

वार्षिक प्रतिवेदन ANNUAL REPORT 2015-16



भाकृअप - कृषि प्रौद्योगिकी अनुप्रयोग संस्थान
ICAR-Agricultural Technology Application Research Institute

Hebbal, Bengaluru - 560 024





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

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ANNUAL REPORT

2015-16



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Director



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Preface

Krishi Vigyan Kendras are Institutions dedicated for Frontline Extension of Agricultural Technologies. These are an important constituent of the National Agricultural Research System. KVKs at the national level are overseen by the Division of Agricultural Extension of ICAR. While those in the state of Karnataka, Kerala, Tamil Nadu, Goa and The Union Territories of Puducherry and Lakshadweep are monitored by ATARI Bengaluru. There are 81 KVKs in the states and UTs which comprise of Zone-VIII. The KVKs over the years have evolved as an important knowledge and resource centers at the district level. Their Contribution to development of science-based agriculture is being increasingly recognized in various contexts across the country.

During the year under report, the KVKs took up new responsibilities especially in generating awareness about nationally important programmes such as distribution of soil health cards, demonstrating the potential of improved technologies in enhancing the production of pulses and oilseeds through Cluster Demonstrations. The KVKs of this Zone also engaged actively in conducting Kharif and Rabi awareness campaigns by inviting the people's representatives to KVKs. ATARI Bengaluru took initiative to get the ICAR institutes and SAUs of the Zone to implement Mera Gaon-Mera Gaurav (My Village-My Pride) across 683 villages in Tamil Nadu, Karnataka, Kerala and Goa.

A few initiatives were undertaken by ATARI, Bengaluru for capacity development of Subject Matter Specialists of KVKs. A Symposium (KVKSVMZONE-VIII) was organized for the first time in the Zone exclusively for the Subject Matter Specialists of the KVKs. The Symposium was very well received by the subject matter specialists of the KVKs. Besides, ATARI also organized orientation courses to the newly joined KVK staff. In order to give emphasis to plantation crops, a special training programme was jointly organized by ATARI, Bengaluru and CPCRI, Kasargod for imparting knowledge on new technologies of plantation crops. ATARI Bengaluru also facilitated the conduct of Agro climatic region-wise workshops for the East-Coast, West- Coast and Islands in Chennai, Goa and Port Blair respectively. It is also heartening to note that KVK, Bengaluru Rural received the National Best KVK Award for the Year 2014-15.

This Report summarises the activities of the Zone and their outcomes during the year 2015-16. It will also be helpful as a reference material for information on various frontline extension initiatives in the Zone. I Hope this information will serve the interest of different stakeholders of the KVK system.

Place: Bengaluru

Date: 04 July 2016



(Sreenath Dixit)

C O N T E N T S

Preface	
Executive Summary (Hindi)	i - viii
Executive Summary (English)	ix - xvii
1. About Agricultural Technology Application Research Institute	1 - 5
1.1 Genesis	1
1.2 Mandate	2
1.3 Staff	2
1.4 Organizational structure	3
1.5 Major activities	4
1.6 Budget	5
2. About Krishi Vigyan Kendras	6 - 9
2.1 Establishment of KVKs	6
2.2 Mandate	7
2.3 Manpower	7
2.4 Infrastructure at KVKs	8
2.5 Scientific Advisory Committee	9
2.6 Revolving fund	9
2.7 Thrust areas	9
3. Achievements	10 - 167
3.1 Krishi Vigyan Kendras	10
3.1.1 Technology assessment and refinement	10
3.1.2 Frontline demonstrations	20
3.1.3 Capacity development	85
3.1.4 Frontline extension programmes	98
3.1.5 Production of technological inputs	102
3.1.6 Technology week	110
3.1.7 Kisan Mobile Advisory Services (KIMAS)	111
3.1.8 E-Connectivity	112

3.1.9	Soil, water and plant analysis	112
3.1.10	Rain water harvesting units	114
3.1.11	Convergence and Linkages	114
3.1.12	Prosperity of farmers through technological interventions	116
3.1.13	Recognition and Awards	122
3.2	Agriculture Technology Information Centre (ATIC)	122
3.3	Technological backstopping by Directorate of Extension	123
3.4	Special Programmes	125
3.4.1	Cluster Frontline Demonstrations of Rabi Pulses under NFSM	125
3.4.2	Cluster Frontline Demonstrations of Rabi Oilseeds under NMOOP	134
3.4.3	National Innovations in Climate Resilient Agriculture (NICRA)	141
3.4.4	MERA GAON – MERA GAURAV (My Village – My Pride)	158
3.4.5	Pre-Kharif and Pre-Rabi Campaigns	162
3.5	Research Project	163
4.	Human Resource Development	168-172
5.	Publications	173-174
6.	Workshops/Meetings/Conferences	175-177
7.	Personnel	178

कार्यकारी सारांश

भारतीय कृषि अनुसंधान परिषद ने भाकृअनुप संस्थान, राज्यकृषि विश्व विद्यालय, गैर-सरकारी संगठन, स्वशासी विश्वविद्यालय, एवं राज्य कृषि विभाग जैसे विभिन्न संगठनों के अधीन राज्य स्तर पर कृषि विज्ञान केन्द्रों का नेटवर्क स्थापित किया है। देश में 31 माच, 2016 तक 643 कृषि विज्ञान केन्द्रों की स्थापना की गई है, जिनमें से 81 कृषि विज्ञान केन्द्र, कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, बैंगलूरु (क्षेत्र-VIII) में हैं। कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान कर्नाटक (31), तमिल नाडू (30), केरल (14), पुदुच्चेरी (3), गोवा (2) एवं लक्षद्वीप (1) के 81 कृषि विज्ञान केन्द्रों के प्रौद्योगिकीय अंतःक्षेप एवं अग्रिम-पंक्ति विस्तार कार्यक्रमों का समन्वयन, योजना बनाने, निगरानी एवं मूल्यांकन का कार्य करता है। कृषि विज्ञान केन्द्र किसानों एवं अन्य साझेदारों की सहभागिता से राज्य कृषि विश्वविद्यालयों और भारतीय कृषि अनुसंधान परिषद के संस्थानों की प्रौद्योगिकियों की मदद से प्रौद्योगिकियों का मूल्यांकन, परिष्करण एवं प्रदर्शन का कार्य करते हैं। कृषि विज्ञान केन्द्र अपने साझेदारों के लिए आवश्यकता-आधारित क्षमता-विकास कार्यक्रम आयोजित करते हैं तथा उचित अग्रिम पंक्ति विस्तार कार्यक्रम के माध्यम से उन्नत कृषि प्रौद्योगिकियों के बारे में जागरूकता पैदा करते हैं। प्रौद्योगिकियों के बारे में प्रारंभिक समझ के लिए गुणवत्तायुक्त बीजों, रोपण-सामग्रियों, पशु-धन नस्लों, पशु-उत्पादों एवं जैव-उत्पादों का उत्पादन एवं वितरण का कार्य किया जाता है। इस प्रकार कृषि विज्ञान केन्द्र जिले की कृषि-अर्थव्यवस्था को सुधारने के लिए सरकारी, निजी एवं स्वैच्छि क्षेत्रों द्वारा ली जा रही पहल को समर्थन देने के लिए कृषि-प्रौद्योगिकी के ज्ञान एवं संसाधन केन्द्रों के रूप में कार्य करते हैं। इस वर्ष के दौरान कृषि विज्ञान केन्द्र द्वारा खरीफ-पूर्व एवं रबी-पूर्व अभियान, मृदा-परीक्षण एवं मृदा-स्वास्थ्य कार्ड वितरण, तिलहन एवं दलहनों का सामूहिक प्रदर्शन जैसे विशेष पहल किए गए। भारतीय कृषि अनुसंधान परिषद एवं राज्य कृषि विश्वविद्यालयों के माध्यम से 'पहले किसान' एवं 'मेरा गाँव मेरा गौरव' कार्यक्रम प्रारंभ किए गए। कृषि विज्ञान केन्द्रों द्वारा प्रधान मंत्री फसल बीमा योजना के बार में जागरूकता कार्यक्रम

भी प्रारंभ किया गया। वर्ष (2015-16) के दौरान प्राप्त की गई महत्वपूर्ण उपलब्धियाँ निम्नलिखित हैं :

1. प्रौद्योगिकी का मूल्यांकन एवं परिष्करण

- ★ कृषि विज्ञान केन्द्रों द्वारा 1711 प्रक्षेत्र-परीक्षण के माध्यम से 328 स्थानों पर 305 प्रौद्योगिकियों का मूल्यांकन किया गया तथा तीन प्रौद्योगिकियों का परिष्करण किया गया। इनमें से 7.79: प्रौद्योगिकियाँ फसलों के अंतर्गत तथा शेष पशु-धन, कुक्कुट, मात्स्यिकी एवं अन्य क्षेत्रों के अंतर्गत था।
- ★ फसलों के अंतर्गत, 268 प्रौद्योगिकियों का मूल्यांकन किया गया, जिनमें फसल-प्रणालियाँ (06), कठिन परिश्रम को कम करना (02), प्रक्षेत्र यंत्र (08), समेकित फसल-प्रबंधन (28), समेकित रोग-प्रबंधन (27), समेकित पोषण-प्रबंधन (20), समेकित नाशीजीव-प्रबंधन (25), समेकित नाशीजीव व रोग-प्रबंधन (01), समेकित खरपतवार प्रबंधन (02), प्रसंस्करण एवं मूल्य-संवर्धन (08), संसाधन संरक्षण प्रौद्योगिकियाँ (12), बीज एवं रोपण सामग्रियों का उत्पादन (01), भण्डारण-तकनीक (01), एवं किस्मवार मूल्यांकन (127) शामिल हैं।
- ★ पशु-पालन एवं मात्स्यिकी प्रौद्योगिकियों के अंतर्गत पाँच विषय क्षेत्रों के तहत कुल 24 प्रौद्योगिकियों का मूल्यांकन किया गया, जिनमें रोग-प्रबंधन (07), नस्लों का मूल्यांकन (03), पोषण-प्रबंधन (07), चारा प्रबंधन (03) और उत्पादन व प्रबंधन (04) शामिल थीं।
- ★ ग्रामीण महिलाओं के सशक्तिकरण के अंतर्गत, छः विषय क्षेत्रों के तहत 13 प्रौद्योगिकियों का मूल्यांकन किया गया, जिनमें कठिन परिश्रम को कम करना

(02), पोषण प्रबंधन (03), उत्पादन व प्रबंधन (04), प्रसंस्करण एवं मूल्य-संवर्धन, भण्डारण-तकनीक और किस्मवार मूल्यांकन (एक-एक) शामिल थीं।

- ★ कर्नाटक में मिर्चियों के किस्मों के मूल्यांकन ने संकेत दिया कि केबीसीएच-1 हासन, माण्डया एवं मैसूरु जिलों में अच्छा निष्पादन किया, जहाँ उपज 21.84 किं./हे. से 30.56 किं./हे. के बीच रही।
- ★ तमिल नाडू में उच्च पैदावार वाली मूँगफली की किस्मों के प्रक्षेत्र परीक्षण ने संकेत दिया कि टीजी 37 ए वेल्हूर एवं डिण्डिगुल जिलों में अच्छा निष्पादन किया, जबकि सीओ-7 ने करूर एवं पुदकोट्टई जिलों में अन्य किस्मों से अधिक पैदावार दी। कदरी-9 ने नागपट्टिणम और सेलम जिलों में अधिक पैदावार दी तथा नामक्कल जिले में आईसीजीवी-91114 एवं तूतुकुडी जिले में टीएमवी 13 का निष्पादन अच्छा रहा।
- ★ तमिल नाडू में धान में समेकित नाशीजीव मोड्यूल के मूल्यांकन से पता चला कि धान में समेकित नाशीजीव प्रबंधन में परिस्थिति-अनुकूल विधियों को अपनाने से धर्मपुरी, नागपट्टिणम और तूतुकुडी जिलों में रासायनिक दवाइयों के छिड़काव में लगने वाली लागत को कम करने से बेहतर उपज शुद्ध आय प्राप्त हुई। इस तकनीक में मुख्यतः मेंडों पर उड़द, मूँग, सरसों, तिल, सूरजमुखी, जैसी फसलों को उगाना शामिल है।

2. फ्रण्टलाइन प्रदर्शन

- ★ कुल 12014 अग्रिम पंक्ति प्रदर्शन आयोजित किए गए, जिनमें अनाजों पर 1822, तिलहनों पर 406, दलहनों पर 1096, वाणिज्यिक फसलों पर 191, चारा फसलों पर 259, हरी खाद फसलों पर 05, सब्जी फसलों पर 936, कन्द फसलों पर 67, फल फसलों

पर 286, पुष्प फसल पर 167, औषधीय एवं सुगंधित फसलों पर 35, मसाला फसलों पर 398 तथा रोपण फसलों पर 142 शामिल थे। इसके अतिरिक्त कर्नाटक एवं तमिल नाडू के चयनित जिलों में एनएफएसएम एवं एनएमओओपी के तहत कृषि सहकारिता एवं कृषक कल्याण विभाग द्वारा प्रायोजित कार्यक्रम के रूप में दलहन पर 1680 एवं तिलहन 1584 पर सामूहिक प्रदर्शन भी आयोजित किए गए।

- ★ कर्नाटक, तमिल नाडू एवं केरल में अग्रिम पंक्ति प्रदर्शन में धान की पैदावार संबंधित चेक की 44.26 किं./हे. से 48.03 किं./हे. की तुलना में 52.84 किं./हे. से 56.17 किं./हे. के बीच रही। मक्के में प्रौद्योगिकी प्रदर्शन के कारण कर्नाटक में पैदावार किसानों की पद्धति की 47.56 किं./हे. की तुलना में 56.93 किं./हे. थी। मिलेट में कर्नाटक में अनुपचारित की तुलना में फिंगर मिलेट, फोक्सटेल मिलेट एवं लिटिल मिलेट में पैदावार क्रमशः 15.08:, 14.15: और 23.15: बढ़ी तथा तमिलनाडु में अनुपचारित की तुलना में इनकी उपज क्रमशः 28.34:, 56.29: और 58.38: तक बढ़ी।
- ★ कृषि विज्ञान केन्द्रों द्वारा विभिन्न फसलों की संकर किस्मों पर कर्नाटक (518), तमिल नाडू (335) एवं केरल (43) में 305.04 हेक्टेयर क्षेत्रफल में धान, मक्का, ज्वार, तिल, सूरजमुखी, अरण्डी, कपास, मिर्ची, बैंगन, भिण्डी, पत्तागोभी, फूलगोभी, टमाटर, लौकी, प्याज, तरबूज, रजनीगंधा एवं रेशम उत्पादन पर 896 प्रदर्शन कार्यक्रम चलाए गए। धान में कर्नाटक में केआरएच-4 संकर ने किसानों की किस्मों की अपेक्षा 5.44: अधिक पैदावार दी। मक्के की संकर किस्मों में 'हेमा', जो एक सार्वजनिक क्षेत्र की संकर किस्म है, जिसने किसानों की किस्मों की अपेक्षा 11.52: अधिक पैदावार दी, को छोड़कर मुख्यतः निजी संकरों का ही प्रदर्शन किया गया। तमिल नाडू में सीओआरएच-4, सीओ (सीयू)-9,

कोरकनाथ 509 का निष्पादन चेक किस्मों की अपेक्षा अच्छा रहा।

- ★ तमिल नाडु में प्रदर्शित सब्जियों की संकर किस्मों में बीन्स में चमत्कार, भिण्डी में शक्ति, करेला में पल्लवी, लौकी में सीओ-1, मिर्ची में सीओसीएच-1, तुरई में नागा, चिचिंडा में पोलो-1, टमाटर में अर्का रक्षक एवं सीओटीएच-3 का प्रदर्शन के तहत परीक्षण किया गया, जिन्होंने स्थानीय चेक किस्मों की तुलना में बेहतर पैदावार एवं आय दी। कर्नाटक में लौकी की संकर किस्म वरदा, बैंगने की संकर किस्में महीको-10, 9 एवं एमईबीएच-10, पत्तागोभी की संकर किस्में सेन्ट, सान्डोज़, हरिरानी एवं उन्नति, मिर्ची की संकर किस्में अर्का मेघना, बुल्लेट, इन्डस 815 एवं तेजस्विनी, पोल बीन की संकर किस्म एन ज़ेड, टमाटर की संकर किस्में अर्का रक्षक, अर्का सम्राट एवं निजी संकर किस्में, एमराल्ड, इन्डस 1030, सिंजेन्डा संकर किस्में आदि ने भी चेक किस्मों से बेहतर प्रदर्शन किया और किसानों को बेहतर आय दी।

3. क्षमता-विकास

- ★ रिपोर्टाधीन वर्ष के दौरान 224314 व्यक्तियों के लिए 5153 प्रशिक्षण कार्यक्रम आयोजित किए गए। इनमें से अधिकांश प्रशिक्षण कार्यक्रम (3841 पाठ्यक्रम) किसानों/कृषक महिलाओं के लिए थे, जिनमें 165213 किसान/कृषक महिलाएँ थे।
- ★ किसानों/कृषक महिलाओं को दिए गए प्रशिक्षण के मुख्य विषय फसल-उत्पादन था, जिसमें 1024 पाठ्यक्रम चलाए गए, जिनमें 56578 कृषक/कृषक महिलाएँ शामिल थे। इसके बाद पौध-संरक्षण (599) एवं गृह विज्ञान (514) अधिक पसंदीदा पाठ्यक्रम थे, जिसके बाद पशुधन-विकास एवं प्रबंधन (401 पाठ्यक्रम) था।
- ★ ग्रामीण युवा वर्गों को दिए गए प्रशिक्षण का मुख्य

विषय मूल्य-संवर्धन था, जिसके तहत 70 पाठ्यक्रम (1650 प्रतिभागी) आयोजित किए गए, जिसके बाद खुम्ब-उत्पादन (61 पाठ्यक्रम, 1447 प्रतिभागी), मधुमक्खी-पालन (28 पाठ्यक्रम, 1032 प्रतिभागी) एवं समेकित कृषि (21 पाठ्यक्रम, 2246 प्रतिभागी) थे।

- ★ 5400 विस्तार कार्यकर्ताओं के लिए कुल 143 प्रशिक्षण चलाए गए। विस्तार कार्यकर्ताओं के लिए आयोजित प्रशिक्षण कार्यक्रम में मुख्य विषय मैदानी फसलों की उत्पादकता में बढ़ोत्तरी (28 पाठ्यक्रम और 1153 प्रतिभागी) था। अगला प्रमुख विषय समेकित नाशीजीव-प्रबंधन (26 पाठ्यक्रम और 1014 प्रतिभागी) था।
- ★ कृषि विज्ञान केन्द्र ने 32889 प्रतिभागियों के लिए विभिन्न विषयों में 573 प्रायोजित प्रशिक्षण कार्यक्रम आयोजित किए। अधिकांश प्रशिक्षण कार्यक्रम (219) फसलों के उत्पादन एवं उत्पादकता में बढ़ोत्तरी पर आयोजित किया गया। इसके अतिरिक्त उक्त वर्ष के दौरान 239 व्यावसायिक प्रशिक्षण कार्यक्रम भी आयोजित किए गए, जिनमें 9377 नव उद्यमियों ने भाग लिया। इस प्रशिक्षण का मुख्य क्षेत्र कृषि परा-कार्यकर्ता/परा-वेत प्रशिक्षण था, जिसमें 78 पाठ्यक्रमों में 2189 प्रतिभागियों ने भाग लिया। मूल्य-संवर्धन (37 पाठ्यक्रम, 905 प्रतिभागी), समेकित फसल-प्रबंधन (21 पाठ्यक्रम, 2282 प्रतिभागी) प्रशिक्षण के अन्य प्रमुख विषय थे।

4. फ्रण्टलाइन विस्तार कार्यक्रम

- ★ कृषि विज्ञान केन्द्र ने कृषि एवं संबद्ध क्षेत्रों के विभिन्न पहलुओं, जैसे किस्मवार निष्पादन, उत्पादन-तकनीकियाँ, समेकित नाशीजीव एवं रोग प्रबंधन, पशु-स्वास्थ्य एवं पोषण, कुक्कुट की उत्पादन-तकनीकी और मात्स्यिकी एवं मानव-पोषण आदि, पर 0.79 लाख विस्तार कार्यक्रम आयोजित किए,

जिनमें 106.76 लाख किसानों एवं 5.79 लाख विस्तार कार्यकर्ताओं ने भाग लिया। इसके अतिरिक्त पशु-स्वास्थ्य शिविर चलाए, जिनमें कुल 7119 पशुओं की स्वास्थ्य-जाँच की गई तथा कृषि विज्ञान केन्द्रों ने विस्तार साहित्य (21701), समाचार पत्रों में समाचार (1942), लोकप्रिय लेख (706), रेडियो प्रसारण एवं वार्ता (497), टेलिविज़न प्रसारण एवं वार्ता (401), तकनीकी लेख (118), तकनीकी बुलेटिन (54), सीडी/डीवीडी (22) और तकनीकी प्रतिवेदन (20) के माध्यम से संगत तकनीकियों का प्रचार-प्रसार किया।

5. उत्पादन-तकनीकी

- ★ कृषि विज्ञान केन्द्रों ने विभिन्न फसलों की किस्मों के 4818.99 किं. बीजों, विभिन्न फसलों एवं संकरों की 40.34 लाख रोपण-सामग्रियों, 3333.31 किं. जैविक उत्पादों, 2.5 लाख पशुधन नस्लों और छोटी मछलियों को तैयार किया और 3.51 लाख किसानों को वितरित किया।
- ★ कृषि विज्ञान केन्द्रों ने 3333.31 किं. जैविक उत्पादों, 49000 ईपीएन, 17761 फेरोमोन जालों एवं 3663 ट्राइको कार्डों का उत्पादन एवं वितरण किया, जिसके माध्यम से 96000 किसानों को कीट-प्रबंधन के लिए रासायनों के उपयोग को कम करते हुए जैव-नियंत्रण विधियों को अपनाने के लिए प्रेरित किया गया।

6. मृदा, जल एवं पौध-परीक्षण विश्लेषण

- ★ इस क्षेत्र के किसानों को विश्लेषण संबंधी सेवाएँ प्रदान करने के लिए 67 कृषि विज्ञान केन्द्रों में मृदा, जल एवं पौध-परीक्षण के लिए प्रयोगशालाओं की स्थापना की गई। इस वर्ष के दौरान 29326 गाँवों के 54900 किसानों से प्राप्त मृदा, जल, पौध, खाद एवं पर्ण-ऊतक के 64609 नमूनों का विश्लेषण किया गया,

जिससे 47.95 लाख की आय प्राप्त हुई। किसानों को 3277 मृदा-स्वास्थ्य कार्ड वितरित किए गए। राज्य-वार आँकड़े दर्शाते हैं कि कर्नाटक, केरल, तमिलनाडू, गोवा और पुदुच्चेरी के कृषि विज्ञान केन्द्रों ने क्रमशः 4482, 11727, 7041, 537 और 462 नमूनों का विश्लेषण किया।

7. वर्षा-जल संग्रहण इकाइयाँ

- ★ ग्यारहवीं योजना तक 16 कृषि विज्ञान केन्द्रों में सूक्ष्म सिंचाई प्रणाली के साथ स्थापित वर्षा-जल-संग्रहण इकाइयों का उपयोग करते हुए कुल 43 प्रशिक्षण कार्यक्रम एवं 127 प्रदर्शन कार्यक्रम चलाए गए तथा 12005 रोपण-सामग्रियाँ तैयार की गईं। इसके अतिरिक्त 13073 किसानों एवं 518 अधिकारियों व कर्मचारियों ने इन इकाइयों का भ्रमण किया और वर्षा-जल संग्रहण तकनीकों से परिचित हुए।

8. कृषि विज्ञान केन्द्रों की सम्मिलन एवं संपर्क

- ★ कृषि विज्ञान केन्द्रों ने इस क्षेत्र के अधिकांश जिलों के कृषि प्रौद्योगिकी प्रबंधन एजेंसी (आत्मा) के पूर्ण सहयोग से कार्य किया है। इस वर्ष के दौरान कृषि विज्ञान केन्द्रों ने 'आत्मा' के 1186 कार्यक्रमों में भाग लिया तथा उसी समय कृषि विज्ञान केन्द्रों ने 'आत्मा' के सहयोग से 352 कार्यक्रम आयोजित भी किए। 'आत्मा' के संपर्क का उपयोग करते हुए 45 कृषि विज्ञान केन्द्रों ने प्रशिक्षण कार्यक्रम, 24 कृषि विज्ञान केन्द्रों ने प्रदर्शन कार्यक्रम, और 15 कृषि विज्ञान केन्द्रों ने प्रदर्शिनियों का आयोजन किया। सम्मिलन-प्रयासों के अंग के रूप में 43 बैठकें आयोजित की गईं।
- ★ विभिन्न कार्यक्रम एवं गतिविधियाँ आयोजित करने के लिए कृषि विज्ञान केन्द्रों को बाहरी वित्तीय सहायता प्राप्त हुई। कृषि विज्ञान केन्द्र की गतिविधियों के लिए वित्तीय सहायता प्रदान करने वाली प्रमुख एजेंसियों

में राष्ट्रीय कृषि विकास योजना, राष्ट्रीय खाद्य सुरक्षा मिशन, भारतीय कृषि अनुसंधान परिषद की विभिन्न परियोजनाएँ और नबार्ड शामिल हैं।

9. सफल गाथा : एक झलक

- ★ प्रदर्शित की गई ग्वार फली किस्म एमडीयू-1 का निष्पादन अच्छा रहा और इसने चेक की 59.31 किं./हे. की अपेक्षा 71.2 किं./हे. की पैदावार दी और इससे चेक की रु. 77625/हे. की आय की तुलना में रु. 105875/हे. की आय दी। चूँकि यह फसल 90-100 दिनों का है, इसलिए ग्वार फली के बीजों को रु. 800/कि.ग्रा. की दर से बेचने के द्वारा कम अवधि में ही किसानों को अधिक लाभ प्राप्त हुआ। कृषि विज्ञान केन्द्र, सेलम द्वारा एमडीयू-1 को लाने से ग्वार फली की किसानों द्वारा की जाने वाली खेती में परिवर्तन आया तथा इसने कम समय में ही कई किसानों की आजीविका को सुधारा और तमिलनाडू के सेलम जिले के कोरणमपट्टी, तंगयूर, कोंगणापुरम, काचुपल्ली खंडों के कई किसान बीच बेचते हुए व्यापारी बन गए।
- ★ कृषि विज्ञान केन्द्र, चिकबल्लापुरा ने मेडिकेरे एवं तुम्म नहल्ली क्लस्टरों में टमाटर की फसल में ऊँची क्यारियों में टपक सिंचाई प्रणाली के साथ 25 माइक्रोन मोटे चाँदी व काले रंग की प्लास्टिक शीट से पलवार का सफलतापूर्वक प्रदर्शन किया। इस तकनीकी से मेडिकेरे क्लस्टर के किसानों वर्ष 2013-14 के दौरान 72 टन/हे. की पैदावार प्राप्त हुई, जिससे रु. 3.46 लाख/हे. की शुद्ध आय भी प्राप्त हुई। जबकि तुम्मनहल्ली क्लस्टर के किसानों को वर्ष 2014-15 के दौरान 113.90 टन/हे. की पैदावार प्राप्त हुई, जिससे रु. 6.60 लाख/हे. की शुद्ध आय प्राप्त हुई। चूँकि इन दोनों क्लस्टरों में प्लास्टिक से पलवार करने की तकनीकी सफल थी, इसलिए वर्तमान में इस जिले में टमाटर में प्लास्टिक से पलवार करने की विधि 1000

हेक्टेयर क्षेत्र में फैल गई।

- ★ अय्यमपट्टी गाँव के किसान श्री जी. गणेशन द्वारा कृषि विज्ञान केन्द्र, शिवंगंगई के तकनीकी मार्गदर्शन से अपनाई गई सटीक खेती प्रणाली अच्छा निष्पादन कर रही है और उन्हें सब्जियों के पौध बेचने से रु. 30000, मिर्चियों में रु. 2.5 लाख/हे. तथा कपास में रु. 2.00 लाख/हे. की आय प्राप्त हो रही है। श्री गणेशन की सफलता को देखते हुए वर्तमान में शिवंगंगई जिले में सटीक खेती लगभग 3600 हेक्टेयर क्षेत्रफल में फैल गई है।
- ★ कृषि विज्ञान केन्द्र, बीदर में प्रशिक्षण प्राप्त किसानों में से अहमदाबाद तहसील के श्री येसाजी राव पाटील ने कृषि विज्ञान केन्द्र के वैज्ञानिकों के मार्गदर्शन से 4.00 हेक्टेयर क्षेत्रफल में अदरक में समेकित रोग प्रबंधन तकनीक को अपनाया। उन्हें 22.5 टन/हे. की पैदावार प्राप्त हुई और रु. 9.00 लाख/हे. आय प्राप्त हुई। इस प्रकार उन्हें 4.00 हेक्टेयर से केवल अदरक की फसल से ही रु. 36.00 लाख की शुद्ध आय प्राप्त हुई। वर्तमान में समेकित रोग प्रबंधन तकनीकी बीदर में लगभग 25 से 30 प्रतिशत क्षेत्रों में तथा रायचूर एवं गुलबर्गा जिलों के कुछ क्षेत्रों में भी फैल गई है।
- ★ कृषि विज्ञान केन्द्र, एरणाकुलम ने पोक्काली प्रणाली में फिन मछलियों, जैसे सीबास, मुल्लेट और पर्ल स्पॉट, का समेकित मछली पालन का सफलतापूर्वक प्रदर्शन किया, जहाँ से केवल धान से ही रु. 15000 और केवल झींगे से
- ★ 50000 का लाभ प्राप्त हुआ। जबकि धान में झींगा एवं फिन मछली के समेकित पालन से रु. 1.3 लाख/हे. की आय प्राप्त हुई। राज्य सरकार का मछली पालक विकास अभिकरण पोक्काली खेतों में खुले रूप से तथा पोक्काली खेतों में स्थापित पिंजरो में मछली पालन की मदद करने आगे आया। इसके

अतिरिक्त कृषि विज्ञान केन्द्र की नई पहल 'प्रक्षेत्र फाटक बाज़ार' से किसानों व ग्राहकों में प्रभावी आदान-प्रदान संभव हुआ और इससे पोक्काली उत्पादों के लिए अच्छी कीमत तथा ग्राहकों के लिए सुरक्षित पोक्काली उत्पाद सुनिश्चित हुआ।

10. पुरस्कार एवं मान्यताएँ

- ★ बैंगलूरू ग्रामीण कृषि विज्ञान केन्द्र को वर्ष 2014-15 का राष्ट्रीय सर्वश्रेष्ठ कृषि विज्ञान केन्द्र पुरस्कार प्राप्त हुआ, जो 25-26 जुलाई 2015 को पटना में आयोजित कृषि विज्ञान केन्द्रों के 9वाँ राष्ट्रीय सम्मेलन में प्रदान किया गया।

11. कृषि प्रौद्योगिकी सूचना केन्द्र (एटिक)

- ★ रिपोर्टाधीन वर्ष के दौरान 113475 किसान, 3124 विस्तार कार्यकर्ता एवं 14245 अन्य साझेदारों ने कृषि प्रौद्योगिकी सूचना केन्द्रों का भ्रमण किया। कुल मिलाकर 74159 व्यक्तियों ने सूचना के लिए तथा 56685 व्यक्तियों ने तकनीकी उत्पादों के लिए कृषि प्रौद्योगिकी सूचना केन्द्र का भ्रमण किया।
- ★ संचार के विभिन्न माध्यमों द्वारा कुल 26086 किसानों ने कृषि प्रौद्योगिकी सूचना केन्द्र को संपर्क किया अथवा कृषि प्रौद्योगिकी सूचना केन्द्र द्वारा संपर्क किया।
- ★ प्रकाशन के तहत कृषि प्रौद्योगिकी सूचना केन्द्र ने 21415 पुस्तकें, 4393 तकनीकी बुलेटिनें प्रकाशित कीं और 923 सीडी, 104 डीवीडी और 202 वीडियो फिल्में तैयार कीं तथा भ्रमणकारियों को वितरित किया। इस वर्ष के दौरान किसानों व उद्यमियों के लिए 1972 निदानकारी सेवाएँ प्रदान की गईं।

12. विस्तार निदेशालय द्वारा प्रौद्योगिकी का समर्थन

- ★ विस्तार निदेशकों और अन्य अधिकारियों ने 35 विज्ञान

सलाहकार समिति की बैठकों, 72 प्रक्षेत्र दिवसों, 87 कार्यशालाओं/संगोष्ठियों, परिसर बाह्य प्रशिक्षण सहित 85 प्रशिक्षण कार्यक्रमों और 22 प्रौद्योगिकी सप्ताहों में भाग लिया।

- ★ इस वर्ष के दौरान निदेशालय द्वारा 36 कृषि विज्ञान केन्द्रों को 132.32 किं. बीज, 27 कृषि विज्ञान केन्द्रों को 40000 लाख रोपण सामग्रियाँ, 31 कृषि विज्ञान केन्द्रों को 51.84 किं. जैविक उत्पाद, 10 कृषि विज्ञान केन्द्रों को 1355 पशुधन, 11 कृषि विज्ञान केन्द्रों को 13259 कुक्कुट और 5 कृषि विज्ञान केन्द्रों को 10.55 किं. पोषक तत्व मिश्रण उपलब्ध कराए गए।

13. विशेष कार्यक्रम

- ★ दलहनों में सामूहिक प्रौद्योगिकी प्रदर्शन के तहत चने में किसानों की पद्धति की 9.20 किं./हे. की तुलना में 12.35 किं./हे. की औसत पैदावार सहित 24.84: पैदावार बढ़ी। उड़द में किसानों की पद्धति की 5.80 किं./हे. की तुलना में 7.83 किं./हे. की औसत पैदावार सहित 26.35: पैदावार बढ़ी। इसी प्रकार मूँग में किसानों की पद्धति की 4.51 किं./हे. की तुलना में 5.83 किं./हे. की औसत पैदावार सहित 19.64: पैदावार बढ़ी।
- ★ तिलहनों में सामूहिक प्रौद्योगिकी प्रदर्शन के तहत मूँगफली में चेक किस्मों की 16.84 किं./हे. की तुलना में 23.49 किं./हे. की औसत सहित 37.42: पैदावार बढ़ी। सूरजमुखी में चेक किस्मों की 8.55 किं./हे. की तुलना में 10.53 किं./हे. की औसत सहित 18.94: पैदावार बढ़ी तथा अलसी में चेक किस्मों की 3.88 किं./हे. की तुलना में 4.7 किं./हे. (प्रदर्शन) की औसत पैदावार सहित 21.43: पैदावार बढ़ी।

- ★ राष्ट्रीय जलवायु समुत्थानशील कृषि नवाचार के तहत

11 राष्ट्रीय जलवायु समुत्थानशील कृषि नवाचार गाँवों में जलवायु समुत्थानशीलता हेतु 1117 किसानों को शामिल करते हुए कुल 333.2 हेक्टेयर क्षेत्रफल में एनआरएम से संबंधित अंतःक्षेपों से उपचार किया गया। फसल-प्रदर्शनों में 1465 किसानों ने 470.83 हेक्टेयर में जुलवायु समुत्थानशील फसल-तकनीकियों को प्रदर्शन किया। राष्ट्रीय जलवायु समुत्थानशील कृषि नवाचार गाँवों में जलवायु-परिवर्तन के विपरीत प्रभावों से निपटने के लिए पशुधन/पक्षियों की 819 उन्नत नस्लों एवं उन्नत पनाहों/आवासों का प्रदर्शन किया गया, जिनसे 223 किसान लाभान्वित हुए। किराए पर लेने की प्रक्रिया के तहत राष्ट्रीय जलवायु समुत्थानशील कृषि नवाचार गाँवों के 942 किसानों ने 902.23 हेक्टेयर में खेती करने हेतु समय पर बुवाई और अन्य कृषि क्रियाओं के लिए 53 यंत्रों का उपयोग किया। इसके अतिरिक्त इस परियोजना के तहत 5758 किसानों एवं विस्तार कार्यकर्ताओं को सम्मिलित करते हुए 290 विस्तार गतिविधियाँ आयोजित की गईं।

मेरा गाँव - मेरा गौरव

- ★ भा. कृ. अनु. प. -कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, बैंगलूरु ने 'मेरा गाँव - मेरा गौरव' योजना के प्रभावी कार्यान्वयन हेतु कार्यान्वयन केन्द्रों के लिए मार्गदर्शन और कार्य-बिन्दुओं पर सुग्राही कार्यशाला आयोजित की। 'मेरा गाँव - मेरा गौरव' पर एक वेबपृष्ठ तैयार किया गया तथा 'मेरा गाँव - मेरा गौरव' के कार्यान्वयन के लिए मार्गदर्शन प्राप्त करने हेतु इसे भा. कृ. अनु. प. -कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, बैंगलूरु की वेबसाइट पर अपलोड किया गया। 678 वैज्ञानिकों सहित 161 बहु-विषयक दलों का गठन किया गया। इन दलों ने 2.38 लाख परिवार एवं 1.75 लाख हेक्टेयर क्षेत्रफल सहित 683 गाँवों को गोद लिया, जिसमें कर्नाटक में 49716 परिवार एवं 62821 हेक्टेयर क्षेत्रफल सहित 236

गाँव, तमिल नाडु में 39119 परिवार एवं 39443 हेक्टेयर क्षेत्रफल सहित 109 गाँव, केरल में 147514 परिवार एवं 73598.64 हेक्टेयर सहित 334 गाँव तथा गोवा में 2325 परिवार सहित 4 गाँव शामिल हैं।

14. क्षेत्रीय परियोजना निदेशालय में गतिविधियाँ

- ★ कृषि में मूलभूत, रणनीतिक एवं सीमांत अनुप्रयोग अनुसंधान के लिए राष्ट्रीय निधि से प्राप्त रु. 92,52,594 की वित्तीय सहायता से 01.04.2014 से "कृषि नवाचारों पर किसानों के निर्णय लेने के व्यवहार का विश्लेषण" नामक अनुसंधान परियोजना लागू की गई है। डॉ. एम.जे. चन्द्रगौडा, प्रधान वैज्ञानिक (कृषि विस्तार) इस परियोजना के प्रधान अन्वेषक हैं। भा. कृ. अनु. प. -कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, बैंगलूरु इसका प्रमुख केन्द्र है तथा कृषि विश्वविद्यालय, धारवाड, ग्रामीण प्रबंधन संस्थान, आनंद और गैर-सरकारी संगठन 'समूह' इसके तीन साझेदार हैं। कर्नाटक एवं गुजरात में धान, मूँगफली, कपास, आलू एवं मक्का के संबंध में नवाचारों पर किसानों के निर्णय लेने के व्यवहार का अध्ययन किया गया। इस परियोजना की अवधि दो वर्ष है।
- ★ निदेशालय ने कृषि विज्ञान केन्द्र, तृशूर एवं बीजापुर में प्रौद्योगिकी का मूल्यांकन, परिष्करण एवं प्रदर्शन पर अभिमुखीकरण कार्यक्रम आयोजित किए तथा क्षेत्र-8 के नवनियुक्त 48 कर्मचारियों को प्रशिक्षित किया।
- ★ निदेशालय ने कृषि विस्तार विभाग, भारतीय कृषि अनुसंधान परिषद के सहयोग से राष्ट्रीय कृषि अनुसंधान प्रबंध अकादमी, हैदराबाद में आयोजित आधारभूत प्रशिक्षण कार्यक्रम में नौ परियोजना समन्वयकों की प्रतिभागिता सुनिश्चित की।

- ★ कुल 13 लेख/प्रतिवेदन/आलेख प्रकाशित हुए, 13 बैठकें/कार्यशालाएँ आयोजित की गईं तथा क्षेत्रीय परियोजना निदेशक एवं निदेशालय के कर्मचारियों ने 20 बैठकों/कार्यशालाओं/सम्मेलनों/संगोष्ठियों में भाग लिया तथा कृषि विज्ञान केन्द्रों द्वारा 41 एस ए सी बैठकें आयोजित की गईं।
- ★ विस्तार निदेशालय, तमिल नाडु कृषि विश्वविद्यालय, कोयम्बतूर में 14-16 सितंबर 2015 के दौरान कृषि विज्ञान केन्द्रों की अधिदेशित गतिविधियों पर अभिमुखीकरण कार्यक्रम आयोजित किए गए।
- ★ केन्द्रीय रोपण फसल अनुसंधान संस्थान, कासरगोड के सहयोग से दो चरणों में 2-3 फरवरी 2016 एवं 5-6 फरवरी 2016 को 'नारियल का लाभदायक उत्पादन, प्रसंस्करण एवं विपणन तंत्र' पर प्रशिक्षण कार्यक्रम आयोजित किए गए, जिनमें 34 विषय विशेषज्ञोंने भाग लिया।
- ★ भा. कृ. अनु. प. -कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, बैंगलूरु एवं भा. कृ. अनु. प. -केन्द्रीय तटीय कृषि अनुसंधान संस्थान, गोवा ने संयुक्त रूप से 16 अक्टूबर 2015 को भा. कृ. अनु. प. -केन्द्रीय तटीय कृषि अनुसंधान संस्थान, गोवा में 'इपश्चिम तटीय समतल एवं घाट क्षेत्रों के लिए कृषि एवं संबद्ध क्षेत्रों में कृषि-जलवायु क्षेत्रवार कार्यशाला' आयोजित की। भा. कृ. अनु. प. -कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, बैंगलूरु एवं भा. कृ. अनु. प. -केन्द्रीय द्वीपीय कृषि अनुसंधान संस्थान, पोर्टब्लेयर ने संयुक्त रूप से 18 नवंबर 2015 को द्वीपीय क्षेत्र के लिए भा. कृ. अनु. प. -केन्द्रीय द्वीपीय कृषि अनुसंधान संस्थान, पोर्टब्लेयर में एक अन्य कार्यशाला आयोजित की।
- ★ भा. कृ. अनु. प. -कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, बैंगलूरु में 6 जून 2015 को एवेक, बैंगलूरु के अधिकारियों को शामिल करते हुए 'स्वयं सहायता समूहों द्वारा उत्पादन एवं विपणन तंत्रों को मजबूत करने की रणनीति' पर समूह चर्चा आयोजित की गई।
- ★ भा. कृ. अनु. प. -कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, बैंगलूरु एवं विस्तार निदेशालय, कृषि विश्वविद्यालय, धारवाड ने संयुक्त रूप से 21-22 जनवरी 2016 को कृषि विश्वविद्यालय, धारवाड में प्रथम कृषि विज्ञान सिम्पोजियम क्षेत्र 8 आयोजित की। दो दिवसीय सिम्पोजियम में छः तकनीकी सत्र, जैसे तकनीकी के प्रचार-प्रसार का सामाजिक-आर्थिक पहलू, कीट एवं रोग प्रबंधन, उत्पादन एवं प्रबंधन, नवाचारी तकनीकी वितरण तंत्र, किस्मवार मूल्यांकन एवं संसाधन संरक्षण तकनीकी आदि शामिल थे। इस सिम्पोजियम में क्षेत्र 8 के कृषि विज्ञान केन्द्रों से लगभग 100 विषय विशेषज्ञों ने भाग लिया और कुल 34 मौखिक आलेख एवं 96 पोस्टर आलेख प्रस्तुत किए गए।

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 31st, 2016, 643 KVKs were established in the country, out of which 81 KVKs are in Zone VIII. The Agricultural Technology Application Research Institute (ATARI) previously known as Zonal Project Directorate /Zonal Coordinating Unit -Zone VIII coordinates, plans, monitors and evaluates the technological interventions and frontline extension programmes of 81KVKs in Karnataka (31), 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 create 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 BimaYojana was also initiated by the KVKs. Salient achievements during the year (2015-16) are summarized as follows:

1. Technology Assessment and Refinement

- A total of 305 technologies were assessed and three technologies were refined by KVKs through 1711 OFTs at 328 locations. Out of these 87.99% of technologies were under crops and remaining under livestock, poultry, fisheries and others.
- Under crops, a total of 268 technologies were assessed, which included cropping systems (06), drudgery reduction (02); farm machinery (08); integrated crop management (28); integrated disease

management (27), integrated nutrient management (20), integrated pest management (25), integrated pest and disease management (01), integrated weed management (02); processing and value addition (08), resource conservation technologies (12), seed and planting material production (01); storage technique (01), and varietal evaluation (127).

- Under Livestock and Fishery Technologies, KVKs assessed 24 technologies on five thematic areas including disease management (07); evaluation of breeds (03); nutrition management (07), feed management (03) and production and management (04).
- Under empowerment of rural women, 13 technologies were assessed under six thematic areas viz., drudgery reduction (02), nutrition management (03), production and management (04), processing and value addition, storage techniques and varietal evaluation (01 each)
- Assessment of chilli varieties in Karnataka indicated that KBCh - 1 performed better in Hassan, Mandya and Mysuru districts with the yield ranging from 21.84 q/ha to 30.56 q/ha
- On Farm testing in high yielding groundnut varieties in Tamil Nadu indicated that TG 37A performed better

in Vellore and Dindigul districts, whereas Co-7 out yielded other cultivars in Karur and Pudukottai districts; Kadri-9 gave higher yield in Nagappatinam and Salem districts and in Namakkal district ICGV-91114 and in Tuticorin district, TMV 13 performed better.

- Assessment of Integrated Pest Management Module for paddy in Tamil Nadu revealed that adoption of ecological engineering methods in integrated pest management practices in paddy realized better yield and net return mainly through reduction in cost of chemical spraying in Dharmapuri, Nagappatinam and Tuticorin districts. The techniques mainly involved include growing of crops like blackgram, Greengram, mustard, sesame, sunflower etc on the bunds.

2. Frontline Demonstrations

- A total of 12014 frontline demonstrations were conducted including 1822 on cereals and millets, 406 on oilseeds, 1096 on pulses, 191 on commercial crops, 259 on fodder crops, 5 on green manure crops, 936 on vegetable crops, 67 on tuber crops, 286 on fruit crops, 167 on flowers, 35 on medicinal and aromatic crops, 398 on spice crops and 142 on plantation crops, besides, 1680 cluster demonstrations on pulses and 1584 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 52.84 q/ha to 56.17 q/ha under frontline demonstrations in Karnataka, Tamil Nadu and Kerala states as compared to 44.26 q/ha to 48.03 q/ha in their respective check. In maize, the yield due to technologies demonstration was 56.93 q/ha as compared to 47.56 q/ha under farmers' practice in the state of Karnataka. Under millets, 15.08%, 14.15% and 23.15% increased yield was recorded in finger millet, foxtail millet and little millet demonstrations respectively over control in Karnataka and 28.34%, 56.29% and 58.38% increased yield respectively over check in the state of Tamil Nadu.
- 896 demonstrations on hybrids in various crops were conducted by the KVKs in the states of Karnataka (518), Tamil Nadu (335) and Kerala (43) covering 305.04 ha area in crops like paddy, maize, sorghum, sesamum, sunflower, castor, cotton, chilli, brinjal, bhendi, cabbage, cauliflower, tomato, bottle gourd, onion, watermelon, tuberoses and sericulture. In paddy KRH-4 hybrid recorded 5.44 % higher yield over farmers' variety in Karnataka. In maize mostly private hybrids were demonstrated except Hema, a public sector hybrid which gave 11.52% higher yield over farmers' variety. In Tamil Nadu, hybrids

such as CoRH-4, Co (Cu)-9, Koraknath 509 performed better than their check varieties.

- Among the vegetable hybrids demonstrated in Tamil Nadu, hybrids such as Chamathkar in beans, Sakthi in bhendi, Pallavi in bitter gourd, Co-1 in bottle gourd, CoCH-1 in chilli, Naga in ridge gourd, Polo-1 in snake gourd, ArkaRakshak and CoTH 3 in tomato tested under demonstrations gave better yield and economic returns as compared to their local check varieties. In Karnataka, bottle gourd hybrid varda, brinjal hybrids Mahyco-10, 9 and MEBH-10, cabbage hybrids Saint, Sandoz, Harirani and Unnathi, chilli hybrids ArkaMeghana, Bullet, Indus 815 and Tejaswini, pole bean hybrid NZ, tomato hybrids ArkaRakshak, ArkaSamrat and private hybrids like Emerald, Indus 1030, Syngenta hybrids have also performed better than varieties and gave better economic returns to the farmers.

3. Capacity Development

- During the year under report, 5153 training courses were organized for 224314 persons. Majority of these (3841 courses) were for farmers/farm women category in which 165213 farmers/farm women were trained.
- For farmers and farmwomen, the major area of training was crop production

in which 1024 courses were conducted involving 56578 farmers/farmwomen. Training courses on plant protection (599) and home science (514) were the next most demanded courses followed by livestock production and management (401 courses).

- For rural youth, value addition was the major training area with 70 courses (1560 participants) followed by 58 courses on mushroom production (1447 participants), bee keeping (28 courses, 1032 participants) and integrated farming (21 courses, 2246 participants)
- For extension functionaries, a total of 143 courses were organized for 5400 personnel. Productivity enhancement in field crops was the major area with 28 courses and 1153 participants. Integrated pest management was the next major training area with 26 courses and 1014 participants.
- A total of 573 sponsored trainings were conducted by the KVKs in different areas for the benefit of 32889 participants. Large number of training courses (219) were organized on increasing production and productivity of crops. In addition, 239 vocational training courses were organized during the year involving 9377 budding entrepreneurs. Agril. para-workers/para-vet training was the major area of training with 78 courses and 2189 participants. Value addition

(37 courses, 905 participants) and Integrated crop management (21 courses, 2282 participants) were the other major areas.

4. Frontline Extension Programmes

- KVKs organized a total of 0.79 lakh extension programmes and created awareness among 106.76 lakh farmers and 5.79 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 conducted Animal Health Camps wherein a total of 7119 animal were treated and also disseminated relevant technologies through number of extension literature (21701) followed by newspaper coverage (1942), popular articles (706), radio coverage and talks (497), T V coverage and talks (401), Technical articles (118), technical bulletins (54), CD/DVD (22) and technical reports (20).

5. Production of Technological Inputs

- KVKs produced and supplied 4818.99 q of seeds of different crop varieties, 40.34 lakh planting materials of different crops and hybrids, 3333.31 q of bio-products and 2.5 lakh of livestock strains and fish fingerlings benefiting 3.51 lakh farmers.

- KVKs produced and supplied 3333.31 q of bio products, 49000 EPN, 17761 pheromone traps and 3663 Tricho cards through which more than 96000 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 67 KVKs for providing analytical services to farmers in the zone. During the year, a total of 64609 samples of soil, water, plant, manure and leaf tissue received from 54900 farmers belonging to 29326 villages were analyzed with realization of Rs. 47.95 lakh. 3277 Soil Health Cards were distributed to farmers. State-wise data showed that KVKs in Karnataka analyzed 44842 samples, Tamil Nadu KVKs analyzed 11727 samples, Kerala KVKs analyzed 7041 samples, Goa KVKs analyzed 537 samples and Puducherry 462 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 43 training courses and 127 demonstrations were conducted and 12,005 planting materials were produced. Further, 13073 farmers and 518 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 1186 programmes of ATMA during the year and at the same time KVKs organized 352 programmes in collaboration with ATMA. Using the linkage with ATMA, 45 KVKs conducted training programmes, 24 KVKs conducted demonstrations, and 15 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. RashtriyaKrishiVikasYojana(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

- Demonstrated cluster bean variety MDU1 performed better and gave 71.2 q/ha as against check (59.31 q/ha) with a net return of Rs. 105875/ha as compared to check (Rs. 77625 /ha). As crop takes 90-100 days duration, within a short time farmers have gained good profits through selling of cluster bean seeds @ Rs.800/Kg. Intrusion of MDU-1 by KVK Salem has

changed the way farmers cultivate Cluster beans and it has improved the livelihood of many farmers in a short period of time and many of the farmers became merchants by selling the seeds in Koranampatty, Thangayur, Konganapuram, Kachupally Blocks of Salem district in Tamil Nadu.

- KVK Chikkaballapura has successfully demonstrated mulching with plastic sheet of 25 micron thick silver and black coloured on raised beds with inline drip irrigation system in tomato crop in two cluster viz., Medikere and Thummanahalli. Farmers of Medikere cluster harvested 72 tonnes/ha of tomato with demonstrated technology that gave a net profit of Rs.3.46 lakh/ha during 2013-14. Whereas, farmers of Thummanahalli cluster harvested more yield 113.90 tonnes/ha of tomato with demonstrated technology which provided a net profit of Rs.6.60 lakh/ha during 2014-15. As, plastic mulching technology was successful in two clusters, the practice of using plastic mulch in tomato has spread to an area over 1000 ha in the district at present.
- Precision farming systems adopted by Shri G Ganesan, a farmer belonging to Ayyampatti village under the technical guidance of KVK, Sivagangai performing better and he is earning a sum of Rs.30000 through supply of vegetable seedlings, a net return of Rs.2.5 lakh/ha in

chillies, and of Rs.2.00 lakh/ha in cotton. By seeing the success of Shri G Ganesan, precision farming is spread in about 3600 hectares in Sivagangai district at present.

- Among the farmers trained at KVK Bidar, Shri Yesajirao Patil belonging to Ahamadabad taluk adopted IDM in ginger in 4.00 ha area of his farm under the technical guidance of KVK Scientists. He harvested 22.5 tonne/ha of ginger and got economic benefit of Rs. 9.00 lakh/ ha and thus he got net revenue of Rs.36.00 lakh from 4.00 ha of ginger crop alone. At present, IDM technology was spread in an area around 25 to 30 per cent in Bidar as well as few area in Raichur and Gulbarga districts of Karnataka.
- KVK Ernakulam has successfully demonstrated integrated farming of finfish such as Asian Seabass, Mullet and Pearl spot in Pokkali system wherein paddy alone gave a profit of Rs.15000 and shrimp alone Rs.50000. Whereas the new paddy shrimp fin fish integrated farming fetched Rs.1.3 lakh/ha. Fish Farmers Development Agency (FFDA) under the State Government came forward to support fish farming both in open Pokkali fields and also in cages sited in Pokkali fields. Further, KVK's new initiative called as Farm gate market has created an effective interface between farmer and consumer and ensured premium price for Pokkali produce and safe to eat Pokkali produce for consumers.

10. Awards and Recognition

- Bangalore Rural KVK received the National Best KVK Award for the year 2014-15, which was presented at 9th National Conference of KVKs held at Patna on 25th and 26th July, 2015

11. Agricultural Technology Information Centres (ATICs)

- During the period under report, a total of 113475 farmers, 3124 extension personnel and 14245 other stakeholders visited Agriculture Technology Information Centres (ATICs). Altogether, 74159 visited for information and 56685 visited for technology products.
- A total of 26086 farmers contacted ATICs or were contacted by ATICs through various means of communication.
- Under publications, 21415 Books, 4393 Technical bulletins, 923 CDs, 104 DVDs and 202 Video films were produced and provided to the ATIC visitors. During the reporting period, 1972 diagnostic services were provided to farmers and entrepreneurs.

12. Technology Backstopping by Directorates of Extension

- Directors of Extension and their officials participated in 35 Scientific Advisory Committee Meetings, 72 field days, 87 workshops/ Seminars, 85 training

programmes including off campus programmes and 22 Technology Weeks.

- During the year 132.32 quintals of seeds to 36 KVKs, 40000 planting materials to 27 KVKs, 51.84 quintals of bio-products to 31 KVKs, 1355 livestock to 10 KVKs, 13259 poultry birds to 11 KVKs and 10.55 quintals of nutrient mixture for 5 KVKs were arranged by the Directorates.

13. Special Programmes

- Under cluster demonstrations in pulses, 24.84 % yield increased with an average yield of 12.35 q/ha in chickpea as compared to farmers practice (9.20 q/ha). In blackgram, 26.35 % yield increased with an average yield of 7.83 q/ha as compared to farmers practice (5.80 q/ha). Similarly in greengram, 19.64 % increased yield was recorded with an average yield of 5.83 q/ha as compared to farmers practice (4.51 q/ha).
- Under cluster demonstration on oilseeds, 37.42 % increased yield with an average of 23.49 q/ha as compared to check varieties (16.84 q/ha) in groundnut, 18.94 % increased yield with average yield of 10.53 q/ha as compared to check varieties (8.55 q/ha) in sunflower and 21.43 % increased yield with an average yield of 4.7 q/ha (demo) as compared to check varieties (3.88 q/ha) in linseeds were reported.

- Under NICRA, a total of 333.2 ha area was treated with NRM related interventions covering 1117 farmers to build climate resilient in eleven NICRA villages. In the crops, 1465 farmers demonstrated climate resilient crop technologies in an area of 470.83 ha. About 819 improved breeds of livestock/birds and 118 units of improved shelter/housing were demonstrated to tackle the adverse climatic conditions in the NICRA villages benefiting 223 farmers. Under custom hiring, 942 farmers of NICRA villages have used 53 various implements to cultivate 902.23 ha area for timely sowing and other cultural operations. In addition, 290 extension activities were carried out involving 5758 farmers and extension personnel under the project.

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

- The ICAR-ATARI, Bangalore organized a sensitization workshop on MeraGaon – Mera Gaurav (MG-MG) for guiding the implementing centres on guidelines and action points for effective implementation. Designed a web page on MG-MG and it was up loaded in the Website of ICAR-ATARI, Bangalore as a ready reference for implementing MGMG. A total of 161 multi-disciplinary teams were formed with 678 Scientists. The teams adopted a total of 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.

14. Activities at the Zonal Project Directorate

- A Research Project on “Behavioral Analysis of Farmers Decision Making on Agricultural Innovations” is being implemented since 01.04.2014 with a financial assistance Rs.92,52,594 under National Fund for Basic, Strategic and Frontier Application Research in Agriculture (NFBSFARA). Dr.M.J.Chandre Gowda, Principal Scientist (Agricultural Extension) is the Principal Investigator of the project. ICAR ATARI Bengaluru is the Lead Centre with three Partner Institutes namely University of Agricultural Sciences, Dharwad, Institute of Rural Management Anand (IRMA) and Samuha NGO. Farmers decision making behavior on agricultural innovations related to paddy, groundnut, cotton, potato and maize have been studied in Karnataka and Gujarat. The sanctioned duration of the project was two years.
- The Directorate organized orientation training courses on Technology Assessment, Refinement and

Demonstration at KVK, Thrissur and KVK Bijapur and trained 48 newly recruited KVK staff of Zone VIII.

- Directorate in coordination with the Division of Agricultural Extension, ICAR facilitated the participation of nine Programme Coordinators in the Foundation Training conducted by NAARM Hyderabad.
- A total of 13 articles/reports/papers were published, 13 meetings/workshops were organized and Zonal Project Director and staff of Directorate participated in 20 meetings/workshops/conferences/seminars and 41 SAC meetings organized by the KVKs.
- Orientation programme on mandated activities of the KVK was conducted at Directorate of Extension TNAU Coimbatore during 14th to 16th September 2015
- Training programme entitled “profitable production, processing and marketing mechanisms in coconut “ was organized in coordination with CPCRI Kasaragod in two phases 2-3rd February 2016 and 5-6th February 2016, in which 34 Subject Matter Specialists have participated
- ICAR-ATARI Bengaluru and ICAR CCARI, Goa jointly organized the “Agro-Climatic region wise workshop in agriculture and its allied sectors for West Coast Plains and Ghat Regions” at ICAR CCARI, Goa on 16th October 2015. Another workshop was jointly organised by ICAR-ATARI Bengaluru and ICAR CIBA Chennai, for the East Coast Plains and Hills Regions at ICAR Central Institute of Brackish Water Aquaculture, Chennai on 29th October 2015. The third workshop organized by ICAR ATARI Bengaluru and ICAR CARI Port Blair on 18th November 2015 for the Island Region at ICAR Central Agricultural Research Institute, Post Blair.
- A Group Discussion involving officials from AWAKE Bengaluru was organized on “Strategies for strengthening production and marketing mechanisms by SHGs” on 6th June 2015 at ICAR ATARI Bengaluru
- ICAR Agricultural Technology Application Research Institute Bengaluru and Directorate of Extension, University of Agricultural Sciences, Dharwad jointly organized the First KVK Symposium Zone VIII (*KVKSYMZONEVIII*) during 21st and 22nd January, 2016 at UAS, Dharwad. The two day symposium consisted of six technical sessions *viz.*, Socio Economic Aspects of Technology Dissemination, Pest and Disease Management, Production and Management, Innovative Technology Delivery Mechanisms, Varietal Evaluation and Resource Conservation Technologies. About 100 Subject Matter Specialists from KVKs of Zone VIII have participated in the symposium and a total of 34 oral papers and 96 poster papers were presented.



About Agricultural Technology Application Research Institute

The Agricultural Extension Division, one of the eight divisions of Indian Council of Agricultural Research (ICAR), New Delhi has established a network of Krishi Vigyan Kendras (KVKs) all over the country. The KVKs are hosted by ICAR, 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 Agricultural Technology Application Research Institutes (earlier known as Zonal Project Directorates) located across the country. The jurisdiction of Agricultural Technology Application Research Institutes is illustrated in Table 1.

1.1 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 had 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

Table 1: Agricultural Technology Application Research Institutes and States

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

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. At this juncture, Goa was added to the jurisdiction of the Unit. Zonal Coordinating Units were upgraded as Zonal Project Directorates (ZPDs) during the XI Five Year Plan (2009) and Zonal Coordinators were re-designated as Zonal Project Directors with financial and administrative powers akin to Directors of other ICAR institutes. Zonal Project Directorates (ZPDs) were upgraded as Agricultural Technology Application Research Institutes (ATARIs) during the XII Five Year Plan (2015) and Zonal Project Directors were re-designated as Directors akin to Directors of other ICAR institutes

1.2 Mandate

Mandate of the Agricultural Technology Application Research Institutes is as follows:

- To formulate, implement, monitor and evaluate strategies on technology assessment, refinement and demonstration programme of the Council in the respective zone.
- To initiate, plan, coordinate and execute the extension research to support and improve technology dissemination system.

- To link KVK efforts to strengthen extension approaches viz. consortium, convergence, public -private partnership, farmer-led and market-led extension in the zone.
- To dovetail technology application programmes by coordinating and fostering linkages with technology generation and delivery system and other stakeholders of agriculture development in the zone.
- To make periodical reports to the Deputy Director General (Agricultural Extension), ICAR on work plan, progress and evaluation.
- To perform any other duties that may be assigned by the Council.

1.3 Staff

Total sanctioned staff strength of Agricultural Technology Application Research Institute-Zone VIII, Bangalore is 18, out of which 16 are currently filled (Table 2).

Table 2: Staff strength of Agricultural Technology Application Research Institute-Zone VIII

Category	Sanctioned	Filled
Director (RMP)	1	1
Scientific	6	6
Technical	2	2
Administrative	8	6
SSS (Gr-II)	1	1
Total	18	16

1.4 Organizational Structure

The organizational structure of Agricultural Technology Application Research Institute-Zone VIII and KVKs functioning under this Institute is depicted in Fig.1.

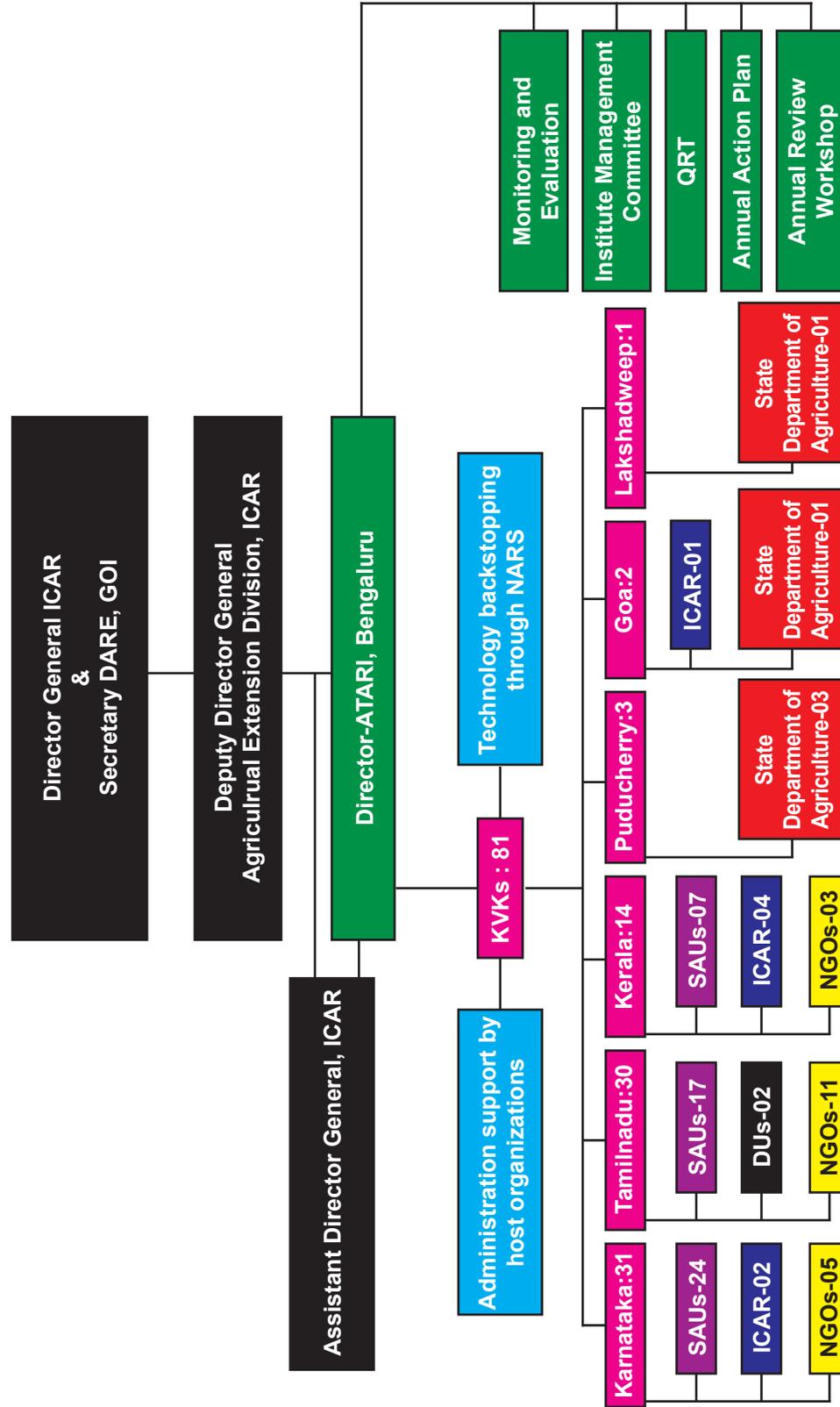


Fig. 1 : Organogram – Agricultural Technology Application Research Institute, Zone VIII

1.5 Major activities

During 2015-16, Agricultural Technology Application Research Institute-Zone VIII organized two major activities viz., Annual Zonal Review Workshop of KVKs in Zone VIII at UAHS, Shivamogga during 20-23rd May, 2015 and the First Zonal KVK Symposium for Zone VIII at University of Agricultural Sciences, Dharwad. A brief account of the same is furnished below.

1.5.1 Annual Zonal Review Workshop of KVKs at UAHS, Shivamogga

The workshop was held at UAHS, Shivamogga during 20-23rd May, 2015. Dr. C.Vasudevappa, Hon'ble Vice Chancellor of UAHS, Shivamogga inaugurated the workshop on 20th May, 2015. A total of 130 participants including Programme Coordinators/SMSs of KVKs and Directors of Extension in Zone VIII, scientists from ICAR institutes and scientists and officers from ZPD-Zone VIII participated in the workshop. Dr. C.Vasudevappa, Hon'ble Vice Chancellor, in his address, emphasized that region specific emerging issues related agricultural and allied sectors need to be addressed and accordingly, technological interventions must be taken up by the KVKs.

The workshop was conducted with three concurrent technical sessions, each group having 26 KVKs and an Expert Review Panel. Expert panel consisting of three Directors of Extension, one Nodal Professor from DE Office, one Nodal Scientist from ICAR-ZPD-Zone VIII and four professors from UAHS reviewed the presentations made by KVKs. A total of 77 KVKs of Zone VIII

were reviewed during the workshop. Further, one expert talk on subsidy schemes and credit facilities for farming community was arranged as common session on 21st May, 2015 and another expert talk on Rice portal to rice check – opportunities for Krishi Vigyan Kendras was arranged on 22nd May 2015. Each KVK was evaluated on criteria like implementation of action plan during the year, data presented, quality and clarity of presentation. The KVKs that were rated as very good were issued certificate of appreciation, while the ones rated as average will be given additional handholding during the year.

1.5.2 First Zonal KVK Symposium at University of Agricultural Sciences, Dharwad

ICAR Agricultural Technology Application Research Institute Bengaluru and Directorate of Extension, University of Agricultural Sciences, Dharwad jointly organized the First KVK Symposium Zone VIII (*KVKSVMZONEVIII*) during 21st and 22nd January, 2016 at UAS, Dharwad. The two-day symposium consisted of six technical sessions viz., Socio Economic Aspects of Technology Dissemination, Pest and Disease Management, Production and Management, Innovative Technology Delivery Mechanisms, Varietal Evaluation and Resource Conservation Technologies. About 100 Subject Matter Specialists from KVKs of Zone VIII participated in the symposium and a total of 34 oral papers and 96 poster papers were presented.

The Symposium was organized with a view to provide a platform for the Scientists/ Subject Matter Specialists of KVKs to present and analyze the data generated as a part of their work. The Symposium also created cross learning opportunities for the KVKs.

1.6 Budget

A total of Rs. 7523.48 lakh was sanctioned for the year 2015-16 and 7522.47 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 of Zone VIII for 2015-16

(Rs. in Lakh)

Heads	Sanction				Expenditure			
	ZPD	KVKs	Support to DEE at SAUs	Total	ZPD*	KVKs	Support to DEE at SAUs	Total
(A) Recurring								
Pay & Allowance	182.57	6379.78	0.00	6562.35	182.57	6379.78	0.00	6562.35
T.A	13.80	75.35	6.25	95.40	13.79	75.35	6.25	95.39
HRD	1.53	0.00	5.25	6.78	1.53	0.00	5.25	6.78
Contingencies	22.30	548.20	25.75	596.25	22.25	548.20	25.75	596.20
Total	220.20	7003.33	37.25	7260.78	220.14	7003.33	37.25	7260.72
(B) Non Recurring								
Works	0.00	168.87	0.00	168.87	0.00	168.87	0.00	168.87
Furniture & Equipment	5.63	41.00	0.00	46.63	4.78	41.00	0.00	45.78
Vehicle	7.20	40.00	0.00	47.20	7.10	40.00	0.00	47.10
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
Total	12.83	249.87	0.00	262.70	11.88	249.87	0.00	261.75
(C) Special Programmes								
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
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grand Total (A+B+C)	233.03	7253.20	37.25	7523.48	232.02	7253.20	37.25	7522.47

About Krishi Vigyan Kendras

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. 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. Currently, the total number of KVKs in the country is 643.

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 Tumkur district, Karnataka under Indian Institute of Horticultural Research, Bangalore.

The Agricultural Technology Application Research Institute-Zone VIII, earlier known as Zonal Project Directorate-Zone VIII, started with establishing, monitoring and coordination of 8 KVKs during V Five Year Plan. During VI, VII, VIII, X and XI Five Year Plans, 7, 5, 20, 34 and 6 KVKs were established respectively. At present, there are 81 KVKs in the Zone under different host organizations *viz.*, ICAR, SAUs, NGOs, DUs and State Department of Agriculture and functioning in Zone VIII. The state-wise and host organization-wise distribution is presented in Table 4.

Table 4: Distribution of KVKs - State and host organization-wise

States	Host organizations					Total
	SAUs	NGOs	ICAR Research Institutes	DUs	SDA	
Karnataka	24	5	2	-	-	31
Tamil Nadu	17	11	-	2	-	30

Kerala	7	3	4	-	-	14
Goa	-	-	1	-	1	2
Puducherry	-	-	-	-	3	3
Lakshadweep	-	-	-	-	1	1
TOTAL	48	19	7	2	5	81

SAU - State Agricultural Universities, NGO - Non-Governmental Organizations, ICAR - Indian Council of Agricultural Research, DU- Deemed Universities, SDA- State Department of Agriculture

2.2 Mandate

Krishi Vigyan Kendras 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 81 KVKs of Zone VIII is 1296, out of which 974 (75.15 %) are in position. Details of state-wise and category-wise staff strength of KVKs are furnished in Table 5.

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

Category	Karnataka (31 KVKs)		Tamil Nadu (30)		Kerala (14)		Goa (2)		Puducherry (3)		Lakshadweep (1)		Total (81)	
	S	F	S	F	S	F	S	F	S	F	S	F	S	F
Programme Coordinator	31	24	30	24	14	12	2	0	3	0	1	0	81	60
Subject Matter Specialist	186	150	180	145	84	61	12	6	18	8	6	2	486	372
Programme Assistant	93	78	90	68	42	27	6	3	9	6	3	0	243	182
Administrative	62	40	60	50	28	20	4	2	6	2	2	1	162	115
Driver	62	46	60	52	28	18	4	2	6	4	2	0	162	122
Supporting	62	42	60	51	28	24	4	2	6	3	2	1	162	123
Total	496	380	480	390	224	162	32	15	48	23	16	4	1296	974
Percentage vacancy	23.39		18.75		27.68		53.13		52.08		75		24.85	

S-Sanctioned F-Filled Figures in parenthesis is number of KVKs

2.4 Infrastructure at KVKs

Out of 81 KVKs in Zone VIII, 77 KVKs have administrative building, 68 KVKs have farmers' hostel and there are staff quarters in 49 KVKs, 150 demonstration units in 52 KVKs, 20 KVKs have established rain water harvesting units, 37 KVKs

have e-connectivity, 67 KVKs have soil and water testing labs, 10 KVKs have portable carp hatchery, 4 KVKs have minimal processing units, 31 KVKs have plant health diagnostic labs. A regards to mobility, 78 KVKs have four wheeler besides 161 two wheelers (Table 6).

Table 6 : State wise details of infrastructure in KVKs

Infrastructure	Karnataka (31)	Tamil Nadu (30)	Kerala (14)	Goa (2)	Puducherry (3)	Lakshadweep (1)	Total (81)
Administrative building	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	41	70	27	08	04	0	150
Rainwater Harvesting Unit	10	03	06	01	0	0	20
E-Connectivity	11	14	10	01	01	0	37
Soil & Water Testing Lab	24	27	13	01	01	01	67
Portable Carp Hatchery	04	02	02	0	02	0	10
Minimal Processing Unit	01	01	02	0	0	0	4
Plant Health Diagnostic Lab	09	16	05	0	1	0	31
Four wheeler	31	30	13	02	02	0	78
Two Wheeler	63	60	28	02	05	03	161

Figures in parenthesis is number of KVKs

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 other 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 44 SAC meetings were conducted by 44 KVKs, during the year.

2.6 Revolving Fund

Revolving Fund is in operation at 73 KVKs of the Zone. The KVKs are utilizing revolving fund for production of technological products and the net balance as on March 31st 2015 was Rs.6.09 crores. During the reporting period, a net balance of more than Rs.20 lakhs was there with five KVKs. Another eleven KVKs had a balance in the range of Rs.10 to 20 Lakhs. Net balance in other KVKs ranged from Rs.4 to 10 Lakhs in 32 KVKs, Rs.1 to 4 lakhs in 19 KVKs and less than Rs. one lakh in six KVKs.

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 Krishi Vigyan Kendras for their location specificity involving farmers as partners through the Technology Assessment and Refinement process. On Farm Trials 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 305 technologies were assessed and 03 technologies were refined by KVKs through 1711 On Farm Trials conducted in 328 locations.



Assessment of spilt application of lime in Malappuram district of Kerala

Technology Assessment and Refinement – a brief overview

- A total of 305 technologies were assessed and 03 technologies refined by KVKs through 1711 On Farm Trials in 328 locations.
- Of this, 87.99% of technologies was under crops and 7.79% was under livestock, poultry and fishery enterprises
- Under crops, technologies were assessed mainly in Varietal Evaluation (128), Integrated Crop Management (28), Integrated Disease Management (27), Integrated Pest Management (25); followed by Integrated Nutrient Management (20)
- Crop technologies were assessed mainly in paddy, ragi, groundnut, banana, chilli, onion, tomato, bengalgram, redgram, black pepper, and ginger
- Livestock technologies assessed were categorized as Disease Management and Feed Management (07 each) and in the case of Empowerment of Rural Women, technologies were mainly assessed in Nutrition Management and in Production and Management (05 each)

3.1.1.1 Technology Assessment: KVKs assessed 268 technologies through 1397 On Farm Trials on various crops under various thematic areas such as Cropping Systems (06), Drudgery Reduction (02); Farm Machinery (08); Integrated Crop Management (28); Integrated Disease Management (27), Integrated Nutrient Management (20), Integrated Pest Management (25), Integrated Pest and Disease Management (01), Integrated Weed Management (02); Processing and Value Addition (08), Resource Conservation Technologies (12), Seed and Planting Material Production (01); Storage Techniques (01), and Varietal Evaluation (127). Details on number of trials and number of locations under each thematic area are presented in Table 7.



Assesment of suitable machine planting technique for Rice in Thiruvavur district of Tamil Nadu

Table 7: Thematic areas of technology assessment under Crops

Thematic area	Technology (no.)	Trial (no.)	Location (no.)
Cropping Systems	6	33	7
Drudgery Reduction	2	3	2
Farm Machinery	8	42	8
Integrated Crop Management	28	136	31
Integrated Disease Management	27	177	30
Integrated Nutrient Management	20	95	20
Integrated Pest Management	25	156	29
Integrated Pest and Disease Management	1	5	1
Integrated Weed Management	2	8	2
Processing and Value Addition	8	23	8
Resource Conservation Technologies	12	60	13
Seed and Planting Material Production	1	2	1
Storage Techniques	1	5	1
Varietal Evaluation	127	652	130
Total	268	1397	283

Under Crops, 111 technologies were assessed through 591 trials in Tamil Nadu followed by 85 technologies assessed through 420 trials in Karnataka, 60 technologies assessed through 320 trials in Kerala, 07 technologies assessed through 36 trials in Lakshadweep, 03 technologies assessed through 21 trials in Goa and 02 technologies assessed through 09 trials in Puducherry (Table 8).

Table 8: Crops technology assessment: State/UT-wise

State	Technology (no.)	Trial (no.)	Location (no.)
Karnataka	85	420	99
Tamil Nadu	111	591	107
Kerala	60	320	65
Goa	3	21	3
Puducherry	2	9	2
Lakshadweep	7	36	7
Total	268	1397	283

Under Livestock and Fisheries, KVKs assessed 24 technologies on five thematic areas including Disease Management (07); Evaluation of Breeds (03); Nutrition Management (07), Feed Management (03) and Production and Management (04) through 203 On Farm Trials. Details on number of trials and locations on each thematic area are presented in Table 9.

Table 9: Thematic areas of technology assessment under livestock and fishery

Thematic areas	No. of technologies	No. of trials	No. of locations
Disease Management	7	107	7
Evaluation of breeds	3	12	3
Nutrition Management	7	57	7
Feed Management	3	7	3
Production and Management	4	20	4
Total	24	203	24

From the Table 10, it could be observed that 08 technologies in livestock, poultry and fisheries sectors, were assessed through 107 trials in Tamil Nadu followed by 08 technologies assessed through in 40 trials in Kerala, 07 technologies assessed through 51 trials in Karnataka and 01 technology assessed through 05 trials in Puducherry.

Table 10: Livestock and fisheries technologies assessment: State-wise

State	Technology (no.)	Trial (no.)	Location (no.)
Karnataka	7	51	7
Tamil Nadu	8	107	8
Kerala	8	40	8
Puducherry	1	5	1
Total	24	203	24

In the case of technologies assessed for empowerment of rural women, 13 technologies were assessed under six thematic areas *viz.*, Drudgery Reduction (02), Nutrition Management (03), Production and Management (04), Processing and Value Addition, Storage Techniques and Varietal Evaluation (01 each) through 98 On Farm Trials and the details on number of trials and locations on each thematic area are presented in Table 11.

Table 11: Thematic areas of technology assessment for empowerment of rural women

Thematic areas	Technology (no.)	Trial (no.)	Location (no.)
Drudgery Reduction	2	8	2
Nutrition Management	3	40	5
Production and Management	4	20	5
Processing and Value Addition	1	0	1
Storage Techniques	1	5	1
Varietal Evaluation	2	25	4
Total	13	98	18

In the case Empowerment of Rural Women, seven technologies were assessed through 59 trials in Karnataka followed by five technologies assessed through 34 trials in Tamil Nadu and one technology assessed through five trials in Kerala (Table 12).

Table 12: Thematic areas of technology assessment for empowerment of rural women

State	Technology (no.)	Trial (no.)	Location (no.)
Karnataka	7	59	10
Tamil Nadu	5	34	7
Kerala	1	5	1
Total	13	98	18

3.1.1.2 Refinement: KVKs refined 03 technologies through 13 On Farm Trials, one each under Farm Machinery, Integrated Nutrient Management and Integrated Pest Management (Table 13).

Table 13: Thematic areas of crops technology refinement

Thematic areas	Technology (no.)	Trial (no.)	Location (no.)
Farm Machinery	1	5	1
Integrated Nutrient Management	1	5	1
Integrated Pest Management	1	3	1
Total	3	13	3

Under crops, two technologies were refined through two trials in Kerala followed by one technology refined through one trial in Tamil Nadu (Table 14).

Table 14: Crops technology refinement: State-wise

State	Technology (no.)	Trial (no.)	Location (no.)
Tamil Nadu	1	1	5
Kerala	2	2	8
Total	3	3	13

3.1.1.3 Location specificity of the technologies

Technologies identified in various thematic areas in a particular crop, based on problem prioritization, at times were assessed by more than one KVK in a State. Successful assessments emerging as common interventions were considered for up-scaling through Frontline Demonstrations

followed by large-scale demonstrations in a convergence mode. During the reporting period nine interventions were undertaken 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:

A. Varietal Evaluation

1. Assessment of chilli cultivars in Karnataka

Chilli is a major vegetable crop cultivated in about one lakh ha in Karnataka with an annual production of 1.06 lakh t with an average yield of 1060 kg/ha. KVKs Hassan, Mandya and Mysuru assessed the performance of chilli cultivars. The results indicated that KBCh-1 hybrid performed better in all the three districts as compared to other cultivars like Arka Khyathi and Priyanka in Hassan, Arka Khyathi and non-descript local cultivar in Mandya and non-descript local cultivar in Mysuru.



Chilli cv. KBCh-1 in Mandya District

In Hassan district, KBCh-1 gave 30.56 q/ha yield, and a net return of Rs.220950/ha with 3.94 BCR. The corresponding data in the case of Mandya district was 22.68 q/ha; Rs.151800/ha and 3.02 and in Mysuru it was 21.84 q/ha; Rs.141320/ha and 3.09 respectively. The increase in yield of KBCh-1 chilli hybrid was 17.61% as compared to Priyanka in Hassan; 14.55% and 35.65% over non-descript local cultivar in Mandya and Mysuru respectively.

Arka Khyathi was the second best performing variety in Hassan and Mandya, with an yield of 28.98 q/ha (8.34% higher than non-descriptive local), net return of Rs.206680/ha and BCR 3.75 in Hassan and the respective figures for Mandya was 20.65 q/ha (4.29% more than non-descriptlocal cultivar), Rs.104500/ha and 2.73.

2. Assessment of redgram cultivars in Karnataka

Redgram is cultivated in Karnataka State in an area of 8.20 lakh ha. The annual production is 6.00 lakh t and average productivity is 732 kg/ha. KVKs Raichur, Kalaburagi and Mysuru assessed the performance of improved redgram varieties during the reporting period. In Raichur district, BDN-711 and GRG-811 were assessed against the farmers choice(TS-3R). The results indicated that BDN-711 performed better with yield of 8.20 q/ha. The net return and BCR were Rs.40780/ha and 2.89 respectively. The same in the case of TS-3R variety was 7.85 q/ha (4.46% lesser than BDN-11); Rs.38120/ha and 2.77. However GRG-811 gave a yield of only 7.00 q/ha (10.83% lesser than TS-3R) and gave a net return and BCR of Rs.31660/ha and 2.46 respectively.

In Kalaburagi district, of the four varieties (BSMR-736, TS-3R, ICPH-2740, GRG-811) tested, BSMR-736 performed better with a yield and net return of 11.90 q/ha and Rs.70200/ha. However, in terms of BCR, GRG-811 did well due to better market price, though the yield of was only 11.86 q/ha, the BCR was 6.15. The percentage increase in yield of BSMR-736 and GRG-811 as compared to TS-3R was 65.28 and 64.72 respectively.

In Mysuru district, BRG-5 and BRG-2 were assessed against the farmers' choice (cv.TTB-7). BRG-2 realized better yield, net return and BCR of 5.26 q/ha; Rs.20680/ha and 2.52 as compared to TTB-7 (4.87 q/ha; Rs.13490/ha and 2.01). However in the case of BRG-5, though the yield (4.56 q/ha) was 15.35% lesser than BRG-2, due to better market price, both the net return (Rs.23050/ha) and BCR (2.71) were higher than those of BRG-2.

3. Assessment of sorghum varieties in Karnataka

Sorghum is an important millet cultivated throughout Karnataka. It is grown in an area of 11.80 lakh ha with an annual production of 13.00 lakh t and an average productivity of 1105 kg/ha. KVKs Dharwad and Gadag located in Northern Karnataka assessed the performance of sorghum varieties during 2015-16. It was observed from the results of the On Farm Trials that both in Dharwad and Gadag districts, SPV-2217 performed better than other varieties.



In Dharwad district, SPV-2217 and Phule Suchitra were assessed against the popular cv. M 35-1. The results showed that SPV-2217 gave better yield, net return and BCR viz., 20.21 q/ha; Rs.25550/ha and 2.72. The increase in yield was 18.81% over M 35-1 and 3.38% over Phule Suchitra.

In Gadag district, among the cvs. M 35-1, SPV-2217 and BJV-44, the realized yield, net return and BCR in case of SPV-2217 were 11.28 q/ha; Rs.7200/ha and 1.47. The increase in yield over M 35-1 and BJV-44 were 18.32% and 9.73% respectively.

4. Assessing the performance of bhendi cultivars in Tamil Nadu

Bhendi is an important vegetable crop of Tamil Nadu cultivated in an area of about 7760 ha with an annual production and average productivity of 52557 t and 6772 kg/ha, respectively. KVKs Thiruvallur and Dharmapuri assessed the performance of bhendi cvs. Shakthi and Kashi Kranti. Kashi Kranti



Performance of Sorghum varieties SPV-2217 in Dharwad District and BJV-44 in Gadag District of Karnataka

gave better yield, net return and BCR 110 q/ha; Rs.220140/ha and 5.00 in Thiruvallur. The increase in yield of Kashi Kranti over Shakthi was 20.88%.

In Dharmapuri district, Co(Bh)H-1 and Kashi Kranti were assessed against the popular variety (Shakthi). Co(Bh)H-1 outperformed Kashi Kranti and Shakthi with a yield, net return and BCR of 157 q/ha; Rs.136660/ha and 3.70 respectively. Yield increase in Co(Bh) H-1 was 7.24% and 16.82% over Shakthi and Kashi Kranti respectively.

5. Assessment of groundnut varieties in Tamil Nadu

Groundnut is a major oilseed crop cultivated in an area of 3.37 lakh ha with an annual production and average productivity of 9.16 lakh t and 2718 kg/ha respectively. Eight KVKs in Tamil Nadu viz., Vellore, Karur, Nagappatinam, Pudukottai, Namakkal, Salem, Dindigul and Tuticorin conducted On Farm Trials on high yielding groundnut varieties for assessing their performance under rainfed conditions. On Farm testing indicated that TG 37 A performed better in Vellore and Dindigul districts, whereas Co-7 out yielded other cvs in Karur and Pudukottai districts,; Kadri-9 gave higher yield in Nagappatinam and Salem districts and in Namakkal district ICGV-91114 and in Tuticorin district, TMV 13 performed better.

In Vellore district, the yield of TG 37 A was 16.96 q/ha (51.97% higher than TMV 7), with a net return of Rs.50570/ha (BCR 2.59). The same variety in Dindigul district gave a yield of 17.17 q/ha (12.52% higher than the non-descriptive local). The net return and BCR were Rs.63060/ha and 2.89.



OFT on Groundnut CO 7 in Karur District

Groundnut variety Co-7 yielded 27.63 q/ha (59.99% higher than TMV 7). The net return was Rs.64290/ha with a BCR of 2.57. The same in case of Pudukottai district were 21.50 q/ha (27.67% increase over TMV 7); Rs.61980/ha and 2.36.

In Nagappatinam district, cv. Ki-9 gave a yield of 18.11 q/ha (12.01% higher than TMV -7). The net return and BCR were Rs.62000/ha and 2.90. The same variety gave a yield of 16.06 q/ha (46.40 % increase over TMV- 7) in Salem district. In this case the net return was Rs.37280/ha with a BCR of 1.71.

In Namakkal district, ICGV 91114 gave a yield, net return and BCR of 17.20 q/ha (20.28% more yield than TMV-7); Rs.52900/ha and 2.41. In Tuticorin district the yield, net income and BCR of TMV 13 were 18.46 q/ha (33.96 % increase in yield over TMV-7); Rs.64900/ha and 2.42.

6. Assessing the performance of ragi varieties in Tamil Nadu

Ragi is a major millet crop cultivated in many districts of Tamil Nadu in an area of 1.19 lakh ha with an annual production of 3.62 lakh t and the

average productivity is 3042 kg/ha. KVKs Vellore, Thiruvannamalai, Villupuram, Perambalur, Nagappatinam and Pudukottai assessed high yielding ragi varieties for their performance under local conditions. The results of the On Farm Trials proved that in Vellore and Pudukottai districts, ML-365 performed better than other varieties. In the case of Vellore, ML-365 gave a yield, net return and BCR of 40.87 q/ha (125.18% higher than GPU-25); Rs.58770/ha and 2.36. The same in the case of Pudukottai were 26.22 q/ha (25.82 % increase over non-descript local cultivar); Rs.24330/ha and 2.62.



Co15 ragi variety in Thiruvannamalai District

In Thiruvannamalai district GPU-67 performed better with a yield, net return and BCR of 39.76 q/ha (29.66% more in yield than GPU-28); Rs.55070/ha and 2.94.

In the other three districts viz., Villupuram, Perambalur and Nagapptinam, Co-15 out yielded other varieties with better yield, net return and BCR. In Villupuram district, the yield, net return and BCR of Co-15 was 20.91 q/ha (64.39% higher

than non-descriptive local); Rs.24240/ha and 2.38 respectively. The same in the case of Perambalur was 15.23 q/ha (60.48 % increase over non-descriptive local); Rs.15060/ha and 1.98. In Nagappatinam district, yield from Co-15 ragi variety was 25.13 q/ha (15.86 % higher than the non-descriptive local). Further, the variety gave a net return of Rs.13070/ha and the realized BCR was 2.62

7. Assessment of ginger varieties in Kerala

Ginger is cultivated both as a pure crop and as an intercrop in perennial crop based cropping systems of Kerala. It is cultivated in an area of 4800 ha in the State with an annual of production (cured form) of 22989 t with an average productivity of 4789 kg/ha. KVKs Kollam and Ernakulam assessed the performance of high yielding ginger varieties for their suitability under local conditions with an aim to up-scale their area for realizing higher district level production and productivity.



OFT on ginger varieties in Kollam District

In Kollam district, cv.Varadha realized higher yield (18.50 q/ha; 52.89 % more yield than non

descript local cultivar), net return (Rs.260000/ha) and BCR (1.89), whereas in Ernakulam district, commonly cultivated Himachal variety gave higher yield (66q/ha; 34.85 % higher yield than Varadha), net return (Rs.395000/ha) and BCR (1.40).

B. Integrated Pest Management

8. Assessment of Integrated Pest Management Module for paddy in Tamil Nadu

Paddy is cultivated extensively in most of the districts of Tamil Nadu. It is grown in an area of 17.90 lakh ha with an annual production of 55.40 lakh tand the average productivity of the crop is 3100 kg/ha. Paddy is infested with varied types of pests like brown plant hopper, green leaf Hopper, stem borer, leaf folder, swarming caterpillar, ear head bug, thrips, gall midge etc. Integrated pest management (IPM) practices have been evolved by National Agricultural Research Systems to manage these pests.

The main principle of IPM is to create suitable conditions in the paddy cultivation ecology to enable growth of natural enemies of these pests. The techniques involved include growing of crops like blackgram, greengram, mustard, sesame, sunflower etc on the bunds. KVKs Dharmapuri, Nagappatinam and Tuticorin have assessed this technology in paddy during the year under report.

The results indicated that in Dharmapuri and Tuticorin district, raising a combination of crops like Daincha sp (50 g) sunflower (100 g), sesame (100 g), cowpea (100 g), marigold (20 g) greengram

(100 g) and blackgram (100 g) on the bunds as a component of IPM gave higher yield, net return and BCR. In Dharmapuri district, the realized paddy yield was 45.20 q/ha (19.58 % increase over the farmer's general practice of spraying of insecticides based on their own experiences) and the realized net return and BCR was Rs.44240/ha and 1.80. Under Ecological Engineering, no sprays were given to the crop, thereby saving about Rs. 10000/ha in cost of cultivation. The yield; net return and BCR in the case of Tuticorin district was 65.60 q/ha (24.01 % higher than spraying of insecticides based on farmer's own experiences); Rs.37660/ha and 1.90 respectively Under ecological engineering the number of sprays has been reduced to one as compared to three sprays under farmer's practice, thereby reducing the cost of cultivation by Rs. 3000/ha. .

In Nagapptinam district, three times application of *T. japonicum* @ 100000 (5 cc) / ha and *T. chilonis* @ 1,00,000 (5 cc) /ha at weekly interval along with setting up of Pheromone traps @ 12/ha realized higher yield, net return and BCR of 46.15 q/ha (35.30 % more yield than spraying of insecticides based on farmer's own experiences); Rs.26240/ha and 1.70. Under ecological engineering the crop was devoid of any spray, which reflected in reduction in cost of cultivation of Rs.8000/ha.

C. Integrated Disease Management

9. Management of Late Blight in Potato

Potato is an important tuber crop cultivated, in an area of about 44000 ha in Karnataka. The State's annual production is 6.98 lakh t with an

average yield of 15727 kg/ha. In South Eastern parts of Karnataka, potato is widely cultivated in Chikkaballapura, Bengaluru Rural, and Kolar districts. The crop is prone to late blight disease resulting in yield loss upto 25%. In order to reduce this loss, KVKs Chikkaballapura and Kolar have undertaken technology assessment for management of late blight of potato during the year.

Soil application of *Trichoderma* and *Pseudomonas*, Prophylatic–Mancozeb (0.2%), Fenamidone+Mancozeb (0.2%), Dimethomorph (0.1%)+ Mancozeb (0.2%) was proved to be successful for management of late blight in potato in Chickkaballapura district. The yield realized was 246.60 q/ ha (41.89 % higher than the farmers practice of spraying Mancozeb (0.2%), CoC



Enrichment of FYM in Chickkaballapura District as part of OFT on management of late blight in potato

(0.3%), Cymoxanil+ Mancozeb (0.1%), metalaxyl + Mancozeb (0.1%), Chlorothalonil(0.2%), Dimethomorph (0.1%)+ Captan (0.2%), CoH, Propineb). The net profit and BCR were Rs.163900 /ha and 2.53 respectively.

In Kolar district, soil application of *Trichoderma* and *Pseudomonas* (FYM) with a prophylactic spray of Mancozeb (0.2%) gave better yield 194.30 q/ha ((19.94 more yield than spraying Mancozeb (0.2%), Dimethomorph (0.1%) + Mancozeb (0.2%), CoC(0.3%), Fenamidone + Mancozeb Metalaxyl + Mancozeb (0.2%), Cymoxanil + Mancozeb (0.3%)). The realized net return was Rs.85450/ha and BCR was 1.51.

3.1.2 Frontline Demonstrations

Frontline demonstrations (FLDs) on crops and allied agriculture activities were taken up to demonstrate the production potential of newly released crop varieties, resource conservation technologies, crop production and protection technologies, improved technologies in livestock and fisheries and other allied activities. During the year, 12014 frontline demonstrations were conducted (Table 15) including 1822 on cereals and millets, 406 on oilseeds, 1096 on pulses, 191 on commercial crops, 259 on fodder crops, 5 on green manure crops, 936 on vegetable crops, 67 on tuber crops, 286 on fruit crops, 167 on flowers, 35 on medicinal and aromatic crops, 398 on spice crops and 142 on plantation crops, besides, 1680 cluster demonstrations on pulses and 1584 on oilseeds were conducted as sponsored programmes of Department of Agriculture Cooperation and Farmers welfare under NFSM and NMOOP in selected districts of Karnataka and Tamil Nadu. KVKs also conducted 896 demonstrations on hybrids of various crops, 268 on farm implements, 1011 on livestock and fisheries and 810 on enterprises in the states of Karnataka, Tamil Nadu, Kerala, Goa and

Puducherry. Apart from this, 1127 demonstrations on crops and 351 demonstrations on livestock were at different stages of implementation at the time compilation of results in the KVKs of Karnataka, Tamil Nadu, Kerala, Goa and Puducherry. During

the year, 137 demonstrations on crops covering an area of 40.8 ha were vitiated due to drought mostly in the districts of Northern Karnataka and floods in coastal districts of Tamil Nadu during NE monsoon.

Table15: Details of Frontline demonstrations conducted during 2015-16

Crop Category	No. of Demonstrations	Area (ha)
Cereals and millets	1822	715.5
Oilseeds	406	146.6
Pulses	1096	427.8
Commercial crops	191	250.9
Fodder Crops	259	71.11
Vegetable crops	936	243.61
Tuber crops	67	19.66
Fruit crops	286	95
Flower crops	167	55.5
Plantation crops	142	41.6
Spices and condiments	353	71.5
Medicinal and aromatic crops	35	6.4
Green manure crops	5	2
Cluster pulses program	1680	672
Cluster oilseeds program	1584	693
Hybrids of various crops	896	305.04
Farm implements	268	105.4
Livestock, fisheries, sheep & goat, piggery	1011	Animals-1822, Birds-1819, Fishery-43 units
Other enterprises	810	
Grand total	12014	3922.62
Demonstrations under progress in crops	1127	
Demonstrations under progress in livestock	351	-
Demonstrations vitiated	137	40.8
Grand Total	1615	

3.1.2.1 Cereals and millets: A total of 1822 demonstrations were conducted in various cereals and millets covering an area of 715.5 ha during the year by the KVKs of Zone-VIII. The state wise break up includes 905 KVKs in Karnataka, 767 in Tamil Nadu, 110 in Kerala, 10 in Goa and 30 in Puducherry. The state wise and KVK wise results are as under:

Karnataka: A total of 305 in paddy, 39 in maize, 75 in wheat, 182 in sorghum, 142 in finger millet, 122 in foxtail millet and 50 demonstrations in little millet crops were conducted covering an area of 348.8 ha in the farmers' fields during the year (Table 16). In paddy, technologies such as IPDM, INM and ICM gave higher increase in grain yield over respective local check. BCR of what, was higher with pest management (3.33), planting

methods (3.08) and INM (2.54). The highest yield of 65.68 q/ha was recorded with IPM and lowest was 38 q/ha under weed management technology. The ICM technology in maize gave higher increase in yield followed by intercropping systems and organic farming as compared to farmers practice. In wheat, an average of 26.65 q/ha grain yield was recorded under demonstrations as compared to 23.35q/ha in the local check. The durum wheat variety gave highest yield of 28.74 q/ha as compared to 22.98 q/ha in the farmers' variety. In sorghum, ICM and drought management technologies gave higher increase in yield by 26.62% and 26.11% over their local check. The value addition technology, although gave 18.46% less yield as compared to check, the BCR was marginally better with 3.6 as compared to 3.43 in local check. The productivity



Paddy BPH management at Koppal district

of rabi sorghum was higher with 17.14 q/ha as compared to 12.27 q/ha in kharif sorghum under technology demonstrations. The technologies like drought tolerant varieties and drought management practices gave 22 to 27% higher yields in finger millet as compared to their local check. In minor millets, foxtail and little millets performed better under technology demonstrations with 14.15% and 23.15% increase in yield respectively over their local check.

Tamil Nadu: Out of a total 767 demonstrations in the state, 516 in paddy, 65 in sorghum, 15 in pearl millet, 87 in finger millet, 26 in barnyard millet, 12 in foxtail millet, 18 in kodo millet and 28 in little millet were implemented covering an area of 321.2 ha in farmers' fields (Table 17).

In paddy technology demonstrations gave an average yield of 56.17 q/ha as compared to 46.81 q/ha in the farmers practice. Among the technologies demonstrated, methods of planting, water management, IPDM and IPM gave higher increase in yield as compared to their local check.



Rabi Sorghum var. SPV-2217 at Dharwad district

In sorghum, IDM gave highest increase in yield followed by IPDM and variety. Pearl millet variety demonstration gave 15.58 q/ha as compared to local check (11.70 q/ha). In finger millet, variety demonstration gave 59.31% increase in yield over local check. The crop diversification towards barnyard millet from groundnut has resulted in negative yield and economics. The other minor millets like foxtail millet, kodo millet and little millet performed better under technology demonstration as compared to farmers practice with better economic returns.



Ecological engineering in paddy at Dharmapuri district

Table16: Frontline demonstrations conducted by KVVKs of Karnataka on cereals and millet crops

Crop	Thematic area	No of KVVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check		
					Demo	Check		Net Return	BCR	Net Return	BCR	
Paddy	ICM	11	152	50.4	52.19	45.04	18.42	48313	2.11	35924	1.79	
	INM	1	5	2	61.50	51.80	18.73	55900	2.54	44500	2.34	
	Fertilizer use efficiency	1	10	4	46.50	40.75	14.11	37400	2.01	29010	1.80	
	IPDM	4	41	14.4	61.18	51.57	20.39	49295	2.04	34343	1.71	
	IPM	2	20	8	65.68	56.71	15.80	64976	2.34	48415	1.97	
	Mechanization	1	15	6	57.98	54.20	6.97	56075	2.24	44550	1.89	
	Pest management	1	20	4	48.25	44.20	9.16	45875	3.08	43810	3.04	
	Planting methods	2	20	8	64.62	60.09	7.54	85019	3.33	66015	2.41	
	Variety evaluation	1	3	0.6	40.00	33.00	21.21	17841	1.44	9583	1.25	
	Water saving technology	1	10	4	58.33	54.47	7.09	30391	1.73	26479	1.64	
	Weed management	1	9	4	38.00	36.50	4.11	27900	2.30	22350	1.89	
		Paddy		305	105.4	54.02	48.03	13.05	47180	2.29	36816	1.98
	Wheat	ICM	1	3	1.2	32.49	26.87	20.92	32883	2.59	16584	1.62
		Crop introduction	1	5	2	22.00	18.62	18.15	68360	4.13	53422	3.33
IDM		1	7	2	24.00	19.80	21.21	24986	2.08	17043	1.75	
Variety evaluation		1	12	5	28.10	28.10	0.00	58956	3.67	48776	3.27	
	Wheat		27	10.2	26.65	23.35	15.07	46296	3.12	33956	2.49	
Maize	ICM	2	14	5.2	65.50	53.19	21.37	61950	3.17	46882	2.72	
	Intercropping systems	1	10	4	64.29	54.00	19.06	46229	2.09	34565	1.86	
	Organic farming	1	15	6	40.99	35.50	15.46	24565	2.00	16567	1.64	
	Maize		39	15.2	56.93	47.56	18.63	44248	2.42	32671	2.07	

Durum Wheat	Variety evaluation	3	48	19.2	28.74	22.98	24.65	42815	2.93	31143	2.61
Sorghum	ICM	3	32	13	14.50	11.58	26.62	17073	2.09	12258	1.84
	Drought management	1	10	4	7.97	6.32	26.11	9245	1.80	3800	1.30
	In situ moisture conservation	1	15	6	13.68	12.71	7.63	26313	3.19	22326	2.86
	Value addition	2	30	12	7.97	9.76	-18.46	23682	3.60	22132	3.43
	Variety evaluation	2	35	14	17.24	15.11	14.02	28683	3.14	21711	2.58
	Sorghum		122	49.00	12.27	11.10	11.18	20999	2.76	16445	2.40
Sorghum (Rabi)	ICM	1	20	8	13.00	10.25	26.83	26500	3.12	20350	2.96
	Crop introduction	2	40	16	21.28	18.34	15.51	23013	2.60	18288	2.31
	Sorghum (Rabi)		60	24.00	17.14	14.30	21.17	24756.50	2.86	19319.00	2.64
Finger millet	ICM	5	75	30	20.73	17.00	21.95	22724	2.11	13761	1.69
	Intercropping systems	1	10	5	16.50	18.50	-10.81	23900	2.87	15600	1.59
	Drought management	2	40	17	24.53	19.89	22.04	22325	1.97	15778	1.74
	Drought tolerant variety	2	17	7	28.75	22.70	27.16	36082	2.74	23693	2.22
	Finger millet		142	59	22.63	19.52	15.08	26257	2.42	17208	1.81
Foxtail millet	ICM	4	50	22	8.70	6.87	24.76	13111	2.71	8981	2.31
	Crop diversification	1	10	4	16.30	13.26	22.93	23680	3.24	16630	2.37
	Seed production	1	10	4	14.42	19.10	-24.50	18089	2.80	38510	5.17
	Variety evaluation	2	42	16.8	8.38	6.05	33.39	14397	3.86	9618	2.92
	Foxtail millet	112	46.80	11.95	11.32	14.15	17319	3.15	18435	3.19	
Little millet	ICM	2	20	8	11.12	6.13	16.16	17167	2.40	11118	2.41
	Crop diversification	2	30	12	8.25	6.28	30.15	6115	2.53	2480	1.92
	Little millet		50	20	9.68	6.20	23.15	11641	2.46	6799	2.16
			905	348.8							

Table 17: Frontline demonstrations on cereals and millets conducted in the state of TamilNadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Paddy	ICM	4	55	22	66.15	51.45	28.03	51283	2.25	31584	1.80
	Variety introduction	2	20	8	46.24	40.94	14.21	21321	1.56	10016	1.27
	Crop diversification	2	20	9	61.79	51.91	19.15	44362	1.76	26209	1.57
	Nutrient management	2	20	9.5	43.61	41.75	4.36	30046	2.06	20352	1.62
	Disease management	2	20	8	54.37	46.28	17.12	43888	2.00	26470	1.54
	Disease tolerant variety	1	20	8	47.05	39.95	17.77	43106	2.34	33329	1.96
	Drought management	1	10	4	44.47	37.95	17.18	17920	1.51	10090	1.28
	Eco-friendly pest management	1	10	4	45.30	41.85	8.24	34835	2.45	26258	1.93
	High yielding variety	2	30	12	65.57	53.88	21.63	43667	1.93	26182	1.54
	IDM	1	10	4	54.60	49.48	10.35	65700	2.51	48980	1.98
	IPDM	3	28	12	50.48	40.65	28.25	46163	2.47	29232	1.88
	IPM	3	30	10.5	60.19	48.74	26.49	45498	2.07	27592	1.61
	Methods of planting	2	10	4	62.15	43.23	43.77	69678	3.34	43548	2.70
	Problematic soils	2	8	4	56.20	47.79	17.60	22900	1.69	11665	1.32
	Seed farmer	2	15	6	67.50	60.40	11.75	69474	2.82	38993	1.79
	Seed production	7	95	42	56.71	46.39	22.28	52437	2.38	31894	1.87
	Variety demonstration	3	40	16	59.41	50.48	17.59	44390	2.04	26268	1.63
	Variety evaluation	3	40	16	59.19	48.49	21.93	48707	2.47	30131	1.81

Water management	1	25	10	67.50	47.80	41.21	59780	2.64	35175	1.93
Weed management	1	10	4	54.90	46.70	17.56	32146	1.80	10337	1.20
	Paddy	516	213	56.17	46.81	20.32	44365	2.20	27215	1.71
Sorghum	IDM	10	4	28.44	19.67	44.59	38782	2.54	20279	1.86
	IPDM	10	4	23.80	19.50	22.05	14745	1.65	10228	1.51
	Variety demonstration	45	18	16.35	13.75	18.94	41054	2.52	33320	2.28
	Sorghum	65	26	22.86	17.64	28.53	31527	2.24	21276	1.88
Pearl millet	Variety demonstration	15	6	15.58	11.70	33.22	21994	2.62	25854	1.96
Finger millet	ICM	40	16	24.30	20.70	17.70	21404	2.29	15570	1.96
	Variety introduction	10	4	16.20	15.00	8.00	18200	2.28	15200	2.09
	Variety demonstration	37	15	33.11	19.34	59.31	38368	3.18	21431	2.45
	Finger millet	87	35	24.54	18.35	28.34	25991	2.58	17400	2.17
Barnyard millet	Crop diversification in groundnut area	10	4	7.66	25.80	-70.31	3375	1.12	155000	3.53
	Value addition	4	2	11.87	12.50	-5.04	44200	4.45	27500	3.20
	Variety demonstration	12	12	20.28	17.55	15.56	24216	2.69	17845	2.15
	Barnyard millet	26	18	13.27	18.62	-19.93	23930	2.75	66782	2.96
Foxtail millet	Variety demonstration	12	5	13.16	8.42	56.29	20622	2.09	9985	1.65
Kodo millet	Crop diversification	18	7.2	14.39	10.74	33.89	16859	2.08	9675	1.70
Little millet	Crop diversification	28	11	13.28	8.23	58.38	29763	3.01	13203	1.95
		767	321.2							

Kerala: A total of 94 demonstrations in paddy and 16 demonstrations in finger millet were conducted covering an area of 28.8 ha in the farmers' fields during the year (Table 18). The technologies such as Micronutrient management, resource conservation technologies, ICM and bio-fertilizers in paddy gave over 20 % increase in

yield as compared to farmers' practice. The BCR was higher in all the technology demonstrations as compared to farmers' practice. In finger millet variety demonstration resulted an increase of 35.82% (18.2 q/ha) grain yield as compared to local check (13.4 q/ha).

Table 18: Frontline demonstrations on cereals and millets conducted in the state of Kerala

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Paddy	ICM	1	5	1	44.00	33.00	33.33	38750	1.67	22950	1.48
	Nutrient management	1	10	2	62.50	56.70	10.23	56580	1.73	41770	1.52
	Biofertilizers	1	10	0.8	48.00	40.00	20.00	-37000	0.61	-11000	0.86
	Disease management	1	18	10	74.30	68.24	9.20	112440	3.31	96769	3.07
	Mechanization	1	11	2	49.37	42.87	15.16	30924	1.46	-7520	0.92
	Micro nutrient management	1	5	1	54.80	40.20	36.32	38035	1.51	12195	1.17
	Problematic soils	1	10	4	48.00	40.00	20.00	-47000	0.51	-30000	0.63
	Weed management	2	20	4	44.35	39.85	15.47	26445	1.35	16441	1.20
	Resource conservation technologies	1	5	2	50.25	37.50	34.00	42553	1.65	15625	1.24
Paddy			94	26.8	52.84	44.26	21.52	29081	1.53	17470	1.34
Finger millet	High yielding variety	1	16	2	18.20	13.40	35.82	14191	2.86	7672	1.92
			110	28.8							

Goa: Technologies such as variety and management of problematic soils were demonstrated in 10 farmers field covering an area

of 2.7 ha in paddy during the year (Table 19). The increase in yield was 104% due to technology demonstration as compared to farmers' practice.

Table 19: Frontline Demonstrations conducted by KVKs of Goa on cereals

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Paddy	Problematic soils	1	5	2.5	25.00	18.00	38.89	5000	1.33	4000	1.40
	Variety	1	5	2	54.00	20.00	170.00				
Paddy			10	2.7	39.5	19	104.445	5000	1.33	4000	1.4

Puducherry: A total of 30 demonstrations on paddy varieties, seed production and micro nutrient management covering an area of 14 ha have recorded 16.57 % increase in yield as compared to farmers practice during the year (Table 20). The BCR was higher in all the technologies as against farmers' practice.

Table 20: Frontline demonstrations on cereals conducted in the state of Puducherry

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Paddy	Micro nutrient management	1	10	5	43.87	36.75	19.37	36778	2.00	49638	2.23
	Seed production	1	10	4	53.00	48.80	8.61	7763	1.16	17304	1.38
	Variety demonstration	1	10	5	56.60	46.50	21.72	38297	2.12	32275	1.91
Paddy			30	14	51.16	44.02	16.57	27613	1.76	33072	1.84

3.1.2.2 Oilseeds: During the year 406 demonstrations were conducted by KVKs of Karnataka, Tamil Nadu and Goa states under Zone-VIII covering groundnut, safflower, sesame, linseed and soybean in an area of 146.6 ha in farmers' fields. The state wise and KVK wise results are as under:

Karnataka: During the year, a total demonstrations of 52 in groundnut, 34 in sesamum, 29 in soybean, 25 in safflower, 10 in niger and 5 in

sunflower were conducted by KVKs of Karnataka under oilseeds in an area of 59.6 ha in farmers' fields (Table 21). The groundnut crop performed better under technology demonstrations such as ICM and variety introduction with better BCR as compared to farmers practice. In safflower, pest management technology gave better yield followed by ICM. Variety demonstration in sesamum has resulted in negative yield growth as compared to farmers practice, but the economic return was better due to

better market price. The other technologies like ICM and IPM gave better yield and economic returns as compared to their local check. In soybean, demonstration on ICM and DSb-21 variety introduction have outperformed local farmers practice with over 24 % increase in yield and better BCR. The sunflower demonstrations with disease management gave 15.83 q/ha yield as compared to 10.38 q/ha in farmers' practice.



Bee pollination in sunflower at Koppal district

Table 21: Frontline demonstration on oilseeds conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Groundnut	Variety evaluation	3	19	9	16.50	14.37	15.78	140002	2.90	115276	2.54
	ICM	5	33	11.2	13.11	10.34	34.58	26308	1.68	16428	1.66
Total Groundnut			52	20.2	14.78	11.69	28.32	64206	2.08	49377	1.96
Niger	Variety evaluation	1	10	2	3.60	3.10	16.13	6305	3.34	5055	2.88
Safflower	ICM	1	10	4	5.41	4.40	22.95	-3090	0.83	-4795	0.72
	Pest management	1	15	6	7.88	6.09	29.39	4202	1.24	1002	1.06
Total Safflower			25	10	6.645	5.245	26.17	556	1.03	-1896	0.89
Sesamum	ICM	3	19	7.7	7.71	5.67	46.45	20487	2.50	15293	7.18
	Variety introduction	1	10	4	4.23	4.30	-1.63	30930	2.56	16100	1.88
	IPM	1	5	2	3.13	2.15	45.58	11350	3.67	7000	2.87
Total Sesamum			34	13.7	5.02	4.04	30.13	20922	2.91	12797	3.98
Soybean	Variety evaluation	1	5	2	16.06	14.05	14.31	31416	2.19	25916	2.05
	ICM	4	24	9.7	15.83	12.11	28.84	33555	2.92	14164	1.93
Total Soybean			29	11.7	15.91	12.76	24.00	32842	2.68	18082	1.97
Sunflower	Disease management	1	5	2	15.83	10.38	52.50	49354	5.57	28680	3.67
			155	59.6							

Tamil Nadu: A total demonstrations of 149 in groundnut, 85 in sesame and 12 in sunflower were organized by KVKs of Tamil Nadu covering an area of 87 ha during the year (Table 22). The groundnut yield increased under demonstrations by 24.09 % as compared to farmers practice due to various technologies like ICM, variety, mechanization, drought tolerant variety, planting methods etc. The

BCR under demonstrations was 2.42 as compared to only 1.88 under farmers practice. In sesame, technologies like ICM, variety, pest management and IPM gave an increase of 23.02 % in yield over farmers practice. The sunflower crop management demonstration recorded 17.89 q/ha as compared to 13.96 q/ha in local check.

Table 22: Frontline demonstrations on oilseeds conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Groundnut	ICM	4	34	8.4	14.51	11.85	23.01	41802	2.17	18163	1.60
	Drought tolerant variety	1	10	2	31.09	22.93	35.59	116564	2.66	77065	2.27
	Mechanization	3	33	11	26.43	21.80	20.61	90302	2.44	60598	1.96
	Micro nutrient management	1	25	10	29.88	28.00	6.71	90674	2.54	82141	2.42
	Planting methods	1	10	4	25.48	19.72	29.21	46697	1.83	23482	1.42
	Seed production	2	16	4.4	28.21	20.79	35.52	74516	2.74	38663	1.96
	Variety demonstration	2	16	6.4	27.68	15.55	67.67	60519	2.54	20125	1.58
	Variety evaluation	1	5	1	19.00	15.00	26.67	61000	2.65	39000	2.15
	Intercropping systems	1	5	2	24.68	18.91	30.51	93550	2.72	61500	2.18
	Total Groundnut			149	51.2	24.09	18.61	29.78	69320	2.42	41933
Sesame	ICM	2	22	6.4	6.29	4.62	35.57	18028	2.18	-2789	0.79
	IPM	1	10	4	3.85	3.48	10.63	4942	1.38	2285	1.16
	Pest management	1	20	8	9.75	8.02	21.57	41750	2.58	30725	2.21
	Variety demonstration	2	33	13	8.99	7.25	24.30	52530	2.86	35630	2.23
Total Sesame			85	31.4	7.22	5.84	23.02	29313	2.25	16463	1.60
Sunflower	Crop management	1	12	2.4	17.89	13.96	28.15	31076	2.21	19231	1.73
			251	87							

3.1.2.3 Pulses: A total of 1096 demonstrations were undertaken on major pulses in 427.8 ha area of farmers' fields by the KVKs of Zone-VIII during the year. The state wise and KVK wise results are presented as under:

Karnataka: A total demonstrations of 123 in blackgram, 170 in greengram, 189 in pigeonpea and 245 in chickpea were organized by KVKs of Karnataka covering an area of 74 ha (Table 23).

Technology demonstration in blackgram gave higher yield of 11.58 q/ha as compared to local check

(7.96 q/ha). The INM technology has outperformed other technologies in blackgram with 22.95 q/ha. In greengram, ICM and variety demonstrations gave an increase of 27.89% over farmers' practice. In pigeonpea, overall yield increase due to technology demonstration was 24.04% over local check. The technology like variety, IPDM, transplanting technique and ICM gave superior yield over other technologies in pigeonpea. In chickpea, ICM and INM technologies gave an increase of more than 15% yield advantage over their local check.



IPM for the management of Pod borer in Chickpea at Chamarajnar district

Table 23: Frontline demonstrations on pulses conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Black gram	ICM	6	107	43	6.78	5.62	21.72	25367	3.72	18518	3.18
	Variety introduction	1	10	2	5.00	4.24	17.92	10192	1.51	6690	1.36

	INM	1	6	2.4	22.95	14.01	63.81	10491	3.10	5598	2.49
	Black gram Total		123	47.4	11.58	7.96	34.48	15350	2.78	10269	2.34
Chick pea	ICM	14	217	87	9.01	7.22	25.53	23245	2.62	15981	2.13
	INM	1	28	12.8	8.40	7.91	6.19	16635	1.88	14749	1.80
	Chick pea Total		245	99.8	8.71	7.57	15.86	19940	2.25	15365	1.97
Green gram	ICM	10	140	55.5	7.35	5.89	25.10	25390	2.99	18546	2.61
	Variety introduction	2	30	12.8	7.75	5.55	29.28	36500	3.55	22480	2.81
	Greengram total		170	68.3	7.62	5.66	27.89	32796	3.37	21169	2.75
Pigeon pea	ICM	7	87	35	10.22	7.51	34.40	52365	3.41	34087	2.72
	Variety introduction	1	25	10	11.68	8.18	42.79	70089	2.50	40886	2.00
	Disease tolerant variety	1	12	5	17.50	13.80	26.81	70400	3.03	52100	2.70
	IPDM	2	30	12	18.05	14.07	42.52	25171	1.92	13137	1.63
	Post harvest technology	1	10	2	9.40	25.20	-62.70	53031	2.45	39540	2.28
	IPM	1	15	6	7.51	6.49	15.72	56565	4.33	45735	3.56
	Transplanting technique	1	10	4	17.29	10.92	58.33	98430	5.36	51940	3.12
	Pigeonpea Total		189	74	12.73	11.71	24.04	59802	3.30	38939	2.59
			727	289.5							

Tamil Nadu: A total demonstrations of 156 in blackgram, 118 in greengram, 20 in chickpea, 10 each in cowpea and field bean, 30 in horse gram, 15 in pigeonpea and 10 in moth bean were undertaken in 138.3 ha area of farmers' field by the KVKs of Tamil Nadu during the year (Table 24).

In blackgram, technologies like disease tolerant varieties, mechanization, pest management and crop management gave an increase of 29.21 % in yield over local check. The average yield under technology was 9.36 q/ha as compared to 7.43 q/

ha under farmers practice. In greengram variety demonstration and ICM technologies registered over 20% increase in yield over local check. The average yield under technology demonstrated was 8.42 q/ha as compared to only 6.69 q/ha under farmers practice. The technologies such as disease management and IPM in pigeonpea gave 28.99% increase in yield over farmers practice (6.94 q/ha). In chickpea, ICM and variety demonstration gave 22.38% increase in yield over local check yield of 8.02 q/ha. The crops like cowpea, field bean and

moth bean also recorded over 20% increase in yield under demonstrations as compared to farmers practice. The horsegram performed superior under

demonstration with more than 47% increase in yield over check.

Table 24: Frontline demonstrations on pulses conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Black gram	Disease tolerant variety	5	60	24	8.80	6.75	33.40	44264	3.09	24317	2.00
	High yielding variety	1	20	4	10.53	8.42	25.06	39457	2.67	27000	2.17
	Mechanization	3	30	8.4	7.65	5.50	43.70	55876	4.08	34751	3.26
	Pest management	1	15	6	11.87	10.67	11.25	70975	2.98	55500	2.37
	Variety demonstration	2	20	8	9.20	6.90	33.99	51735	2.94	34125	2.36
	Crop management	1	11	4.4	8.67	7.02	23.50	48782	3.27	35812	2.70
	Blackgram total			156	54.8	9.36	7.43	29.21	50765	3.16	33689
Chick pea	ICM	1	10	4	11.45	9.78	17.08	25235	1.55	10773	1.22
	Variety demonstration	1	10	4	7.98	6.25	27.68	19647	1.90	6598	1.32
	Chickpea total		20	8	9.72	8.02	22.38	22441	1.73	8686	1.27
Cowpea	Variety demonstration	1	10	4	8.38	6.77	23.78	21114	2.22	11512	1.68
Field bean	ICM	1	10	4	28.30	22.80	24.12	33678	2.05	23653	1.81
Green gram	IPM	1	10	2.5	10.40	8.76	18.72	52940	3.11	37780	2.35
	Seed production	1	25	10	8.60	7.40	16.22	27800	2.17	21400	1.93
	Variety demonstration	7	73	29	8.11	5.78	43.81	27786	2.72	15999	1.99
	ICM	1	10	4	6.89	5.74	20.03	24244	2.21	16581	1.82
	Greengram total		118	45.5	8.42	6.69	28.52	32111	2.59	21552	2.02
Pigeon pea	Disease management	1	10	4	6.81	5.34	27.53	24655	2.14	15773	1.77
	IPM	1	5	2	12.55	8.54	30.44	42709	2.96	30623	2.34
	Pigeonpea total		15	6	9.68	6.94	28.99	33682	2.55	23198	2.06

Horse gram	ICM	1	10	4	8.92	7.47	19.41	11212	2.01	6512	1.61
	High yielding variety	2	20	8	22.93	10.82	75.07	15204	2.53	6753	1.77
Horsegram total			30	12	15.93	9.15	47.24	13208	2.27	6633	1.69
Moth bean	ICM	1	10	4	4.73	3.19	48.28	13413	1.89	6527	1.52
			369	138.3							

3.1.2.4 Commercial crops: A total of 191 demonstrations were organized on major commercial crops including fibre crops covering an area of 250.9 ha during the year by the KVKs of Karnataka, Tamil Nadu and Puducherry under Zone-VIII. The state wise and KVK wise results are presented as under:

Karnataka: A total of 77 demonstrations were conducted by KVKs in commercial crops

like cotton, chilli (dry), coriander, mulberry and sugarcane in about 22.5 ha area in Karnataka state (Table 25).

In cotton, intercropping has resulted in higher yield of 18.20 q/ha as compared to 17.10 q/ha seed cotton yield under farmers practice. The ICM in chilli gave an increased yield of 22.36 q/ha dry chilli as compared to check with 18.22 q/ha. In



Integrated Crop Management in Cotton at Chamarajanagar district

coriander, cultivation of improved variety gave 99.20 q/ha fresh coriander leaf yield as compared to 63.3 q/ha in farmers practice. The results revealed that mulberry leaf yield increased by 18.68 % due to ICM and INM technology demonstrations as compared to local check. The technologies like ICM

and weed management in sugarcane gave 36.57% increased cane yield over check. The BCR was highest in coriander (3.93) followed by sugarcane with ICM technology (3.79) as compared to other crops and technologies in commercial crops.

Table 25: Frontline demonstrations on commercial crops conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check		
					Demo	Check		Net Return	BCR	Net Return	BCR	
Cotton	Intercropping systems	1	13	4	18.20	17.10	6.43	44986	2.29	42213	2.21	
Chilli (dry)	ICM	3	20	6	22.36	18.22	16.89	203429	3.36	153951	2.81	
Coriander	Variety introduction	1	7	0.7	99.20	63.30	56.71	33269	3.93	19146	3.05	
Mulberry	ICM	1	10	4	119.40	108.03	10.52	33839	2.31	28515	2.12	
	INM	1	10	1	52.00	41.00	26.83	26045	2.34	13550	1.79	
Mulberry total				20.00	5.00	85.70	74.52	18.68	29942	2.33	21032	1.96
Sugar cane	ICM	3	12	4.8	1365.00	1028.80	40.34	193265	3.79	118930	2.39	
	Weed management	1	5	2	1320.00	994.00	32.80	145390	2.23	87140	1.78	
Sugarcane total				17	6.8	1342.5	1011.4	36.57	169327	3.01	103035	2.08
				77	22.5							

Tamil Nadu: A total of 100 demonstrations were conducted by KVKs of Tamil Nadu in cotton, sugarcane, chilli (dry), coriander and mulberry covering an area of 31.4 ha during the year (Table 26).

The results revealed that the seed cotton yield under demonstrations was 16.77 q/ha as compared to 13.11 q/ha under farmers practice. Among the technologies demonstrated disease management, planting methods and pest management gave over

15% increase in seed cotton yield over their local check. The IPDM technology in chilli gave 23.06 q/ha dry chilli, which is 12.49% higher than the farmers practice (20.5 q/ha). In coriander, crop management and variety demonstrations gave over 80% increase in fresh coriander leaf yield (72.6 q/ha) above check (41.25 q/ha). Similarly, crop management technology in mulberry and biofertilizers in sugarcane gave 7.84% and 23.92% increased yield respectively.

Table 26: Frontline demonstrations on commercial crops conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Cotton	Crop management	1	10	4	17.00	14.30	18.88	37162	2.15	29692	2.02
	Disease management	1	10	4	24.11	19.76	22.01	79923	2.45	53603	1.94
	IPM	1	10	4	15.17	10.67	42.17	38584	2.49	19288	1.76
	Mechanization	1	5	0.4	4.90	2.20	122.73	50157	2.31	28039	1.54
	Pest management	1	10	4	18.48	16.06	15.07	25278	1.53	17975	1.39
	Planting methods	1	10	4	20.93	15.67	33.57	43408	2.02	21282	1.50
	Cotton total			55	20.4	16.77	13.11	42.41	45752	2.16	28313
Chilli	IPDM	1	5	2	23.06	20.50	12.49	225095	3.75	176550	3.09
Coriander	ICM	1	10	1	79.23	41.56	90.64	80136	2.87	44111	2.35
	Variety demonstration	1	10	2	73.17	40.94	78.72	70989	2.83	31410	2.05
Coriander total			20	3	76.2	41.25	84.68	75563	2.85	37761	2.2
Mulberry	Crop management	1	10	4	91.85	85.17	7.84	10196	1.41	7430	1.31
Sugarcane	Biofertilizers	1	10	2	93.25	75.25	23.92	6269	1.76	2845	1.32
			100	31.4							

Goa: In sugarcane, variety demonstration in 5 farmers' fields by KVK Goa gave an increased yield of 1000 q/ha (Table 27).

Table 27: Frontline demonstrations on commercial crops conducted in the state of Goa

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Sugarcane	Variety demonstration	1	5	2	1000			0			

Puducherry: The integrated crop management technology in sugarcane demonstrated by KVK Puducherry in 9 farmers' fields gave 1249 q/ha as compared to 922 q/ha in farmers practice (Table 28).

Table 28: Frontline demonstrations on commercial crops conducted in the state of Puducherry

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Sugar cane	ICM	1	9	4	1249	922	35.48	163239	2.42	113833	2.21

3.1.2.5 Fodder crops: During the year, 259 demonstrations were conducted on the production of fodder crops including mixed fodder production in 71.11 ha area in the States of Karnataka, Tamil Nadu and Kerala. The state wise and KVK wise results are presented as under:

Karnataka: A total of 41 demonstrations were

conducted on fodder crops covering an area of 7 ha by KVKs in the state of Karnataka during the year (Table 29). The technologies such as cultivation of mixed fodder for enhanced nutritive value, napier grass cultivation as intercrop in plantation crops and improved variety gave an increased fodder yield ranging from 25-100 % over farmers practice.

Table 29: Frontline demonstrations on fodder crops conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Mixed fodder	Nutritive value	4	20	5	543.35	261.28	29.87	27024	4.40	20464	3.28
Napier grass	Variety introduction	1	11	1	220.00	176.00	25.00	155123	6.43	120747	5.69
Napier grass	Intercropping systems	1	10	1	980.00	490.00	100.00	21386	1.97	16732	1.72
			41	7							

Tamil Nadu: A total of 188 demonstrations on multicut fodder, fodder cafeteria, mixed fodder crops, fodder cowpea, fodder sorghum, hedgelucern and napier grass were conducted in 60.11 ha farmers' fields during the year by the KVKs of Tamil Nadu state (Table 30). The results on fodder

crops revealed that the napier grass and fodder sorghum gave more than 1000 q/ha green fodder. The economic returns in terms of BCR was higher in fodder cafeteria due to sale of fodder seed/slips in spite of low green fodder yield.

Table 30: Frontline demonstrations on fodder crops conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Multi-cut fodder grass	Intercropping systems	1	10	4	22.90	-	-	69000	2.52		
Fodder cafeteria	Nutritional value	1	4	0.8	46.50	21.81	113.20	23575	13.01	10100	13.53
	Nutritional value	3	35	1.31	573.05	505.22	46.51	51915	3.35	30489	2.72
Fodder cafeteria total			39	2.11	309.78	263.52	79.86	37745	8.18	20295	8.13
Mixed fodder	Nutritional value	1	10	1.6	123.60						
	Nutritional value	1	4	2	163.00	31.00	425.81	55377	2.49	22840	1.67
Mixed fodder crops total			14	3.6	143.3	31	425.81	55377	2.49	22840	1.67
Fodder Cowpea	Crop management	1	10	2	26.50	24.00	10.42	44300	4.12	40400	3.93
Fodder sorghum	Variety demonstration	4	50	18.4	1396.11	889.95	165.77	71950	3.54	48240	2.53
Hedge Lucerne	Crop demonstration	1	10	2	11.50	10.60	8.49	89890	4.75	78650	4.36
Napier grass	Variety demonstration	2	35	26	1198.73	975.73	29.66	146712	3.12	94277	2.64
	Variety evaluation	1	20	2	1500.00	1450.00	3.45	86000	2.34	81500	2.28
Napier grass total			55	28	1349.37	1212.87	16.56	116356	2.73	87889	2.46
			188	60.11							

Kerala: A total of 20 demonstrations were organized by two KVKs of Kerala state on fodder maize and fodder sorghum production technologies including improved varieties covering an area of 2 ha mostly in the homesteads during the year (Table

31). The results indicated an increased fodder yield to the extent of 74.2% in fodder sorghum and 15.60% in fodder maize under demonstrations over their local check.

Table 31: Frontline demonstrations on fodder crops conducted in the state of Kerala

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Fodder maize	Varietal demonstration	1	10	1	341.02	294.99	15.60	29060	1.52	20728	1.39
Fodder sorghum	Crop management	1	10	1	887.90	509.70	74.20	78580	1.79	23140	1.29
			20	2							

Puducherry: A total of 10 demonstrations were implemented on fodder cafeteria in Puducherry mainly to supply fodder seeds/slips to the needy farmers (Table 32).

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

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Fodder cafeteria	Nutritional value	1	10	2	22.00	0.00		14679	2.96		

3.1.2.6 Green manure crops: A total of 5 demonstrations on green manure crop sunhemp was taken by one KVK in Tamil Nadu for seed production purpose (Table 33). The demonstration recorded about 2.4 q/ha sunhemp seed with BCR of 2.43.

Table 33: Frontline demonstrations on green manure crops conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Sun hemp	Seed production	1	5	2	2.40			10742	2.43		

3.1.2.7 Vegetable crops: Vegetable crops such as amaranthus, brinjal, cabbage, chilli, field bean, pole bean, cluster bean, french bean, dolicos bean, onion, tomato, lab lab, gourds, yardlong bean, watermelon, radish, carrot, cucurbits and vegetable cowpea were demonstrated with improved technologies in 936 farmers' fields covering an area of 243.61 ha by the KVKs of Zone-VIII. The state wise and KVK wise results are presented as under:

Karnataka: A total of 349 demonstrations were conducted in major vegetables covering an area of 112 ha by the KVKs of Karnataka State during the year (Table 34).

Cultivation of amaranthus in 5 farmers' fields recorded 107.31% increased greenleaf yield with BCR of 3.35 as compared to farmers practice BCR of 1.96. In bhendi, demonstration of disease management and IPDM technologies have recorded on an average 45.18% increased yield as compared their local check. In brinjal, in-situ moisture conservation, fertilizer use efficiency and pest management technologies gave 18-23.16% increase in yield over their local check. Among the technologies, fertilizer use efficiency (fertigation) gave maximum yield of 579.5 q/ha with BCR of 4.82. The crop management technology in capsicum gave 329.3 q/ha yield as compared to 278.8 q/ha in check. Similarly, ICM in chilli gave 20.93% increase in green chilli yield over farmers' practice. In yardlong bean, improved variety gave 28.15% increased yield over check varieties. Improved crop management in pole bean also gave higher yield of 248.4 q/ha, which is 12.45% higher over check.

In avare/dolicos bean, cultivation of Hebbalavere (HA-4) and intercropping gave 21.89% increase in yield over farmers' practice. Similarly, cultivation of field bean as intercrop in other crops gave 738 q/ha bean yield with BCR of 3.45. In frenchbean, ICM, variety and intercropping technologies demonstrated gave an increased yield to the extent of 16.71% over their local check. The ICM technology in ridge gourd recorded higher yield of 300.68 q/ha as compared to local check (276.61 q/ha). In tomato, disease management technologies resulted in an increased yield by 23.25% over farmers' practice. In vegetable cowpea, crop management and variety demonstrations gave over 49% increased yield with BCR of 2.61. In onion, micronutrient, nutrient management and variety demonstrations gave over 25% increase in onion yield over farmers practice. The seed production technology in onion resulted in less yield as compared to farmers' practice. However, the economic returns were higher with seed production technology compared to farmers' practice. The ICM technology demonstrated in watermelon recorded 234.89 q/ha as compared to check (207.26 q/ha). The BCR was also higher (4.33) with ICM as compared to check (4.03).

Table 34: Frontline demonstrations on vegetable crops conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Amaranthus	High yielding varieties	1	5	1	218.92	105.60	107.31	153610	3.35	51670	1.96
Bhendi	Disease management	1	10	0.4	57.05	37.25	53.15	168630	3.70	96140	2.91
	IPDM	1	5	2	147.50	107.50	37.21	98000	2.05	58500	1.72

Bhendi total			15	2.4	102.28	72.38	45.18	133315	2.88	77320	2.32
Brinjal	In-situ moisture conservation	1	3	0.6	244.60	198.60	23.16	324820	3.52	191400	2.81
	Fertilizer use efficiency	1	5	2	579.50	490.50	18.14	367400	4.82	285098	3.66
	Pest management	1	10	2.5	332.50	273.00	21.79	179655	3.35	118610	2.88
Brinjal total			18	5.1	385.53	320.7	21.03	290625	3.90	198369	3.12
Cap sicum	Crop management		5	1	329.30	278.80	18.11	198568	2.21	148320	1.94
Chilli	ICM	3	22	9	64.75	53.53	20.93	192524	5.54	156881	4.88
Yard long bean	Variety evaluation	1	5	1	162.00	122.00	32.79	234410	3.64	163350	3.05
	High yielding variety	2	30	3	175.43	144.25	23.51	176287	2.76	109022	2.20
Yard long bean total			35	4	168.72	133.13	28.15	205349	3.2	136186	2.63
Pole beans		1	5	1	248.40	220.90	12.45	164799	2.24	124937	1.89
Dolichos bean	Intercropping systems	2	10	3	15.24	11.40	33.22	62044	2.78	35803	2.22
Dolichos bean	Seed production	1	8	3.6	8.18	7.63	7.21	31723	2.48	21900	1.98
Dolichos bean	Variety evaluation	1	5	2.4	12.25	10.72	14.27	31000	2.72	25880	2.52
Dolichos bean Total			23	9	12.73	10.29	21.98	46703	2.69	29846	2.24
Field bean	Intercropping systems	1	5	2	738.00	0.00		104850	3.45	0	
French bean	ICM	1	5	2	131.50	109.40	20.20	237875	5.10	182400	3.86
	Intercropping systems	1	10	2	134.22	115.65	16.06	151870	2.70	98234	2.10
	Variety evaluation	3	19	3.1	126.52	116.27	13.87	160430	3.52	111543	2.76
Frenchbean total			34	7.1	130.75	113.77	16.71	183392	3.77	130726	2.91
Ridge gourd	ICM	1	10	2	300.68	276.61	8.70	162120	1.82	136503	1.70
Tomato	Disease management	1	5	2	628.50	552.00	13.86	318496	2.73	244158	2.24
	IDM	1	5	2	1227.00	925.00	32.65	562980	5.82	343910	3.90
Tomato total			10	4	927.75	738.5	23.25	440738	4.27	294034	3.07

Cowpea	Crop management	1	10	4	58.00	52.00	11.54	31160	2.16	27210	2.10
	Variety introduction	1	5	2	93.82	50.20	86.89	94810	3.06	46200	2.01
Cowpea total			15	6	75.91	51.1	49.215	62985	2.61	36705	2.05
Onion	ICM	7	68	26.4	176.87	146.77	20.44	152875	3.31	115220	2.77
	Micro nutrient management	1	2	0.8	289.00	225.00	28.44	249180	5.59	189700	5.08
	Pest and disease management	1	5	2	168.00	148.00	13.51	235165	7.99	205628	7.60
	Seed production (bulb)	1	5	2	422.00	3000	-85.93	602600	4.46	255000	3.68
	Seed production	1	3	1.2	7.88	11.82	-33.33	257590	4.17	331010	2.87
	Variety evaluation	3	28	11.5	168.43	135.83	25.92	115962	9.02	77600	6.16
	Weed management	2	10	4	173.05	153.50	12.97	170922	3.18	170046	3.14
	Nutrient management	1	5	2	240.00	189.00	26.98	344630	9.75	264400	7.96
Onion total			126	49.9	202.46	461.85	3.27	253555	5.64	191536	4.67
Water melon	ICM	2	11	4.5	234.89	207.26	12.88	249828	4.33	215863	4.03
			349	112							

Tamil Nadu: A total of 456 demonstrations on major vegetable crops of the state of Tamil Nadu were demonstrated in 119 ha area during the year (Table 35).

In amaranthus, high yielding cv. PLR-1 gave 45.94% higher green leaf yield with better BCR of 3.31 as compared local check with BCR of 2.58. Demonstration of ICM, disease management, IPM, micronutrient, variety, IDM and mechanization technologies in brinjal gave an increased yield to the extent of 13.99% as compared to local practice. Among the technologies, variety and ICM have recorded higher yield with about 25% increase as compared to local check. In snake gourd, IPDM

and variety demonstrations gave 227.1 q/ha yield as compared to 170.98 q/ha in check plots. Organic farming in carrot gave over 44% increased yield as compared to farmers practice. In chillies, ecofriendly pest management, variety, mechanization and IPDM technologies performed superior with over 25% green chilli yield as compared to farmers' practice. The BCR was very good with ecofriendly pest management technology in chilli as compared to any other technologies. The crop management technology in chow chow gave 54.7 q/ha yield as compared to 50 q/ha in check plot. In cluster bean high yielding varieties gave 40% increased bean yield as compared to their local check. The variety demonstration radish resulted in 11.48% increased

yield over local check. The ICM technology in vegetable cowpea led to 11.64% increased yield as compared to farmers' practice. The mechanization demonstration in cucurbits resulted in higher economic returns as compared to farmers practice. In french bean, ICM and variety demonstration led to 123.65 q/ha bean yield as compared to 98.25 q/ha in check. High yielding variety in lab lab gave over 35% increase yield over local check

variety. In moringa, ecofriendly pest management gave marginal increase in yield by 4.26% as compared to farmers' practice. In onion, bio-fertilizers, IPDM, IDM and variety demonstrations performed superior to farmers practice with increased yield to the extent of 35.42%. The disease management in watermelon gave 349 q/ha melon yield as compared to 295 q/ha in farmers' practice.



IPM in Bhendi at Dharmapuri district

Table 35: Frontline demonstrations on vegetables conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Amaranthus	High yielding variety	2	30	3	81.77	58.64	37.73	70065	3.95	51432	3.21
	Variety demonstration	2	25	7	44.76	33.23	22.41	23651	2.66	10727	1.94
Amaranthus total			55	10	63.27	45.94	30.07	46858	3.31	31080	2.58
Brinjal	ICM	2	20	4	304.65	242.90	24.78	324081	3.08	196250	2.20
	Disease management	1	20	8	177.00	165.45	6.98	160550	2.53	110300	1.80
	IPM	3	30	7.5	262.24	243.65	6.86	205060	3.96	170173	3.36
	Micro nutrient management	1	10	4	157.40	132.50	18.79	188736	2.47	127431	2.17
	Variety demonstration	1	5	2	199.00	158.50	25.55	152000	4.23	112000	3.41
	IDM	1	10	4	86.00	77.10	11.54	153315	2.37	103930	1.82
	Mechanization	1	10	4	83.80	81.00	3.46	117363	2.19	94115	1.86
	Brinjal total			105	33.5	181.44	157.3	13.99	185872	2.98	130600
Snake gourd	IPDM	1	10	2	202.00	188.00	7.45	111630	3.23	99880	2.97
	Variety demonstration	1	10	4	252.20	153.95	63.82	223250	3.81	109152	2.44
	Snake gourd total			20	6	227.1	170.98	35.64	167440	3.52	104516
Carrot	Organic farming	1	2	0.4	166.25	115.40	44.06	380663	1.84	215400	1.50
Chilli	Eco-friendly pest management	1	10	2	166.75	155.00	7.58	115421	36.64	76150	3.19
	Mechanization	1	10	2	196.80	157.00	25.35	209230	5.49	152700	3.97
	Variety demonstration	1	5	2	138.60	107.00	29.53	196099	3.78	74147	2.05
	IPDM	1	10	4	104.00	74.50	39.60	51675	1.97	26908	1.57
	Chilli total			35	10	151.54	123.38	25.52	143106	11.97	82476
Chow chow	ICM	1	5	1	54.70	50.00	9.40	452750	2.23	333750	1.80
Cluster bean	High yielding variety	9	89	16.8	128.63	95.12	40.35	82737	3.16	45162	2.31

Radish	Variety demonstration	1	5	2	258.40	231.80	11.48	37020	1.91	33438	1.93
Cowpea	ICM	1	10	2	52.40	46.30	11.64	71772	2.21	45237	1.74
Cucur bits	Mechanization	1	10	1	10.83	7.50	44.33	39468	2.25	26063	1.82
French bean	ICM	1	10	4	118.30	107.50	10.05	174078	2.56	128117	2.18
	Variety demonstration	1	10	2.5	129.00	89.00	44.94	271500	2.15	92500	1.42
French bean total			20	6.5	123.65	98.25	27.50	222789	2.36	110309	1.8
Lablab	High yielding variety	1	10	2	70.15	51.80	35.42	56303	2.34	24912	1.62
Moringa	Eco-friendly pest management	1	10	0.4	181.50	174.09	4.26	104105	2.76	91544	2.41
Onion	Biofertilizers	1	5	2	85.10	68.50	24.23	82850	1.95	50850	1.59
	IDM	1	10	4	129.85	93.75	38.51	85726	2.94	52331	2.26
	IPDM	1	40	16	177.00	126.00	40.48	159082	2.48	67736	1.58
	Variety demonstration	1	5	2	180.00	130.00	38.46	307000	3.46	97500	1.60
Onion total			60	24	142.99	104.56	35.42	158665	2.71	67104	1.76
Small Onion	Variety demonstration	1	5	0.4	121.00			174042	2.89	0	
Water melon	Disease management	1	15	3	349.00	295.00	18.31	159930	4.11	121067	3.15
			456	119							

Kerala: A total of 120 demonstrations were implemented in vegetable crops like bitter gourd, snake gourd, chilli, tomato, onion, cowpea and yardlong bean covering an area of 11.61 ha mostly in the homestead farming (Table 36).

In bitter gourd, IPDM, crop management and open precision farming technologies performed superior to farmers' practice and recorded 61.61% increased yield over check. Water management technology in chilli led to 27.23% increased yield over check. The crop management technology in

onion gave 79 q/ha with BCR of 1.26. Bio pesticides and ecofriendly pest management in snake gourd gave 30.55% increased yield over check. In tomato, variety and organic farming technology gave yield to the extent of 192.5 q/ha with BCR of 1.48. The vegetable cowpea performed better with variety and micronutrient management by recording 172.93 q/ha as compared to 136.41 q/ha in check. The pest management technology in yardlong bean and vegetable crops also gave better yields as compared to their local check.



Demonstration solanaceous vegetable grafts at Malappuram district

Table 36: Frontline demonstrations on vegetables conducted in the state of Kerala

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Bitter gourd	IPDM	1	10	2	13.00	10.00	30.00	49140	1.30	35000	1.30
	Crop management	1	10	0.01	296.25			300000	1.97		
	Precision farming	1	3	0.12	181.00	112.00	61.61	318300	2.01	139000	1.55
Bitter gourd total			23	2.13	122.56	112	61.61	222480	1.76	139000	1.55
Chilli	Water management	1	5	0.2	295.80	232.50	27.23	86425	1.27	16200	1.05
Onion	Crop management	1	3	0.15	79.00			41000	1.26	0	
Snake gourd	Biopesticides	1	10	2	234.40	185.90	26.09	215680	1.72	115348	1.39
	Eco-friendly pest management	1	20	2	37.80	28.00	35.00	202600	1.81	90745	1.37
Snake gourd total			30	4	136.1	106.95	30.55	209140	1.77	103046	1.38

Tomato	Variety demonstration	1	10	0.08	226.00	169.00	33.73	100000	1.49	69000	0.13
	Organic management	1	5	0.01	159.0	85.0	87.06	75625	1.46	28500	1.29
Tomato total			15	0.09	192.5	127	60.4	87812	1.48	48750	0.71
Cowpea	Variety demonstration	1	10	0.04	148.75	125.00	19.00	204250	1.84	133000	1.55
	Micro nutrient management	1	10	2	197.11	147.82	33.34	441120	1.81	280176	1.61
Cowpea total			20	2.04	172.93	136.41	26.17	322685	1.83	206588	1.58
Yardlong bean	Pest management	1	3	1	16.64	15.19	9.55	195800	2.43	162800	2.15
Vegetable crops	Eco-friendly pest management Total	1	21	2	299.00	189.00	58.20	379246	4.80	196067	2.85
			120	11.61							

Goa: IPDM technology demonstration in chilli gave 42.65% higher yield as compared to local check in the state of Goa (Table 37).

Table 37: Frontline demonstrations on vegetables conducted in the state of Goa

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Chilli	IPDM	1	11	1	134.80	94.50	42.65	142150	1.98	53600	1.40

3.1.2.8 Tuber crops: A total of 67 demonstrations were conducted on major tuber crops like potato, sweet potato, cassava and coleus covering an area of 19.66 ha by the KVKs of Karnataka, Tamil Nadu and Kerala states during the year. The state wise and KVK wise results are as under :

Karnataka: In potato, 30 demonstrations

were conducted on ICM, nutrient management, bio fertilizers and post-harvest technologies covering an area of 13 ha by KVKs of Karnataka during 2014-15 season. The results indicated that demonstrated technologies have out yield its local check to the extent of 11.85 to 18.54% with better BCR (Table 38). The average tuber yield obtained with these technologies was 201.07 q/ha as compared to check (173.75 q/ha).

Table 38: KVK wise Frontline demonstrations on tuber crops conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Potato	ICM	1	10	4	211.00	178.00	18.54	112480	1.72	65724	1.41
	Nutrient management	1	5	4	98.76	88.30	11.85	83640	2.30	132450	2.03
	Biofertilizers	1	5	1	246.20	211.50	16.41	207866	2.52	163988	2.24
	Post harvest technology	1	10	4	248.30	217.20	14.32	253370	3.69	199612	2.91
Potato total			30	13	201.07	173.75	15.28	164339	2.56	140444	2.15

Tamil Nadu: Crops such as cassava and sweet potato were demonstrated with ICM, and improved variety in 25 farmers' fields covering an area of 6.5 ha during the year (Table 39). The results have indicated the superiority of demonstrated technologies by

registering higher yield and economic returns to investment in all technologies. The yield increase was 31.45% in cassava and 60.40% in sweet potato with better BCR as compared to farmers' practice.

Table 39: KVK wise Frontline demonstrations on tuber crops conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Cassava	ICM	1	10	4	166.80	119.50	39.58	119200	3.50	73370	2.59
	Variety	1	10	2	436.50	354.00	23.31	80775	2.61	57712	2.19
Cassava total			20	6	301.65	236.75	31.45	99988	3.06	65541	2.39
Sweet potato	Variety demonstration	1	5	0.5	32.60	60.40	-46.03	6300	1.24	30036	2.64
			25	6.5							

Kerala: A total of 12 demonstrations on frontline technologies in tuber crops like cassava and coleus were under taken in 0.16 ha area by two KVKs of Kerala during the year (Table 40).

The demonstration on bio-fertilizers in cassava and improved variety in coleus have recorded 12.50% increased yield in cassava and 40.67% in coleus as compared to local check.

Table 40: Frontline demonstrations on tuber crops conducted in the state of Kerala

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Cassava	Biofertilizers	1	2	0.08	198.00	176.00	12.50	81009	1.68	107875	1.83
Coleus	Variety evaluation	1	10	0.08	16.88	12.00	40.67	3	2.27	1	1.61
			12	0.16							

3.1.2.9 Fruit crops: A total of 286 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 95 ha during the year. The state wise and KVK wise results are as under:

Karnataka: A total of 102 demonstrations on various fruit crops were conducted in 44 ha area (Table 41). The results indicated that the yield was substantially higher under demonstration of ICM, INM, nutrient management, planting methods and disease management technologies in banana with

BCR as high as 4.91 under nutrient management. Among the technologies demonstrated in banana, planting methods demonstration has given highest yield of over 800 q/ha. Disease management in grapes, citru and lime also performed superior under demonstrations with better economic returns. Demonstration of IDM in papaya and pineapple led to better fruit yield and economic returns. In pomegranate, ICM, IDM, IPM and pest management technologies demonstrations proved superior over farmers practice. Among these demonstrated technologies, IDM and ICM technologies gave higher yield of 125 -174 q/ha with superior BCR.

Table 41: Frontline demonstrations on fruit crops conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Banana	ICM	1	10	4	110.00	96.50	13.99	282475	2.04	237080	1.97
	INM	1	5	4	58.14	53.04	9.62	225714	4.47	203714	4.31
	Nutrient management	2	17	6	214.80	163.70	26.83	334246	4.91	259865	4.42
	Disease management	1	5	1	287.00	235.00	22.13	282500	3.35	199000	2.53
	Planting methods	1	3	3	848.40	545.30	55.58	308805	2.08	178123	1.87

Banana total			40	18	303.67	218.71	25.63	286748	3.37	215556	3.02
Citrus	Disease management	1	12	5	520.83	328.50	58.55	13815	1.44	2765	1.11
Fig	ICM	1	5	2	210.00	192.00	9.38	227000	2.17	183000	1.91
Grapes	Disease management	1	10	4	143.90	135.00	6.59	456080	3.75	353600	3.10
Lime	Disease management	1	3	1.2	14.08	12.20	15.41	156666	4.92	118950	3.40
Papaya	IDM		2	0.8	95.75	65.25	46.74	641000	6.13	402000	4.35
Pine apple	IDM	1	5	2	498.00	419.60	18.68	419200	3.35	331720	2.93
Pomo granate	ICM	1	10	5	125.00	95.00	31.58	845000	5.81	604600	5.14
	IDM	1	5	2	174.00	128.00	35.94	740480	4.39	482580	3.18
	IPM	1	5	2	111.00	98.00	13.27	475764	4.53	387924	3.73
	Pest management	1	5	2	69.60	69.60	0.00	342000	3.69	294600	3.40
Pomogranate total			25	11	119.9	97.65	20.20	600811	4.61	442426	3.86
			102	44							

Tamil Nadu: A total of 112 demonstrations were implemented in banana, guava, mango and papaya covering an area of 42.8 ha in the farmers' fields by the KVKs of Tamil Nadu (Table 42).

In banana, technologies such as IDM, ICM, Micronutrient management, fertilizer use efficiency, mechanization and wind breaks demonstrations have resulted in yield increase of 40.65% with BCR

of 3.19. Among the technologies demonstrated in banana wind breaks, fertilizer use efficiency (fertigation) and micronutrient management gave superior yield and returns. The crop management technology demonstration in guava and papaya also have gave higher yield and economic returns. The micronutrient management in mango recorded 24.05% increase in yield over local practice.

Table 42: Frontline demonstrations on fruit crops conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Banana	Farm mechanization	1	10	4	885.78	799.80	10.75	474255	4.25	408272	3.69
	Fertilizer use efficiency	1	5	2	375.00	253.00	48.22	142300	4.15	89500	3.42

	IDM	2	15	6	51.55	43.66	18.77	216545	2.74	169812	2.42
	Micro nutrient management	3	32	12.8	362.28	301.60	23.68	197975	3.34	151053	3.20
	Nutrient management	1	10	2	356.58	303.54	17.47	151619	2.13	100874	1.71
	ICM	1	10	4	342.50	296.13	15.66	280315	3.14	212521	2.49
	Wind breaks	1	5	2	1000.00	400.00	150.00	487440	2.56	12040	1.05
Banana total			87	32.8	481.96	342.53	40.65	278636	3.19	163439	2.57
Guava	ICM	1	5	2	127.05	97.20	30.71	165127	2.62	86955	1.99
Mango	Micro nutrient management	1	10	4	52.87	42.62	24.05	106923	2.77	60260	2.09
Papaya	ICM	1	10	4	1011.98	962.60	5.13	666610	4.40	608000	3.95
			112	42.8							

Kerala: A total of 72 demonstrations were implemented by KVKs of Kerala on banana during the year. The technologies such as nutrient management, bio-pesticides, botanical pesticides, ecofriendly pest management, IPDM and planting methods performed better with overall increase of

35.19% in yield as against local check. Among the technologies, planting methods, IPDM and nutrient management technologies have resulted superior yield (264 to 532 q/ha) and economic returns (Table 43).

Table 43: Frontline demonstrations on fruit crops conducted in the state of Kerala

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Banana	Nutrient management	2	25	1.4	125.75	95.50	39.46	-291450	1.08	-134125	1.02
	Bio-pesticides	1	1	0.5	320.00	272.00	17.65	244000	1.81	142400	1.45
	Botanical pesticides	2	20	2.4	195.34	159.50	23.15	368547	1.87	241370	1.59
	Eco-friendly pest management	1	10	2	201.00	158.48	26.83	375989	1.87	247585	1.64
	IPDM	1	10	0.4	264.00	165.00	60.00	377168	1.91	131280	1.36
	Mechanization	1	5	1	198.00	190.00	4.21	201800	1.94	143000	1.56
	Planting methods	1	1	0.5	532.00	304.00	75.00	670000	2.01	303500	1.66
			72	8.2	262.30	192.07	35.19	278008	1.78	153573	1.47

3.1.2.10 Plantation crops: A total of 142 demonstrations were undertaken by the KVKs of Karnataka, Tamil Nadu, Goa and Kerala states on major plantations like arecanut, coconut, coffee, cashew, cocoa and tea covering an area of 41.6 ha during the year. The state wise and KVK wise results are discussed as under:

Karnataka: A total of 34 demonstrations on plantation crops like arecanut, coconut and coffee were conducted in 34 ha area by KVKs

of Karnataka state (Table 44). The overall yield increase recorded in demonstrations as compared to farmers' practice was 27.13% due to ICM (38.29%), INM (14.37%) and pest management (28.72%) in arecanut. In coconut, sustainable production demonstrations gave 10.71% increase in nut yield by recording 7626 nuts/ha/year as compared to 6888 nuts/ha/year under farmers' practice. In coffee, micronutrient management technology demonstration gave 14.91% increase in berry yield over farmers' practice.

Table 44: Frontline demonstrations on plantation crops conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Arecanut	ICM	2	8	3.2	27.33	19.69	38.29	542950	7.13	373885	5.89
	INM	2	8	2.3	14.81	12.95	14.37	172450	2.96	136847	2.64
	Pest management	1	5	2	12.10	9.40	28.72	239200	4.17	177400	3.65
Arecanut total			21	7.5	18.08	14.01	27.13	318200	4.75	229377	4.06
Coconut	Sustainable production technology	1	3	1.2	7626	6888	10.71	51960	3.14	45830	2.80
Coffee	Micro nutrient management	1	10	4	12.64	11.00	14.91	58202	3.10	48050	2.80
			34	12.7							

Tamil Nadu: A total of 55 demonstrations were implemented in cashew, cocoa, coconut and tea plantations by the KVKs of Tamil Nadu covering an area of 18 ha during the year (Table 45). In cashew, crop management and pest management technologies have led to yield increase to the extent of 38.45% in cashew yield as compared to local check. The crop management technology recorded 10.1 q/ha cashew yield with BCR of

3.35. The pest management in cocoa gave 42.86% increased cocoa yield over check. The ICM and IPM technologies in coconut led to yield increase of 54.64% by recording average of 11681 nuts/ha/year as compared to check with only 7625 nuts/ha/year. The bio-pesticides demonstration in tea plantation gave 18% higher yield as compared to farmers' practice.

Table 45: Frontline demonstrations on plantation crops conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Cashew	Crop management	1	10	4	10.10	6.50	55.38	67350	3.35	37150	2.51
	Pest management	1	10	4	6.72	5.53	21.52	43370	2.82	32895	2.47
Cashew			20	8	8.41	6.02	38.45	55360	3.09	35023	2.49
Cocoa	Pest management	1	10	4	10.00	7.00	42.86	143492	3.62	90000	2.80
Coconut	ICM	1	10	1	12420	8640	43.75	50003	1.91	21666	1.49
	IPM	1	10	4	10941	6610	65.52	32709	3.96	14727	2.26
Coconut			20	5	11681	7625	54.64	41356	2.94	18197	1.88
Tea	Bio-pesticides	1	5	1	164.20	139.15	18.00	73890	1.53	27830	1.25
			55	18							

Kerala: The two important plantation crops of Kerala such as coconut and arecanut were demonstrated with front line technologies such as IPM, micronutrient management, pest management and soil management practices in 42 fields of farmers covering an area of 8.9 ha during the

year (Table 46). The technology IPM in arecanut recorded an increased yield of 17.4 q/ha chali yield as compared to 13.8 q/ha in farmers' practice. In coconut, micronutrient management and organic farming technologies recoded higher nut yield and economic returns to the farmers.

Table 46: Frontline demonstrations on plantation crops conducted in the state of Kerala

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Are canut	IPM	1	5	1	17.40	13.80	26.09	212200	1.77	136400	1.55
Coconut	Micro nutrient management	1	18	2	15340	10920	40.48	95647	4.04	56102	2.62
	Organic farming	1	3	0.5	12240	12184	0.46	69324	2.31	63824	2.09
	Pest management	1	6	5	5291	4752	11.34	10996	1.26	7104	1.19
	Soil management	1	10	0.4	4935	2212	123.10	54071	1.92	2212	1.13
	Coconut total			37	7.9	9452	7517	44	57510	2.38	32311
			42	8.9							

Goa: Demonstration of integrated pest management in cashew plantations in the state of Goa in about 2 ha area of 11 cashew farmers has revealed 124.45%

increase in cashew nut yield with BCR of 3.72 as compared to 2.30 in local check (Table 47).

Table 47: Frontline demonstrations on plantation crops conducted in the state of Goa

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Cashew	IPM	1	11	2	144.10	64.20	124.45	527000	3.72	209700	2.30

3.1.2.11 Spice and condiments: A total of 353 demonstrations were under taken in major spices like black pepper, cardomum, ginger, turmeric, nutmeg, garlic and coriander covering an area of 71.5 ha in the states of Karnataka, Tamil Nadu and Kerala by the KVKs under Zone-VIII. The state wise and KVK wise results are as under:

Karnataka: In spices, a total of 158 demonstrations were conducted in black pepper, garlic, ginger and turmeric covering an area of 33.3 ha during the year (Table 48). The yield increase recorded as compared to farmers' practice was 26.14 % in black pepper due to IDM, ICM, micronutrient

and post-harvest technology demonstrations. The ICM, micronutrient and variety demonstrations in turmeric gave 17.86% increase in yield over check. The overall yield under demonstrations was 119.07 q/ha with BCR of 4.56. Weed management in garlic led to 18.31% increase in yield over farmers practice. In ginger, technologies such as disease, pest and micronutrient were demonstrated successfully with enhanced yield to the tune of 21.04% over farmers check. Among the technologies demonstrated in ginger, micronutrient and disease management gave higher yield and economic returns.

Table 48: Frontline demonstrations on spice crops conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Turmeric	ICM	1	10	4	16.65	14.42	15.46	402934	5.17	340150	4.68
	Micro nutrient management	1	10	5.5	7.57	6.20	22.10	595040	5.27	462400	4.33
	Variety evaluation	1	5	0.5	333.00	287.00	16.03	312220	3.25	182720	2.52
Turmeric total			25	10	119.07	102.54	17.86	436731	4.56	328423	3.84

Black pepper	ICM	1	5	1	20.20	14.30	41.26	684010	6.44	461500	5.18
	IDM	3	23	1.9	8.55	7.00	21.05	249197	2.11	180977	3.47
	Micro nutrient management	3	40	3.4	8.02	6.65	18.46	217779	2.87	146571	2.34
	Post harvest technology	2	25	4.4	9.36	7.52	23.79	392875	2.18	281421	1.84
Black pepper total			93	10.7	11.53	8.87	26.14	385965	3.4	267617	3.21
Garlic	Weed management	1	5	2	57.50	48.60	18.31	348200	4.11	265000	3.14
Ginger	Biofertilizers	1	10	2	188.72	153.43	23.00	362520	2.22	229505	1.75
	Disease management	2	15	6	255.43	188.00	40.85	542099	3.75	339244	2.74
	Micro nutrient management	1	3	1.2	218.00	192.30	13.36	640828	5.43	546080	4.74
	Pest management	1	7	1.4	144.6	135.2	6.95	227000	2.68	178000	2.11
Ginger total			35	10.6	201.69	167.23	21.04	443112	3.52	323207	2.83
			158	33.3							

Tamil Nadu: A total of 70 frontline demonstrations were conducted in spice crops like turmeric, ginger and garlic covering an area of 26 ha during the year by KVKs of Tamil Nadu (Table 49). In turmeric, plant multiplication technique, disease management and micronutrient management technologies led to 22.76% increase in yield over

control. The micronutrient management technology recorded highest turmeric yield. However, BCR was better in plant multiplication technique. The crop management in garlic recorded higher yield 63q/ha as compared to check (58.3q/ha). In ginger, IDM demonstration gave 16.97% increase in yield over farmers practice.

Table 49: Frontline demonstrations on spice crops conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Turmeric	Plant multiplication techniques	1	20	8	161.50	144.25	14.70	310659	3.07	225445	2.27
	Disease management	1	10	4	183.26	159.24	15.08	167512	2.33	124579	1.96
	Micro nutrient management	2	20	8	226.79	161.35	46.58	94512	2.85	50743	2.24

Turmeric total			50	18	183.26	152.27	22.76	220835	2.83	156553	2.19
Garlic	ICM	1	10	4	63.00	58.30	8.06	290276	2.89	229121	2.52
Ginger	IDM	1	10	4	96.50	82.50	16.97	313375	2.95	213155	2.55
			70	26							

Kerala: A total of 125 demonstrations were implemented in turmeric, black pepper, cardamom, ginger and nutmeg crops by KVKs of Kerala covering 12.2 ha area (Table 50). In turmeric, plant multiplication and improved variety demonstrations led to marginal increase in yield and economic returns. In black pepper, disease management and micronutrient management gave 23.88% increase in yield over farmers practice. The BCR with these technologies adoption was over 3 as compared. The technologies such as nutrient management and

biological pest control in cardamom gave 20.21% increase in yield over local check. The cardamom yield was higher with nutrient management technology with 9.9 q/ha as compared to 8 q/ha in farmers practice. In ginger, crop management, IDM, plant multiplication, micronutrient and planting methods demonstrated gave higher yield over their check.

The INM demonstration in nutmeg gave 40% more number of fruits/plant as compare to farmers practice.

Table 50: Frontline demonstrations on spice crops conducted in the state of Kerala

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Turmeric	Plant multiplication techniques	1	10	0.4	245.00			267548	1.67		
Turmeric	High yielding variety	1	20	0.2	131.60	93.63	40.55	-159478	0.65	-70228	0.79
Turmeric total			30	0.6	188.3						
Black pepper	Disease management	1	10	2	6.80	5.50	23.64	287690	3.21	218160	2.94
	Micro nutrient management	1	10	2	15.44	12.44	24.12	0		0	
Black pepper total			20	4	11.12	8.97	23.88	143845	3.21	109080	2.94
Cardamom	Nutrient management	1	10	1	9.90	8.00	23.75	403600	2.61	196200	1.90

	Biological pest control	1	10	2	1.40	1.20	16.67	117745	1.38	95000	1.32
Cardamom total			20	3	5.65	4.6	20.21	260673	2.00	145600	1.61
Ginger	Crop management	1	10	0.4	186.10			600000	1.50		
	IDM	1	10	2	195.89	143.18	36.81	505145	1.75	304506	1.55
	Micro nutrient management	1	10	0.2	190.00	184.00	3.26	400000	1.47	300000	0.14
	Plant multiplication techniques	1	10	0.4	123.00						
	Planting methods	1	10	0.8	97.10			400000	1.70		
Ginger total			50	3.8	158.42	163.59	20.04	476286	1.61	302253	0.85
Nutmeg	INM (no/plant)	1	5	0.8	1750.00	1250.00	40.00				
			125	12.2							

3.1.2.12 Medicinal and aromatic crops: A total of 35 demonstrations on frontline technologies in 6.4 ha area were organized by KVKs of Karnataka under Zone-VIII during the year.

During the year, 35 demonstrations in about 6.4 ha area on ashwagandha and betel leaf were

implemented by KVKs of Karnataka (Table 51). Variety demonstration in ashwagandha gave 2.5 q/ha yield with BCR of 1.75. In betel leaf, bio fertilizers and IDM technology demonstrations gave 7.03 lakh leaves/ha/year as compared to farmers practice (5.1 lakh leaves/ha/year).

Table 51: Frontline demonstrations on medicinal and aromatic crops conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Ashwa gandha	Variety evaluation	1	10	4	2.50			16274	1.75		
Betel leaf (lakh/ha)	Biofertilizers	1	10	2	2.90	2.40	20.83	34040	1.89	11500	1.32
	IDM	1	15	0.4	11.16	7.80	43.08	819	1.36	184	1.09
Betel leaf total			25	2.4	7.03	5.1	31.96	17430	1.63	5842	1.21
			35	6.4							

3.1.2.13 Flower crops: A total of 167 demonstrations on flower crops covering an area of 55.5 ha were implemented by KVKs of Karnataka and Tamil Nadu during the year.

Karnataka: A total of 32 demonstrations were implemented in flower crops such as china aster, chrysanthemum, gaillardia, jasmine and marigold covering 11.5 ha area by the KVKs of Karnataka (Table 52). In china aster, variety demonstration

gave 40.63% higher yield as compared to farmers practice. The ICM technology in chrysanthemum led to 26.19% increased flower yield with BCR of 4.81 as compared to 3.87 in farmers practice. Improved variety demonstration in gaillardia and marigold also gave 12.31% and 16.67% increased yield over farmers practice respectively. The ICM in jasmine gave 49 q/ha flower yield as compared to 41 q/ha flower yield with farmers practice leading better BCR of 3.57.

Table 52: Frontline demonstrations on flower crops conducted in the state of Karnataka

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
China aster	Variety introduction	1	2	1	45.0	32.0	40.63	99725	3.83	65600	3.16
Chrysanthemum	ICM	1	5	2	636.00	504.00	26.19	755600	4.81	560660	3.87
Gaillardia	High yielding variety	1	10	4	95.80	85.30	12.31	203250	3.41	167127	2.88
Jasmine	ICM	2	10	2.5	49.00	41.00	17.81	487838	3.57	392813	3.14
Mari gold	High yielding variety	1	5	2	52.50	45.00	16.67	174250	5.87	144250	5.03
			32	11.5							

Tamil Nadu: A total of 135 demonstrations were conducted on major flowers such as crossandra, jasmine, marigold, tuberose and rose covering an area of 44 ha during the year (Table 53). In crossandra, introduction of improved varieties gave 155.77% increased flower yield with BCR of 3.36 as compared to check. The ICM, INM, IPM and crop management technologies in jasmine have enhanced the flower production by 31.09% over

local check. Among the technologies demonstrated in jasmine, INM, ICM and IPM gave higher yield economic returns to the farmers. In tuberose, bio pesticides and IPM technologies adoption gave 21.77% increase in flower yield with higher BCR of 2.7 as against only 2.15 in local check. In rose, ICM technology recorded 30.89% higher yield over farmers practice.

Table 53: Frontline demonstrations on flower crops conducted in the state of Tamil Nadu

Crop	Thematic area	No of KVKs	No of demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net Return	BCR	Net Return	BCR
Crosandra	Variety demonstration	1	10	5	133.00	52.00	155.77	1121000	3.36	370200	2.45
Jasmine	ICM	2	20	6	40.61	31.67	33.76	251855	3.61	166831	3.01
	INM	1	20	4	84.92	78.02	8.84	143338	2.45	125041	2.29
	IPM	2	20	5	64.25	52.66	22.05	343105	3.08	203887	2.29
	Crop management	1	5	2	19.60	12.48	57.05	500376	3.50	100000	1.67
Jasmine total			65	17	50.00	41.30	31.09	298106	3.25	152518	2.47
Marigold	IDM	1	10	4	108.50	85.70	26.60	112437	3.06	69926	2.18
	Crop management	1	10	4	170.00	129.40	31.38	103995	2.04	50000	1.63
Marigold total			20	8	139.25	107.55	28.99	108216	2.55	59963	1.91
Tuberose	Bio-pesticides	1	10	4	98.20	70.80	38.70	207260	1.98	81700	1.41
	IPM	1	10	4	125.04	119.27	4.84	353440	3.41	311684	2.88
Tuberose total			20	8	111.62	95.04	21.77	280350	2.70	196692	2.15
Rose	ICM	2	20	6	191.50	140.75	30.89	271539	3.89	198559	3.41
			135	44							

3.1.2.14 Hybrids: During the year, 896 demonstrations on hybrids in various crops were conducted by the KVKs in the states of Karnataka (518), Tamil Nadu (335) and Kerala (43) covering 305.04 ha area in crops like paddy, maize, sorghum, sesamum, sunflower, castor, cotton, chilli, brinjal, bhendi, cabbage, cauliflower, tomato, bottle gourd, onion, tomato, watermelon, tuberose and sericulture. The State-wise and KVK wise results are discussed as under:

Karnataka: A total of 518 demonstrations were conducted by KVKs of Karnataka in various crop hybrids as presented in Table 54. In paddy

KRH-4 hybrid recorded 5.44 % higher yield over farmers' variety. In maize hybrids mostly private hybrids were demonstrated except Hema, a public sector hybrid which gave 11.52% higher yield over farmers' variety. In bajra, 86M52 hybrid gave 15.53% higher yield over check variety. The sunflower hybrids in North Karnataka did not perform well due to long moisture stress conditions prevailed during last year. The castor hybrid DCH-519 gave 24.76% higher yield over local variety. In sericulture also the hybrids (FC1 & FC2) rearing performed better than variety in terms of cocoon yield and economic returns. In cotton mostly private

Bt cotton hybrids were demonstrated and most of them performed superior over farmers' practice. In vegetable crops, bottle gourd hybrid varda, brinjal hybrids Mahyco-10, 9 and MEBH-10, cabbage hybrids Saint, Sandoz, Harirani and Unnathi, chilli hybrids Arka Meghana, Bullet, Indus 815 and Tejaswini, pole bean hybrid NZ, tomato hybrids Arka Rakshak, Arka Samrat and private hybrids like Emerald, Indus 1030, Syngenta hybrids have also performed better than varieties and gave better economic returns to the farmers.



Chilli hybrid (KBCH 1) at Hassan district

Table 54: Frontline demonstrations on hybrids conducted in the state of Karnataka

KVK	Crop	Hybrid	No of Demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net returns	BCR	Net returns	BCR
Hassan	Paddy	KRH-4	10	4	77.5	73.5	5.44	71625	3.17	64225	2.84
Gadag	Maize (Rf)	CP 818	10	4	18.98	15.32	23.89	5412	1.31	3728	1.25
Bengaluru rural	Maize (Rf)	Dekalb 900M	15	6	35.17	28.67	22.67	20584	1.68	11472	1.38
Hassan	Maize (Rf)	Ganga Kaveri	4	4	64.46	59.78	7.83	38860	2.52	35250	2.44
Mysore	Maize (Rf)	Nithyashree	9	3.8	51	45.6	11.84	35422	2.36	29467	2.18
Koppal	Maize (Rf)	Pvt hybrid	3	1.2	58.75	53	10.85	32027	1.98	28110	1.93
Bellary	Maize	Pvt.hybrid	5	2	73.28	65.76	11.44	67312	2.91	54504	2.45
Mandya	Maize	Hema	6	3	68.53	61.45	11.52	37050	2.18	28550	1.87
Vijayapura	Bajra (Rf)	86M52	10	4	15.25	13.2	15.53	5150	1.50	2564	1.24
Shivmogga	Sunflower	KBSH-41	10	4	10.1	11.63	-13.16	2813	1.12	6063	1.26
Koppal	Sunflower (Rf)	KBSH-53	3	1.2	6.35	4.32	46.99	30110	4.17	16600	4.32
Kalburagi	Sunflower (Rf)	PvtHybrid	12	5	5.53	3.7	49.46	9636	2.13	4241	1.54
Raichur	Castor (Rf)	DCH-519	10	4	10.23	8.2	24.76	26047	2.88	15347	1.92
Kalburagi-A	Chilli	HPH 1900	3	1.2	36.6	31.3	16.93	47750	1.79	25200	1.37
Kolar	Sericulture	FC1 & FC2	5	0	86.3	79.17	9.01	20148	2.55	16473	2.32
Chickballapur	Sericulture	FC1 & FC2	3	1.2	104	89	17.67	51116	3.20	39075	2.79

Kalburagi-A	Mulberry	Double cross Hybrid	3	1	530	434	22.12	322540	1.93	139510	1.46
Chitradurga	Cotton (Rf)	Bt. Cotton	13	5.2	9	6.7	34.33	82785	2.73	55496	2.30
Davangere	Cotton (Rf)	Bt. Cotton	20	8	17.93	16.67	7.56	40765	2.59	35405	2.35
Kalburagi-A	Cotton (Rf)	Bt. Cotton	10	4	22.24	18.6	19.57	76064	3.90	59400	3.01
Kalburagi	Cotton (Rf)	Bt. Cotton	12	5	13.79	10.55	30.71	37910	3.03	22632	2.09
Vijayapura	Cotton (Rf)	Bt. Cotton	15	6	22.97	21.37	7.49	110620	5.07	96113	4.45
Gadag	Cotton (Rf)	Bt Cotton	20	8	8.45	7.36	14.81	13735	1.66	9578	1.47
Belgavi-A	Cotton (Rf)	MRC-7347	10	4	14.7	11.9	23.53	38498	2.25	27285	1.94
Chamar ajanagar	Cotton (Rf)	MRC-7351	20	8	19.10	15.75	21.26	64025	3.03	46260	2.40
Dharwad	Cotton (Rf)	Bt Cotton	5	2	19.91	16.36	21.70	24665	2.63	17940	2.21
Kalburagi-A	Cotton (Rf)	Bt. Cotton	10	4	25.5	24.5	4.08	85944	3.57	51209	2.46
Kalburagi-A	Cotton (Rf)	Bt. Cotton	10	4	21.6	16.7	29.34	88116	3.85	47066	2.39
Bellary	Cotton	Bt. Cotton	10	4	31.46	23.42	34.33	71512	2.18	35380	1.56
Raichur	Cotton	Bt. Cotton	10	4	27.43	23.26	17.93	75205	3.02	59920	2.69
Koppal	Bhindi	Pvthybrid	3	1.2	66	31	112.90	68134	2.72	19450	1.63
Chickballapur	Bottlegourd	Varda	5	2	275	213	29.35	168828	2.84	92186	1.86
Kalburagi	Brinjal	Mahyco -10	6	2.5	194	183	6.01	485900	5.65	355900	3.98
Mandya	Brinjal	Mahyco-9	5	2.5	316	266	18.80	116800	2.60	84200	2.12
Koppal	Brinjal	Pvthybrid	5	2	224	145	54.48	40550	2.49	29300	2.17
Belgavi-A	Brinjal (Rf)	MEBH-10	5	2	221	197	12.18	17717	1.84	10130	1.43
Kolar	Cabbage	Unnati	5	1	524	456	14.91	41090	1.64	24410	1.37
Belgavi	Cabbage	Saint	10	2	191	149	28.20	72926	1.89	25613	1.29
Belgavi-A	Cabbage (Rf)	Saint	5	2	295	258	14.34	45242	2.26	29578	1.77
Mandya	Cabbage	Sandoz, Hari rani	5	2.5	217	192	13.02	30200	1.82	14150	1.42
Mysore	Cabbage	Unnathi	10	4	350	274	27.85	126957	2.93	78384	2.08
Chickballapur	Cabbage	Unnathi	5	2	698	568	22.95	367254	2.92	96512	2.13
Bengaluru rural	Cabbage	Unnathi	5	1	268	239	12.13	127204	2.45	99386	2.08
Kodagu	Chilli (PI)	Arka Meghana	5	1	180	140	28.63	65580	1.81	32620	1.41
Chamar ajanagar	Chilli	Bullet	5	2	216	192	12.50	132908	2.05	97994	1.74
Mysore	Chilli	Indus 815	14	5.8	151	122	23.57	70354	2.64	45068	1.97

Mandya	Chilli	Tejaswini	10	2.5	163	146	12.29	80500	1.97	63050	1.76
Chickballapur	Pole bean	NZ	5	2	335	311	7.63	269678	2.63	216096	2.15
Koppal	Solaneceous vegetables	Pvt hybrid	3	1.5	224	168	33.33	63000	1.82	9000	1.12
Ramanagara	Tomato	ArkaRakshak	10	2	408	315	29.52	393200	3.21	229000	2.54
Belgavi	Tomato	ArkaRakshak	5	1	508	453	12.14	255302	5.57	214222	4.38
Davangere	Tomato	ArkaRakshak	15	6	616	520	18.46	108146	3.36	77473	2.47
Haveri	Tomato	ArkaRakshak	10	4	116	64.4	80.43	77045	2.23	14892	1.24
Kodagu	Tomato (PI)	ArkaRakshak	5	1	251	211	19.11	60880	1.79	42824	1.65
Tumkur-A	Tomato	ArkaRakshak	5	2	276	183	50.93	121652	3.76	63590	2.37
Chickballapur	Tomato	Emerald	5	1	772	658	17.33	518276	3.42	356328	2.33
Kolar	Tomato	Indus 1030	5	1	476	409	16.38	60132	1.58	32064	1.29
Mandya	Tomato	Pvthybrid 555	8	2.5	442	238	85.82	744500	6.32	234000	2.90
Tumkur-A	Tomato	Pvthybrid	3	1	746	652	14.42	252850	4.05	186850	3.53
Belgavi-A	Tomato	Syngenta (1389)	10	2	293	262	11.66	78143	2.00	53490	1.68
Kalburagi-A	Tomato	ArkaRakshak	3	1.2	220	210	4.76	103366	3.46	66500	2.45
Vijayapura	Tomato	Arkasmrat	5	2	112	98	14.29	42130	3.71	31700	2.83
Chickballapur	Tomato	Arkasmrat	5	2	575	496	15.97	493265	3.51	375449	2.71
Bidar	Marigold	Pvthybrid	2	0.2	61.5	50.2	22.51	193200	4.66	150450	3.99
Mysore	Fodder	DHN 6	20	2	1580	1080	46.23	83325	2.11	40575	1.59
			518	188.2							

Tamil Nadu: A total of 335 frontline demonstrations have been conducted covering 113.8 ha area in various crop hybrids by the KVKs of Tamil Nadu state during the year (Table 55). In paddy, hybrids such as CoRH-4, Co (Cu)-9, Koraknath 509 performed better than their check varieties. The hybrid Koraknath 509 recorded highest yield followed by Co-4 in paddy. In maize, CoHM-6 performed superior over local in all the districts of Tamil Nadu. The highest yield was obtained in Ariyalur district with CoHM-6 hybrid in

maize. In cotton, MRC-7981 and RCH gave better yield as compared to their local check. Among the vegetables, hybrids such as Chamathkar in beans, Sakthi in bhendi, Pallavi in bitter gourd, Co-1 in bottle gourd, CoCH-1 in chilli, Naga in ridge gourd, Polo-1 in snake gourd, Arka Rakshak and CoTH-3 in tomato tested under demonstrations gave better yield and economic returns as compared to their local check varieties. The cassava hybrid Sree Athulya and hybrid napier grass Co(BN)-5 also performed superior over their local check varieties.

Table 55: Frontline demonstrations on hybrids conducted in the state of Tamil Nadu

KVK	Crop	Hybrid	No of Demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net returns	BCR	Net returns	BCR
Thruchy	Paddy	Co (Cu) 9	10	4	30.35	23	31.96	21935	1.82	9800	1.36
Thiruvallur	Paddy	Co4	10	4	62.46	45.29	37.91	45448	2.27	35699	1.97
Theni	Paddy	Koraknath 509	10	4	74.86	67.33	11.18	128255	4.05	58616	2.17
Virudhunagar	Maize (Rf)	CoH (M) 6	10	4	68.43	59.56	14.89	60549	2.90	50722	2.71
Pudukottai	Maize	NK6240	20	8	73.45	65.08	12.86	63280	2.60	41592	1.84
Theni	Maize	CoH (M) 6	5	2	75.69	59.71	26.76	69277	2.89	42902	2.05
Thiruvarur	Maize	CoH (M) 6	5	2	59	47	25.53	49685	2.40	33000	2.01
Madurai	Maize	CoH (M) 6	10	4	51.08	44.42	14.99	40425	2.30	31108	2.00
Ariyalur	Maize	CoH (M) 6	10	4	80.62	65.42	23.23	61507	2.30	44657	2.02
Dindigul	Maize	CoH (M) 6	10	4	36.43	28.99	25.66	26255	2.16	10870	1.41
Coimbatore	Maize	CoH (M) 6	10	4	68.5	67.48	1.51	42151	1.91	39993	1.85
Perambalur	Cotton (Rf)	MRC 7981	10	4	15.38	13.21	16.43	20261	1.41	8931	1.18
Thruchy	Cotton	RCH	10	4	24.78	20.71	19.65	52148	1.84	33403	1.54
Vellore	Beans	Chamathkar	10	4	126	80.74	56.66	289687	3.52	154675	2.49
Kanchipuram	Bhendi	Sakthi	10	2	97.5	86.37	12.89	78277	3.06	62777	2.54
Coimbatore	Bhendi	Mycho-10	10	2	164	147	11.42	60660	2.12	45763	1.80
Thruchy	Bittergourd	Pallavi	5	2	122	108	13.03	86144	2.40	60840	1.89
Dharmapuri	Bittergourd	Pvt. hybrid	10	4	326	258	26.36	276200	3.40	147360	2.10
Thruchy	Bottle gourd	Co-1	10	4	26.9	14.19	89.57	114200	3.42	42640	2.00
Thiruvarur	Bottle gourd	Co-1	10	2	688	440	56.36	135220	2.83	70000	2.13
Dharmapuri	Capsicum	Pvt. hybrid	10	4	845	785	7.64	2930000	4.36	2595000	3.77
Dharmapuri	Chillies	CoCH 1	10	4	320	267	19.98	614585	4.29	500933	3.97
Vellore	Lablab	Co(Gb)14	10	5	69.07	57.89	19.31	76744	2.89	49488	1.75
Thiruvanamalai	Ridge gourd	Naga	15	3	428	343	24.98	349701	3.15	234332	2.41
Karur	Snake Gourd	Polo 1	5	1	331	238	39.05	195194	2.43	97926	1.70
Dharmapuri	Tomato	ArkaRakshak	10	2	582	488	19.26	217060	2.64	176100	2.06
Salem	Tomato	ArkaRakshak	10	4	117	97.1	20.49	36717	1.42	25972	1.32
Coimbatore	Tomato	Pvt. Hyb 5005	10	2	931.3	851.85	9.33	105165	2.30	77870	1.84

Dindigul	Tomato	CoTH 3	10	2	628	511	22.97	176106	2.93	135633	2.47
Cuddalore	Watermelon	NS 5	10	4	298	242	22.83	128968	2.65	91245	2.22
Villupuram	Marigold	Pvt. Hybrid	10	2	195	127	53.54	196460	3.03	94807	1.99
Salem	Cassava	SreeAthulya	10	4	356	266	33.83	81364	2.04	34271	1.43
Kanyakumari	Napier grass	Co (BN) 5	10	4	3210	3100	3.55	201000	2.68	190000	2.58
Villupuram	Napier grass	Co(BN) 5	10	0.8	67.92	61.12	11.13	110816	2.88	96608	2.72
			335	113.8							

Kerala: A total 43 demonstrations conducted on hybrids in brinjal, tomato, yardlong bean, cucumber and cocoa in about 3.04 ha area have revealed higher yield by 40% in tomato hybrid Arka Rakshak,

13.80% in NS-621 yardlong bean hybrid, 62.9% in Multistar cucumber hybrid and 198% in F1 hybrid cocoa as compared to their local check varieties in the state of Kerala (Table 56).

Table 56: Frontline demonstrations on hybrids conducted in the state of Kerala

KVK	Crop	Hybrid	No of Demos	Area (ha)	Yield (q/ha)		% increase	Economics of Demo		Economics of Check	
					Demo	Check		Net returns	BCR	Net returns	BCR
Malappuram	Brinjal	Green long	10	0.12	902	NA		1534875	3.13	0	
Wynad	Tomato	ArkaRakshak	10	0.4	280	200	40.00	182500	2.87	107500	2.16
Kottayam	Yard long bean	NS 621	10	0.4	371	326	13.80	2.825	2.03	2.0137	1.75
Kollam	Cucumber	Multistar	3	0.12	505	310	62.90	782000	2.47	303500	1.60
Kasaragod	Cocoa	F1 Hybrid	10	2	15.6	5.22	198.85	41957	2.53	9134	1.64
			43	3.04							

3.1.2.15 Farm implements and tools:

Farm mechanization was popularized through 237 demonstrations of various farm implements covering an area of 86.4 ha during the year by KVKs of Zone VIII. Of which 178 demonstrations on farm implements were conducted by KVKs of Tamil Nadu followed by 36 demonstrations in Karnataka and 23 demonstrations in Kerala. The state-wise details of implements demonstrated are presented in table

Karnataka: During the year seven implements were demonstrated by three KVKs covering 36 farmers in the state of Karnataka (Table 57). Improved sickle demonstrated for 10 famers resulted in the saving of 9 man days/ha as compared to conventional method. Similarly, Spiral separator in soybean could save 6 man days/ha. Groundnut decorticator demonstrated in five farmers could save 18 man days/ha and Groundnut stripper could save 3.5 man days/ha. Arecanut Dehusker demonstrated dehusked 650 kg/ 8hrs/four labours as compared

to 320 kg/8hrs/four labours by hand. Improved Fruits and Vegetable Preservator was demonstrated in 3 schools which could extent shelf life upto 10-12 days more.

Table 57: Frontline demonstrations on farm implements conducted in the state of Karnataka

KVK	Implement/Equipment demonstrated	No. of farmers	Area (ha)	No. of labours saved/ha	Name of technology specific parameter	Demo plot	Check plot
Belagavi II	Improved sickle for paddy	10	4	9			
	Spiral separator in soybean	5	2	6			
	Groundnut decorticator	5	2	18			
	Groundnut stripper	5	2	3.5			
Tumkur-I	Arecanut Dehusker	4			Labour requirement in Mandays (480kg dehusking)	4	12
	Improved Fruits and Vegetable Preservator		3 schools		Extension of shelf life	10-12 days	
Udupi	Power operated paddy weeder	9	4				
State total		36	14				

Tamil Nadu

A total of 20 implements were demonstrated in 178 farmer's field covering more than 66.6 ha area by the KVKs of Tamil Nadu (Table 58). Improved cotton bag and picking machine for cotton picking demonstrated for 10 farmers exhibited a picking efficiency of 23 kg/hour compared to 14.6 Kg/hour in check. Demonstration of Power weeder in cotton saved 89 labours/ha and generated Rs. 10,896/ha savings in terms of labour cost. Whereas demonstration of TD groundnut harvester saved 19 labours/ha and generated Rs. 1245/ha savings in terms of labour cost. Recovery percentage of 70 was achieved in a demonstration of millet dehuller for

10 farmers in Dharmapuri district of Tamil Nadu. Demonstration of Mechanized Turmeric Seed Planter could save 33 man-days/ha and generated Rs. 10,500/ha as a savings in labour cost. Seed rate was 845 kg/ha in demo (kg/ha) as compared to 2500 kg/ha in local. Similarly, turmeric harvester could save 72.5 labours/ha.

Tamarind dehuller demonstrated in one ha for 10 farmers showed 76.30 kg/hour capacity as compared to 5.89 kg/hr in local method. Use of power weeder yielded in substantial saving in labour requirement. Tractor operated Pulse seeder in blackgram had a net return of Rs. 62,393/ha as compared to Rs. 40,560/ha in check. Smokeless

chulha was demonstrated by Thiruvarur KVK which showed fuel efficiency of 0.9 kg/hour. Demonstration of Mini combined harvester (rice) for small farm holdings could earn a net return of Rs.48, 129/ha as compared to that of Rs.12,610/ha in check.

Germination per cent was 91.4 per cent in the demonstration of Zero till seed cum fertilizer drill

for rice fallow blackgram as compared to 66.8 per cent germination in the conventional method. Demo gave a net return of Rs. 61,521/ha compared to that of Rs. 35,884/ha in check. Motorized sugarcane bud chipper had an efficiency of 2255 number of buds/hr as compared to 420 buds/hr in conventional method.

Table 58: Frontline demonstrations on farm implements conducted in the state of Tamilnadu

KVK	Implement/ Equipment demonstrated	No.of farmers	Area (ha)	No.of labou rs saved/ ha	% incre- ase over check	Net returns (Rs/ha)		Name of technology specific parameter	Demo plot	Check plot
						Demo	Check			
Ariyalur	Mechanized Groundnut cultivation	10	4	103		65920	48150	Stripping efficiency (%)	96.70	99
	Improved cotton bag and picking machine for cotton picking	10	4	33.8				Picking efficiency	23 kg/ hr,	14.6 kg/hr,
Coimbatore	Power weeder in cotton	10	4	89		27657	7691	Savings in labour (Rs./ha)	10896	
	TD groundnut harvester	10	4	19		23122	15527	Savings in labour (Rs./ha)	1245	
Dharmapuri	Millet dehuller	10	10			3927	1500	Recovery percentage of rice in per cent	70	
Erode	Turmeric seed planter	4	1.6	33		338500	271750	Field capacity (ha/hr)	0.14	0.05
	Turmeric Harvester	4	1.6	72.5				Field capacity (ha/hr)	0.079	0.005
	Tamarind dehuller	10	1	19.64		14840.40	11294	Capacity (kg / hr)	76.3	5.89
Krishnagiri	Power weeder in tomato	10	4	12		87320	82990			

Madurai	Paddy Straw Balers	10	4		36130	19885			
	Impact type groundnut stripper	10	4		71911	62961			
	Demonstration of power weeder in dry land	10	4		31116	22890			
Pudukottai	Tractor operated Pulse seeder in blackgram	10	0.4	24.88	62393	40560			
Sivagangai	Rice cum green manure seeder	10	5	25	60600	30000			
Thiru vannahmalai	Tractor Drawn seed drill & Improved dryland weeder for groundnut cultivation	13	5	25.25			No. of productive tillers per hill	29	22
							Time required for harvest	24.4	61.1
Thiruvarur	Smokeless chulha	1					Fuel Efficiency (kg/hour)	0.9	1.6
Trichy	Mini combined harvester (rice) for small farm holdings	15	6	43.39	48129	12610			
	Zero till seed cum fertilizer drill for rice fallow blackgram	10	4	63.82	61521	35884	Germination (%)	91.4	66.8
Vellore	Motorized sugarcane bud chipper	10		3.5	188584	184171	No. of buds/hr	2255	420
	Biogas plant	1					% of LPG gas saved /Family / Month (%)	72.58	
State total		209	85.6						

Kerala

In Kerala four implements were demonstrated for 23 farmers in an area of 5.8 hectare. 10 demonstrations were conducted on Wonder climber devised for mechanized harvesting in coconut,

covering 5 ha area under Malappuram KVK. Time taken per palm was 63.5 second while using wonder, whereas conventional method took 158.2 second/palm. Easiness in operation score was 8 out of 10 for the demonstration whereas the same was 7 in conventional method.

KVK Palakkad demonstrated herbicide applicator attachment to tractor operated dry seeder for rice. In-line drip irrigation system for solanaceous vegetable cultivation and automatic drip irrigation system for roof-top vegetable cultivation was demonstrated by KVK Trivandrum.

In-line drip irrigation system for solanaceous vegetable cultivation had a water use efficiency of 1.65 q/ha/cm and labour requirement for irrigation was only 2 compared to 45 in conventional method. Automatic drip irrigation system for roof-top vegetable cultivation showed a water use efficiency of 22.83 q/ha/cm

3.1.2.16 Other enterprises: A total of 793 demonstrations were organized on other enterprises such as processing and value addition in coconut, sorghum, banana, foxtail millet, maize, ragi, jack fruit, tapioca, tamarind, soya, amla, wild amla, barnyard millet, kodo millet, mango, milk and mushroom, resource conservation technologies like drum composter for management of kitchen

waste, nutri- composting, composting by use of EM solution, by utilizing earthworms, inoculum and also aerobic model of composting. Demonstrations were also conducted on integrated farming system, production and management of mushroom, sericulture, apiary, for income generation mainly for farm women by the KVKs through establishment of SHGs and production units during the year.

In Karnataka 233 demonstrations were conducted under various thematic area such as; agroforestry, child development, drudgery reduction, integrated farming system, small scale income generating enterprise, nutrition management, processing and value addition, sericulture and waste management (Table 59). Eleven self-help groups were also organized for promoting some of the enterprises. Maximum number of demonstrations were done on nutrition management and processing and value addition followed by sericulture by the KVKs in the state of Karnataka

Table 59: Frontline Demonstrations on Enterprises conducted by KVKs of Karnataka

Thematic area	Number of KVKs	Number of demonstrations
Agroforestry	1	5
Child development	5	33
Drudgery reduction	1	1
Integrated farming system	1	5
Small scale income generating Enterprise	3	13
Nutrition management	10	64
Processing and value addition	6	63
Sericulture	6	42
Waste management	2	7
State total		233

Tamil Nadu

In Tamil Nadu 333 demonstrations were organized by KVKs under various thematic area such as; agroforestry, apiculture, drudgery reduction, IFS, small scale income generating enterprises, mushroom cultivation, nutrition

management, organic farming, processing and value addition, sericulture and waste management. Four self-help groups were also organized for promoting some of the enterprises. Maximum number of demonstrations were done on nutrition management followed by processing and value addition (Table 60).

Table 60: Frontline Demonstrations on Enterprises conducted by KVKs of Tamil Nadu

Thematic area	Number of KVKs	Number of demonstrations
Agroforestry	1	5
Apiculture	1	10
Drudgery reduction	3	24
IFS	2	6
Small scale income generating Enterprises	1	5
Mushroom cultivation	3	17
Nutrition management	15	123
Organic farming	2	6
Processing and value addition	10	82
Sericulture	3	35
Waste management	3	20
State total		333

Kerala

In Kerala, a total of 227 demonstrations were organized by KVKs, under various thematic area such as; bio pharmacy, drudgery reduction, IFS, mushroom cultivation, nutrition management,

organic farming, processing and value addition, sericulture and waste management (Table 61). Maximum demonstrations were conducted on processing and value addition and twenty-two self-help groups were also organized for promoting various enterprise

Table 61: Frontline Demonstrations on Enterprises conducted by KVKs of Kerala

Thematic area	Number of KVKs	Number of demonstrations
Bio pharmacy	1	5
Drudgery reduction	2	13
IFS	1	17

Mushroom cultivation	1	10
Nutrition management	1	5
Organic farming	2	20
Processing and value addition	8	102
Sericulture	1	5
Waste management	4	50
State total		227

3.1.2.17 Livestock and fisheries: During the year under report, 1011 demonstrations on dairy, sheep & goat, poultry and fisheries were conducted by the KVKs of Karnataka, Tamil Nadu, Kerala, Puducherry and Goa states under Zone-VIII. The state-wise details of technologies demonstrated and their performance are presented below:

Karnataka: Out of 201 demonstrations, 138 were on dairy cattle covering 154 animals, 37 on sheep

& goat covering 160 animals and 26 on fisheries. The technologies demonstrated included integrated nutritional management, mastitis management, management of endo and ecto parasites, feeding rumen bypass fat, fodder production, azolla production, feeding pro-biotics, area specific mineral mixture, management of foot rot, carp farming etc. The details of technology/breed/species demonstrated with economics are presented in Table 62.

Table 62: Details of technology/breed/species demonstrated with economics in Karnataka.

KVK	Technology demonstrated	Breed / Species	Farmer (no.)	live stock/ units (no.)	Unit	Yield		% increase over check	Net ret-urns Rs/anim. (or demo) /year (or cycle)		B:C ratio	
						Demo	Check		Demo	Check	Demo	Check
Dairy												
Bangalore Rural	Integrated nutritional interventions in dairy animals	Crossbred cows	15	15	Milk yield l/anim./lactation	3105	2349	32.18	20466	8555	1.55	1.25
Bangalore Rural	Management of mastitis at sub clinical stage in dairy animals	Crossbred cows	15	15	Milk yield l/anim./lactation	3443	2565	34.21	24318	16404	1.65	1.35

Bangalore Rural	Integrated management of endo and ecto parasites in dairy	Crossbred cows	10	10	Milk yield l/anim./lactation	3578	2903	23.26	15972	8733	1.56	1.32
Bellary	Feeding of rumen bypass fat to improve milk yield & milk fat percentage in cross bred dairy animals.	Crossbred cows	05	05	Milk yield l/anim./lactation	4239	3207	32.18	1056456	659988	4.69	3.77
Bellary	Use of chelated minerals and cow mats for better milk production and reproduction in dairy cattle	Crossbred cows	05	05	Milk yield l/anim./lactation	3019	2500	20.73	69077	50566	4.22	3.6
Davangere	Integrated management of dairy animals for better performance	Crossbred cows	01	05	Milk yield l/anim./lactation	2458	2079	18.23	20542	15525	1.5	1.42
Gadag	Fodder production	Crossbred cows	04	04	Milk yield l/anim./lactation	1620	1318	22.95	19275	1897	1.89	1.06
Gadag	Azolla production	Crossbred cows	10	10	Milk yield l/anim./lactation	1998	1877	6.47	10378	8334	1.27	1.23
Hassan	Demo of area specific mineral mixture in milch animals	Crossbred cows	03	15	Milk yield l/anim./lactation	4760	4394	8.34	81261	73932	3.4	3.34
Kodagu	Introduction of effective ectoparasiticide for control of ticks and lice in milch cows	Crossbred cows	08	08	Milk yield l/anim./lactation	3325	2876	15.61	7922	3097	1.51	1.21

Kodagu	Introduction of effective treatment for controlling milk fever in milch cows	Crossbred cows	25	25	Milk yield l/anim./lactation	3263	2841	14.85	7214	2833	1.49	1.22
Koppal	Demonstration of effective treatment for repeat breeding in dairy cows	Crossbred cows	03	03	Fertility %	63.33	26.66	36.67	-	-	-	-
Koppal	Rubber cow mats for comfort and better milk production	Crossbred cows	03	03	Milk yield l/anim./lactation	2268	2052	10.53	70860	59540	12.81	7.0
Koppal	Area specific mineral mixture in dairy cattle	Crossbred cows	03	03	Milk yield l/anim./lactation	2538	2214	14.63	71370	56120	4.5	4.3
Mandya	Area specific mineral mixture & other POP	Crossbred cows	05	05	Milk yield l/anim./lactation	2916	2646	10.20	10898	4117	1.51	1.21
Raichur	Effect of feeding slow releasing urea on milk yield and composition in dairy animals	Crossbred cows	10	10	Milk yield l/anim./lactation	2862	2646	8.16	63909	54270	3.91	3.75
Raichur	Use of chelated minerals for better production and reproduction in dairy cattle	Local cattle	10	10	Milk yield l/anim./lactation	1431	1323	8.16	31860	27054	3.87	3.70
Tumkur-I	Management of dairy animals in transition period	Crossbred cows	03	03	Milk yield l/anim./lactation	1390	1033	34.56	11120	5165	1.5	1.33
Sub-Total			138	154								

Sheep and Goat												
Belgaum-I	Nutritional intervention with UMMB in goats	Jamnabari	08	64	Weight in kg/animal	35.3	28.6	23.43	11049	8803	12	10.6
Davangere	Balanced feeding and total deworming in small ruminants for better body weight gain	Bellary Local	10	50	Weight gain in kg/anim./60 days	4.48	-	-	4909	-	2.08	-
Koppal	Demonstration on prevention & control of foot rot/soft hoof in Sheep/Goat	Local	03	03	Foot rot Recovery %	80	40	40	-	-	-	-
Koppal	Demonstration on oestrus induction and synchronisation in sheep/Goat using indigenous intra-vaginal sponges	Local	03	03	Conception rate %	80	20	60	-	-	-	-
Raichur	Effect of feeding probiotics on growth performance in sheep & Goat	Kenguri	10	10	Weight in Kg/anim.	22.75	18.00	26.39	-	-	-	-
Tumkur-I	Integrated Disease Management in Goats	Local	03	30	Morbidity %	1	10	-9	-	-	-	-
Sub-Total			37	160						-	-	
Fishery												
Belgaum-I	Stunted fingerling for higher productivity	Carps	05	05	Yield in q/ha	336.9	226.7	48.61	179024	111405	5.4	4.09

Belgaum-I	Carp farming in alkaline and saline areas	Carps	05	05	Yield in q/ha	370	-	-	178 613	-	5.1	-
Hassan	Demonstration of Composite fish culture in farm pond	Rohu, Common carp, Grass carp	08	08	Yield in kg/ha	1166	829.5	40.52	109 500	52781	5.6	4.9
Koppal	Carps farming in alkaline/saline salts of Tungabhadra command area	Carps	03	03	Yield in t/ha	Fish 2.6	Paddy 1.5	-	98000	10000	1.9	1.5
Mysuru	Rearing of Indian major carps in small tanks under very high density	Carps	05	05	Weight in Kg/fish	0.66	0.51	29.41	94820	64700	2.11	1.65
Sub-Total			26	26								
State-Total			201	340								

Tamil Nadu: Out of 655 demonstrations, 405 were on dairy cattle covering 550 animals, 185 on sheep & goat covering 805 animals, 60 on poultry covering 1779 birds and five on fishery. Technologies demonstrated included area specific mineral mixture, oestrous synchronization, fodder production, clean milk production, calf

management, ethno veterinary medicines, GRAND supplement, infertility management, integrated disease management, package of practices for desi birds, introduction of high yielding breeds/species, Pangasius fish culture etc. The details of technology/breed/species demonstrated with economics are presented in Table 63.

Table 63: Details of technology/breed/species demonstrated with economics in Tamil Nadu.

KVK	Technology demonstrated	Breed / Species	Farmer (no.)	live stock/ units (no.)	Unit	Yield		% increase over check	Net ret-urns Rs/anim. (or demo) /year (or cycle)		B:C ratio	
						Demo	Check		Demo	Check	Demo	Check
Dairy												
Coimbatore	Area specific mineral mixture	Crossbred cows	10	10	Milk yield l/anim./lactation	1976	1593	24.07	14294	4305	1.7	1.41

Dharmapuri	Oestrous synchronization in dairy cattle	Crossbred cows	10	10	Conception rate %	90	0	90	47628.8	-312	2.74	0.98
Dharmapuri	Herbal treatment for mastitis in lactating cattle	Crossbred cows	50	50	Milk yield l/anim./lactation	3240	2160	50.00	29461	23151	2.75	2.18
Dindigul	Demonstration on Mineral mixture for cattle	Crossbred cows	40	40	Milk yield l/anim./lactation	2422	1906	27.05	22131	16237	2.5	2.3
Erode	Fodder production	Crossbred cows	10	10	Milk yield l/anim./lactation	2868	2484	15.46	138424	110348	2.01	1.86
Kancheepuram	Demonstration of ABT-SCC quick count tube kit to identify mastitis	Crossbred cows	10	10	Milk yield l/anim./lactation	1849.5	1134	63.10	29295	5940	2.12	1.21
Namakkal	Package of Practices for Mastitis Control and Clean Milk Production	Crossbred cows	25	50	Milk yield l/anim./lactation	2684	1420	89.01	14400	8100	2.8	1.7
Perambalur	Demonstration Fodder sorghum Co31 production for dairy farmers	CoFS31	15	15	Milk yield l/anim./lactation	2153	1774	21.31	39870	25530	2.77	2.50
Perambalur	Demo on Cumbu Napier hybrid grass Co(CN)5 production for small, marginal dairy farmers	Co5	25	25	Milk yield l/anim./lactation	2051	1702	20.52	43098	25755	2.63	2.40
Perambalur	Packages & Practices of calf management up to one year	Crossbred cows	10	20	Weight in kg/calf at 6 months	106	88.5	19.66	16944	9688	2.78	2.15

Perambalur	Demonstration on Packages of Ethno veterinary medicines on Ruminants	Crossbred cows	10	10	Days to recovery	2.4	5.6	-3.2	3260	1728	2.9	2.04
Salem	Follicular wave synchronization using GnRH for augmenting fertility in dairy cattle	Crossbred cows	10	10	Conception rate %	100	40	60	50660	975	2.5	1.07
Salem	Use of TANUVAS GRAND supplement in crossbred dairy cattle	Crossbred cows	20	40	Milk yield l/anim./lactation	2946	2754	6.96	37875	19806	2.15	1.60
Sivagangai	Demonstration on synchronization of ovulation (ovsynch protocol) and fixed time A.I to augment fertility in anoestrus dairy cows	Crossbred cows	30	30	Conception rate %	79	62	27	45043	26373	2	1.70
Sivagangai	Demonstration on use of TRIU-B to treat infertility in dairy cows	Crossbred cows	20	20	Conception rate %	80	61	19	47580	25556	2	1.56
Theni	Demonstration of grand supplement for dairy animals	Crossbred cows	05	05	Milk yield l/anim./lactation	666	589	13.07	-	-	-	-
Thiruvarur	Induction on follicular wave and artificial insemination augment fertility in dry non pregnant cows and the buffaloes of Thiruvarur district	Buffaloes & Crossbred cows	30	30	Conception rate %	86.7	-	-	-	-	-	-

Tuticorin	Demonstration for improvement of profitability in High yielding cross bred Dairy cows	Crossbred cows	15	15	Milk yield l/anim./lactation	2832	2525	12.14	29075	23483	1.69	1.59
Tuticorin	Demonstration for improvement of profitability in Low yielding cross bred Dairy cows	Crossbred cows	20	20	Milk yield l/anim./lactation	2210	1967	12.33	25818	20207	1.87	1.69
Vellore	Demonstration of ethno-veterinary medicine for the control of external parasites in dairy cow.	Crossbred cows	10	100	No. of days protected from parasites	15	21	-6	-	-	-	-
Villupuram	Demonstration of TANUVAS - grand supplement in Villupuram district	Crossbred cows	20	20	Milk yield l/anim./lactation	1847	1620	14	19718	9566	2.07	1.53
Villupuram	Management of postpartum anoestrus for improving the breeding efficiency in cross bred Dairy cows	Crossbred cows	10	10	Conception rate %	90	0	90	-	-	-	-
Sub-Total			405	550								
Sheep and Goat												
Erode	Area Specific Mineral Mixture	Local	10	10	Weight in Kg/anim. at 9 months	18.8	16.4	14.63	3029	1,940	2.90	1,90

Kancheepuram	Integrated Diseases Management in Sheep and Goat	Local	10	10	Weight in kg/anim. at 3 months	5.31	4.14	28.26	1047	547	3.01	1.81
Namakkal	Packages of practices for control of mortality in kids	ND	25	200	Mortality %	2	30	-28	1400	1000	1.9	1.52
Namakkal	Packages of practices for control of mortality in lambs	Mecheri	25	200	Mortality %	5	18	-13	2500	2000	2.2	1.8
Salem	package of practices for scientific goat rearing	ND	10	10	Weight gain in gm/anim./day	119.4	84.3	41.64	2240	774	1.92	1.32
Sivagangai	Demonstration on packaging of practices for prevention of mortality in goats	ND	25	25	Mortality %	1.6	5.2	-3.6	2845	2002	2.63	2.08
Theni	Demonstration on management practices on goat	Local	05	05	Weight in kg/anim.	24.66	21	17.43	-	-	-	-
Tuticorin	Scientific Management and Comprehensive Disease Control Practices in Sheep Rearing	Local	10	100	Mortality %	5	24	-19	8330	2682	1.66	1.22
Tuticorin	Demonstration on Mineral lick feeding to enhance body weight gain in Goat kids	Local	20	200	Weaning weight in kg/anim.	7.84	7.26	7.99	1987	1463	4.97	4.04

Vellore	Artificial insemination of native female goats by using Frozen semen straws of Boer breed	Local	20	20	Birth weight kg/kid	2.57	1.75	46.86	-	-	-	-
Villupuram	Demonstration of Oestrus synchronization in native breeds of goat	Local	25	25	Conception rate %	51.1	46.1	5	-	-	-	-
Sub-Total			185	805								
Poultry												
Erode	Community Egg Incubator	Desi birds	01	01	Hatching %	85	54	31	3050	1380	2.05	1.58
Kancheepuram	Demonstration of Nandanam-3 broiler chicks and Pekin ducklings in IFS models	Pekin ducks	05	05	Weight in kg/bird	2.27	0.920	146.74	6472	553	2.05	1.16
Namakkal	Package of Practices for Rearing of Desi Birds for Meat	Vanaraja	10	250	Weight in Kg/bird	1.3	0.9	44.44	150	100	2.4	2.1
Namakkal	Package of Practices for Rearing of Desi Birds for Egg	Desi birds	10	20	Number of eggs/bird	132	76	73.68	900	300	2.5	1.9
Namakkal	Continuous production and supply of Native chicken chicks through community Egg Incubator	Desi birds	01	200	Hatch ability %	90	-	-	-	--	-	--
Thiruvarur	Demonstration of Gold Quail	Gold Quail	10	250	Weight in kg/bird	250	191.5	30.55	10080	1697	2.09	1.40

Thiruvapur	Demonstration of Ranikhet vaccination in desi poultry	Desi birds	10	50	kg	59.5	49.7	19.72	5111	4018	2.14	1.85
Vellore	Demonstration of Calcium supplementation to desi backyard poultry for prevention of breakage of eggs.	Native desi chicken	10	1000	Mark etable egg production %	99	91	8	19682	10202	2.1	1.5
Vellore	Mini Incubator	Desi birds	03	03	Hatchability %	86.3	75.3	11	14047	5244	2.2	1.5
Sub-Total			60	1779								
Fishery												
Nagapattinam	Demonstration of Pangasius fish culture under farmers participatory mode	Pangasius	5	5	Weight in gram/fish	948	613	54.65	29565	25289	2.26	2.12
Sub-Total			5	5								
State-Total			655	3139								

Kerala: Out of 124 demonstrations, 69 were on dairy cattle covering 69 animals, 12 on sheep & goat covering 12 animals, 40 on poultry covering 40birds, 02 on rabbitary covering 32 animals and one on fisheries were conducted by KVKs of Kerala. The technologies demonstrated include OVO synchronization for infertility management,

ethno veterinary medicines, control of endo &ecto parasites, introduction of new breeds/species in poultry & rabbit, Ranikhet disease management etc. The details of technology/breed/species demonstrated with economics are presented in Table 64.

Table 64: Details of technology/breed/species demonstrated with economics in Kerala.

KVK	Technology demonstrated	Breed / Species	Farm er (no.)	live stock/ units (no.)	Unit	Yield		% inc-rease over check	Net ret-urns Rs/anim. (or demo) /year (or cycle)		B:C ratio	
						Demo	Check		Demo	Check	Demo	Check
Dairy												
Aleppy	Cream separator for enhancing profitability of dairy units	Crossbred cows	01	01	Rs./litre	46.6	42	11	84975	62775	1.63	1.49
Palakkad	Ovulation synch ronization protocol to treat infertility in cattle	Crossbred cows	20	20	Concep tion rate %	87.5	0	87.5	42856	25564	1.77	1.52
Pathan amthitta	Pashu chocolate making machine to popularize the use of UMMB	Crossbred cows	03	03	Labour saving %	66	0	66	4811	3600	1.6	1.34
Trivandrum	Controlled breeding interventions using GnRH and PGF2 α to treat cyclic repeat breeders	Crossbred cows	15	15	Concep tion rate %	68.4	31.05	37.35	191804	98953	1.43	1.19
Trivandrum	Ethno veterinary practices for management of mastitis	Crossbred cows	10	10	Milk yield l/ anim./ lactation	4765	4293	11	61417	29750	1.41	1.18
Idduki	Popularization of Fodder Cafeteria in rural households of Idukki district.	Crossbred cows	10	10	Milk yield l/ anim./ lactation	903	713	21	16810	9340	2.23	1.63

Idduki	Demonstration of Ivermectin for control of Ecto-Endo Parasitic Infestation in dairy cattle	Crossbred cows	10	10	Milk yield l/anim./lactation	860	698	18	13200	8980	1.9	1.66
Sub-Total			69	69								
Sheep and Goat												
Mallapuram	Mineral mixture supplementation	Local	12	12	Morbidity %	5	20	-15	-	-	-	-
Sub-Total			12	12								
Poultry												
Aleppy	Kadakknath breed in backyard poultry rearing	Kadakknath	20	20	Eggs/ bird	90	194	-53.61	2538	884	1.53	1.2
Idduki	Prophylactic management of Newcastle Disease in poultry using oral pellet vaccine	Hybrid and indigenous breed	20	20	Eggs/ demo	530	370	30	530	370	1.7	1.47
Sub-Total			40	40								
Rabbitary												
Ernakulam	Demonstration of pure bred rabbit kit production protocol	Soviet chinchilla	02	32	Weight in kg/anim. of 12 weeks	2.8	2.4	16.67	9820	3850	1.87	1.47
Sub-Total			02	32								
Fishery												
Ernakulam	Demonstration of farming and marketing of Genetically Improved Farmed Tilapia (GIFT)	Tilapia	01	01	Kg/m2	110	36	205.56	49000	13000	1.8	1.5
Sub-Total			01	01								
State-Total			124	154								

Puducherry: Out of 20 demonstrations, 10 on dairy cow covering 10 animals and 10 on sheep & goat covering 30 animals were conducted by KVK of Puducherry. The technologies demonstrated

include rumen bypass feed supplement in dairy cows and integrated disease management in goats. The details of technology/breed/species demonstrated with economics are presented in Table 65.

Table 65: Details of technology/breed/species demonstrated with economics in Puducherry.

KVK	Technology demonstrated	Breed / Species	Farmer (no.)	live stock/ units (no.)	Unit	Yield		% increase over check	Net ret-urns Rs/anim. (or demo) /year (or cycle)		B:C ratio	
						Demo	Check		Demo	Check	Demo	Check
Dairy												
Karaikal	Rumen bypass feed supplement in dairy cows	Crossbred cows	10	10	Milk yield l/ anim./ lactation	2457	2268	8.33	8379	7260	1.9	1.80
Sub-Total			10	10								
Sheep and Goat												
Karaikal	Integrated disease management in goats	Local	10	30	Weight in kg/ anim.	12	10.5	14.29	1170	900	1.43	1.35
Sub-Total			10	30								
State-Total			20	40								

Goa: Eleven demonstrations were conducted on fisheries by KVK South Goa. The technologies demonstrated include promotion of composite freshwater carp culture in village ponds and

introduction of green mussels rope culture. The details of technology/breed/species demonstrated with economics are presented in Table 66.

Table 66: Details of technology/breed/species demonstrated with economics in Goa.

KVK	Technology demonstrated	Breed / Species	Farmer (no.)	live stock/ units (no.)	Unit	Yield		% increase over check	Net ret-urns Rs/anim. (or demo) /year (or cycle)		B:C ratio		
						Demo	Check		Demo	Check	Demo	Check	
Fishery													
South Goa	Promotion of composite freshwater carp culture in village ponds	Carps	10	10	Kg/m2	31.5	-	-	373	725	-	2.48	-
South Goa	Introduction of green mussels rope culture	Mussels	01	01	Kg/m2	15	-	-	432	50	-	2.34	-
Sub-Total			11	11									
State-Total			11	11									

3.1.3 Capacity development

During the year under report, 5153 training courses were organized in which 224314 persons belonging to different categories participated (Table 67). Majority of these (3841 courses) were for farmers/farm women category in which 165213 farmers/farm women were trained. It may be noted that 574 sponsored training courses were

organized by involving 32889 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 (2010), followed by Karnataka (1696). Details are given below:

Table 67. Participation in training courses organized by KVKs: State-wise and category-wise

State / UT	Farmers / Farm Women		Rural Youth		Extension Functionary		Sponsored Programmes		Vocational Programmes		Total	
	C	P	C	P	C	P	C	P	C	P	C	P
Goa	50	1151	11	208	0	0	28	695	0	0	89	2054
Karnataka	1346	68292	54	1917	54	2327	174	15682	68	1997	1696	90215
Kerala	780	35115	194	5909	45	1763	114	4198	101	1987	1234	48972
Lakshadweep	25	1895	9	680	1	20	0	0	8	1621	43	4216

Puducherry	62	1641	7	108	2	45	10	274	0	0	81	2068
Tamil Nadu	1578	57119	82	2613	41	1245	247	12040	62	3772	2010	76789
Total	3841	165213	357	11435	143	5400	573	32889	239	9377	5153	224314

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

3.1.3.1 Farmers and Farmwomen:

Training organized for farmers/farmwomen covered different areas (Table 68). The major area of training was crop production in which 1024 courses were conducted involving 56578 farmers/farmwomen emphasizing the fact that it is still a much sought-after aspect by farmers. Training courses on plant protection (599) and home science (514) were the next most popular courses followed by livestock production and management (401 courses for 14292 farmers). It is heartening to note that courses on soil health and fertility management (300 courses) also attracted nearly 13000 participants. This is also due to emphasis given

by KVKs on account of the International Year of Soils. In horticultural crops, vegetable cultivation with 280 courses was the leading training area. Women participants outnumbered men in home science/women empowerment, income generation and value addition training courses.



Training on Groundnut striper at Haveri

Table 68: Training courses organized for Farmers and Farmwomen

Training Area	Courses (no.)	General participants (no.)			SC/ST participants (no.)			Total participants (no.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Crop production	1024	34477	12918	47395	7155	2218	9373	41632	15136	56768
Plant protection	599	17151	3762	20913	2628	851	3479	19779	4613	24392
Home science/ women empowerment	514	6354	11419	17773	1209	2485	3694	7563	13904	21467
Livestock production and management	401	6205	4650	10855	1246	2191	3437	7451	6841	14292
Soil health and fertility management	300	8067	2784	10851	1364	475	1839	9431	3259	12690
Vegetable crops	280	5343	2684	8027	1099	670	1769	6442	3354	9796

Production of inputs at site	122	2324	1478	3802	420	418	838	2744	1896	4640
Capacity building and group dynamics	118	2839	1398	4237	540	283	823	3379	1681	5060
Fruits	99	2110	478	2588	464	193	657	2574	671	3245
Agril. engineering	81	1947	513	2460	297	127	424	2244	640	2884
Fisheries	62	1010	422	1432	104	50	154	1114	472	1586
Plantation crops	56	1269	422	1691	263	130	393	1532	552	2084
Spices	43	952	344	1296	207	129	336	1159	473	1632
Ornamental plants	37	606	384	990	87	99	186	693	483	1176
Agro-forestry	32	873	259	1132	161	73	234	1034	332	1366
Income generation activities	28	246	239	485	31	211	242	277	450	727
PHT and value addition	19	221	280	501	17	21	38	238	301	539
Livestock and fisheries	10	192	119	311	11	11	22	203	130	333
Tuber crops	7	62	26	88	113	73	186	175	99	274
Methods of protective cultivation	6	151	35	186	6	0	6	157	35	192
Medicinal & aromatic plants	3	61	9	70	0	0	0	61	9	70
Total	3841	92460	44623	137083	17422	10708	28130	109882	55331	165213

A look at state-wise data reveals that out of 3841 courses, 1578 courses were organized in Tamil Nadu, 1346 courses in Karnataka and 780 courses in Kerala. Out of the 165213 participants,

68292 were from Karnataka. Of the total number of participants, 28130 (17%) were from SC/ST category and 49340 (33.5 %) were women participants (Table 69).

Table 69: State-wise break-up of the training programmes conducted for Farmers and Farmwomen

Training Area	Courses (no.)	General participants (no.)			SC/ST participants (no.)			Total participants (no.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Goa	50	466	526	992	111	48	159	577	574	1151
Karnataka	1346	41706	14321	56027	9340	2925	12265	51046	17246	68292
Kerala	780	16872	14265	31137	2040	1938	3978	18912	16203	35115

Lakshadweep	25	0	0	0	1243	652	1895	1243	652	1895
Puducherry	62	546	747	1293	113	235	348	659	982	1641
Tamil Nadu	1578	32870	14764	47634	4575	4910	9485	37445	19674	57119
Total	3841	92460	44623	137083	17422	10708	28130	109882	55331	165213

3.1.3.2 Rural Youth: Training courses were also organized in different areas for rural youth (357 courses, 11435 participants). Among these, value addition was the major training area with 70 courses (1560 participants) followed by 58 courses on mushroom production (1447 participants), bee keeping (28 courses, 1032 participants), integrated farming (21 courses, 2246 participants). Nursery management of horticulture crops (20 courses, 674 participants) and protected cultivation of vegetable crops 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 70).



On campus training - KVK, Ariyalur

Table 70: Training courses organized for Rural Youth

Training Area	Courses (no.)	General participants			SC/ST participants			Total participants		
		M	F	T	M	F	T	M	F	T
Value addition	70	411	862	1273	47	240	287	458	1102	1560
Mushroom production	58	626	607	1233	103	111	214	729	718	1447
Bee-keeping	28	674	222	896	92	44	136	766	266	1032
Integrated farming	21	412	290	702	150	68	218	562	358	920
Nursery management of horticulture crops	20	339	220	559	65	50	115	404	270	674
Protected cultivation of vegetable crops	16	344	284	628	36	29	65	380	313	693
Production of organic inputs	13	235	188	423	51	17	68	286	205	491
Sericulture	13	372	69	441	46	12	58	418	81	499
Small scale processing	13	107	312	419	24	52	76	131	364	495
Post harvest technology	12	122	212	334	10	23	33	132	235	367
Production of quality animal products	12	50	93	143	111	123	234	161	216	377

Sheep and goat rearing	12	114	110	224	8	14	22	122	124	246
Rural crafts	10	67	59	126	21	168	189	88	227	315
Vermi-culture	10	286	113	399	105	48	153	391	161	552
Dairying	9	137	118	255	59	11	70	196	129	325
Ornamental fisheries	9	171	67	238	26	15	41	197	82	279
Poultry production	7	41	87	128	142	134	276	183	221	404
Composite fish culture	5	112	38	150	12	14	26	124	52	176
Planting material production	4	80	37	117	13	1	14	93	38	131
Repair and maintenance of farm machinery and implements	4	37	5	42	5	0	5	42	5	47
Seed production	4	118	46	164	6	15	21	124	61	185
Training and pruning of orchards	4	67	76	143	14	13	27	81	89	170
Piggery	2	18	14	32	4	10	14	22	24	46
Rabbit farming	1	4	0	4	0	0	0	4	0	4
Total	357	4944	4129	9073	1150	1212	2362	6094	5341	11435

Training courses related to rural youth have been further categorized under different states as given in Table 71. KVKs of Kerala conducted more number of courses for rural youth (194 courses) than those in Tamil Nadu (82 courses) and Karnataka (54 courses). This shows the interest of Kerala youth in activities that contribute profitability. Interestingly, nearly half of the participants

(46.7%) of the participants were women. This is a very positive trend as women are equally eager to acquire knowledge and skills in these areas. Youth belonging to SC/ST also participated in good number (20.7%) reassuring that the capacity building efforts of KVKs are equally valuable in mainstreaming the youth of socially disadvantaged sections.

Table 71: State/Union Territory-wise break-up of the training programmes conducted for 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	11	100	74	174	17	17	34	117	91	208
Karnataka	54	1117	451	1568	194	155	349	1311	606	1917
Kerala	194	2487	2596	5083	307	519	826	2794	3115	5909
Lakshadweep	9	0	0	0	423	257	680	423	257	680

Puducherry	7	67	40	107	1	0	1	68	40	108
Tamil Nadu	82	1173	968	2141	208	264	472	1381	1232	2613
Total	357	4944	4129	9073	1150	1212	2362	6094	5341	11435

3.1.3.3 Extension Functionaries: A total of 143 courses were organized for 5400 extension functionaries. Among the different training areas, productivity enhancement in field crops was the major area with 28 courses and 1153 participants. Integrated pest management was the next major

training area with 26 courses and 1014 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 72.

Table 72: Training courses organized for Extension Functionaries

Training Area	Courses (no.)	General participants (no.)			SC/ST participants (no.)			Total participants (no.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Productivity enhancement in field crops	28	793	295	1088	54	11	65	847	306	1153
Integrated Nutrient management	26	645	341	986	16	12	28	661	353	1014
Integrated Pest Management	16	411	105	516	41	17	58	452	122	574
Household food security	10	107	163	270	8	30	38	115	193	308
Production and use of organic inputs	9	232	77	309	28	13	41	260	90	350
Protected cultivation technology	9	336	62	398	17	7	24	353	69	422
Women and child care	8	0	310	310	0	99	99	0	409	409
Group dynamics and farmers organization	7	71	30	101	5	0	5	76	30	106
Low cost and nutrient efficient diet designing	6	56	84	140	0	12	12	56	96	152
Management in farm animals	6	107	64	171	10	2	12	117	66	183
Information networking among farmers	5	56	42	98	7	4	11	63	46	109
Livestock feed and fodder production	4	98	28	126	18	5	23	116	33	149

Capacity building for ICT application	2	114	111	225	5	1	6	119	112	231
Care and maintenance of farm machinery and implements	2	31	17	48	3	0	3	34	17	51
Gender mainstreaming through SHGs	2	4	53	57	0	16	16	4	69	73
Plant protection	2	67	6	73	18	1	19	85	7	92
Rejuvenation of old orchards	1	16	7	23	1	0	1	17	7	24
Total	143	3144	1795	4939	231	230	461	3375	2025	5400

Details of training courses organized for extension functionaries have also been categorized state-wise (Table 73). KVKs in Karnataka organized 54 courses in which 2327 extension functionaries

participated. In Kerala, 45 courses were organized for 1763 participants and in Tamil Nadu, 41 courses were organized for 1245 extension functionaries.

Table 73: State-wise break-up of the training courses conducted for 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	54	1394	660	2054	119	154	273	1513	814	2327
Kerala	45	870	810	1680	44	39	83	914	849	1763
Lakshadweep	1	0	0	0	15	5	20	15	5	20
Puducherry	2	39	4	43	2	0	2	41	4	45
Tamil Nadu	41	841	321	1162	51	32	83	892	353	1245
Total	143	3144	1795	4939	231	230	461	3375	2025	5400

3.1.3.4 Sponsored Programs: Besides the regular training courses, 573 sponsored trainings were conducted by the KVKs in different areas for the benefit of 32889 participants (Table 74). Largest number of training courses (219) was organized on increasing production and productivity of crops with the participation of 15686 farmers/rural youth/extension functionaries. Livestock production and management and soil health and fertility management were the next major areas of training



Training on ripening chamber in mango

under sponsored category with 81 and 69 courses respectively. Commercial production of vegetables and processing/value addition are the other major areas of training that attracted sponsorship for 43 and 46 training courses respectively.

Table 74: Sponsored training courses organized during 2013-14

Training Area	Courses (no.)	General participants (no.)			SC/ST participants (no.)			Total participants (no.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Increasing production and productivity of crops	219	10898	3050	13948	1182	556	1738	12080	3606	15686
Livestock production and management	81	1921	1438	3359	326	497	820	2247	1435	4182
Soil health and fertility management	69	2911	448	3359	390	63	453	3301	511	3812
Commercial production of vegetables	43	1088	795	1883	360	200	560	1448	995	2443
Processing and value addition	46	822	682	1504	91	145	236	913	827	1740
Methods of protective cultivation	38	789	589	1378	94	44	138	883	633	1516
Production of inputs at site	25	586	363	949	29	58	87	615	421	1036
Economic empowerment of women	21	103	369	472	80	45	125	183	414	597
Capacity building and group dynamics	11	306	146	452	63	38	101	369	184	553
Household nutritional security	9	427	523	950	53	77	130	480	600	1080
Farm machinery tools and implements	9	124	55	179	9	19	28	133	74	207
Production of organic inputs	2	0	33	33	0	4	4	0	37	37
Total	573	19975	8491	28466	2677	1746	4423	22652	10237	32889

The State-wise break-up of sponsored programs is provided in Table 75. A total of 247 courses were organized in Tamil Nadu, followed by 174 in Karnataka and 114 in Kerala. The proportion

of women participation was better in Goa, Puducherry and Kerala reflecting the participation of women in farming in these states/UTs.

Table 75: State/Union Territory-wise break-up of the Sponsored Programmes

State/UT	Courses (no.)	General participants (no.)			SC/ST participants (no.)			Total participants (no.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Goa	28	239	237	476	117	102	219	356	339	695
Karnataka	174	10384	3281	13665	1456	561	2017	11840	3842	15682
Kerala	114	2168	1585	3753	239	206	445	2407	1791	4198
Puducherry	10	135	109	244	13	17	30	148	126	274
Tamil Nadu	247	7049	3279	10328	852	860	1712	7901	4139	12040
Total	573	19975	8491	28466	2677	1746	4423	22652	10237	32889

3.1.3.5 Vocational Programmes: This is an important area of training where the focus is to impart skills and enable the trainee to fully earn or supplement his/her livelihood. A total of 239 training courses were organized during the year involving 9377 budding entrepreneurs. Among the different vocations, Agril. para-workers/para-vet

training was the major area of training with 78 courses and 2189 participants. Value addition (37 courses, 905 participants) and Integrated Crop Management (21 courses, 2282 participants) were the other major areas. Processing and value addition training courses also attracted more number of women (571 as compared to 334 men). Details are provided in Table 76.

Table 76: Vocational training courses organized during 2013-14

Training Area	Courses (no.)	General participants (no.)			SC/ST participants (no.)			Total participants (no.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Agril. para-workers, para-vet training	78	1384	404	1788	312	89	401	1696	493	2189
Processing and value addition	37	283	434	717	51	137	188	334	571	905
Integrated Crop Management	21	1354	357	1711	292	279	571	1646	636	2282
Rural crafts	15	16	182	198	0	109	109	16	291	307
Dairying	18	227	109	336	334	166	500	561	275	836

Tailoring, stitching, embroidery, dyeing etc.	12	6	172	178	0	35	35	6	207	213
Commercial vegetable production	9	52	117	169	74	69	143	126	186	312
Repair and maintenance of farm machinery and implements	9	123	44	167	12	2	14	135	46	181
Capacity building and group dynamics	7	21	36	57	0	29	29	21	65	86
Organic farming	7	74	60	134	18	30	48	92	90	182
Production of bio-agents, bio-pesticides, bio-fertilizers etc.	6	18	39	57	312	226	538	330	265	595
Sheep and Goat rearing	5	9	250	259	134	335	469	143	585	728
Mushroom cultivation	4	24	24	48	8	0	8	32	24	56
Beekeeping	3	28	14	42	5	0	5	33	14	47
Poultry farming	3	5	3	8	120	71	192	125	75	200
Seed production	2	6	21	27	0	4	4	6	25	31
Commercial fruit production	1	8	0	8	1	0	1	9	0	9
Nursery raising	1	86	117	203	0	0	0	86	117	203
Vermi-composting	1	15	0	15	0	0	0	15	0	15
Total	239	3739	2383	6122	1673	1582	3255	5412	3965	9377

Vocational training conducted by the KVKs has also been presented state-wise in Table 77. Large number of vocational courses was conducted in Kerala (101 courses) but more participation was recorded in Tamil Nadu (3772 participants from 62 training courses). KVKs in Karnataka conducted 68

vocational courses with the participation of 1997 participants. Out of the total 9377 participants, 3255 were from SC/ST category (34.7%). Extent of women participation was the highest in Kerala (1200 out of 1987, 60.4%).

Table 77: State/Union Territory wise break-up of the Vocational training courses

State/UT	Courses (no.)	General participants (no.)			SC/ST participants (no.)			Total participants (no.)		
		Men	Women	Total	Men	Women	Total	Men	Women	Total
Karnataka	68	1261	289	1550	307	140	447	1568	429	1997
Kerala	101	655	964	1619	132	236	368	787	1200	1987
Lakshadweep	8	0	0	0	1008	613	1621	1008	613	1621
Tamil Nadu	62	1823	1130	2953	226	593	819	2049	1723	3772
Total	239	3739	2383	6122	1673	1582	3255	5412	3965	9377

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 2.

Annexure I

State-wise number of training courses organized for different category of participants

Farmers and Farm Women (On+Off)	Courses (no.)	Participants (no.)		
		General	SC/ST	Total
Goa	50	992	159	1151
Karnataka	1346	56027	12265	68292
Kerala	780	31137	3978	35115
Lakshadweep	25	0	1895	1895
Puducherry	62	1293	348	1641
Tamil Nadu	1578	47634	9485	57119
TOTAL	3841	137083	28130	165213
Rural Youth (On+Off)				
Goa	11	174	34	208
Karnataka	54	1568	349	1917
Kerala	194	5083	826	5909
Lakshadweep	9	0	680	680
Puducherry	7	107	1	108
Tamil Nadu	82	2141	472	2613
TOTAL	357	9073	2362	11435

Extension Functionaries (On+Off)				
Karnataka	54	2054	273	2327
Kerala	45	1680	83	1763
Lakshadweep	1	0	20	20
Puducherry	2	43	2	45
Tamil Nadu	41	1162	83	1245
TOTAL	143	4939	461	5400
Sponsored Programmes				
Goa	28	476	219	695
Karnataka	174	13665	2017	15682
Kerala	114	3753	445	4198
Puducherry	10	244	30	274
Tamil Nadu	247	10328	1712	12040
TOTAL	573	28466	4423	32889
Vocational Programmes				
Karnataka	68	1550	447	1997
Kerala	101	1619	368	1987
Lakshadweep	8	0	1621	1621
Tamil Nadu	62	2953	819	3772
TOTAL	239	6122	3255	9377
All Programmes				
Goa	89	1642	412	2054
Karnataka	1696	74864	15351	90215
Kerala	1234	43272	5700	48972
Lakshadweep	43	0	4216	4216
Puducherry	81	1687	381	2068
Tamil Nadu	2010	64218	12571	76789
GRAND TOTAL	5153	185683	38631	224314

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

Farmers and Farm Women (On+Off)	Courses (no.)	Participants (no.)		
		General	SC/ST	Total
Goa	50	577	574	1151
Karnataka	1346	51046	17246	68292
Kerala	780	18912	16203	35115
Lakshadweep	25	1243	652	1895
Puducherry	62	659	982	1641
Tamil Nadu	1578	37445	19674	57119
TOTAL	3841	109882	55331	165213
Rural Youth (On+Off)				
Goa	11	117	91	208
Karnataka	54	1311	606	1917
Kerala	194	2794	3115	5909
Lakshadweep	9	423	257	680
Puducherry	7	68	40	108
Tamil Nadu	82	1381	1232	2613
TOTAL	357	6094	5341	11435
Extension Functionaries (On+Off)				
Karnataka	54	1513	814	2327
Kerala	45	914	849	1763
Lakshadweep	1	15	5	20
Puducherry	2	41	4	45
Tamil Nadu	41	892	353	1245
TOTAL	143	3375	2025	5400
Sponsored Programmes				
Goa	28	356	339	695
Karnataka	174	11840	3842	15682
Kerala	114	2407	1791	4198
Puducherry	10	148	126	274
Tamil Nadu	247	7901	4139	12040
TOTAL	573	22652	10237	32889

Vocational Programmes				
Karnataka	68	1568	429	1997
Kerala	101	787	1200	1987
Lakshadweep	8	1008	613	1621
Tamil Nadu	62	2049	1723	3772
TOTAL	239	5412	2712	9377
All Programmes				
Goa	89	1050	1004	2054
Karnataka	1696	67278	22937	90215
Kerala	1234	25814	23158	48972
Lakshadweep	43	2689	1527	4216
Puducherry	81	916	1152	2068
Tamil Nadu	2010	49668	27121	76789
Total	5153	147415	76899	224314

3.1.4 Frontline extension programmes

KVKs organized a total of 0.79 lakh extension programmes and created awareness among 106.76 lakh farmers and 5.79 lakh extension personnel and public on various aspects viz., varietal performance, production technologies, Integrated Pest and Disease Management, animal health and nutrition, production technologies of poultry, fisheries and human nutrition.

KVKs are in the forefront of mass media utilization in disseminating timely and relevant technologies to the farming community without any time lag, as well as front-runner in organization of frontline extension programmes to create awareness about recent developments in agriculture & allied sectors, and to disseminate various technologies among farmers on a larger scale. Various extension

programmes carried out by KVKs in coordination and collaboration with other line departments/agencies working in the district during the year are presented here under.

A total of 0.79 lakh extension programmes and services were organized through different methods and means wherein technologies related to agriculture and allied sectors were appraised among 106.76 lakh farmers and 5.79 lakh extension personnel (Table 78). Data further indicated that KVKs in Karnataka organized maximum extension programmes (38900) with the participation of 101.28 lakh farmers and 5.39 lakh extension personnel followed by Tamil Nadu (22425) with 2.65 lakh farmers and 0.22 lakh extension personnel, Kerala (15782) with 2.45 lakh farmers and 0.15 lakh extension personnel, Puducherry (1118) with 0.11 lakh farmers and 0.01 lakh extension personnel, Goa (465) with 0.20 lakh farmers and 0.008 lakh extension personnel and

Lakshadweep (458) with 0.04 lakh farmers and 0.002 lakh extension personnel. Details of activity wise extension programmes organized are furnished Table 79. Data indicate that KVKs in Karnataka have participated in Agricultural Exhibitions and Kisan Melas organized as Mega events annually by their respective Host Organization wherein lakhs of

farmers, extension personnel and other stakeholders take part and hence these two events boosted the number of participants in extension activities of KVKs. As a whole it implies that KVKs' efforts through extension programmes covered a large number of farmers and made them aware about new technologies, activities and enterprises.

Table 78: State wise frontline extension programmes organized and distribution of participants

State	Extension programmes (No.)	Participants (No.)	
		Farmers	Extension Personnel
Karnataka	38908	10128603	539361
Tamil Nadu	22425	265462	22308
Kerala	15782	245731	15923
Goa	465	20205	821
Puducherry	1118	11484	1254
Lakshadweep	458	4573	208
Total	79156	10676058	579875

Table 79 : Activity wise extension programmes organised and distribution of participants

Activity	Extension programmes (No.)	Participants (No.)	
		Farmers	Extension Personnel
Advisory Services (Over phone)	36895	63734	3649
Animal/Plant Health Clinic	608	3631	181
Celebration of Important Days (International)	144	12125	1484
Diagnostic visits	3926	21315	1857
Exhibition	391	6382328	461289
Exposure visits	423	9461	752
Ex-trainees Sammelan	10	489	43
Farm Science Club	43	917	26
Farmers Group Meeting	319	10171	671
Farmers Seminar/Workshop	316	28858	2197
Farmers visit to KVK	23547	88287	4830
Field Day	480	28838	1088

Film Show	562	20920	1291
Group Discussions	431	10082	668
Kisan Ghosthi	99	10933	747
Kisan Mela	257	3744153	59748
Lectures Delivered as Resource Person	2713	134765	9663
Meeting/ Workshop with Extension Personnel	550	10669	24586
Method Demonstrations	1051	35272	1368
Scientists' visit to farmers field	5877	29978	1861
Self Help Group (SHGs)	281	4639	191
Soil health Camp	92	5182	266
Special Day Celebration (National)	141	19311	1419
Total	79156	10676058	579875



Jai Kisan Jai Vigyan Programme, KVK Puducherry



Field on performance of Paddy variety TKM 13, KVK Nagapattinam



Kharif Awareness Programme, KVK Haveri



Rabi Awareness Programme, KVK, Tumakuru-II (Hirehalli)

Further, KVKs popularized technologies through service, literature and mass media and the details are presented in Table 80. KVKs conducted Animal Health Camps wherein a total of 7119 animal were treated of which more number of animals by KVKs in Tamil Nadu followed by KVKs in Karnataka (1529 animals) and KVKs in Kerala (34 animals). Among the print media, a total of 21701 extension literature of various kind were distributed among

framers followed by KVKs activities covered in News papers (1942 No.) of which majority by KVKs in Karnataka (12929 extension literature and 867 news paper coverage). Whereas in case of utilization of electronic media, KVKs in Tamil Nadu used better by TV coverage (154 No.), Radio talks (132 No.), Radio coverage (119 No.), TV talks (66 No.) and CD/DVD (10 No.) in respective KVK activities.

Table 80 : State wise extension programmes organized for mass contact

Activity	States					Total
	Karnataka	Tamil Nadu	Kerala	Goa	Puducherry	
Animal Health Camps (No. of animals treated)	1529	5556	34	0	0	7119
Electronic Media (No. of CD/DVD)	9	10	3	0	0	22
Extension Literature (No. distributed)	12929	5686	2572	200	314	21701
News Letter (No. published)	7	21	1	0	0	29
News paper (No. of KVK activities covered)	867	652	417	0	6	1942
Popular articles (No.)	215	410	50	1	30	706
Radio (No. of KVK activities covered)	61	119	22	0	1	203
Radio talks (No.)	119	132	36	3	4	294
Technical Articles (No. published)	42	57	12	0	7	118
Technical bulletins (No. published)	9	40	4	1	0	54
Technical Reports (No.)	4	9	1	5	1	20
TV coverage (No. of KVK activities covered)	31	154	61	0	0	246
TV Talks (No.)	77	66	7	0	5	155
Total	15899	12912	3220	210	368	32609

Awareness Programmes on Protection of Plant Varieties and Farmers Rights Act

Protection of Plant Varieties and Farmers Rights Authority under Ministry of Agriculture and Farmers Welfare encourage registration of farmers' varieties of crops under Protection of Plant Varieties and Farmers Rights Act 2001. During the reporting period, 11 KVKs (08 in Karnataka and one each in Goa, Kerala and Tamil Nadu) have organized the awareness programme. The major agenda of these programmes includes exhibition of farmers' varieties in various crops, seminars from eminent scientists, group discussions and registration of farmers' varieties under PPV and FR Act.

These programmes created awareness amongst farmers, Plant Breeders and researchers about the Farmers' Rights, conservation, protection and preservation of Plant Genetic Resources for sustainable use under PPV and FR Act 2001. These awareness programmes have further resulted in receipt of applications from farmers for grant of IPR to their varieties and also help in facilitating farmers in applying for Plant Genome Saviour Community Award, Reward and Recognition.

3.1.5 Production of technological inputs

To achieve the potential yield in agriculture and allied sectors, timely availability of good quality seeds, planting materials, livestock breeds and bio-products are the primary requirement. In this direction, 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 of ICAR-ATARI, Bangalore produced and supplied 4818.99 q of seeds of different crop varieties, 40.34 lakh planting materials of different crops and hybrids, 3333.31 q of bio-products and 2.5 lakh of livestock strains and fish fingerlings benefiting 3.51 lakh farmers.

During the period under report, KVKs produced 4818.99 q seeds of crop varieties, 3333.31 q bio-products, 37.84 lakh number of planting materials of varieties, 2.50 lakh number of planting materials of hybrids and 2.50 lakh number livestock and fisheries and supplied to 0.94 lakh, 0.96 lakh, 1.51 lakh, 0.03 lakh, 0.07 lakh farmers, respectively (Table 81).

Table 81 : Production and supply of technological inputs

Category	Quantity	Worth (Rs.in lakh)	Farmers (No. in lakh)
Seeds of crop varieties (q)	4818.99	435.70	0.94
Bio-products (q)	3333.31	189.54	0.96
Planting materials of crops (No. in lakh)	37.84	400.69	1.51
Planting materials of crop hybrids (No. in lakh)	2.50	6.92	0.03
Livestock and fisheries (No. in lakh)	2.50	86.90	0.07

(A) **Seeds:** State and crop category wise details pertaining to seed production by KVKs of ICAR-ATARI, Bangalore is presented in Tables 82 and 83, respectively. Data in Table 82 indicates that KVKs in Tamil Nadu produced the highest quantity of seeds (2075.98 q) followed by KVKs of Karnataka (1994.12 q), Puducherry (573.23 q), Kerala (97.98 q) and Goa (77.68 q). Data in Table

83 shows that more quantity of seed was produced on Cereals (2841.63 q), Fodder crops (597.18 q), Pulses (477.82 q), Oilseeds (331.19 q), Millets (206.59 q), Vegetable Crops (157.13 q), Green manure crops (156.02 q), Spices (37.63 q), Fibre crops (9.36 q), Tuber crops (3.77 q), Fruit crops (0.44 q), and Flower crops (0.23 q).

Table 82: State wise production and supply of seeds

State	Seeds		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Tamil Nadu	2075.98	22030638	29025
Karnataka	1994.12	15652969	4609
Puducherry	573.23	1307721	1056
Kerala	97.98	4111280	59322
Goa	77.68	467571	397
Total	4818.99	43570179	94409

Table 83 : Crop category wise production of seeds

Crop category	Seeds		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Cereals	2841.63	8292374	3114
Fodder crops	597.18	16113958	25271
Pulses	477.82	3526454	1705
Oilseeds	331.19	2247359	730
Millets	206.59	665739	596
Vegetable Crops	157.13	11842418	62499
Green manure crops	156.02	693467	325
Spices	37.63	115060	113
Fibre crops	9.36	29484	21
Tuber crops	3.77	8516	13
Fruit crops	0.44	22030	3
Flower crops	0.23	13320	19
Total	4818.99	43570179	94409

(B) Planting material: State and crop category wise details pertaining to production of planting materials by KVKs of ICAR-ATARI, Bangalore is presented in Tables 84 and 85, respectively. Data in Table 84 indicates that KVKs in Tamil Nadu produced the highest number of planting material (1418474) of crops followed by KVKs in Karnataka (1271655), Kerala (922864), Puducherry (135051), Goa (19790) and Lakshadweep (15800). Data

in Table 85 shows that the maximum quantity of planting material was fodder slips (1296648) and the rest was seedlings of vegetable crops (787665), plantation crops (531083), fruit crops (399553), spices (327552), commercial crops (100617), forest species (97950), ornamental plants (94021), pulses (60000), flower crops (59362), medicinal crops (18360), agro-forestry (10120), and aromatic crops (703).

Table 84: State wise production and supply of planting material

State	Planting Material		
	Quantity (No.)	Value (Rs.)	Farmers (No.)
Tamil Nadu	1418474	7713849	19736
Karnataka	1271655	15917300	4285
Kerala	922864	14130328	124202
Puducherry	135051	1883937	520
Goa	19790	376895	2192

Lakshadweep	15800	46300	323
Total	3783634	40068609	151258

Table 85: Crop category wise production of planting material

Crop category	Planting material		
	Quantity (No.)	Value (Rs.)	Farmers (No.)
Fodder crops	1296648	1021479	2473
Vegetable crops	787665	2756961	100217
Plantation crops	531083	10022610	4724
Fruit crops	399553	13893864	21791
Spices	327552	6513280	10540
Commercial crops	100617	174370	30
Forest Species	97950	1248375	3013
Ornamental plants	94021	2709509	5216
Pulses	60000	90000	25
Flower crops	59362	1135900	1263
Medicinal crops	18360	386252	1780
Agroforestry	10120	101094	157
Aromatic crops	703	14915	29
Total	3783634	40068609	151258

(C) Hybrid planting material: State and crop wise details pertaining to production of planting materials of hybrids by KVKs of ICAR-ATARI, Bangalore is presented in Tables 86 and 87, respectively. Data in Table 86 indicates that KVKs in Karnataka produced highest number of hybrid planting materials (124840) followed by KVKs in Tamil

Nadu (113390), and Kerala (11973). In the case of crops, more number of hybrid seedlings of Tomato (135447), Chillies (41178), Capsicum (20000), Marigold (19155), Papaya (12578), Watermelon (12100), Sapota (4138), Brinjal (2988), Coconut (1418), and Drumstick (1201) (Table 87).

Table 86: State wise production of planting materials of hybrids

State	Planting materials of hybrids		
	Quantity (No.)	Worth (Rs.)	Farmers (No.)
Karnataka	124840	380162	352
Tamil Nadu	113390	196977	120
Kerala	11973	114616	2815
Total	250203	691755	3287

Table 87: Crop category wise production of planting materials of hybrids

Crops	Planting materials of hybrids		
	Quantity (No.)	Worth (Rs.)	Farmers(No.)
Tomato	135447	69592	90
Chillies	41178	57862	1831
Capsicum	20000	50000	20
Marigold	19155	47888	25
Papaya	12578	137928	167
Watermelon	12100	32670	121
Sapota	4138	165520	68
Brinjal	2988	11935	960
Coconut	1418	106350	3
Drumstick	1201	12010	2
Total	250203	691755	3287

(D) Bio-products: State and category wise details pertaining to production of bio products by KVKs of ICAR-ATARI, Bangalore is presented in Tables 88 and 89, respectively. Data in Table 88 indicates that during the year KVKs in Tamil Nadu produced largest quantity of bio products (1443.16 q) followed by KVKs in Kerala (1292.30 q), Karnataka (530.93 q), Goa (41.06 q), and Puducherry (25.86 q). Data in Table 89 shows that largest quantity of bio-products produced was organic manure (1496.33 q) followed by bio-fungicides (972.49 q), mushroom spawn (644.75 q), bio-pesticides (135.41 q),

bio-fertilizers (64.66 q), and bio-agents (19.67 q). Further, KVKs produced 49000 number of EPN (Entomo Pathogenic Nematode), 17761 pheromone traps and 3663 Trico cards (Table 90).

Bio-products

KVKs produced and supplied 3333.31 q of bio products, 49000 EPN, 17761 pheromone traps and 3663 Tricho cards through which more than 96000 farmers were motivated to adopt bio-control by reducing use of chemicals.

Table 88: State wise production of bio-products

State	Bio products		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Tamil Nadu	1443.16	3282731	8538
Kerala	1292.3	9752135	76787
Karnataka	530.93	5627556	8984
Goa	41.06	86998	1234
Puducherry	25.86	205085	829
Total	3333.31	18954505	96372

Table 89: Category wise production of bio-products

Category	Bio products		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
Organic manure	1496.33	1020771	5216
Bio fungicides	972.49	8015561	43634
Mushroom spawn	644.75	7213762	28955
Bio pesticides	135.41	1660436	15405
Bio fertilizers	64.66	451816	1706
Bio agents	19.67	592159	1456
Total	3333.31	18954505	96372

Table 90 : Production of other bio-products

Category	Bio products		
	Quantity (q)	Worth (Rs.)	Farmers (No.)
EPN	49000	49000	298
Pheromone traps	17761	1991916	11930
Tricho cards	3663	77025	546
Total	70424	2117941	12774

(E) Livestock and fisheries: State and category wise details pertaining to production of livestock and fisheries by KVKs of ICAR-ATARI, Bangalore is presented in Tables 91 and 92. Data in Table 91 indicates that KVKs in Kerala produced largest number of livestock materials and fisheries (177027)

followed by Tamil Nadu (30689), Puducherry (28494), Karnataka (10869) and Goa (2785). Of total production, maximum number (145580) was under Poultry followed by Fisheries (88129), Poultry-egg (10893), Sheep and Goat (298), Piggery (152), Rabbitary (65), and Dairy animals (47) (Table 92).

Table 91: State wise production of livestock materials and fisheries

State	Livestock materials and fisheries		
	Quantity (No.)	Worth (Rs.)	Farmers (No.)
Kerala	177027	4724282	3914
Tamil Nadu	30689	2201387	1853
Puducherry	28494	137862	263
Karnataka	10869	1476216	833
Goa	2785	149985	320
Total	249864	8689732	7183

Table 92: Category wise production of livestock materials and fisheries

Category	Livestock materials and fisheries		
	Quantity (No.)	Worth (Rs.)	Farmers (No.)
Poultry	145580	6293831	5310
Fisheries	88129	63338	152
Poultry (Eggs)	10893	42248	897
Ornamental fish	4700	39699	486
Sheep and Goat	298	1084043	164
Piggery	152	443050	81
Rabitary	65	20450	56
Dairy animals	47	703073	37
Total	249864	8689732	7183


Piggery and Goat Units at KVK Virudhnagar

KVKs in Karnataka

Seeds: Produced a total of 1994.12 q seeds of different crops that worth Rs. 156.53 lakh and supplied to 4609 farmers. Out of which, paddy seed ranked first with 484.90 q followed by Bengalgram (201.43 q), Jowar (168.94 q), pigeonpea (159.90 q), Soybean (116.09 q) and rest with other crops.

Planting material: Produced a total number of 12.72 lakh planting material that worth Rs.159.17 lakh and supplied to 4285 farmers. Out of which, Fodder slips (napier) occupied first rank with 2.64 lakh followed by seedlings of Chilly (1.15 lakh), Arecanut (0.95 lakh), Coffee (0.94 lakh), Blackpepper (0.78 lakh) and rest with other crops.

KVKs in Tamil Nadu

Seeds: Produced a total of 2075.98 q seeds of different crops that worth Rs. 220.31 lakh and supplied to 29025 farmers. Out of which, paddy seed ranked first with 1284.38 q followed by Fodder Maize (167.70 q), Fodder Sorghum (138.40 q), Fodder cowpea (74.64 q), Sunhemp (71.55 q) and rest with other crops.

Planting material: Produced a total number of 14.18 lakh planting materials of different crops that worth Rs.77.14 lakh and supplied to 19736 farmers. Out of which, Fodder slips (napier) occupied first place with 7.40 lakh followed by Guinea grass (0.78 lakh), Mulberry (0.58 lakh), seedlings of Onion (0.55 lakh), Tomato (0.43 lakh) and rest with other crops.

KVKs in Kerala

Seeds: Produced a total of 97.98 q seeds of different crops that worth Rs. 41.11 lakh and supplied to 59322 farmers. Out of which, paddy seed ranked first with 60.00 q followed by Cowpea (9.75 q), Amaranthus (7.55 q), Elephant footyam (3.62 q), Turmeric (3.43 q) and rest with other crops.

Planting material: Produced a total number of 9.23 lakh planting materials of different crops that worth Rs. 141.30 lakh and supplied to 1.24 lakh farmers. Out of which, Arecanut occupied first rank with 1.52 lakh seedlings followed by Black pepper (1.10 lakh), Cabbage (0.89 lakh), Mango (0.56 lakh), Cauliflower (0.53 lakh) and rest with other crops.

KVKs in Goa

Seeds: Produced a total of 77.68 q seeds of different crops that worth Rs.4.67 lakh and supplied to 397 farmers. Out of which, maximum were paddy seeds (77.39 q) followed by Brinjal (0.18 q), Cowpea (0.09 q) and Red Amaranthus (0.008 q).

Planting material: Produced a total number of 0.20 lakh planting materials that worth Rs. 3.76 lakh and supplied to 2192 farmers. Out of which, Chilly occupied first rank with 7555 seedlings followed by Coconut (3488), Papaya (1679), Brinjal (751), Cashew (657) and rest with other crops.

KVKs in Puducherry

Seeds: Produced a total of 573.23 q seeds of different crops that worth Rs. 13.08 lakh and supplied to 1056 farmers. Out of which, paddy seed ranked first with 469.18 q followed by Blackgram (88.77 q), Cotton (9.36 q), Foxtail millet (1.73 q), Finger millet (1.68 q) and rest with other crops.

Planting Material: Produced a total number of 1.35 lakh planting materials of different crops that worth Rs.18.84 lakh and supplied to 520 farmers. Out of which, production of Fodder slips (napier) occupied first place (86580 numbers) followed by Crotons (43800), Mango (2935), Jasmine (500), Brinjal (375) and rest with other crops.

KVK in Lakshadweep

Produced a total number of 15800 planting materials of crops that worth Rs.46300 of which Fodder slips (Napier) occupied maximum number (9000) followed by Cucurbitaceous vegetables (3700), Papaya (2500) and Banana (600).

3.1.6 Technology week

Technology Week is an effective extension programme which 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 also acts as a common platform to discuss and sharing of experiences of various stakeholders on the latest

issues and prioritized problems and for making appropriate strategies for arriving solutions to them. The major technical agenda in Technology Week include 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, 23 KVKs of the Zone; viz., 16 in Karnataka, 5 in Kerala and

2 in Tamil Nadu organized Technology Week, in which a total of 356481 farmers participated. These programmes were organized in coordination with 304 agencies. In addition, 2.16 t seeds of high yielding varieties / hybrid seeds, 14242 planting materials and 2.47 t of bio-products, were made available for sale to the farmers.

3.1.7 Kisan Mobile Advisory Services (KIMAS)

Kisan Mobile Advisory Service is one of the Information and Communication Technology (ICT) tools for dissemination of requisite and need based information at the right time to the needy people.

KVKs are sending information via text and voice messaging to registered farmers advising them on the vital issues of agricultural importance. Accordingly 64 KVKs have advised farmers regularly on the areas of crops, livestock, other enterprises, weather, marketing and awareness of latest agricultural technologies through text messages, voice calls and both depending on the expertise available with them. During the reporting period 6041 text messages and 4113 voice messages were sent to farmers. Among these communications major share was of crops (5120) followed by awareness (1545), livestock (1103), weather (1046), marketing (714), and other enterprises (626). The details are presented in Table 93.

Table 93: Details of State-wise SMS/Voice calls sent under various priority areas

Name of State	No of KVKs	Message Type	Crop	Lives-tock	Weather	Market-ing	Aware-ness	Other enter-prise	Total
Karnataka	28	Text only	1141	124	164	128	414	168	2139
	1	Voice only	0	0	0	0	2	0	2
	TOTAL		1141	124	164	128	416	168	2141
Tamil Nadu	27	Text only	808	216	115	105	254	116	1614
	6	Voice only	482	609	124	32	63	48	1358
	TOTAL		1290	825	239	137	317	164	2972
Kerala	7	Text only	205	80	560	35	302	75	1257
	3	Voice only	2197	53	83	67	193	50	2643
	TOTAL		2402	133	643	102	495	125	3900
Goa	1	Text only	2	21	0	0	0	7	30
Puducherry	1	Voice only	285	0	0	347	317	162	1111
TOTAL	64	Text only	2441	441	839	615	1287	528	6151
	10	Voice only	2679	662	207	99	258	98	4003
ZONAL TOTAL			5120	1103	1046	714	1545	626	10154

3.1.8 E-Connectivity

Under the e-connectivity project implemented by ICAR in the XI Plan period, E-Linkage was established in 37 KVKs along with Zonal Project Directorate, Bangalore with technical guidance and execution by ERNET India. State-wise number of KVKs provided with e-linkage is given in Table 94. These KVKs were connected electronically through VSAT and to the Hub established at New

Delhi. The communication between KVKs across the country through IP phones was enabled by providing IP phone numbers. KVK staffs were regularly apprised of the latest technologies through guest lectures by eminent scientists in the respective fields and other communications through e-connectivity/video conferencing. Using these facility e-seminars were webcasted from KVK hub New Delhi involving experts in the field covering various topics of interest to KVKs during the year.

Table 94: KVKs with e-linkage facility

States	No. of KVKs	Districts
Karnataka	11	Raichur, Bidar, Gulbarga, Haveri, Hassan, Mandya, Chitradurga, Chickmagalur, Mysore, Belgaum, Gadag
Tamil Nadu	14	Salem, Cuddalore, Trichy, Pudukottai, Vellore, Ramanathapuram, Madurai, Kanchipuram, Dindigul, Nilgiris, Thiruvannamalai, Erode, Tuticorin, Karur
Kerala	10	Palghat, Kollam, Wyanad, Kannur, Malappuram, Thrissur, Kasaragod, Calicut, Trivandrum, Pathanamthitta
Goa	1	North Goa
Puducherry	1	Puducherry

3.1.9 Soil, Water and Plant Analysis

A total of 67 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 64609 samples of soil, water, plant, manure and leaf tissue received from 54900 farmers belonging to 29326 villages were analyzed with realization of Rs. 47.95 lakh (Table 95). 3277 Soil Health Cards were distributed to

farmers. State-wise data showed that KVKs in Karnataka analyzed samples (44842) followed by Tamil Nadu (11727), Kerala (7041), Goa (537) and Puducherry (462) (Table 96).



World Soil Health day celebration at Haveri district

Table 95: Details of Samples analyzed during 2015-16

Type of sample	No. of samples	No. of Farmers	No. of villages	Amount realized (Rs.)
Soil samples	44549	37003	17671	3547048
Water samples	19590	17575	11414	1233924
Plant samples	359	256	181	390
Organic Manure	94	59	53	12060
Leaf Tissue Analysis	17	7	7	1700
Total	64609	54900	29326	4795122

Table 96: State-wise soil, water, plant analysis undertaken during 2015-16

Type of sample	No. of samples	No. of Farmers	No. of villages	Amount realized (Rs.)
Karnataka	44842	39694	25124	3602960
Tamil Nadu	11727	8833	2716	363945
Kerala	7041	5618	1364	790235
Goa	537	493	17	10132
Puducherry	462	262	105	27850
Total	64609	54900	29326	4795122

World Soil Day Celebration

World Soil Science Day was celebrated in 61 KVKs on 5.12.2016 in the presence of 15 Member of Parliament and 6 Member of Legislative Assembly including one Union Minister of State,

Government of India. In these programmes, 11373 farmers participated and got benefitted. On the occasion, 10631 Soil Health Cards were distributed to the farmers. The state wise details are presented in Table 97 given below.

Table 97: State-wise details of World Soil Science Day celebrated at KVKs

Sl. No.	State	No of KVKs participated	No of farmers participated	No of soil health cards distributed	Public Representatives participation		
					State Minister	Member of Parliament	Member of Legislature Assembly
1	Kerala	12	1617	1433	1	7	3
2	Karnataka	28	6203	5895	0	0	0
3	Tamil Nadu	19	3257	2915	0	6	2
4	Goa	1	130	250	0	1	1
5	Puducherry	1	165	138	0	0	0
	Grand total	61	11372	10631	1	14	6

3.1.10. Rainwater Harvesting Units

Rainwater harvesting units with micro irrigation system were established in 16 KVKs. A total of 43 training courses and 127 demonstrations were conducted and 12,005 planting materials were produced utilizing this facility. Further, 13073 farmers and 518 officials visited these units and got acquainted with the rainwater harvesting techniques.

3.1.11. Convergence and Linkages

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

Nature of linkages: KVKs were involved with all 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. Capacity development and confidence building of extension personnel of development

departments was also undertaken by involving them in on farm testing. Extension activities were conducted by involving all stakeholders including media, local institutions, district administration and people's representatives. Diagnostic field visits and joint field visits with development departments were carried out to problematic fields and to identify emerging problems, if any. KVKs supported all the development departments by providing necessary technical backstopping necessary in implementing various schemes and programmes.

Convergence through Agricultural Technology Management Agency (ATMA): Convergence was effectively achieved by the KVKs to promote various technologies in their respective districts. Details given in table 98 further elaborate the activities through which ATMA platform was used to achieve convergence. KVKs participated in 1186 programmes of ATMA during the year and at the same time KVKs organized 352 programmes in collaboration with ATMA. Using the linkage with ATMA, 45 KVKs conducted training programmes, 24 KVKs conducted demonstrations, and 15 KVKs conducted exhibitions. Forty-three meetings were organized as part of convergence efforts.

Table 98: Details of Linkages with ATMA by KVKs

Sl. No.	Programmes	No of KVKs involved	No of programmes attended by KVK staff	No of programmes organized by KVK staff
1	Meetings	43	237	38
2	Research projects	7	5	7
3	Training programmes	45	433	118

4	Demonstrations	24	110	56
5	Extension Programmes	3	16	1
6	Technology Week	11	5	1
7	Exposure visit	12	40	27
8	Exhibition	15	18	15
9	Soil health camps	12	27	20
10	Animal Health campaigns	4	20	10
11	Farm field school	7	52	13
12	Capacity development	2	141	3
13	Kisan Mela	9	12	9
14	Agri-preneurs development	2	5	1
15	Video films	2	5	6
16	Watershed approach	2	17	10
17	Extension literature	10	43	17
TOTAL			1186	352

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 99. 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 99: Details of External Funding received by KVKs through convergence and linkages

Sl.No.	Agency	No of KVKs involved	Amount Received (Rs.)
1	Rashtriya Krishi Vikas Yojana (RKVY)	17	32349523
2	Agricultural Technology Management Agency (ATMA)	15	2196028
3	National Food Security Mission(NFSM)	15	3998398
4	ICAR Institutes	14	18609510
5	National Bank for Agriculture and Rural Development (NABARD)	11	8280150
6	National Horticulture Mission (NHM)	7	5762107
7	State Department of Agriculture	6	4872000
8	State Planning Board	5	5353570

9	State Agricultural Universities	4	18942967
10	Karnataka State Biofuel Development Boards	2	3385000
11	Directorate of Cashew and Cocoa Development	2	180000
12	State Poultry Development Scheme	2	1286800
13	Coconut Development Board (CDB)	1	1700000
14	Department of Biotechnology (DBT)	1	2150000
15	Others	28	20437055
TOTAL			129503108

3.1.12. Prosperity of farmers through technological interventions

3.1.12.1 Cluster bean variety MDU 1 enhanced livelihood of farmers as well turned them as seed sellers in Salem district of Tamil Nadu

Salem district is suitable for cluster bean cultivation and it is raised in 100 ha. Lack of improved high yielding variety, occurrence of diseases and pests like powdery mildew etc., farmers realize low yield from this crop. This setback is regularly highlighted by the farmers during scientists' field visits and Zonal monthly meetings. Keeping the major constraint in view, KVK Salem, demonstrated an improved variety of cluster bean MDU-1, which is the first release in cluster bean from Agricultural College & Research Institute (AC&RI), TNAU, Madurai during 2015. Frontline demonstration was conducted with MDU-1 in an area of 1 ha by involving 10 farmers belonging to Koranampatty and Konganapuram blocks of Salem district, Tamil Nadu. Crop was raised during *Kharif* under irrigated condition. IIHR Arka Vegetable mixture 1kg, *Pseudomonas fluorescence* 1 kg and *Trichoderma viride* 1 kg were

used as critical inputs. A series of events like training and other extension activities were organized by KVK towards creating awareness as well as imparting knowledge and skill on the production technologies of cluster bean especially growing of MDU-1. Demonstrated variety MDU1 along with production technologies performed better and gave 71.2 q /ha while the check recorded 59.31 q/ha. The number of fruits per plant recorded was 203 as against check (Spic Private variety) recorded 150. Occurrence of powdery mildew incidence was observed 5% in the MDU1 as compared to 8.1% in check. Farmers had a net return of Rs. 105875/ha with BCR of 3.30 in the demonstration while the check recorded a net return of Rs. 77625 /ha with BCR of 2.61. As there is wider scope for area expansion, farmers themselves started seed production of cluster bean. As crop takes 90-100 days duration, within a short time farmers have gained good profits through selling of cluster bean seeds. Cluster bean fetches Rs.12-15/kg as vegetable and Rs.800/kg as seeds. Further farmers saved the seed cost of Rs.400 for their self use as private seeds cost Rs.1200/kg. This technological intervention by KVK Salem has changed the way farmers cultivate cluster beans and it has improved the livelihood of many farmers in a short period of

time and many of the farmers became merchants by selling the seeds in Koranampatty, Thangayur, Konganapuram, Kachupally Blocks of Salem district in Tamil Nadu.



A view of field performance of MDU-1



A view of pods per plant and yield

3.1.12.2 Plastic mulching in tomato in Chikkaballapura district of Karnataka

Tomato is a major commercial vegetable crop in Chikkaballapur district, cultivated in an area of

2,474 ha with a production of 73,477 tonnes and productivity of 29.96 tonnes / ha. Farmers of the district are facing problems due to the climate change which has led to drought-like situation, drying up of bore wells, scarcity of labour etc. Subsequently cost of cultivation has gone up being influenced by the above factors. Farmers are finding it difficult to overcome these problems in the light of raised input costs and fluctuations in market prices. Keeping in view of the constraints, KVK Chikkaballapura demonstrated mulching with plastic sheet of 25 micron thick silver and black coloured on raised beds with inline drip irrigation system in tomato crop. FLDs were laid in eight farmers fields belonging to cluster villages of Madikere of Chintamani taluk during 2013-14 and five farmers' fields belonging to cluster villages of Thummanahalli of Shidlaghatta taluk during 2014-15 covering an area of 2.6 ha. Along with this KVK scientists trained FLD farmers on production technologies in all the growth stages of the crop like growing maize as a border crop, marigold as a trap crop, installation of yellow sticky cards against sucking pests and spraying of need based chemicals depending upon the severity of the pest incidence. Thus, the tomato crop was grown under close supervision of scientists of KVK in two clusters and details are given below.

(a) Medikere cluster: During the year 2013-14, eight farmers were involved in the demonstration. Weeding was done only once by utilizing 35 mandays when compared to check where weeding was done thrice by utilizing 125 mandays. Even water consumed to produce 1kg of produce was only 41 litres compared to check (63

litres). They harvested 72 tonnes of tomato per ha and sold @ Rs.7.0 per kg. This resulted in a gross income of Rs. 5.04 lakhs/ ha with the expenditure of Rs. 1.58 lakh/ ha. Thus, they earned a net profit of Rs. 3.46 lakh/ ha (BC Ratio 3.18).

(b) Thummanahalli cluster: During the year 2014-15, five farmers were part of the demonstration. During crop period weeding was done only once by utilizing 35 mandays when compared to check where weeding was done thrice by utilizing 104 mandays. Water consumed to produce 1kg of produce was 45.40 litres compared to check (66 litres). This resulted in a gross income of Rs. 9.68 lakhs per ha with the expenditure of Rs. 3.07 lakhs per ha. They harvested 113.90 tonnes of tomato per ha and sold @ Rs.8.50 per kg. Thus, they earned a net profit of Rs. 6.60 lakh per ha (BC ratio 3.15).

Field days were conducted in each cluster to show the results of front line demonstration in farmers' field and other farmers from same village, from neighbouring villages and extension officials from the line department attended the programme.



A view of plastic mulching in tomato



Scientists visit to a demo field

As, plastic mulching technology enhanced moisture conservation, water use efficiency, reduced requirement of labour for weeding and reduced the incidences of pests and viral diseases by the reflective surface of mulch at both the clusters, farmers of surrounding villages encouraged to adopt plastic mulching technique along with other improved production technologies in tomato. As on now the practice of using plastic mulch has spread to an area over 1000 ha in the district.

3.1.12.3 Precision farming of vegetables and cotton in Shivagangai district of Tamil Nadu

Shri G Ganesan, a farmer belonging to Ayyampatti village in Shivagangai district of Southern Tamil Nadu adopted IARI developed precision farming technologies for cultivation of chillies and brinjal and drip and fertigation techniques in cotton under the technical guidance of KVK, Shivagangai. On receiving the technology and techniques on "Precision farming" he had set out an unit to produce 500000 protray seedlings of

chilli and brinjal in every season and supplying the same not only the farmers of Shivangai district, but also to the nearby districts. He is earning a sum of Rs.30000 through supply of vegetable seedlings. The realized net return was to the extent of Rs.2.5 lakh/ha in chillies. The same in case of cotton through drip and fertigation system was Rs.2.00 lakh/ha. Shri Ganesan has also developed export marketing link for regular marketing of dry chillies. He received appreciation from district administration for hi-tech cultivation of crops. More than 500 farmers have visited his and they were exposed



A view of Precision farming unit of Shri G Ganesan in Shivangai district

to hi-tech cultivation of vegetables and cotton. At present precision farming is spread in about 3600 hectares in Shivangai district. Three cluster level registered associations in Shivangai district are collectively undertake Market Linked Production which gave better price for the farmers.

4. Management of ginger rhizome rot in Bidar district of Karnataka

Ginger is major commercial spice crops of Bidar district cultivated on an area of 3000 ha with yield potentiality of 25 t/ ha and district average yield is 9.5 t/ha. The yield gap is mainly due to several biotic and abiotic factors. Among these factors, ginger rhizome rot is a major constraint for realizing higher yield. Keeping in view of the constraint, KVK Bidar has taken up a series of technology interventions like OFTs, FLDs, training, extension activities and advisory services in collaboration with ICAR adhoc project entitled Investigations on the etiology and integrated management of rhizome rot of ginger and turmeric in Northern Karnataka for combating major menace in ginger cultivation. KVK conducted OFT on IDM of ginger rhizome rot followed by FLDs. The IDM technologies includes selection of healthy seed material, early planting, soil application with neem cake and *Trichoderma*, avoiding water logging, seed treatment, roguing of disease infected plants and soil drenching with fungicides. Further, KVK has trained farmers on production technologies of ginger and conducted various extension activities as well as extended advisory services during technology demonstration period.

Among the farmers trained at KVK, Shri YesajiraoPatil belonging to Ahamadabad taluk in Bidar district of Karnataka who is having 6 ha of land with irrigation facilities adopted IDM in ginger under the technical guidance of KVK Scientists. He is growing mainly, ginger, soybean and watermelon with Integrated Farming System approach. Hitherto he has not harvested 10 t/ha in ginger due to rhizome rot disease. There was two fold increase due to IDM in yield i.e. around 20-25 t per ha and had maximum profit by selling rhizome as healthy seed material to the ginger growing farmers of the state of Karnataka, Madhya Pradesh, Andhra Pradesh, Maharashtra and Chattisgad. Every year, he is growing 4 ha of ginger. During 2009-10 and 2010-11 he harvested 22.5 t per ha and got economic benefit of Rs. 900000/ ha and in total he got net revenue of Rs. 36 lakh from ginger crop alone. Many ginger growing farmers visited his field and adopted this technology in their field and getting maximum yield. Further, technology on Integrated Disease Management of ginger rhizome rot was standardized and released as well as published in University package of practices book.

After depicting the technology on IDM of ginger and success stories in Krishimela at UAS Raichur, UAS Dharwad, KVAFSU Bidar and KVK Bidar during 2009 and 2010 the participated farmers realized about the economic gains in ginger cultivation, further area of ginger increasing year after year in Bidar district. At present in the district this IDM technology adopted in an area around 25 to 30 per cent. Recently 25 farmers from Raichur and Gulbarga Districts visited Kendra learnt about

this technology. During 2011 about 8 ha of ginger crop was grown in Raichur as well as Gulbarga districts of Karnataka.



A view of demo and control field of ginger



A view of ginger with IDM on field of Shri YesajiraoPatil

3.1.12.4 Farm gate market- A new initiative by KVK Ernakulam in Kerala

Pokkali is a traditional zero input and naturally organic farming system in which Paddy and Shrimp farming are alternatively done in the same field in Ernakulam. Widespread attack of WSS virus, labour shortage, lack of machinery, pollution, low price, erratic monsoon, saline water intrusion, unpredicted floods *etc.* compelled farmers

refrain from this farming system. The indigenous fishermen of this region have the traditional right to enter these farmers' fields and catch wild fish and shrimp as livelihood means prior to and during the paddy cultivation period. Land holding farmers get exclusive ownership and license to their field only for five months during shrimp farming. At the end of each year's license period the farmers open up the fields again for the local fisher folk for their livelihood. Due to this special social arrangement any intervention for fish farming during periods other than license period in this farming system is challenging. Keeping in view of social and farming system, KVK Ernakulam made an attempt and demonstrated technology of integrated farming of finfish such as Asian Seabass, Mullet and Pearl spot to utilize maximum space and time to augment income as well as cage culture in vacant field spaces to promote intensive aquaculture. Paddy alone gave a profit of Rs.15000, paddy & shrimp Rs.50000 whereas the new paddy shrimp finfish integrated farming fetched Rs.1.3 lakh/ha. The income generated showed the viability and replicable nature of the model which received

national attention and several farmers come forward to replicate the model.

Further, KVK has taken a new initiative for formation of new marketing avenue in collaboration with local self government and farmer groups called as farm gate markets. This has created an effective interface between farmer and consumer and ensured premium price for Pokkali produce and safe to eat Pokkali produce for consumers. Farm gate mela was attracted more than 2000 fish lovers of the state. Farmer sold all produce through the new market. Seeing the success of this farming system, youth are attracted and came forward for initiating such integrated finfish farming at various parts of the district. So far 10 farmers have initiated this farming model. Further, Fish Farmers Development Agency (FFDA) under the State Government has initiated a scheme – Integrated fish farming in Pokkali fields. Under this scheme, the agency support fish farming both in open Pokkali fields and also in cages sited in Pokkali fields. A total of 100 ha open fields and 50 cage units, each comprising of 2 cages would receive financial assistance (Rs.8000/cage unit and INR 20,000/- per ha open field) from the agency this year.



Dr A Gopalakrishnan, Director ICAR-CMFRI Kochi inaugurating Farm Gate Market



Progress of fish sale at Farm Gate Market

3.1.13 Recognition and Awards

National Best KVK Award

Bangalore Rural KVK received the National Best KVK Award for the year 2014-15 at National level on 9th National Conference of KVKs held at Patna on 25th and 26th July, 2015 and KVK also received Dr R Dwarakinath Best Article Award 2014 in Krishimela-2015 for the article “Plastic mulching in Tomato crop – A Success story”

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:

Farmers / Extension personnel / Stakeholders visits to ATICs: During the period under report, a total of 113475 farmers, 3124 extension personnel and 14245 other stakeholders visited Agriculture Technology Information Centres (ATICs) in the zone. Altogether, 130844 persons visited the ATICs, out of which, 74159 visited for information and 56685 visited for technology products.

Communication with stakeholders: A total of 26086 farmers contacted ATICs or were contacted by ATICs through various means of communication

like phone calls from farmers (including Kisan Call Centre escalated calls), video shows, letters received and letters replied and participation in training.

Publications: Under publications, 21415 Books, 4393 Technical bulletins, 923 CDs, 104 DVDs and 202 Video films were produced and provided to the ATIC visitors or those requested by mail. Totally, 22580 farmers and other stakeholders were benefited by these publications and documents.

Technology services provided: During the reporting period, 1972 diagnostic services were provided by the ATICs which included 880 soil and water testing and 613 plant diagnostic services. A total of 479 services to line Departments were provided by the ATICs.

Technology products provided: A total 70842 visitors were benefited in the form of technology products of ATICs. Among different technology products provided, 1040442 kg seeds were provided to 48526 visitors to ATICs. A total of 380264 number of planting material of various crops/plants were provided to 5032 visitors. Bio control products, bio-agents, micro nutrient specials, healer-cum sealer, microbial products, fruit fly traps/lures *etc.* were provided to 9492 farmers. Details are provided in the Table 100.

Table 100: Technology products provided by ATICs in Zone VIII

Particulars	Unit of quantity	Quantity	Number of farmers benefited
Seeds	Kg.	1040442	48526
Planting material	Nos.	380264	5032

Bio-products	Kg.	48864.8	9394
Bio-products	Nos	11600	98
Livestock & Poultry	No.	59322	547
Poultry birds (egg)	No.	272650	4675
Bakery products	No.	25518	2570
Grand Total			70842

Revenue generated: Totally, an amount of ₹ 13,41,37,615 was generated through various technology products/ publications and services provided by the ATICs. Details of item-wise revenue generated are given in Table 101.

Table 101: Income generated by ATICs in Zone VIII

Product	Income generated (Rs.)
Seeds/ Planting materials	11,76,79,187
Publications/ Audio Video cassettes & CDs /ICAR Publications	29,29,898
Testing/ Diagnostic services	23,56,798
Livestock	3,85,465
Value added products	35,89,304
Animal products (Milk)	34,340
Animal products/eggs	6,29,000
Bio-agents/ Bio fertilizers /Bio products	65,33,623
Grand Total	13,41,37,615

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 technology 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 technological support to the KVKs in various forms, which helps them to carry out their mandated activities more efficiently and effectively.

Directors of Extension have also monitored the activities of KVKs through various programmes including workshops/review meetings, action plan meetings, sensitization meetings, regional committee meeting, scientific workers conference, crop specific awareness programmes *etc.* During 2015-16, the Directorates of Extension have conducted 72 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, pre-action plan meetings *etc.*

Directors of Extension and their officials participated in 35 Scientific Advisory Committee Meetings, 72 field days, 87 workshops/seminars, 85 training programmes including off campus programmes and 22 Technology Weeks. In addition they have attended in 33 other programmes including interface meetings, group discussion with KVK officials, farmers meet, animal health camp,



Coconut Seminar organized at KVK Kanyakumari

inauguration of farmers group / society in villages, Krishimela *etc.* In addition they also have made field visits to 65 plots wherein on farm trials were conducted, 123 plots of frontline demonstration and participated in 61 training programmes conducted by the KVKs, 53 extension activities and 16 Farm Field Schools programmes. Further they have also assisted the KVKs for preparing 17 documents on success stories / case studies.

In order to provide technological backstopping on latest technologies in agriculture and its allied sectors, the Directorate of Extension organized 54 training programmes in which 741 KVK staff from 79 KVKs have participated. The thematic areas covering these training programmes include 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, mushroom production, *etc.* During the year 132.32 quintals of seeds were arranged to 36 KVKs. In addition, 0.40 lakh of planting materials to 27 KVKs, 51.84 quintals of bio-products to 31 KVKs, 1355 livestock numbers to 10 KVKs, 20 kg of livestock products to 2 KVKs, 13259 poultry birds to 11 KVKs, 10 kg of poultry products to 3 KVKs, and 10.55 quintals of nutrient mixture for 5 KVKs were facilitated.



Vice Chancellor TNAU Coimbatore is observing the roof garden at KVK Cuddalore

3.4 Special Programmes

3.4.1 Cluster Frontline Demonstrations of Rabi Pulses under NFSM

The project entitled Cluster Frontline Demonstrations of *Rabi* Pulses under NFSM 2015-16 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 pulses in the country. As a part of this project, ICAR-ATARI, Bengaluru implemented the project

on *rabi* pulse crops viz, chickpea, blackgram and greengram in selected districts through respective KVKs in the states of Karnataka and Tamil Nadu during the year 2015-16. Details are presented hereunder:

Physical target

Cluster FLDs were implemented on three pulse crops namely Chickpea, Blackgram and Greengram under NFSM 2015-16 in an area of 672 ha in two states viz., Karnataka and Tamil Nadu in Zone VIII by involving 1680 farmers (Demos). The crop wise details are presented in Table 102.

Table 102: Implementation of cluster FLDs on *rabi* pulses under NFSM 2015-16

State	Crop	No. of KVKs	Cluster FLDs on <i>rabi</i> pulses under NFSM 2015-16					
			Demonstrations (No)			Area (ha)		
			Rabi	Summer	Total	Rabi	Summer	Total
Karnataka	Chickpea	19	545	-	545	218	-	218
Tamil Nadu	Chickpea	1	30	-	30	12	-	12
Sub-Total		20	575	-	575	230	-	230

Karnataka	Blackgram	2	25	50	75	10	20	30
Tamil Nadu	Blackgram	14	240	290	530	96	116	212
Sub-Total		16	265	340	605	106	136	242
Karnataka	Greengram	5	125	50	175	50	20	70
Tamil Nadu	Greengram	11	200	125	325	80	50	130
Sub-Total		16	325	175	500	130	70	200
Total			1165	515	1680	466	206	672

Results

Data with regard to yield and net returns obtained from cluster FLDs on rabi pulses under NFSM 2015-16 were collected from each KVK and it was pooled based on the crop and variety demonstrated. Details are presented hereunder:

(i) Chickpea: Cluster demonstrations on chickpea were conducted in an area of 230 ha by involving 575 farmers. Variety wise performance in terms of yield and net return is depicted in Table 103. Chickpea variety JG-11 was demonstrated in more area (136 ha) with 340 farmers by 12 KVKs viz., Bangalore Rural, Belgavi-II, Vijayapura, Chamrajanagar, Chikkamagalur, Chitradurga, Davanagere, Dharwad, Haveri, Mysuru, Raichur and Tumkur-I followed by JAKI-9218 in 36 ha with 90 farmers by three KVKs viz., Belagavi-I, Koppal and Gadag and GBM-2 in 36 ha with 90 farmers by three KVKs viz., Bidar, Kalaburagi-I and Kalaburagi-II and BGD-103 in 10 ha with 25 farmers by KVK Bellary in Karnataka and JG-11 in 12 ha with 30 farmers by KVK Dindigul in Tamil Nadu.

Among the varieties demonstrated, BGD-103

performed better and gave high yield of 15.29 q/ha as against check (11.29 q/ha) that contributed 26.29 % increase of yield over check variety Annigeri -1 in Bellary district that made an increase of 39.68 % net return per ha with net returns of Rs.49989 (demo) and Rs.30149 (check) followed by GBM-2 (14.66 q/ha) as against check (10.21 q/ha) that contributed an increase of 30.35% yield and 38.61% net returns, JAKI-9218 (11.42 q/ha) as compared to check (9.36 q/ha) that gave an increase of 18.04% yield and 33.48% net returns, JG-11 (8.59 q/ha) as against check (6.92 q/ha) that made an increase of 19.44% yield and 36.19% net returns in Karnataka and JG-11 gave 11.80 q/ha as against check (8.25 q/ha) that granted an increase of 30.08% yield and 15.70% net returns in Tamil Nadu.

On the whole, 24.84 % yield was increased with the average yield (12.35 q/ha) of improved varieties of chickpea per hectare through cluster FLDs under NFSM 2015-16 as compared to farmers practice (9.20 q/ha) that gave 32.73% increase on net return per hectare with net returns of Rs. 35692 (demo) and Rs. 23807 (check).

Table 103: Results of cluster FLDs on chickpea under NFSM during 2015-16

State	No. of KVKs	Demo variety	Demos (No.)	Area (ha)	Average yield (q/ha)			Average net return (Rs./ha)		
					Demo	Check	% increase	Demo	Check	% increase
Karnataka	12 (Bangalore Rural, Belgavi-II, Vijayapura, Chamrajanagar, Chikkamagalur, Chitradurga, Davanagere, Dharwad, Haveri, Mysuru, Raichur and Tumkur-I)	JG-11	340	136	8.59	6.92	19.44	23137	15103	36.19
Karnataka	3 (Belagavi-I, Koppal and Gadag)	JAKI-9218	90	36	11.42	9.36	18.04	28789	20783	33.48
Karnataka	3 (Bidar, Kalaburgi-I and Kalaburgi-II)	GBM-2	90	36	14.66	10.21	30.35	46297	27504	38.61
Karnataka	1 (Bellary)	BGD-103	25	10	15.29	11.27	26.29	49989	30149	39.68
Tamil Nadu	1 (Dindigul)	JG-11	30	12	11.80	8.25	30.08	30250	25500	15.70
Total / average			575	230	12.35	9.20	24.84	35692	23807	32.73



JG-11, KVK Dharwad



BGD-103, KVK, Bellary



KVK Belgavi-I



GBM-2, KVK Gulbarga-I

A view of Chickpea varieties demonstrated by KVKs through cluster FLDs under NFSM 2015-16

(ii) Blackgram: Demonstrations on blackgram were conducted in an area of 242 ha by involving 605 farmers. Variety wise performance in terms of yield and net return is depicted in Table 104. Blackgram variety DU-1 was demonstrated in more area (26 ha) with 65 farmers by two KVKs viz., Koppal and Uttara Kannada followed by TAU-1 in 4 ha with 10 farmers by KVK Koppal in Karnataka and VBN-6 in 96 ha with 240 farmers by six KVKs viz., Erode, Nagapattinam, Namakkal, Perambalur, Pudukottai, Thiruvannamalai, VBN-5 in 68 ha with 170 farmers by five KVKs viz., Cuddalore, Karur, Thiruvallur, and villupuram, MDU-1 in 36 ha with 90 farmers by three KVKs viz., Madurai, Thrichy and Virudhnagar and ADT-5 in 12 ha with 30 farmers by KVK Thiruvarur in Tamil Nadu.

Among the varieties demonstrated, TAU-1 performed better and gave high yield of 7.50 q/ha as against check (5.00 q/ha) that contributed 33.33% increase of yield over local variety in Koppal district that made an increase of 41.41 % net

return per ha with net returns of Rs.61875 (demo) and Rs.36250 (check) followed by DU-1 (5.89 q/ha) as against check (4.21 q/ha) that contributed an increase of 28.52% yield and 44.37 % net returns in Karnataka and MDU-1 (10.21 q/ha) as compared to check (7.68 q/ha) that gave an increase of 24.78 % yield and 44.02 % net returns, VBN-6 (8.36 q/ha) as against check (6.75 q/ha) that made an increase of 19.26% yield and 31.69 % net returns, VBN-5 (8.52 q/ha) as against check (6.69 q/ha) that granted an increase of 21.47 % yield and 28.90 % net returns and ADT-5 (6.50 q/ha) as against check (4.50 q/ha) that made an increase of 30.76 % yield and 36.06% net returns in Tamil Nadu.

On the whole, 26.35 % yield was increased with the average yield (7.83 q/ha) of improved varieties of Blackgram per hectare through cluster FLDs under NFSM 2015-16 as compared to farmers practice (5.80 q/ha) that gave 37.74 % increase on net return per hectare with net returns of Rs. 55515 (demo) and Rs. 34486 (check).

Table 104: Results of cluster FLDs on blackgram under NFSM during 2015-16

State	No. of KVKs	Demo variety	Demos (No.)	Area (ha)	Average yield (q/ha)			Average net return (Rs./ha)		
					Demo	Check	% increase	Demo	Check	% increase
Karnataka	2 (Koppla and Uttara Kannada)	DU-1	65	26	5.89	4.21	28.52	60293	33536	44.37
Karnataka	Koppal	TAU-1	10	4	7.50	5.00	33.33	61875	36250	41.41
Tamil Nadu	6 (Erode, Nagapattinam, Namakkal, Perambalur, Pudukottai, Thiruvannamalai)	VBN-6	240	96	8.36	6.75	19.26	50966	34814	31.69
Tamil Nadu	4 (Cuddalore, Karur, Thiruvallur, and villupuram)	VBN-5	170	68	8.52	6.69	21.47	59121	42033	28.90
Tamil Nadu	3 (Madurai, Thirichy and Virudhnagar)	MDU-1	90	36	10.21	7.68	24.78	52588	29438	44.02
Tamil Nadu	1 (Thiruvarur)	ADT-5	30	12	6.50	4.50	30.76	48250	30850	36.06
Total/Average			605	242	7.83	5.80	26.35	55515	34486	37.74

(iii) **Greengram:** Demonstrations on greengram were conducted in an area of 200 ha by involving 500 farmers. Variety wise performance in terms of yield and net return is depicted in Table 105. Greengram variety BGS-9 was demonstrated in more area (30 ha) with 75 farmers by two KVKs viz., Dakshina Kannada and Kalaburagi-II followed by IPM-02-14 (Shreya) in 20 ha with 50 farmers by KVK Dharwad, DDGV-2 in 10 ha with 25 farmers by KVK Uttara Kannada and KKM-3 in 10 ha with 25 farmers by KVK Shivamogga in Karnataka and

CO (Gg)-8 in 110 ha with 275 farmers by nine KVK viz., Kancheepuram, Nagapattinam, Namakkal, Pudukottai, Salem, Tiruvallur, Vellore, Villupuram and Virudhunagar, ADT-3 in 10 ha with 25 farmers by KVK Thiruvarur and PDM-139 in 10 ha with 25 farmers by KVK Dindigul in Tamil Nadu.

Among the varieties demonstrated, IPM-02-14 (Shreya) performed better and gave high yield of 5.93 q/ha as against check (4.91 q/ha) that contributed 17.20% increase of yield over local variety in Dharwad district that made an increase



VBN-5, KVK Villupuram



VBN-6, KVK Namakkal



MDU-1, KVK Madurai



ADT-5, KVK Thiruvarur



DU-1, KVK Uttara Kannada



TAU-1, KVK Koppal

of 30.10 % net return per ha with net returns of Rs.27808 (demo) and Rs.19436 (check) followed by BGS-9 (5.25 q/ha) as against check (4.05 q/ha) that contributed an increase of 22.85 % yield and 36.04 % net returns, DDGV-2 (4.06 q/ha) as compared to check (3.30 q/ha) that gave an increase of 18.72 % yield and 27.80% net returns, KKM-3 (2.98 q/ha) as against check (2.50 q/ha) that made an increase of 0.16 % yield and 12.51 % net returns in Karnataka and CO(Gg)-8 (9.06 q/ha) as compared to check (7.10 q/ha) that gave an increase of 21.63 % yield and 31.97 % net returns, PDM-

139 (7.45 q/ha) as against check (5.50 q/ha) that made an increase of 26.17 % yield and 49.21 % net returns, ADT-3 (6.14 q/ha) as against check (4.25 q/ha) that granted an increase of 30.78% yield and 36.51 % net returns in Tamil Nadu.

On the whole, 19.64 % yield was increased with the average yield (5.83 q/ha) of improved varieties of Greengram per hectare through cluster FLDs under NFSM 2015-16 as compared to farmers practice (4.51 q/ha) that gave 32.02 % increase on net return per hectare with net returns of Rs. 28552 (demo) and Rs. 18991 (check).

Table 105: Results of cluster FLDs on greengram under NFSM during 2015-16

State	No. of KVKs	Demo variety	Demos (No.)	Area (ha)	Average yield (q/ha)			Average net return (Rs./ha)		
					Demo	Check	% increase	Demo	Check	% increase
Karnataka	2 (Dakshina Kannada and Kalaburagi-II)	BGS-9	75	30	5.25	4.05	22.85	35400	22640	36.04
Karnataka	1 (Dharwad)	IPM-02-14 (Shreya)	50	20	5.93	4.91	17.20	27808	19436	30.10
Karnataka	1 (Uttara Kannada)	DDGV-2	25	10	4.06	3.30	18.72	22478	16228	27.80
Karnataka	1 (Shivamogga)	KKM-3	25	10	2.98	2.5	0.16	11716	10250	12.51
Tamil Nadu	9 (Kancheepuram, Nagapattinam, Namakkal, Pudukottai, Salem, Tiruvallur, Vellore, Villupuram and Virudhunagar)	CO (Gg)-8	275	110	9.06	7.10	21.63	39005	26535	31.97
Tamil Nadu	1 (Thiruvarur)	ADT-3	25	10	6.14	4.25	30.78	44260	28100	36.51
Tamil Nadu	1 (Dindigul)	PDM-139	25	10	7.45	5.50	26.17	19200	9750	49.21
Total/Average			500	200	5.83	4.51	19.64	28552	18991	32.02



CO (Gg)-8, KVK Thiruvallur



ADT-3, KVK Thiruvarur



IPM-02-14 (Shreya), KVK Dharwad



BGS-9, KVK Kalaburagi-II



KKM-3, KVK Shivamogga



DDGV-2, KVK Uttara Kannada

A view of different varieties of Greengram demonstrated by KVKs through cluster FLDs under NFSM 2015-16

(c) Training conducted on production technologies of pulse crops demonstrated through cluster FLDs under NFSM 2015-16

On and off campus training programmes were organized by KVKs on production technologies of chickpea, blackgram and greengram for the cluster FLD farmers under NFSM and details are presented in Table 106. Data indicate that a total of 151 training programmes were organized with the participation of 4662 FLD farmers (3775 male and 888 female) that consists of 36 on-campus with 1053 participants (927 male and 126 female)

and 115 off-campus with 3609 participants (2848 male and 762 female). Out of which, 59 training programmes (18 on-campus and 41 off-campus) were conducted on production technologies of chickpea with the participation of 1638 FLD farmers (1462 male and 176 female) followed by 53 training programmes (9 on-campus and 44 off-campus) on production technologies of greengram with the participation of 1823 FLD farmers (1372 male and 452 female) and 39 training programmes (9 on-campus and 30 off-campus) on production technologies of blackgram with the participation of 1201 FLD farmers (941 male and 260 female).

Table 106: Training programmes organized for the cluster FLD farmers of *rabi* pulses under NFSM 2015-16

Crop	On-campus				Off-campus				Total			
	No. of courses	FLD farmers			No. of courses	FLD farmers			No. of courses	FLD farmers		
		Male	Female	Total		Male	Female	Total		Male	Female	Total
Chickpea	18	494	33	527	41	968	143	1111	59	1462	176	1638
Blackgram	9	235	45	280	30	706	215	921	39	941	260	1201
Greengram	9	198	48	246	44	1174	404	1577	53	1372	452	1823
Total	36	927	126	1053	115	2848	762	3609	151	3775	888	4662

(d) Extension activities organized towards cluster FLDs on *rabi* pulses under NFSM 2015-16

Different extension activities were organized by KVKs for the cluster FLD farmers during *rabi* season under the programme and details are presented in Table 107. Data indicate that a total of 22428 personnel (21751 FLD farmers and 677 Extension Officials) participated in different

extension activities organized in relation to cluster FLDs on chickpea, blackgram and greengram. Out of which, 10526 personnel (10253 FLD farmers and 273 Extension Officials) participated in extension activities related to chickpea followed by 10005 personnel (9763 FLD farmers and 242 Extension Officials) participated in extension activities related to greengram and 1897 personnel (1735 FLD farmers and 162 Extension Officials) participated in extension activities related to blackgram.

Table 107: Extension activities organized towards cluster FLDs on rabi pulses under NFSM 2015-16

Crop	Farmers participation			Extension personnel participation			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Chickpea	2309	364	10253	220	59	273	2529	423	10526
Blackgram	1302	433	1735	132	32	162	1434	465	1897
Greengram	1554	619	9763	182	59	242	1736	678	10005
Total	5165	1416	21751	534	150	677	5699	1566	22428

3.4.2. Cluster Frontline Demonstrations of Rabi Oilseeds under NMOOP

The project entitled Cluster Frontline Demonstrations of Rabi Oilseeds under NMOOP 2015-16 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, Bangalore implemented the project on rabi oilseed crops viz, Groundnut, Sunflower and Linseed in selective districts through respective KVKs in Zone VIII during the year 2015-16. Details are presented hereunder:

Physical target

A total of 1995 cluster FLDs on rabi oilseeds viz., groundnut, sunflower and linseed were allocated in an area of 798 ha in Zone VIII for the year 2015-16. Out of which, 1020 cluster FLDs

were allocated on groundnut in an area of 408 ha to 17 KVKs. Among these groundnut FLDs, 555 demonstrations in 222 ha allotted to 9 KVKs viz., Bagalkot, Belgavi-I, Bellary, Vijayapura, Gadag, Kalaburagi-II, Haveri, Koppal and Raichur in Karnataka and 465 demonstrations in 186 ha allotted to 8 KVKs viz., Cuddalore, Dindigul, Kancheepuram, Karur, Namakkal, Thiruvallur, Tiruvannamalai and Villupuram in Tamil Nadu. A total of 675 demonstrations in 270 ha on Sunflower were allotted to 7 KVKs viz., Bagalkot, Dharwad, Gadag, Kalaburagi-I, Kalaburagi-II, Koppal, Raichur and 300 demonstrations in 120 ha on Linseed were allotted 8 KVKs viz., Bagalkot, Belgavi-I, Belgavi-II, Vijayapura, Gadag, Kalaburagi-I, Koppal, Raichur in Karnataka (Table 108). A total of 396 demonstrations in 100 ha, 321 in sunflower in 70 ha and 90 in linseed in 35 ha were not implemented due to unfavorable conditions prevailed during rabi in the Northern districts of Karnataka and coastal districts of Tamil Nadu.

Table 108: Allocation and implementation of cluster FLDs on *rabi* oilseeds during 2015-16

State	Crop	No. of KVKs	Cluster FLDs on <i>rabi</i> oilseeds 2015-16			
			Demonstrations (Number)		Area (ha)	
			Allocated	Implemented	Allocated	Implemented
Karnataka	Groundnut	9	555	555	222	222
Tamil Nadu	Groundnut	8	465	465	186	186
Karnataka	Sunflower	7	675	354	270	200
Karnataka	Linseed	8	300	210	120	85
Total	3	32	1995	1584	798	693

Results:

(i) **Groundnut:** Demonstrations on groundnut were conducted in an area of 408 ha by involving 1020 farmers. Variety wise performance in terms of yield and net return is depicted in Table 109. Groundnut variety GPBD-4 was demonstrated in more area (102 ha) with 255 farmers by four KVKs *viz.*, Bagalkot, Belgavi-I, Vijayapura and Gadag in Karnataka followed by TMV-13 in 99.20 ha by four KVKs *viz.*, Cuddalore, Thiruvallur, Thiruvanamalai and Villupuram in Tamil Nadu. Further, the variety Kadiri-6 was demonstrated in 56 ha area with 140 farmers by three KVKs *viz.*, Dindigul, Kancheepuram, Karur in Tamil Nadu and in 30 ha area with 75 farmers by KVK Koppal

in Karnataka. Among the groundnut varieties demonstrated, GJG-9 performed better and gave record yield of 47.68 q/ha that is 94.61 % increase over check variety VRI-2 in Cuddalore district of Tamil Nadu which contributed an increase of 110.74 % net return per ha i.e. Rs.195728. This was followed by Kadiri-6 with 66.66 % and 31.68 % yield increase in Koppal district of Karnataka and Dindigul, Kancheepuram and Karur districts of Tamil Nadu as compared to check variety, respectively. On the whole, 37.42 % yield increased with improved varieties of groundnut per hectare under cluster FLDs was obtained with an average yield of 23.49 q/ha as compared to check varieties (16.84 q/ha).

Table 109: Results of cluster FLDs on groundnut under NMOOP during 2015-16

State	No. of KVKs	Demo variety	Demos (No.)	Area (ha)	Average yield (q/ha)			Average net return (Rs./ha)		
					Demo	Check	% increase	Demo	Check	% increase
Karnataka	4 (Bagalkot, Belgavi-I, Vijayapura, Gadag)	GPBD-4	255	102	19.65	16.27	21.24	82174	64575	26.30
Karnataka	1 (Haveri)	GPBD-5	30	12	19.50	15.00	30.00	66450	45000	47.66

Karnataka	1 (Koppal)	Kadiri-6	75	30	20.00	12.00	66.66	84780	72000	17.75
Karnataka	1 (Kalburagi)	Kadiri-9	60	24	16.90	14.00	20.71	70000	53150	31.70
Karnataka	2 (Bellary, Raichur)	TMV-2	135	54	14.42	11.70	23.38	39772	23432	69.95
Tamil Nadu	1 (Cuddalore)	GJG-9	22	8.8	47.68	24.50	94.61	195728	92873	110.74
Tamil Nadu	4 (Cuddalore, Thiruvallur, Thiruvanamalai, Villupuram)	TMV-13	248	99.2	28.81	23.42	23.24	110711	85749	28.63
Tamil Nadu	3 (Dindigul, Kancheepuram, Karur)	Kadiri-6	140	56	23.82	18.17	31.68	67974	46413	53.82
Tamil Nadu	1 (Namakkal)	CO-7	55	22	20.67	16.50	25.27	56615	38250	48.01
Total/Average			1020	408	23.49	16.84	37.42	86022	57938	48.28



GPBD-4 (KVK Bagalkot)



GPBD-5 (KVK Haveri)



K-6 (KVK Kancheepuram)



K-9 (KVK Kalburagi-A)



TMV-2 (KVK Ballary)



TMV(Gn)-13 (KVK Villupuram)



GJG-9 (KVK Cuddalore)



CO-7 (KVK Namakkal)

A view of groundnut varieties demonstrated under NMOOP 2015-16

(ii) **Sunflower:** Demonstrations on sunflower were conducted in an area of 200 ha by involving 354 farmers. Variety wise performance in terms of yield and net return is depicted in Table 110. Sunflower variety Kargil-413 was demonstrated in more area (110 ha) with 165 farmers by three KVKs viz., Kalburagi-I, Koppal, Raichur followed by KBSH-41 in 60 ha with 114 farmers by 2 KVKs viz., Bagalkot, Dharwad and Cauvery champ in 30 ha with 75 farmers by KVK Gadag in Karnataka.

KBSH- 41 performed better with 27.30% yield increase per hectare over check (Modern) and gave 63.43% increase on net return per hectare followed by Kargil-413 with 26.55% yield increase and 38.84% increase on net return. On the whole, 18.94 % yield increased with improved varieties of sunflower per hectare with average yield of 10.53 q/ha (demo) as compared to check varieties (8.55 q/ha).

Table 110: Results of cluster FLDs on sunflower under NMOOP during 2015-16

State	No. of KVKs	Demo variety	Demos (No.)	Area (ha)	Average yield (q/ha)			Average net return (Rs./ha)		
					Demo	Check	% increase	Demo	Check	% increase
Karnataka	3 (Kalburgi, Koppal, Raichur)	Kargil-413	165	110	14.34	11.03	26.55	36726	25773	38.84
Karnataka	2 (Bagalkot, Dharwad)	KBSH- 41	114	60	12.10	09.61	27.30	21056	13390	63.43
Karnataka	1 (Gadag)	Cauvery champ	75	30	05.16	05.01	02.99	5698	5172	10.17
Total/Average			354	200	10.53	8.55	18.94	21160	14778	37.48


KBSH- 41 (KVK Dharwad)

Cauvery champ (KVK Gadag)

Kargil-413, KVK, Kalburgi-I

A view of Sunflower varieties demonstrated under NMOOP 2015-16

(iii) **Linseed:** Demonstrations on linseed were conducted in an area of 75 ha by involving 185 farmers. Variety wise performance in terms of yield and net return is depicted in Table 111. Data show that the linseed variety PKVNL-260 was demonstrated in more area (40 ha) with 100 farmers by four KVKs viz., Bagalkot, Belagavi –I, Belagavi –II, Raichur followed by PKVNL-52 in 30 ha with 75 farmers by KVK Kalaburagi-I and PKVNL-115 in 5 ha with 10 farmers by KVK Vijayapura

in Karnataka. The variety PKVNL-52 performed better with 28.12% yield increase per hectare over check (Harwal local) and gave 36.07% increase on net return per hectare followed by PKVNL-115 with 23.40% yield increase and 41.16% increase on net return. On the whole, 21.43 % yield increased with improved varieties of linseed per hectare with an average yield of 4.7 q/ha (demo) as compared to check varieties (3.88 q/ha).

Table 111: Results of cluster FLDs on linseed under NMOOP during 2015-16

State	No. of KVKs	Demo variety	Demos (No.)	Area (ha)	Average yield (q/ha)			Average net return (Rs./ha)		
					Demo	Check	% increase	Demo	Check	% increase
Karnataka	4 (Bagalkot, Belagavi I & II, Raichur)	PKVNL-260	100	40	4.2	3.75	12.77	18275	16250	14.89
Karnataka	1 (Vijayapura)	PKVNL-115	10	5	5.8	4.7	23.40	21400	15160	41.16
Karnataka	1 (Kalaburagi-I)	PKVNL-52	75	30	4.1	3.2	28.12	21500	15800	36.07
Total/Average			185	75	4.7	3.88	21.43	20391	15736	30.70



PKVNL-115 (KVK Vijayapura)



PKVNL-260 (KVK Belgavi-I)

(c) Training: On and off campus training programmes were organized by KVKs on production technologies of groundnut, sunflower and linseed for the cluster FLD farmers under the project. The details are presented in Table 112. Data indicate that a total of 80 training programmes were organized with the participation of 2736 FLD farmers (2454 male and 322 female) that consists of 24 on-campus with 1107 participants (981 male and 136 female) and 56 off-campus with 1629 participants (1473 male and 186 female). Out of

which, 53 training programmes (19 on-campus and 34 off-campus) were conducted on production technologies of groundnut with the participation of 1743 FLD farmers (1548 male and 235 female) followed by 26 training programmes (5 on campus and 15 off campus) on production technologies of sunflower with the participation of 747 FLD farmers (682 male and 65 female) and 7 off-campus training programmes on production technologies of linseed with the participation of 246 FLD farmers (224 male and 22 female).

Table 112: Training programmes organized for *rabi* oilseeds under NMOOP 2015-16

Crop	On-campus			Off-campus			Total					
	No. of courses	FLD farmers		No. of courses	FLD farmers		No. of courses	FLD farmers				
		Male	Female		Total	Male		Female	Total			
Groundnut	19	701	97	788	34	847	138	955	53	1548	235	1743
Sunflower	5	280	39	319	15	402	26	428	20	682	65	747
Linseed	-	-	-	-	7	224	22	246	7	224	22	246
Total	24	981	136	1107	56	1473	186	1629	80	2454	322	2736

(d) Extension activities: Different extension activities were organized by KVKs during the crop season under the project and details are presented in Table 113. Data indicate that a total of 1749 personnel (1630 FLD farmers and 119 extension officials) participated in different extension activities organized in relation to cluster FLDs on groundnut, sunflower and linseed. Out of which,

1255 personnel (1167 FLD farmers and 88 extension officials) participated in extension activities related to groundnut followed by 307 personnel (284 FLD farmers and 23 extension Officials) participated in extension activities related to sunflower and 187 personnel (179 FLD farmers and 8 extension officials) participated in extension activities related to linseed.

Table 113: Extension activities organized for *rabi* oilseeds under NMOOP 2015-16

Crop	Farmers participation			Extension personnel participation			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Groundnut	1038	133	1167	69	19	88	1107	152	1255
Sunflower	257	27	284	15	8	23	272	35	307
Linseed	175	4	179	6	2	8	181	6	187
Total	1470	164	1630	90	29	119	1560	193	1749

3.4.3 National Innovations in Climate Resilient Agriculture (NICRA)

The scheme on National Innovations in Climate Resilient Agriculture (NICRA) is being implemented in the country to develop improved technologies through short term and long term research as well as to demonstrate the existing technologies on farmers' fields for enhancing climate resilience. In Zone-VIII, it is being implemented in eleven most vulnerable districts namely, Belagavi (drought/heat), Davanagere (drought/heat), Chikkaballapur (drought/heat), Tumkur (drought), Gadag (drought/heat) and Kalburagi (drought/heat) in Karnataka, Namakkal (drought), Villupuram (drought/flood/cyclone), Ramanathapuram (drought/flood/cyclone/salinity) and Thiruvarur (drought/flood/salinity) in Tamil Nadu and Alleppey (water inundation/drainage) in Kerala. The interventions being implemented are based on four modules, i.e. (1) Natural resources

management, (2) Crop production, (3) Livestock and fisheries (4) Institutional interventions (5) Capacity building and (6) Extension activities.

Rainfall: The month wise actual rainfall received, no of dry spells, intensive rain spells and waterlogging observed during the crop growth period as recorded in the NICRA village meteorological observatory is provided in Table 114 for Kerala & Karnataka and Table 115 for Tamil Nadu.

In Alleppey district of Kerala waterlogging was observed for 48 days during monsoon period. The no of dry spells of 10-15 days observed were one in Davanagere, four in Chikkaballapur, three in Gadag, seven in Kalburagi and five in Tumkur districts of Karnataka. The intensive rain spell of >60 mm was recorded only in Davanagere, two spells in September, Chikkaballapur, one spell in June and Kalburagi, one spell in September.

Table 114: Rainfall data of NICRA villages in Kerala and Karnataka during monsoon 2015

KVK/State	Kharif 2015	June	July	August	September	Annual	
Alleppey, Kerala	Rainfall received in (mm)	539.6	209.3	98.55	241.6	2491.8	
	No. of dry spells during kharif season	>10days	0	0	0	0	
		>15days	0	0	0	0	
		>20days	0	0	0	0	
	No. of intensive rain spells	>60 mm per day	3	0	0	0	
Water logging observed (days)		18	6	10	14		

Davanagere, Karnataka	Rainfall received in (mm)		42.5	74	82.5	211	410
	No. of dry spells during kharif season	>10days	0	0	0	1	
		>15days	1	0	0	0	
		>20days	0	0	0	0	
No. of intensive rain spells	>60 mm per day	0	0	0	2		
	Rainfall received in (mm)		90	69	92	218	1163
Chikkaballapur, Karnataka	No. of dry spells during kharif season	>10 days	0	0	0	0	
		>15days	1	1	1	0	
		>20days	0	0	0	0	
	No. of intensive rain spells	>60 mm per day	1	0	0	0	
		Water logging observed -days		4	0	0	0
Gadag, Karnataka	Rainfall received in (mm)		67.7	8.63	68.5	91.8	388.77
	No. of dry spells during kharif season	>10days	0	0	1	1	
		>15days	0	0	0	0	
		>20days	0	1	0	0	
No. of intensive rain spells	>60 mm per day	0	0	0	0		
	Kalburagi, Karnataka	Rainfall received in (mm)		18.6	69	128	189.8
No. of dry spells during kharif season		>10days	1	1	1	0	
		>15days	1	1	0	0	
		>20days	1	1	0	0	
No. of intensive rain spells	>60 mm per day	0	0	0	1		
	Tumkur, Karnataka	Rainfall received in (mm)		73	50	68	144
No. of dry spells during kharif season		>10days	1	0	1	1	
		>15days	0	0	0	0	
		>20days	0	1	0	0	
No. of intensive rain spells	>60 mm per day	0	0	0	0		

Tamil Nadu: The districts such as Namakkal, Villupuram and Ramanathapuram have experienced 5 to 6 spells of inadequate moisture during 2015. In Thiruvarur district, NICRA village has experienced one event of high intensity rain during November month and also water inundation for 19 days during

November to December. In Villupuram, dry spell of more than 10 days occurred for 9 times during June to November months. However a high intensity rain was occurred in second fortnight of November and December leading to water inundation for 21 days (Table 115).

Table 115: Rainfall data of NICRA villages in Tamil Nadu during monsoon 2015

KVK	Kharif and Rabi 2015	June	July	Aug	Sept	Oct	Nov	Dec	Annual	
Namakkal	Rainfall received in (mm)	0	35	92	143	217	100.5	0	668.5	
	No. of dry spells	>10days	0	0	2	0	0	1	0	
		>15days	0	2	0	0	0	0	0	
		>20days	1	0	0	1	0	0	1	
No. of intensive rain spells	>60 mm per day	0	0	0	1	0	0	0		
Thiruvarur	Rainfall received in (mm)	24.2	23	84	22.4	72.7	404.2	240.4	1043.5	
	No. of dry spells	>10days	1	0	1	1	0	0	0	
		>15days	0	0	0	0	0	0	0	
		>20days	0	0	0	0	0	0	0	
	No. of intensive rain spells	>60 mm per day	0	0	0	0	0	1	0	0
Water logging observed (days)		0	0	0	0	0	12	7		
Ramanatha puram	Rainfall received in (mm)	30.5	10.25	4.25	54	87.5	253.25	215.5	919.25	
	No. of dry spells	>10days	0	1	1	0	1	0	0	
		>15days	0	1	1	0	0	0	0	
		>20days	1	0	0	0	0	0	0	
No. of intensive rain spells	>60 mm per day	0	0	0	0	0	1	0		
Villupuram	Rainfall received in (mm)	6.25	48	179.5	88.5	93.0	543.5	303.5	1262.25	
	No. of dry spells	>10days	1	0	1	1	2	1	0	
		>15days	1	0	1	1	0	0	0	
		>20days	0	0	0	0	0	0	1	
	No. of intensive rain spells	>60 mm per day	0	0	0	0	0	4	1	
Water logging observed (days)		0	0	0	0	0	14	7		

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 333.2ha area has been treated with NRM related treatments covering 1117 farmers fields in order to build climate resilience in eleven villages. The details are presented in Table 116.

Table 116: NRM activities undertaken during 2015-16 in the NICRA villages

Interventions	KVK	No. of farmers benefitted	Area under practice (ha)	Measurable indicators	Remarks
Resource conservation technology					
Large scale composting of aquatic weeds	Alleppey	350	117.1	65 t compost	Paddy fields cleared by the removal of water weeds to be fit for cultivation.
Recycling of organic residues for energy generation and crop production using portable biogas plants	Alleppey	4	58	biogas- 1.5 -2 hrs/ day.	Savings in cost of LPG – Rs. 1064/yr
Green Manuring-Dhiancha	Davanagere	12	5		Improved soil organic matter content
Mulching in chilli	Villupuram	10	2	100 q/ha	BCR: 2.55
Sugarcane trash mulching	Belagavi	3	0.4	6.97 % increase in yield (Chilli and Turmeric)	Improved soil organic matter and moisture content
Artificial ground water recharge					
Deepening of farm pond : 234 cum	Davanagere	30	0	Water storage capacity increased by 234 cum	
De silting of Nalas: 1585.8 cum	Belagavi	2	0	Increase in water storage capacity 3086380 liter	No. of open well recharged : 23
In-situ moisture conservation and crop performance					
Ploughing across the slope and maize cultivation	Davanagere	30	25	51.3	BCR: 2.2

Opening of dead furrows in Maize + Redgram (6:2)	Davanagere	2	2	73.8	BCR: 2.66
Vermicompost production and application for paddy	Ramanatha puram	25	10	53.88	BCR: 2.3
Broad bed furrow planting in bottle gourd	Villupuram	20	2	370	BCR: 2.78
Trench cum bunding - Groundnut	Tumkur	15	5	13	BCR: 1.5
BBF in Groundnut	Chikkaballapur	16	20	10.82	BCR: 2.29
Rejuvenation of drainage channel and aerobic paddy cultivation	Tumkur	2	1.5	31.5	BCR: 2.0
Moisture conservation practices					
Conservation tillage where appropriate	Chikkaballapur	20	12	-	-
Fodder grass on farm bunds	Kalburagi	5	10	-	-
Soil conservation	Kalburagi	3	20	-	-
Water harvesting and recycling for supplemental irrigation					
Protective irrigation from farm pond for ragi ML-365	Davanagere	1	0.8	29.5	BCR: 2.82
Plastic lining of farm pond–Aerobic Paddy	Tumkur	1	1	32	BCR: 2
Desilting and widening of defunct farm pond : (Tomato cup)	Tumkur	5	3	36	BCR: 2.8
Renovation of check dam : (Maize cup)	Tumkur	2	2	33	BCR: 2.2
Farm pond and jasmine cultivation	Namakkal	1	0.4	68.13	BCR: 2.5
Water saving technology					
Drip irrigation in Onion	Namakkal	2	1	295	BCR: 2.6
Supplemental irrigation of farm pond using mini portable sprinkler	Ramanatha puram	7	7	9.5	BCR: 2.02

Temporary water storage pond and small onion cultivation	Namakkal	12	0.4	182	BCR: 4.2
Strengthening of water storage structures					
Construction of Nalabund	Chikka ballapur	25	0	-	-
Disilting of tank and Disilting of checkdam	Gadag	150	0	-	-
Renovation of old drainage channel	Kalburagi	15	15	-	-
Organic input production and usage					
Vermicompost production and application to groundnut	Gadag	4	3.2	15.13	BCR: 1.66
Application of silt to farm fields	Davanagere	15	6	-	-
Agroforestry					
Dryland horticulture: (Mango cup)	Davanagere	5	2	-	-
Utilization of Bunds: (melia dubia)	Davanagere	120	10	-	1100 seedlings planted
Plantation of custard apple seedlings	Belagavi	44	1	-	-
Kagzi Lime plating	Belagavi	58	2	-	-
Live fencing of casuarina (CJ 6 clone) as wind barrier	Ramanatha puram	1	1	-	500 clones planted
Total		1117	333.2		

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 1465 farmers demonstrated large number of technologies in 470.83 ha area spread over

in eleven villages. The increase in yield under technology demonstration ranged from (-)49.63% in foxtail millet as diversification from ragi area at Chikkaballapur district to 90.77% in ragi+redgram



Seedling treatment with Pseudomonas at NICRA village of Thiruvarur District

intercropping system again at Chickballur district. The district-wise and technology-wise details are presented in Table 117.



Introduction of foxtail millet in place of finger millet at Chikkaballapur district

Table 117: Effect of climate resilient crop production technologies on yield and income

Technology demonstrated	KVK	No. of farmers benefitted	Area (ha)	Measurable indicators Yield(q/ha)		% increase in yield	Economics of Demo		Economics of Check	
				Demo	Local		Net Return	BCR	Net Return	BCR
Drought tolerant varieties										
Ragi (ML-365)	Davanagere	20	8	24.5	19.5	25.64	36540	2.52	24450	2.04
Ragi (ML-365)	Chikkaballapur	35	14	21.78	15.65	39.17	26018	2.02	13645	1.47
Ragi (Co 15)	Villupuram	25	5	18.5	13.9	33.09	19745	2.83	12385	2.17
Ragi (ML-365)	Tumkur	70	25	27.2	19.3	40.93	18750	1.85	7900	1.38
Ragi (GPU-28)	Tumkur	8	16	24.5	19	28.95	14950	1.69	8200	1.4
Redgram (BRG-5)	Chikkaballapur	15	6	13.6	10.78	26.16	60100	3.8	40177	2.64
Introduction of Castor	Chikkaballapur	5	2	12	-	-	72250	7.15	-	-
Seed onion (Co (On)5)	Namakal	11	4.4	188	167	12.57	159900	3.43	132950	2.97

Jasmine (Ramanathapuram Gundu)	Namakkal	14	1.6	68.13	59.2	15.08	546387	2.46	422750	1.91
Paddy variety (ANNA(R)-4)	Ramanathapuram	10	4	32.51	37.95	-14.33	3562	1.1	10090	1.28
Paddy (NLR 34449)	Ramanathapuram	42	5.6	50.35	37.95	32.67	40075	2.13	10090	1.28
Paddy variety (CO (R) 50)	Ramanathapuram	6	2	42.14	37.95	11.04	23588	1.67	10090	1.28
Groundnut (TMV 13)	Villupuram	5	2	13	9.7	34.02	67550	2.85	41600	2.16
Foxtail millet (DHFt-109-3)	Gadag	5	2	16.8	13.5	24.44	17149	1.87	10518	1.55
Barnyard millet (Co(KV)-2)	Ramanathapuram	15	3	13.8	10	38.00	10560	2.76	6000	2
Drumstick (KDM-1)	Davanagere	11	2	Under progress						
Improved variety and drought tolerating measures										
Rabi sorghum (M 35-1)	Gadag	25	10	11.2	9.3	20.43	9462	1.51	5234	1.29
Greengram variety (DGGV-2)	Gadag	25	10	2.87	2.33	23.18	3639	1.19	620	1.03
Short duration varieties										
YMV disease resistant with synchronized maturity greengram (Co-8)	Namakkal	22	5	8.2	7.3	12.33	27850	2.3	22100	2.02
YMV disease resistant blackgram (VBN-6)	Namakkal	30	6	8.55	7.2	18.75	44950	2.92	34800	2.53
Green gram (Co 8)	Villupuram	57	11.4	6.7	5.75	16.52	21040	1.77	13300	1.47
Blackgram (MDU 1)	Villupuram	22	4.5	8	6.5	23.08	51660	2.82	38750	2.48
Redgram (BRG-2)	Tumkur	50	6	11.9	9.5	25.26	24900	2.1	15900	1.72
Redgram (BRG-4)	Tumkur	12	5	12.1	9.8	23.47	25900	2.15	17600	1.81
Redgram (TS3R)	Kalburagi	10	4	4.8	4	20.00	16200	2.59	12350	2.28

Moth bean	Villupuram	30	6	7.5	6.9	8.70	56550	5.54	50480	4.88
Amaranthus (Co 1)	Villupuram	5	1.5	110	97	13.40	86500	3.51	72790	3.15
Amaranthus (Co 3)	Villupuram	5	1.5	190	143	32.87	175400	6.22	122630	4.54
Sorghum (M 35-1)	Belagavi	133	53.2	10	7.5	33.33	17750	2.73	11150	2.13
Wheat (DWR 2006)	Belagavi	50	10	11.5	8.75	31.43	22750	2.94	15350	2.41
Crop diversification										
Groundnut (K 6)	Villupuram	13	5.4	21.5	13.5	59.26	132550	4.36	69950	2.84
Lab-Lab (Co (Gb) 14)	Villupuram	15	0.6	70	59	18.64	76550	3.69	61050	3.22
Paddy (ADT 49)	Villupuram	8	3.2	52.5	41.7	25.90	44950	2.33	29130	1.87
Paddy (TPS 5)	Villupuram	7	2.8	48.2	43	12.09	26390	1.84	20650	1.67
Paddy (Trichy 3)	Villupuram	6	2.4	58.4	42.3	38.06	43160	2.32	17750	1.54
Brinjal (Co 2)	Villupuram	30	1	118	84	40.48	110000	3.53	55350	2.03
Bhendi (CoBH 1)	Villupuram	20	1.5	94	70	34.29	73600	2.51	39760	1.78
Foxtail millet v/s Ragi	Chikkaballapur	5	2	10.97	21.78	-49.63	68207	4.41	26017	2.02
Finger millet (Co(RA)14)	Ramanathapuram	10	2	16.5	13	26.92	27250	2.95	18500	2.32
Dryland horticulture-Mango	Gadag	10	4.5	Under progress						
Forest seedlings on bunds-Teak	Gadag	13	0.5	Under progress						
Contingent Crop										
Horse gram (PHG-9) as contingent crop	Chikkaballapur	27	10.8	9.48	7.95	19.25	11687.5	1.97	4580	1.3
Horse gram (GPM-06)	Belagavi	9	0.8	6.5	4.75	36.84	12750	6.5	8335	4.75
Flood tolerant varieties										
Paddy (CR 1009 SUB 1) (Long duration)	Thiruvarur	100	40	62.1	54.27	14.43	57045	2.58	47083	2.37
Paddy (Swarna Sub1) (Medium duration)	Thiruvarur	15	6	60.92	49.95	21.96	55458	2.54	42668	2.32

High yielding variety										
Chickpea (Jaki-9218)	Gadag	10	4	4.25	3.45	23.19	-201	0.99	-3066	0.84
IPDM										
Integrated pest and disease management in Small onion	Namakkal	30	12	182	168	8.33	245953	3.08	212663	2.72
Location specific intercropping systems with high sustainable yield index										
Maize+Redgram (BRG-2)- (6:1)	Davanagere	53	21.2	62.37	47.02	32.65	44.718	2.05	24628	1.6
Maize + Redgram (TS-3R)- (5:1)	Gadag	20	8	34.24	21.95	55.99	11374	1.34	712	1.03
Groundnut + Redgram (10:2)	Chikkaballapur	16	6.4	13.25	7.97	66.25	33226	2.4	24140	2.03
Ragi +Redgram (10:2)	Chikkaballapur	28	11.2	12.4	6.5	90.77	19243	3.24	31903	2.4
Paddy + Redgram (10:2) under rainfed	Chikkaballapur	2	0.8	80.2	74.35	7.87	98905	4.23	32158	3.89
Groundnut (Co-6) with redgram (Co-7)	Namakkal	12	3	18.5	14.5	27.59	79100	2.91	39750	2.19
Red gram (BSR 2) in groundnut	Villupuram	20	1	16.96	9.9	71.31	87300	3.61	46000	2.39
Cowpea (PKM 1) in groundnut	Villupuram	20	1	12.5	10.6	17.92	77300	3.33	51530	2.55
Pigeonpea (TS-3R)+Bajra (ICTP-8203) in 1:2 ratio	Belagavi	16	2.6	7	4.5	55.56	28250	3.05	17750	2.92
Foxtail millet (PS-4)+Bajra (ICTP-8303) in 4:4 ratio	Belagavi	7	1.6	12.23	7.5	63.07	20075	2.91	11450	2.57
Pigeonpea +Foxtail millet (1:2)	Belagavi	30	4.2	8.17	5.75	42.09	34800	3.44	24650	3.5
Groundnut +Foxtail millet (4:2)	Belagavi	10	2	8.1	6.79	19.29	25525	2.7	22550	2.98

Ragi (ML 365)+Redgram (BRG-2)	Tumkur	15	5	29.21	23	27.00	21250	1.89	12750	1.57
Maize (local)+Redgram (BRG-2)	Tumkur	10	4	38.07	33	15.36	40750	1.6	9900	1.43
Ground nut + Redgram (BRG-2)	Tumkur	15	5	16.08	13	23.69	16500	1.92	8100	1.48

Cultivation practices to overcome flooded situations

Tissue culture banana plantlets in poly bags for initial 1-1.5 months and planting in the main field after the flooding	Alleppey	13	0.8	The crop is in the bunch emergence stage						
Vegetables in poly bags under rain shelter during rainy season	Alleppey	18	0	103 kg / unit	Nil		2228	0.86		

Water saving paddy cultivation methods

SRI method of paddy cultivation	Chikkaballapur	7	2.8	69.37	59.89	15.83	32158	3.89	22675	2.48
Aerobic paddy (MAS-26)	Tumkur	5	10	32	26	23.08	17700	2.01	11800	1.7
Drum seeder for wet seeding	Alleppey	47	44	67.1	60.9	10.18	86163	2.49	55715	1.71
Total		1465	470.8							

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. The details are furnished in Table 118. During year, about 3113 livestock have been covered under general health checkup and preventive vaccination programme. Under heat stress management through balanced nutrition 325 animals were covered benefitting 163

farmers in the NICRA villages. About 819 improved breeds of livestock/birds and 118 units of improved shelter/housing were demonstrated to tackle the adverse climatic conditions in the NICRA villages benefitting 223 farmers. In order to enhance the fodder availability to livestock during lean period, about 7.6 ha of community land was brought under fodder cultivation.



Introduction of improved breed chicks at NICRA village of Thiruvarur district

Table 118: Climate resilient technologies for sustainable production of livestock and fisheries.

Technology demonstrated	KVK	No. of farmers	Unit/ No. / Area (ha)	Measurable indicators of output		% increase
				Demo	Local	
Animal health camps						
Vaccination, fertility and general checkup	Kalburagi	52	100			
Vaccination, fertility and general checkup	Belagavi	80	1738			
Deworming of small and large ruminants	Chikkaballapur	69	703			
Total		201	2541			
Preventive vaccination						
Prevention of FMD	Davanagere	129	403 livestock			
Prevention of blue tongue disease in Sheep/Goat	Chikkaballapur	49	653	653	47 dead in the adjacent village	
Preventive vaccination against harsh climate	Namakkal	122	2377	Mortality –Nil	Mortality –Nil	
Ranikhet disease vaccine	Thiruvarur	15	750 birds	Mortality-Nil	Mortality-60-70%	
RDVK Oral pellet vaccine	Villupuram	20	500	Mortality-Nil	Mortality-60-70%	
Prevention of FMD	Kalburagi	30	72			
Total		365	572			

Heat stress management through balanced nutrition						
Addition of mineral lick	Namakkal	8	170 (sheep and goat)	Kids mortality 2%, 16 kg average wt.	Kids mortality 9%-13 kg av. Wt.	12.5
Addition of mineral mixture	Namakkal	5	5	8 lit/day	7.5 lit/day	33.2
Mineral mixture to mulching cows	Belagavi	100	100	5.1 lit/day	4.7 lit/day	
TANUVAS GRAND supplement to mulching cows	Villupuram	50	50	Milk yield – 9.5 lit/day	Milk yield – 7.5 lit/day	19.05
Total		163	325			
Breed up gradation						
Breed upgradation-Telicherry buck	Namakkal	22	1			
Improved he bull (Kilari) and buffalo breeds	Belagavi	11	11			
Improved he goat breeds -Shirohi and Jamanapari	Belagavi	28	28	22.3 kg bodywt of 6 month kid	17.50 kg bodywt of 6 month kid	7805
Namakkal 1 crossbred Chicken	Thiruvarur	15	750 birds	700 g -9 th week	500 g 9 th week	
Up gradation of local sheep breed for twinning-2 Rams of NAARI Suvarna	Chikkaballapur	3	3 herds	23 Pair of twins (1:1 Male : Female)	23 Single	100
Nandanam IV	Villupuram	20	20 units	Weight/bird – 2.26kg	Weight/bird – 1.56 kg	44.47
Madras Red Ram-sheep	Villupuram	6	6			
Total		105	819			
Improved fodder/feed storage methods						
Silage making in plastic bins	Davanagere	9	9 units	8.44 lit/day-milk	7.09 lit/day-milk	15.99
Dry and poor quality fodder enrichment	Davanagere	15	500kg	8.03 lit/day-milk	7.09 lit/day-milk	11.71
Use of fodder cover for dry fodder heap-HDPE sheet	Davanagere	35	35 heaps	Fodder saved- 2 t/season	Fodder loss 10-11%	

Covering of dry fodder from aberrant weather conditions-Tarpaulin sheets	Chikkaballapur	55	55	3.5 t fodder saved		
Fodder production-Guinea grass, Rhodes, Signal grass	Gadag	3	3			
Enrichment of dry fodder-Silpaulin sheet, Jaggery, Salt	Gadag	3	3			
Silage making-Silage bag, Silage culture	Gadag	3	3			
Azolla feeding	Villupuram	5	5 units	Milk yield – 5.5 lit/day	Milk yield – 5.0 lit/day	38.37
Total		128				

Improved housing /shelter for protection of livestock against extreme weather

Customized Poultry cage, Automatic vaccinator, Introduction of improved breeds, &Azolla as feed	Alleppey	70	70 units	Mortality – 13 %, Egg production – 811eggs/ unit of 15 birds/ year	Mortality – 53 %, Egg production – 2684 eggs/ unit of 15	75.40%
Housing of goat in slatted floor to overcome flooded conditions	Alleppey	14	14 units	Mortality – Nil, No. of kids/year - 10	Mortality – 6%, No. of kids/year-5	50
Improved night shelter for Poultry	Namakkal	11	11 units (832 Desi birds)	Predator mortality was controlled 1%	Predator mortality 11%	
Caged house for poultry	Thiruvarur	15	15 units	1.50%	60-70%	
Cages for Backyard Poultry farming	Villupuram	8	8 units	Mortality-Nil	Mortality-5-10%	
Total		118	118			

Model dairy unit for stress and feed management

Use of cow mat with a size of 6ft x 4ft x 24” to reduce the stress; Automatic drinking system for ensuring fresh water availability round the clock.	Alleppey	9	9	2850 l/year	2500lit/year	14
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Use of community lands for fodder production during droughts / floods

Production of HYV of Sampoorna (DHN-6) fodder	Davanagere	10	2	320.1	193.5	39.49
Anjan Grass	Villupuram	25	2.5	Fodder yield 190 q/ha		
Stylosanthes	Villupuram	25	2.5	Fodder yield 250 q/ha		
Desmanthes	Villupuram	8	0.6	Fodder yield 102 q/ha		
Total		68	7.6			
Management of fish ponds / tanks during water scarcity and excess water						
Composite Fish culture	Villupuram	1	2000 Nos			

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 and climate literacy through a village weather station. The

NICRA implementing centres have established six units of fodder banks and three units of seed banks to meet the drought and flood related issues. In respect of custom hiring centres, 942 farmers of NICRA villages have used 53 various implements to cultivate 902.23 ha area for timely sowing and other cultural operations. The revenue generated by these custom hiring centres was Rs 3.69 lakhs (Table 119).

Table 119: Details of Institutional Interventions implemented under NICRA

KVK	Implements (No)/Name of crops / Commodity groups	Area covered (ha)	Farmers covered	Revenue generated through CHCs (Rs.)
Custom hiring centre (CHC)				
Belagavi	2	15	8	1340
Tumkur	3	25	112	13050
Davanagere	17	89	161	9090
Chikkaballapur	10	272.60	96	26410
Gadag	-	0	-	-
Kalburagi	-	0	-	-
Ramanathapuram	4	241	30	2500
Namakkal	7	105.83	376	298729

Villupuram	5	27.2	57	12900
Thiruvarur	3	82.4	54	4035
Alleppey	2	44.2	48	750
Total	53	902.23	942	368804
Fodder bank				
Chikkaballapur	Gini &CO-4 grasses	2 units	4	0.4
Gadag	Polythene sheets are used for protection of fodder from extreme climate condition	1 unit	40	-
Villupuram	Fodder seed production- Seeds of COFS 31, HedgeLucerne, Guinea Grass- slips	3 units	3	1.2
Ragi processing				
Tumkur	Ragi processing- cleaning, polishing, powdering	1 unit	40	
Seed bank				
Gadag	Seed bank	1 unit	60	
Namakkal	Seed bank- Greengram CO.8, Blackgram.VBN.6, Groundnut. CO.6	1 unit	40	
Thiruvarur	Seed bank-120 t CR 1009 Sub 1, Swarna Sub 1paddy seed	1 unit	55	

Capacity building of farmers: During the year, NICRA implementing KVKs have conducted trainings on 36 thematic areas related to climate

resilient agriculture benefiting 2799 farmers including 693 women farmers. The details are provided in Table 120.

Table 120: Details of capacity building programmes organized under NICRA

Thematic area	No. of KVKs	No. of beneficiaries		
		Male	Female	Total
ICM	2	67	3	70
INM	1	15	0	15
Crop diversification	1	36	0	36
Agro forestry	1	29	5	34
Composting techniques	1	27	27	54
Crop production	8	184	52	236
Heat stress management in dairy	1	6	15	21

Drought tolerant improved varieties with ICM	3	131	16	147
Farm implements and machineries	4	68	20	88
Fish farming	1	16	8	24
Fodder and feed management	6	116	50	166
Income generating activities	1	0	14	14
<i>In-situ</i> moisture conservation	1	43	0	43
Intercropping system	1	30	0	30
IPDM	1	4	16	20
IPM	1	43	0	43
Irrigation management	1	34	10	44
Livestock management	7	144	95	239
Location specific intercropping systems	1	120	0	120
Management of horticultural crops	2	15	15	30
Moisture conservation	3	45	0	45
Natural Resource Management	7	162	18	180
New technology in field crops	2	39	13	52
Nursery raising	2	33	26	59
Nutrition and health management	5	71	25	96
Organic farming	1	27	6	33
Parasite management in livestock	1	28	0	28
Pest and disease management	7	170	32	202
Post harvest technology	1	5	44	49
Public cleanliness and Health	1	16	0	16
Resource conservation technologies	3	178	64	242
Sheep management	1	4	12	16
Short duration varieties	1	13	0	13
Soil health management	3	172	77	249
Value addition	2	0	30	30
Weed control	1	15	0	15
Total		2106	693	2799

Extension Activities: During the year, 290 extension activities have been carried out to create awareness among the community about the climate related impacts on the agriculture and related

sector and measures need to be initiated to alleviate these adverse impacts. A total of 5758 farmers have benefitted through their participation in these programmes including 1341 women farmers (Table

121). About 586 farmers including 94 women farmers were taken on exposure visits to various places/intuitions by the NICRA KVKs during the year.

Table 121: Details of extension activities implemented under NICRA

Name of the activity	No .of KVKs	Number of programmes	No. of beneficiaries		
			Male	Female	Total
Animal health	11	41	921	258	1179
Agro advisory services	4	87	313	86	399
Animal Health Check up	2	6	52	24	76
Celebration of Important Days	2	2	49	0	49
Diagnostic visits	4	35	254	82	336
Exposure visit of farmers	11	18	492	94	586
Field days	9	18	823	173	996
Formation of farmers groups	1	2	24	0	24
Group meeting on “Resource conserving and ecofriendly technologies in Paddy”	6	32	602	34	636
Harvest Festival of “Resource conserving and ecofriendly technologies in Paddy”	1	1	55	5	60
Integrated farming system	5	6	74	38	112
Interaction of RAWE students with farmers about NICRA		1	9	11	20
Method demonstrations	11	25	408	251	659
Poultry Vaccination and awareness camp	1	2	14	66	80
SHGs activities	3	12	202	59	261
Up scaling of technology demonstrations by organizing Agricultural technology meet	2	2	125	160	285
Total		290	4417	1341	5758

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

Various agencies are working in agriculture at present in the country and farmers are keen to know about the services provided by them. The technologies developed and refined by NARS are accepted and adopted to various extents by farming community. However, the awareness among farmers

about the organisations and their programmes need to be created on regular basis. In this context, an innovative initiative “Mera Gaon - Mera Gaurav” has been launched by the Hon’ble Prime Minister on 25th July, 2015 on the 87th Foundation Day of the ICAR and KVK Conference at Patna and it was implemented in the Country by the Agricultural Extension Division, ICAR, New Delhi through

its Eight ICAR-ATARIs. In this initiative, 20,000 scientists of National Agricultural Research and Education System (NARES) will work by selecting villages. At Institute/Agricultural University level, many groups of multidisciplinary scientists will be constituted. One group may consist of four scientists who will adopt 5 villages within a radius of 50-100 km from their place of working. Scientist groups remain in touch with the selected villages and provide information to the farmers on technical and other related aspects in a time frame through personal visits or on telephone. Objectives are as follows:

- Promoting direct interface of scientists with the farmers to accelerate the lab to land process
- Providing required information, knowledge and skills on best farm practices, inputs, service providers etc. on regular basis by adopting villages
- Issuing timely alerts and advisories to farmers
- Creating awareness among farmers about the organisations and their programmes and schemes as well as government policies related to the farming sector
- Developing convergence with different departments and organizations for development of villages
- Imbibing a sense of ownership among the agricultural scientists of the country

The ICAR-ATARI, Bangalore is one among the

eight ICAR-ATRAIs in the country implemented Mera Gaon - Mera Gaurav in Zone VIII comprising the States of Karnataka, Tamil Nadu, Kerala, Goa, Puducherry and Lakshadweep during the reporting year. In this initiative, a sensitization workshop on Mera Gaon – Mera Gaurav (MG-MG) was organised under the Chairmanship of Dr.A.K.Singh, Deputy Director General, Agricultural Extension, ICAR, New Delhi on 03rd October, 2015 in the Conference Hall of Directorate of Extension, UAS Hebbal Campus, Bangalore. A total of 44 scientists from different ICAR Institutes and SAUs located in zone VIII participated in the Workshop. Various issues related to MG-MG were discussed and suggested guidelines and action points for effective implementation of MG-MG in Zone VIII. During the year, the following activities were carried out under MG-MG by different Institutions in Zone VIII:

(a) Web page on MG-MG: Designed a web page with contents viz., Introduction, Objectives, Modus operandi, The 10 tasks, Activity chart, Operational mechanism, Work progress, Photo gallery and FAQs and the same was uploaded in the Website of ICAR-ATARI, Bangalore as a ready reference for implementing MGMG.

(b) Scientists Teams and villages: All ICAR Institutes including Regional Stations and Centres located in Zone VIII are implemented MG-MG and scientists working in these Institutes are formed in teams and adopted villages. As per the guidelines, Core ICAR Institutes that is their Headquarters located in the jurisdiction of ICAR-ATARI and the villages adopted as well as quarterly reports

pertaining to MG-MG by these Institutes will be submitted to respective ICAR-ATARI for compilation of Zonal Report on MG-MG. Regional Stations and Centres will be directly reported to their respective Headquarter with a copy to ICAR-ATARI in their jurisdiction for information. However, Regional Stations/Centres will participate in all interactive meetings/workshops conducted by their respective ICAR-ATARIs for updating awareness and knowledge on MG-MG. Accordingly, details of MG-MG of Core ICAR Institutes in Zone VIII during 2015-16 is presented in Table 122. A total of 161 multi-disciplinary teams were formed with 678 Scientists of different cadres who are working in Core ICAR Institutes located in Zone VIII which includes 52 teams with 238 Scientists from ICAR Institutes *viz.*, ICAR-IIHR, Bangalore, ICAR-NIANP, Bangalore, ICAR-NBAIR, Bangalore,

ICAR-NIVEDI, Bangalore, ICAR-DCR, Puttur in Karnataka, 33 teams with 113 Scientist from ICAR Institutes *viz.*, ICAR-SBI, Coimbatore, ICAR-CIBA, Chennai, ICAR-NRCB, Trichy in Tamil Nadu, 72 teams with 304 Scientists from ICAR Institutes *viz.*, ICAR-CPCRI, Kasaragod, ICAR-CTCRI, Trivandrum, ICAR-IISR, Calicut, ICAR-CMFRI, Cochin, ICAR-CIFT, Cochin in Kerala, and 4 teams with 23 Scientists from ICAR RC for Goa, North Goa in Goa. All these teams were adopted a total of 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.

Table 122: Details of MG-MG of Core ICAR Institutes in Zone VIII during 2015-16

State/ICAR Institute	No. of Scientists in position	Number of Teams formed	No. of villages selected in a cluster	Total number of households	Total area (ha)
A. Karnataka					
ICAR-IIHR, Bangalore including its CHES at Chettalli and CHES at Bhubaneswar	139	28	117	13207	22012.94
ICAR-NIANP, Bangalore	41	10	51	8461	10463.60
ICAR-NBAIR, Bangalore	29	6	30	11718	13946.89
ICAR-NIVEDI, Bangalore	17	5	23	7551	4154.40
ICAR-DCR, Puttur	12	3	15	8779	12244.00
Total (A)	238	52	236	49716	62821.83
B. Tamil Nadu					
ICAR-SBI, Coimbatore	62	16	75	20126	25811.00
ICAR-CIBA, Chennai	34	12	13	3793	732.00

ICAR-NRCB, Trichy	17	5	21	15200	12900.00
Total (B)	113	33	109	39119	39443.00
C. Kerala					
ICAR-CPCRI, Kasaragod including its substations at Vittal, Kayamkulam, Kahikuchi, Mohitnagar and Kidu	63	17	70	66199	32143.00
ICAR-CTCRI, Trivandrum	34	8	41	23088	5929.64
ICAR-IISR, Calicut	25	5	10	3000	4000.00
ICAR-CMFRI, Cochin including its regional stations/centres at Veraval, Mumbai, Karwar, Mangalore, Calicut, Vizhinjam, Tuticorin, Mandapam, Chennai, Visakhapatnam and Puri.	137	33	154	-	-
ICAR-CIFT, Cochin	70	14	69	58227	35526.00
Total (C)	304	72	334	147514	73598.64
D. Goa					
ICAR RC for Goa, North Goa	23	4	4	2325	-
Total (D)	23	4	4	2325	-
Grand total (A+B+C+D)	678	161	683	238674	175863.50

(c) **Interventions:** Benchmark survey in a prescribed format for all selected villages was completed by the Core ICAR Institutes. In line with the objectives, various technological interventions were carried out by the teams in their respective Institute's location specific technologies in the areas of agriculture, horticulture, plantation crops, livestock, fisheries, farm machinery and implements, post harvest technology *etc.*, as well as technologies suitable for the adopted cluster villages from different Institutions from NARS through which created an awareness, showcased knowledge and skills among selective farmers. Further, different extension activities and services *viz.*, training, regular visits to villages, gothis/meetings, mobile-based advisory, literature support,

facilitation for technological inputs (new varieties, production technologies, seeds, planting materials, biological agents, bio-products *etc.*), diagnosis of major problems, creation of general awareness, creation of linkages with line departments and



Dr.A.K.Singh, Deputy Director General Agricultural Extension Division, ICAR, New Delhi chairing the Sensitization Workshop on MG-MG

organization *etc.* were in use for the interface of ICAR Scientist teams with the farmers belonging to adopted cluster villages in the states of Karnataka, Tamil Nadu, Kerala and Goa during the reporting period.

Pre-Kharif and Pre-Rabi Campaigns

During 2015-16, Ministry of Agriculture and Farmers Welfare, Government of India has initiated a new programme of conducting campaigns before the commencement of *kharif* and *rabi* seasons, which was implemented through KVKs. In Zone VIII, pre-*kharif* campaign programmes were conducted by 54 KVKs and pre-*rabi* programmes were conducted by 47 KVKs and the State-Wise details of conducting the campaigns are furnished in table 123.

Table 123. State-wise number of KVKs involved in organization of pre-kharif and pre-rabi campaigns

S.No	State	Pre-Kharif (No.)	Pre-Rabi (No.)
01	Goa	02	02
02	Karnataka	22	18
03	Kerala	11	09
04	Puducherry	-	01
05	Tamil Nadu	19	17
	Total	54	47



The major programmes included were seminars, group discussions, film shows etc. and KVKs have also prepared display boards in regional language on latest and most important technologies in major aspects of agriculture and its allied sectors.

Rainfall pattern

Rainfall pattern decides the prosperity of Indian economy in general and agricultural economy in particular. Based on the available rainfall data from the Indian Metrological Department, it was observed that during 2015-16, though the total annual rainfall was nearer to normal (deviation of -1.95% in Kerala to -8.81% in Karnataka), the rainfall during the major agricultural season (*kharif*) coinciding with South West monsoon was lesser by 18.33% in Karnataka and 26.00% in Kerala. During *rabi* season, the same was lesser by 7.44% in Karnataka, whereas higher by 26.92% in Kerala and 52.96% in Tamil Nadu (Tables 124, 125 and 126).

Table 124: State-wise pre-monsoon and monsoon rainfall pattern during 2015-16

Sl. No.	STATE	Pre monsoon			Monsoon		
		Actual	Normal	Deviation	Actual	Normal	Deviation
1	Karnataka	184.6	123.4	49.59	679.7	832.3	-18.33
2	Tamil Nadu	NA	NA	NA	NA	NA	NA
3	Kerala	465	380	22.37	1514	2046	-26.00

Table 125: State –wise post-monsoon and winter rainfall pattern during 2015-16

Sl. No.	STATE	Post monsoon			Winter		
		Actual	Normal	Deviation	Actual	Normal	Deviation
1	Karnataka	174.1	188.1	-7.44	2.4	4.3	-44.19
2	Tamil Nadu	676.1	442	52.96	NA	NA	NA
3	Kerala	610.1	480.7	26.92	19.2	24.4	-21.31

Table 126: State –wise annual rainfall pattern during 2015-16

Sl. No.	STATE	Annual		
		Actual	Normal	Deviation
1	Karnataka	980	1074	-8.81
2	Tamil Nadu	NA	NA	NA
3	Kerala	2523	2573	-1.95

Source: Indian Metrological Department

3.5 Research Project

Title of Research Project: “Behavioral analysis of farmers’ decision making on agricultural innovations”

Project period: 01.04.2014 to 31.03.2016, Budget: Rs.98.52594 lakh

Lead Centre: Zonal Project Directorate, (ATARI) Zone VIII, Bangalore, Karnataka

Principal Investigator: Dr.M.J.Chandre Gowda, Principal Scientist (Ag. Extension)

Cooperating Centre (s) and Co-PIs:

1. University of Agricultural Sciences, Dharwad – Co-PI Dr.S.S.Dolli, Professor (Agril. Extension)
2. Institute of Rural Management, Anand, Gujarat – Co-PI Dr.M.V.Durga Prasad, Professor, Operations Research,

3. Samuha NGO, Kanakagiri, Koppal, Karnataka - Mr. D. Saravanan, Assistant Director (Agriculture)

Objective 1: Asses the farmers’ decision making process in selection, adoption and continuation of innovations in different cropping systems of Karnataka and Gujarat to evolve innovation-decision process models.

Objective 2: Analyze the influence of push factors exerted from technology generation, dissemination and facilitation systems and the pull factors emanated from technology utilization, marketing and consumption systems on the farmers’ decision making in the two states.

Objective 3: Categorize farmers on the basis of adoption rate for specific innovations and determine their characteristics based on which recommend strategies to hasten innovation decision among late adopters.

Details of study area and the sample size

Sl	Crop	District		Sample size (No.)		
		Karnataka	Gujarat	Karnataka	Gujarat	Total no.
1	Cotton	Raichur	Botad	73	85	158
2	Groundnut	Dharwad	Junagad	90	62	152
3	Maize	Haveri	Panchmahal	89	78	167
4	Paddy	Koppal	Khed	73	70	143
5	Potato	Kolar, Chikkaballapur	Banaskanta	100	67	167
Total				425	362	787

Methodology:

Innovations adopted by the farmers were identified by recording the crop management technologies/practices adopted during the cropping period 2014-15 using a structured interview schedule as well as observation of farmers actions/activities. Each farmer was visited 7 to 8 times by the field investigators to document the practices and technologies used in seeds (varieties/hybrids), irrigation method (drip/sprinkler), micro/secondary-nutrients, pesticides (chemical/biological) and marketing channels and approaches. In addition to individual farmers, data was collected from households, focused groups, key informants, public/private extension personnel, public/private research workers, market officials and consumers on various components. Available tools and instruments were used in most of the cases. Wherever required new tools and techniques were developed and standardized. For example, an instrument to measure village agricultural situation through a composite index “Village Agricultural Situation Index” (VASI) was developed for the study.

Results:

Decision making behavior: The “initiation-stages” approach was used to analyze the farmers’ decision making behavior.

Based on the source and context of “Initiation”, five distinct patterns namely Self-initiation, Problem-driven, Incidental, Community sharing and Extension initiation were identified. It is referred to as SPICE pattern to innovation initiation. Pooled data revealed that for about 50 percent of the farmers, the innovations were community-driven. Problem-driven initiation was noticed in about 16 % farmers. Extension initiated the innovation decision making among 13.35% farmers. Incidental initiation happened for 11.52% farmers. About 10% of the decisions were self-initiated.

Activities carried out by the farmers and the sources contacted in between initiation and adoption were studied to delineate the decision process stages for each innovation. Analysis of farmers’ activities subsequent to initiation revealed three distinct pattern of persuasion namely (i) 2-step: Awareness-

Adoption (ii) 3-step: Awareness-Observe-Adoption /Awareness- Understand -Adoption and (iii) 4-step: Awareness-Observe/Understand-Try/Verify-Adoption. Majority farmers followed the 3-step process (48.5%) followed by 2-step process (43%) in decision making.

Based on the “initiation – stages” matrix, three broad decision patterns were identified namely (i) Induced Decision making pattern (ii) Imitation Decision making pattern and (iii) Informed Decision making pattern. Informed decision making was predominant with about 43.23 per cent of farmers followed by induced decision by about 30.78 % farmers.

Majority of incidental initiation (81.3 %) and problem-driven initiation (68.6 %) resulted in two-stages “awareness-adoption”. On the contrary, farmers who were self-initiated (46.3 %) and extension initiated (39.9 %) passed through three-stage decision making in the form of “Aware–Understand-Adopt”. Farmers who got initiated to innovation decision through community-sharing followed different patterns decision process wherein 33.7 % passed through “aware-adopt” (induced), 29.6 % followed “aware-observe-adopt” (imitation) and 26.2 % followed “aware-understand-adopt” (informed decision). It is also clear that the multi-stage decision making was seen mainly among farmers who were self-initiated (17.2 %), extension-initiated (11.3 %) and community-initiated (10.4 %).

New approach to Adopter categorization:

The present study noted that about 86.14 % of the study sample farmers were adopters of at

least one innovation. Remaining who did not adopt any innovation in the five functional areas of crop management were considered as non-adopters. “Relative Earliness” was used to identify adopters into “innovators”, “early adopters” and “late adopters”. About 35.7 % of the farmers were categorized as innovators in the first stage and about 27 % in the late adopter category. An attempt was made to rationalize categorization of adopters using a two-stage classification. The second stage classification was based on knowledge level of the adopters on those innovations. Innovators were further classified as informed innovators (17.1 %) and ignorant adopters (18.6 %). Late adopters were further classified as late adopters (18.8 %) and informed late adopters (8.4 %).

Characteristics of adopter categories:

Based on the data presented in tables 10, 11 and 12, characterization of the five adopter categories has been summarised below.

1. Innovators: Informed innovators are knowledgeable, high on innovativeness and adopt more number of innovations and take reasonable amount of time to pass through the innovation decision process. Their households have significantly higher socio-economic status than others. On personality traits, innovators higher extraversion, conscientiousness and openness to experience. They had the highest scientific orientation as well extension participation compared to others.

2. Informed late adopters: Informed late adopters are knowledgeable and innovative but take more time to pass through the innovation decision process. They might be doing it deliberately as

they have other choices or sometimes, for example, prefer eco-friendly practices than using chemicals. In terms of personality traits, informed late adopters had higher agreeableness and emotional stability. They were next to innovators on conscientiousness and openness to experience. They also had better scientific orientation, but exhibited low level of extension participation.

3. Early adopters: These are the farmers who followed others in the adoption process. They are guided/ influenced by front-runners. They have medium level of knowledge and innovativeness. Their level of conscientiousness component of personality trait was the least among all categories. They also had medium level of scientific orientation and achievement orientation.

4. Ignorant adopters: These are the farmers who adopt early although they have little or no knowledge about the innovation. This may happen in problem-driven or incidental decision making. Psychologically less innovative, but take little time to adopt an innovation. They end up in adopting more innovations too. They were low on emotional stability component of personality trait. They exhibited highest level of achievement motivation compared to others.

5. Late adopters: Late adopters are the farmers who take relatively more time to adopt. They wait until large majority adopt the innovations. They are low on innovativeness, adopt very few innovations and also have poor household socio-economic status. They were low on extraversion component of the personality trait.

Factors influencing decision making

Personality Traits: Majority of the informed decision makers were high on agreeableness, conscientiousness and emotional stability. In all the personality traits, the common striking feature is that most of the farmers who are in the low categories resorted to imitation pattern of decision making. Among those who resorted to induced decisions, more farmers were found to have high scores on openness to experience.

Socio-Economic Status: The socio-economic status had positive and significant relationship with decision behaviour, innovativeness, earliness in adoption and number of innovations adopted.

Village Agricultural Situation: The village agricultural situation index (VASI) values of the project villages ranged from 44.8 to 86.4. Average value for Gujarat villages was 73.8 and for Karnataka villages was 65.3, indicating that Gujarat village agricultural situation was better than Karnataka villages. Village agricultural situation index had positive relation with number of innovations adopted and better / informed decision making.

Technology development process in public and private institutes: The difference was seen in research focus, internal quality, developer responsibility and facilitation role. Public research institutes look for productivity parameters while private is more focused on market demand and segmentation in addition to productivity. The role of researcher in private goes beyond development as he is responsible for supervising test marketing

and spread for first two years. The private research institute is responsible for supply of material in required quantity and supervises its distribution and make it available in all segments. The difference in the process of development and its monitoring result in extent of spread and time.

Extension in Public/Private extension activities: There was visible difference in the presence of public and private extension in the field. All the private companies organized educational activities in the form of individual contact methods, group contact methods as well as mass contact methods very extensively. Group meetings, training programme, demonstrations and field days were organized by most of the companies. Private companies also used mass media like posters, pamphlet, radio, display on the vans/vehicles, and film shows, covering over 50 percent of people. On the other hand, public extension services were limited to pre-seasonal visits to villages for awareness creation on schemes and rest of the time spent in office to provide inputs available on subsidies under various schemes. Public extension could spare little time for educational activities.

Recommendations: The study recommends an extension strategy based on “MAX-MIN-FACILITATE” - maximize informed decision

making, minimize induced decision making and facilitating imitation decision making.

Informed decision making is mostly seen among self-initiated and extension-initiated decision making. This requires encouragement for “innovators” and also presence of “extension system” in the field. Induced decisions are mostly happening in the incidental and problem-driven decision making where the private extension is playing key and crucial role. These kind of decisions have been found to be taken without knowledge and hence the study identified a new category of innovators as “ignorant adopters”.

Ignorant adopters are made to spend more per unit area and hence end up in losing their income. They have the potential to adopt innovations early, but inadequate knowledge and exposure force them to take instantaneous decisions.

Farmers personality traits have great relevance in understanding the farmers decision making process. The study clearly revealed that majority of the farmers who took imitation type of decisions were low on personality traits. Imitation is a social learning process and hence can be facilitated by the extension system by making them to follow informed decision makers (self-initiated and extension-initiated) than induced decision makers.

Human Resources Development

1. Orientation Training Programme on Mandated Activities of Krishi Vigyan Kendra for the newly recruited KVK staff

Orientation programmes are conducted by ICAR ATARI Bengaluru for the newly recruited KVK staff in order to sensitize them on various mandated activities of the KVK system. During the reported period, one orientation programme on mandated activities of the KVK was conducted at Directorate of Extension TNAU Coimbatore during 14th to 16th September 2015. In which 30 newly recruited Programme Coordinators and Subject Matter Specialists from KVKs in Tamil Nadu have participated. The major technical content of

the programme included i) an overview of KVK system, ii) participatory rural appraisal techniques – principles and research methodological aspects, iii) technology assessment and refinement, iv) frontline demonstration, v) training programmes vi) production and supply of technology products including revolving fund, vii) maintenance of KVK infrastructures and facilities, viii) extension activities, ix) process documentation x) database management and xi) project proposals. The participants opined that the orientation programme was useful and they could more clarity on topics such as Participatory Rural Appraisal Techniques, Technology Assessment and Refinement, Frontline Demonstrations *etc.*



Director ICAR ATARI-Bengaluru handling the technical session



PRA exercise on resource mapping is in progress

2. Training Programme on Profitable Production, Processing Technologies and Marketing Mechanisms in Coconut at CPCRI Kasaragod

Coconut is a major small holder's plantation crop widely cultivated in the states of Kerala, Tamil Nadu and Karnataka. The crop plays a crucial role in the agricultural economy of Kerala State. Considering the importance of this crop, in order to equip SMS of KVKs with the latest technologies in coconut, a training programme entitled "profitable production, processing and marketing mechanisms in coconut" was organized in coordination with CPCRI Kasaragod in two phases 2-3rd February 2016 and 5-6th February 2016, in which 34 Subject Matter Specialists have participated. The feedback from the participants was encouraging and they suggested to have similar programmes on frontier technologies of major crops/cropping systems at regular intervals.

3. Management Development Programme– Phase III for the newly recruited Programme Coordinators

Two Programme Coordinators from KVKs Cuddalore and Bellary have participated in three phases of 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 8-12th June 2015, they gained knowledge about the objectives, mandates and activities of ATARI, technological backstopping given by the Directorate of Extension, administrative and accounts procedures related to KVKs, exposure visit to neighbouring KVKs for cross learning *etc.* The participants felt that the programme was useful to them.

4. Agro-Climatic Region Wise Workshops in Agriculture and its Allied Sectors for East Coast Plains and Hills Region

Based on Prime Minister's Office directions ICAR-ATARI Bengaluru and ICAR-CIBA Chennai jointly organized the "agro-climatic region wise workshop in agriculture and its allied sectors for east coast plains and hills region" at ICAR CIBA Chennai on 29th October 2015. Dr. A K Singh, Deputy Director General (Agricultural Extension) and Chairman for the workshop made the following major recommendations for the National Agricultural Research Systems and for relevant Development Departments / Institutions.

- Zone – XI-East Coast Plains and Hills Region is more prone for cyclones and hence suitable cropping / farming system models need to be standardized for minimizing the hazards from high tides.
- Salinity has become a major problem throughout the coastal area of the region and hence suitable soil reclamation and water treatment programmes need to be undertaken on top priority. Saline tolerant varieties especially in crops like rice need to be evolved and promoted.
- Land shaping and groundwater harvesting are the major areas in which NARS and State Departments need to work together for sustainable development of agriculture in the Zone.
- Indigenous crop varieties / livestock, poultry and fishery breeds to be conserved and farmers could play a major role along with the National Agricultural Research System.
- Production and supply of quality seeds, planting materials, livestock and poultry breeds, fingerlings, bio-agents, bio-products etc need more emphasis. KVKs in convergence with State Departments and farmers can give more emphasis for this.
- Zone XI can further be classified based on commodity specific areas based on cropped area of a particular crop category. Accordingly suitable technology transfer programmes may be disseminated on a larger scale to the farmers.
- Integrated Farming System to be promoted on a larger scale involving trees as a component of the system.
- Coarse cereals and minor millet cultivation to be promoted in Eastern Plains and Hills Region.
- Pulses are highly sensitive for climatic changes. Hence climate-resilient technologies and varieties which would perform better under the present conditions need to be developed in major pulse crops of the region viz., redgram, blackgram and Greengram.
- Harvesting problem in sugarcane need to be addressed and efforts for achieving higher productivity in this crop has to be made in all the states of the Zone.
- Price policies need to be revisited in oil palm

crop. Similarly the procurement policies and support price mechanism for various crops in different states of the region may be re-visited and re-shaped according to the existing conditions.

- Up-scaling of successful technologies is a major agenda to be undertaken on convergence mode by KVKs, NARS and State Department of Agriculture. All ICAR Institutes and State Agricultural Universities need to periodically update their technology inventory and yearly once they need to give latest high yielding and profitable technologies to the KVKs under their jurisdiction for assessing and up-scaling.
- Milk procurement and marketing related issues for all the major crops and livestock products need to be addressed involving the

concerned Departments

- Establishment of storage and cool chambers, facilities like drying yard etc to be made on a wider scale. NABARD can play a lead role in this aspect.
- Farmers Producers Organization (FPO) concept is becoming popular for various crops / enterprises. NABARD is already encouraging the same in various areas. SWOT and constraints analysis on the status of already established FPOs would help for promoting efficient FPOs in future.
- Fishery sector plays a major role in Zone – XI. Hence successful and profitable technologies to be up-scaled in convergence with agencies like NABARD, National Fisheries Development Board, and Department of Fisheries *etc.*



Agro-Climatic Region Wise Workshop for East Coast Plains and Hills Region is in progress at ICAR CIBA Chennai



Group Discussion is in progress at Agro-Climatic Region Wise Workshop at ICAR CIBA Chennai

5. Group Discussion on “Strategies for strengthening production and marketing mechanisms by SHGs”

Association of Women Entrepreneurs of Karnataka (AWAKE) is an organization located in the Industrial area of Rajajinagar of Bengaluru. They conduct capacity building programmes for women entrepreneurs and encourage them for income generation on EDP mode. A Group Discussion involving officials from AWAKE Bengaluru was organized on “Strategies for strengthening production and marketing mechanisms by SHGs” on 6th June 2015 at ICAR ATARI Bengaluru. The major recommendations of the group discussion are as follows:

- Programme Coordinator and Subject Matter Specialists (Home Science) need to create a database on number of SHGs which are effectively producing quality agricultural

product based processed and value added products, scale of production, the quantity of production and period of their, availability.

- Appraise the District Collector on the problems faced by the SHGs specifically with respect to marketing and seek his/her suggestions to overcome the same.
- KVKs need to encourage market promotion studies by the SHGs for assessing the consumer preference and to create awareness among the consumers about the quality products of the SHGs. This would also help them to assess the nature of demand for various processed and value added products.
- ATARI will initiate action for training the Subject Matter Specialist (Home Science) and potential SHG members exclusively in marketing related issues in coordination with AWAKE.

Publications

5.1. Research Articles

1) M.J.Chandre Gowda and Sreenath Dixit, 2015. “Influence of farmers educational level on comprehending, acting-upon and sharing of agro advisories”. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*. 116(2): 167-172, Journal ID J025, NAAS rating 6.00.

2) M.Shirur, N.S.Shivalingegowda, M.J.Chandre Gowda and B.J.Rajkumar, 2015. Mushroom entrepreneurial behavior: Dimensions and measurement. *International Journal of Agricultural Statistics Science*, 11:61-68, Journal ID I126 NAAS rating 5.00.

3) M.V.Prasad, C V Sairam, S Arulraj, J.Jameena (2015), Estimation of cost of production of oil palm in Andhra Pradesh, *Journal of Plantation Crops*, 2015, 43(1):83-87

4) Moolchand Singh and C V Sairam (2015), “Evaluation of Integrated Weed Management Practices in rainfed cotton”, *International Journal of Tropical Agriculture*, 33(1), pp.51-53.

5.2 Papers presented in International/ national Conferences

1) Sreenath Dixit and C V Sairam, “Convergence of extension initiatives for inclusive development – Experiences of Krishi Vigyan Kendras, Paper presented in the workshop on “Model Training Course on Participatory

Technology Approaches for Plantation Crops” at CPCRI Kasaragod on 15th June 2015

2) C V Sairam, B T Rayudu, D V S Reddy, M J Chandre Gowda, Sreenath Dixit, R S Ramamurthy and Mallikarjun B Hanji (2015). Management Strategies for Sustaining Crop Production and Farm Income with Changing Climate – Experiences of Krishi Vigyan Kendras, Paper presented in National Seminar on Climate Change and Agrarian Economy at UAS Dharwad during 22-23rd January 2015.

5.3 Book/Chapters

1) Sreenath Dixit and V.I.Benagi, (2016) “Technology Delivery Mechanisms of KVKs for higher productivity and profitability in agriculture, (Eds.), P.S.Hugar, C.V. Sairam, M.J.Chandre Gowda, D.V. Srinivasa Reddy, B.T. Rayudu, D.V.Kolekar and Mallikarjun B Hanji, Compilation of Abstracts for the First KVK Symposium held at UAS Dharwad during 21-22nd January 2016.

5.4 Popular articles

1) Chandre Gowda M.J., Channakeshava and B.S.Basavaraju, Potato cultivation: Constraints faced by farmers and available solutions (part 1) Janamitra, 13th May 2015.

2) Chandre Gowda M.J., Channakeshava and B.S.Basavaraju, Potato cultivation: Constraints faced by farmers and available solutions (part 2) Janamitra, 18th May 2015

5.5 Reports

Annual Report 2014-15, ICAR-ATARI Bengaluru (2015), Ed: M.J.Chandre Gowda, C.V.Sairam, D.V.S.Reddy, B.T.Rayudu, R.S.Ramamurthy, Mallikarjun B. Hanji and J.Mathew, ICAR Zonal Project Directorate, Zone VIII, Bangalore, India. P 134.

Hugar P.S., C.V.Sairam, M.J.Chandre Gowda,

2016. Abstracts, KVK Symposium 21-22 January 2016, UAS Dharwad, Technology Delivery Mechanisms of KVKs for Higher Productivity and profitability in Agriculture, ICAR-ATARI Bengaluru and UAS Dharwad, PP 99.

5.6 Publications by KVKs

KVK staff have published 264 research papers, 107 technical bulletins and 785 popular articles; KVKs have documented 1017 extension literature, 2594 newspaper coverage, 44 books, 80 CD/DVD and 129 newsletters on various technological aspects of agriculture and its allied enterprise

Workshops/Meeting/Conferences

6.2 Participation in Workshops/Meeting/Conferences/seminars

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

Director

- National Consultation Meeting for Agricultural Contingency Plans at CRIDA, Hyderabad on 24th April 2015
- Meeting of ICAR Institutes/Agri. & Fisheries Universities and KVKs located in Tamil Nadu by Hon'ble Union Agriculture Minister & President of the ICAR Society at CIBA, Chennai on 9th May 2015
- ICAR Directors and Vice Chancellors Conference at ICAR, New Delhi on 15-16th May 2016
- Coconut Seminar cum Exhibition organized by KVK Kanyakumari at Nagercoil on 30th May 2015
- *Kharif* Awareness programme at Tumkur – A, on 7th August 2015
- 4th Annual Workshop of NICRA at CMFRI, Kochi on 13th August 2015
- Krishi Mela of UAS Dharwad on 27th September 2015
- Agro-climatic Zone Meeting for West Coast Plains and Hills at CCARI, Goa on 15th October 2015
- Board of Regents Meeting at UAS Dharwad on 17th October 2015
- Meeting at Delhi on Soil Health Card distribution on the occasion of International Soils Day on 5th December, 2015 on 28th October 15
- Agro-climatic Workshop for Agro-climatic Zone XI representing East Coast Plains and Hills at CIBA Chennai on 29th October 15
- Convergence Meeting with Agripreneurs of Gadag district at KVK, Gadag on 31st October 15
- Workshop on 'Strategies for Development of Agriculture and Allied Sectors of Island Region' at CARI, Port Blair on 18th November 2015
- National Dialogue on Innovative Extension Systems for Farmer's Empowerment and Welfare at NASC, New Delhi on 17-19th December 2015

- Workshop organized by Zone V for the KVKs implementing Cluster Demonstration on Pulses at ATARI, Hyderabad on 22nd December 2015
- State Level Seminar cum Exhibition on Agro Biodiversity and Conservation of Indigenous Plant Varieties of Farmers at BR Hills, Chamrajnagar on 26th December 2015
- First KVK Symposium organized for the Subject Matter Specialists of the KVKs of Zone VIII. on 21st January 2016
- Joint Annual Meeting of Directors & Vice Chancellors of SAUs and Director of ICAR at New Delhi on 23rd-24th January 2016
- Radio Kisan Day organized by KVK Davanagere and All India Radio, Chitradurga at KVK Davanagere on 14th February 2016
- ‘Documentation in KVKs’ in the MDP for the Newly Recruited Programme Coordinators of KVKs at NAARM, Hyderabad on 23rd April 2015
- “Sustainable rural livelihoods – NAIP experiences” for the participants of 10 Day ICAR short Course on “Enabling Processes for Livelihood Enhancement in Rainfed Agriculture” at CRIDA, Hyderabad on 24th June 2015
- Experiences of NAIP and NICRA implementation by KVKs at ICAR sponsored Summer School titled “Multi-pronged Extension Management Strategies for Dryland Agricultural Development with special reference to promoting Climate Resilient Agriculture” at TNAU Coimbatore on 14th August 2015
- KVKs as Innovative Institutions in the Training Programme for the new incumbents of KVKs of TNAU, Coimbatore on 14th September 2015
- ‘KVK’s Role in Supply of Seeds and Planting Materials’ in KrishiMela of UAS Dharwad on 27th September 2015
- Lecture on ‘Participatory Methods of Technology Transfer in Plantation Crops’ for the participants of Model Training Course at CPCRI Kasaragod on 30th November 2015
- ‘Lessons Learnt from OFT & FLDs’ in MDP for newly recruited Programme Coordinators of KVKs NAARM, Hyderabad on 23rd December 2015
- ✓ “Mango Day” at KVK Ramanagara on 6th June 2015
- ✓ National Seminar on PPFRA held at NASC New Delhi on 7th July 2015
- ✓ 9th National Conference on KVKs held at S.K.Memorial Hall, Gandhi Maidan, Patna during 26-27th July 2015
- ✓ World Soil Health Day on 5th December 2015 at KVK Salem
- ✓ First KVK Symposium Zone VIII held at UAS Dharwad during 21st to 22nd January 2016

- ✓ National ARYA Convention held at NASC New Delhi on 27th January 2016
- ✓ Training Workshop on Competency Development for HRD Nodal Officers of ICAR held at NAARM Hyderabad during 10-12th February 2016
- Workshop on Capacity needs assessment of extension and advisory service providers held at NAARM, Hyderabad during 6-7th October 2015 organized by Centre for Research on Innovation and Science Policy (CRISP), Hyderabad and ICAR-NAARM, Hyderabad.
- Workshop of Vigilance Officers of ICAR Institutes held at Seminar Hall, NASC, New Delhi on 28.10.2015 organized by ICAR, New Delhi.
- National Brainstorming session on promotion of pulses in non-traditional niches: summer cultivation held at IIPR, Kanpur during 9-10th February, 2016 organised by ICAR-IIPR, Kanpur.
- FLD projects sanctioned under NFSM and NMOOP held at NASC Complex, New Delhi on 14.03.2016 organized by Agricultural Extension Division, ICAR, New Delhi.
- Review Meeting of Vigilance Officers held on 16.11.2015 at ICAR-Sugarcane Breeding Institute, Coimbatore organized by ICAR, New Delhi.

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

- 8th International Conference on Innovative Digital Applications for Sustainable Development at UAS on 5-7th, January 2016. Chaired one technical session and co-chaired one technical session. Presented the session recommendations in the plenary session.
- National Dialogue on “Innovative Extension Systems for Farmers Empowerment and Welfare” at NASC Complex, New Delhi during 17-19th December 2015.
- Convergence Meeting with Agripreneurs of Gadag district at KVK, Gadag on 31st October 15
- First KVK Symposium organized for the Subject Matter Specialists of the KVKs of Zone VIII. on 21st January 2016

Dr. Mallikarjun B.Hanji Chief Technical Officer (Computer)

- First Workshop of Nodal Officers of KRISHI of ICAR Institutes at NASC , New Delhi during on 3rd – 6th, August 2015. Presented the Online Reporting System developed by Zone VIII, Bengaluru at technical session on Unit Level Data Repository.
- Organized the Workshop on Online Reporting System (OLRS) at KVK Mysore during 19-20th, January 2016 to design version 2.0 of the OLRS based views of selected computer programmers of KVKs of Zone VIII.

Personnel

Existing staff position of the Agricultural Technology Application Research Institute, Zone VIII, Bengaluru as on March 31st, 2016 is presented below

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



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