	21	588	398	986	116	74	190	704	472	1176
Sericulture	22	826	54	880	121	6	127	947	60	1007
Small scale processing	16	341	352	693	34	30	64	375	382	757
Post harvest technology	11	125	318	443	5	7	12	130	325	455
Production of quality animal products	10	228	98	326	32	1	33	260	99	359
Sheep and goat rearing	3	96	47	143	1	16	17	97	63	160
Rural crafts	7	38	114	152	0	23	23	38	137	175
Vermi-culture	9	51	177	228	11	43	54	62	220	282
Ornamental fisheries	3	38	33	71	7	0	7	45	33	78
Poultry production	9	141	64	205	47	15	62	188	79	267
Composite fish culture	1	36	12	48	5	4	9	41	16	57
Planting material production	18	334	252	586	37	14	51	371	266	637
Repair and maintenance of farm machinery and implements	8	81	45	126	21	2	23	102	47	149
Seed production	7	111	90	201	27	14	41	138	104	242
Training and pruning of orchards	7	76	192	268	4	12	16	80	204	284
Piggery	1	31	3	34	10	3	13	41	6	47
Commercial fruit production	4	145	10	155	15	4	19	160	14	174
Freshwater prawn culture	1	9	1	10	1	1	2	10	2	12
Quail farming	1	0	3	3	0	0	0	0	3	3
Tailoring and stitching	1	0	10	10	0	1	1	0	11	11
<b>Total</b>	<b>500</b>	<b>8819</b>	<b>6824</b>	<b>15643</b>	<b>1550</b>	<b>1087</b>	<b>2637</b>	<b>10369</b>	<b>7911</b>	<b>18280</b>



Training courses related to rural youth have been further categorized under different States as given in Table 81. KVKs of Kerala conducted more number of courses for rural youth (217 courses) than those in Karnataka (148 courses) and Tamil Nadu (117 courses). This shows the interest of Kerala youth in activities that contribute to profitability. Interestingly, nearly half of the participants

(43.3%) were women. This is a very positive trend as women were equally eager to acquire knowledge and skills in these areas. Youth belonging to SC/ST also participated in good number (14.4 %) reassuring that the capacity building efforts of KVKs are equally valuable in mainstreaming the youth of socially disadvantaged sections.

**Table 81: State/Union Territory-wise break-up of the training programmes and participation of rural youth**

State/UT	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Goa	13	104	106	210	76	90	166	180	196	376
Karnataka	148	3253	1257	4510	706	353	1059	3959	1610	5569
Kerala	217	3647	3794	7441	465	473	938	4112	4267	8379
Puducherry	5	17	47	64	5	2	7	22	49	71
Tamil Nadu	117	1798	1620	3418	298	169	467	2096	1789	3885
<b>Total</b>	<b>500</b>	<b>8819</b>	<b>6824</b>	<b>15643</b>	<b>1550</b>	<b>1087</b>	<b>2637</b>	<b>10369</b>	<b>7911</b>	<b>18280</b>

### 3.1.5.3 Extension functionaries

A total of 319 courses were organized for 11604 extension functionaries. Among the different training areas, productivity enhancement in field crops was the major area with 94 courses and 3714 participants. Protected cultivation technology was the next major

training area with 29 courses and 873 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 82.

**Table 82: Training courses organized and participation of extension functionaries**

Training Area	Courses (No.)	General participants			SC/ST participants			Total participants		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Productivity enhancement in field crops	94	2331	919	3250	268	196	464	2599	1115	3714
Protected cultivation technology	29	674	161	835	32	6	38	706	167	873
Women and child care	26	98	675	773	6	154	160	104	829	933
Integrated nutrient management	25	533	276	809	54	12	66	587	288	875
Integrated pest management	24	634	98	732	35	9	44	669	107	776
Household food security	22	96	509	605	0	147	147	96	656	752
Information networking among farmers	20	654	29	683	15	11	26	669	40	709

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Production and use of organic inputs	18	332	167	499	36	47	83	368	214	582
Low cost and nutrient efficient diet designing	17	70	482	552	0	147	147	70	629	699
Group dynamics and farmers organization	13	370	113	483	3	23	26	373	136	509
Capacity building for ICT application	11	274	104	378	48	7	55	322	111	433
Rejuvenation of old orchards	6	298	60	358	16	0	16	314	60	374
Management in farm animals	4	74	40	114	3	1	4	77	41	118
Livestock feed and fodder production	4	98	9	107	5	1	6	103	10	113
Care and maintenance of farm machinery and implements	2	32	9	41	0	0	0	32	9	41
Formation and management of SHGs	2	14	17	31	2	1	3	16	18	34
Gender mainstreaming through SHGs	1	0	12	12	0	40	40	0	52	52
Integrated farming	1	14	3	17	0	0	0	14	3	17
<b>Total</b>	<b>319</b>	<b>6596</b>	<b>3683</b>	<b>10279</b>	<b>523</b>	<b>802</b>	<b>1325</b>	<b>7119</b>	<b>4485</b>	<b>11604</b>

Details of training courses organized for extension functionaries have also been categorized State-wise (Table 83). KVKs in Tamil Nadu organized 136 courses in which 5055 extension functionaries participated. Karnataka,

135 courses were organized for 5144 participants and in Kerala, 46 courses were organized for 1356 extension functionaries.

**Table 83: State-wise break-up of the training courses and participation of extension functionaries**

State/UT	Courses (No.)	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Karnataka	135	2687	1782	4469	250	425	675	2937	2207	5144
Kerala	46	532	771	1303	23	30	53	555	801	1356
Goa	1	16	8	24	0	0	0	16	8	24
Puducherry	1	24	1	25	0	0	0	24	1	25
Tamil Nadu	136	3337	1121	4458	250	347	597	3587	1468	5055
<b>Total</b>	<b>319</b>	<b>6596</b>	<b>3683</b>	<b>10279</b>	<b>523</b>	<b>802</b>	<b>1325</b>	<b>7119</b>	<b>4485</b>	<b>11604</b>

#### 3.1.5.4 Sponsored programmes:

Besides the regular training courses, 263 sponsored trainings were conducted by the KVKs in different

areas for the benefit of 12133 participants (Table 84). Largest number of training courses (92) was organized on increasing production and productivity

of crops with the participation of 5362 farmers/rural youth/extension functionaries. Livestock production and management and methods of protective cultivation were the next major areas of training under sponsored category with 52 and 32 courses respectively. Economic empowerment of women and processing/value addition are the other major areas of training that attracted sponsorship for 22 and 14 training courses respectively.



**Training on mushroom cultivation**

**Table 84: Sponsored training courses organized and participation of farmers and rural youth**

Training Area	Courses (No.)	General (No.)			SC/ST (No.)			Total (No.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Increasing production and productivity of crops	92	3557	1032	4589	503	270	773	4060	1302	5362
Livestock production and management	52	581	845	1426	185	248	433	766	1093	1859
Methods of protective cultivation	32	971	573	1544	51	8	59	1022	581	1603
Economic empowerment of women	22	178	635	813	7	7	14	185	642	827
Processing and value addition	14	94	220	314	75	31	106	169	251	420
Household nutritional security	10	104	139	243	4	39	43	108	178	286
Soil health and fertility management	9	130	50	180	149	81	230	279	131	410
commercial production of vegetables	8	168	114	282	65	8	73	233	122	355
Production of inputs at site	8	65	32	97	23	107	130	88	139	227
Capacity building and group dynamics	8	272	46	318	22	0	22	294	46	340
Production and value addition	3	66	11	77	4	0	4	70	11	81
Farm machinery tools and implements	1	30	0	30	5	5	10	35	5	40
Women and child care	1	45	15	60	3	2	5	48	17	65
Integrated crop management	1	28	72	100	0	0	0	28	72	100
Integrated disease management	1	18	12	30	0	0	0	18	12	30
Nursery management of horticulture crops	1	79	49	128	0	0	0	79	49	128
<b>Total</b>	<b>263</b>	<b>6386</b>	<b>3845</b>	<b>10231</b>	<b>1096</b>	<b>806</b>	<b>1902</b>	<b>7482</b>	<b>4651</b>	<b>12133</b>

The State-wise break-up of sponsored programs is provided in Table 85. A total of 154 courses were organized in Tamil Nadu, followed by 57 in Kerala and

48 in Karnataka. The proportion of women participation was better in Kerala.

Table 85: State/Union Territory-wise break-up of the Sponsored Programmes

State/UT	Courses (No.)	General (No.)			SC/ST (No.)			Total (No.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Goa	2	103	53	156	0	0	0	103	53	156
Karnataka	48	1950	468	2418	269	96	365	2219	564	2783
Kerala	57	771	1146	1917	11	18	29	782	1164	1946
Puducherry	2	50	1	51	9	0	9	59	1	60
Tamil Nadu	154	3512	2177	5689	807	692	1499	4319	2869	7188
<b>Total</b>	<b>263</b>	<b>6386</b>	<b>3845</b>	<b>10231</b>	<b>1096</b>	<b>806</b>	<b>1902</b>	<b>7482</b>	<b>4651</b>	<b>12133</b>

### 3.1.5.5 Vocational programmes:

This is an important area of training where the focus is to impart skills and enable trainees to fully earn or supplement his/her livelihood. A total of 188 training courses were organized during the year involving 5019 budding entrepreneurs. Among the different vocations,

rural crafts was the major area of training with 38 courses and 763 participants. Value addition (32 courses, 845 participants) and integrated crop management (21 courses, 669 participants) were the other major areas. Rural crafts training courses attracted only women participants (763). Details are provided in Table 86.

Table 86. Programmes and participation in vocational training courses organized

Training Area	Courses (No.)	General participants			SC/ST participants			Total participants		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Rural crafts	38	0	559	559	0	204	204	0	763	763
Value addition	32	229	510	739	32	74	106	261	584	845
Integrated crop management	21	301	316	617	19	33	52	320	349	669
Mushroom cultivation	18	222	159	381	56	29	85	278	188	466
Organic farming	10	153	111	264	6	2	8	159	113	272
Commercial vegetable production	9	166	93	259	12	19	31	178	112	290
Capacity building and group dynamics	8	153	92	245	5	0	5	158	92	250
Tailoring, stitching, embroidery, dyeing etc.	7	8	120	128	2	60	62	10	180	190
Vermi-composting	7	88	83	171	8	7	15	96	90	186
Dairy farming	5	124	3	127	0	0	0	124	3	127
Production of bio-agents, bio-pesticides, bio-fertilizers etc.	5	37	72	109	1	0	1	38	72	110
Nursery raising	5	57	63	120	0	0	0	57	63	120
Repair and maintenance of farm machinery and implements	4	71	5	76	43	0	43	114	5	119
Sheep and goat rearing	4	175	4	179	52	1	53	227	5	232
Agril. para-workers, para-vet training	3	43	24	67	9	5	14	52	29	81

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Poultry farming	3	40	6	46	1	1	2	41	7	48
Composite fish culture	3	43	51	94	1	1	2	44	52	96
commercial fruit production	2	44	13	57	0	0	0	44	13	57
Carp breeding & hatchery management	1	30	0	30	0	0	0	30	0	30
Feed and fodder technology	1	0	0	0	12	1	13	12	1	13
Integrated pest management	1	25	0	25	0	0	0	25	0	25
Sericulture	1	0	25	25	0	5	5	0	30	30
<b>Total</b>	<b>188</b>	<b>2009</b>	<b>2309</b>	<b>4318</b>	<b>259</b>	<b>442</b>	<b>701</b>	<b>2268</b>	<b>2751</b>	<b>5019</b>

Vocational training conducted by the KVKs has also been presented State-wise in Table 87. Large number of vocational courses was conducted in Kerala (96 courses with 2590 participants) followed by Tamil Nadu (53 courses with 1311 participants). KVKs in Karnataka conducted 35 vocational courses with the participation of 1035 participants. Out of the total of 5019 participants, 701 were from SC/ST category (14%). Extent of women participation was the highest in Kerala (1782 out of 2590, 68.8%).

**Table 87. State/Union Territory wise break-up of the vocational training courses and participation**

State/UT	No. of Courses	General participants (No.)			SC/ST participants (No.)			Total participants (No.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Karnataka	35	421	406	827	81	127	208	502	533	1035
Kerala	96	773	1514	2287	35	268	303	808	1782	2590
Goa	1	0	0	0	12	1	13	12	1	13
Puducherry	3	49	19	68	1	1	2	50	20	70
Tamil Nadu	53	766	370	1136	130	45	175	896	415	1311
<b>Total</b>	<b>188</b>	<b>2009</b>	<b>2309</b>	<b>4318</b>	<b>259</b>	<b>442</b>	<b>701</b>	<b>2268</b>	<b>2751</b>	<b>5019</b>

The summary of state-wise number of training courses under different categories of participants is given in Annexure I and the participation details of these courses based on gender are given in Annexure-II.

## ANNEXURE I

## State-wise number of training courses organized and participation of different category of participants

State	Courses (No.)	Participants (No.)		
		General	SC/ST	Total
Farmers and Farm Women (On + Off)				
Karnataka	1575	55038	10750	65788
Kerala	851	26794	3812	30606
Goa	54	847	372	1219
Puducherry	66	1509	297	1806
Tamil Nadu	1733	48716	8358	57074
<b>Total</b>	<b>4279</b>	<b>132904</b>	<b>23589</b>	<b>156493</b>
Rural Youth (On+Off)				
Karnataka	148	4510	1059	5569
Kerala	217	7441	938	8379
Goa	13	210	166	376
Puducherry	5	64	7	71
Tamil Nadu	117	3418	467	3885
<b>Total</b>	<b>500</b>	<b>15643</b>	<b>2637</b>	<b>18280</b>
Extension Functionaries (On+Off)				
Karnataka	135	4469	675	5144
Kerala	46	1303	53	1356
Goa	1	24	0	24
Puducherry	1	25	0	25
Tamil Nadu	136	4458	597	5055
<b>Total</b>	<b>319</b>	<b>10279</b>	<b>1325</b>	<b>11604</b>
Sponsored Programmes				
Karnataka	48	2418	365	2783
Kerala	57	1917	29	1946
Goa	2	156	0	156
Puducherry	2	51	9	60
Tamil Nadu	154	5689	1499	7188
<b>Total</b>	<b>263</b>	<b>10231</b>	<b>1902</b>	<b>12133</b>
Vocational Programmes				
Karnataka	35	827	208	1035
Kerala	96	2287	303	2590
Goa	1	0	13	13
Puducherry	3	68	2	70
Tamil Nadu	53	1136	175	1311
<b>Total</b>	<b>188</b>	<b>4318</b>	<b>701</b>	<b>5019</b>
All Programmes				
Karnataka	1941	67262	13057	80319
Kerala	1267	39742	5135	44877
Goa	71	1237	551	1788
Puducherry	77	1717	315	2032
Tamil Nadu	2193	63417	11096	74513
<b>Grand Total</b>	<b>5549</b>	<b>173375</b>	<b>30154</b>	<b>203529</b>



## ANNEXURE II

## State-wise number of training courses and gender representation in different categories of training

State	Courses (No.)	Participants (No.)		
		Men	Women	Total
<b>Farmers and Farm Women (On+Off)</b>				
Karnataka	1575	46960	18828	65788
Kerala	851	17731	12875	30606
Goa	54	471	748	1219
Puducherry	66	915	891	1806
Tamil Nadu	1733	38658	18416	57074
<b>Total</b>	<b>4279</b>	<b>104735</b>	<b>51758</b>	<b>156493</b>
<b>Rural Youth (On+Off)</b>				
Karnataka	148	3959	1610	5569
Kerala	217	4112	4267	8379
Goa	13	180	196	376
Puducherry	5	22	49	71
Tamil Nadu	117	2096	1789	3885
<b>Total</b>	<b>500</b>	<b>10369</b>	<b>7911</b>	<b>18280</b>
<b>Extension Functionaries (On+Off)</b>				
Karnataka	135	2937	2207	5144
Kerala	46	555	801	1356
Goa	1	16	8	24
Puducherry	1	24	1	25
Tamil Nadu	136	3587	1468	5055
<b>Total</b>	<b>319</b>	<b>7119</b>	<b>4485</b>	<b>11604</b>
<b>Sponsored Programmes</b>				
Karnataka	48	2219	564	2783
Kerala	57	782	1164	1946
Goa	2	103	53	156
Puducherry	2	59	1	60
Tamil Nadu	154	4319	2869	7188
<b>Total</b>	<b>263</b>	<b>7482</b>	<b>4651</b>	<b>12133</b>
<b>Vocational Programmes</b>				
Karnataka	35	502	533	1035
Kerala	96	808	1782	2590
Goa	1	12	1	13
Puducherry	3	50	20	70
Tamil Nadu	53	896	415	1311
<b>Total</b>	<b>188</b>	<b>2268</b>	<b>2751</b>	<b>5019</b>
<b>All Programmes</b>				
Karnataka	1941	56577	23742	80319
Kerala	1267	23988	20889	44877
Goa	71	782	1006	1788
Puducherry	77	1070	962	2032
Tamil Nadu	2193	49556	24957	74513
<b>Grand Total</b>	<b>5549</b>	<b>131973</b>	<b>71556</b>	<b>203529</b>



### 3.1.6 Frontline Extension Programmes

KVKs organized about one lakh extension programmes and created awareness over 17 lakh farmers and one lakh extension personnel and public on various aspects of improved farming practices such as varietal performance, production technologies, integrated pest and disease management, animal health and nutrition, production technologies of poultry, fisheries and human nutrition.

KVKs use mass media extensively for dissemination of information about relevant technologies to the farming community. They take up frontline extension programmes to create awareness about recent developments in agriculture and allied sectors. KVKs also engage with mainstream extension functionaries of the state line departments to disseminate information on rapid spread of suitable technologies on a large scale. Various extension programmes carried out by KVKs

in collaboration with other line departments/ agencies working in the district during the year are presented hereunder.

A total of 0.99 lakh extension programmes were organized through different methods through which technologies related to agriculture and allied sectors were appraised among 17.43 lakh farmers and 1.09 lakh extension personnel (Table 88). Data further indicated that KVKs in Karnataka organized maximum extension programmes (51028) with the participation of 11.12 lakh farmers and 0.61 lakh extension personnel followed by Tamil Nadu (25740) with 3.18 lakh farmers and 0.25 lakh extension personnel, Kerala (19693) with 2.74 lakh farmers and 0.19 lakh extension personnel, Goa (1332) with 0.23 lakh farmers and 0.01 lakh extension personnel and Puducherry (1257) with 0.14 lakh farmers and 0.01 lakh extension personnel. Activity-wise extension programmes organized are furnished in Table 89.

**Table 88: Frontline extension programmes organized and participation of farmers and extension personnel**

State	Programmes (No.)	Farmers (No.)			Extension Personnel (No.)		
		Male	Female	Total	Male	Female	Total
Karnataka	51028	840454	271731	1112185	51300	10696	61996
Tamil Nadu	25740	240645	79530	318689	20348	4819	25167
Kerala	19693	149292	125669	274961	10525	9317	19842
Goa	1332	16439	6999	23438	820	209	1029
Puducherry	1257	9751	4885	14636	971	455	1426
<b>Total</b>	<b>99050</b>	<b>1256581</b>	<b>488814</b>	<b>1743909</b>	<b>83964</b>	<b>25496</b>	<b>109460</b>



Participation in exhibition, KVK Kozhikode



Rabi awareness programme, KVK, Bengaluru Rural

**Table 89: Activity-wise extension programmes organized by KVKs**

State	Extension Programs (No.)	Farmers (No.)			Extension Personnel (No.)		
		Male	Female	Total	Male	Female	Total
Farmers visit to KVK	52817	68854	37580	106434	2181	1590	3771
Advisory services	26485	34487	11582	46069	1644	825	2469
Scientists visits to farmers field	8002	22475	6508	28983	1141	567	1708
Lectures delivered as resource persons	3252	130541	62487	193028	1887	956	2843
Diagnostic visits	2174	7905	2914	10819	822	355	1177
Method demonstrations	1374	21981	9968	31949	866	530	1396
Group discussion meetings	1099	14633	5204	19674	1819	943	2762
Film shows	755	19339	9739	29078	814	389	1203
Exposure visits	531	8498	3652	12150	308	287	595
Field days	459	12949	4926	17875	598	280	878
Exhibitions	439	464300	144668	607645	64648	15031	79679
Celebration of important days	327	20186	11319	31505	1133	894	2027
Animal/plant health camps	250	10034	3708	13742	264	140	404
Farmers seminars	198	11036	6817	17853	549	271	820
Workshops	185	7325	2991	10316	1798	969	2767
Self help group conveners meetings	181	1213	2407	3620	74	42	116
Soil health camps	160	7036	2325	9361	285	117	402
Kisan mela	113	380148	154681	534829	2185	920	3105
Awareness programmes	104	8619	3529	12148	511	217	728
Farm science club conveners meet	79	1482	489	1971	72	46	118
Kisan ghosthi	66	3540	1320	4860	365	127	492
<b>Total</b>	<b>99050</b>	<b>1256581</b>	<b>488814</b>	<b>1743909</b>	<b>83964</b>	<b>25496</b>	<b>109460</b>


**Participation in doordharsan programmes, KVK Puducherry**

**Celebration of Jai Kisan Jai Vigyan Diwas, KVK Tiruvarur**

Further, KVKs popularized technologies through service, literature and mass media and the details are presented in Table 90.

Among the print media, a total of 30338 extension literature of various kind were distributed among framers followed by KVKs activities covered in Newspapers (2174 No.), popular articles (741), and research papers (46). Whereas in case of utilization of electronic media, KVKs used better by Radio talks/programmes (616 No.) followed by TV talks/programmes (296 No.) and VCDs (23 No.) in their respective activities.

KVKs participated/organized a total of 439 Exhibitions and 113 Kisan Melas to raise awareness among of farmers, extension personnel and stakeholders. Further, KVKs in Karnataka participated in Agricultural Exhibitions and Kisan Melas organized as Mega events annually by their respective Host Organizations in which lakhs of farmers, extension personnel and other stakeholders took part.

**Table 90: State wise extension programmes organized for mass contact**

Activity	No.
Extension literature	30338
Newspaper coverage	2174
Popular articles	741
Radio talks/programmes	616
Exhibitions	439
TV talks/programmes	296
Research papers	46
Kisan mela	113
Video CDs	23
<b>Total</b>	<b>34234</b>

### 3.1.7 Production of Technological Inputs

Timely availability of good quality seeds, planting materials, livestock breeds and bio-products are the primary requirement to realize potential productivity in agriculture and allied sectors. KVKs are actively involved in production of quality seeds, planting materials, livestock, bio-products and supplying them to the needy farmers.

#### Quality technological products

During the year, KVKs produced and supplied over 600 t of seeds of different crop varieties, 54 lakh planting material of different crops and hybrids, nearly 440 t of bio-products and 3 lakh of livestock strains and fish fingerlings benefiting over 5 lakh farmers.

During the period under report, KVKs produced 6011.10 q seeds of crop varieties, 4438.70 q bio-products, 50.04 lakh number of planting materials of varieties, 4.10 lakh number of planting materials of hybrids and 2.78

lakh number livestock and fisheries and supplied to 1.10 lakh, 1.52 lakh, 2.37 lakh, 0.05 lakh, 0.11 lakh farmers, respectively (Table 91).

**Table 91 : Production and supply of technological inputs**

Category	Quantity	Worth (Rs.in lakh)	Farmers (No. in lakh)
Seeds of crop varieties (q)	6011.10	451.41	1.10
Bio-products (q)	4438.70	255.28	1.52
Planting material of crops (No. in lakh)	50.04	465.69	2.37
Planting material of crop hybrids (No. in lakh)	4.10	8.29	0.05
Livestock and fisheries (No. in lakh)	2.78	109.86	0.11
<b>Total</b>	<b>10506.72</b>	<b>1290.53</b>	<b>5.15</b>



(A) **Seeds:** KVKs in Karnataka produced the highest quantity of seeds (2959.01 q) followed by KVKs of Tamil Nadu (2343.81 q), Puducherry (582.22 q) and Kerala (126.06 q) (Table 92). Data in Table 93 shows that more quantity of seed was produced on Cereals (4497.64 q) followed by commercial crops (460.28 q), Pulses (379.95 q), Oilseeds (264.64 q), Fodder crops (228.14 q), Millets (54.45 q), Vegetable Crops (52.38 q), Green manure crops (35.82 q), Spices (24.92 q) and Tuber crops (12.88 q).

**Table 92: State-wise production and supply of seeds**

State	Seeds		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Karnataka	2959.01	17125219	7967
Tamil Nadu	2343.81	22244090	33826
Puducherry	582.22	1583864	1742
Kerala	126.06	4188540	67297
<b>Total</b>	<b>6011.10</b>	<b>45141713</b>	<b>110832</b>

**Table 93: Crop category wise production of seeds**

Crop category	Seeds		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Cereals	4497.64	16177163	16378
Commercial	460.28	163860	280
Pulse	379.95	3800238	10362
Oilseed	264.64	2677570	829
Fodder	228.14	14609610	10444
Millet	54.45	271605	2217
Vegetable	52.38	6439027	69115
Green manure	35.82	214920	332
Spice	24.92	742640	822
Tuber	12.88	45080	53
<b>Total</b>	<b>6011.10</b>	<b>45141713</b>	<b>110832</b>

(B) **Planting material:** KVKs in Tamil Nadu produced the highest number of planting material (2201888) of crops followed by KVKs in Karnataka (1549104), Kerala (968747), Puducherry (256656) and Goa (28103) (Table 94). Data in Table 95 shows that the maximum quantity of planting material was fodder slips (2591815)

and the rest was seedlings of Vegetable crops (869327), Spices (494727), Plantation crops (441653), Fruit crops (411989), Agro-forestry (83423), Flower crops (72190), Ornamental crops (29872), Forest species (5235), Medicinal plants (3504) and Aromatic plants (763).

**Table 94: State wise production and supply of planting materials**

State	Planting Material		
	Quantity (No.)	Value (Rs.)	Farmers (No.)
Tamil Nadu	2201888	9811359	25667
Karnataka	1549104	18899512	10720
Kerala	968747	15462371	193562
Puducherry	256656	1975841	3264
Goa	28103	420259	3909
<b>Total</b>	<b>5004498</b>	<b>46569342</b>	<b>237122</b>

**Table 95: Crop category wise production of planting materials**

Crop category	Planting material		
	Quantity (No.)	Value (Rs.)	Farmers (No.)
Fodder	2591815	1791626	19860
Vegetable	869327	3765068	78599
Spice	494727	10031804	52569
Plantation	441653	11580235	35568
Fruit	411989	16123364	25546
Agroforestry	83423	875205	11215
Flower	72190	1626639	2821
Ornamental	29872	610508	9696
Forest	5235	93010	554
Medicinal	3504	53048	494
Aromatic	763	18835	200
<b>Total</b>	<b>5004498</b>	<b>46569342</b>	<b>237122</b>

(C) **Hybrid planting material:** KVKs in Karnataka produced highest number of hybrid planting materials (192407) followed by KVKs in Tamil Nadu (130533), and Kerala (87163) (Table 96). In the case of crops, more number of hybrid seedlings of chilies (162062) were produced followed by tomatoes (148641), cauliflower (44785), cabbage (42378), brinjal (12000) and sapota (237) (Table 97).

**Table 96: State-wise production of planting materials of hybrids**

State	Planting material of hybrids		
	Quantity (No.)	Worth (Rs.)	Farmers (No.)
Karnataka	192407	393820	1455
Tamil Nadu	130533	261066	918
Kerala	87163	174326	3468
<b>Total</b>	<b>410103</b>	<b>829212</b>	<b>5841</b>

**Table 97: Crop category-wise production of planting materials of hybrids**

Crop	Planting materials of hybrids		
	Quantity (No.)	Worth (Rs.)	Farmers (No.)
Chilli	162062	324124	1035
Tomoto	148641	297282	933
Cauliflower	44785	89570	2232
Cabbage	42378	84756	1236
Brinjal	12000	24000	155
Sapota	237	9480	250
<b>Total</b>	<b>410103</b>	<b>829212</b>	<b>5841</b>

**(D) Bio-products:** KVKs in Tamil Nadu produced largest quantity of bio products (1900.87 q) followed by KVKs in Kerala (1750.01 q), Karnataka (638.02 q), Puducherry (124.77 q) and Goa (25.03 q) (Table 98). Data in Table 99 shows that largest quantity of bio products produced was Micro nutrient mixtures (1546.95 q) followed by Bio fungicides (1166.19 q), Organic manure (963.88), Bio pesticides (355.72 q), Bio fertilizers (319.64 q), Mushroom spawn (79.09 q), and Bio agents (7.23 q). Further, KVKs produced 35131 number of pheromone traps, 11406 EPN (Entomo Pathogenic Nematode), 4260 Acerophagus (Papaya mealy bug) parasitoid and 3240 Tricho cards (Table 100).

#### Bio products

KVKs produced and supplied over 35000 pheromone traps, 11000 EPN, 4200 Acerophagus (Papaya mealy bug) parasitoid and 3200 Tricho cards through which more than 1.65 lakh farmers were motivated to adopt bio-control by reducing use of chemicals.

**Table 98: State wise production of bio products**

State	Bio products		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Tamil Nadu	1900.87	6462769	18407
Kerala	1750.01	11381846	110082
Karnataka	638.02	6538220	10871
Puducherry	124.77	1081930	11666
Goa	25.03	63400	983
<b>Total</b>	<b>4438.70</b>	<b>25528165</b>	<b>152009</b>

**Table 99: Category wise production of bio products**

Category	Bio products		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Micro nutrient mixture	1546.95	7706544	16727
Bio-fungicide	1166.19	8179883	56247
Organic manure	963.88	1506566	17239
Bio-pesticide	355.72	3974711	36577
Bio-fertilizer	319.64	2373540	20965
Mushroom spawn	79.09	1683885	3570
Bio-agent	7.23	103036	684
<b>Total</b>	<b>4438.70</b>	<b>25528165</b>	<b>152009</b>

**Table 100: Production of other bio products**

Category	Bio products		
	Quantity (No.)	Value (Rs.)	Farmers (No.)
Pheromone traps	35131	1793643	12245
EPN	11406	17109	228
Acerophagus papayae	4260	2130	26
Tricho cards	3240	64800	345
<b>Total</b>	<b>54037</b>	<b>1877682</b>	<b>12844</b>

**(E) Livestock and fisheries:** KVKs in Kerala produced largest number of livestock materials and fisheries (184853) followed by Puducherry (33369), Tamil Nadu (31433), Karnataka (24978) and Goa (4060) (Table 101). Of total production, maximum number (153512) was under Fisheries followed by Poultry (109115), Poultry-egg (14949), Sheep and Goat (799), Piggery (200), Dairy animals (76), and Rabbitary (42) (Table 102).

**Table 101: State-wise production of livestock materials and fisheries**

State	Livestock material and fisheries		
	Quantity (No.)	Worth (Rs.)	Farmers (No.)
Kerala	184853	5606677	6568
Puducherry	33369	257856	622
Tamil Nadu	31433	2478124	2542
Karnataka	24978	2365470	1080
Goa	4060	278140	670
<b>Total</b>	<b>278693</b>	<b>10986267</b>	<b>11482</b>

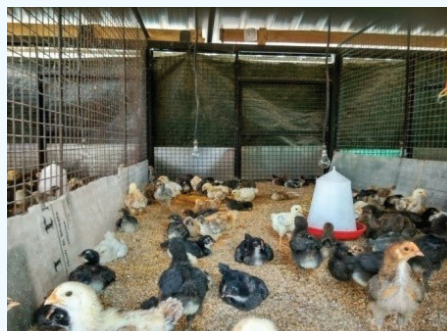
**Table 102: Category-wise production of livestock materials and fisheries**

Category	Livestock materials and fisheries		
	Quantity (No.)	Worth (Rs.)	Farmers (No.)
Fisheries	153512	418771	1072
Poultry	109115	6273209	9278
Poultry eggs	14949	72187	613
Sheep & Goat	799	3046100	296
Piggrey	200	512600	150
Dairy animals	76	651400	52
Rabitary	42	12000	21
<b>Total</b>	<b>278693</b>	<b>10986267</b>	<b>11482</b>


**Production of vegetable seedlings in Portrays (KVK, Pathanamthitta)**

**Fodder production unit (KVK, Tiruvallur)**

**Nursery unit (KVK Dharwad)**

**Sheep-cum-poultry unit (KVK Bangalore Rural)**

**Poultry unit (KVK Chikkamagalur)**

**Pepper vine production unit (KVK Kannur)**

### 3.1.8 Jai Kisan Jai Vigyan / Technology Week

Technology week is being observed on a convergence mode by the KVKs for 4-6 days to create awareness among farmers and other stakeholders about the latest technologies in agriculture and its allied sectors. Besides,

Technology week served as a platform to discuss and share experiences of various stakeholders. Technology week included exhibition on latest technologies, seminars and guest lectures, visit to demonstration units/plots inside the KVK campus, film shows, group discussions etc.

During the period under report, 39 KVKs of the Zone in the states of Karnataka (21KVKs), Kerala (10 KVKs) and Tamil Nadu (8 KVKs) organized technology week in coordination with 368 agencies

wherein 3.59 lakh farmers participated. During the technology week, a total of 1.57 t seeds of high yielding varieties, 0.63 lakh planting material and 1.39 t of bio-products were made available for sale.

### Technology Week



**Inauguration: KVK Kasaragod**



**Technical session: KVK Shivamogga**



**Display of technical products: KVK Theni**



**Training session: KVK Kodagu**

#### 3.1.9. Kisan Mobile Advisory Services

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 farmers. KVKs are sending information via text and voice messaging to registered farmers advising them important agricultural operations, events, programmes etc. Accordingly, KVKs advised farmers regularly on crops, livestock, other enterprises, weather, marketing and

awareness of latest agricultural technologies, events and programmes through text and voice messages. During the reporting period 10285 text messages and 3688 voice messages were sent to 12.72 lakh farmers. Among these communications major share was of crops (5826) followed by weather (5201), awareness (1266), livestock (785), other enterprises (512), and marketing (383). The details are presented in Table 103.

**Table 103: Details of state-wise SMS/Voice calls sent to various priority areas**

Name of State	KVKs (No.)	Message Type	Farmers (No.)	Crop	Live-stock	Weather	Mar-keting	Aware-ness	Other enterprise	Total
<b>Karnataka</b>	30	Text	936700	793	106	72	46	295	128	1440
<b>Tamil Nadu</b>	25	Text	176882	608	140	71	74	147	92	1132
	10	Voice	55839	411	255	39	48	50	41	844
	<b>Total</b>		<b>232721</b>	<b>1290</b>	<b>825</b>	<b>239</b>	<b>137</b>	<b>317</b>	<b>164</b>	<b>2972</b>
<b>Kerala</b>	10	Text	101457	1792	45	4981	17	428	42	7305
	3	Voice	345	2160	91	38	98	246	71	2704
	<b>Total</b>		<b>101802</b>	<b>2402</b>	<b>133</b>	<b>643</b>	<b>102</b>	<b>495</b>	<b>125</b>	<b>3900</b>
<b>Goa</b>	1	Text	335	0	3	0	0	0	2	5
	1	Voice	64	0	65	0	0	0	0	65
	<b>Total</b>		<b>399</b>	<b>0</b>	<b>68</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>70</b>
<b>Puducherry</b>	2	Text	50	27	40	0	100	100	136	403
	1	Voice	10	35	40	0	0	0	0	75
	<b>Total</b>		<b>60</b>	<b>62</b>	<b>80</b>	<b>0</b>	<b>100</b>	<b>100</b>	<b>136</b>	<b>478</b>
<b>Total</b>	68	Text	1215424	3220	334	5124	237	970	400	10285
	15	Voice	56258	2606	451	77	146	296	112	3688
	<b>Grand total</b>		<b>1271682</b>	<b>5826</b>	<b>785</b>	<b>5201</b>	<b>383</b>	<b>1266</b>	<b>512</b>	<b>13973</b>

### 3.1.10 Soil, Water and Plant Analysis

A total of 70 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 conducting FLDs and OFTs as well rendering advisory services on nutrient based recommendations to the farmers. During the year, a total of 80327 samples of soil, water, plant, and organic manure received from 64228 farmers belonging to 32529 villages were analyzed with realization of Rs. 50.76 lakh (Table 104). 55642 Soil Health Cards were distributed to

farmers. State-wise data showed that KVKs in Karnataka analyzed samples (58396) followed by Tamil Nadu (13382), Goa (4559), Kerala (3475), and Puducherry (515) (Table 105).


**Demonstration of soil and water testing kit**
**Table 104: Details of samples analyzed during 2016-17**

Type of sample	Samples (No.)	Farmers (No.)	Villages (No.)	Amount realized (Rs.)
Soil samples	58063	43998	18743	3635653
Water samples	22064	20085	13684	1429630
Plant samples	159	118	70	600
Organic manure	41	27	32	10050
<b>Total</b>	<b>80327</b>	<b>64228</b>	<b>32529</b>	<b>5075933</b>



Table 105: State-wise soil, water, plant analysis undertaken during 2016-17

Type of sample	Samples (No.)	Farmers (No.)	Villages (No.)	Amount realized (Rs.)
Karnataka	58396	43750	28005	4090843
Tamil Nadu	13382	12653	3616	588835
Kerala	3475	3196	398	359785
Goa	4559	4506	391	0
Puducherry	515	123	119	36470
<b>Total</b>	<b>80327</b>	<b>64228</b>	<b>32529</b>	<b>5075933</b>

### 3.1.11 World Soil Day Celebration

World Soils Day was celebrated by 70 KVKs on 5.12.2016 in the presence of three State Ministers and seven Members of Legislative Assembly. In

these programs, 14216 farmers participated. On the occasion, 4744 Soil Health Cards were issued to farmers. State wise details are presented in the Table 106 given below.

Table 106: State-wise details of World Soil Science Day celebrated at KVKs

Sl. No	State	KVKs participated (No.)	Farmers participated (No.)	Soil health cards distributed (No.)	Public Representatives participation	
					State Minister	Member of Legislature Assembly
1	Karnataka	31	9366	2530	3	4
2	Kerala	12	824	474	0	2
3	Tamil Nadu	24	3924	1658	0	1
4	Goa	1	35	50	0	0
5	Puducherry	2	67	32	0	0
<b>Grand total</b>		<b>70</b>	<b>14216</b>	<b>4744</b>	<b>3</b>	<b>7</b>

### 3.1.12 Rainwater Harvesting Units

Rainwater harvesting units with micro irrigation system have been established in 16 KVKs. A total of 41 training courses and 28 demonstrations were conducted and 3128 planting materials were produced utilizing this facility. Further, 3128 farmers and 209 officials visited these units and got acquainted with the rainwater harvesting techniques.

### 3.1.13 Convergence and Linkages

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 *kisan goshti/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 107 substantiate the activities through which ATMA platform was used to achieve convergence. Altogether, KVKs participated in 2278 programmes of ATMA

during the year and at the same time KVKs organized 509 programmes in collaboration with ATMA. Using the linkage with ATMA, 52 KVKs conducted training programmes, 24 KVKs conducted demonstrations, and 16 KVKs conducted exhibitions. Forty-three meetings were organized as part of convergence efforts.

**Table 107: Details of linkages with ATMA by KVKs**

Sl. No.	Programmes	KVKs involved (No.)	Programmes attended by KVK staff (No.)	Programmes organized by KVK staff (No.)
1	Meetings	44	312	64
2	Research projects	4	4	2
3	Training programmes	52	733	220
4	Demonstrations	24	306	57
5	Extension programmes	3	15	25
6	Technology week	13	25	9
7	Exposure visit	14	47	21
8	Exhibition	16	56	14
9	Soil health camps	15	45	28
10	Animal health campaigns	6	15	6
11	Farmers field school	6	38	8
12	Capacity development	13	584	0
13	Kisan mela	10	15	11
14	Agri-preneurs development	1	4	0
15	Video films	3	7	8
16	Watershed approach	2	14	14
17	Extension literature	13	58	22
	<b>Total</b>		<b>2278</b>	<b>509</b>

External funding was received by the KVKs to organize various programs and activities. Rashtriya 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 as detailed in the Table 108. Various Boards like Planning Board, Bio-fuel Development Board also supported the KVKs in a big way. Various Boards and Directorates also supported the KVK activities.

**Table 108: Details of external funding received by KVKs through convergence and linkages**

Sl. No.	Agency	KVKs (No.)	Amount Received (Rs. in Lakh)
1	Rashtriya Krishi Vikas Yojana(RKVY)	12	133.2
2	Agricultural Technology Management Agency (ATMA)	2	6.34
3	National Food Security Mission(NFSM)	2	2.73

Contd.... P.83

4	ICAR Institutes	3	20.52
5	National Bank for Agriculture and Rural Development (NABARD)	18	159.97
6	National Horticulture Mission (NHM)	3	32.7
7	State Department of Agriculture	13	357.86
8	State Planning Board	14	311.63
9	State Agricultural Universities	7	93.55
10	Karnataka State Biofuel Development Board	3	12.92
11	Directorate of Cashew and Cocoa Development	3	3.36
12	State Poultry Development Scheme	0	0
13	Coconut Development Board (CDB)	1	2.12
14	Department of Biotechnology (DBT)	3	78.39
15	Others	7	153.27
		<b>Total</b>	<b>1368.56</b>

### 3.1.14 Success Stories

#### 3.1.14.1 Integrated farming system – boosted the annual income of a farmer

Shri Govindraj, S/o Hanumiah hails from Dandenahalli village of Magadi Talluk in Ramanagara district, Karnataka is a role model for other farmers. He has adopted integrated farming system in his farm with the technical support from KVK, Magadi, Ramanagara on his 6 acres farm. Earlier he cultivated finger millet, sunflower and used to earn around Rs.1.5 lakh per year. Under the guidance of KVK, Ramanagara he began integrate cultivating improved varieties of different crops. He has introduced new improved varieties finger miller (MR-1, MR-6) redgram (BRG-1, BRG-2) field bean (HA-4) and soyabean (KBS-23 V/s M.A.U.S-2). He also strengthened his livestock component by planting fodder cuttings such as Co-3, Co-4 and Chaya. Besides he also adopted labour and input saving practices like use of herbicides, seed drill for ragi sowing, IPM practices in vegetables and azolla production on his farm under the guidance of the KVK. Effective utilization of all these resources helped him to earn Rs.3.50 lakh from poultry followed by Banana (Rs. 1.50 lakh), dairy (Rs.0.82 lakh), tomato (Rs.0.60 lakh), and finger millet (Rs.0.50 lakh) during the year. With diversification of crops and integration of livestock his earnings have now reached Rs 7 lakh per year from the same piece of land.



A view of fodder intervention in the IFS unit

#### 3.1.14.2 Composite fish culture created as livelihood

Shri Padmanaban, S/o Deivanayagam from Sellipet village of Puducherry searched for job for a while after his graduate studies. But could not get one to his liking. That is when he thought of doing something he liked. That's when he approached KVK Puducherry to acquaint himself with composite fish culture. He chose a half acre plot that had been excavated for brick kiln. KVK, Puducherry not only guided him technically but also guided him to avail subsidy for fish pond construction from the Fish Farmer Development Agency (FFDA), Puducherry. After manuring the pond with raw cattle

dung and inorganic fertilizer, he stocked composite fish fingerlings in the pond. Fishes were fed with rice bran and groundnut oil cake periodically for six months. With two harvests in a year, he realized Rs.0.90 lakh as a net profit through sale of fish. After the success in Composite fish culture, he expanded his fish pond to one more acre as he faced hardship in taking up Paddy cultivation due to labour scarcity. His success motivated unemployed rural youth in the same village and neighboring villages of Vinayagampet and Sorapet to start with composite fish culture in their lands as well and also in village panchayat ponds on lease by availing subsidy from FFDA for their livelihood. Further, he also started fish seed production and fish marketing besides fish culture.



**A view of composite fish culture pond**

### **3.1.14.3 Onion seed production**

Shri Govindaraju, a farmer of Marutipura village in Hoskere hobli of Madhugiri taluk, Tumakuru district in Karnataka has 5 acre land where he was cultivating vegetables, field crops and other plantation crops since many years. With his traditional cultivation practices he was finding it difficult to earn a livelihood. After he came in contact with KVK Tumakuru he was motivated to take up seed production of a popular onion variety Arka Kalyan. He not only got necessary technical guidance of the KVK but also got the seed buyback assurance. As per agreement between him and IIHR KVK he collected seed from KVK and took up the sowing during June month of 2015 and harvested only 1.20 t of onion bulbs in 0.50 acre land due to excess rainfall. After a month, he planted 1.20 t bulbs for raising seed crop

in another piece of land that gave 75 kg of good quality onion seeds of Arka kalyan. His seed was procured by the KVK as per agreement. After the sale of seeds he received Rs.0.75 lakh to his account via electronic transfer. In fact, the sale price of 1.20 t onion bulb was only Rs.15000, whereas he realized five times the value due to seed production by extending the activity to one more season. Enthused by this, he further extended seed production to 2 acre. Apart from him, nearly 15 farmers have taken up seed production in other crops like redgram, finger millet, and french bean under the technical guidance of KVK.



**A view of onion seed production field of Shri Govindaraju**

### **3.1.14.4 Refined-indigenous technology of brined jackfruit processing through community approach**

Traditionally jackfruit brining was done using hand measure and the shelf life of the product was more than a year. Brined jackfruit is used in the form of curry and is a special delicacy in the region of Kasaragod district and the adjoining southern coastal district of Karnataka. However this technique remained familiar only to few of the elderly women though in demand was gradually restricted to few farm families who managed to process it for their household use. Considering its demand and the low cost technique it was felt that the fruit can be used effectively by revival of this technique through standardization of the same with a community approach. In this direction KVK, Kasaragod, Kerala worked on revival of traditional jackfruit brining technique since

three years through different activities and standardized the technique. On determining the brining percentage the technology was demonstrated in few schools with school lunch programmes involving teachers and students and women SHG's. The technology has been taken up at Sri Bharathi Vidyapeeta at Mujangavu and Badiatka, Sri Durga Parameshwari High school, Dharmathadka, Holy family convent, Kumbla Sadguru Sri Nithyananda Vidyapeeta, Kondevoor and 2 women entrepreneurs. For the past three years, a total of 7700 kg of raw jackfruit was processed out of which 1700 kg during 2014, 1800 kg during 2015 and 4200 kg during 2016 by different organizations Viz., Sri Bharathi Vidyapeeta, Mujangavu, Sri Bharathi Vidyapeeta, Badiatka, Sri Durga Parameshwari High School, Dharmathadka, Holy Family convent, Kumbla, Sadguru Sri Nithyananda Vidyapeeta, Kondevoor and two farm women entrepreneurs namely Smt Lakshmi Bhat and Smt Vijayashree in Kasaragod district. The brined jackfruit which was earlier stored in large pots or plastic containers is also made available in small standing pouches with attractive packaging and labeling and sold @ Rs 150/Kg. Value added products from brined jackfruit like Nippattu and Undalakalu (supplemented with sprouted finger millet flour) was also standardized and promoted through above mentioned 2 women entrepreneurs and other SHGs in the district.



**A view of value addition of brined jackfruit**

### **3.1.14.5 Hi tech tuberose cultivation – enhanced the income of a farmer**

Shri Thangarasu, a progressive farmer aged 62, residing at Kuvagam village, Andimadam block of Ariyalur District, Tamil Nadu has 10 acres of land. He attended a training

course on Scientific Tuberose Cultivation organized by KVK, Ariyalur during May 2014. He started cultivating tuberose under the technical guidance of the KVK. He observed that cultivation of tuberose flowers is a better source of income compared to cultivation of vegetables which was engaged in prior to his training with the KVK. He cultivated an improved tuberose variety Prajwal released by IIHR in one acre. The selected field was ploughed thoroughly by using chisel plough (once), disk plough (once) and cultivator (four times) and then ten tones of FYM, 500 kg single super phosphate, 800g of Azospirillum, 800g of phosphobacteria, 1 kg of *Trichoderma viridi* along with FYM 50 kg and neem cake 100 kg were applied before ploughing. A total of 300 kg tuberose corns treated with Azospirillum, Phosphobacteria, *Pseudomonas*, Nematicide and *Trichoderma viridi* were sown 45 cm x 25 cm apart with polythene mulching techniques to control weeds and soil moisture conservation. The expenditure incurred for polythene mulching, fertilizer, pesticide, flower harvesting, irrigation, labour etc. was Rs.60000. Harvesting started from third month after planting. An average of 30-35 Kg of flower yield was harvested every day and sold in the nearby flower market at Kumbakonam with average price of Rs.50/kg. However, the demand for tuberose was as high as Rs.400/kg during marriage seasons. He harvested 6000 kg tuberose flowers/acre and gained a net income of Rs.4.2 lakh/acre within a year through the sale of flowers.



**Tuberose under precision farming**



### 3.1.14.6 Successful women entrepreneur in goat rearing

Today the success in the enterprise brings good income and greater social recognition with the support of KVK, Erode Says Smt Brindha Devi graduate women from Bungalapudur village in Erode district, Tamil Nadu. She further explains that the KVK's technical input and hand holding support brought a remarkable change in the goat farming system. At the beginning, the income from the goat farming activity was very minimum and sometime led into loss. Interventions adopted by her under the technical guidance of the KVK was an eye opener to make the enterprise a successful model. Construction of goat shed with slated floor shed, selection of appropriate breeds and their up-gradation, production of green fodder and use of concentrated feed, disease management and market linkage were the key practices that changed the enterprise into a profitable one.

She established goat farm with 10 local goats and gradually replaced them with Tellicherry breed. At present the unit has 100 goats with 20:1 goats and buck ratio. Further, use of Boer bucks for crossing with Tellicherry breed has improved the weight of the new born. The weight of the goat ranges from 30 – 40 kg at the age of 9 – 10 months. The goat is being sold as live weight for Rs. 250 / kg at the farm gate. She feeds each goat with 2 kg fodder / goat / day by cultivating mixed fodders like napier (CO 4), fodder sorghum CO (FS) 29 and hedge lucerne besides feeding concentrated feed prepared at the farm. PPR vaccination, deworming and regular health checkup were carried out in a regular interval to avoid the seasonal diseases. She earns income of Rs. 4.37 lakh per year through sale of on an average 50 goats from the unit. She received award from ASPEE Foundation, Mumbai for "BEST WOMAN ENTREPRENEUR" for the year 2016 – 2017.

The KVK has identified the farm as a resource centre for goat rearing. Documentary film on Slated Floor Goat Rearing has been developed as a training material. More than 1000 farmers have visited the farm for updating their skill and knowledge on goat rearing. Motivated by this entrepreneur a total of 30 units have come up in Erode district recently.



Goat rearing unit of Smt Brindha Devi

### 3.1.15 Recognition and Awards

Zonal Best KVK Award 2015 was given to KVK Malappuram on the occasion of ICAR Foundation Day held in New Delhi on July 16, 2016.



Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protsahan Puraskar 2016 was awarded to KVK Malappuram. The award was presented by Hon'ble Union Agriculture Minister Shri Radha Mohan Singh on 15<sup>th</sup> March 2017, during the inaugural function of Krishi Unnati Mela of IARI, Puna, New Delhi.



### 3.2. AGRICULTURE TECHNOLOGY INFORMATION CENTRE (ATIC)

The zone has ten ATICs, wherein three are located in Karnataka, five in Kerala and two in Tamil Nadu. Brief progress achieved by the ATICs during the reporting period is given below:

#### 3.2.1 Farmers / Extension Personnel / Stakeholders Visits

During the period under report, a total of 70355 farmers, 311 extension personnel and 1904 other stakeholders visited ATICs in the zone. Altogether, 72570 persons visited the ATICs, out of which, 22015 visited for information and 50555 visited for technology products.

#### 3.2.2 Communication with Stakeholders

A total of 8953 farmers contacted ATICs through various means of communication like phone calls, video shows, letters received and letters replied and participation in training.

#### 3.2.3 Publication

Under publications, 6929 books, 2500 technical bulletins and 87 DVDs were produced and provided to the ATIC visitors or those requested by mail. Totally, 6450 farmers and other stakeholders were benefited by these publications and documents.

#### 3.2.4 Technology Services Provided

During the reporting period, 636 soil and water samples were tested by ATICs.

#### 3.2.5 Technology Products Provided

Among different technology products, 146.22 quintals of seeds and 495600 number of planting material worth 150.89 lakh and Rs. 103.73 lakh, respectively were provided to farmers. Details are provided in Table 109.

**Table 109: Technology products provided by ATICs in Zone VIII**

Technology products	Unit of quantity	Quantity
Seeds	Quintals	146.22
Planting material	Numbers	380264

### 3.2.6 Revenue Generated

An amount of Rs. 263.48 lakh was generated through various technology products/ publications and services provided by ATICs. Details of item-wise revenue generated are given in Table 110.

**Table 110: Income generated by ATICs**

Items	Income generated (Rs. lakh)
Seeds/ Planting materials	254.62
Publications/ Audio Video cassettes & CDs / ICAR Publications	8.86
<b>Total</b>	<b>263.48</b>

### 3.3 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 nine 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, Shimoga; Kerala Agricultural University, Thrissur; Tamil Nadu Agricultural University, Coimbatore; and Tamil Nadu Veterinary and Animal Sciences University, Chennai which are providing adequate technology support to the KVKs in various forms, that 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 and crop specific awareness programmes. During 2016-17, the Directorates of Extension have conducted 47 workshops/meetings exclusively for KVK staff, in which 79 KVKs from Zone VIII have 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 celebrations, world water day celebrations, pulse day celebrations, monthly review meetings, quarterly review meetings and pre-action plan meetings.

Directors of Extension and their officials participated in 22 Scientific Advisory Committee meetings, 42 field days, 34 workshops/seminars and 30 training programmes. In addition they have attended 42 other programmes including interface meetings, group discussion with KVK officials, farmers meet, animal health camps, inauguration of farmers group / society in villages, Krishi mela *etc.* In addition they also have made field visits to 53 wherein on farm trials field, 128 fields of frontline demonstrations and participated in 290 training programmes conducted by KVKs and 13 FFS programmes. Further, they have also assisted the KVKs for preparing 11 documents on success stories / case studies.

In order to provide backstopping on latest technologies in agriculture and its allied sectors, the Directorate of Extension organized 47 training programmes in which 160 KVK staff participated. The thematic areas covering 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.

### 3.4 CLUSTER FRONTLINE DEMONSTRATIONS

#### 3.4.1 Cluster Frontline Demonstrations on Pulses under NFSM

The project entitled Cluster Frontline Demonstrations (CFLDs) of Pulses under NFSM 2016-17 was sanctioned by Government of India, Ministry of Agriculture and Farmers Welfare, Department of Agriculture, Co-operation and Farmers Welfare with an aim to enhance the production of pulses in the country. As a part of this project, ICAR-ATARI, Bengaluru implemented the project on pulse crops viz, pigeonpea, greengram, blackgram and chickpea in selective districts through respective KVKs in the Zone during 2016-17.

A total of 3751 CFLDs on different pulse crops were conducted by the KVKs of Karnataka, Tamil Nadu, Kerala and Puducherry in an area of 1500.40 ha of farmers' field. Crop wise CFLDs implemented during the year are presented in Table 111.

- (a) **Pigeonpea:** A total of 21 KVKs implemented CFLDs on pigeonpea of which 18 KVKs of Karnataka viz., Bagalkot, Bengaluru Rural, Belagavi-I, Bidar, Chikkaballapura, Chitradurga, Davanagere, Gadag, Kalaburagi-I, Kalaburagi-II, Kolar, Koppal, Mandya, Raichur, Ramanagara, Tumakuru-I, Tumakuru-II and Vijayapura-I in 250 ha by involving 625 farmers with high yielding varieties of BRG-1, BRG-2, BRG-4, BRG-5, BSMR-736, GRG-811 and TS-3R and 3 KVKs of Tamil Nadu viz., Dindigul, Karur and Krishnagiri in 30 ha by involving 75 farmers with high yielding varieties of TS-3R, BRG-2 and BRG-4. Thus, a total of 700 CFLDs were conducted in 280 ha in the Zone during Kharif (Table 111).
- (b) **Greengram:** A total of 33 KVKs implemented CFLDs on greengram of which 11 KVKs of Karnataka viz., Bidar, Belagavi-I, Belagavi-II, Dharwad, Dakshina Kannada, Gadag, Kalaburagi-I, Kalaburagi-II, Koppal, Shivamogga and Uttara Kannada in 209.20 ha by involving 523



farmers with high yielding varieties of DGGV-2, BGS-9, KKM-3, Shreya, 15 KVKs of Tamil Nadu viz., Coimbatore, Cuddalore, Dindigul, Erode, Kancheepuram, Karur, Madurai, Nagapattinam, Theni, Thiruvallur, Thiruvarur, Namakkal, Salem, Virudhunagar and Villupuram in 264 ha by involving 660 farmers with high yielding variety of Co(gg)-8, 6 KVKs of Kerala viz., Kasaragod, Kollam, Kottayam, Palakkad, Thiruvanthapuram and Wayanad in 70 ha by involving 175 farmers with high yielding varieties of Co(gg)-8, PDM-139 and Karaikal KVK of Puducherry in 10 ha by involving 25 farmers with Co(gg)-8 variety. Thus, a total of 1383 CFLDs were conducted in 553.20 ha in the Zone, out of which 500 CFLDs in 200 ha during Kharif, 735 CFLDs in 294 ha during rabi and 148 CFLDs in 59.20 ha during summer (Table 111).

- (c) **Blackgram:** A total of 35 KVKs implemented CFLDs on blackgram of which 7 KVKs of Karnataka viz., Bidar, Davanagere, Kalaburagi-I, Kalaburagi-II, Mysuru, Koppal and Uttara Kannada in 80 ha by involving 200 farmers with high yielding varieties of DU-1, AKU-15, DVG-5, Rashmi, 21 KVKs of Tamil Nadu viz., Ariyalur, Cuddalore, Dindigul, Erode, Karur, Kancheepuram, Nagapattinam, Namakkal, Perambalur, Pudukottai, Salem, Sivagangai,

Theni, Trichy, Thiruvarur, Thiruvallur, Tuticorin, Thiruvannamalai, Vellore, Virudhunagar and Villupuram in 290 ha by involving 725 farmers with high yielding varieties of VBN-5, VBN-6, VBN-8, 6 KVKs of Kerala viz., Kasaragod, Kollam, Kottayam, Palakkad, Pathanamthitta and Wayanad in 60 ha by involving 150 farmers with high yielding variety of VBN-6, DU-1, T-9, TAU-1 and Karaikal KVK of Puducherry in 10 ha by involving 25 farmers with high yielding variety of VBN-6. Thus, a total of 1100 CFLDs were conducted in 440 ha in the Zone, out of which 100 CFLDs in 40 ha during Kharif, 800 CFLDs in 320 ha during rabi and 200 CFLDs in 80 ha during summer (Table 111).

- (d) **Chickpea:** A total of 568 CFLDs were conducted in 227.20 ha during rabi (Table-111) by 19 KVKs viz., Bagalkot, Bengaluru Rural, Belagavi-I, Ballari, Bidar, Chikkamagaluru, Chitradurga, Davanagere, Dharwad, Gadag, Kalaburagi-I, Kalaburagi-II, Hassan, Haveri, Koppal, Raichur and Vijayapura-I of Karnataka and Coimbatore and Dindigul of Tamil Nadu. Out of which, 518 CFLDs were conducted by the KVKs of Karnataka in 207.20 ha with high yielding varieties of JG-11, Jaki-9218, BGD-103, NBeG-3 and GBM-2 and 50 CFLDs by KVKs of Tamil Nadu in 20 ha with high yielding varieties of Co-4 and Jaki-9218.

**Table 111: Cluster demonstrations on pulses under NFSM implemented by KVKs during 2016-17**

Crop	Seasons 2016-17						Total	
	Kharif		Rabi		Summer		Demo (No.)	Area (ha)
	Demo (No.)	Area (ha)	Demo (No.)	Area (ha)	Demo (No.)	Area (ha)		
Pigeonpea	700.00	280.00	-	-	-	-	700.00	280.00
Greengram	500.00	200.00	735.00	294.00	148.00	59.20	1383.00	553.20
Blackgram	100.00	40.00	800.00	320.00	200.00	80.00	1100.00	440.00
Chickpea	-	-	568.00	227.20	-	-	568.00	227.20
<b>Total</b>	<b>1300.00</b>	<b>520.00</b>	<b>2103.00</b>	<b>841.20</b>	<b>348.00</b>	<b>139.20</b>	<b>3751.00</b>	<b>1500.40</b>

Performance of cluster FLDs on pulses under NFSM 2016-17



Greengram variety BGS-9 (KVK Gulabarga-II)



Greengram variety Co-8 (KVK Salem)



Blackgram variety VBN-6 (KVK Vellore)



Blackgram variety DU-1 (KVK Bidar)



Pigeonpea variety BRG-5 (KVK Ramanagara)



Pigeonpea variety BRG-4 (KVK Karur)



Chickpea variety JAKI-9218 (KVK Bangalore Rural)



Chickpea variety GBM-2 (KVK Bidar)

### 3.4.2 Cluster Frontline Demonstrations on Oilseeds under NMOOP

The project entitled Cluster Frontline Demonstrations (CFLDs) of Oilseeds under NMOOP 2016-17 was sanctioned by Government of India, Ministry of Agriculture & Farmers Welfare, Department of Agriculture, Co-operation & Farmers Welfare with an aim to enhance the production of oilseeds in the country. As a part of this project, ICAR-ATARI, Bengaluru implemented the project on oilseed crops viz, groundnut, sunflower, soybean and linseed in selective districts through respective KVKs in the Zone during the year 2016-17.

A total of 3353 CFLDs on different oilseed crops were conducted by the KVKs of Karnataka and Tamil Nadu in 1341 ha of farmers' field. Crop wise CFLDs implemented during the year are presented in Table 112.

- (a) **Groundnut:** A total of 24 KVKs implemented CFLDs on groundnut of which 10 KVKs of Karnataka viz., Bagalkot, Belagavi-I, Ballari, Gadag, Kalaburagi-II, Koppal, Raichur, Tumakuru-II, Uttara Kannada and Vijayapura-I in 360 ha by involving 900 farmers with high yielding varieties of GPBD-4, GPBD-5, G2-52, Kadiri-6, Kadiri-9, KCG-6, TMV-2 and 14 KVKs of Tamil Nadu viz., Ariyalur, Coimbatore, Cuddalore, Dindigul, Kancheepuram, Karur, Namakkal, Perambalur, Theni, Thiruvallur, Tiruvannamalai, Tuticorin, Vellore and Villupuram in 507 ha by involving 1268 farmers with high yielding varieties of Co-6,
- Co-7, GJG-9, GJG-31, Kadiri-9, TMV-13, TG-37 A, and VRI-8. Thus, a total of 2168 CFLDs were conducted in 867 ha in the Zone, out of which 491 CFLDs in 196.20 ha during Kharif, 1592 CFLDs in 636.80 ha during rabi and 85 CFLDs in 34 ha during summer (Table 112).
- (b) **Sunflower:** A total of 13 KVKs implemented CFLDs on sunflower of which 7 KVKs of Karnataka viz., Davanagere, Gadag, Dharwad, Haveri, Kalaburagi-II, Raichur and Vijayapura in 208 ha by involving 520 farmers with hybrids of DSFH-3, KBSH-44, Kargil, Kaveri, KBSH-53, Sankranti and Sunbred and 6 KVKs of Tamil Nadu viz., Dindigul, Karur, Namakkal, Theni, Trichy and Villupuram in 106 ha by involving 265 farmers with hybrids of BRSSC-3, KBSH-44, KBSH-53 and Sunbred. Thus, a total of 785 CFLDs were conducted in 314 ha in the Zone, out of which 325 CFLDs in 130 ha during Kharif, 410 CFLDs in 164 ha during rabi and 50 CFLDs in 20 ha during summer (Table 112).
- (c) **Soybean:** A total of 195 CFLDs were conducted in 78 ha during kharif season (Table 112) by 3 KVKs viz., Belagavi-I, Dharwad and Bidar of Karnataka with high yielding varieties of DSB-21 and JS-9305.
- (d) **Linseed:** A total of 205 CFLDs were conducted in 82 ha during rabi season (Table 112) by 4 KVKs viz., Bagalkot, Belagavi-I, Koppal and Vijayapura-I of Karnataka with high yielding varieties of NL-115 and PKVNL-260.

Table 112: Demonstrations on oilseeds under NMOOP implemented by KVKs during 2016-17

Crop	Seasons 2016-17						Total	
	Kharif		Rabi		Summer			
	Demo (No.)	Area (ha)	Demo (No.)	Area (ha)	Demo (No.)	Area (ha)	Demo (No.)	Area (ha)
Groundnut	491.00	196.20	1592.00	636.80	85.00	34.00	2168.00	867.00
Sunflower	325.00	130.00	410.00	164.00	50.00	20.00	785.00	314.00
Soyabean	195.00	78	-	-	-	-	195.00	78.00
Linseed	-	-	205.00	82.00	-	-	205.00	82.00
<b>Total</b>	<b>1011.00</b>	<b>404.20</b>	<b>2207.00</b>	<b>882.80</b>	<b>135.00</b>	<b>54.00</b>	<b>3353.00</b>	<b>1341.00</b>

Performance of cluster FLDs on Oilseeds under NMOOP 2016-17



Groundnut variety GPBD-4 (KVK Gadag)



Groundnut variety TG-37A (KVK Vellore)



Sunflower hybrid DSFH-3(KVK Haveri)



Sunflower hybrid Kaveri (KVK Raichur)



Soyabean variety DSB-21 (KVK Dharwad)



Soyabean variety DSB-21 (KVK Belagavi-I)



Linseed vareity PKVNL-260 (KVK Bagalkot)



Linseed vareity PKVNL-260 (KVK Belagavi-I)

### 3.4.3 National Innovations in Climate Resilient Agriculture (NICRA)

National Innovations in Climate Resilient Agriculture (NICRA) is being implemented by 11 KVKs of the Zone to demonstrate the climate resilient technologies on farmers' fields for enhancing resilience of the farming community against climate variability. The

interventions being implemented are based on four modules, i.e. (I) Natural resources management, (II) Crop production, (III) Livestock and fisheries and (IV) Institutional interventions supported with appropriate capacity building and extension activities. Activities carried out under each of these modules by KVKs during 2016-17 is presented in Table 113.

**Table 113: Activities under NICRA carried out by the KVKs during 2016-17**

KVK	NRM		Crop production		Livestock & Fisheries			Capacity Building		Extension Activities	
	Demonstrations (No.)	Area (ha)	Demonstrations (No.)	Area (ha)	Demonstrations (No.)	Area (ha)	Animals (No.)	Courses (No.)	Farmers (No.)	Programmes (No.)	Farmers (No.)
Belagavi-I	103	955.40	391	118.00	27	3.10	1693	7	211	82	513
Davanagere	55	70.00	169	67.00	49	3.00	1164	21	548	37	355
Gadag	157	62.00	161	68.00	23	0.30	612	22	588	28	1062
Kalaburagi-I	15	5.00	124	152.00	70	26.20	1472	8	251	10	398
Chikkaballapur	211	151.60	525	214.40	56	12.00	992	10	258	3	77
Tumakuru-II	80	67.60	280	143.00	0	0.00		1	25	3	101
Namakkal	1	29.60	445	161.22	184	4.50	2362	38	1297	30	868
Thiruvarur	2	10.00	250	100.00	69	0.80	199	27	496	14	234
Villupuram	10	2.00	289	97.90	85	123.00	2468	9	318	28	683
Ramanathapuram	10	26.00	96	38.00	14	0.00	449	8	234	4	92
Alappuzha	13	750.00	578	25.40	72	72.00	0	11	237	8	261
<b>Total</b>	<b>657</b>	<b>2129.20</b>	<b>3308</b>	<b>1184.92</b>	<b>649</b>	<b>244.90</b>	<b>5478</b>	<b>162</b>	<b>4463</b>	<b>247</b>	<b>4644</b>

The modulewise technologies implemented in the NICRA villages are presented in the foregoing discussions.

#### Module I: Natural resources management

This module consists of interventions related to resource conservation technologies, in-situ moisture conservation, water harvesting and recycling for

supplemental irrigation, water saving technology, moisture conservation technologies, strengthening of water storage structures, organic input production and usage and agroforestry. A total of 2135.20 ha area has been treated with NRM related treatments covering 2615 farmers' fields in order to build climate resilience in eleven villages through 657 demonstrations. The details are presented in Table 114.

**Table 114: NRM activities undertaken during 2016-17 in the NICRA villages**

Thematic area	Intervention	KVK	Demo (No.)	Area (ha)	Farmers benefitted (No.)
Ground water recharge	Borewell recharge	Kalaburagi-I	4	0	210
	Renovated Ponnankanni kuttai (64×35×5.5 m)	Namakkal	1	29.60	55

Contd.... P94



Improved drainage in flood prone areas	Weed clearing, widening, straightening and deeping of channels/nalas	Thiruvarur	2	10.00	36
	Widening, straightening and deeping of nala	Kalaburagi-I	9		9
Soil moisture conservation practices	Conservation tillage where appropriate	Chikkaballapur	55	22.00	55
	<i>In-situ</i> moisture conservation practices	Gadag	155	62.00	155
	<i>In-situ</i> moisture conservation practices	Kalaburagi-I	2	5.00	2
	<i>In-situ</i> moisture conservation practices	Chikkaballapur	10	2.40	10
	<i>In-situ</i> moisture conservation practices	Villupuram	10	2.00	10
	<i>In-situ</i> moisture conservation practices	Ramanathapuram	2	25.00	15
	<i>In-situ</i> moisture conservation practices sowing across the slope (maize+ pigeonpea)	Davanagere	40	70.00	40
	Trench cum bunding	Tumakuru-II	9	6.00	9
Resource conservation technologies	Fodder grass on farm bunds	Belagavi-I	2	0.20	2
	Green manuring	Chikkaballapur	18	7.20	18
	Green manuring	Belagavi-I	1	5.20	10
	Large scale composting of aquatic weeds using EM solution and use for vegetable cultivation in grow bags	Alappuzha	13	750.00	400
	Soil test based nutrient application	Chikkaballapur	25	10.00	25
	Soil test based nutrient application	Belagavi-I	95	950.00	1158
	Tank silt application	Tumakuru-II	4	1.60	4
	Levelling	Tumakuru-II	2	1.00	2
	Rotary tillage	Tumakuru-II	20	15.00	20
	Trench cum bunding	Chikkaballapur	78	70.00	78
	Removal of <i>Prosopis</i> shrub and other bushes in the pond and water flowing structure and deepening of existing ponds	Ramanathapuram	8	1.00	20
	Desilting of existing community water harvesting pond and check dam	Gadag	2	-	140.00

Contd.... P95

	Ridges and furrows	Tumakuru-II	25	50	25.00
Strengthening of water storage structures	Desilting of nalas	Belagavi-I	5	6880.33 cum	47
	Desilting of channel	Tumakuru-II	5		5
	Desilting and widening of defunct farm pond	Tumakuru-II	11		11
Water harvesting and recycling for supplemental irrigation	Renovation of check dam	Tumakuru-II	2		2
	Water harvesting and recycling for supplemental irrigation – Farm pond	Davanagere	15	300 Cum each	15
	Water harvesting and recycling for supplemental irrigation- Farm pond	Tumakuru-II	1		1
	Water storage structure	Tumakuru-II	1		1
Water saving technology	Micro irrigation systems	Chikkaballapur	25	40	25
	<b>Total</b>		<b>657</b>	<b>2135.20</b>	<b>2615</b>



**Desilted Kuyavan canal at Rayapuram village of Thiruvarur**

## 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, flood tolerant varieties, high yielding varieties, location specific intercropping systems for sustainable production, cultivation practices to overcome flooded situations, resource conservation and ecofriendly management practices and water saving cultivation methods (SRI, aerobic, direct seeding). A total of 3308 farmers' demonstrated large number of technologies in 1184.92 ha area spread over in eleven villages. District and technologywise details are presented in Table 115.

**Table 115: Activities undertaken during 2016-17 in the NICRA villages**

Thematic area	Intervention	KVK	Farmers (No.)	Area (ha)	Yield (q/ha)		Increase in yield (%)	B.C ratio	
					Demo	Check		Demo	Check
Contingency crop planning	Pigeonpea (VBN 3)	Namakkal	25	8.50	8.20	7.50	18.84	2.30	1.96
	Greengram (Co8)	Ramanathapuram	10	4.00	Crop failure due to severe drought				
	Blackgram (VBN8)	Ramanathapuram	6	2.40	Crop failure due to severe drought				
	Horsegram (PHG9)	Chikkaballapur	150	60.00	0.43	0.375	14.60	0.15	0.12
	Green gram (Co-8)	Villupuram	98	24.00	6.30	4.30	45.30	1.80	1.27
		<b>Sub Total</b>	<b>289</b>	<b>98.90</b>					

Contd.... P.96



Crop diversification	Barnyard millet (Co2)	Ramanathapuram	10	4.00	Crop failure due to severe drought				
	Finger millet (ML365)	Ramanathapuram	10	4.00	Crop failure due to severe drought				
	Foxtail millet (DHFT-109-03)	Gadag	40	16.00	13.24	10.64	24.43	1.53	1.32
	Brinjal (CoBH-1)	Villupuram	20	4.00	100.00	80.00	25.00	1.60	1.54
	Sesamum (TMV-7)	Namakkal	30	12.00	7.86	6.14	28.01	2.80	1.81
	Small onion	Namakkal	50	20.83	89.10	81.00	10.00	2.80	1.90
	Cowpea (C-152)	Chikkaballapur	9	4.00	2.55	2.25	13.30	0.81	0.78
		<b>Sub total</b>	<b>169</b>	<b>64.83</b>					
Drought tolerant varieties	Sorghum (M35-1)	Kalaburagi-I	47	53.00	16.20	13.80	17.00	6.00	4.60
	Wheat (DWR2006)	Belagavi-I	80	16.00	8.20	6.40	28.13	1.99	1.73
	Anna (R) - 4	Ramanathapuram	15	5.60	Crop failure due to severe drought				
	Bajra (ICTP-8203)	Belagavi-I	40	8.00	5.11, Fodder: 8.90	4.28, Fodder: 7.30	19.39	1.87	1.57
	Foxtail millet (DHFT-109-3)	Belagavi-I	60	10.00	4.63	3.63	27.55	1.46	1.33
	Groundnut (TMV 13)	Villupuram	20	4.00	150.00	13.00	15.30	1.70	1.50
	Mothbean (TMV 1)	Villupuram	40	15.50	7.20	5.95	21.00	2.40	1.90
	Paddy (TRY 3)	Villupuram	40	40.00	Crop failure due to severe drought				
	Pigeonpea (TS-3R)	Belagavi-I	20	4.00	4.22	3.45	22.32	1.30	1.29
	Rabi jowar (M 35-1)	Belagavi-I	100	40.00	4.79, Fodder: 7.50	3.36, Fodder: 5.02	42.55	1.30	1.28
	Finger millet (ML 365)	Tumakuru-II	80	60.00	6.50	5.00	37.50	3.00	2.30
	Ramanathapuram mundu chill	Ramanathapuram	22	8.80	5.95	4.65	22.00	2.10	144%
	Finger millet (ML-365)	Chikkaballapur	80	32.00	1.03	0.85	21.10	0.14	0.13
			<b>Sub total</b>	<b>644</b>	<b>296.90</b>				
Dryland crops	Foxtail millet (DHFT 109-3) v/s finger millet	Chikkaballapur	26	10.40	2.90	2.40	20.80	0.39	0.29
Flood escape practices	Cultivation of high yielding short duration cassava variety -Sree Jaya to escape flood	Alappuzha	15	0.60	25.00	12.00	108.00	2.31	1.11
	Planting of different tree species having flood tolerance and dense green foliage	Alappuzha	300	-					
	Poly bag cultivation of TC banana for overcoming flood during initial growth stages	Alappuzha	13	0.80	23.43	10.00	134.00	1.66	1.15
		<b>Sub total</b>	<b>328</b>	<b>1.40</b>					
Flood tolerant varieties	CR1009 Sub 1	Thiruvarur	200	80.00	60.26	54.75	10.06	2.51	2.27
	Swarna Sub 1	Thiruvarur	50	20.00	57.28	52.25	9.62	2.31	2.18
		<b>Sub total</b>	<b>250</b>	<b>100.00</b>					
Fodder production	Improved fodder/feed storage methods (CoFS 29)	Tumakuru-II	15	3.00					
ICM	Pigeonpea (BRG-5)	Davanagere	5	2.00	7.98	7.13	11.90	2.15	1.95

Contd.... P.97



Income generation activities	Mushroom production for income generation	Alappuzha	5	5 units	0.6 kg	0.2 kg	200.00	2.00	1.00
Location specific intercropping systems	Groundnut var. K-6+ pigeonpea var. BRG-1	Chikkaballapur	100	44.00	0.91+ 0.46	0.88 + 37.5	3.40	0.24	0.22
	Blackgram+ pigeonpea (5:1)	Gadag	5	2.00	Blackgram:4.19, Pigeonpea: 5.67	4.96	-	1.39	1.19
	Greengram+pigeonpea (5:1)	Gadag	20	8.00	Greengram:7.06, Pigeonpea: 5.86	7.85	-	1.60	1.39
	Pigeonpea (BRG-2) + maize(6:1)	Davanagere	122	48.80	43.00	32.50	32.30	1.58	1.45
	Maize+pigeonpea (5:1)	Gadag	75	30.00	Maize:14.46, Pigeonpea: 5.60	17.90	-	1.45	1.25
	Pigeonpea (TS-3R) + groundnut (2:4)	Belagavi-I	91	40.00	3.95	3.10	27.42	1.65	1.30
	Groundnut + pigeonpea	Tumakuru-II	15	5.00	13.50	13.00	3.80	2.20	2.10
	Maize + pigeonpea	Tumakuru-II	20	7.00	9.40	9.00	4.40	1.20	1.00
	Ragi+pigeonpea	Tumakuru-II	25	8.00	7.00	6.50	7.70	3.40	2.00
		<b>Sub total</b>	<b>473</b>	<b>192.80</b>					
Nutrient management	Blackgram	Namakkal	10	4.16	5.72	4.58	24.89	1.91	1.42
	Greengram	Namakkal	25	7.20	6.23	5.62	19.72	1.93	1.49
	Groundnut	Namakkal	40	8.33	8.91	7.13	24.96	1.94	1.50
	Rabi sorghum	Gadag	6	6.00	8.44	6.60	27.87	1.42	1.11
	Gypsum application in groundnut var. GKVK-5	Chikkaballapur	10	4.00	4.00	2.80	42.80	0.71	0.50
	Sesamum	Namakkal	30	12.00	7.86	6.14	28.01	2.864	1.812
		<b>Sub total</b>	<b>121</b>	<b>41.69</b>					
Pest and disease management	Groundnut	Namakkal	85	27.20	11.64	9.85	18.17	2.54	1.95
	Pest and disease management- small onion	Namakkal	85	45.80	89.10	81.00	10.00	2.80	1.90
		<b>Sub total</b>	<b>170</b>	<b>73.00</b>					
Eco friendly management practices	Paddy	Alappuzha	31	24.00	67.60	60.90	11.00	2.48	1.68
Short duration varieties	Amaranthus (Co-1)	Villupuram	40	4.00	17.00	13.00	30.00	2.40	1.85
	Amaranthus (Co-3)	Villupuram	20	2.00	20.00	13.00	53.80	2.20	1.44
	Blackgram (VBN-6)	Villupuram	11	4.40	6.90	4.85	41.00	2.20	1.60
	Chickpea (JG-11)	Kalaburagi-I	23	20.00	14.82	11.30	31.00	5.70	4.10
	Finger millet(ML-365)	Davanagere	40	15.00	22.50, fodder 49.70	19.30, 46.50	16.58	1.97	1.78
	Paddy-NLR 34449	Ramanathapuram	23	9.20	Crop failure due to severe drought				
	Pigeonpea (BRG-2)	Tumakuru-II	80	40.00	5.00	4.30	16.30	1.60	1.40
	Redgram (TS3R)	Kalaburagi-I	54	79.00	15 qt	12 qt	25.00	4.80	3.47
	Greengram (Co-6)	Namakkal	25	7.20	7.30	6.90	5.79	2.29	1.94
	Pigeonpea (Vamban-3)	Namakkal	40	8.00	7.83	6.35	23.30	1.83	1.56
	Pigeonpea (BRG-5)	Chikkaballapur	150	60.00	0.43	0.375	14.60	0.15	0.12
		<b>Sub total</b>	<b>506</b>	<b>248.80</b>					

Contd.... P.98

Soil fertility management	Soil health card for better nutrient management	Alappuzha	214	1000 nos					
Supplement irrigation from Farm pond	Assessment of different CIMMYT Maize hybrids	Davanagere	1	0.80	60.50	28.50	112.20	2.73	1.52
	Maize hybrids NAH-1137 v/s MAH-14-5	Davanagere	1	0.40	57.30	52.90	8.31	2.50	2.38
<b>Sub total</b>			<b>2</b>	<b>1.20</b>					
Variety evaluation	Rabi sorghum (BJV-44)	Gadag	15	6.00	7.62	5.60	36.07	1.73	1.33
Water saving technology	Aerobic paddy (MAS 26)	Tumakuru-II	45	20.00	42.00	31.00	35.40	2.80	2.10
<b>Grand total</b>			<b>3308</b>	<b>1184.92</b>					



**Paddy harvest festival at Muttar, village: KVK, Alappuzha**



**Greengram + Pigeonpea (5:1) intercropping system at Mahalingapur village: KVK, Gadag**



**Demonstration on pigeonpea (TS-3R) at Yadagud village: KVK, Belagavi**

### **Module III: Livestock and fisheries**

Animal health camps, preventive vaccination, heat stress management in livestock through nutrition, breed upgradation, improved fodder/feed storage methods, use of community lands for fodder production during droughts/floods, 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. During year, about 11486 livestock including poultry birds have been covered under various livestock interventions through 433 demonstrations and details are furnished in Table 116.

Table 116: Climate resilient technologies for sustainable production of livestock

Interventions	KVKs (No.)	Demonstrations (No.)	Animals/ birds treated (No.)
Animal health check up camp	8	20	2909
Artificial insemination	1	100	98
Breed upgradation	5	38	69
De-worming in livestock	7	16	1494
Improved shelters for reducing heat stress in livestock	5	77	560
Insurance coverage for livestock	2	-	5
Mitigation of mineral deficiencies in animals	6	11	564
Popularization of backyard poultry	4	36	500
Popularization of duck farming	1	20	600
Poultry night shelters	1	10	167
Preventive vaccination (RDVK and blue tonue)	8	27	4490
Silage making	1	10	20
Demonstration of fish silage feed supplementing to backyard poultry rearing during flooded situations	1	68 units	1930 eggs /unit of 10 birds/year
<b>Total</b>		<b>433</b>	<b>11486</b>



Blue tongue vaccination camp for sheep at Vadavathur village of KVK Namakkal



Poultry shelter at Rayapuram village of KVK, Thiruvarur

**Fodder production:** A total of 239 demonstrations were organized in the area of fodder production covering 24.5 ha area, 35 units of azolla and 4 units of hydroponic fodder production. A total fodder of 5019.1 q was produced through these demonstrations in 11 NICRA villages (Table 117).

Table 117: Climate resilient technologies for sustainable fodder production

Interventions	KVKs (No.)	Demonstrations (No.)	Area (ha)	Total production (q)
Azolla	3	30		26.4
Low cost fodder sprouts production for dairy units	1	4	4 units	43.8
Improved fodder production	8	142	24.5 ha	4892.7
Improved fodder/ feed storage methods	3	63	35 units	56.2
		<b>239</b>	<b>24.50</b>	<b>5019.10</b>



**Low cost fodder sprout unit at Muttar village of KVK, Alleppey**

**Fisheries production:** A total of 25 demonstrations KVKs under NICRA. The harvest of fish is yet to be done (Table 118).

**Table 118: Climate resilient technologies for sustainable fish production**

KVK	Interventions	Demonstrations (No.)	Area (ha)	Total Production (Quintal)
Namakkal	Management of fish ponds/ tanks during water scarcity and excess water	5	0.50	Yet to harvest
Thiruvarur	Management of fish ponds/ tanks during water scarcity and excess water	10	0.20	
	Fish production	10	0.20	
<b>Total</b>		<b>25</b>	<b>0.90</b>	

**Module IV: Institutional interventions**

The module consists of interventions for strengthening the existing or initiating new institutional mechanisms relating to seed bank, fodder bank, commodity groups, custom hiring centre, collective marketing group,

introduction of weather index based insurance & climate literacy through a village weather station. A total of 113 activities were organised under different institutional intervention in NICRA villages by involving 1466 farmers. Details are presented in Table 119..

**Table 119: Details of institutional interventions implemented under NICRA**

Interventions	KVKs (No.)	Demonstrations / activities (No.)	Farmers (No.)	Area (ha)
Climate literacy through a village level weather station	4	19	459	
Commodity groups	3	34	62	13.20
Community nursery	1	1	36	0.40
Fodder bank	1	3	3	0.60
Seed bank	3	14	67	29.40
Mechanization through custom hiring for timely planting	9	36	833	664.41
Post-harvest losses	1	6	6	-
<b>Total</b>		<b>113</b>	<b>1466</b>	<b>708.01</b>



**Seed cum fertilizer drill at work in Raguttahalli village:  
KVK, Chikkaballapur**

**Capacity building to farmers:** During the year, NICRA implementing KVKs have conducted trainings on 20 thematic areas related to climate resilient agriculture benefiting 4463 farmers including 1208 women farmers. 162 training courses. Details are provided in Table 120.

**Table 120: Capacity building programmes organized under NICRA**

Thematic areas	KVKs (No.)	Trainings (No.)	Participant farmers (No.)		
			Male	Female	Total
Awareness on the pulse production technology and social issues	3	6	388	205	593
Crop management	9	34	603	217	812
Enterprises for self employment	2	5	7	83	90
Farm implements and machineries	2	2	35	0	35
Fish farming	2	4	64	12	76
Fodder and feed management	9	16	303	60	363
Forest tree/ agro forestry plantation	2	2	70	0	70
Irrigation management	1	2	38	0	38
Livestock management	8	23	462	222	686
Management of horticultural crops	4	14	262	174	436
Method demonstrations-compost preparation using decomposer	1	1	20	5	25
Natural resource management	6	10	229	34	263
Pest and disease management	7	17	369	30	399
Post harvest technology	2	3	47	0	47
Resource conservation technology	3	5	128	12	140
Seed production	1	3	56		56
Soil health management	5	9	98	116	214
Value addition	1	1	6	14	20
Vegetable production	1	3	19	13	32
Water saving technology	2	2	57	11	68
<b>Total</b>		<b>162</b>	<b>3261</b>	<b>1208</b>	<b>4463</b>



**Capacity building programme for the women group  
at KVK, Gadag**

**Extension activities:** During the year, 247 extension activities have been carried out to create awareness among the community about the climate related impacts on the agriculture and related sector through 9 various activities. A total of 4644 farmers have benefitted through their participation in these programmes including 982 women farmers (Table 121). It is heartening to note that about 608 farmers including 134 women farmers were taken on exposure visits to various places/institutions by the NICRA KVKs during the year.

**Table 121: Extension activities implemented and participation under NICRA**

Extension Activity	KVKs (No.)	Activities (No.)	Beneficiaries (No.)		
			Male	Female	Total
Agro advisory services	2	80	149	42	191
Awareness programmes	5	11	372	93	465
Women awareness	3	4	81	36	117
Diagnostic visits	1	16	75	19	94
Exposure visits	11	25	474	134	608
Field days	9	18	866	214	1122
Group dynamics : Group discussion	6	24	519	54	573
International farmers day	1	1	12	-	12
Method demonstrations	10	68	1072	390	1462
<b>Total</b>		<b>247</b>	<b>3620</b>	<b>982</b>	<b>4644</b>



**NICRA- Best Innovative Farmer Award –2016-17 under livestock module to Shri. C. Sowndhararasan KVK, Namakkal**

### 3.4.4 MERA GAON – MERA GAURAV (My Village – My Pride)

The ICAR-ATARI, Bengaluru is being coordinated the activities of Mera Gaon - Mera Gaurav in the Zone during the year. A total of 161 multi-disciplinary Scientist teams from ICAR Institutes located in the zone VIII viz., ICAR-IIHR, Bengaluru; ICAR-NIANP, Bengaluru; ICAR-NBAIR, Bengaluru; ICAR-NIVEDI, Bengaluru; ICAR-DCR, Puttur in Karnataka, ICAR-SBI, Coimbatore; ICAR-CIBA, Chennai; ICAR-NRCB, Trichy in Tamil Nadu, ICAR-CPCRI, Kasaragod; ICAR-CTCRI, Trivandrum; ICAR-IISR, Calicut; ICAR-CMFRI, Cochin; ICAR-CIFT, Cochin in Kerala and ICAR-CCARI, North Goa in Goa adopted 683 villages

with 2.38 lakh households and 1.75 lakh ha area that includes 236 villages with 49716 households and 62821 ha area in Karnataka, 109 villages with 39119 households and 39443.00 ha area in Tamil Nadu, 334 villages with 147514 households and 73598.64 ha area in Kerala, and 4 villages with 2325 households in Goa. Scientists Teams carried out various interventions with organization of 0.15 lakh activities by the participation of 0.98 lakh farmers (Table 122). Further, scientist teams rendered service for the door step delivery of 1050 q of technological input like seeds, bio products *etc* to the 1951 farmers.

**Table 122: Activities and farmers contacted under MG-MG by scientist teams during 2016-17**

Name of activity	Activities (No.)	Farmers (No.)
Mobile based advisories	9086	8925
Extension literature	4107	16517
Team visit to villages	878	16136
Interface meeting/ <i>Goshties</i>	493	19495
Awareness programmes	254	13585
Method demonstrations	213	3629
Training programmes	187	4937
Linkages with other agencies	110	14630
Introduction of new technologies	30	939
Introduction of new varieties	18	73
Introduction of new crops	10	20
<b>Total</b>	<b>15386</b>	<b>98886</b>



**Interface meeting under MGMG  
(CTCRI, Thiruvananthapuram)**

### 3.4.5 Pre-Kharif and Pre-Rabi Campaigns

During 2016-17, Ministry of Agriculture and Farmers Welfare, Government of India supported organizations of campaigns before the commencement of cropping seasons in the country. In Zone VIII, pre-rabi programmes were conducted by 55 KVKs and about 2383 farmers were benefitted through their participation. State-wise details of conducting the campaigns are furnished in Table 123.

**Table 123. State wise details of pre-rabi campaigns and participation**

Sl.No	State	Pre-rabi (No.)	Farmers (No.)
1	Goa	02	28
2	Karnataka	23	1186
3	Kerala	10	460
4	Puducherry	01	26
5	Tamil Nadu	19	683
	<b>Total</b>	<b>55</b>	<b>2383</b>

### 3.4.6 Awareness on 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, 9 KVKs (4 in Karnataka, 3 in Tamil Nadu and 2 in Kerala) have 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 & FRA.

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 & FRA 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. Cheruvayal Raman a traditional farmer in Wayanad who belongs to the Kurichya Tribal Community won the Genome Saviour Award 2016 for his life time efforts for conservation of traditional rice varieties. Currently, he is the custodian of 45 varieties of traditional rice.

### 3.4.7 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. ARYA project is implemented in 25 states through KVKs, one district from each state.

In ATARI, Zone VIII, 3 KVKs (Bengaluru Rural in Karnataka, Kannur in Kerala and Kanyakumari in Tamil Nadu) have implemented ARYA project. ARYA Stakeholders Interactive Meeting was held on 17 September, 2016 at TNAU, Coimbatore and chaired by Dr.K.Narayana Gowda, Former Vice Chancellor of UAS, Bangalore and Chairman of Zonal Monitoring Committee, ARYA Project. The meeting was attended by all line department heads and bankers besides progressive farmers. Under this project, 317 rural youth were trained on processing, value addition and marketing of agriculture produce like finger millet, banana and coconut during the year.



## HUMAN RESOURCES DEVELOPMENT

## CHAPTER 4

### 4.1 MANAGEMENT DEVELOPMENT PROGRAMME- PHASE III FOR NEWLY RECRUITED PROGRAMME COORDINATORS

Two Programme Coordinators from KVK Dharmapuri and Ramanathapuram participated in the three-phase Management Development Programme (MDP) organized by the Division of Agricultural Extension in coordination with NAARM, Hyderabad and ICAR ATARI, Bengaluru. During the Phase III of their programme at ICAR-ATARI, Bengaluru during 6-10 June, 2016, participants were oriented about the objectives, mandate and activities of ATARI, technological backstopping by the Directorate of Extension, administrative and accounts procedures related to KVKs, exposure visit to neighbouring KVKs for cross learning etc. The participants opined that the programme was useful to them for managing the KVK activity.

### 4.2 TRAINING PROGRAMME ON PARTICIPATORY IMPACT MONITORING AND ASSESSMENT

The training programme on Participatory Impact Monitoring and Assessment (PIMA) for the scientists of KVKs in ICAR ATARI, Zone-VIII was organized from 21 to 25 February, 2017 at KVK, Erode, Tamil Nadu. The main objectives of the programme were to make the participants to understand the meaning and process of PIMA and acquire the basic skills to conduct PIMA independently. About 30 trainees from KVKs of Karnataka, Kerala and Tamil Nadu participated in the training programme. The major training programme course content include concept of development, concept of participation, logical framework analysis, methods and tools that can be used in PIMA, PIMA in the context of KVK, selection of survey units and respondents, choosing methods

for assessment of selected impacts, drafting tools for data collection, drafting data collection sheets, drafting summary sheet, preparation for field work, data compilation, analysis and report preparation. The participants explored the possibility to study the impact in their respective KVKs and prepared tentative action plan and agreed to discuss with the KVK team to proceed further on impact study.

### 4.3 ORIENTATION OF KVK TRAINERS ON SKILL DEVELOPMENT PROGRAMME

The ICAR-ATARI, Bengaluru and Agriculture Skill Council of India, New Delhi jointly organized orientation of KVK trainers on Skill Development Programme from 26-28 October 2016 in Bengaluru. The objective of this skill development programme is to enable KVK Trainers to know about the scheme and train large number of youths to take up industry-relevant skill training aimed at securing a better livelihood.

Dr.Sreenath Dixit, Director, ICAR-ATARI, Bengaluru inaugurated the programme and briefed about the role of KVKs in skilling India programme. Dr. Keshava, Principal Scientist, Agricultural Extension Division, ICAR, New Delhi sensitized participants in organizing long duration training under skill development areas as per cost norms notified by the Ministry of Skill Development and Entrepreneurship (MSDE) during 2016-17. The major training programme contents include skill courses/ areas, qualification packs, model curriculum for skill and common norms of MSDE. Programme Coordinators and Subject Matter Specialists of 21 KVKs from Zone V and VIII attended the programme. At the end, evaluation test was conducted for the participants by experts from Agriculture Skill Council of India, New Delhi. Entire programme was coordinated by Dr.M.J.Chandre Gowda, Principal Scientist, ICAR ATARI, Bengaluru.



## PUBLICATIONS

### CHAPTER

#### 5.1 RESEARCH ARTICLES

Mahantesh Shirur, N.S. Shivalingegowda, M.J. Chandregowda and Rajesh K. Rana, 2016. Technological adoption and constraint analysis of mushroom entrepreneurship in Karnataka, *Economic Affairs*, 61(3): 427-436.

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Srinivasa Reddy, D.V., Sreenath Dixit, N. Loganandhan N., Manjunath Gowda, Mohan B., 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.

#### 5.2 PAPERS PRESENTED IN INTERNATIONAL/NATIONAL CONFERENCES

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Chandre Gowda, M.J., 2016. Skill Intensive Agricultural Technology Interventions undertaken by

KVKs of Zone VIII, *Proceedings of 9<sup>th</sup> National Conference on KVKs: Skill Intensive Agriculture*. 25-26 July 2015, pp 93-96.

Chandre Gowda, M.J. and Sreenath Dixit, 2017. Smallholders Adaptations towards Sustainable Farm Management: Implications to Climate Change Adaptation, *Book of Abstracts: XIII Agricultural Science Congress-2017: Climate Smart Agriculture*, 21-24 February 2017, UAS, Bengaluru, pp514.

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Chandre Gowda, M.J., Shrishail Dolli, Durga Prasad and Saravanan, 2017. An Innovative and Comprehensive Approach for Identification of Adopter Categories, *Abstracts: AGREX'17 International Conference on Agricultural Extension*, 14-16 February 2017, University Putra, Malaysia, pp35.

Manjula N, Nagaraja N, Manjunah Gowda, Chandre Gowda M.J. and Rajanna N, 2017. Programmed Instruction as an innovative method for last mile delivery of climate smart agricultural technologies, *Book of Abstracts: XIII Agricultural Science Congress-2017: Climate Smart Agriculture*, 21-24 February 2017, UAS, Bengaluru, pp597.

Sairam, C V, B.T.Rayudu, D V S Reddy, M J Chandre Gowda, Sreenath Dixit, Moolchand Singh, D.V.Kolekar and Mallikarjun B Hanji, 2016. Frontline extension programmes for sustainable growth in coconut sector, *Paper presented in ISOCRAD -3* during 12-15 December, 2016 at CPCRI Kasaragod.



Srinivasa Reddy, D.V., Sreenath Dixit, Loganandhan, N., Manjunath Gowda, Mohan, B., Sheeba, S., Mallikarjuna, B.O., and Anitha, M, 2017. Influence of farm ponds towards imparting climate resilience to rainfed farming: Success from NICRA village. *Abstract, Book of Abstracts, XIII Agricultural Science Congress-2017, Climate Smart Agriculture, 21-24 February 2017, UAS, Bengaluru.*

Srinivasa Reddy, D.V., Sreenath Dixit, Ramesh, P.R., Chougala, D.C., Manjunath Gowda, Sheeba, S., Mallikarjuna, B.O., and Anitha, M, 2017. Climate Smart Agriculture-Influence of in-situ moisture conservation practices on the performance of field crops. *Abstract, Book of Abstracts, XIII Agricultural Science Congress-2017, Climate Smart Agriculture, 21-24 February 2017, UAS, Bengaluru.*

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### 5.3 BOOK/ CHAPTERS

Akila N and M.J. Chandre Gowda, 2016. Status of Farmer Producer Organizations in Namakkal District *In: Farmer Producer Organizations in Kerala and Tamil Nadu: A KVK Perspective* (Editor: M.J. Chandre Gowda and Sreenath Dixit), pp79-81.

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Raju Teggelli and M.J.Chandre Gowda, 2016. Status of Farmer Producer Organizations in Kalaburagi District, *In: Farmer Producer Organizations in Karnataka: A KVK Perspective* (Editor: M.J.Chandre Gowda and Sreenath Dixit), ICAR ATARI Bengaluru, pp72-76.

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Perspective (Editor: M.J.Chandre Gowda and Sreenath Dixit), pp17-22.

#### 5.4 TECHNICAL BULLETINS

Chandre Gowda M.J. and Sreenath Dixit, 2016. Farmer Producer Organizations in Karnataka: A KVK Perspective, ICAR ATARI Bengaluru, p100.

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#### 5.5 REPORT

Annual Report 2015-16, ICAR-ATARI, Bengaluru, Published by Sreenath Dixit, (Eds: M.J.Chandre Gowda, C.V.Sairam, D.V.S.Reddy, B.T.Rayudu, R.S.Ramamurthy, Mallikarjun B.Hanji and J.Mathew), ICAR-ATARI, Bengaluru, India.

#### 5.6 PUBLICATIONS BY KVKs

KVK staff published 221 research papers, 52 technical bulletins and 594 popular articles; KVKs have documented 642 extension literature, 275 newspaper coverage, 23 books, 73 CD/DVD and 109 newsletters on various technological aspects of agriculture and its allied enterprise.



## WORKSHOPS/MEETING/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**

Awareness Programme of Pradhan Mantri Fasal Bhima Yojana held at ICAR Krishi Vigyan Kendra, Davanagere on 5 April, 2016.

Annual Review Meeting of KVKs of Zone VIII held at KVK, Ambalavayal, Kerala during 20-22 April, 2016.

National Workshop on Pulses and Oilseeds held on 16-17, May 2016.

ATARI Directors Meeting held at the Division of Agricultural Extension on 18 May, 2016.

National Orientation Workshop for Fisheries held on 16 June, 2016.

Seminar on Tuber Crops Technology Transfer and Commercialization held at CTCRI, Trivandrum on 25 June, 2016.

Brain Storming Session on Strengthening of Agricultural Extension, Research & Education organized by National Academy of Agricultural Sciences at Delhi on 9 July, 2016.

ARYA Stakeholders Interactive Meeting held on 17 September, 2016 at Kanyakumari.

Meeting of KVKs with the Principal Secretary, Horticulture, Govt of Karnataka to determine the role of KVKs in training and capacity building of Farmer Producer Organizations held on 19 September, 2016 at Bengaluru.

Brainstorming workshop organized by the Commissionerate for Horticulture, Govt. of Karnataka

for preparing a framework for PPP for Horticulture Extension in Karnataka held on 26 September, 2016.

National Seminar and Kissan Mela organized by CPCRI, Regional Station, Kayangulam on 29 September, 2016.

Review meeting on the Implementation of the KVK Scheme and other initiatives taken by the KVKs and to discuss about the future strategies for developing EFCs etc. beyond the XII Plan' held during 6-7 October, 2016 at the Division of Agricultural Extension, UAS, Bengaluru.

Krishi Mela and review the activities of KVKs under UAS, Raichur held on 8 November 2016.

Extension Policy Interface workshop jointed organized by MANAGE, ATARI and CRISP on 9-10 November, 2016 at Hyderabad.

Regional Committee Meeting at Coimbatore held on 11-12 November, 2016.

Brain storming session for restructuring FOCARS, delivered by Director General, ICAR held at NAARM Hyderabad on 3 December, 2016.

Annual Review Workshop of NICRA held at Delhi during 9-10 December, 2016.

Review Workshop on Attracting and Retaining Youth in Agriculture (ARYA) Project held during 17-18 January, 2017.

Brainstorming Session on Climate Smart Technologies for Enhancing Vegetable Oil Production and made the presentation about the KVK Experience in Cluster Demonstrations with Resource Conservation Technologies held on 20 January, 2017 at IIOR, Hyderabad.

Director's Conference held during 14-15 February, 2017 at Delhi.

RAC meeting of CIFT Kochi held on 22 February, 2017.

Brainstorming session on Climate Change Research in Agriculture held at New Delhi on 23 February, 2017.

Action plan meeting between 2 to 4 March 2017 for the KVKs of Karnataka and Goa at UHS, Bagalkot. Second KVK Symposium 2017 held at Coimbatore on 7 March, 2017.

SAC meeting of KVK Thrissur and inauguration of administration building of KVK Kottayam held during 9-11 March, 2017.

Final Action Plan Workshop of KVKs of Tamil Nadu and Puducherry held at KVK Namakkal on 16-17 March, 2017.

State Coordination Committee meeting for Doubling Farmers Income held at University of Agricultural Sciences, Birmaharajpet on 21 March, 2017.

Brainstorming session on Doubling of farmer's income by 2022 held at CSWCR & TI, Research Centre, Ballari on 24 March, 2017.

**Dr.M.J. Chandre Gowda, Principal Scientist (Agricultural Extension)**

National Consultation on Small Farmer Production Systems: Way Forward held during 22-23 December 2016 at NDRI, SRS, Adugodi, Bengaluru.

XIII Agri Science Congress held at UAS Bengaluru during 21-24 February, 2017.

Expert Panelist in the Satellite Meeting of the XIII Agri Science Congress, on Disruptive Smart Agri-Tech Trends – Climate Adaptive Initiatives held on 23 February, 2017.

**Dr. C.V. Sairam, Principal Scientist (Agricultural Economics)**

PPV&FRA Symposium on Take it to breeders and researchers rights through awareness and main streaming of farmers and Award Ceremony held on 30 June, 2016 at NASC New Delhi.

Kisan Mela and Coconut Seminar at CPCRI Kayangulam on 28 September, 2016.

International Symposium on Coconut Research and Development (ISCOCRAD – 3) at CPCRI Kasaragod during 10-12 December 2016.

ARYA Review Workshop held at NASC, New Delhi during 17-18 January, 2017.

HRD programme on Competency Enhancement Programme for Effective Implementation of Training Functions by ICAR HRD Nodal Officers held at NAARM, Hyderabad during 13-15 February, 2017.

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

National workshop on cluster FLDs on oilseeds and pulses organized by DAC and ICAR at NASC, New Delhi during 16-17 May, 2016.

24<sup>th</sup> ICAR Regional Committee meeting of Zone-VII held at The International Centre, Goa held during 8-9 September, 2016

IMC meeting of ICAR-IIHR, Bengaluru held on 22 October, 2016.

IMC meeting of ICAR-Directorate of Cashew Research, Puttur held on 29 November, 2016 as an ICAR nominee member of IMC.

NICRA Annual Workshop held at NASC, New Delhi during 9-10 December, 2016.

Review Workshop cum training on Cluster FLDs on pulses and oilseeds under NFSM/NMOOP held during 7 September, 2016 at UAS, Dharwad for the KVKs of Karnataka and 19 September, 2016 at TNAU, Coimbatore for the KVKs of Tamil Nadu States.

XIII Agricultural Science Congress held during 21-24 February, 2017 at UAS, Bengaluru.

Review of Seed Hub and cluster FLDs on pulses meeting and closing ceremony of International Year of Pulses held on 22 December, 2016 at Agra.

Review workshop on Oilseeds cluster FLDs organized by IGAU, Raipur during 17-18 February, 2017.



Symposium on production technologies of crops and animal husbandry in 2<sup>nd</sup> KVK Symposium 2017 held at TNAU, Coimbatore during 7-8 March, 2017.

State Coordination Committee of Goa State for doubling the farmers' income held at ICAR-CCARI, Goa on 27 March, 2017.

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

Strategy Workshop on Towards Self-sufficiency of Pulses in India held during 7-8 April, 2016 at NASC, New Delhi.

National Workshop on Pulses and Oilseeds - Technology Evaluation and Demonstration held during 16-17 May, 2016 at NASC, ICAR, New Delhi.

Review Meeting on cluster FLDs of Pulses under NFSM held on 09 August, 2016 at Krishi Bhawan, New Delhi.

Review meeting of pulses seed hubs held on 22 December, 2016 at Hotel ITC Mugal, Agra.

National Review Workshop of Cluster FLDs on Oilseeds held during 17-18 February, 2017 at IGKV, Raipur.



## PERSONNEL

### CHAPTER

# 7

### 7.1 STAFF IN POSITION

Existing staff position of the ICAR-Agricultural Technology Application Research Institute, Zone VIII, Bengaluru as on 31 March, 2017 is presented below

<b>Research Management Position</b>	Dr. Sreenath Dixit	Director
<b>Scientific</b>	Dr.M.J. Chandre Gowda	Principal Scientist (Agricultural Extension)
	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)
<b>Technical</b>	Dr. Mallikarjun B.Hanji	Chief Technical Officer (Computer)
	Shri Hemanth Kumar	Driver
<b>Administrative</b>	Shri B.N.Ramachandrappa	Assistant. Finance & Accounts Officer
	Shri J.Mathew	Assistant Administrative Officer
	Shri Prabu Kumar	Assistant
	Mrs. Ramola Pinto	Junior Stenographer
	Shri N.Vinod Kumar	LDC
	Ms K.Roopakala	LDC
	Shri Chennakeshava	SSS (Gr.II)

### 7.2 TRANSFERS

Dr. (Mrs.) K. Rajula, Scientist (Ag. Econ.), transferred from ICAR- ATARI, Bengaluru to ICAR-CIFT, Kochi was relived on 05, November 2016.

Dr. C.V. Sairam, Principal Scientist (Ag. Econ.), transferred from ICAR-ATARI, Bengaluru to ICAR-CIBA, Chennai was relived on 13, March 2017.

Dr. Thimmappa K., Senior cientist (Ag. Econ.) ICAR-CSSRI, Karnal to ICAR-ATARI, Bengaluru, reported on 20, March 2017.

