Zonal Project Directorate - Zone VIII
Indian Council of Agricultural Research
MRS, HA Farm Post, Hebbal, Bangalore - 560 024

वार्षिक प्रतिवेदन
Annual Report
2011-12

भाकृअनुप
ICAR

क्षेत्रीय परियोजना निदेशालय - क्षेत्र ८
भारतीय कृषि अनुसंधान परिषद
बेंगलूर - 560 024

Zonal Project Directorate - Zone VIII
Indian Council of Agricultural Research
Bangalore - 560 024

हर कदम, हर डगर
किसानों का हमसफर
भारतीय कृषि अनुसंधान परिषद
Agrisearch with a human touch

वार्षिक प्रतिवेदन

Annual Report
2011-12

भाकृअनुप
ICAR

क्षत्रीय परियोजना निदेशालय - क्षेत्र ८
भारतीय कृषि अनुसंधान परिषद
बेंगलूर - 560 024

Zonal Project Directorate - Zone VIII
Indian Council of Agricultural Research
Bangalore - 560 024

Zonal Project Directorate – Zone VIII
MRS, HA Farm Post, Hebbal
Bangalore - 560 024, Karnataka, India
Phone : 080-23510616, 23410614
Fax : 080-23410615
Email : icartot8@yahoo.com
zpd8bangalore@gmail.com
Website : www.zpdviii.gov.in

Published by
Dr.S.Prabhu Kumar
Zonal Project Director

Citation
Annual Report 2011 -12,
Zonal Project Directorate – Zone VIII, ICAR,
Bangalore, Karnataka, India

Printed at
Precision Fototype Services,
No.13, SNT Street,
Guptha Layout, Halasuru,
Bangalore-560 008
Ph: 080-25364349/080-25546146

डॉ. एस. प्रभू कुमार
क्षेत्रीय परियजना निदेशक
Dr. S. Prabhu Kumar
Zonal Project Director

क्षेत्रीय परियोजना निदेशालय - क्षेत्र ८
भारतीय कृषि अनुसंधान परिषद
एम्.आर.एस., हेच.ए. फार्म पोस्ट, हेब्बाल,
बेंगलूर-560 024

Zonal Project Directorate - Zone VIII
Indian Council of Agricultural Research
MRS, HA Farm Post, Hebbal,
Bangalore - 560 024

PREFACE

Indian agriculture has made a remarkable progress by achieving a record of 252.56 million tonnes of food production during 2011-12, thanks to the tireless efforts of Indian farmers ably supported by the Central and State Government Organizations, National Agricultural Research System (NARS) and various Development Organizations. The agriculture and its allied sectors have achieved a growth rate of 3.5 per cent during the Eleventh Plan compared to the growth rates of 2.4 per cent and 2.5 per cent during Tenth and Ninth Plans, respectively.

The Indian Council of Agricultural Research (ICAR) is playing a pivotal role in achieving sustainable growth in Indian agriculture through its strong network of NARS. Krishi Vigyan Kendra (KVK) system, one among the feathers of NARS, is serving as district level knowledge and resource centre for empowering farmers and other stakeholders on latest technologies in agriculture and its allied sectors in coordination with line Departments, by which the overall growth and prosperity of district level agriculture is ensured. Further, Agricultural Technology Information Centres (ATICs) established by ICAR aimed to provide technology input, information and services to the farmers through single window system.

The Zonal Project Directorate-Zone VIII is coordinating and monitoring 80 KVKs and 10 ATICs functioning in Karnataka, Tamil Nadu, Kerala, Goa, Puducherry and Lakshadweep. KVKs perform the task of technology assessment, refinement and demonstration, conduct need based training, production and supply of technological products and provide services to farmers and other stakeholders. Technological backstopping for the KVKs is provided by the Directorate of Extension of State Agricultural Universities, State Veterinary Universities as well as ICAR Institues located in this Zone.

At the outset, I congratulate KVK Mysore for receiving the Best KVK Award of Zone VIII for the year 2010 from the ICAR for their concerted efforts on various spheres of agriculture, especially for taking a lead in the seed village concept. I am happy to share that the work of KVK at Malappuram has got international acclaim and bagged Second Best Poster Award at the Global Conference on Women in Agriculture and I congratulate the concerned staff. I also take this opportunity to congratulate Shri P.N.Suruli Vel, who has been honoured with Jagjivan Ram Abhinav Kissan Puruskar Innovative Farmer Award 2010 and I appreciate the efforts of KVK, Theni in bringing this farmer in limelight.

The Annual Report of this Directorate for the year 2011-12 contains the salient achievements of KVKs in the mandated activities and details of technological backstopping and human resources development extended to KVKs by the Directorates of Extension as well as technology services, inputs and information provided by the ATICs to the farmers.

Further, the report contains brief achievements of research project on development of expert system for agriculture and animal husbandry enterprises, Prosperity of farmers through KVKs, special programme on pulse crop demonstrations, National Initiative on Climate Resilent in Agriculture (NICRA) and other activities of this directorate.

I wish to express my sincere thanks and gratitude to Dr.S.Ayyappan, Secretary, DARE and Director General, ICAR, Dr.K.D.Kokate, Deputy Director General (Agricultural Extension), Assistant Director Generals, Dr.A.K.Mehta and Dr.V.Venkatasubramanian of Division of Agricultural Extension, ICAR,New Delhi. I also express my thanks to all the Directors of Extension and the staff of Directorates of Extension for providing technological backstopping to the KVKs and for ably coordinating with this Directorate in monitoring the activities of their respective KVKs. I compliment the staff of KVKs and ATICs for systematically planning and implementing the action plan and achieving the targets of the year. I express my deep sense of gratitude to all my colleagues in this Directorate for their involvement in achieving the targets of this Zone and the Editorial board for bringing out this Annual Report.

I hope that the information and data provided in this report will be of immense use to Researchers, Administrators, Policy makers, Extension personnel, Farmers and other Stakeholders.

Place : Bangalore
Date : July 10, 2012

(S.PRABHU KUMAR)

CONTENTS

भाकृअनुप
ICAR

कार्यकारी सारांश

भारतीय कृषि अनुसंधान परिषद ने भा.कृ.अनु.प. संस्थान, राज्य कृषि विश्वविद्यालय, गैर–सरकारी संगठन, स्वशासी विश्वविद्यालय और राज्य कृषि विभाग जैसे विभिन्न मेज़बान संस्थाओं के अधीन जिला स्तर पर कृषि विज्ञान केन्द्र का नेटवर्क स्थापित किया है। मार्च 31, 2012 तक देश में 630 कृषि विज्ञान केन्द्रों की स्थापना की गई है, जिनमें से 80 कृषि विज्ञान केन्द्र क्षेत्र–8 के अधीन हैं। क्षेत्रीय परियोजना निदेशालय–क्षेत्र 8 कर्नाटक के 30, तमिलनाडू के 30, केरल के 14, गोवा के 2, पुदुच्चेरी के 3 और लक्षद्वीप के 1 कृषि विज्ञान केन्द्रों का समन्वय करता है, इनके लिए योजनाएँ बनाता है और इनके तकनीकी एवं विस्तार गतिविधियों का संवीक्षण और मूल्यांकन करता है।

कृषि विज्ञान केन्द्र राज्य कृषि विश्वविद्यालयों और भा.कृ.अनु.प. संस्थानों के प्रौद्योगिकियों का सहारा लेकर एवं किसानों और अन्य साझेदारों को सहभागी बनाकर प्रौद्योगिकियों का मूल्यांकन, परिष्करण और प्रदर्शन का कार्य करते हैं। कृषि विज्ञान केन्द्र साझेदारों की क्षमता को बढ़ाने के लिए आवश्यकता–आधारित प्रशिक्षण कार्यक्रम आयोजित करते हैं और उचित विस्तार गतिविधियों के माध्यम से उन्नत 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, जैविक उत्पादों के उत्पादन और वितरण का कार्य भी करते हैं। कृषि विज्ञान केन्द्र संबंधित जिलों की कृषि–अर्थव्यवस्था को सुधारने के लिए सरकारी, निजी और स्वैच्छिक संगठनों द्वारा ली जा रही पहल की मदद करन के लिए कृषि–प्रौद्योगिकी के जानकारी एवं कुशलता केन्द्र के रूप में कार्य करते हैं।

कृषि विज्ञान केन्द्रों का कार्यनिष्पादन

1. प्रौद्योगिकी का मूल्यांकन एवं परिष्करण

कृषि विज्ञान केन्द्र ने विभिन्न विषयगत क्षेत्रों के अधीन फसलों पर 322, पशु–पालन पर 62 और महिला–सशक्तिकरण पर 3 प्रौद्योगिकियों का मूल्यांकन किया है। कृषि विज्ञान केन्द्र ने फसलों व पशु–पालन पर 12 प्रौद्योगिकियों का परिष्करण भी किया है।

फ्रण्टलाइन प्रदर्शनों के माध्यम से आगे बढ़ाने की प्रौद्योगिकियाँ

- मूँगफली की किस्म जीपीबीडी 4 ने तमिलनाडू के पेरम्बलूर एवं कृष्णगिरी जिलों में अधिक पैदावार एवं शुद्ध आय दी, जबकि ईरोड जिले में टीएमवी 13 और अरियलूर जिले में चिन्तामणि 3 ने अन्य की तुलना में अधिक पैदावार दी।

- धरमपुरी और सेलम जिलों में हल्दी की किस्मों में से बीएसआर 2 ने अधिक पैदावार एवं शुद्ध आय दी, जबकि पेरम्बलूर जिले में प्रतिभा किस्म उत्कृष्ट पाई गई।

- दक्षिण कर्नाटक में एट्राजिन 50 डब्ल्युपी का 2.5 कि.ग्रा./हे. (बुवाई के 0–3 दिन बाद) के दर से अंकुरण–पूर्व प्रयोग एवं 2,4–डी सोडियम साल्ट 80 डब्ल्युपी का 0.5 ए.आई./हे. (बुवाई 30 दिन बाद) की दर से प्रयोग करने से मक्के में खरपतवारों का प्रभावी नियंत्रण किया जा सका।

- तमिलनाडू में फूल लगने से पहले और बाद में 20 ग्रा./कि.ग्रा. के दर से मीथाइलोबैक्टीरियम से बीजोपचार + तथा मीथाइलोबैक्टीरियम का 500 मि.ली./हे. की दर से पर्ण–छिड़काव करने से दलहनी फसलों में सूखे प्रति सहनशीलता बढ़ी, जिसके परिणामस्वरूप पैदावार में भी बढ़ोत्तरी हुई।

- भारतीय बागवानी अनुसंधान संस्थान के सूक्ष्मपोषण मिश्रण 'अर्का केला स्पेशल' का प्रयोग मदुरै, डिण्डिगुल, करूर, पुदुकोट्टई एवं रामनाथपुरम में प्रभावी पाया गया, जबकि राष्ट्रीय केला अनुसंधान केन्द्र, ट्रिची का सूक्ष्मपोषण मिश्रण, 'केला शक्ति', का प्रयोग कन्याकुमारी, शिवगंगई, तिरुवल्लूर एवं वेल्लूर जिलों में प्रभावी पाया गया।

- तुअर की रोपाई तकनीक तमिलनाडू के करूर, नामक्कल और विरुधुनगर जिलों में सफल थी।

- उत्तरी एवं उत्तरपूर्वी तमिलनाडू में कार्बेन्डाजिम से 2 ग्रा./कि.ग्रा. बीज के दर से बीजोपचार करने तथा जुताई एवं हेक्साकोनाज़ोल को 1 मि.ली./ली. की दर से फूल लगने से पूर्व तथा क्लोरोथालोनिल को 2 ग्रा. /ली. की दर से छिड़काने से धान के आभासी धब्बे को प्रभावी रूप से नियंत्रित किया जा सका।

- उत्तरी कर्नाटक में कीटों के आक्रमण के समय एवं 15 दिन बाद *लाम्डा* साइहलोथ्रिन को 0.5 मि.ली./ली. की दर से छिड़ाकाने से प्याज के थ्रिप्स को नियंत्रित किया जा सका।

- तमिलनाडू के पेरम्बलूर, अरियलूर एवं तिरुनेलवेली जिलों में ईटीएल के आधार पर बुवाई 60, 80 एवं 120 दिन बाद फिप्रोनिल 5 एससी का 2 ग्रा./ली. पानी के दर से पर्ण छिड़काव करने के बाद नत्रजन की कम मात्रा के पर्ण प्रयोग से कपास के मिरिड कीट का प्रभावी नियंत्रण किया जा सका।

- केरल के कासरगोड जिले में 5 प्रतिशत ट्राइडेमोर्फ + कोलतार के लेपन और 0.1 प्रतिशत ट्राइडेमोर्फ का 25 लीटर पानी में 25 मि.ली. के दर से मिट्टी में बौछार करने से नारियल के तने के निःस्रवण रोग का प्रभावी नियंत्रण किया जा सका। कण्णूर जिले में 5 प्रतिशत हेक्साकोनाज़ोल + कोलतार के लेपन और हेक्साकोजनाज़ोल का 25 लीटर पानी में 62.5 मि.ली. के दर से मिट्टी में बौछार करने से इस बीमारी का प्रभावी नियंत्रण किया जा सका।

- कर्नाटक में प्रजनन के बाद दुधारू गाय को अनुशंसित पदार्थों और चारों के साथ में 150 ग्रा. /दिन/जानवर के हिसाब से बायपास वसा देने से दूध की मात्रा बढ़ी।

- तमिलनाडू में दुधारू गाय को क्षेत्र–विशेष खनिज मिश्रण देने से दूध में 6.67 प्रतिशत से 37.50 प्रतिशत की वशद्धि हुई।

2. फ्रण्टलाइन प्रदर्शन

फसलों की नई विमोचित किस्मों की उत्पादन–क्षमता, फसलों एवं पशु–पालन की उत्पादन प्रौद्योगिकी एवं कृषि संबंधी अन्य उद्यमों के प्रदर्शन के लिए कृषि विज्ञान केन्द्रों ने फ्रण्टलाइन प्रदर्शन संचालित किए गए। इन प्रदर्शनों के साथ में सफल प्रौद्योगिकियों के प्रचार–प्रसार के लिए किसानों एवं विस्तार कार्यकर्ताओं के लिए प्रशिक्षण एवं प्रक्षेत्र दिवस आयोजित किए गए। इस अवधि के दौरान 11625 प्रदर्शन आयोजित किए गए, जिनका विवरण निम्नलिखित हैं :

- कर्नाटक, तमिलनाडू, केरल, पुदुच्चेरी और गोवा में वषा–आधारित एवं सिंचाई दोनों के अधीन 1228 हेक्टेयर में धान पर फ्रण्टलाइन प्रदर्शन संचालित किए गए। उन्नत प्रौद्योगिकी/किस्म के कारण कर्नाटक में 52.65 क्विं./हे., तमिलनाडू में 51.02 क्विं./हे., केरल में 44. 97 क्विं./हे., और पुदुच्चेरी में 45.31 क्विं./हे. की औसत पैदावार प्राप्त हुई। गेहूँ में 107 प्रदर्शन संचालित किए गए और कर्नाटक में 32.28 क्विं./हे. और तमिलनाडू में 27.39 क्विं./हे. की औसत पैदावार प्राप्त हुई। प्रदर्शित प्रौद्योगिकियों को अगर इन राज्यों के किसान बड़े पैमाने पर अपनाएँगे तो संबंधित राज्यों में अनाज के उत्पादन में पर्याप्त बढ़ोत्तरी होगी।

- तिलहनी फसलों के तहत् मूँगफली, सरसों, तिल, सोयाबीन, सूरजमुखी एवं कलौंजी पर 289.85 हेक्टेयर में 798 प्रदर्शन लगाए गए। पैदावार में सूरजमुखी में 12.07 प्रतिशत से लेकर कलौंजी में 43.75 प्रतिशत तक की बढ़ोत्तरी हुई। कर्नाटक में मूँगफली तकनीकी को प्रभावी रूप से अपनाया गया, जिससे पैदावार 8.36 क्विं./हे. के राज्य औसत की तुलना में 17.86 क्विं./हे. बढ़ी। सूरजमुखी में भी कर्नाटक की 6.5 क्विं/हे. की एवं तमिलनाडू की 12.92 क्विं/हे. की प्रदर्शन पैदावार संबंधित राज्य औसत से अधिक थी। सोयाबीन में प्रौद्योगिकी प्रदर्शन के तहत् प्राप्त पैदावार दुगनी से ज्यादा थी। कृषि विज्ञान केन्द्र द्वारा प्रदर्शित इन जिला–विशेष प्रौद्योगिकियों को किसानों द्वारा अपनाने के लिए राज्य एवं केन्द्र सरकार की वर्तमान योजनाओं के अधीन अद्यतन किया जाना चाहिए।

- इस वर्ष प्रमुख दलहनी फसलों के तहत् उड़द, चना, लोबिया, तुअर, मूँग, कुल्थी और वल (*फील्ड बीन*) में 320.80 हेक्टेयर में 830 प्रदर्शन लगाए गए। पैदावार में लोबिया में 19.73 प्रतिशत एवं उड़द में 32.81 प्रतिशत बढ़ोत्तरी हुई। प्रदर्शन में प्राप्त औसत पैदावार कर्नाटक में चने में 6.26 क्विं/हे. के राज्य औसत की तुलना में

10.9 क्विं/हे. प्राप्त हुई। तुअर में फ्रण्टलाइन प्रदर्शन के तहत् पैदावार कर्नाटक और तमिलनाडू में 5.71 क्विं./हे. एवं 6.29 क्विं./हे. के राज्य औसत की तुलना में क्रमशतः 11.52 क्विं./हे. 11.67 क्विं./हे. प्राप्त हुई। इसलिए दलहन की बेहतर उत्पादकता प्राप्त करने के लिए इन जिला–विशेष प्रौद्योगिकियों में अपार क्षमता है बशर्ते कि किसानों को सही समय पर आवश्यकत मात्रा में गुणवत्तायुक्त निवेश सामग्रियाँ उपलब्ध हों।

- गन्ना (87), कपास (106), शहतूत (13) एवं पान (10) जैसी वाणिज्यिक फसलों में 80.20 हेक्टेयर में कुल 216 प्रदर्शन लगाए गए। फ्रण्टलाइन प्रदर्शन में पैदावार संबंधित फसलों की स्थानीय चेक किस्म की तुलना में गन्ने में 23.62 प्रतिशत, कपास में 20.88 प्रतिशत, शहतूत में 19.72 प्रतिशत और पान में 27.53 प्रतिशत बढ़ी।

- चारा फसलों में कुल मिलाकर 24.10 हेक्टेयर में 141 प्रदर्शन लगाए गए। चारे की पैदावार भूसा ज्वार में 11.99 प्रतिशत से लेकर मिश्रित चारा फसलों में 93.84 प्रतिशत तक थी।

- कन्द फसलों में 17.98 हेक्टेयर में 87 प्रदर्शन लगाए गए, जिनमें पैदावार में किसानों की पद्धति की तुलना में आलू में 9.64 प्रतिशत, सुरन में 20.25 प्रतिशत और कसावा में 22.89 प्रतिशत की वर्धि हुई।

- मसालों में 87.58 हेक्टेयर में 504 प्रदर्शन लगाए गए। किसानों की पद्धति की तुलना में पैदावार में इलायची में 25 प्रतिशत, काली मिर्च में 67.15 प्रतिशत, धनिया में 25.13 प्रतिशत, सूखी मिर्ची में 41.99 प्रतिशत, लहसुन में 5.12 प्रतिशत, अदरक में 45.11 प्रतिशत और हल्दी में 16.56 प्रतिशत की बढ़ोत्तरी हुई।

- पुष्प फसलों में 28.75 हेक्टेयर में 139 प्रदर्शन लगाए गए। इनमें पैदावार किसानों की पद्धति की तुलना में चमेली में 25.02 प्रतिशत, गुलदाऊदी में 18.97 प्रतिशत, तारापुष्प में 16.42 प्रतिशत और गुलाब में 13.44 प्रतिशत बढ़ी।

- केला, अंगूर, नींबू, संतरा, आम और पपीते, जैसे फल फसलों, पर 156 हेक्टेयर क्षेत्र में कुल 568 प्रदर्शन संचालित किए गए।

- विभिन्न फसलों के संकरों में 407.64 हेक्टेयर में कुल 1211 प्रदर्शन लगाए गए। पैदावार में धान में 25.24 प्रतिशत, मक्के में 64.75 प्रतिशत, ज्वार में 15.17 प्रतिशत, बाजरे में 17.74 प्रतिशत और बेबी मकई में 16.07 प्रतिशत बढ़ोत्तरी हुई। कपास के संकरों में पैदावार में 36.51 प्रतिशत तक की बढ़ोत्तरी हुई, जबकि तिलहन संकरों में 35.32 प्रतिशत बढ़ोत्तरी हुई। बाजरा नेपियर संकर (सीओ–4) में घासों की अन्य किस्मों की तुलना में पैदावार में 25.60 प्रतिशत की वर्धि हुई। सब्जियों के संकरों में पैदावार स्थानीय चेक किस्म की तुलना में मिर्ची में 26.71 प्रतिशत, भिण्डी में 36.76, बैंगन में 123.03 प्रतिशत, पत्तागोभी में 25.41 प्रतिशत, फूलगोभी में 17.71 प्रतिशत, टमाटर में 24.54 प्रतिशत, कसावे में 32.09 प्रतिशत और सेम फली में 21.83 प्रतिशत की बढ़ोत्तरी हुई।

- पशुधन के अंतर्गत डेयरी, बतख, कुक्कुट, सुअर–पालन, भेड़, बकरी, खरगोश, मात्स्यिकी, झींगा, चारा बैंक और अज़ोल्ला आदि पर 1705 प्रदर्शन संचालित किए गए।

- अन्य उद्यमों के अंतर्गत रेशम की खेती, खुम्ब, मधुमक्खी–पालन, पौधशाल और फसल–प्रसंस्करण में 478 प्रदर्शन संचालित किए गए।

- प्रक्षेत्र यंत्रीकरण को 621 प्रदर्शनों के माध्यम से लोकप्रिय बनाया गया, जिनमें से 107 कटाई/तुड़ाई उपकरणों पर, 83 अंतर–जुताई उपकरणों पर, 81 धान के यंत्रीकरण पर, 41 जुताई उपकरण, मूँगफली के छिलके निकालने के उपकरण एवं इंधन–क्षम चूल्हों पर थे। इसके अतिरिक्त दाल भण्डारण डिब्बे, चरकटा, नारियल के पेड़ पर चढ़ने की मशीन, नारियल के छिलके निकालने की मशीन, मूँगफली की फली निकालने की मशीन, चाय के यांत्रिक कटाई मशीन, रोपाई/बुवाई मशीन, छोटा दाल मिल, केंचुआ खाद छानने की मशीन, हल्दी भूनने की मशीन, गन्ना डीट्रेशर, सब्जी परिरक्षक मशीन, इमली के छिलके निकालने एवं बीज निकालने की मशीन, कपास की तुड़ाई के लिए कपड़े की दस्ताने और पौध–संरक्षण के लिए छिड़काव–मशीन आदि का भी प्रदर्शन किया गया।

3. प्रशिक्षण

लगभग 4.67 लाख प्रतिभागियों के लिए कुल 13658 प्रशिक्षण कार्यक्रम आयोजित किए गए। प्रत्येक कृषि विज्ञान केन्द्र ने लगभग 6058 प्रतिभागियों के लिए करीब 177 कार्यक्रम आयोजित किए। 13658 कार्यक्रमों में से 11499 (83.83 प्रतिशत) कार्यक्रम किसानों/कृषक महिलाओं/ग्रामीण युवाओं और विस्तार कार्यकर्ताओं की आवश्यकताओं की पूर्ति के लिए आयोजित किए गए। शेष कार्यक्रम प्रायोजित (1758) एवं व्यासायिक प्रशिक्षण कार्यक्रम (451) थे। अधिकतर प्रशिक्षण कार्यक्रम (3259) फसल उत्पादन पर थे, जिसके बाद पशुध ान–उत्पादन (1730) और बागवानी–उत्पादन (1668) पर थे। कुल मिलाकर 1.66 लाख कृषक महिलाओं (35.58 प्रतिशत) और 1.07 लाख अनुसूचित जाति और अनुसूचित जनजाति (22.91 प्रतिशत) के प्रतिभागियों ने इन प्रशिक्षण कार्यक्रमों से लाभ उठाया।

- कुल 317090 किसानों व कृषक महिलाओं (207842 किसान और 109248 कृषक महिला) के लिए 9215 प्रशिक्षण कार्यक्रम आयोजित किए गए। इन प्रशिक्षण कार्यक्रमों के अंतर्गत कृषि एवं संबंधित क्षेत्रों के 15 प्रमुख क्षेत्रों पर प्रशिक्षण दिलाया गया। अधिकतर कार्यक्रम फसल उत्पादन (2188) पर आयोजित किए गए, जिसके बाद बागवानी (1282) एवं पशुधन–उत्पादन (1077) पर। ज्यादातर कृषक महिलाओं ने गश्ह विज्ञान एवं महिला सशक्तिकरण (21632) एवं पशुधन–उत्पादन व प्रबंधन (17473) कार्यक्रमों में भाग लिया।
- इस क्षेत्र के कृषि विज्ञान केन्द्रों ने ग्रामीण युवकों के लिए 1375 कार्यक्रम आयोजित किए गए। कुल 41677 प्रतिभागियों में से 23.4 प्रतिशत प्रतिभागी अनुसूचित जाति/जनजाति के तथा 39.1 प्रतिशत प्रतिभागी महिलाएँ थीं। ग्रामीण युवकों के लिए अधिकांश प्रशिक्षण कार्यक्रम पशुधन–उत्पादन व प्रबंधन (6729 प्रतिभागी) पर तथा खेत पर ही निवेश सामग्रियों के उत्पादन (6323 प्रतिभागी) पर थे। खेत पर ही निवेश सामग्रियों के उत्पादन से संबंधित क्षमता–सश्जन कार्यक्रम से बीजों, रोपाई सामग्रियों, जैव–कारकों और जैविक कीटनाशकों के उत्पादन पर शीघ्र प्रभाव पड़ा। कई कृषि विज्ञान केन्द्र ऐसे प्रशिक्षित युवकों की सेवाओं का उपयोग साझेदारी से निवेश सामग्रियों के उत्पादन के लिए करते हैं और ऐसे उत्पादित सामग्रियाँ किसानों को बेच देते हैं। सबसे सफल उदाहरण कर्नाटक के गडग, केरल के तश्श्शूर एवं पत्तनमतिट्टा तथा तमिलनाडू के नामक्कल में पाए गए हैं।
- कृषि विज्ञान केन्दों ने 24041 विस्तार कार्यकर्ताओं के लिए 859 प्रशिक्षण कार्यक्रम आयोजित किए। अनुसूचित जाति/जनजाति के एवं महिला प्रतिभागियों की व्याप्ति ने सूचित किया कि तमिलनाडू और कर्नाटक में अनुसूचित जाति/जनजाति के (3960 में से क्रमशः 1720 एवं 1397) एवं महिला विस्तार कार्यकर्ताओं (7344 में से क्रमशः 3345 एवं 2248) में से अधिक प्रतिभागियों ने भाग लिया।
- प्रायोजित श्रेणी के अंतर्गत इस क्षेत्र के कृषि विज्ञान केन्द्रों ने 1758 पाठ्यक्रम संचालित किए जिससे 71350 प्रतिभागियों को फ़ायदा हुआ। इसमें 13835 प्रतिभागी अनुसूचित जाति/जनजाति समुदाय के थे और 27194 प्रतिभागी महिलाएँ थीं। मुख्य प्रायोजकों में राज्य विकास विभाग, कृषि प्रौद्योगिकी प्रबंधन एजेंसी (आत्मा), सी ए डी ए, सी ए पी ए आर टी, भारतीय कृषि अनुसंधान परिषद की संस्थाएँ, जिला वाटरशेड विकास एजेंसी, भारतीय उर्वरक संघ, नबार्ड, गैर–सरकारी संगठन, कमोडिटी बोर्ड एवं जिला पंचायत शामिल हैं।
- इस अवधि में 451 व्यावसायिक प्रशिक्षण कार्यक्रम आयोजित किए गए, जिनमें 12313 प्रतिभागियों ने भाग लिया। इन व्यावसायिक प्रशिक्षण कार्यक्रमों में अनुसूचित जाति/जनजाति समुदाय के लोगों और महिलाओं की प्रतिभागिता अभूतपूर्व थी (क्रमशः 23.5 प्रतिशत एवं 48 प्रतिशत)।

4. विस्तार गतिविधियाँ

कृषि विज्ञान केन्द्रों द्वारा कुल 1.33 लाख विस्तार गतिविधियों एवं सेवाओं का संचालन किया गया, जिनमें कृषि एवं सबद्ध क्षेत्रों से जुड़ी प्रौद्योगिकियों को 49.05 लाख किसानों और 1.43 लाख विस्तार कार्यकर्ताओं के बीच लोकप्रिय बनाया गया। कृषि विज्ञान केन्द्र प्रौद्योगिकियों को समाचार पत्रों (2262), विस्तार साहित्यों (2241), लोकप्रिय लेखों (832), रेडियो

वार्ताओं (609), टेलिविज़न वार्ताओं (377), प्रदर्शिनियों (415) और किसान मेलाओं (104) के माध्यम से प्रचार किया एवं लोकप्रिय बनाया।

5. बीज, रोपण सामग्रियाँ और जैव–उत्पाद

कृषि विज्ञान केन्द्रों ने फसल–किस्मों के 17045.15 क्विं. बीजों, फसल–संकरों के 62.88 क्विं. बीजों एवं 1839.02 क्विं. जैव–उत्पादों का उत्पादन किया। रु. 243.85 लाख के बीजों को इस क्षेत्र के 58119 हेक्टेयर क्षेत्रों में 0.95 लाख किसानों को वितरित किया गया। रोपण सामग्रियों में 1751 हेक्टेयर क्षेत्र में किसानों को फसलों के 43.95 लाख पौधे और फसल–संकरों के 5.44 लाख पौधे वितरित किए गए। कृषि विज्ञान केन्द्रों ने 1839 क्विं. जैव–उत्पादों, 567180 परभक्षियों, 1366 फेरोमोन जालों और 794 जैविक कारकों का उत्पादन किया और 0.35 लाख किसानों को वितरित किया। कृषि विज्ञान केन्द्रों ने जानवरों के 1.17 लाख छोटे बच्चों और छोटी मछलियों को वितरित किया, जिनका मूल्य रु. 58.41 लाख था।

6. मिट्टी, पानी और पौधों की जाँच

इस क्षेत्र के किसानों को विश्लेषणात्मक सेवाएँ प्रदान करने के लिए 67 कृषि विज्ञान केन्द्रों में मिट्टी, पानी और पौधों की जाँच करने की प्रयोगशालाएँ स्थापित की गईं। 14392 गाँवों के 31022 किसानों से प्राप्त मिट्टी, पानी, पौधा, खाद, चूना आदि के 38179 नमूनों का विश्लेषण किया गया और इनके परिणामों को उचित सलाह के साथ किसानों को दिया गया।

7. वर्षा–जल–संग्रहण

सोलह कृषि विज्ञान केन्द्रों ने वर्षा–जल–संग्रहण इकाई की स्थापना की, जिस पर किसानों और विस्तार कार्यकर्ताओं के लिए 122 प्रशिक्षण कार्यक्रम और 166 प्रदर्शन आयोजित किए गए।

8. कृषि विज्ञान केन्द्रों के संपर्क क्षेत्र

सभी कृषि विज्ञान केन्द्रों ने अपने अधिदेशित कार्यों को संपन्न करने के लिए कृषि विश्वविद्यालयों, विकास विभागों, प्रमुख बैंकों एवं नबार्ड से संपर्क स्थापित किया है। सभी कृषि विज्ञान केन्द्रों का समाचार पत्रों से संपर्क भी मज़बूत है, जिसके माध्यम से कृषि विज्ञान केन्द्र किसानों को जागरूक एवं समय पर परामर्श दे सके। विकास विभाग प्रदर्शनों, विस्तार गतिविधियों, प्रशिक्षणों, कीटों व रोगों की संवीक्षण और निगरानी के दौरान अपने मानव संसाधनों एवं सामग्रियों को बाँटते हैं। 'आत्मा' का सभी जिलों में फैलने से कृषि विज्ञान केन्द्रों का संपर्क और मज़बूत हुआ। गैर–सरकारी संगठनों और भारतीय कृषि अनुसंधान परिषद संस्थानों से संपर्क के अतिरिक्त कृषि विज्ञान केन्द्रों ने आकाशवाणी, शैक्षणिक संस्थानों, कमोडिटी बोर्ड, पंचायत कार्यालयों, सहकारी सोसाइटी, दूरदर्शन और सरकारी उपक्रमों से भी संपर्क स्थापित किया है।

9. कृषि विज्ञान केन्द्रों के माध्यम से किसानों की समश्द्धि – चयनित सफल विधियाँ

किसानों को समश्द्ध बनाई कुछ सफल प्रौद्योगिकियाँ एवं विधियाँ निम्नलिखित हैं :

- काली मिर्च के पाद विगलन से कण्णूर जिले के किसानों का राहत : कण्णूर जिले में 1418 हेक्टेयर में 3544 किसानों को 1.42 करोड़ की आर्थिक हानि होने से राहत दी गई।
- टिकाऊ और लाभकारी प्याज की किस्म को बढ़ावा देने में कृषि विज्ञान केन्द्र, गडग ने किए गए प्रयासों के फलस्वरूप उत्तर कर्नाटक में अर्का कल्याण किस्म 3700 हेक्टेयर में फैली और प्याज का उत्पादन 41 प्रतिशत तक बढ़ा।
- दावणगेरे जिले में उत्पादन, प्रदाय करते हुए और सूक्ष्म–पोषक मिश्रण (अर्का केला स्पेशल) के छिड़काव के बारे में किसानों को बताते हुए केले की उत्पादकता और आय में बढ़ोत्तरी प्राप्त की गई। 255 गाँवों के किसानों ने इस प्रौद्योगिकी का उपयोग 112 हेक्टेयर में किया तथा 15–20 प्रतिशत उत्पादकता और प्रति हेक्टेयर में 50,000 रुपये की अतिरिक्त आय प्राप्त की।
- कृषि विज्ञान केन्द्र, बीदर ने उत्तर कर्नाटक में 4000 हेक्टेयर में तुअर में रोपाई की तकनीकी का मानकीकरण किया और इसको लोकप्रिय बनाया। रोपाई की गई खेतों में किसानों की पद्धति के 17.5 क्विं./हे. की तुलना में सिंचित परिस्थिति में 34.8 क्विं./हे. पैदावार प्राप्त हुई।

- तमिलनाडू के तिरुवण्णामलई जिले में धान की अधिकता प्रणाली 17 गाँवों में 27870 हेक्टेयर में फैली है, जिसमें 40103 किसान शामिल हैं। धान की अधिकता प्रणाली के अधीन सिंचाई के पानी और बीजों के बाचाव के साथ–साथ धान की औसत पैदावार परंपरागत प्रणाली के तहत् प्राप्त 56.1 क्विं./हे. से 77.0 क्विं./हे. तक बढ़ी।

- कृषि विज्ञान केन्द्र, ईरोड, तमिलनाडू समूह पद्धतियों के माध्यम से जिले के आदिवासियों की सेवा में जुड़ा है। फलों के बागानों में उच्च पैदावारवाली फ्रेंचबीन की किस्मों की अंतरवर्ती खेती, जैव मात्रा फसल जैसी, कैशिया सियामी, के एक लाख पौधों को पुश्तों पर लगाना तथा 100 हेक्टयर से ज्यादा ज़मीनों की समूह सिंचाई आदि ने 13 आदिवासी गाँवों में खेती पर निर्भर प्रत्येक परिवार को रु. 30000 की अतिरिक्त आय प्रदान की।

- कृषि विज्ञान केन्द्र, पत्तनमतिट्टा ने चारा घास की सीओ–4 किस्म की शुरूआत की और इसे लोकप्रिय बनाया। किसानों को 2700 क्विं./हे. की औसत पैदावार प्राप्त होती है, जिससे प्रति वर्ष रु. 15000 का शुद्ध लाभ प्राप्त होता है।

10. पुरस्कार एवं मान्यताएँ

- कृषि विज्ञान केन्द्र, मैसूर को भारतीय कृषि अनुसंधान परिषद के वर्ष 2010 का सर्वश्रेष्ठ कृषि विज्ञान केन्द्र पुरस्कार प्राप्त हुआ।

- तमिलनाडू के तेनी जिले के गोपी नागप्पा आरुलगम गाँव के निवासी श्री पी.एन. सुनिल वेल को जगजीवनराम अभिनव किसान पुरस्कार 2010 प्राप्त हुआ।

- श्रीमती सजीना, एस. सहायक प्रोफेसर (कृषि अभियांत्रिकी), कृषि विज्ञान केन्द्र, मलप्पुरम को वैश्विक महिला सम्मेलन में सर्वश्रेष्ठ पोस्टर प्रस्तुति का पुरस्कार प्राप्त हुआ।

11. कृषि प्रौद्योगिकी सूचना केन्द

कृषि प्रौद्योगिकी सूचना केन्द्र (ATIC) ने 69982, 2296000 और 278510 किसानों को क्रमशः तकनीकी सेवाएँ, निवेश और सूचनाएँ प्रदान कीं। इस कार्य से कृषि प्रौद्योगिकी सूचना केन्द्र ने रु. 316.37 लाख का राजस्व प्राप्त किया।

12. विस्तार निदेशालय द्वारा प्रौद्योगिकियों का समर्थन

विस्तार निदेशालय ने 42 प्रशिक्षण कार्यक्रम आयोजित किए जिसके माध्यम से इस क्षेत्र के कृषि विज्ञान केन्द्रों के 1279 कर्मचारियों को प्रशिक्षित किया। निदेशालय ने 49 कार्यशालाओं/बैठकों/संगोष्ठियों का आयोजन किया, जिनमें कृषि विज्ञान केन्द्र के 511 कर्मचारियों ने भाग लिया।

13. विशेष कार्यक्रम

कर्नाटक एवं तमिलनाडू के दलहन–उत्पादन करनेवाले एन एफ एस एम जिलों में दलहन के उत्पादन को बढ़ाने के लिए तकनीकी प्रदर्शन के तहत् 354.2 हेक्टेयर में दलहनों (उड़द, मूँग, तुअर एवं लोबिया) पर 860 प्रदर्शन लगाए गए।

जलवायोन्मुखी कृषि पर राष्ट्रीय पहल परियोजना के तहत् 9 गाँवों में 1285 किसानों को शामिल करते हुए 1313.74 हेक्टेयर क्षेत्रों को एन आर एम से उपचारित किया गया। फसल उत्पादन के तहत् 649 हेक्टेयर में 2082 प्रौद्योगिकियों का प्रदर्शन किया गया। पशुधन एवं मात्स्यिकी के तहत् 9 कृषि विज्ञान केन्द्रों ने टीका दिए गए जानवरों के 1242 उन्नत नस्ल, 535 कुक्कुड़, केंचुआ खाद एवं अज़ोल्ला की 63 इकाइयाँ तथा चयनित गाँवों के सामुदायिक ज़मीन में सूखे के दौरान 1126 किसानों के 9.88 हेक्टेयर में उन्नत चारे की खेती आदि प्रारंभ किए गए। इसके अतिरिक्त सूखा जैसी परिस्थितियों से निपटने के लिए 104.9 हेक्टेयर क्षेत्र को बीज बैंक और चारा बैंक के रूप में विकसित किया गया। प्रौद्योगिकियों की बेहतर स्वीकार्यता के लिए गाँवों में 16 कमोडिटी समूहों का सृजन किया गया। प्रक्षेत्र यंत्रीकरण को अपनाने एवं समय पर प्रक्षेत्र कार्यों को पूर्ण करने के लिए किराए पर सामग्री उपलब्ध होने के 3 केन्द्र स्थापित किए गए।

14. क्षेत्रीय परियोजना निदेशाल की गतिविधियाँ

- संस्थान प्रबंधन समिति की द्वितीय बैठक क्षेत्रीय परियोजना निदेशालय, बेंगलूर में दिनांक 12.03.2012 को क्षेत्रीय परियोजना निदेशक, क्षेत्र–8 की अध्यक्षता में संपन्न हुई।

- क्षेत्रीय परियोजना निदेशालय के प्रशासनिक भवन के विस्तार का कार्य रु. 82.68 लाख में केन्द्रीय लोक निर्माण विभाग को दिया गया, जो अगस्त 2012 तक पूर्ण होगा।

- **केरल एवं तमिलनाडू के कृषि विज्ञान केन्द्रों की साझेदारों के साथ इंटरफेस बैठक** बेंगलूर में मई 2010 के दौरान आयोजित 22वीं क्षेत्रीय समिति की बैठक में लिए गए निर्णय के अनुपालन के लिए कृषि विज्ञान केन्द्रों की साझेदारों के साथ इंटरफेस बैठक केरल में दिनांक 07.07.2011 को केरल कृषि विश्वविद्यालय, तश्शूर में तथा तमिलनाडू में दिनांक 18.11.2011 को तंजावूर में आयोजित की गई।

- किसानों, विस्तार कार्यकर्ताओं, वैज्ञानिकों और अन्य साझेदारों की सेवा के लिए एक विशेषज्ञ–प्रणाली का विकास किया गया। विशेषज्ञ–प्रणाली के तीन अंग हैं – सूचना प्रणाली, निर्णय समर्थन प्रणाली और निदानकारी प्रणाली (फसल डॉक्टर)। धान, केला, गन्ना, रागी और नारियल से संबंधित अंग्रेज़ी और तमिल में विशेषज्ञ–प्रणाली का विकास किया गया। मलयालम और कन्नड़ में इसके अनुवाद का कार्य प्रगति पर है। गाय–भैंस से संबंधित पशुपालन विशेषज्ञ–प्रणाली अंग्रेज़ी में तैयार किया गया जिसका तमिल, मलयालम और कन्नड़ में अनुवाद करने का कार्य प्रगति पर है। भेड–बकरी और कुक्कुड़ संबंधी विशेषज्ञ–प्रणाली के विकास का कार्य भी प्रगति पर है।

- क्षेत्रीय परियोजना निदेशालय एवं क्षेत्र–8 के कृषि विज्ञान की वर्ष 2005–06 से 2009–10 की पंचवर्षीय मूल्यांकन समिति, जिसका अध्यक्ष डॉ. मश्त्युंजय, पूर्व राष्ट्रीय निदेशक, एन ए आई पी तथा डॉ. पी.एल. मालीवाल, निदेशक (विस्तार शिक्षा), महाराणा प्रताप कृषि एवं प्रौद्योगिकी विश्वविद्यालय, उदयपुर एवं डॉ. एस.वी.एन. राव, प्रोफेसर एवं प्रमुख, पशु चिकित्सा एवं पशुपालन विस्तार विभाग, आरजीसीवीएएस, पुदुच्चेरी सदस्य और डॉ. एस. प्रभुकुमार, क्षेत्रीय परियोजना निदेशक, क्षेत्र–8, बेंगलूर सदस्य सचिव है, ने अपनी रिपोर्ट को अंतिम रूप दिया और इसे परिषद को प्रस्तुत किया।

- समिति ने 24 कृषि विज्ञान केन्द्रों का भ्रमण करते हुए और भ्रमण–कार्यशालाओं के माध्यम से 73 कृषि विज्ञान केन्द्रों के कार्यनिष्पादन की समीक्षा चार चरणों में की गई। समिति ने टिप्पणी की कि कृषि विज्ञान केन्द्र अच्छी तरह कार्य करते हैं और इसके लिए क्षेत्रीय परियोजना निदेशालय की मदद की सराहना की जाती है। समिति ने यह बताया कि कृषि विज्ञान केन्द्रों ने पशुधन और मात्स्यिकी की तुलना में फसल क्षेत्र में बेहतर कार्य किया। सफल कृषि विज्ञान केन्द्रों की विशेषता कार्यक्रम समन्वयक, कटिबद्ध कर्मचारी और मेजबान संस्थाओं से पर्याप्त प्रशासनिक एवं वित्तीय मदद है। दूसरी ओर, जिन कृषि विज्ञान केन्द्रों का कार्य अच्छा नहीं था, वहाँ स्थानीय असुविधा, निरंतर स्थानांतरण, रिक्त पद और मेज़बान संस्था का कम समर्थन आदि समस्याएँ थीं।

- क्षेत्रीय परियोजना निदेशालय ने क्षेत्र–8 के कृषि विज्ञान केन्द्र के 55 नवनियुक्त कर्मचारियों के लिए प्रौद्योगिकी का मूल्यांकन, परिष्करण और प्रदर्शन पर तीन दिवसीय अनुकूलन प्रशिक्षण कार्यक्रम आयोजित किया गया। इसके अतिरिक्त कृषि विज्ञान केन्द्र के 601 कर्मचारियों, जिनमें 42 कार्यक्रम समन्वयक, 477 विषय विशेषज्ञ, 69 कार्यक्रम सहायक एवं 13 प्रक्षेत्र प्रबंधक शामिल हैं, ने इस वर्ष विभिन्न संस्थाओं द्वारा आयोजित विभिन्न मानव संसाधन विकास कार्यक्रमों में भाग लिया।

Executive Summary

The Indian Council of Agricultural Research (ICAR) has established the network of Krishi Vigyan Kendras (KVKs) at district level under different host organizations viz., ICAR Institutes, State Agricultural Universities (SAUs), Non-Governmental Organizations (NGOs), Deemed Universities (DUs) and State Department of Agriculture (SDA). As on March 31, 2012, 630 KVKs were established in the country, out of which 80 KVKs are in Zone VIII. The Zonal Project Directorate-Zone VIII coordinates, plans, monitors and evaluates the technological interventions and extension programmes of KVKs in Karnataka (30), Tamil Nadu (30), Kerala (14), Goa (2), Puducherry (3) and Lakshadweep (1).

The assessment, refinement and demonstration of technologies are carried out by the KVKs with technological backstopping from SAUs and ICAR Institutes and by partnering with farmers and other stakeholders in the system. KVKs organize need-based training programmes for building capacity of the stakeholders and creating awareness about improved agricultural technologies through appropriate extension activities. Production and supply of quality seeds, planting materials, livestock breeds, animal products, bio-products are also being 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 the agricultural economy of the district.

Performance of Krishi Vigyan Kendras

1. Technology Assessment and Refinement

KVKs have assessed 322 technologies on crops, 62 technologies on animal husbandry and three technologies on women empowerment under various thematic areas. KVKs have also refined 12 technologies under crops as well as animal husbandry.

Technologies for up-scaling through frontline demonstrations

- Groundnut variety GPBD 4 gave better yield and net return in Perambalur and Krishnagiri districts of Tamil Nadu. Whereas, TMV 13 at Erode and Chintamani 3 at Ariyalur district of Tamil Nadu out yielded others.
- Among turmeric varieties, BSR 2 gave higher yield and net return in Dharmapuri and Salem districts, while variety Prathiba performed better in Perambalur district.
- In Southern Karnataka, pre-emergent application of atrazine 50 WP@ 2.5 kg/ha (0-3 DAS) and post-emergent application of 2, 4-D sodium salt 80 WP @ 0.5 kg / ha (30 DAS), effectively controlled weeds in maize
- In Tamil Nadu, seed treatment with methylobacterium @ 20g/kg + foliar spray of methylobacterium @ 500ml/ha during pre-flowering and post flowering increases drought tolerance in blackgram and greengram resulting in higher yield.
- Application of Arka Banana Special (micro-nutrient mixture) of IIHR Bangalore was found to be effective in Madurai, Dindigul, Karur, Pudukottai and Ramanathapuram districts, while application of Banana Sakthi of NRCB Trichy was found to be effective in Kanyakumari, Shivagangai, Thiruvallur and Vellore districts.
- Redgram transplanting technique was successful in increasing the productivity at Karur, Namakkal and Virudhunagar districts of Tamil Nadu.
- In Northern and North Eastern Tamil Nadu, false smut disease in paddy was effectively controlled by seed treatment with carbendazim @ 2 g/kg seed + spraying of hexaconazole @ 1ml/l at tillering and pre-

flowering stages + chlorothalonil 2g/l at maturity stage.

- In Northern Karnataka, spraying of ë – cyhalothrin @ 0.5 ml/l at the time of pest attacking stage and another spray 15 days later effectively controls thrips in onion
- Mirid bug in cotton was effectively managed at Perambalur, Ariyalur and Tirunelveli districts of Tamil Nadu, through foliar spraying of Fipronil 5 Sc @ 2 g/l of water at 60, 80 and 120 days after sowing based on ETL followed by foliar application of low dose of nitrogen
- Smearing of 5 per cent tridemorph + coal tar, followed by soil drenching with 0.1per cent tridemorph @ 25ml in 25 l of water effectively controlled stem bleeding disease of coconut in Kasaragod district of Kerala. In Kannur district, smearing of 5 per cent hexaconazole + coal tar, followed by soil drenching with hexaconazole@ 62.5ml in 25 l of water effectively controls the disease.
- Supplementation of bypass fat during post calving in dairy cows @ 150g/day/animal along with the recommended concentrates and roughages, increased the milk yield.
- Providing Area Specific Mineral Mixture to dairy cows increased the milk yield from 6.67 per cent to 37.50 per cent.

2. Front Line Demonstrations

Frontline demonstrations (FLDs) were conducted by KVKs to demonstrate the production potential of newly released crop varieties, production technologies in crops, animal husbandry and other agriculture related enterprises. These demonstrations were supplemented and complemented through training and field days for extension workers and farmers for dissemination of successful technologies. During the reporting period, 11605 demonstrations were organized, whose details are given below.

- FLDs on paddy were conducted in an area of 1228 ha covering the states of Karnataka, Tamil Nadu, Kerala, Puducherry and Goa under both rainfed and irrigated conditions. The average yield recorded due to improved technology/variety was 52.65 q per ha in Karnataka, 51.02 q per ha in Tamil Nadu, 44.97 q per ha in Kerala and 45.31 q per ha in Puducherry. In case of wheat, 107 demonstrations recorded an average yield of 32.28 q per ha in Karnataka and 27.39 q per ha in Tamil Nadu. The demonstrated technologies, if adopted on a large scale by the farmers of these states, will add to substantial increase in production of cereal grains in the respective states.
- Under oilseeds, 798 demonstrations were conducted in an area of 289.85 ha covering groundnut, mustard, sesamum, soybean, sunflower and niger. The percentage increase in yield varied from 12.07 per cent in safflower to 43.75 per cent in niger. Groundnut technologies performed impressively in Karnataka by recording an average yield of 17.86 q per ha as against the State average of only 8.36 q per ha. In sunflower also, demonstration yield of 6.50 q per ha in Karnataka and 12.92 q per ha in Tamil Nadu were significantly higher than the respective State average. In soybean, the yield recorded under technology demonstration was more than double. These district specific technologies demonstrated by the KVKs need to be up scaled for their adoption by the farmers through the line departments under the ongoing schemes of State and Central governments.
- During the year, 830 demonstrations were conducted covering 320.80 ha on major pulse crops including blackgram, bengalgram, cowpea, redgram, greengram, horsegram and field bean. The increase in yield ranged from 19.73 per cent in cowpea to 32.81 per cent in blackgram. The average yield achieved in demonstration was 10.90 q per ha in bengalgram in Karnataka as compared to the State average of 6.26 q per ha. In redgram, the yield recorded under FLDs was 11.52 q per ha in Karnataka and 11.67 q per ha in Tamil Nadu as

against the State averages of 5.71 q per ha and 6.29 q per ha respectively. Hence, these district specific technologies have great potential to achieve better pulses productivity, provided quality inputs are made available to farmers at right time in required quantity.

- A total of 216 demonstrations were conducted in commercial crops like sugarcane (87), cotton (106), mulberry (13) and betelvine (10) in an area of 80.20 ha. The yield increase in FLDs was in the order of 23.62 per cent in sugarcane, 20.88 per cent in cotton, 19.72 per cent in mulberry and 27.53 per cent in betelvine as compared to local check in the respective crops.
- Altogether, 141 demonstrations were conducted in fodder crops covering an area of 24.10 ha. The fodder yield increase was in the range of 11.99 per cent in fodder sorghum to 93.84 per cent in mixed fodder crops.
- A total of 1190 demonstrations on various vegetable crops covering an area of 286.92 ha were conducted.The yield increase by FLD plots ranged from 3.45 per cent in amaranthus to 94.07 per cent in cucumber.
- In tuber crops, 87 demonstrations were conducted in 17.98 ha area, which recorded an increased yield of 9.64 per cent in potato, 20.25 per cent in elephant foot yam and 22.89 per cent in tapioca over farmers' practice.
- In spices, 504 demonstrations were conducted in an area of 87.58 ha. The increase in yield as compared to farmers' practice was 25 per cent in cardamom, 67.15 per cent in pepper, 25.13 per cent in coriander, 41.99 per cent in dry chillies, 5.12 per cent in garlic, 45.11 per cent in ginger and 16.56 per cent in turmeric.
- During the year, 139 demonstrations on flower crops were conducted in 28.75 ha area. The yield recorded in demonstrations, as compared to farmers' practice, was higher by 25.02 per cent in jasmine, 18.97 per cent in chrysanthemum, 16.42 per cent in aster, and 13.44 per cent in rose.
- A total of 568 demonstrations covering an area of 156 ha were conducted on fruit crops such as banana, grapes, lime, mandarin, mango and papaya.
- A total of 1211 demonstrations on hybrids in various crops were conducted covering an area of 407.64 ha. The extent of increase in yield was 25.24 percent in paddy, up to 64.75 per cent in maize, 15.17 per cent in sorghum, 17.74 per cent in bajra and 16.07 per cent in baby corn. In case of cotton, the yield increase was up to 36.51 per cent, whereas, oilseed hybrids recorded up to 35.32 per cent increase in yield. The bajra napier hybrid (Co-4) recorded an yield increase of 25.60 per cent as compared to other varieties of grass. Among vegetable hybrids, the yield increase was upto 26.71 per cent in chillies, 36.76 per cent in bhendi, up to 123.03 per cent in brinjal, up to 25.41 per cent in cabbage, up to 17.71 per cent in cauliflower, up to 24.54 per cent in tomato, 32.09 per cent in tapioca (cassava) and 21.83 per cent in lablab as compared to local check.
- Under livestock, 1705 demonstrations were conducted on dairy, poultry, piggery, sheep, goat, rabbit, fisheries, prawn, fodder bank and azolla.
- Under other enterprises, 478 demonstrations were conducted in sericulture, mushroom, beekeeping, nursery and fruit processing.
- Farm mechanization was popularized through 621 demonstrations, of which, 107 were on harvesting equipments and tools, 83 were on inter-tillage equipments, 81 on paddy mechanization, 41 each on tillage equipments, groundnut decorticator and fuel efficient chulhas. In addition, pulse storage bins, chaff cutter, coconut climber, coconut dehusker, groundnut pod stripper, mechanical harvester in tea, planting/sowing equipments, mini dhal mill, vermicompost siever, turmeric broiler, sugarcane detrasher, vegetable preservator (CRIDA – Model), tamarind dehuller-cum-deseeder, cloth gloves for

cotton harvest and sprayers for plant protection were also demonstrated.

3. Training

A total of 13658 training courses were organized for 4.67 lakh participants. On an average, each KVK organized 177 courses involving 6058 participants. Out of 13658 courses, 11499 (83.83 per cent) were organized to meet the needs of farmers/farm women/rural youth and extension functionaries. Remaining were sponsored courses (1758) and vocational training courses (451). Most number of training courses were in the area of crop production (3259) followed by 1730 on livestock production and 1668 courses on horticulture production. Overall, 1.66 lakh women (35.58 percent) and 1.07 lakh SC and ST (22.91 per cent) participants took benefit of these training courses. Category wise details are given below:

- A total of 9215 courses were organized for 317090 farmers and farm women (207842 farmers and 109248 farm women). These courses covered all the 15 major areas related to agriculture and allied sectors. Most number of courses (2188) were organized on crop production followed by horticulture (1282) and livestock production and management (1077). Maximum participation of women farmers was recorded in the area of home science and women empowerment (21632) and livestock production and management (17473).

- KVKs in the Zone organized 1375 courses for rural youth. Out of a total of 41677 participants, 23.40 per cent were SC/ST and 39.10 per cent were women. Most number of training courses for rural youth were on livestock production and management (6729 participants) and production of inputs at site (6323 participants). Capacity building activities related to production of inputs at site have borne immediate impact on the production of seeds, planting material, bio-agents and bio-pesticides. Many KVKs are using such trained youth to produce inputs in a partnership mode and supply to other farmers. The most successful examples have been reported from Gadag in Karnataka, Thrissur and Pathanamthitta in Kerala and Namakkal in Tamil Nadu.

- On the whole, 859 courses were organized by the KVKs for 24041 extension functionaries. Extent of SC/ST and women participants indicates that Tamil Nadu and Karnataka recorded higher participation of extension functionaries from SC/ST community (1720 and 1397 respectively out of a total of 3960) and women extension functionaries (3345 and 2248 respectively out of a total of 7344).

- Under sponsored category, a total of 1758 courses were organised by the KVKs of the Zone benefitting 71350 participants. Out of which, 13835 were from SC/ST community and 27194 were female. Most common sponsoring agencies were State Development Departments, Agricultural Technology Management Agency (ATMA), CADA, CAPART, ICAR Institutes, District Watershed Development Agency, Fertiliser Association of India, National Bank for Agriculture and Rural Development (NABARD), NGOs, Commodity Boards and Zilla Panchayats.

- During the reporting period, 451 vocational training courses were organized with the participation of 12313 participants. Participation of SC/ST community and women was encouraging in vocational training courses (23.50 per cent and 48 per cent respectively).

4. Extension Activities

A total of 1.33 lakh extension activities and services were organized by the KVKs wherein technologies related to agriculture and allied sectors were popularised among 49.05 lakh farmers and 1.43 lakh extension functionaries. KVKs popularized relevant technologies through newspaper coverage (2262), extension literature (2241), popular articles (832), radio talks (609), T V talks (377), exhibitions (415) and kisan melas (104).

5. Seeds, Planting Material and Bio-products

KVKs produced 17045.15 q seeds of crop varieties, 62.88 q seeds of crop hybrids and 1839.02 q bio-products. The seeds worth Rs. 243.85 lakh were supplied to 0.95 lakh farmers covering an area of 58119 ha in the zone. In case of planting material, 43.95 lakh plants of crops and 5.44 lakh plants of crop hybrids were supplied to farmers which would have covered an area of 1751 ha. Besides, KVKs also produced 567180 numbers of parasitoids, 1839 q of bio products,1366 pheromone traps and 794 Tricho cards and supplied to 0.35 lakh farmers. KVKs in the Zone also supplied 1.17 lakh young ones of animals and fishlings worth Rs. 58.41 lakh.

6. Soil, Water and Plant testing

Soil, water and plant testing laboratory have been established in 67 KVKs for providing analytical services to farmers in the Zone. A total of 38179 samples of soil, water, plant, manure, lime etc received from 31022 farmers belonging to 14392 villages were analyzed and the results along with appropriate advisory services have been given to those farmers.

7.Rain Water Harvesting

Sixteen KVKs have established rain water harvesting units wherein 122 training courses and 166 demonstrations were organized for the benefit of farmers and extension functionaries.

8. Convergence and linkages

All the KVKs had convergence and linkages with Agricultural Universities, Development Departments, Lead Bank and NABARD while carrying out their mandated activities. Linkages with print media has been equally strong in all the KVKs which helped the KVKs to create wide awareness about activities and to communicate timely advisories. Development departments have been sharing their human and material resources with KVKs during demonstrations, extension activities, training, surveillance and monitoring of pest and disease etc. Expansion of ATMA to all the districts has further strengthened the linkages with KVKs. Besides linkages with NGOs and ICAR Institutes, KVKs had linkages with All India Radio, Educational Institutions, Commodity Boards, Panchayat Offices, Co-operative Society, Doordarshan and Public Sector Undertakings.

9. Prosperity of farmers through KVKs

Some of the successful technologies and approaches which brought prosperity to farmers have been briefly mentioned here.

- Relief to Kannur district farmers from pepper foot rot has been achieved in an area of 1418 ha by benefitting 3544 farmers thereby preventing an economic loss of Rs. 1.42 crore in the district.
- The efforts of KVK Gadag in promoting a sustainable and profitable onion variety has resulted in the spread of variety Arka Kalyan in more than 3700 ha in Northern Karnataka and increasing the onion production by more than 41 per cent.
- Enhancing productivity and income from banana has been achieved in Davanagere district by producing, supplying and educating farmers to spray micro-nutrient mixture (Arka Banana Special). Farmers from 255 villages have used the technology in 112 ha area and realised 15-20 per cent higher productivity and additional income of Rs. 50,000 per ha.
- Transplanting technology for redgram (pigeonpea) cultivation in North Karnataka has been standardised and popularised by KVK Bidar in 4000 ha area. The transplanted plots yielded up to an average of 34.80 q per ha as against 17.50 q per ha in farmers practice.
- System of Rice Intensification (SRI) in Thiruvannamalai district of Tamil Nadu has spread to an area of 27870 ha in 17 villages covering 40103 farmers. The average yield of paddy has increased from 56.10 q/ha under conventional system to 77.00 q/ha under SRI, besides saving in irrigation water and seeds.

- KVK Erode in Tamil Nadu has been in the service of tribals of the district, through group approach. Intercrop of high yielding varieties of french beans in fruit orchards, planting of one lakh plants of bio mass crop like *Cassia siamea* on bunds, and community irrigation for over 100 ha. of land have provided an additional income of up to Rs.30000 per farm family in 13 tribal villages.
- CO-4 variety of fodder grass has been introduced and popularised by KVK Pathanamthitta. Farmers are getting an average yield of 2700 q per ha and earned Rs. 15000 as net profit annually.

10. Awards and Recognition

- KVK Mysore received the Best Zonal KVK Award of Indian Council of Agricultural Research for the year 2010.
- Jagjivan Ram Abhinav Kissan Puruskar Innovative Farmer Award 2010 was awarded to Mr.P.N.Suruli Vel resident of Gopi Nagappa Arulagam, Theni district, Tamil Nadu for his innovative works.
- Best Poster presentation award at Global Women Conference was received by Dr.Sajeena S, Assistant Professor (Agrl. Engineering), KVK, Malappuram.

11. Agricultural Technology Information Centres

The ATICs have provided technology services, inputs and information support to 69982, 2296000 and 278510 farmers, respectively. In the process, ATICs generated a revenue of Rs.316.37 lakh.

12. Technological Backstopping by Directorates of Extension

Directorates of Extension organized 42 training courses and trained 1279 staff of various KVKs in the Zone. Besides, Directorates organized 49 workshops/ meetings/seminars with a participation of 511 staff of KVKs.

13. Special Programmes

- A total of 860 demonstrations on pulse crops (blackgram, greengram, redgram and cowpea) covering an area of 354.20 ha were implemented in the pulse growing NFSM districts of Karnataka and Tamil Nadu under Technology Demonstration for Harnessing Pulse Production.
- Under National Initiative on Climate Resilient Agriculture (NICRA), 1313.74 ha area has been treated with NRM related interventions covering 1285 farmers in 9 villages. Under crop production, demonstrations were carried out in an area of 649 ha involving 2082 farmers. Under livestock and fisheries, 9 KVKs have introduced 1242 number of improved breeds of animals with vaccination, 535 poultry birds, 63 units of vermicomposting and azolla and 9.88 ha improved fodder cultivation in the community lands of selected villages during drought period benefiting 1126 farmers. In addition, 104.90 ha area was developed as seed bank and fodder bank to meet the drought related situations, 16 commodity groups were formed in the villages for better coordination in technology adoption, 3 custom hiring centres were established to facilitate adoption of farm mechanization and achieve timely farm operations, and trained a total of 6268 farmers.

14.Activities at the Zonal Project Directorate

- The second meeting of the Institute Management Committee was held at Zonal Project Directorate, Bangalore on 12.03.2012 under the chairmanship of Zonal Project Director, Zone VIII, Bangalore.
- Vertical expansion of administrative building of Zonal Project Directorate has been awarded to CPWD at a total cost of Rs.82.68 lakh and the same is in progress.
- As a follow up to the decision of the XXII Regional Committee meeting held in May 2010 at Bangalore,

interface meetings of KVKs with various stakeholders were organised on 07.07.2011 for Kerala State at KAU Thrissur and on 18.11 2011 for KVKs of Tamil Nadu at Thanjavur.

- An expert system has been designed and developed to serve the farming community, extension workers, scientists and other stakeholders. The expert system has three components, viz., Information System, Decision Support System and Diagnosing System (Crop Doctor). Expert system has been designed and developed for paddy, banana, sugarcane, ragi and coconut in English and Tamil. Translation of the same in Malayalam and Kannada is in progress. Animal husbandry expert system has been designed and developed for cattle & buffaloes in English and its Tamil, Malayalam and Kannada version is in progress. Expert system for sheep and goat and poultry is also in progress.

- The Quinquinneal Review Team (QRT) in respect of Zonal Project Directorate and Krishi Vigyan Kendras (KVKs) of Zone-VIII for the period 2005-06 to 2009-10 comprising Dr. Mruthyunjaya, Former National Director, NAIP as Chairman, Dr. P.L. Maliwal, Director of Extension Education, MPUAT, Udaipur and Dr. S.V.N. Rao, Professor and Head, Department of Veterinary and AH Extension, RGCVAS, Puducherry as members, and Dr. S. Prabhu Kumar, Zonal Project Director, Zone-VIII, Bangalore as Member Secretary finalised its report and submitted to the Council. The team reviewed the performance of 73 KVKs of the Zone in four phases through travel workshops and by visiting 24 KVKs. The QRT remarked that KVKs are performing well and the support of Zonal Project Directorate is appreciable. The QRT was of the view that KVKs performed better in crop sector compared to livestock and fisheries sectors. Successful KVKs are characterized by capable Programme Coordinator, committed staff and adequate administrative & financial support from the host institutions. On the other hand, poor performing KVKs are fraught with location disadvantage, frequent transfers, vacancies of staff and lukewarm support from the host institution.

- The Zonal Project Directorate organized three orientation training courses on technology assessment, refinement and demonstration and trained 55 newly recruited KVK staff of Zone VIII. In addition, 601 KVK staff consisting of 42 Programme Coordinators, 477 Subject Matter Specialists, 69 Programme Assistants and 13 Farm Managers participated in various HRD programmes in different institutions during the year.

BACK COVER

A view of farmers field school organized by KVK

Ex-trainees mall at KVK Kannur

Chapter 1

About Zonal Project Directorate

The Division of Agricultural Extension, one of the eight Divisions of Indian Council of Agricultural Research (ICAR), New Delhi has established the network of Krishi Vigyan Kendras all over the country under the administrative control of various ICAR Institutes, SAUs, State Department of Agriculture and NGOs with an aim to assess, refine and demonstrate technologies in agriculture and allied sectors. The Agricultural Extension Division, headed by the Deputy Director General (Agricultural Extension) monitors the progress of KVKs through its eight Zonal Project Directorates (previously known as Zonal Coordinating Units) located in eight zones in the country (Table 1).

1.1 Genesis

The ICAR established eight Zonal Coordinating Units in September 1979 to monitor and coordinate the Lab to Land Progrmme (LLP) which was launched in 1979 on the occasion of ICAR's Golden Jubilee celebrations. To begin with, Zonal Coordinating Unit-Zone VIII had its office at Tamil Nadu Agricultural University (TNAU), Coimbatore but was subsequently shifted to the Campus of Regional Station of National Dairy Research Institute (NDRI) at 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 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 the National Pulse Project was added. At this juncture, Goa was added to the jurisdiction of the Unit. During the XI Five Year Plan (2009), Zonal Coordinating Units were upgraded as Zonal Project Directorates (ZPDs) and Zonal Coordinators were re-designated as Zonal Project Directors with financial and administrative powers akin to other ICAR institutes.

1.2 Mandate

Mandate of the Zonal Project Directorate is as follows:

- Formulate, implement, monitor and evaluate the programmes and activities of KVKs and ATICs.
- Coordinate the work relating to KVKs and ATICs implemented through various agencies such as SAUs, ICAR institutes, voluntary agencies and developmental departments.
- Coordinate with State/Central Government organizations, credit institutions and any other organization for successful implementation of programmes.

Table 1 : States and Union Territories (UTs) covered under different zones

Zone	States/UTs
I	Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir and Punjab
II	A & N Islands, Bihar, Jharkhand and West Bengal
III	Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura
IV	Uttar Pradesh and Uttarakhand
V	Andhra Pradesh and Maharashtra
VI	Rajasthan and Gujarat
VII	Chattisgarh, Madhya Pradesh and Odisha
VIII	Karnataka, Tamil Nadu, Kerala, Goa, Puducherry and Lakshadweep

- Serve as feedback mechanism from the projects to research and extension systems.
- Help in implementation of other projects on oilseeds, pulses, maize, cotton, improved implements, climate resilience etc. assigned by ICAR headquarters.
- Have a very close liaison with ICAR headquarters particularly with Deputy Director General (Agricultural Extension) for preparing reports/write-ups for ICAR.

1.3 Staff

Total sanctioned staff strength of Zonal Project Directorate-Zone VIII, Bangalore is 18, out of which 14 have been filled up (Table 2).

1.4 Organizational Structure

Table 2: Staff strength of Zonal Project Directorate-Zone VIII

Category	Sanctioned	Filled
Zonal Project Director (RMP)	1	1
Scientific	6	5
Technical	2	2
Administrative	8	5
SSS (Gr-II)	1	1
Total	**18**	**14**

The organizational structure of Zonal Project Directorate-Zone VIII and KVKs functioning in the zone is depicted in Fig.1.

1.5 Institute Management Committee

The second meeting of the Institute Management Committee (IMC) was held at Zonal Project Directorate, Bangalore on 12.03.2012 under the chairmanship of Dr.S.Prabhu Kumar, Zonal Project Director. The Director welcomed and presented brief activities of the Directorate and KVKs of Zone VIII including the specific achievements on entrepreneurship development through different novel ideas by KVK Kannur. Action Taken Report on the first IMC meeting held on 10.02.2011 and fresh agenda points were discussed in detail. The distinguished members of the Committee gave fruitful suggestions and guidance for effective functioning of the Directorate.

1.6 Expantion of Administrative Building

Vertical expansion of administrative building of the Directorate was started in December, 2011. The work has been awarded to CPWD with a total cost of Rs.82.68 lakh and expected to be completed by August, 2012.

1.7 Interface Meetings of KVKs

As per the recommendations of XXII Regional Committee Meeting held on May 2010 at Bangalore, the Directorate organized two interface meetings for KVKs in Kerala and Tamil Nadu with different stakeholders with a view to develop effective convergence among them.

1.7.1 Interface meeting for KVKs in Kerala: It was organized at KAU, Thrissur on 07.07.2011. Shri.K.P.Mohanan, Hon'ble Minister for Agriculture, Government of Kerala; Shri.M.P.Vincent, Hon'ble Member of Legislative Assembly, Ollur Constituency; Dr.K.D.Kokate, Deputy Director General (AE), ICAR, New Delhi; Dr.K.R.Viswambaran, Vice-Chancellor, KAU, Thrissur; Dr.Vijayan Nair, Director, Sugarcane Breeding Institute, Coimbatore; Dr.S.Prabhu Kumar, Zonal Project Director, Zone VIII, Bangalore; Dr.T.R.Goapalakrishnan, Director of Research, KAU, Thrissur; Dr.P.B.Pushpalata, Registrar, KAU, Thrissur; Dr.A.Jalaudden, Director Academics and Research, Kerala Veterinary and Animal Sciences University; Smt.P.S.Radhamani, Joint Director of Agriculture, Thrissur; and Smt. P.T.Usha, AGM, NABARD, Thrissur participated in the meeting. Scientists, officials from line departments, Programme Coordinators and Subject Matter Specialists from KVKs in Kerala attended the meeting. On the basis of discussions, the meeting was

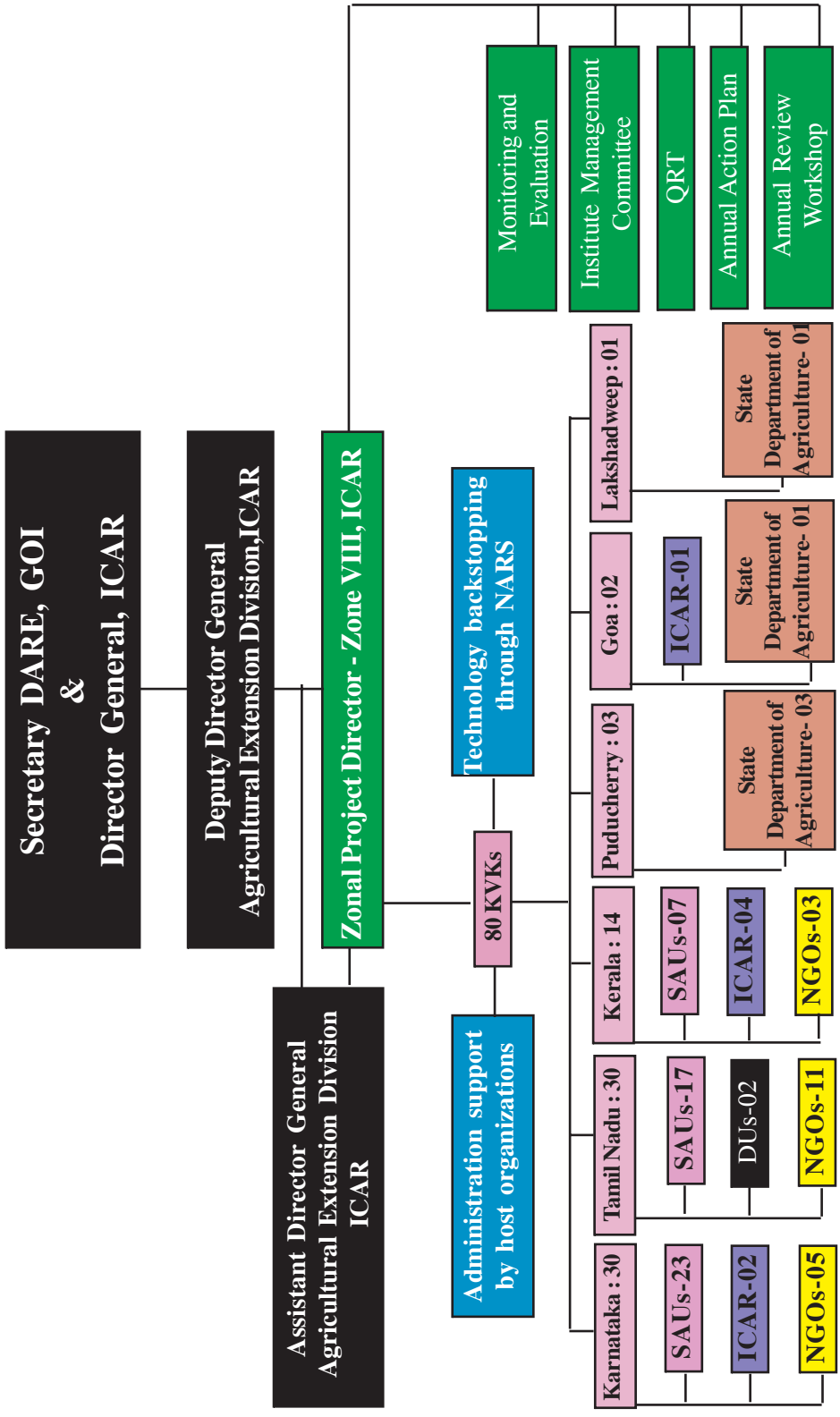

Fig.1 : Organizational structure of Zonal Project Directorate-Zone VIII

Interface meeting for KVKs in Kerala

concluded with the following decisions:

- Additional programmes from the developmental departments, Directorate of Extension and SAUs may be taken up by the KVKs without affecting the ICAR mandated activities.
- Creation of database on animal wealth in Kerala
- Reviewing of livestock breeding policy in the state
- Ensuring participation of all local representatives in SAC for effective planning of KVK activities

1.7.2 Interface meeting for KVKs in Tamil Nadu: It was organized at Thanjavur on November 18, 2011. Shri.S.Damodaran, Minister for Agriculture, Government of Tamil Nadu; Shri.R.Vaithialingam, Minister for Housing and Urban Development, Government of Tamil Nadu; Shri.Sandeep Saxena, Agriculture Production Commissioner and Secretary to Government of Tamil Nadu; Dr.K.Manivasan, IAS, Commissioner of Agriculture, Government of Tamil Nadu; Dr.P.Murugesa Boopathi, Vice Chancellor, TNAU, Coimbatore; Dr.S.Prabhu Kumar, Zonal Project Director, Zone VIII, Bangalore; Dr.P.Kalaiselvan, Director of Extension, TNAU, Coimbatore; and Dr.D.Kathiresan, Director of

Interface meeting for KVKs in Tamil Nadu

Extension, TANUVAS, Chennai participated in the meeting. Officials from TNAU, scientists from ICAR institutes, officials from Government of Tamil Nadu, officials from NABARD, Programme Coordinators and Subject Matter Specialists from KVKs in Tamil Nadu attended the meeting. Based on the discussions held during the meeting, following action points emerged:

- Promotion of System of Rice Intensification on a large scale in Tamil Nadu
- Increasing pulse production in Tamil Nadu through concerted efforts of KVKs and state departments
- Promotion of farm mechanization through group approach
- Scaling up of successful technologies under frontline demonstrations of KVKs through state department schemes

1.8 Research Project

1.8.1 Development of expert system for agriculture and animal husbandry enterprises

Keeping the importance of ICT enabled interventions in agriculture and providing timely expert advice to farmers, a network project entitled Development of Expert System for Agriculture and Animal Husbandry Enterprises was sanctioned by ICAR under the Directorate of Research for Women in Agriculture, Bhubaneswar with Zonal Project Directorate-Zone VIII, Bangalore as lead centre. The Directorate of Extension Education, Tamil Nadu Agricultural University, Coimbatore and the Directorate of Extension, Tamil Nadu Veterinary and Animal Sciences University, Chennai are the implementing centres. Main objective of the project is to develop expert systems for agriculture (paddy, sugarcane, banana, ragi and coconut) and animal husbandry for the farmers of three states viz., Tamil Nadu, Karnataka and Kerala in local languages ie., Tamil, Kannada and Malayalam, besides English.

Methodology : Development of expert systems for crop and animal enterprises facilitating instant decision-making process of the farmers has been done through ICT enabled mechanism. The process of expert system development and its home page were designed with knowledge base, the inference engine and user interface. The home page of the expert system has the following components:

- Information system
- Decision support system
- Diagnosing system (crop doctor)

Expert system was designed and developed to serve the farming community, extension workers, scientists and other stakeholders. The reliability and validity of the expert

A screen shot view of Expert System for sugarcane

A screen shot view of Expert System for paddy

system contents were tested with the help of Subject Matter Specialists of KVKs in Zone VIII.

Salient achievements: Expert system has been designed and developed for paddy, banana, sugarcane, ragi and coconut in English and Tamil to facilitate instant decision-making process of the farmers, extension workers, scientists and other stakeholders through ICT enabled mechanism. Translation of the expert system to Malayalam and Kannada is in progress. Animal husbandry expert system has been designed and developed for cattle and buffaloes in English and translation of the same to Tamil, Malayalam and Kannada is in progress. Further, expert system design and development for sheep and goat and poultry is in progress.

1.9 Quinquennial Review of KVKs of Zone VIII

The Quinquinneal Review Team (QRT) in respect of Zonal Project Directorate and KVKs of Zone-VIII for the period 2005-06 to 2009-10 was constituted under the chairmanship of Dr. Mruthyunjaya, Former National Director, NAIP. The committee included Dr. P.L. Maliwal, Director of Extension Education, MPUAT, Udaipur, Dr. S.V.N. Rao, Professor and Head, Department of Veterinary and AH Extension, RGCVAS, Puducherry as members and Dr. S. Prabhu Kumar, Zonal Project Director, Zone-VIII, Bangalore as member secretary. The team reviewed the performance of KVKs for the last five years through travel workshops and visits in four phases.

Phase I of the travel workshop was organised during June 24 - 26, 2011 at UAS, Dharwad wherin the team reviewed the performance of 16 KVKs of Northern Karnataka and 2 KVKs of Goa.The team also visited five KVKs viz.,Dharwad, Gadag and Haveri in Karnataka and both the KVKs of Goa i.e South and North Goa and assessed their performance.

Demonstration on coconut palm climbing through mechanical device by women trainee before QRT

Interaction of QRT with farmers and KVK trainees

Phase II of the travel workshop was organized during August 4 - 7, 2011 at KVK, Puducherry wherein the team reviewed the performance of 16 KVKs of Tamil Nadu and two KVKs of Puducherry. The workshop was followed by visit to seven KVKs viz., Puducherry, Villupuram, Perambalur, Thanjavur, Karur, Madurai and Ramanathapuram and assessed their performance.

Phase III of the travel workshop was organized during October 21 - 25, 2011 at KVK, Namakkal wherein the team reviewed the performance of 16 KVKs followed by visit to five KVKs viz., Namakkal, Salem, Dharmapuri,

Bangalore Rural and Kolar (Chikkaballapur) and assessed their performance.

Phase IV of the travel workshop was organized during November 13 - 17, 2011 at KVK, Kasargod wherein the team reviewed 19 KVKs. Besides, the team visited seven KVKs located in Dakshina Kannada, Kasaragod, Kannur, Malappuram, Coimbatore, The Nilgiris and Erode districts and assessed their performance.

During the four phases of travel workshop, the team reviewed 73 KVKs and assessed the performance of 24 KVKs through visits.

Based on the review, some of the major observations made by the QRT are mentioned hereunder:

- KVKs are performing well and the support of Zonal Project Directorate has been very good and well appreciated.
- Performance of a KVK depends on its leadership, attitude and commitment of staff towards farmers and other stakeholders, passion for work/service, rapport with the development departments, creative innovations and the patronage of the host institution.
- KVKs are performing well in crop sector compared to livestock and fisheries sectors.
- Successful KVKs are characterized by capable Programme Coordinator, committed staff, and administrative and financial support from the host institutions.
- On the other hand, poor performing KVKs are fraught with locational disadvantage, frequent transfers, vacancies and lukewarm support from the host institutions.

Further, the team has observed novelties/creative innovations of certain KVKs which are worth to be emulated by other KVKs. These include:

- Maintaining a market outlet for processed and packed products of KVK and SHGs in the premises of KVK, Gadag
- Supplying quality seeds and planting materials to the farmers by KVK, Dharwad
- Promotion of value added products on its own brand name/trade mark through SHGs by KVK, Puducherry
- Facilitating marketing of agricultural produce by KVK, Namakkal
- Facilitating marketing of agricultural produce and promotion of FSR model on farmers fields by KVK, Bangalore Rural
- Promotion of mechanical device for climbing coconut trees in collaboration with Coconut Development Board and value addition in coconut by KVK, Kasaragod
- Facilitating marketing of value added products prepared by SHGs through branding by KVK, Kannur
- Introduction of value chain from production to processing, value addition and marketing of tea leaves to increase income of tea growers by KVK, The Nilgiris
- Establishment of highly cohesive community resource groups at village level to act as intermediary/development brokers between farmers, KVK and other development departments by KVK, Erode.

1.10 Budget

A total of Rs.6864.04 lakh was sanctioned to Zone VIII for the year 2011-12 and 99.99 per cent of it was utilized. Head wise details of budget and expenditure are furnished in Table 3.

Table 3 : Head wise budget and expenditure of Zone VIII

(Rs. in lakh)

Head	Sanction				Expenditure			
	ZPD	KVKs	Support to DEE at SAUs	Total	ZPD	KVKs	Support to DEE at SAUs	Total
(A) Recurring								
Pay and allowance	122.00	4434.00	-	4556.00	122.00	4434.00	-	4556.00
T.A	9.00	96.10	6.75	111.85	9.00	96.10	6.75	111.85
HRD	1.20	-	5.00	6.20	1.20	-	5.00	6.20
Contingency	19.00	772.80	29.00	820.80	19.00	772.80	29.00	820.80
Total (A)	151.20	5302.90	40.75	5494.85	151.20	5302.90	40.75	5494.85
(B) Non Recurring								
Works	55.12	905.50	-	960.62	55.12	905.50	-	960.62
Furniture and equipment	13.50	123.05	-	136.55	13.49	123.05	-	136.54
Vehicle	-	39.78	-	39.78	-	39.78	-	39.78
Revolving fund	-	3.00	-	3.00	-	3.00	-	3.00
Total (B)	68.62	1071.33	-	1139.95	68.61	1071.33	-	1139.94
(C) Special Programmes								
Minimal processing unit	-	9.24	-	9.24	-	9.24	-	9.24
Rain water harvesting Unit	-	30.00	-	30.00	-	30.00	-	30.00
Plant diagnostic centre	-	190.00	-	190.00	-	190.00	-	190.00
Total (C)	-	229.24	-	229.24	-	229.24	-	229.24
Grand total (A+B+C)	219.82	6603.47	40.75	6864.04	219.81	6603.47	40.75	6864.03

About Krishi Vigyan Kendras

Agricultural technologies and their diffusion process are important factors in developing countries' quests for food and nutritional security. Farming in different resource endowments must be sustainable, economical, and intensive in order to provide dependable and long-term support for rural households. To achieve these capabilities, farmers must have access to sustainable technologies in crop, livestock, forestry, and fisheries. In this regard, the Indian Council of Agricultural Research (ICAR) started programmes like Lab to Land, National Demonstrations, Operational Research Projects and Institute Village Linkage Programme, which are all now embedded in the scheme of Krishi Vigyan Kendra (KVK).

KVK, as a plan scheme of ICAR, plays a vital role in facilitating application of agricultural technologies by the farmers. It is an unique scheme of ICAR oriented to serve the farmers by being the fountainhead of agricultural technologies at the district level. KVKs are the agricultural knowledge centres for farmers, farmwomen, rural youth and extension functionaries.

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 the 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 a pilot basis under the administrative control of Tamil Nadu Agricultural University, Coimbatore. The Zone VIII had eight KVKs by V Five Year Plan. During subsequent Five Year Plans, seven (VI Five Year Plan), five (VII), 20 (VIII), 34 (X) and six (XI) KVKs were established which shows that the Zone had significant increase during VIII and X Five Year Plan periods. Till 2010-11, the Zone had established 77 KVKs. The XI Five Year Plan envisaged establishing an additional KVK in larger districts. Three new KVKs viz., Belgaum-A and Gulbarga-A as additional KVKs in larger districts of Karnataka and new KVK in Yanam of Puducherry were established during 2011-12 with which the total number of KVKs has reached to 80 in the Zone.

These KVKs have been established under different host organizations viz., ICAR, SAUs, NGOs, DUs and State Department of Agriculture in Zone VIII. The state wise and host organization wise distribution of KVKs is presented in Table 4.

2.2 Mandate

Krishi Vigyan Kendras aim at assessment, refinement and demonstration of technologies/products to cater to the needs of farming community, extension personnel and other stakeholders in the district. In order to accomplish the aim, 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 on 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 clienteles 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 clienteles.

Table 4: State and host organization wise KVKs

State	Host organizations					Total
	SAUs	NGOs	ICAR Institutes	DUs	SDA	
Karnataka	23	5	2	-	-	30
Tamil Nadu	17	11	-	2	-	30
Kerala	7	3	4	-	-	14
Goa	-	-	1	-	1	2
Puducherry	-	-	-	-	3	3
Lakshadweep	-	-	-	-	1	1
TOTAL	**47**	**19**	**7**	2	5	**80**

SAUs - State Agricultural Universities, NGOs - Non-Governmental Organizations, ICAR - Indian Council of Agricultural Research, DUs- Deemed Universities, SDA- State Department of Agriculture

- 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

In order to carry out the mandated activities in the district, the approved strength of manpower for each KVK is 16, which include 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 80 KVKs of Zone VIII is 1280, out of which 1038 (81.09 per cent) are in position. Details of state wise and category wise staff strength of KVKs are furnished in Table 5.

2.4 Infrastructural Facilities

Out of 80 KVKs in the Zone, 77 KVKs have administrative building and 68 KVKs have farmers' hostel. There are 301 staff quarters in 50 KVKs and 150 demonstration units in 53 KVKs. Twenty KVKs have established Rain Water Harvesting Unit, 37 KVKs have e-connectivity, 67 KVKs have Soil, Water and Plant Testing Lab, 10 KVKs have Portable Carp Hatchery, four KVKs have Minimal Processing Unit and 31 KVKs have Plant Health Diagnostic Lab. This apart, 79 jeeps and 163 two-wheelers are there in KVKs. Details of infrastructure available in KVKs are given in Table 6.

2.5 Scientific Advisory Committee

Scientific Advisory Committee (SAC) is chaired by the Head of the host organization. Members include Zonal Project Director, Director of Extension of SAU, heads of all development departments in the district, and progressive farmers. A total of 58 SAC meetings were conducted by 56 KVKs, which were used to review the progress and guide the KVKs in planning activities for the ensuing seasons.

2.6 Revolving Fund

Revolving fund is in operation in 77 KVKs of the Zone. All these KVKs are utilizing revolving fund for production of technological products and the net balance as on March 31, 2012 was Rs.4.82 crore.

2.7 Thrust Areas

As per the agro-ecological situations and the prevailing cropping and farming systems, KVKs are working with the following broad 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 system

- Empowerment of women and youth in terms of improved nutrition, income and drudgery reduction through technological literacy
- Scientific management of dairy and small livestock
- Promotion of horticulture for augmenting family and national income
- Value addition, processing and market facilitation of household and commercial enterprises
- Soil, water conservation and watershed management for drought proofing and sustainable rainfed farming
- Small scale mechanization for time saving and reducing cost and drudgery
- Capacity building of rural youth and women to establish self-employment units
- Increasing income from fishery enterprises through production, processing and marketing

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

Staff category	Karnataka (30)		Tamil Nadu (30)		Kerala (14)		Goa (2)		Puducherry (3)		Lakshadweep (1)		Total (80)	
	S	F	S	F	S	F	S	F	S	F	S	F	S	F
Programme Coordinator	30	27	30	24	14	13	2	1	3	1	1	-	**80**	**66**
Subject Matter Specialist	180	141	180	170	84	75	12	9	18	12	6	4	**480**	**411**
Programme Assistant	90	66	90	85	42	33	6	4	9	4	3	-	**240**	**192**
Administrative staff	60	35	60	58	28	21	4	3	6	2	2	1	**160**	**120**
Driver	60	41	60	59	28	12	4	3	6	3	2	-	**160**	**118**
SSS (Gr-II)	60	47	60	59	28	19	4	3	6	2	2	1	**160**	**131**
Total	**480**	**357**	**480**	**455**	**224**	**173**	**32**	**23**	**48**	**24**	**16**	**6**	**1280**	**1038**
Vacancy (%)	**25.63**		**5.21**		**22.77**		**28.13**		**50.00**		**62.50**		**18.91**	

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

Table 6: State wise details of infrastructure in KVKs

Infrastructure	Karnataka	Tamil Nadu	Kerala	Goa	Puducherry	Lakshadweep	Total
Administrative building	29	30	14	2	2	-	**77**
Farmers hostel	27	29	9	2	1	-	**68**
Staff quarters	102	148	45	6	-	-	**301**
Demo unit	41	70	27	8	4	-	**150**
Rainwater harvesting unit	10	3	6	1	-	-	**20**
E-connectivity	11	14	10	1	1	-	**37**
Soil,water and plant testing lab	24	27	13	1	1	1	**67**
Portable carp hatchery	4	2	2	-	2	-	**10**
Minimal processing unit	1	1	2	-	-	-	**4**
Plant health diagnostic lab	9	16	5	-	1	-	**31**
Jeep	30	30	14	2	3	-	**79**
Two wheeler	60	60	28	2	6	3	**161**

Dr. S. Ayyappan, Secretary, DARE & DG, ICAR at KVK Tumkur - A

Mango Nursery Unit at KVK Kannur

Scientific Advisory Committee Meeting at KVK Thiruvarur

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 under controlled conditions from National Agricultural Research System (NARS) are assessed by the KVKs to ensure their suitability to local situations. This process is carried out in a participatory mode by involving farmers at all stages using the tool known as On Farm Trial (OFT). A total of 399 technologies were assessed and refined by KVKs through 3624 On Farm Trials in 77 locations.

3.1.1.1Technology assessment: KVKs have assessed 322 technologies on different crops under various thematic areas through 2506 trials. Out of these, 73 technologies were assessed through 472 trials in 77 locations under varietal evaluation followed by 61 technologies through 504 trials in 77 locations under integrated nutrient management. Number of technologies assessed under different thematic areas are given in Table 7.

From the Table 8, it could be observed that 135 technologies were assessed through 1059 trials by 28 KVKs in Karnataka followed by 93 technologies assessed through 678 trials by 14 KVKs in Kerala and 82 technologies assessed through 685 trials by 30 KVKs in Tamil Nadu. In addition, five technologies were assessed through 30 trials by two KVKs in Puducherry, four technologies were assessed through 26 trials by one KVK in Lashadweep and three technologies were assessed through 28 trials by two KVKs in Goa.

Table 7: Thematic area wise technology assessment under crops

Thematic area	No. of technologies	No. of trials	No. of locations
Varietal evaluation	73	472	77
Integrated nutrient management	61	504	77
Integrated pest management	50	490	71
Integrated crop management	35	235	41
Integrated disease management	28	271	37
Cropping system	22	114	22
Weed management	13	97	17
Processing and value addition	12	79	16
Farm machinery	7	45	10
Resource conservation technology	7	54	10
Storage technique	5	56	8
Drudgery reduction	4	34	4
Integrated pest and disease management	3	22	5
Drought management	1	30	6
Plant propagation	1	3	1
Total	**322**	**2506**	

In case of animal husbandry, poultry and fisheries, KVKs assessed 62 technologies on various thematic areas through 990 trials (Table 9). Out of these, 26 technologies were assessed through 206 trials in 30 locations under thematic area of production and management followed by 18 nutrition management technologies through 346 trials in 36 locations, 8 disease management technologies through 344 trials in 24 locations and 8 technologies through 88 trials in nine locations under evaluation of breeds.

From the Table 10, it could be observed that 29 technologies were assessed through 635 trials by 30 KVKs in Tamil Nadu followed by 16 technologies assessed through 147 trials by nine KVKs in Kerala,

Table 8: State wise technology assessment under crops

State	No. of technologies	No. of trials	No. of KVKs
Karnataka	135	1059	28
Kerala	93	678	14
Tamil Nadu	82	685	30
Puducherry	5	30	2
Lakshadweep	4	26	1
Goa	3	28	2
Total	**322**	**2506**	**77**

Table 9: Thematic area wise technology assessment under animal husbandry, poultry and fisheries

Thematic area	No. of technologies	No. of trials	No. of locations
Production and management	26	206	30
Nutrition management	18	346	36
Disease management	8	344	24
Evaluation of breed	8	88	9
Drudgery reduction	1	1	1
Processing and value addition	1	5	1
Total	**62**	**990**	

Table 10: State wise technology assessment under animal husbandry, poultry and fisheries

State	No. of technologies	No. of trials	No. of KVKs
Tamil Nadu	29	635	30
Kerala	16	147	9
Karnataka	11	178	26
Goa	3	5	2
Puducherry	3	25	1
Total	**62**	**990**	**68**

Table 11: State wise technology assessment for empowerment of rural women

State	No. of technologies	No. of trials	No. of KVKs
Kerala	2	45	5
Tamil Nadu	1	2	1
Total	**3**	**47**	6

Table 12: Thematic area wise technology refinement under crops and animal husbandry

Thematic area	No. of technologies	No. of trials	No. of locations
Integrated crop management	4	15	4
Integrated pest management	2	10	2
Processing and value addition	2	9	2
Integrated nutrient management	1	5	1
Integrated disease management	1	12	2
Storage technique	1	5	1
Production and management of animals	1	25	1
Total	**12**	**81**	

11 technologies assessed through 178 trials by 26 KVKs in Karnataka, three technologies assessed through 25 trials by one KVK in Puducherry and three technologies assessed through five trials by 2 KVKs in Goa.

Data in Table 11 indicates that three technologies were assessed through 47 trials by six KVKs (5 KVKs in Kerala and one KVK in Tamil Nadu) for empowerment of rural women.

3.1.1.2 Technology refinement: KVKs have refined 12 technologies under crops and animal husbandry through 81 trials (Table 12). Out of these, four technologies were refined through 15 trials in four locations under thematic area of integrated crop management followed by two integrated pest panagement technologies through 10 trials in two locations and two technologies through 9 trials in two locations under processing and value addition.One technology each was refined under other thematic areas.

From the Table 13, it was observed that four technologies were refined through 17 trials by three KVKs in Karnataka, four technologies through 22 trials by 5 KVKs in Kerala, two technologies through 30 trials by two KVKs in Tamil Nadu and two technologies through 12 trials by one KVK in Lakshadweep.

3.1.1.3 Location specificity of the technologies

The salient findings of selected on farm trials conducted by KVKs under different thematic areas are briefly discussed below:

(A) Varietal assessment

(i) Assessment of groundnut varieties: Groundnut (*Arachis hypogea*) is a major oilseed crop of Tamil Nadu cultivated both under irrigated and rainfed conditions. The average productivity of groundnut in the state is 19.90 q/ha which is low. In order to increase the groundnut productivity, four KVKs viz., Perambalur, Ariyalur, Krishnagiri and Erode have conducted on farm trials with three technology options (GPBD 4, Chintamani 3, TMV 13) and VRI 2 as farmers practice.

The results indicated that GPBD 4 performed better in Perambalur and Krishnagiri districts which gave 28.20 q/ha and 23.70 q/ha, respectively. These yield levels were higher by 18.00 and 14.49 per cent over VRI 2 respectively. In Ariyalur district, Chintamani 3 yielded

Table 13: State wise technology refinement under crops and animal husbandry

States	No. of technologies	No. of trials	No. of KVKs
Karnataka	4	17	3
Kerala	4	22	5
Tamil Nadu	2	30	2
Lakshadweep	2	12	1
Total	**12**	**81**	**11**

20 q/ha which is 21.21 per cent increase over VRI 2. Whereas, TMV 13 yielded 18.90 q/ha which is15.24 per cent increase over VRI 2 in Erode district.

OFT on groundnut varieties

(ii) Assessment of turmeric varieties: Turmeric (*Curcuma longa*) is a major spice crop in many districts of Tamil Nadu. In order to increase the productivity of turmeric, three KVKs viz., Perambalur, Dharmapuri and Salem have conducted on farm trials with four technology options such as Alleppey Supreme, BSR 2, Prathiba, PTS 10 against farmers practice (Co 1 and *Eraiyur* local).

The results indicated that BSR 2 performed better with 55.00 q/ha which is 7.84 per cent increase over Alleppey Supreme and gave a net return of Rs.231000/ha in Dharmapuri. In Salem district, the BSR 2 gave 51.20 q/ha of yield (21.70 per cent increase over *Eraiyur* local) and net income of Rs.215040/ha. Whereas, Prathiba performed better and gave an average yield of 39.40 q/ha (28.76 per cent increase over Co 1) and net return of Rs.165480/ha in Perambalur.

(B) Crop management

(iii) Performance of transplanted redgram: Redgram (*Cajanus cajan*) is the third major pulse crop cultivated in Tamil Nadu after blackgram and greengram. The crop is normally cultivated through sowing/broadcasting technique mainly under irrigated conditions. As transplanting technique in redgram was proved successful in increasing productivity in Northern Karnataka, three KVKs in Tamil Nadu at Karur, Namakkal and Virudhunagar districts conducted on farm trials with three technology options such as (a) transplanting technique, (b) dibbling and (c) direct sowing (farmers practices) in Tamil Nadu.

High yielding varieties for up scaling through frontline demonstrations

- GPBD 4 variety of groundnut was performed better both in terms of yield and net returns in Perambalur and Krishnagiri, while TMV 13 variety performed well at Erode and Chintamani 3 performed well in Ariyalur districts of Tamil Nadu.
- BSR 2 variety of turmeric performed better both in terms of yield and net returns in Dharmapuri and Salem, while Prathiba variety performed well in Perambalur district of Tamil Nadu.

The results indicated that the transplanted redgram performed better in all the three districts. In Namakkal , transplanted redgram gave 16.00 q/ha which is 29.03 per cent increase over farmers practice and net returns of Rs.36000/ha. In Virudhunagar, the yield was 8.30 q/ha (29.69 per cent increase over farmers practices) and the net returns was Rs.25260/ha.Yield and net returns at Karur was 7.50 q/ha (53.06 per cent increase over farmers practices) and Rs.19760/ha, respectively.

(C) Nutrient management

(iv) Micronutrient management in banana: Banana (*Musa spp.*) is a major fruit crop of Tamil Nadu cultivated in many districts. The average productivity of banana in the State is 331 q/ha. Micronutrients play a major role in increasing the yield of banana, but farmers in general do not apply micronutrients as per the crop requirement.

With this background, nine KVKs located in Madurai, Dindigul, Karur, Kanyakumari, Pudukottai, Shivagangai, Thiruvalur, Vellore, and Ramanathapuram districts in Tamil Nadu conducted on farm trials with two technological options such as Arka Banana Special (IIHR) and Banana Sakthi (NRCB).

The results indicated that the Arka Banana Special technology performed better in five districts. The technology yielded 900 q/ha (20 per cent more than farmers fractice) and gave a net retuns of Rs.720000/ha in Madurai. The corresponding data for other districts are; 494 q/ha(8.81 per cent increase over farmers practice) and Rs.165490/ha in Pudukottai, 475 q/ha (19.05 per cent increase over farmers practice) and Rs.142330/ ha in Dindigul, 461 q/ha (2.44 per cent increase over farmers practice) and Rs.136050/ha in Ramanathapuram and 370 q/ha (19.74 per cent increase over farmers practice) and Rs.285000/ha in in Karur.

Crop production technologies for up scaling through frontline demonstrations

- Application of atrazine-50 WP @ 2.5 kg/ha at 0-3 DAS followed by application of 2, 4 D sodium salt 80 WP @ 0.5 kg/ha at 30 DAS was performed better for controlling the weeds in maize in southern Karnataka.
- Seed treatment with methylobacterium @ 20g/kg followed by two times foliar spray of methylobaterium @ 500ml/ha at pre-flowering and post flowering stages was found to be increases drought tolerance in both blackgram and greengram that resulted increase in yield in Tamil Nadu.
- Application of Banana Special (IIHR) was found to be effective for increasing the yield in Madurai, Dindigul, Karur, Pudukottai and Ramanathapuram, while application of Banana Sakthi (NRCB) performed better in Kanyakumari, Shivagangai, Thiruvallur and Vellore districts of Tamil Nadu.
- Transplanted redgram was found to be successful in increasing the productivity per unit area in Karur, Namakkal and Virudhunagar districts of Tamil Nadu.

OFT on micro nutrient management in Banana

Whereas, Banana Sakthi performed better in remaining four districts.The highest was in Thiruvallur district (745 q/ha which is 33.27 per cent increase over farmers practice and net returns of Rs.316040/ha) followed by Shivagangai district (540 q/ha, 24.14 per cent increase over farmers practice and net returns of Rs.210000/ha), Vellore district (472 q/ha, 11.06 per cent increase over farmers practice and net income of Rs.234410/ha) and Kanyakumari district (303 q/ha, 21.20 per cent increase over farmers practice and net income of Rs.333300/ha). Further, it was observed that performance of Banana Sakthi was better in saline soils.

(D) Drought management

(v) Drought management in pulses: Blackgram (*Vigna mungo*) and greegram (*Vigna radiata*) are widely cultivated in Coimbatore, Pudukottai, Thiruvannamalai, Ramanathapuram,Vellore and Villuppuram districts of Tamil Nadu. The crop is mainly cultivated under rainfed conditions during *rabi* season with an average yield of 5.00 q/ha. Occurrence of drought during the critical stages of crop growth is one among the major reasons for low yield. With this background, five KVKs viz., Coimbatore, Pudukottai, Thiruvannamalai, Ramanathapuram and Villuppuram conducted on farm trials by comparing the technology option of seed treatment with methylobacterium @ 20g/kg followed by two times foliar spray of methylobaterium @ 500ml/ha at pre-floweriung and post flowering stages, and farmers practice in order to manage the drought in blackgram and greengram.

The results indicated that foliar application of methylobacterium was found to be effective for increasing the drought tolerance in both blackgram and greengram. The technology option gave 8.30 q/ha which is 18.57 per cent increase over farmers practice and net returns of Rs.27730/ha in Pudukottai followed by 8.30 q/ha (7.79 per cent increase over farmers practice) and Rs.22740/ha in Thiruvannamalai, 7.40 q/ha (2.78 per cent increase over farmers practice) and Rs.15790/ha in Coimbatore, 7.30 q/ha (32.73 per cent increase over farmers practice) and Rs.18550/ha in Ramanathapuram, 7.00 q/ha (9.38 per cent increase over farmers practice) and Rs.12940/ha in Vellore and 7.00 q/ha (62.79 per cent increase over farmers practice) and Rs.27060/ha in Villuppuram.

(E) Weed management

(vi) Weed management in maize: Maize (*Zea mays*) is a major cereal cultivated on a larger area in Davangere, Kolar and Bangalore Rural districts of Karnataka. The crop is mainly cultivated under rainfed conditions and prone to weed infestation, especially grasses like savna (*Echinochloa crusgalli), crowfoot grass (Eleusine indica)* and hariyali *(Cynodon dactylon).* Incidence of these weeds would reduce yield loss up to 30 per cent.

In order to manage the weeds in maize, two KVKs viz., Bangalore Rural and Davangere compared two technological options viz., (a) application of atrazine-50 WP @ 2.5 kg/ha at 0-3 DAS and (b) application of atrazine-50 WP @ 2.5 kg/ha at 0-3 DAS followed by application of 2, 4 D sodium salt 80 WP @ 0.5 kg/ha at 30 DAS, with (c) farmers practice (two hand weedings).

Technology option (b) i.e application of atrazine-50 WP @ 2.5 kg/ha at 0-3 DAS followed by application of 2, 4 -D sodium salt 80 WP @ 0.5 kg/ha at 30 DAS performed better in both the districts with 59.7 q/ha (17.75 per cent increase over farmers practice) and 46.20 q/ha (8.96 per cent increase over farmers practice) in Bangalore Rural and Davangere, respectively.

(F) Pest and disease management

(vii) Management of thrips in onion: Onion thrips (*Thrips tabaci*) is a serious pest in Haveri, Belgaum, Bagalkot and Bijapur districts of Karnataka. The yield loss due to the occurrence of this pest ranges from 10 to 28 per cent. Three KVKs viz., Haveri, Belgaum and Bagalkot conducted on farm trials with two technology options such as (a) spraying of Dimethoate @1.75 ml/l at the time of pest incidence followed by 15 days after first spraying or one spray at 3 weeks after planting and (b) spraying of Lamda Cyhalothrin @ 0.5 ml/l at the time of pest incidence followed by 15 days after first spray or

one spray at 3 weeks after planting against (c) farmers practice (spraying of Monocrotophos @1.5 ml/l or Dimethoate @1.75 ml/l) in order to manage onion thrips. In addition, KVK Belgaum had the component of maize as border crop.

The results indicated that technology option (b) i.e spraying of Lamda Cyhalothrin @ 0.5 ml/l at the time of pest incidence followed by 15 days after first spray was found to be effective for the control of onion thrips and gave 178 q/ha which is 23.61 per cent more than farmers practice and net returns of Rs.32200/ha in Belgaum followed by 175 q/ha (66.67 per cent increase over farmers practice) and Rs.25800/ha in Bagalkot and 150 q/ha (25 per cent increase over farmers practice) and Rs.42800/ha in Haveri.

(viii) Management of mirid bug in cotton

Cotton (*Gossypium spp*) is major fibre crop cultivated both under irrigated and rainfed conditions in Tamil Nadu. Severe incidence of Mirid bug (*Pseudatomoscelis seriatus)*, causes yield loss up to 25 per cent in Perambalur, Ariyalur and Tirunelveli districts and farmers are not adopting any specific control measures against the pest.

Three KVKs viz., Perambalur, Ariyalur and Tirunelveli conducted on farm trials to compare (a) foliar spraying of Acephate 75 Sp @ 2 g/l of water at 60, 80 and 120 DAS based on ETL and (b) foliar spraying of Fipronil 5 Sc @ 2 g/l of water at 60 and 80 and 120 DAS based on ETL followed by foliar application of low dose of nitrogen against (c) farmers practice in order to manage the Mirid bug in cotton.

The results indicated that the technology option (b) i.e foliar spraying of Fipronil 5 Sc @ 2 g/l of water at 60 and 80 and 120 DAS based on ETL followed by foliar application of low dose of nitrogen performed better in all 3 districts. The yield was 26.50 q/ha (37.31 per cent increase over farmers practice) and net returns was Rs.61650/ha in Perambalur followed by 18.20 q/ha of yield (37.88 per cent increase over farmers practice) and net returns of Rs.58240/ha in Tirunelveli and 11.00 q/ha (57.14 per cent increase over farmers practice) and Rs.30000/ha in Ariyalur.

Crop protection technologies for up scaling through frontline demonstrations

- Seed treatment with Carbendazim @ 2g/kg of seed followed by spraying of Hexaconazole @1ml/l at tillering and pre-flowering stages and spraying of Cholorothalonil @ 2g/l at maturity stage was found to be effective for the control of false smut in paddy in Northern and North Eastern Tamil Nadu.
- Spraying of Lamda Cyhalothrin @ 0.5 ml/l at the time of pest incidence followed by 15 days after first spray found to be effective for the control of thrips in onion in Northern Karnataka.
- Foliar spraying of Fipronil 5 Sc @ 2 g/l of water at 60 and 80 and 120 DAS based on ETL followed by foliar application of low dose of nitrogen was performed better for the control of mirid bug in cotton in Perambalur, Ariyalur and Tirunelveli districts of Tamil Nadu.
- Smearing of 5 per cent tridemorph + coal tar application followed by soil drenching with 0.1per cent tridemorph @ 25ml in 25 l of water found to be effective for the control of stem bleeding disease of coconut in Kasaragod, while smearing of 5 per cent hexaconazole + coal tar application followed by soil drenching with hexaconazole @ 62.5ml in 25 l of water performed better against stem bleeding in Kannur districts of Kerala.

(ix) Management of collar rot in groundnut: Collar rot is a complex disease of groundnut caused by *Aspergillus niger* in groundnut growing tracts of Karnataka especially in Gadag, Haveri and Tumkur districts. The disease occurs due to seed borne as well as soil borne inoculum of the fungus and causes yield loss up to 30 per cent.

In order to manage the disease, Haveri, Tumkur-A and Gadag KVKs conducted on farm trials comparing (a) seed treatment with *Trichoderma harzianum* @ 4 g/kg of seeds and soil treatment with *Pseudomonas fluorescens* @ 2.5 kg and neem cake @ 2.5 q/ha with recommended dose of fertilizers, (b) seed treatment with *Pseudomonas fluorescens* @ 4 g/kg of seeds and soil application of *Pseudomonas fluorescens* @ 2.5 kg and neemcake @ 2.5 q with FYM 5 t/ha, (c) seed treatment with Carboxin @ 3 g/kg of seed and (d) farmers practice (seed treatment with Captan @ 2.5g/kg of seed).

The results indicated that technology option (a) i.e seed treatment with *Trichoderma harzianum* @ 4 g/kg of seeds and soil treatment with *Pseudomonas fluorescens* @ 2.5 kg and neem cake @ 2.5 q/ha with recommended dose of fertilizers found to be effective for the control of disease. The yield was 25.80 q/ha (24.04 per cent increase over farmers practice) under irrigated conditions and the net return was Rs.30700/ha in Haveri district. Whereas, technology option (b) i.e seed treatment with *Pseudomonas fluorescens* @ 4 g/kg of seeds and soil application of *Pseudomonas fluorescens* @ 2.5 kg and neemcake @ 2.5 q with FYM 5 t/ha could effectively control the disease and gave yield of 11.40 q/ha (96.55 per cent increase over farmers practice) under rainfed conditions and net returns of Rs.13600/ha in Tumkur. But, technology option (c) i.e seed treatment with Carboxin @ 3 g/kg of seed gave better results in Gadag under rainfed conditions, perhaps due to lesser load of soil borne inoculum and gave yield of 13.30 q/ha (17.70 per cent increase over farmers practice) and net returns of Rs.15780/ha.

(x) Management of stem bleeding in coconut: Stem bleeding in coconut caused by the fungus *Thielaviopsis paradoxa* is a serious disease in Kerala and causes yield loss ranging from 30 to 80 per cent and in advance stage of the disease, the palms may die.

In order to manage the stem bleeding disease, Kasaragod and Kannur KVKs conducted on farm trials comparing (a) smearing of 5 per cent tridemorph + coal tar along with soil drenching of 0.1per cent tridemorph @ 25ml in 25 l of water and (b) smearing of 5 per cent hexaconazole + coal tar application along with soil drenching of hexaconazole @ 62.5ml in 25 l of water with that of (c) farmers practice- chiseling affected portions and application of coal tar.

The results indicated that the technology option (a) i.e smearing of tridemorph was found to be effective in Kasaragod wherein the yield was 10500 nuts/ha/year which is 50 per cent increase over farmers practice and net returns of Rs.21000/ha/year. In Kannur, technology option (b) i.e smearing of hexaconozole performed better with an average yield of 16100 nuts/ha/year (48.39 per cent increase over farmers practice) and net returns of Rs.31400/ha/year. However, it was observed that the disease spread towards upper portion of the coconut palm was restricted and the palms could yield better due to technology options (a) and (b) in both districts as compared to the farmers practice.

(xi) Management of false smut in paddy: False smut caused by *Ustilaginoides virens* severely affects paddy in Cuddalore, Madurai, Thiruvallur, Villuppuram and Vellore districts of Tamil Nadu. The false smut disease affected paddy produces more tillers, most of them with chaffy grains, leading to yield loss upto 40 per cent.

Keeping the above in view, Cuddalore, Madurai, Thiruvallur, Villuppuram and Vellore KVKs conducted on farm trials with four technological options such as (a) seed treatment with Carbendazim @ 2g/kg of seed followed by spraying of Hexaconazole @1ml/l at tillering and pre-flowering stages and spraying of Cholorothalonil @ 2g/l at maturity stage, (b) spraying of Chlorothalonil @ 2 g/l at pre-flowering/boot leaf stage, (c) spraying of

OFT on false smut management in paddy

Copper hydroxide (35 per cent Mettalic Copper @ 625 g/ha) at milky and maturity stages and (d) farmers practice (spraying of Carbendazim 2 per cent at maturity stage) in order to manage the false sumt in paddy.

The results indicated that spraying of Copper hydroxide @ 625g/ha at milky and maturity stages was found to be effective and gave an average yield of 65.30 q/ha (6 per cent increase over farmers practice) and net returns of Rs. 38740/ha in Cuddalore district. Seed treatment with Carbendazim @ 2g/kg of seed followed by spraying of Hexaconazole @1ml/l at tillering and pre-flowering stages and spraying of Cholorothalonil @ 2g/l at maturity stage yielded 56 q/ha in Madurai followed by 56.30 q/ha in Villuppuram, 52.70 q/ha in Thiruvallur and 46.10 q/ha in Vellore.

(G) Drudgery reduction

(xii) Harvesting turmeric through mechanization: Turmeric is a major spice crop in Salem, Erode, Dharmapuri and Krishnagiri districts of Tamil Nadu. Under the present socio-economic situations in which labour has become scarce and costly input, farmers are in need of suitable farm equipment for harvesting of turmeric.

Therefore, KVKs at Salem, Erode, Dharmapuri and Krishnagiri districts conducted on farm trials by comparing four models namely (a) farmer's innovative model, (b) MYRADA model, (c) TNAU model and (d) improved TNAU model.

The results indicated that the farmer's innovative model performed better with a harvesting rate of 0.27 ha/hr in Dharmapuri. Whereas, MYRADA model had a harvesting rate of 0.06 ha/hr in Salem. The TNAU improved model with tractor drawn facility had a harvesting efficiency of 0.05 ha/hr in Krishnagiri.

(H) Livestock production and management

(xiii) Management of dairy cows during post calving: Supplementation of bypass fat during post calving is done in order to protect the fat from degradation. Supplemented bypass fat is absorbed by intestine for better growth of the cows. Keeping this in view, 5 KVKs viz., Bangalore Rural, Haveri, Bagalkot and Bijapur conducted on farm trials with 4 technology options such as (a) feeding of dry fodder + adequate green fodder (2/3 non leguminous and 1/3 leguminous) + adequate feeding of concentrates @ 1 kg for every 2.5 kg of milk production (above 5 to 8 l of milk production), (b) 1 kg of concentrates for maintaining ration + 50 g of mineral mixture /day/animal, and (c) supplementation of bypass fat @150 g/day/animal along with either (a) or (b) above and (d) farmers practice-feeding of dry fodder, green fodder, groundnut cake and bhusa.

Livestock technologies for up scaling through Frontline Demonstrations

- Supplementation of bypass fat @ 150g/day/animal along with the recommended concentrates and roughages during post calving could increase the milk yield of cow.
- Feeding of Area Specific Mineral Mixture to dairy cows increases the milk yield from 6.67 per cent to 37.50 per cent.

Supplementation of bypass fat was found to be effective in all four districts. The milk yield was 15 litre/day/animal (14.50 per cent increase over farmers practice) in Bangalore Rural, 14.50 litre/day/animal (20.83 per cent increase over farmers practice) in Haveri, 13.70 litre/day/animal (34.31 per cent increase over farmers practice) in Bijapur and 13.50 litre/day/animal (22.73 per cent increase over farmers practice) in Bagalkot.

(xiv) Increasing the productivity of dairy cows: In order to increase the productivity of dairy cows, eight KVKs viz., Perambalur, Thiruvallur, Thiruvarur, Vellore, Villuppuram, Pudukottai, Kanyakumari and Ramanathapuram conducted on farm trials and assessed the performance of Area Specific Mineral Mixture (ASMM) developed by Tamil Nadu Veterinary and Animal Sciences.

The ASMM was found to be effective in all the districts. The milk yield was 12.80 litre/day/animal in Kanyakumari, 11.84 litre/day/animal in Vellore, 10.20 litre/day/animal in Ramanathapuram, 7.00 litre/day/animal in Pudukottai, 6.50 litre/day/animal in Thiruvarur, 5.90 litre/day/animal in Thiruvallur, 5.50 litre/day/animal in Villuppuram and 4.60 litre/day/animal in Perambalur.

3.1.2 Frontline Demonstrations

Frontline demonstrations (FLDs) are conducted by KVKs to demonstrate the production potential of newly released crop varieties, production technologies in crops, animal husbandry and other agriculture related enterprises.The FLDs are also used for organizing training and field days for extension workers and farmers for large scale dissemination of successful technologies. A total of 11605 FLDs were organized including 1998 on cereals and millets, 1705 on livestock, fisheries and poultry, 1211 on hybrids of various crops, 1185 on vegetable crops, 860 on special pulses demonstrations in NFSM districts of Karnataka and Tamil Nadu states, 830 on pulses, 798 on oilseeds, 611 on farm implements, 568 on fruit crops, 504 on spice and condiments, 398 on enterprises, 354 on plantation crops, 216 on commercial crops, 141 on fodder crops,139 on flowers, and 87 on tuber crops, covering an area of 3457.08 ha in Karnataka, Tamil Nadu, Kerala, Goa, Puducherry and Lakshadweep (Table 14).

The crop wise results of FLDs due to combined effect of variety, technology and farming system conducted in the farmers fields are detailed in the following paragraphs:

3.1.2.1 Cereals: A total of 1998 demonstrations in 787.60 ha covering major cereals and millets were conducted, achieving an average increase in yield of 24.13 per cent in wheat to 40.50 per cent in minor millets (Table 15). The Benefit Cost Ratio (BCR) in the demonstrated technologies ranged from 2.24 in paddy to 3.36 in maize. Paddy production technologies such as SRI, soil test result based fertilizer recommendation and variety introduction, group approach for mechanization, ICM in maize, promotion of improved variety and ICM in wheat, and improved varieties and ICM in minor millets demonstrated higher productivity as compared to farmers practice.

FLD on ICM in paddy including management of Baya weaver bird using metalized reflective ribbons

Table 14: Details of frontline demonstrations implemented by KVKs

Category	No. of farmers	Values
Cereals and millets	1998	787.60 ha
Livestock, poultry and fisheries	1705	6383 animals+ 201.64 ha
Hybrids	1211	407.64 ha
Vegetable crops	1185	286.92 ha
Special pulses demonstrations in NFSM districts	860	354.20 ha
Pulses	830	320.80 ha
Oilseeds	798	289.85 ha
Farm implements	611	301.00 ha
Fruit crops	568	156.00 ha
Spices and condiments	504	87.58 ha
Enterprises	398	478 farmers
Plantation crops	354	108.82 ha
Commercial crops	216	80.20 ha
Fodder crops	141	24.10 ha
Flowers	139	28.75 ha
Tuber crops	87	17.98 ha
Grand total	**11605**	

FLDs on paddy were conducted in an area of 1228 ha in Karnataka, Tamil Nadu, Kerala, Puducherry and Goa covering both rainfed and irrigated conditions. The average yield recorded due to improved variety/technology was 52.65 q per ha in Karnataka (as against the state average of 27.10 q per ha), 51.02 q per ha in Tamil Nadu (as against the state average of 30.78 q per ha), 44.97 q per ha in Kerala (as against the state average of 25.47 q per ha), 45.31 q per ha in Puducherry (as against the state average of 25.04 q per ha). In case of wheat, 107 demonstrations recorded an average yield of 32.28 q per ha in Karnataka and 27.39 q per ha in Tamil Nadu due to technology demonstration. These FLDs have proved the production potential of new and emerging varieties/ technologies.These technologies, if adopted on a large scale by the farmers of these states, will lead to substantial increase in production of cereal grains in the country.

Table 15: Details of frontline demonstrations organised in cereals

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Yield increase	BCR	
			Demo.	Check	(%)	Demo.	Check
Paddy	1228	483.40	50.64	41.21	24.43	2.24	1.85
Finger millet	278	121.50	22.83	18.18	27.60	2.93	1.77
Sorghum	176	67.00	57.11	42.67	25.04	3.20	2.58
Minor millets	162	59.50	14.77	10.55	40.50	3.07	2.34
Wheat	107	39.20	30.91	25.30	24.13	2.32	1.99
Maize	47	17.00	43.00	33.07	26.75	3.36	2.67
Total	**1998**	**787.60**					

3.1.2.2 Oilseeds: During the year, 798 demonstrations were conducted covering 289.85 ha on different oilseed crops including groundnut, mustard, sesamum, soybean, sunflower and niger (Table 16). The percentage increase in yield varied from 12.07 in safflower to 43.75 per cent in niger as compared to check. The BCR under improved technology demonstration was more than the check plots and it ranged from 2.68 in niger to 4.91 in mustard. Among the technologies demonstrated, improved variety combined with crop management and INM have proved their worth for up scaling in larger area.

Table 16: Details of frontline demonstrations organised in oilseeds

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Yield increase	BCR	
			Demo.	Check	(%)	Demo.	Check
Groundnut	461	159.85	19.70	15.81	24.10	3.01	2.52
Sesamum	201	76.00	6.11	4.66	32.73	3.16	2.52
Soybean	67	25.00	20.47	15.34	33.61	3.44	3.06
Sunflower	27	11.00	12.92	9.00	42.82	2.85	1.96
Mustard	20	8.00	2.65	-	-	4.91	-
Safflower	12	5.00	6.50	5.80	12.07	3.70	3.42
Niger	10	5.00	5.75	4.00	43.75	2.68	2.55
Total	**798**	**289.85**					

FLD on groundnut varieties

Among oilseed crops demonstrated, groundnut technologies performed well in Karnataka by an average yield of 17.86 q per ha as against state average of 8.36 q per ha. Similarly, in sunflower also yield recorded under FLDs was higher with 6.5 q per ha in Karnataka and 12.92 q per ha in Tamil Nadu as against the respective state average of 2.76 q per ha and 10.0 q per ha. In soybean, yield recorded under FLDs was more than double i.e 20.47 q per ha in Karnataka as compared to state average of 8.51 q per ha. These results have clearly demonstrated the existing potentials of oilseed crops under improved varieties/technologies in Karnataka and Tamil Nadu. Hence, district specific technologies under FLDs need to be up scaled for their adoption by the farmers through the concerned line departments under the ongoing schemes of state and central governments.

3.1.2.3 Pulses: During the year, 830 demonstrations were conducted covering 320.80 ha on major pulse crops including blackgram, bengalgram, cowpea, redgram, green gram, horsegram and field bean (Table 17). The percentage increase in yield varied from 19.73 per cent in cowpea to 32.81 per cent in blackgram and on an average pulse crops under various technology demonstration gave 27.02 per cent more yield than check. The BCR recorded with technology demonstration was higher as compared to their local check and ranged from 1.94 in field bean to 3.41 in bengalgram. Some of the technologies that emerged out of these FLDs were IPM in bengalgram, INM with pulse wonder in blackgram, improved varieties with ICM in greengram, IPM and transplanting technique in redgram.

3.1.2.4 Commercial crops: A total of 216 demonstrations were conducted in commercial crops like sugarcane (87), cotton (106), mulberry (13) and betelvine (10) in an area of 80.20 ha (Table 18). The yield increase in FLDs was 23.62 per cent in sugarcane, 20.88 per cent in cotton, 19.72 per cent in mulberry and 27.53 per cent in betelvine as compared to local check in the respective crops. The BCR ranged from 1.53 in mulberry to 3.59 in sugarcane. Among the technologies, INM, trash management and ICM in sugarcane and improved variety in cotton have given impressive gains in yield and economic returns as compared to farmers practice.

Table 17: Details of frontline demonstrations organised in pulses

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Yield increase	BCR	
			Demo.	Check	(%)	Demo.	Check
Blackgram	270	85.50	7.76	5.93	32.81	2.65	2.29
Redgram	237	94.60	11.54	9.16	27.23	2.91	2.43
Bengalgram	109	63.00	10.89	8.87	24.00	3.41	2.95
Greengram	70	30.80	6.25	5.13	24.33	2.85	2.36
Cowpea	58	12.50	9.07	7.60	19.73	2.82	2.65
Field bean	55	22.00	104.00	85.00	22.35	1.94	0.76
Horsegram	31	12.40	11.43	8.67	31.66	2.10	1.79
Total	**830**	**320.80**					

The FLDs conducted during the year in the states of Karnataka, Tamil Nadu and Kerala have clearly demonstrated the higher yield potential of these crops than what the country is achieving. The average yield achieved due to technology demonstration was 10.9 q per ha in bengal gram in the state of Karnataka as compared to state average of only 6.26 q per ha. Similarly, in redgram, the yield recorded under FLDs was 11.52 q per ha in Karnataka and 11.67 q per ha in Tamil Nadu as against the state average of 5.71 q per ha in Karnataka and 6.29 q per ha in Tamil Nadu. Hence, these district specific technologies have great potential to impress the farmers to go for pulses cultivation provided technological inputs are made available to them at right time with appropriate quality and quantity.

Table 18: Details of fontline demonstrations organised in commercial crops

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Increase in yield	BCR	
			Demo.	Check	(%)	Demo.	Check
Cotton	106	41.00	15.35	12.68	20.88	3.13	2.57
Sugarcane	87	34.00	1002.98	815.19	23.62	3.59	2.66
Mulberry	13	3.20	330.20	278.38	19.72	1.53	1.46
Betelvine	10	2.00	71.80	56.30	27.53	2.00	1.86
Total	**216**	**80.20**					

Demonstration of DAP spray as part of INM in cotton

3.1.2.5 Fodder crops: In fodder crops, 141 demonstrations were conducted covering an area of 24.10 ha (Table 19). The fodder yield increase was in the range of 11.99 per cent in fodder sorghum to 93.84 per cent in mixed fodder crops under FLDs as compared to respective local check. The BCR ranged from 2.45 in bajra napier to 3.50 in mixed fodder crops. The adoption of improved varieties of fodder crops have given significantly higher benefits to farmers as against their practice under both rainfed and irrigated conditions.

Table 19: Details of frontline demonstrations organised in fodder crops

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Yield increase	BCR	
			Demo.	Check	(%)	Demo.	Check
Mixed fodder crops	65	140.00	582.11	250.36	93.84	3.50	2.09
Bajra napier	46	4.90	441.68	267.27	68.20	2.45	1.79
Fodder sorghum	20	4.10	686.59	615.37	11.99	2.55	1.66
Guinea grass	10	1.10	2280.00	1339.09	71.58	3.20	2.03
Total	**141**	**24.10**			**61.40**		

3.1.2.6 Vegetable crops: A total of 1190 demonstrations on various vegetable crops comprising cucumber (273), onion (210), tomato (86), green chilli (66), brinjal (64), snake gourd (63), mixed vegetables (60), drumstick (57), french bean (50), bitter gourd (50), dolichos bean (45), bhendi (35), cabbage (26), cauliflower (23), carrot (20), pea (20), yard long bean (10), amaranthus (10), beet root (10), vegetable cowpea (7) and pole bean (5) were conducted in 286.92 ha area (Table 20). The yield increase by FLD plots ranged from 3.45 per cent in amaranthus to 94.07 per cent in cucumber.

FLD on use of vegetable special in tomato

Table 20: Details of frontline demonstrations organised in vegetable crops

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Yield increase	BCR	
			Demo.	Check	(%)	Demo.	Check
Cucumber	273	23.50	506.59	231.21	94.07	2.14	1.36
Onion	210	90.05	122.22	96.16	27.53	2.96	2.33
Tomato	86	25.00	332.40	278.18	19.46	5.19	4.52
Green chilli	66	10.30	179.06	151.06	21.60	2.44	1.99
Brinjal	64	23.04	240.27	162.35	85.50	5.09	4.19
Snake gourd	63	15.00	317.85	263.24	23.11	2.71	2.33
Mixed vegetables cultivation	60	1.125	145.13	102.93	27.76	1.78	1.30
Drumstick	57	26.00	372.62	260.33	54.09	3.59	2.39
French bean	50	5.50	131.93	95.87	35.39	2.95	2.20
Bitter gourd	50	25.40	87.57	79.39	17.71	2.05	1.93
Dolichos bean	45	8.00	80.34	59.16	37.68	3.27	2.63
Bhendi (okra)	35	8.20	93.11	62.60	52.83	2.85	2.00
Cabbage	26	6.04	189.25	166.75	14.94	3.23	2.52
Cauliflower	23	1.84	175.17	155.02	11.38	3.02	2.38
Carrot	20	1.58	274.22	193.67	14.89	3.50	1.83
Pea	20	4.00	63.96	48.66	31.44	1.92	1.64
Yardlong bean	10	10.00	19.80	14.20	39.44	2.13	1.90
Beet root	10	0.10	42.50	25.00	70.00	1.70	-
Amaranthus	10	0.04	300.00	290.00	3.45	2.00	1.25
Vegetable cowpea	7	0.20	198.00	88.00	87.50	2.98	1.75
Pole bean	5	2.00	9.40	8.00	17.50	1.63	1.49
Total	**1190**	**286.92**					

3.1.2.7 Tuber crops: A total of 87 demonstrations on tuber crops like elephant foot yam, tapioca and potato were conducted in 17.98 ha area. The increase in yield under FLDs as compared to check was 9.64 per cent in potato, 20.25 per cent in elephant foot yam and 22.89 per cent in tapioca. The BCR in potato was 3.39 followed by 2.80 in tapioca and 2.24 in elephant foot yam (Table 21). Improved variety in yam, ICM in tapioca, ICM and yellow mite control in potato have emerged as frontier technologies for enhancing the yield and production in tuber crops.

3.1.2.8 Fruit crops: A total of 568 demonstrations under various fruit crops like banana, grape, lime, mandarin, mango, papaya, pomegranate and watermelon were conducted in 156 ha area (Table 22). The yield increase as compared to check was 23.62 per cent in banana, 18.42 per cent in grape, 19.32 per cent in lime, 19.92 per cent in mandarin, 57.71 per cent in mango, 54.16 per cent in papaya, 24.34 per cent in pomegranate and 55.62 per cent in watermelon with higher BCR of 4.49, 5.31, 3.51, 1.36, 3.37, 2.47, 4.25 and 3.44, respectively as compared to local check. Among fruit

FLD on IDM in pomegranate

Table 21: Details of frontline demonstrations organised in tuber crops

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Yield increase (%)	BCR	
			Demo.	Check		Demo.	Check
Tapioca (cassava)	45	14.04	305.22	248.49	22.89	2.80	2.11
Potato	22	3.80	139.68	128.53	9.64	3.39	3.32
Elephant foot yam	20	0.14	96.71	78.29	20.05	2.24	1.68
Total	**87**	**17.98**					

Table 22: Details of frontline demonstrations organised in fruit crops

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Increase in yield (%)	BCR	
			Demo.	Check		Demo.	Check
Banana	278	91.00	395.05	319.25	23.62	4.49	3.77
Mango	167	32.00	100.12	55.69	57.71	3.37	2.92
Mandarin	35	4.00	44.79	37.42	19.92	1.36	1.22
Pomegranate	29	10.00	61.50	51.10	24.34	4.25	3.06
Grape	27	7.00	62.26	54.63	18.42	5.31	3.28
Lime	12	5.00	210.00	176.00	19.32	3.51	3.28
Papaya	10	5.00	1298.00	842.00	54.16	2.47	1.60
Watermelon	10	2.00	350.70	225.36	55.62	3.44	2.68
Total	**568**	**156.00**					

crop technologies demonstrated, ICM, micronutrient management through banana special, IDM in banana, IPM in grape, IDM in lime, ICM and integrated management of fruit fly in mango, management of mealybug in papaya and ICM in watermelon have impressed the farmers with the better yield and economic returns.

3.1.2.9 Spices and condiments: A total of 504 demonstrations were conducted in cardamom, pepper, coriander, dry chillies, garlic, ginger and turmeric in 87.58 ha area (Table 23). The yield increase recorded as compared to check was 25 per cent in cardamom, 67.15 per cent in pepper, 25.13 per cent in coriander, 41.99 per cent in dry chillies, 5.12 per cent in garlic, 45.11 per cent in ginger and 16.56 per cent in turmeric with higher BCR of 3.60, 3.42, 3.21, 2.83, 4.04, 2.09 and 2.26, respectively as compared to their local checks. Out of the technologies demonstrated, quick wilt and foot rot management in pepper, management of rhizome rot in ginger and turmeric, ICM and root rot management in chillies have been tagged as technologies for upscaling in the states of Karnataka, Tamil Nadu and Kerala.

3.1.2.10 Plantation crops: A total of 354 demonstrations on plantation crops like cashew, arecanut, coconut and coffee were conducted in 108.82 ha area (Table 24). The yield increase under demonstrations as compared to check was 89.12 per cent in cashew, 27.37 per cent in arecanut, 134.94 per cent in coconut and 18.19 per cent in coffee with BCR of 6.96, 4.77, 2.69, and 3.21, respectively as compared to their local checks. These results have clearly brought out the effect of management of tea mosquito bug , root and stem borer in cashew, berry borer in coffee, INM and IDM in arecanut, IPM and crop management

Table 23: Details of frontline demonstrations organised in spices and condiments

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Yield increase	BCR	
			Demo.	Check	(%)	Demo.	Check
Dry chillies	275	48.00	13.27	10.28	41.99	2.83	1.71
Pepper	110	16.52	12.02	9.09	67.15	3.42	2.27
Ginger	50	10.56	172.45	107.29	45.11	2.09	1.37
Turmeric	42	8.50	123.84	103.59	16.56	2.26	1.96
Coriander (seed)	20	3.00	5.20	3.61	25.13	3.21	2.48
Cardamom	5	0.20	10.00	8.00	25.00	3.60	2.00
Garlic	2	0.80	154.00	146.50	5.12	4.04	3.50
Total	**504**	**87.58**					

Table 24: Details of frontline demonstrations organised in plantation crops

Crop	No. of farmers	Area (ha)	Yield		Yield increase	BCR	
			Demo.	Check	(%)	Demo.	Check
Coconut (nuts/ha)	184	49.32	13038	7071	134.94	2.69	2.09
Arecanut (q/ha)	100	34.50	22.30	17.92	27.37	4.77	4.30
Cashew (q/ha)	40	15.00	116.43	67.87	89.12	6.96	2.76
Coffee (q/ha)	30	10.00	29.76	25.18	18.19	3.21	2.98
Total	**354**	**108.82**					

through intercropping and moisture conservation in coconut gardens and impressed the farmers with the higher yield and returns.

3.1.2.11Flower crops: During the year, 139 demonstrations on flower crops like aster, chrysanthemum, jasmine and rose were conducted in 28.75 ha area (Table 25). The yield increase under FLDs as compared to check was 16.42 per cent in aster, 18.97 per cent in chrysanthemum, 25.02 per cent in jasmine and 13.44 per cent in rose with BCR of 3.11, 2.36, 3.05, and 2.59, respectively as compared to their local checks. Adoption of improved variety with improved crop management practices in aster and chrysanthemum and pruning in jasmine have emerged as frontier technologies for up scaling.

3.1.2.12 Hybrids: A total of 1211 demonstrations on hybrids in various crops were conducted in 407.64 ha area on cereal and millets (paddy, maize, baby corn sorghum, pearl millet (bajra)), commercial crops (cotton), oilseeds (Sunflower, castor), fodder (CO-4), vegetables (chilli, bhendi, brinjal, cabbage, cauliflower, tomato, tapioca, lablab, fruits (watermelon) and flowers (tuberose). The hybrids clearly out yielded local checks in all demonstrations (Table 26).

In case of cereals and millets, the yield increase of irrigated paddy was 25.24 per cent, rainfed maize 7.74 to 64.75 per cent, irrigated maize 11.32 to 33.10, rainfed sorghum 15.17 per cent, rainfed bajra 17.74 per cent and irrigated baby corn 16.07 per cent as compared to check. In case of rainfed cotton, the increase in yield ranged from 18.07 to 36.51 per cent. The oilseed hybrids recorded an increase in yield ranging from 19.05 to 35.32 per cent in irrigated sunflower, 17.31 per cent in rainfed sunflower, from 8.49 to 16.67 per cent in rainfed castor, 29.46 per cent in irrigated castor. The bajra napier (CO-4) recorded an yield increase of 25.60 per cent in irrigated condition as compared to other varieties of grass under check.

Similarly among the demonstrations of vegetable hybrids, the yield increase ranged from 9.71 to 26.71 per cent in chilli, 36.76 per cent in bhendi, 4.39 to 123.03 per cent in brinjal, 19.22 to 25.41 per cent in cabbage, 6.93 to 17.71per cent in cauliflower, 13.75 to 24.54 per cent in tomato, 32.09 per cent in tapioca, 21.83 per cent in lablab, 19.42 to 21.92 per cent in watermelon, 55.26 per cent in tuberose under irrigated condition as compared to check.

Table 25: Details of frontline demonstrations organised in flower crops

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Yield increase	BCR	
			Demo.	Check	(%)	Demo.	Check
Jasmine	84	15.25	83.85	68.28	25.02	3.05	2.41
Aster	25	4.50	25.90	22.33	16.42	3.11	1.48
Chrysanthemum	20	5.00	99.14	83.20	18.97	2.36	2.00
Rose (no of flowers)	10	4.00	363000	320000	13.44	2.59	1.09
Total	**139**	**28.75**					

Table 26: Details of frntline demonstrations organised in hybrids

Crop	Hybrids	No. of Demo.	Area (ha)	Yield (q/ha) Demo.	Yield (q/ha) Check	Yield increase %	BCR Demo.	BCR Check
Cereals								
Paddy (irrigated)	CORH4	55	19.00	66.31	53.22	25.24	3.00	2.24
Maize (rainfed)	NAH-1137	52	21.60	52.69	44.15	19.67	3.90	2.85
	Arjun	42	18.00	50.35	43.97	12.78	3.88	3.58
	Prince	10	4.00	41.60	25.25	64.75	2.31	1.68
Maize (irrigated)	NAH-2050	26	11.40	63.07	57.14	11.32	3.53	3.38
	NK6241	25	9.00	52.80	44.56	20.42	3.02	2.63
	Hema	17	6.80	80.05	74.30	7.74	5.34	5.14
	M900	17	10.00	60.11	52.89	14.09	5.87	5.89
	COHM-6	16	10.00	68.10	58.70	16.03	2.37	1.96
	Kargil	10	4.00	67.05	55.45	20.92	3.55	3.37
	NAH-1177	10	4.00	63.50	58.30	8.92	4.61	4.41
	Kaveri	5	2.00	66.75	50.15	33.10	3.39	3.21
Sorghum (irrigated)	CSH-14	10	2.00	13.89	12.06	15.17	1.93	1.74
Bajra (rainfed)	ICTP-8204	35	15.00	10.27	8.74	17.74	3.08	2.79
Baby corn (irrigated)	G-5414	20	5.00	65.00	56.00	16.07	3.05	2.70
Commercial crops								
Cotton (rainfed)	MRC-7919(Bt)	55	20.00	9.50	7.90	20.25	1.65	1.35
	Bt Cotton	25	10.00	24.50	20.75	18.07	3.70	2.87
	MRC 6919(Bt)	23	9.00	20.89	15.50	36.51	2.90	2.40
	RCH 625	12	5.00	17.58	12.94	35.86	2.41	1.94
	MRC-7351(Bt)	12	4.80	15.80	13.28	18.98	1.73	1.48
	MRC 7918 (Bt)	10	4.00	24.58	18.75	31.09	2.76	2.21
	RC 20 Bt	10	5.00	30.00	24.00	25.00	1.43	1.17
Oilseeds								
Sunflower (rainfed)	KBSH-4	8	3.00	13.15	11.21	17.31	4.27	3.80
Sunflower (irrigated)	Private Hybrid	39	16.00	10.64	8.70	22.14	2.95	2.44
	KBSH-54	30	12.00	6.96	5.84	22.19	3.33	2.36
	COSFH2	22	10.00	14.02	10.36	35.32	1.96	1.59
	RSFH-130	12	5.00	12.50	10.50	19.05	3.86	2.76
Castor (rainfed)	DCH-177	13	4.00	10.50	9.00	16.67	2.52	2.62
	DCH-519	10	4.00	8.82	8.13	8.49	1.99	1.79
Castor (irrigated)	YRCH-1	10	4.00	21.75	16.80	29.46	2.84	1.85

(Table 26 contd.....)

Crop	Hybrids	No. of Demo.	Area (ha)	Yield (q/ha) Demo.	Yield (q/ha) Check	Yield increase (%)	BCR Demo.	BCR Check
Fodder								
Bajra napier (irrigated)	Co-4	71	11.44	388.67	294.65	25.60	2.05	1.66
Vegetables								
Chilli (irrigated)	TNAU Chilli hybrid Co2	109	27.00	127.80	101.11	26.71	6.39	2.34
	Siemens Hybrid	25	10.00	226.00	206.00	9.71	1.70	1.37
Bhendi (irrigated)	CoBH-2	55	11.00	126.93	96.59	36.76	3.50	2.65
Brinjal (irrigated)	Ammu	10	2.00	243.70	182.50	33.53	2.65	2.08
	Mahyco -9	15	6.00	507.00	410.00	23.66	19.33	14.64
	CoBH-2	25	7.00	322.50	200.93	50.19	3.55	2.87
	MH-10	6	2.40	384.00	305.00	25.90	6.86	5.47
	Private Hybrid	12	5.00	297.50	285.00	4.39	3.43	2.94
	Mayhco	24	11.00	236.05	139.91	123.03	4.34	3.22
	Arka Anand	6	1.00	249.60	218.20	14.39	4.90	4.19
Cabbage (irrigated)	NS 160	20	0.50	274.20	230.00	19.22	1.53	
	Unnati	10	2.00	153.00	122.00	25.41	2.35	2.13
Cauliflower (irrigated)	Shoba (Private hybrid)	10	2.00	438.00	367.00	19.35	2.90	2.47
	Unnati	10	2.00	216.00	202.00	6.93	2.29	2.03
Tomato (irrigated)	CoTH4	35	11.00	416.41	335.64	17.71	2.62	1.98
	US 619	18	7.20	436.27	410.03	13.75	2.26	2.00
	Arka Ananya	24	5.50	329.04	265.71	24.54	3.55	2.72
	Private Hyb	10	2.00	523.00	424.00	23.35	3.43	3.08
Tapioca (irrigated)	H267	15	7.00	369.50	282.07	32.09	2.94	1.83
Lablab (irrigated)	CO (Gb) 14	12	1.00	75.90	62.30	21.83	3.23	2.17
Fruits								
Watermelon (irrigated)	NS 295/ Riya	20	6.00	315.42	257.33	21.92	2.93	2.53
	Namadhari	20	8.00	242.19	208.75	19.42	6.37	4.88
Flowers								
Tuberose (irrigated)	Prajwal	8	2.00	59.00	38.00	55.26	4.63	3.93

3.1.2.13 Livestock, fisheries and enterprises: A total of 1705 demonstrations on dairy, piggery, poultry, sheep and goat, rabbitary, fisheries, prawn, fodder bank, and azolla, 478 demonstrations on enterprises such as sericulture, mushroom, bee keeping, nursery and food processing were conducted for income generation (Table 27).

Among the livestock demonstrations, 490 were on dairy, 440 on poultry, 244 on fodder banks and 228 on sheep and goat. In the case of enterprises, there were230 demonstrations were on food processing and 112 demonstrations on mushroom.

Table 27: Details of frontline demonstrations organised in livestock, fisheries and enterprises

Category	No. of farmers	Values
Dairy	490	761animals
Poultry	440	4149 birds
Fodder banks	244	113.10 ha
Sheep and goat	228	1074 animals
Fisheries	175	87.34 ha
Piggery	105	372 animals
Azolla	10	10 units
Prawn	7	1.30 ha
Rabbitary	6	27 units
Total	**1705**	
Food processing	230	198 units
Mushroom	112	46 units
Bee-keeping	57	75 units
Sericulture	54	8200 DFLs
Nursery	25	25 units
Total	**478**	

FLD on deworming in cattle

FLD on composite fish farming

Common carp harvested in FLD

3.1.2.14 Farm implements and tools: Farm mechanization was popularized through organization of 621 demonstrations of farm implements and tools.Of which, 107 demonstrations were on harvesting equipments and tools covering 56.80 ha area followed by 83 demonstrations on inter-tillage equipments covering an area of 57.20 ha, 81 demonstrations on paddy mechanization covering an area of 33 ha and 41 demonstrations each on tillage equipments, groundnut decordicator and fuel efficient chulhas (Table 28). The other equipments demonstrated were pulse storage bins, chaff cutter, coconut climber, coconut dehusker, groundnut pod stripper, mechanical harvester in tea, planting/sowing equipments, mini dhal mill, vermicompost siever, turmeric broiler, sugarcane detrasher, vegetable preservator (CRIDA -model) and tamarind dehuller-cum-deseeder.

Table 28: Details of frontline demonstrations organised in farm implements and tools

Farm implement	No. of demo.	Area (ha)
Harvesting equipments and tools	107	56.80
Inter-tillage equipments and tools	83	57.20
Paddy mechanization	81	33.00
Tillage equipments and tools	41	43.30
Groundnut decorticators	41	52.00
Turmeric broiler	30	13.00
Planting/sowing equipments	28	2.60
Mechanical harvester in tea	22	47.90
Groundnut pod stripper	20	8.00
Sugarcane detrasher	10	8.00
Coconut climber	5	2.00
Custom hiring centre	2	20.00
Farm implement	**No. of demo.**	**Units**
Fuel efficient cholas	41	38
Pulse storage bins	30	30
Chaff cutter	20	2
Mini dhal mill	10	10
Vermicompost sieve	10	10
Coconut dehusker (No. of palms)	6	1000
Vegetable preservator	5	5
Tamarind dehuller-cum-deseeder	5	5
Plant protection equipments and tools	4	1

Demonstration on farm mechanization

FLD on paddy mechanization (mat nursery raising on the left and transplanting on the right)

3.1.3 Training

During 2011-12, a total of 13658 training courses were conducted with the participation of 466471 participants. On an average each KVK organised 177 courses with 6058 participants. Out of 13658 courses, 6226 courses were organized by 30 KVKs of Tamil Nadu, 4333 courses by 28 KVKs of Karnataka and 2440 courses by 14 KVKs of Kerala. Two KVKs each in Puducherry and Goa conducted 169 and 102 training courses respectively. Lone KVK in UT of Lakshadweep conducted 388 courses. Out of 13658 courses, 11499 (83.83 per cent) were organized to meet the needs of farmers/farmwomen/rural youth and extension functionaries. KVKs also organized 1758 (12.87 per cent) sponsored courses and 451 vocational training courses as detailed in Table 29.

In terms of participation, a total of 466471 participants got benefitted from the training courses. Thirty KVKs of Tamil Nadu accounted for 45 per cent of participants whereas 28 KVKs of Karnataka accounted for about 34 per cent of participants. State wise distribution of number of participants and the share of each State in terms of percentage are given in Fig.2.

Out of 466471 participants, 165993 (35.58 per cent) were female and the remaining were male (300478). The percentage of female participants in different states is given in Fig.3. Goa had maximum representation of female participants, where the percentage of female was 57.94 per cent. Puducherry was second with 53.83 per cent of the participants being female. In other states, the percentage of female participants ranged from 33.41 per cent (Tamil Nadu) to 43.20 per cent (Kerala).

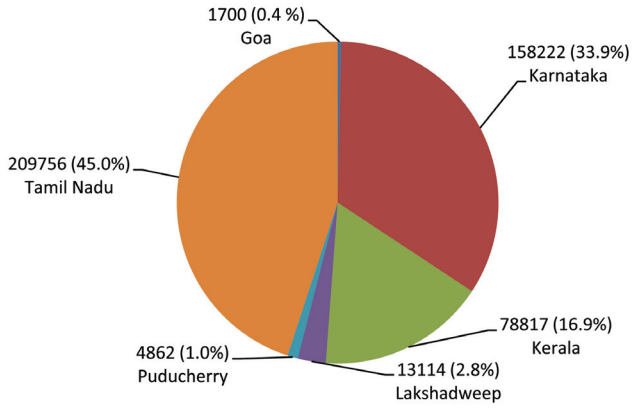

Fig.2 State wise number and percentage of participants

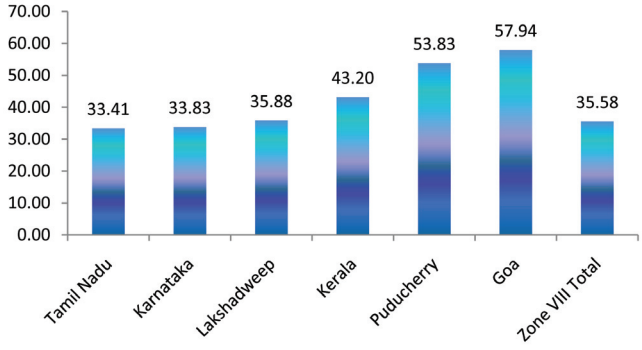

Fig.3 Percentage of women participants in different states

Table 29: State wise distribution of training courses organised and distribution of participants

State /UT	No. of KVKs	Need based		Training courses Sponsored		Vocational		Total	
		No. of courses	No. of participants	No. of courses	No. of participants	No. of courses	No. of participants	No. of courses	No. of participants
Tamil Nadu	30	5258	168226	781	36647	187	4883	6226	209756
Karnataka	28	3654	134083	553	19921	126	4218	4333	158222
Kerala	14	1931	62916	393	13335	116	2566	2440	78817
Goa	2	97	1601	4	88	1	11	102	1700
Puducherry	2	150	4060	16	757	3	45	169	4862
Lakshadweep	1	359	11922	11	602	18	590	388	13114
Total	**77**	**11449**	**382808**	**1758**	**71350**	**451**	**12313**	**13658**	**466471**

Participation of SC and ST community has been given adequate emphasis in the training programmes, wherein the overall average was 22.91 per cent. The state wise percentage of SC/ST participants is depicted in Fig.4. The percentage of SC/ST participants was lowest (15.49 per cent) in Kerala and was maximum (100 per cent) in Lakshadweep. Among the bigger states, participation of SC/ST community in Karnataka was 25.03 per cent followed by Tamil Nadu (19.33 per cent).

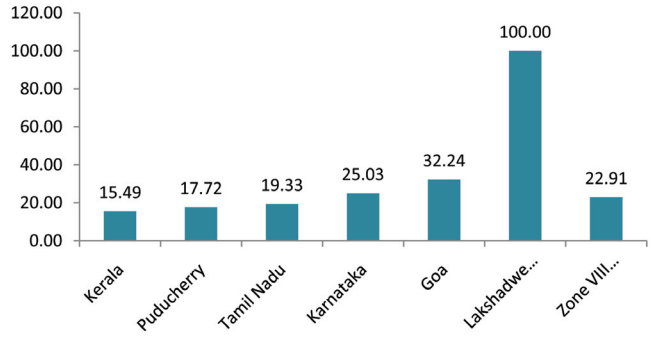

Fig.4 Percentage of SC/ST participants in different states

The training courses organized by the KVKs covered 15 major areas of training needs of farmers and farm women, the details of which are given in Table 30. Most number of training programmes were in the area of crop production (3259) followed by 1730 courses on on livestock production and management and 1668 courses on horticulture production. In terms of participation, horticulture production attracted 64234 participants, next only to crop production which involved 109474 participants.

Table 30: Thematic area wise training courses organised and distribution of participants

Thematic area		Particiapnts								
		General			SC/ST			Total		
	No. of courses	Male	Female	Total	Male	Female	Total	Male	Female	Total
Crop production	3259	71146	17291	88437	14984	6053	21037	86130	23344	109474
Horticulture production	1668	34494	15283	49777	8807	5650	14457	43301	20933	64234
Livestock production	1730	21377	18261	39638	9141	11648	20789	30518	29909	60427
Home science	1297	8444	22921	31365	3007	7594	10601	11451	30515	41966
Plant protection	1148	23169	7629	30798	5839	2286	8125	29008	9915	38923
Production of inputs at site	1002	20416	7650	28066	4827	2924	7751	25243	10574	35817
Soil health and fertility	759	18045	4060	22105	4926	2063	6989	22971	6123	29094
Processing and value addition	743	9218	10024	19242	1788	2280	4068	11006	12304	23310
Farm mechanization	607	10215	3503	13718	2556	1248	3804	12771	4751	17522
Capacity building and group dynamics	558	9737	5420	15157	1619	1901	3520	11356	7321	18677
Fisheries production	323	4825	2372	7197	1324	992	2316	6149	3364	9513
Mushroom production	263	3503	3141	6644	805	783	1588	4308	3924	8232
Agro forestry	103	2107	1200	3307	585	358	943	2692	1558	4250
Sericulture	102	1392	340	1732	221	112	333	1613	452	2065
Bee keeping	96	1689	727	2416	272	279	551	1961	1006	2967
Total	**13658**	**239777**	**119822**	**359599**	**60701**	**46171**	**106872**	**300478**	**165993**	**466471**

Participation of SC/ST community in different training areas was highest in crop production (21037) and least in sericulture (333). Participation of female in the training courses indicate the highest participation was in the area of home science (30515) followed by processing and value addition. Least participation of female was recorded in the area of sericulture (452).

3.1.3.1 Training courses for farmers and farm women: A total of 9215 courses were organized for farmers and farm women by the KVKs, which involved 317090 participants (Table 31). Maximum of 4216 courses were organized in Tamil Nadu followed by 3138 courses in Karnataka and 1412 courses in Kerala. These courses involved 207842 male and 109248 female. The state wise participation of SC/ST community and farm women reveals the fact that Goa had better proportion of SC/ST (434 out of 1067 participants i.e. 40.67 perc ent) as well as female participants (586 out of 1067 participants i.e. 54.92 per cent). Kerala had better ratio of female farmers (20655 out of 48501 i.e. 42.59 per cent) but lower rate of SC/ST participation (7130 out of 48501 i.e. 14.7 per cent).

Training programmes for farmers/farm women category were organized in 15 areas related to agriculture and allied sectors, the details of which are

On campus trainings on nursery production

A view of off campus training

Table 31: State wise training courses organized for farmers/farm women and their distribution

State/UT		Participants								
		General			SC/ST			Total		
	No. of courses	Male	Female	Total	Male	Female	Total	Male	Female	Total
Tamil Nadu	4216	78100	30668	108768	14043	13860	27903	92143	44528	136671
Karnataka	3138	60102	26930	87032	19592	11307	30899	79694	38237	117931
Kerala	1412	24248	17123	41371	3598	3532	7130	27846	20655	48501
Lakshadweep	268	-	-	-	6107	3334	9441	6107	3334	9441
Puducherry	124	1339	1521	2860	232	387	619	1571	1908	3479
Goa	57	226	407	633	255	179	434	481	586	1067
Total	**9215**	**164015**	**76649**	**240664**	**43827**	**32599**	**76426**	**207842**	**109248**	**317090**

Table 32: Thematic area wise training courses organised for farmers/farm women and their distribution

Thematic area	No. of courses	No. of participants		
		Male	Female	Total
Crop production	2188	56416	15320	71736
Horticulture production	1282	35297	16957	52254
Livestock production and management	1077	19831	17473	37304
Plant protection	1047	26544	8195	34739
Home science and women empowerment	915	8245	21632	29877
Production of inputs at site	647	17442	6259	23701
Soil health and fertility management	644	18199	5045	23244
Farm mechanization	330	7245	3025	10270
Processing and value addition	308	3532	5463	8995
Capacity building and group dynamics	274	5464	3702	9166
Fisheries production	213	3843	1952	5795
Mushroom production	119	1661	1896	3557
Agro forestry	103	2692	1558	4250
Bee keeping	51	991	572	1563
Sericulture	17	440	199	639
Total	**9215**	**207842**	**109248**	**317090**

given in Table 32. Most number of courses (2188) were organized on crop production technologies followed by horticulture (1282) and livestock production and management (1077). Maximum participation was also recorded in these three major training areas wherein a total of 71736, 52254 and 37304 participants were involved in the three areas of training courses mentioned above, respectively. Maximum number of female farmers' participation was recorded in the area of home science and women empowerment (21632) and in the area of livestock production and management (17473).

3.1.3.2 Training courses for rural youth: Out of 77 KVKs, 65 KVKs have organized a total of 1375 courses with the participation of 41677 rural youth. The state wise distribution of these courses revealed that 603 courses were organized in Tamil Nadu followed by 422 in Kerala and 244 in Karnataka. The number of rural youth who participated in the KVK training courses was also in the same order wherein 19076 participants were recorded in Tamil Nadu followed by 12258 in Kerala and 7704 in Karnataka. The details of number of courses and participants are given in Table 33.

Thematic areas of training courses

Crop production
- Integrated nutrient management
- Integrated crop management
- Cropping systems
- Weed management practices
- Micro irrigation techniques
- Water management practices
- Location specific IFS models

Plant protection
- Integrated pest management
- Integrated disease management
- Bio-control of pests and diseases
- Integrated pest and disease management

Soil health and fertility management
- Resource conservation technologies
- Soil fertility management
- Soil and water testing
- Soil and water conservation
- Micronutrient deficiency management
- Management of problematic soils
- Balanced use of fertilizers
- Enhancing nutrient use efficiency

Horticulture production
- Low volume and high value crops
- Technology for horticulture crops
- Cultivation of fruits and vegetables
- Mushroom production
- Export potential vegetables
- Protected cultivation
- Organic vegetable cultivation
- Off-season vegetable cultivation
- Training and pruning

Processing and value addition
- Primary processing techniques
- Post harvest technologies
- Processing and value addition

Production of inputs at site
- Nursery raising/ nursery management
- Seed production methods
- Vermicomposting
- Production of bio-fertilizers, bio-agents and bio-pesticides
- Planting material production

Livestock production and management
- Dairy management practices
- Poultry and quail management
- Feed and fodder technology
- Animal disease management
- Sheep and goat management
- Animal nutrition management
- Livestock management

Home science
- Women empowerment
- High nutrient efficiency diets
- Processing and cooking
- Storage loss minimization techniques
- Kitchen gardening/ nutrition gardening
- Women and child care activities
- Minimization of nutrient loss

Farm mechanization
- Farm machinery and its maintenance
- Location specific drudgery reduction
  Capacity building and group dynamics
- Entrepreneurial development
- Formation and management of SHGs
- Leadership development
- Group dynamics

Fisheries production
- Composite fish culture
- Breeding of ornamental fishes
- Fish processing and value addition
- Integrated fish farming

Among 41677 rural youth trained by the KVKs during 2011-12, 9753 were SC/ST (23.40 per cent) and 16292 were female (39.10 per cent). The state wise percentage of SC/ST participants and the percentage of female participants out of total participants are given in Fig 5.

The training area wise categorization of courses related to rural youth (Table 34) reveals that most number of training courses were organized on livestock production and management (235) and production of inputs at site (175) with a participation of 6729 and 6323 rural youth, respectively. Other major areas of training

Table 33: State wise training courses organized for rural youth and their distribution

State/UT	Rural youth									
	General				SC/ST			Total		
	No. of courses	Male	Female	Total	Male	Female	Total	Male	Female	Total
Tamil Nadu	603	9809	5428	15237	1874	1965	3839	11683	7393	19076
Kerala	422	5669	4617	10286	1025	947	1972	6694	5564	12258
Karnataka	244	4384	1516	5900	1171	633	1804	5555	2149	7704
Lakshadweep	61	-	-	-	1209	741	1950	1209	741	1950
Goa	32	66	255	321	46	53	99	112	308	420
Puducherry	13	84	96	180	48	41	89	132	137	269
Total	**1375**	**20012**	**11912**	**31924**	**5373**	**4380**	**9753**	**25385**	**16292**	**41677**

Table34: Thematic area wise training courses organized for rural youth and their distribution

Thematic area	No. of courses	No. of participants		
		Male	Female	Total
Livestock production and management	235	4213	2516	6729
Production of inputs at site	175	4313	2010	6323
Horticulture production	171	3697	1683	5380
Processing and value addition	171	2279	2750	5029
Home science and women empowerment	109	845	2038	2883
Mushroom production	109	2112	1621	3733
Crop production	104	2490	779	3269
Farm mechanization	95	1671	734	2405
Fisheries production	80	1647	1090	2737
Bee keeping	38	866	369	1235
Plant protection	28	520	245	765
Capacity building and group dynamics	26	367	251	618
Sericulture	21	188	172	360
Soil health and fertility management	13	177	34	211
Total	**1375**	**25385**	**16292**	**41677**

Capacity building activities related to production of inputs at site have borne immediate impact on the production of seeds, planting material bio-agents and bio-pesticides. 28 KVKs trained youth on vermi-culture, 23 KVKs trained youth on production of bio-agents, bio-pesticides etc. and 22 KVKs trained youth in production of seeds and planting material. Many KVKs are using such trained youth to produce inputs in a partnership mode. The most successful examples have been reported from Thrissur and Pathanamthitta in Kerala and Namakkal in Tamil Nadu.

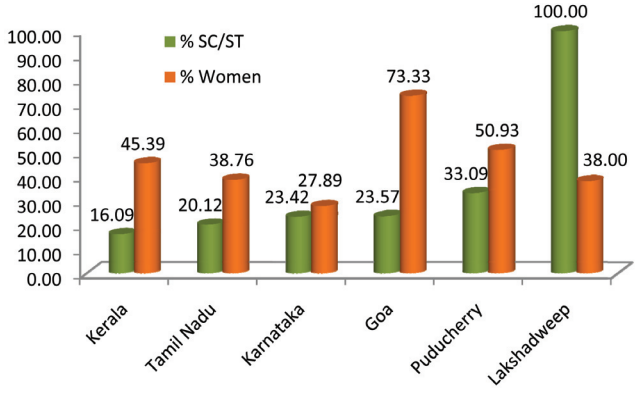

Fig.5 Percentage of SC/ST and women participants in rural youth category

courses which involved rural youth are horticulture production technology (171 courses, 5380 participants) and processing and value addition (171 courses, 5029 participants). Home science and women empowerment and mushroom production had 109 courses each with a participation of 2883 and 3733, respectively. Among these different training areas, maximum number of female in the rural youth category preferred training related to processing and value addition (2750) followed by livestock production and management (2516).

3.1.3.3 Training courses for extension functionaries: The state wise details of training courses organized for extension functionaries by the KVKs are given in Table 35. The data indicates that a total of 859 courses were organized with a participation of 24041 extension

Training rural youth on mushroom spawn production

functionaries. Number of courses organized in Tamil Nadu were 429 followed by 272 courses in Karnataka. In terms of participation, 50 per cent of the participants were from Tamil Nadu (12149 out of a total of 24041). Extent of SC/ST and female participants in different states indicates that Tamil Nadu and Karnataka states recorded higher participation of extension functionaries from SC/ST community (1720 and 1397 respectively out of a total of 3960) and female extension functionaries (3345 and 2248, respectively out of a total of 7344).

The details of training courses organized for extension functionaries during 2011-12 is given in Table 36. Maximum participation was recorded in crop production wherein 309 courses (out of a total of 859) attracted 9527 extension functionaries (out of a total of 24041). Other areas of interest for extension functionaries

Training for extension personnel on white pepper production

Table 35: State wise training courses organized for extension functionaries and their distribution

State/UT	Extension functionaries									
		General			SC/ST			Total		
	No. of courses	Male	Female	Total	Male	Female	Total	Male	Female	Total
Tamil Nadu	429	7814	2615	10429	990	730	1720	8804	3345	12149
Karnataka	272	5272	1779	7051	928	469	1397	6200	2248	8448
Kerala	111	1035	1271	2306	106	174	280	1141	1445	2586
Lakshadweep	30	-	-	-	371	160	531	371	160	531
Puducherry	9	96	100	196	4	13	17	100	113	213
Goa	8	70	29	99	11	4	15	81	33	114
Total	**859**	**14287**	**5794**	**20081**	**2410**	**1550**	**3960**	**16697**	**7344**	**24041**

Table 36: Thematic area wise training courses organised for extension functionaries and their distribution

Thematic area	No. of courses	No. of participants		
		Male	Female	Total
Crop production	309	7579	1948	9527
Home science and women empowerment	108	1153	2025	3178
Capacity building and group dynamics	101	1831	852	2683
Horticulture production	84	1754	500	2254
Livestock production and management	81	1628	692	2320
Plant protection	40	795	393	1188
Farm mechanization	32	578	136	714
Processing and value addition	30	271	517	788
Production of inputs at site	30	494	172	666
Sericulture	30	427	3	430
Fisheries production	14	187	106	293
Total	**859**	**16697**	**7344**	**24041**

were home science and women empowerment (108 courses, 3178 participants) and capacity building and group dynamics (101 courses, 2683 participants). Participation of female extension functionaries was highest in the area of home science and women empowerment (2025 out of 7344) and least in the area of sericulture.

3.1.3.4 Sponsored training courses: A total of 1758 sponsored training courses were organized by the KVKs (Table 37).Tamil Nadu state had most number of sponsored training courses and participants (781 programmes, 36647 participants) followed by Karnataka (553 programmes, 19921 participants) and Kerala (393 programmes, 13335 participants). Out of 71350 participants, 13835 were from SC/ST community (19.40 per cent) and 27194 were female (38.10 per cent). Goa reported 53.41 per cent participation of female followed by 47.69 per cent in Puducherry and 41.29 per cent in Karnataka.

Table37: State wise sponsored training courses organized and distribution of participants

State/UT		Participants								
		General			SC/ST			Total		
	No. of courses	Male	Female	Total	Male	Female	Total	Male	Female	Total
Tamil Nadu	781	20210	10155	30365	3583	2699	6282	23793	12854	36647
Karnataka	553	9489	5910	15399	2207	2315	4522	11696	8225	19921
Kerala	393	6507	4503	11010	1396	929	2325	7903	5432	13335
Puducherry	16	345	308	653	51	53	104	396	361	757
Lakshadweep	11	-	-	-	327	275	602	327	275	602
Goa	4	41	47	88	-	-	-	41	47	88
Total	**1758**	**36592**	**20923**	**57515**	**7564**	**6271**	**13835**	**44156**	**27194**	**71350**

Most common sponsoring agencies: State Agriculture Department, Agricultural Engineering Department, Agricultural Technology Management Agency (ATMA), CADA, CAPART, CARE NGO, CIMAP, Coconut Development Board, Coffee Board, Department of Horticulture, District Industrial Centres (DIC), Forest Department, District Watershed Development Agency, Fertiliser Association of India, Govt Polytechnic College for women, ICDS NGO, ICRISAT, Indian Tobacco Company (ITC), Karnataka Milk Federation, Karnataka State Bio Fuel Development Board, MANAGE, Department of Agriculture and Cooperation, MSME-DI, National Bank for Agriculture and Rural Development (NABARD), Rallies India, SEVA NGO, Spice Board, State Planning Board, Vegetable and Fruit Promotion Council and Zilla Panchayat.

Table 38: Thematic area wise sponsored training courses organized and distribution of participants

Thematic area	No. of courses	No. of participants		
		Male	Female	Total
Crop production	609	18673	5002	23675
Livestock production and management	239	3936	6902	10838
Processing and value addition	175	4347	2711	7058
Capacity building and group dynamics	132	3226	2388	5614
Home science and women empowerment	130	1132	4277	5409
Production of inputs at site	110	2093	1781	3874
Farm mechanization	103	2454	662	3116
Soil health and fertility management	102	4595	1044	5639
Horticulture production	86	1833	1167	3000
Plant protection	33	1149	1082	2231
Sericulture	27	348	-	348
Fisheries production	12	370	178	548
Grand total	**1758**	**44156**	**27194**	**71350**

Under sponsored courses, 609 courses were conducted in the area of crop production followed by 239 courses in the area of livestock production and management with a participation of 23675 and 10838 participants, respectively (Table 38).

3.1.3.5 Vocational training courses: A total of 451 vocational training courses were organized with the participation of 12313 participants. In Tamil Nadu, 26 KVKs organized 187 courses for 4883 participants (187 participants per KVK). In Karnataka, 19 KVKs organized 126 courses with a participation of 4218 participants (222 participants per KVK). Details of number of courses and participants in each State/UT of the Zone are given in Table 39.

Participation of SC/ST community was 23.50 per cent (2898 out of 12313). Equally important is the fact that about 48 per cent of the participants were female (5915 out of 12313).

Vocational training courses were organized on 12 major areas as detailed in Table 40. Livestock production and management area attracted the most number of vocational courses with 98 out of 451 courses for 3236 participants. Processing and value addition was the second most preferred area for vocational training with 59 courses and 1440 participants.

Table 39: State wise vocational training courses organized and distribution of participants

State/UT	No. of courses	Participants								
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Tamil Nadu	187	2576	1564	4140	457	286	743	3033	1850	4883
Karnataka	126	1206	2027	3233	337	648	985	1543	2675	4218
Kerala	116	1089	912	2001	338	227	565	1427	1139	2566
Lakshadweep	18	-	-	-	395	195	590	395	195	590
Puducherry	3	-	30	30	-	15	15	-	45	45
Goa	1	-	11	11	-	-	-	-	11	11
Total	**451**	**4871**	**4544**	**9415**	**1527**	**1371**	**2898**	**6398**	**5915**	**12313**

Vocational training on mechanization for farm women

Coconut technicians during vocational training

Table 40: Thematic area wise vocational training courses organized and distribution of participants

Thematic area	No. of courses	No. of participants		
		Male	Female	Total
Livestock production and management	98	910	2326	3236
Processing and value addition	59	577	863	1440
Crop production	49	972	295	1267
Farm mechanization	47	823	194	1017
Horticulture production	45	720	626	1346
Production of inputs at site	40	901	352	1253
Home science and women empowerment	35	76	543	619
Mushroom production	35	535	407	942
Capacity building and group dynamics	25	468	128	596
Bee keeping	7	104	65	169
Sericulture	7	210	78	288
Fisheries production	4	102	38	140
Total	**451**	**6398**	**5915**	**12313**

3.1.4 Extension Activities

KVKs made efforts to create awareness about recent developments in agriculture and allied sectors among farmers, extension personnel and other stakeholders through individual, group and mass contact activities. A total of 133283 extension activities and services were organized by the KVKs wherein technologies related to agriculture and allied sectors were popularised among 49.05 lakh farmers and 1.43 lakh extension personnel. Among different states, KVKs in Karnataka organized 62528 extension activities followed by 36247 extension activities by the KVKs of Tamil Nadu. The state wise details of extension activities organized by the KVKs of the Zone are available in Table 41. This includes Kerala (32745 activities), Puducherry (1290 activities), Lakshadweep (258

Visitors in an Exhibition Stall and a collage of events at Millets Mela

Table 41: State wise extension activities organized and distribution of participants

State	No. of activities	No. of farmers			No. of extension personnel		
		Male	Female	Total	Male	Female	Total
Karnataka	62528	3606158	606036	4212194	64869	24097	88966
Tamil Nadu	36247	345057	153497	498554	30593	13665	44258
Kerala	32745	101013	70129	171142	3257	2011	5268
Puducherry	1290	5244	6746	11990	718	113	831
Lakshadweep	258	1149	710	1859	757	498	1255
Goa	215	6107	3352	9459	1273	1551	2824
Total	**133283**	**4064728**	**840470**	**4905198**	**101467**	**41935**	**143402**

activities) and Goa (215 activities). Activity wise details are furnished in Table 42. These extension activities enabled the KVKs to establish contact with large number of farmers and made them aware about suitability of new technologies demonstrated in the farmers fields.

KVKs have popularized many technologies through newspaper coverage (2262), production of extension literature (2241), popular articles (832), radio talks (609), exhibitions (415), T V talks (377) and kisan melas (104) for the benefit of large number of farmers as well as other stakeholders. State wise details are presented in Table 43.

Extension activities carried out by the KVKs during 2011-12 involved 49.05 lakh farmers and 1.43 lakh extension personnel. These activities covered various aspects of agriculture and allied sectors like varietal performance, production technologies, integrated pest and disease management, animal health and nutrition, production technologies of poultry, production technologies of fisheries, human nutrition etc.

Diagnostic visit to a Bengalgram field in North Karnataka

Farm Innovators meet at KVK

Table 42: Activity wise extension programmes organised and distribution of participants

Activity	No. of programmes	No. of farmers			No. of extension personnel		
		Male	Female	Total	Male	Female	Total
Farmers visit to KVK	61521	73148	27372	100520	5426	1966	7392
Advisory services	37451	54307	20627	74934	8176	3949	12125
Scientific visit to farmers field	8410	19961	8005	27966	1179	489	1668
Diagnostic visits	4402	16868	8120	24988	1087	676	1763
Lectures delivered as resource persons	2980	58372	31852	90224	5034	2031	7065
Celebration of important days	2210	14640	14738	29378	1335	409	1744
Method demonstrations	1876	22594	12679	35273	2316	1468	3784
Group meetings	1471	21323	11074	32397	1281	646	1927
Film shows	1224	1048033	59961	1107994	4106	849	4955
Field days	647	19577	6697	26274	1307	569	1876
Exposure visits	755	15427	5127	20554	879	290	1169
Exhibitions	415	631158	119781	750939	24955	10890	35845
Self help group conveners meetings	342	1394	6707	8101	92	528	620
Farmers seminars	249	16076	6843	22919	1113	451	1564
Animal health camps	219	7700	3133	10833	1487	277	1764
Workshops	148	5696	2411	8107	1061	510	1571
Soil health camps	126	3159	1335	4494	326	130	456
Farm science club conveners meet	109	2729	1220	3949	46	27	73
Kisan melas	104	2006378	481196	2487574	37848	14593	52441
Soil test campaigns	79	2360	998	3358	95	60	155
Kisan ghosthies	55	2886	1383	4269	346	101	447
Mahila mandals conveners meetings	52	566	986	1552	256	186	442
Ex-trainees sammelan	44	718	336	1054	44	29	73
Agri mobile clinic	20	475	232	707	25	22	47
Others (technology week, FFS, farm innovators meet and awareness programs)	8374	19183	7657	26840	1647	789	2436
Total	**133283**	**4064728**	**840470**	**4905198**	**101467**	**41935**	**143402**

A view of the veterinary health camp organized by KVK

Farmers exposure visit to SRI field in Tamil Nadu

Table 43: State wise extension programmes organized for mass contact

Activity	No. of programmes						Total
	Karnataka	Tamil Nadu	Kerala	Goa	Puducherry	Lakshadweep	
Newspaper coverage	770	933	487	2	70	-	2262
Extension literature	428	1700	50	5	58	-	2241
Popular articles	306	434	76	0	16	-	832
Radio talks	207	334	54	2	12	-	609
T.V talks	196	135	32	4	10	-	377
Exhibitions	102	239	61	4	8	1	415
Kisan melas	47	41	12	2	-	2	104

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 is very essential. In this direction, KVKs have taken up production of quality seeds, planting material, livestock and bio-products and suppled them to the needy farmers.

KVKs produced 17045.15 q seeds of crop varieties, 62.88 q seeds of crop hybrids and 1839.02 q bio-products worth Rs. 243.85 lakh and supplied to 0.95 lakh farmers.

Table 44: Production and supply of seeds, planting material, bio-products, live stock and fisheries

Category	Quantity	Value (Rs. in lakh)	Farmers (No. in lakh)
Seeds of crop varieties (q)	17045.15	175.70	0.64
Seeds of crop hybrids (q)	62.88	2.78	0.01
Bio- products (q)	1839.02	65.37	0.30
Planting materials of crops (No. in lakh)	43.95	178.48	0.47
Planting materials of crop hybrids (No. in lakh)	5.44	24.01	0.12
Livestock and fisheries (No. in lakh)	1.16	58.41	0.15

KVKs of Zone VIII have produced and supplied 17045 q of high yielding varieties of various crops, 43.96 lakh numbers of planting materials, 1839 q of bio-products and 1.16 lakh of livestock strains and fish fingerlings benefiting 0.93 lakh farmers.

KVKs also produced 43.95 lakh plants/seedlings of crops, 5.44 lakh plants/seedlings of crop hybrids and 1.16 lakh young ones of livestock and fish fingerlings worth Rs. 260.90 lakh and supplied to 0.74 lakh farmers (Table 44).

3.1.5.1 Seeds: KVKs in Tamil Nadu produced 12014.38 q of crops seeds followed by KVKs in Karnataka, Kerala, Puducherry, Goa and Lakshadweep (Table 45). Out of total crops seed produced, more quantity (8850.34 q) was produced on cereals followed by oilseeds, pulses, spices, fodder, vegetable, tuber, fruit, commercial, fibre and flower crops (Table 46).

KVKs in Tamil Nadu produced and provided seeds of high yielding varieties of paddy (ADT 43, ADT 49, CR 1009, Co 48, Anna 4, ADT 45, CO R 50, TRY 1 and TRY 3), groundnut (VRI 2, Co 6 and TMV 13), greengram (Co 4, Co 6 and Co 7), blackgram (VBN 3, VBN 4, Shekhar 1, ADT 3 and APK 1) and the extent of coverage was 2042 ha in paddy, 10 ha in groundnut, 81 ha in greengram, and 590 ha in blackgram in the farmers fields. Further, they have produced planting materials of high yielding varieties of amla (Bhanavisagar 1, Krishna, NA 7 and Kanchan), mango (Banganapalli, Neelam, Alphanso, Sendura and Imampasand), coconut (East Coast Tall, West Coast Tall and Malayan Yellow Dwarf), brinjal (Palur 2, Keerthi, Sachin and Mohini), guava (Lucknow 49) and fodder grass (Co 3, Co4 and Guinea Grass). The area coverage was 11 ha in amla, 1007 ha in mango, 153 ha in coconut, 5 ha in brinjal, 28 ha in guava and 65 ha fodder grass in the farmers fields.

KVKs in Karnataka produced and provided seeds of high yielding varieties of ragi (GPU 48, GPU 6, GPU 67, ML 365, MR 911, MR 26), paddy (MO4, Tanu, MTU 1001, BR 2655, IR 30864), groundnut (GPBD 4, GPBD 5, TMV 2, ICGV 91114, Chintamani 3), redgram (BRG 1 BSMR 736, TS 3R), bengalgram (JG 11, GBM 2, BGD 103, MNK 1) and wheat (DWR 195, DWR 1006, DWR 162, DWR 225) to the farmers.The area spread of these high yielding varieties was 46700 ha in ragi, 6733 ha in paddy, 57 ha in groundnut, 750 ha in redgram, 392 ha in bengalgram and 88 ha in wheat. Further, they have produced and supplied planting materials of high yielding varieties of amla (Kanchan), arecanut (Thirthahalli, Hirehalli Tall), mango (Alphanso, Mallikka), sapota (Cricket Ball, Kallipatti), silver oak (Local), fodder grass (Co3, Co4, guinea Grass), coconut (Arsikere Tall) and the spread of these varieties was 16 ha in amla, 38 ha in arecanut, 155 ha in mango, 34 ha in sapota, 51 ha in silver oak, 7 ha in fodder grass, and 14 ha in coconut in farmers fields.

3.1.5.2 Planting materials : KVKs in Tamil Nadu produced 3304680 plants/seedlings of crops followed by KVKs in Karnataka (683296), Kerala (244345), Puducherry (127734), Goa (20016) and Lakshadweep (15800) (Table 45). Out of a total of 4395871 plants/planting material, 31.90 lakh were slips of fodder crops. The remaining include fruit crops seedlings, vegetables seedlings, commercial crops, plantation crops, forest species, medicinal & aromatic plants, ornamental plants, spices, pulses, tuber crops and flower plants were produced and supplied to farmers (Table 47).

Table 45: State wise production of seeds and planting materials

State	Seeds			Planting materials		
	Quantity (q)	Value (Rs. in lakh)	Farmers (No.)	Quantity (No.)	Value (Rs. in lakh)	Farmers (No.)
Tamil Nadu	12014.38	45.61	10373	3304680	97.71	18598
Karnataka	4478.08	89.29	22282	683296	43.81	5601
Kerala	277.48	33.70	29952	244345	27.00	20468
Puducherry	163.59	3.67	768	127734	5.46	2498
Goa	111.13	3.29	537	20016	4.32	246
Lakshadweep	0.49	0.14	300	15800	0.18	134
Total	**17045.15**	**175.70**	**64212**	**4395871**	**178.48**	**47545**

Table 46: Crop category wise production of seeds

Crop category	Quantity (q)	Value (Rs. in lakh)	Farmers (No.)
Cereal	8850.34	67.41	16287
Oilseed	3205.34	8.15	1335
Pulse	2076.42	32.67	5679
Fodder	1419.94	26.64	5529
Spice	1148.01	2.63	1523
Vegetable	209.31	35.88	30970
Tuber	66.39	1.22	2540
Fruit	63.03	0.29	161
Commercial	4.37	0.40	90
Fiber	1.68	0.07	30
Flower	0.32	0.34	68
Total	**17045.15**	**175.70**	**64212**

KVKs in Kerala produced and supplied planting materials of high yielding varieties of mango (Alphanso and Mallika), coconut (West Coast Tall, Malayan Green Dwraf, Malayan Orange Dwarf and Chowghat Orange Dwarf), banana (G9, Nendran, Ed banana and Robusta) and black pepper (Thevam, Malabar Excel, Karimunda, Sreekara, Subakara, Panchami, Pannyiur 1, Panniyur 4, Panniyur 6, Panniyur 7 and Pournami) and the spread was 99 ha in mango, 33 ha in coconut, 16 ha in banana and 8 ha in black pepper in the farmers fields.

KVKs in Puducherry produced and supplied seeds of high yielding paddy varieties (TKM 9, ADT 38, ADT 45, ADT 43, ADT 48, ADT 39 and IW.Ponni) which has spread to an area of 409 ha. Tissue culture seedlings of banana (G9) have been provided to an area of 9 ha.

KVKs in Goa produced Karyat 3 variety of paddy which has spread to an area of 267 ha.

Table 47: Crop category wise production of planting materials

Crop category	Quantity (No.)	Value (Rs. in lakh)	Farmers (No.)
Fodder	3190141	12.21	3603
Fruit	314004	97.82	16057
Vegetable	223744	4.69	2410
Commercial	146094	22.43	4030
Plantation	143858	21.04	3660
Forest species	142776	8.15	6334
Medicinal and aromatic	119508	2.71	1855
Ornamental	49894	6.07	6040
Spice	24612	2.17	3208
Pulse	10000	0.13	15
Tuber	1959	0.63	34
Flower	332	0.06	142
Others	28949	0.37	157
Total	**4395871**	**178.48**	**47545**

3.1.5.3 Hybrid seeds and planting materials: Out of hybrid seeds produced, more quantity (62.20 q) was produced under cereals followed by commercial crops and vegetables (Table 48). In case of planting materials, more number (4.38 lakh) was produced under vegetable seedlings followed by fruit crops, commercial crops, plantation crops and spices (Table 49).

Table 48: Crop category wise production of hybrid seeds

Crop category	Quantity (q)	Value (Rs. in lakh)	Farmers (No.)
Cereal	62.20	2.54	302
Commercial	0.56	0.13	5
Vegetable	0.12	0.11	790
Total	**62.88**	**2.78**	**1097**

Table 49: Crop category wise production of planting materials of hybrids

Crop category	Quantity (No.)	Value (Rs. in lakh)	Farmers (No.)
Vegetable	438265	4.05	10021
Fruit	89170	18.26	2135
Commercial	12708	0.25	227
Plantation	2389	0.48	143
Spice	1588	0.97	322
Total	**544120**	**24.01**	**12848**

Seed production at KVK farm through trained SHG members

3.1.5.4 Bio-products: KVKs in Tamil Nadu have produced more quantity (808.23 q) of bio-products followed by KVKs in Kerala, Karnataka, Puducherry, Goa and Lakshadweep (Table.50). Out of total production of bio-products, more quantity (1039.19 q) was vermicompost followed by bio-agents, bio fungicides, micro nutrient mixture, bio-pesticide, bio-fertilizers, mushroom spawn and growth promoters (Table 51). Further, 567180 number of parasitoids, 1366 pheromone traps and 794 Tricho cards were produced (Table 52).

Table 50: State wise production of bio-products

State	Quantity (q)	Value (Rs. in lakh)	Farmers (No.)
Tamil Nadu	808.23	8.30	5918
Kerala	536.00	32.08	17834
Karnataka	289.81	12.57	2009
Puducherry	176.34	12.11	4245
Goa	28.49	0.29	307
Lakshadweep	0.15	0.02	35
Total	**1839.02**	**65.37**	**30348**

Table 51: Category wise production of bio-products

Category	Quantity (q)	Value (Rs. in lakh)	Farmers (No.)
Vermicompost	1039.19	5.87	1897
Bio-agent	293.01	17.38	7582
Bio-fungicide	226.24	16.86	9383
Micro nutrient mixture	107.98	9.76	2850
Bio-pesticide	98.61	12.53	4014
Bio-fertiliser	51.63	1.30	2790
Mushroom spawn	22.06	1.61	1399
Growth promoter	0.30	0.06	433
Total	**1839.02**	**65.37**	**30348**

Table 52: Production of pheromone traps, parasitoids and trico cards

Category	Quantity (No.)	Value (Rs. in lakh)	Farmers (No.)
Parasitoid	567180	-	3538
Pheromone trap	1366	1.91	1089
Tricho card	794	0.20	50

Papaya mealybug

KVK Salem produced and released 2.5 lakh number of papaya mealy bug parasitoid *Acerophagus papaya* in 1700 farmer's fields covering an area of 1070 ha. The same had effectively controlled papaya mealy bug *Paracoccus marginatus* in tapioca, papaya, guava, tomato, teak and mulberry, infested in Salem, Namakkal, Trichy, Dharmapuri, Karur and Erode districts of Tamil Nadu.

3.1.5.5 Livestock and fisheries: KVKs in Tamil Nadu have produced and supplied more quantity (0.44 lakh) of livestock and fisheries strains followed by Puducherry, Kerala, Karnataka, Lakshadweep and Goa (Table 53). Out of the total production under livestock and fisheries, more quantity (0.62 lakh) was produced under poultry followed by fisheries, dairy animals, goat, sheep, piggery and rabbitry (Table 54).

Table 53: State wise production of livestock materials and fisheries

State	Quantity (No.)	Value (Rs. in lakh)	Farmers (No.)
Tamil Nadu	44448	25.95	4535
Puducherry	28614	1.78	733
Kerala	25329	18.15	3798
Karnataka	18021	10.74	6101
Lakshadweep	250	0.01	2
Goa	207	1.78	29
Total	**116869**	**58.41**	**15198**

Training on vermicompost production using silpauline tanks

3.1.6 Soil, Water and Plant Analysis

A total of 67 KVKs have established soil, water and plant testing laboratory and carrying out the analysis 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 38179 samples of soil, water, plant, manure, lime etc received from 31022 farmers belonging to 14392 villages have been analyzed and realized an amount of Rs. 21.76 lakh. Out of these, 26417 were soil samples followed by water (11323), plant (128) and manure samples (34).

Table 54: Category wise production of livestock materials and fisheries

Category	Quantity (No.)	Value (Rs. in lakh)	Farmers (No.)
Poultry	62950	33.87	10821
Fisheries	51796	1.98	3831
Dairy animal	1404	6.02	158
Goat and sheep	344	12.37	218
Piggery	227	3.82	104
Rabbitary	148	0.35	66
Total	**116869**	**58.41**	**15198**

State wise data showed that KVKs in Karnataka analyzed more samples (24058) followed by Tamil Nadu (10744), Kerala (2868), Puducherry (409) and Goa (100) (Table 55).

Demonstration on soil sampling

3.1.7 Rain Water Harvesting Units

Rain water harvesting unit with micro irrigation system was established in 16 KVKs. A total of 122 training courses and 166 demonstrations were conducted utilizing this facility and produced 1.07 lakh planting materials. Further, 26957 farmers and 615 officials visited these units and got acquainted with the system.

3.1.8 Convergence and linkages

KVKs have convergence and linkages with all the organizations working for the welfare of farmers in rural areas. All KVKs have strong linkages with Agricultural Universities, Development Departments, Lead Bank and NABARD while carrying out their mandated activities and in the process reaching out to all the stakeholders. Linkages with print media has been equally strong in all KVKs which helps the KVKs to create wide awareness about activities and to communicate timely advisories. Agricultural and Veterinary Universities have been providing regular technological backstopping through their human resource development programmes. Scheme-specific supports are being extended to KVKs by all the Development Departments viz., State Departments of Agriculture, Horticulture, Animal Husbandry, Fisheries, Agricultural Engineering, Forestry, Sericulture, Women and Child Welfare, Social Forestry etc. These departments share their human and material resources with KVKs during demonstrations, extension activities, training, surveillance and monitoring of pest and disease etc. Expansion of ATMA to all the districts has further strengthened the linkages of developmental departments and other staekholders with KVKs.

Apart from the above, 47 KVKs had linkages with NGOs for implementation of various programmes and 31 KVKs had linkages with various ICAR Institutes which are the sources of technologies and resource persons for all activities of KVKs including entrepreneurship development. Further KVKs have functional linkages with All India Radio (22 KVKs), Educational Institutions (20 KVKs), Commodity Boards (18 KVKs), Panchayat Offices (17 KVKs), Other Research Organizations (15 KVKs), Private Organizations (14 KVKs), Co-operative Society, Doordarshan and Public Sector Undertakings (10 KVKs each) for mass communication, study tours, creating convergence with various stakeholders, implementation of projects, demonstrations, technology assessment and demonstration, crop loans, group farming, mass communication and technology transfer for entrepreneurship development.

Table 55: State wise soil, plant, water analysis undertaken

State	No. of samples	No. of farmers	No. of villages	Amount generated (Rs. in lakh)
Karnataka	24058	20576	10501	16.09
Tamil Nadu	10744	7784	3459	3.65
Kerala	2868	2411	305	1.45
Puducherry	409	151	122	0.57
Goa	100	100	5	-
Total	**38179**	**31022**	**14392**	**21.76**

3.1.9 Prosperity of Farmers through KVKs

3.1.9.1 Relief to farmers from foot rot in pepper

Foot rot disease, caused by *Phytophthora capsici*, affects all parts of the plant and all the cultivars are highly susceptible causing severe economic loss. Considering the severity of foot rot disease in black pepper, various chemical, cultural and biological control methods were needed to be employed. Under these circumstances, KVK Kannur has successfully implemented the foot rot management programme. The interventions included technology assessment, refinement, demonstration, training, and production and supply of critical inputs like *Trichoderma viride* etc. The major partners in this programme were progressive pepper growers of Panniyur, Kuttiyeri and Kooveri villages.

During second week of May 2005 a campaign on phyto-sanitation was conducted at the farmers' fields. The selected farmers divided their plots into four blocks consisting 25 vines each for carrying out different treatments. With the onset of monsoon, the participants under the supervision of KVK scientists implemented the technological interventions such as phytosanitation followed by application of bio control consortium of 0.3% Potassium phosphonate @ 5 l/vine (two times) + *Pseudomonas* 50 g incubated in 0.5 kg neem cake + 1 kg FYM twice a year and *Trichoderma* 50 g incubated in 0.5 kg neem cake and 1 kg FYM in selected farmers field. One block of pepper is kept as control. Second round of spraying of *Trichoderma viride* as per the package of practices was done.

After the treatments, all the disease symptoms disappeared from the treated plants and did not appear during next season also. The control plants also did not show any disease symptoms possibly due to the reduction in inoculum load in the treated area. The results revealed that all the treatments have positive effect in managing the disease. All the diseases symptoms also were disappeared. *Pollu* berries (unfilled) were also less. They opined that the vines in which the *Trichoderma viride* application was done showed higher growth and vigour.

The results indicated that the low cost, labour efficient and eco-friendly management involving *Trichoderma* can be effectively utilized for foot rot disease management of pepper and the same was communicated to the extension functionaries of the Department of Agriculture using various channels such as the research extension interface, zonal workshop and training programmes etc.

The KVK produced and supplied 28987 kg of *Trichoderma viride* over a period of six years. The success of this intervention has been extended to 1418 ha thereby giving relief to 3544 farmers from an economic loss of Rs. 1.42 crore (Table 57) in Kannur district.

Applicatiion of bio-control consortium

Table 57: Adoption spread of foot rot control measures and economic impact

Year	Area (ha)	No. of Farmers	No. of vines (in lakh)	Economic loss prevented (Rs. in lakh)
2006-07	383	1300	3.83	38.30
2007-08	400	800	4.00	40.00
2008-09	375	735	3.75	37.50
2009-10	6	20	0.06	0.60
2010-11	153	409	1.53	15.30
2011-12	101	280	1.01	10.10
Total	**1418**	**3544**	**14.18**	**141.80**

3.1.9.2 Sustainable and profitable onion variety for Gadag district farmers

In Gadag district, onion is mainly cultivated in *kharif* season under rainfed situation. Area under onion cultivation is 17164 ha with the production of 192566 t and the district productivity is 4.76 t per ha. The crop is cultivated in deep black to medium soils and red loamy soils.

There has been a gradual decrease in the productivity and quality of onion bulb production due to the incidence of basal or bulb rot (*Fusarium oxysporum*) and purple blotch diseases *(Alternari porri)*. The local variety (Bellary red) was more susceptible to bulb rot/ basal rot especially during September-October thereby making heavy losses to farmers. The basal rot was more severe in the areas where crop rotation was not followed whereas, purple blotch disease aggravates by high incidence of thrips, which act as vector for the disease. Application of imbalanced nutrition is another factor affecting the productivity of onion. Farmers use less of potash fertilisers resulting in poor quality of bulbs. Lack of knowledge delivery systems on improved cultivation practice, non-availability of improved quality seeds also contribute for the low productivity of onion.

Keeping the farmers need in view, KVK Gadag has asssessed the performance of Arka Kalyan variety released by IIHR along with local variety (Bellary red) during 2002-03 in Hulkoti and Kurthakoti villages in Gadag block. The results revealed that incidence of purple blotch was comparatively less and incidence of bulb rot was almost nil in Arka Kalyan variety compared to Bellary red variety. Arka Kalyan gave more yield compared to Bellary red. Besides its better performance against bulb rot and purple blotch disease, farmers opined that the bulbs of Arka Kalyan are very attractive and had better marketing preference over Bellary red variety. The variety was then taken to farmers' fields through frontline demonstrations in 75 ha area belonging to different cluster villages of Gadag district with an objective to show maximum production potentiality of the improved variety to the farmers and extension functionaries.

The data on the economics of demonstrations reveals that the BCR of Arka Kalyan over a period of four years of demonstrations was 10.34 compared to 8.11 of local check Bellary red (Table 58).

Table 58: Performance of Arka Kalyan variety in Demonstration plots during 2005 to 2009

Particulars	Arka Kalyan	Local (Bellary red)
Number of farmers	180	
Area (ha)	75	
Average Yield (q/ha)	146.70	107.52
% increase in yield	41.22	-
Cost of production (Rs/ha)	8975	7353
Gross returns (Rs/ha)	103582	72100
Net return (Rs/ha)	94610	64750

After the successful performance of Arka Kalyan variety through technology assessment and frontline demonstrations, there was lot of demand for the seeds from participating cluster villages. The demand was not only from farmers of Gadag district but also from farmers of neighbouring districts and also from other KVKs. Looking in to the demand, KVK initiated seed production activities both in it's farm as well as in identified progressive farmers' fields. Initially the seed production of Arka Kalyan variety was undertaken by 8 farmers who were trained on various aspects related to bulb to seed method of production. These farmers produced 46 quintals of seeds and supplied it to fellow farmers of their village, neighboring villages and Gadag district. The details of quantity of seed produced and supplied by KVK and seed producers are given in Table 59.

Scientists visiting the onion seed production field

Onion seed production of onion variety Arka kalyan

Table 59: Details of onion seed supplied to farmers and KVKs

Year	Supply of onion seed		
	Quantity (Kg)	No. of farmers	No. of KVKs
2003-04	38	28	-
2004-05	255	27	-
2005-06	626	95	5
2006-07	486	42	5
2007-08	499	59	7
2008-09	431	50	6
2009-10	396	41	2
Total	**2731**	**342**	**25**

Table 60: Spread of Arka Kalyan due to efforts of KVK Gadag

Year	Seed supplied by KVK		Seed supplied by seed producers	
	Area (ha)	No. of villages	Area (ha)	No. of villages
2003-04	12	7	-	-
2004-05	102	8	-	-
2005-06	268	63	336	38
2006-07	142	33	408	61
2007-08	156	33	420	57
2008-09	220	46	288	31
2009-10	129	28	388	29

This intervention of seed production paved the way for spread of Arka Kalyan variety in Gadag and neighbouring districts viz., Bijapur, Chitradurga, Chamarajanagar, Raichur, Davanagere, Dharwad, Koppal, Haveri, Chickmagalur, Bidar and Dharwad in Karnataka and Erode and Trichy in Tamil Nadu. The perusal of Table 60 reveals that there has been a consistent spread of variety during 2004-05 to 2009-10. Further, seed supplied by the KVK to the Agricultural Universities were multiplied and the same was supplied to 1280 villages which has covered an area of 3200 ha during 2009-10.

Intervention of KVK Gadag through technology assessment, frontline demonstrations and seed production activities has immensely helped the farmers to enhance the production of onion upto 41 per cent.Through the efforts of both KVK and Universities, Arka Kalyan variety has reached to more than 3700 ha in the districts of Northern part of Karnataka state.

3.1.9.3 Micronutrient mixture boosted banana productivity and income of farmers

Banana is one of the important fruit crops of Davanagere district. The district has 2,167.2 ha. area under banana with total production of 60,075 t and average productivity of the district is 27.72 t per ha. The cost of fertilizers used in banana production forms the major share in the cost of production. Indiscriminate use of fertilizers is common among the banana growers. Majority farmers had not realised the importance of proper application of fertilizers, particularly the micronutrients (dosage and frequency). The survey conducted by the KVK confirmed that farmers are spending 60-70 per cent of cost of production only on fertilizers. The role of micronutrients was also not known to farmers. The soil test results showed the deficiency for micronutrients. KVK Scientists discussed with Scientists of Indian Institute of Horticultural Research (IIHR), Bangalore about the problem. They gave recommendation of balanced use of fertilizers along with spraying of Banana special- a micro-nutrient mixture developed by IIHR.

With this background, KVK Davanagere conducted demonstrations on banana nutrient management with micronutrient spray during 2008-09. Results obtained in demonstration plots over two years confirmed the applicability and profitability of the technology, both in local (Yelakki) and Grand Naine (Table 61).

Farmer spraying banana special

Table 61: Effects of banana special spray

Particulars	Banana varieties	
	Grand Naine	Yelakki
Demo yield (q/ha)	533.90	225.90
Check yield (q/ha)	400.10	162.20
Cost of production (Rs. / ha)	140510	126549
Gross income(Rs./ha)	373730	338850
Net income (Rs./ha)	233220	212301
BCR	2.65	2.67

Harvested banana bunches in the demonstration plot

The successful demonstrations in farmers' fields led to increased demand for the supply of micro nutrient mixture. Looking into the demand, KVK purchased the technology from IIHR, Bangalore and started the production of banana special. During February 2011 to June 2012, KVK has sold 28.00 q of banana special to 275 farmers spread over 255 villages. This production process was supported through revolving fund of KVK and income generated was Rs. 3.92 lakh. The banana special technology has spread to an area of 112 ha of banana cultivation in the district with 15-20 per cent increase in the productivity and provided Rs. 50000 per ha as an additional income over the conventional practice.

3.1.9.4 Transplanting technology revolutionized redgram cultivation in Northern Karnataka

Redgram (Pigeonpea) *(Cajanus cajan* S.) is one of the major pulse crop of Northern Karnataka. Nearly 5.14 lakh ha is under this crop in the state with a production up to 2.42 lakh t and productivity of 766 kg/ha. Bidar district is considered as pulse bowl of Karnataka wherein pulses like blackgram, greengram, redgram and bengalgram are cultivated in an area of 206717 ha. Among these pulses, redgram is cultivated in 65642 ha. Comparison of average yield level of the district with that of the potential yield revealed that there was huge yield gap of 1871 kg/ha. In an effort to bridge the yield gap, KVK Bidar organized farmers scientists interface meet wherein progressive farmers and KVK scientists discussed various aspects to boost the yield levels. One of the option was to assess the transplanting/dibbling technology to avoid delay in sowing.

The KVK organized on farm trial on assessment of transplanting technology of redgram during 2004 to 2007 and results confirmed the superiority of transplanting and

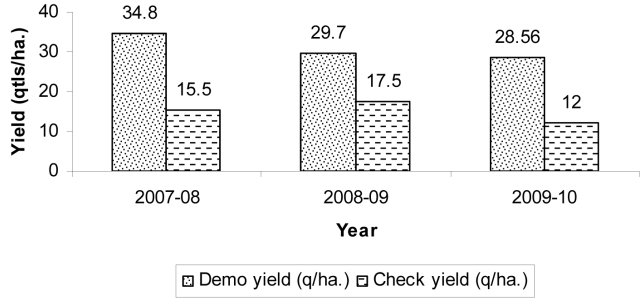

Fig.6. Productivity of transplanted redgram vs farmers method

dibbling methods over the farmer's method of line sowing. The transplanted plots yielded on an average of upto 34.80 q per ha (Fig.6).Whereas, the farmers method of sowing could only yield upto 17.50 q per ha (Table 62). The increased yield was mainly due to advanced date of sowing and maintenance of optimum plant geometry.

Table 62: Economic impact of transplanted redgram in Bidar district

A. 2007-08 Area adopted : 400 ha. Market rate @ Rs. 2500/q

Sl.No.	Particulars	Average yield (q/ha)	Total production q/400 ha.	Value of the produce Rs. in crore
1.	Transplanted redgram	34.8	13920	3.48
2.	Farmers practice	15.5	6200	1.55
	Increase in revenue			**1.93**

B. 2008-09 Area adopted : 2000 ha. Market rate @ Rs. 4200/q

Sl.No.	Particulars	Average yield (q/ha)	Total production q/2000 ha.	Value of the produce Rs. in crore
1.	Transplanted redgram	29.7	59400	24.94
2.	Farmers practice	17.5	35000	14.70
	Increase in revenue			**10.24**

C. 2009-10 Area adopted : 4000 ha. Market rate @ Rs. 4800/q

Sl.No.	Particulars	Average yield (q/ha)	Total production q/4000 ha.	Value of the produce Rs. in crore
1.	Transplanted redgram	28.56	114240	54.83
2.	Farmers practice	12.0	48000	23.04
	Increase in revenue			**31.79**

Redgram seedlings, ready to transplant

Top dressing of fertiliser in transplanted redgram

Discussion with farmer in transplanted redgram field

In order to popularize the technology further, KVK organized frontline demonstrations during subsequent years.Three years of FLDs gave 69.71 per cent to 138 per cent increase in yield over farmers practice. The average yield levels in demonstrations and farmers practice is depicted in the the following graph. Redgram farmers expressed that they had not harvested this much of yield in their life time. There was saving in seed, pod borer damage was less due to early planting, drought resistance was noticed due to deep rooting, wider spacing facilitated plant protection measures and profuse branching resulted in 2-3 fold increase in yield level.

The transplanting technology has spread to other districts viz., Gulbarga, Koppal, Yadgir, Raichur, Bijapur, Haveri, Bagalkot, and Bidar in Karnataka and other states viz., Maharasthra and Andhra Pradesh. Further, transplanted redgram has emerged as alternate profitable crop for sugarcane growers as they were badly hit by low price coupled with scarcity of water and electricity during 2005-07. The factors attributed for taking up redgram in place of sugarcane are presented in Table 63.

Recently, redgram growing farmers in the district have started forming associations and planning to export processed dhal to neighbouring states as well as abroad. Thanks to this technology, living standard of redgram farmers is changing slowly in the pulse bowl of Karnataka.

3.1.9.5 System of Rice Intensification - a boon to paddy farmers in Thiruvannamalai

Thiruvannamalai district located in north eastern part of Tamil Nadu is an agriculturally productive district. Paddy is cultivated in an area of 108140 ha with an average yield of 5107 kg/ha. Despite fluctuation in paddy yield as well as with other socio-economic constraints, the farmers were undertaking paddy cultivation, as there is no suitable alternate crop. Under these circumstances, the System of Rice Intensification (SRI) has come as a boon to increase the productivity of paddy.

KVK Thiruvannamalai assessed the SRI for its suitability to local situations and subsequently carried out 130 FLDs in 84 ha covering four blocks and 10 villages of the district. In addition, the KVK conducted 102 training courses for 2035 farmers and farmwomen on the major aspects of SRI. KVK also conducted various extension

Table 63: Comparison between sugarcane and transplanted redgram cultivation in Bidar district

Particulars	Sugarcane	Redgram
Duration (months)	12	6
Nutritional requirement	Exhaustive	Improves fertility
Water requirement	High (25 irrigations)	Less (3 irrigations)
Average yield (q/ha)	6250	27.5
Cost of cultivation (Rs./ha)	65000	17500
Gross returns (Rs./ha)	125000	132000
Net return (Rs./ha)	60000	114500
Marketability	Perishable and can't be stored	Non perishable and can be stored

Raising of mat nursery for SRI

Scientists supervising inter cultural operations in SRI

activities including 1112 field visits, provided 1850 telephonic advisory services, organized 10 field days and conducted 10 exposure visits to various research stations and demonstration plots.

In all these activities, KVK has maintained an effective linkage with Tamil Nadu Agricultural University for technological backstopping with developmental departments for scaling up of the technology through various schemes on SRI for promotion of farm machineries and equipments such as cono weeder, power weeder, marker and combined harvester; for skill trainings and workshops; and with NABARD for formation of farmers clubs, exposure visits, meetings and campaigns.

Farmers visit to SRI demonstration field

As a result of these efforts, SRI has spread to 27870 ha in 17 villages covering 40103 farmers. The average yield of paddy has increased from 56.10 q/ha under conventional system to 77.00 q/ha under SRI. Feedback from the farmers indicated that the SRI is technically feasibile, economically viabile, has better water use efficiency, and requires less seed and labour. However, they also expressed that operation of conoweeder is difficult under certain soil conditions and the same need to be refined.

3.1.9.6 Sustainable livelihood of tribal community- an institutional approach of KVK Erode

The *Soligar* tribal community of Bejjalatti village, Erode district, Tamil Nadu have been benefitted by the activities of Small Orchard Development Programme, an institutional approach of KVK Erode. The group approach in managing the beans cultivation as intercrop in fruit orchards alongwith community water management was the highlight of the programme.

KVK has its intervention in this village, which has 76 families, since 2004. Natural Resource Management was the key intervention in this tribal settlement. As a result of community irrigation programme, over 300 acres of land has been brought under assured irrigation. Here, the water is lifted from the perennial stream and taken it to the higher elevation and then irrigated to the farm using gravitational force.

As a result of integrated watershed approach, over 250 acres were brought under intensive crop cultivation with the introduction of high yielding varieties of finger millet viz., GPU-28 and HR-911. In order to ensure soil nutrient management, one lakh plants of bio mass crop like *Cassia siamea* has been planted on bunds, and now approximately 1-2 t of green leaf matter is made available for *insitu* mulching and composting. Apart from this, tree species like silver oak has been established along the bunds in every farm. The technological interventions like fodder promotion and timely artificial insemination services helped in increasing the milk yield from 2 to 6 litres per day and the income from Rs.50 to Rs.250 per day for each tribal family.

This tribal orchard with intercropping of bush beans of Arka Komal variety from Indian Institute of Horticultural Research, Bangalore has brought an additional income of Rs.25000 to Rs.30000 per farm family.

A part from this, technological interventions on vermicompost unit, goat up-gradation programme, slatted floor goat rearing, mineral lick and nutrition garden were also taken up by the KVK to maintain the livelihood of this tribe.

Dr.K.D.Kokate, DDG (Agricultural Extension), ICAR interacting with tribal farmers

Similar technological interventions have been made in 13 tribal villages in order to ensure their sustainable livelihood.

3.1.9.7 Fodder grass helped farmers to earn profitable income

In Kerala, cattle rearing is fast declining due to high cost of production and also heavy dependence on other states for concentrate feed. Further, farmers used to get a price of only Rs.2.40 per litre of milk while the market price was Rs. 6 per litre.

Under this situation, KVK Pathanamthitta introduced Co-4 variety of fodder from TNAU, Coimbatore to meet the needs of fodder requirement. The fodder slips were provided to farmers for further multiplication and selling to fellow farmers. Today, farmers are selling this fodder to several private farms in Kollam, Allapuzha, Kottayam and Idukki Districts. On an average, 800-1200 kg of green fodder is being sold by the farmers of the Koipuram milk society.

KVK has been in the forefront of fodder promotion in the Pathanamthitta district and has been conducting many trials to identify suitable forage varieties for the district. Dairy farmers are given training on scientific fodder management practices as and when the need arises.

Feeding one bundle (15 kg) of Co4 grass has been found to increase the milk yield by almost 200 ml per cow. Co4 variety has almost replaced the previous Co3 variety. Several lakh cuttings of this grass have been sold to different agriculture project areas in Kerala.

Farmers are selling this fodder @ Rs1.30 per kg and are able to harvest upto eight cuttings per year (cuttings may vary with the availability of water). Many are able to get an average yield of 270 t per ha and earn Rs. 15000 as net profit annually.The society also generates 300 days of employment through this activity per year.

3.1.10 Awards and Recognition

3.1.10.1 Best Zonal Krishi Vigyan Kendra Award – 2010

KVK Mysore received the Best Zonal KVK Award from the ICAR for the year 2010 for having successfully implemented the mandated activities. As a result of KVK intervention, technology adoption rate in the major crops of Mysore district has increased up to 65 per cent. The seed production programmes initiated by the KVK has led to 82 per cent of paddy farmers in the district using quality seeds. About 5 per cent of paddy farmers are producing paddy seeds themselves and 41 per cent farmers are following balanced nutrition and plant protection measures.

Dr. Arun Balamatti, Programme Coordinator, KVK Mysore receiving the award from Shri.Sharad Pawar, Union Minister for Agriculture

Similarly pulse production has received a boost from introduction of improved varieties of Bengalgram (IG-11) and redgram (BRG-1 and BRG-2). Demonstrations on cotton have led to coverage of Bt.cotton in about 98% of cotton growing area (52,000 ha) in the district.

Technologies like use of banana special, water melon cultivation using plastic mulch, IPM and fertigation in tomato, chilli and other horticultural crops have been popularized by the KVK in the district. Expansion of area under papaya, training and facilitating rural youth for setting up of nurseries to produce quality planting material are the significant contributions of KVK Mysore.

3.1.10.2 Jagjivan Ram Abhinav Kissan Puruskar Innovative Farmer Award 2010

Mr.P.N.Suruli Vel resident of Gopi Nagappa Arulagam, Kaliamman Koli Street, Varushanadu 625 579, Theni District, Tamil Nadu has been awarded with Jagjivan Ram Abhinav Kissan Puruskar Innovative Farmer Award 2010 from the ICAR. The farmer has been awarded for his innovative works related to cardamom cultivation which are as fiollows:

- Development of 5 acres of rocky land into cardamom cultivation
- Development of cardamom varieties PNS-Vaigai 1(Vazhukka) and PNS-Vaigai 2
- Production of organic cardamom
- Introduction of sprinklar irrigation for cardamom
- Adoption of balanced nutrition through application of micro nutrients

Mr.Suruli Vel successfully managed his 40 acres of cardamom, 35 acres of silk cotton, 12.5 acres of mango and 110 acres of coconut in Kerala.

Farmer Shri. P.N.Suruli Vel with his cardamom variety

3.1.10.3 Best poster award

The poster presentation on Empowermen of rural women through rice mechanisation in Malappuram district of Kerala by Er.Sajeena S, Subject Matter Specialist (Agricultural Engineering), KVK, Malappuram bagged Second Best Poster Award at Global Conference on Women in Agriculture held at New Delhi during 13 - 15 March, 2012. She became the lone Indian Scientist to get such an Award in the Conference and she received the award from the President of India, Smt.Pratibha Devisingh Patil at the valedictory function of the conference held on March 15, 2012. The Union Minister for Agriculture and Food Processing Industries, Shri Sharad Pawar and the Minister of State for Agriculture and Food Processing Industries, Shri Charan Das Mahant were also present in the function. The success of the technology is reported in daily newspaper-The Hindu on June 27, 2012.

3.2 Agricultural Technology Information Centres

During tenth plan, ICAR had established Agricultural Technology Information Centres (ATICs) with the mandate of providing technology, inputs and information services to the farming community through single window delelivery system. There are 10 ATICs functioning in Zone VIII (Table 64).

3.2.1 Technology services

ATICs have reported a total of 278510 visitors (farmers, trainees, students and other stakeholders) of which majority (133970) sought technical advises followed by technological products (111121) and other purposes like general enquiry (33413). Further, ATICs have trained 7780 farmers/technocrats/students on various aspects of agriculture and allied sectors and provided analytical services to 19,435 farmers. A total of Rs.195.14 lakh was generated by ATICs by providing technology services.

3.2.2 Technology inputs

ATICs have provided technological inputs which includes seeds (80778.14 q), planting materials (319541

Table 64 : ATICs established in Zone VIII

State	SAUs	ICAR Institutes	Total
Kerala	1	4	5
Karnataka	2	1	3
Tamil Nadu	2	-	2
Total	**5**	**5**	**10**

numbers), bio-products (1457032.24 q), farm implements (2859 numbers), livestock (335559 numbers) and value added products (98063 packets) to 22.96 lakh farmers and generated Rs. 69.95 lakh as revenue.

3.2.3 Technology information

A total of 49516 books and 16447 technical bulletins were made available for farmers at ATICs followed by 361 CDs, 72 technology inventories, 57 Video films, 17 DVDs and 7 audio CDs benefitting 42767 farmers and generated a revenue of Rs.51.28 lakh. Besides, ATICs have also actively participated in TV and Radio talks on various aspects of agriculture and allied sectors.

3.3 Technological backstopping by Directorates of Extension

Directorates of Extension provide technological backstopping to the KVKs in the form of HRD programmes, seminars, workshops etc and through supply of various technology products. There are six Directorates in Zone VIII under University of Agricultural Sciences, Bangalore, University of Agricultural Sciences, Dharwad, Karnataka Veterinary Animal and Fisheries Sciences University, Kerala Agricultural University, Tamil Nadu Agricultural University and Tamil Nadu Veterinary and Animal Sciences University. Technological backstopping and the major ways and means of support extended to KVKs by Directorates of Extension are as follows:

- Providing inputs especially that of HYV and hybrids to all KVKs for undertaking various technological interventions
- Reviewing the mandated activities of KVKs through meetings, field visits, monitoring and evaluation processes
- Undertaking common interventions/projects in all the KVKs under their state/various agro-climatic zones
- Encouraging participation of KVK staff in various seminars, workshops, kisan melas and other extension programmes conducted by the NARS.

During the year, a total of 42 training programmes were organised by the Directorates of Extension on various aspects of agriculture and allied sectors and trained 1279 KVK staff. In addition, the Directorates of Extension organized 49 workshops, meetings and seminars wherein 511 KVK staff participated.

3.4 Special Programmes

3.4.1 Pulse crop demonstrations

Technology demonstrations were carried out for harnessing pulse production in both *kharif* and *rabi* seasons. A total of 860 demonstrations on pulse crops namely blackgram, greengram, redgram and cowpea covering an area of 354.20 ha were implemented in the pulse growing NFSM implementing districts of Karnataka and Tamil Nadu.

3.4.1.1 *Kharif* season: A total of 381 demonstrations were conducted on pulse crops namely blackgram (20), greengram (148) and redgram (213) in 153 ha in pulse growing districts of Karnataka (Table 65).Crop wise details are as follows:

Blackgram: Twenty demonstrations on integrated crop management practices in DU-1 variety of blackgram covering an area of 8 ha under rainfed condition were undertaken in Bidar district of Karnataka. Average yield increase was 60.74 per cent with an average yield of 10.85 q per ha as against 6.75 q per ha under farmers practice. The BCR recorded under demonstrations was 2.86 as against 2.28 under farmers practice.

Greengram: A total of 148 demonstrations on integrated crop management practices in Selection-4, China moong, BGS-9 and Shinymoong varieties of greengram covering an area of 60 ha under rainfed situation were undertaken in 10 districts of Karnataka. Average yield increase ranged from 12.94 to 38.71 per cent with an average yield of 7.49 q per ha as against 5.93 q per ha under farmers practice. The BCR recorded under demonstrations was 2.78 as against 2.40 under farmers practice.

Redgram: A total of 213 demonstrations (32 under irrigated condition and 181 under rainfed condition) on integrated crop management practices in TS-3R, ICPL-87119, BRG-1, BRG-2 and BSMR-736 varieties covering an area of 85 ha were conducted in 8 districts of Karnataka. Average yield increase ranged from 18.28 to 51.42 per cent under irrigated and 15 to 118 per cent under rainfed situations. Average yield realized was 21.51 q per ha in demonstration plots as against 15.52 q per ha in farmers practice under irrigated condition as compared to 10.06 q per ha as against 7.72 q per ha in farmers practice under rainfed condition. The BCR recorded under rainfed demonstrations was 2.91 as against 2.48 under farmers practice.

Table 65: Effect of ICM demonstraions in pulse crops in Karnataka during *kharif* season (2011)

KVK	Variety	No. of demo.	Area (ha)	Yield (q/ha)		Yield increase (%)	BCR	
				Demo.	Check		Demo.	Check
Blackgram (Rainfed)								
Bidar	DU-1	20	8.00	10.85	6.75	60.74	2.86	2.28
Greengram (Rainfed)								
Belgaum	China Moong	20	8.00	6.60	4.80	37.50	2.60	2.47
Bellary	China Moong	12	5.00	8.60	6.20	38.71	2.75	2.25
Bidar	BGS-9	13	5.00	13.12	9.50	38.11	2.87	2.73
Gadag	Selection-4	37	15.00	4.90	4.12	18.93	1.65	1.56
Gulbarga	Selection-4	12	5.00	9.95	8.81	12.94	3.07	2.84
Tumkur	Selection-4	12	5.00	9.50	8.10	17.28	3.80	3.24
Chitradurga	Local	30	12.00	5.10	4.02	26.87	2.46	1.71
Dharwad	Shinymoong	12	5.00	11.20	8.90	25.84	5.86	4.99
Weighted Avg.		**148**	**60.00**	**7.49**	**5.93**	**26.18**	**2.78**	**2.40**
Redgram (Irrigated)								
Bellary	Asha (ICPL-87119)	12	5.00	18.38	15.54	18.28	2.59	2.34
Bidar	BSMR-736	20	8.00	23.47	15.50	51.42	4.63	3.78
Weighted Avg.		**32**	**13.00**	**21.51**	**15.52**	**38.67**	**3.85**	**3.23**
Redgram (Rainfed)								
Belgaum	TS-3R	25	10.00	10.70	7.18	49.03	2.82	2.77
Gulbarga	TS-3R	50	20.00	11.26	9.83	14.55	2.74	2.47
Koppal	TS-3R	25	10.00	3.38	1.55	118.06	2.67	1.46
Raichur	TS-3R	30	12.00	10.93	8.08	35.27	3.55	2.76
Tumkur	BRG-1	26	10.00	11.50	10.00	15.00	3.09	2.73
Mysore	BRG-1	25	10.00	11.25	7.50	50.00	2.63	2.63
Weighted Avg.		**181**	**72.00**	**10.06**	**7.72**	**42.15**	**2.91**	**2.48**
Total		**381**	**153**					

3.4.1.2 *Rabi* season: A total of 479 demonstrations were conducted on pulse crops namely chickpea (268), blackgram (141), greengram (55) and cowpea (15) in 205.20 ha in pulse growing districts of Karnataka (Table 66) and Tamil Nadu (Table 66 A).Crop wise details are as follows:

Bengalgram: A total of 268 demonstrations on integrated crop management practices in JG-11 and ICCV-37 varieties covering an area of 128 ha were conducted in 12 districts of Karnataka. Yield increase ranged from 8.96 to 81.25 per cent under demonstrations, recording an average yield of 11.08 q per ha as against 8.76 q per ha in farmers practice under rainfed situation. In case of irrigated condition, yield increase ranged from 25.53 to 42.59 per cent under demonstrations recording an average yield of 16.70 q per ha as against 12.71 q per ha in farmers practice. The BCR recorded under demonstrations was 3.45 as against 3.06 under farmers practice.

Blackgram: A total of 141 demonstrations on integrated crop management practices in VBN-4, VBN-5 and ADT-3 varieties covering an area of 45.20 ha were conducted in nine districts of Tamil Nadu. Yield increase ranged from 14 to 39.29 per cent under demonstrations recording an average yield of 5.86 q per ha as against 4.76 q per ha in farmers practice under rainfed condition. In case of irrigated condition, the yield increase ranged from 13.29 to 84.31 per cent with an average yield of 10.57 q per ha as against 7.83 q per ha under farmers practice. The BCR recorded under demonstrations was 3.02 as against 2.13 under farmers practice.

Greengram: A total of 55 demonstrations on integrated crop management practices in VRM (Gg)-1, VRM (Gg)-2, VBN(Gg)- 2, VBN(Gg)-3 and ADT(Gg)-3 varieties covering an area of 22 ha were conducted in 6 districts of Tamil Nadu. Yield increase ranged from 12.70 to 67.28 per cent under demonstrations recording an average yield of 6.32 q per ha as against 5.22 q per ha under farmers practice as rainfed crop. In irrigated situation, yield increase was 15.87 per cent with an average yield of 7.30 q per ha as against 6.30 q per ha under farmers practice. The BCR recorded under demonstrations was

Table 66: Effect of ICM demonstrations in pulse crops in Karnataka during *rabi* season (2011-12)

KVK	Variety	No. of demo.	Area (ha)	Yield (q/ha)		Yield increase (%)	BCR	
				Demo.	Check		Demo.	Check
Bengalgram (irrigated)								
Belgaum	JG-11	20	8.00	18.03	13.65	32.09	4.76	4.64
Bidar	JG-11	12	5.00	19.25	13.50	42.59	3.27	2.95
Chitradurga	JG-11	30	12.00	14.75	11.75	25.53	2.66	2.05
Weighted Avg.		**62**	**25.00**	**16.70**	**12.71**	**31.04**	**3.45**	**3.06**
Bengalgram (rainfed)								
Bellary	JG-11	25	10.00	8.00	7.10	12.68	4.20	3.39
Gadag	JG-11	20	8.00	6.81	6.25	8.96	1.14	1.07
Gulbarga	JG-11	48	20.00	12.80	10.20	25.49	3.91	3.01
Koppal	JG-11	25	10.00	8.10	5.60	44.64	2.29	2.04
Raichur	JG-11	20	8.00	10.41	8.33	24.97	2.91	2.32
Tumkur-A	JG-11	5	5.00	12.50	10.50	19.05	3.13	2.63
Tumkur	JG-11	27	27.00	12.10	10.20	18.63	3.03	2.55
Dharwad	ICCV-37	12	5.00	10.50	9.30	12.90	3.04	3.08
Mysore	JG-11	24	10.00	14.50	8.00	81.25	3.22	2.13
Weighted Avg.		**206**	**103.00**	**11.08**	**8.76**	**27.47**	**3.11**	**2.53**
Total		**268**	**128.00**					

1.79 and 2.83 as against 1.59 and 2.45 in farmers practice under irrigated and rainfed situations, respectively.

Cowpea: A total of 15 demonstrations on integrated crop management practices in VBN (CP)-2 variety of cowpea covering an area of 6 ha under rainfed condition were conducted in Virudhanagar district of Tamil Nadu. Yield increase was 19.44 per cent under demonstrations recording an average yield of 8.60 q per ha as against 7.20 q per ha under farmers practice as rainfed crop. The BCR recorded under demonstrations was 2.96 as against 2.58 under farmers practice.

3.4.2 National Initiative on Climate Resilient Agriculture (NICRA)

Climate change impacts on agriculture are global, but countries like India are more vulnerable in view of the high population depending on agriculture. There has been a significant rise in the frequency of extreme weather events in recent years affecting farm level productivity and impacting stable food grains availability at the national level. Within a season, severe droughts and floods are being experienced in the same region posing serious problems to the farmers. Fall in yield leads to shortage of food grains, price rise and inflation affecting the poor

Table 66 A: Effect of ICM demonstrations in pulse crops in Tamil Nadu during *rabi* season (2011-12)

KVK	Variety	No. of demo.	Area (ha)	Yield (q/ha)		Yield increase (%)	BCR	
				Demo.	Check		Demo.	Check
Blackgram (rice fallow)								
Nagapattinam	ADT 3	40	8.00	5.70	5.00	14.00	2.40	2.11
Blackgram (rainfed)								
Virudhunagar	VBN(Bg) 4	15	6.00	7.30	6.10	19.67	2.79	2.19
Villupuram	VBN-5	8	3.00	7.05	5.52	27.72	2.98	1.88
Tuticorin	VBN (Bg)-5	15	5.00	6.80	5.00	36.00	2.87	1.77
Blackgram (rice fallow)								
Thiruvarur	ADT 3	10	4.00	1.95	1.40	39.29	1.09	1.02
Weighted Avg.		**88**	**26.00**	**5.86**	**4.76**	**25.01**	**2.45**	**1.87**
Blackgram (irrigated)								
Erode	VBN-5	10	4.00	7.67	6.77	13.29	2.04	1.65
Thiruvallur	VBN- 5	10	2.00	7.93	5.56	42.63	1.56	1.22
Vellore	VBN- 4	20	8.00	8.16	6.78	20.35	2.19	1.98
Villupuram	VBN-5	13	5.20	9.40	5.10	84.31	3.28	1.46
Weighted Avg.		**53**	**19.20**	**10.57**	**7.83**	**48.66**	**3.02**	**2.13**
Greengram (irrigated)								
Thiruvallur	VBN - 2	5	1.00	9.16	6.62	38.37	2.26	1.86
Vellore	VRM 1	10	4.00	7.62	6.38	19.44	2.10	1.89
Thiruvarur	ADT 3	10	4.00	2.71	1.62	67.28	1.56	1.31
Thiruvanamalai	VRM(GG)-1	5	5.00	7.26	6.44	12.70	1.66	1.54
Thiruvanamalai	VRM(GG)-2	10	2.00	7.16	6.34	12.90	1.70	1.56
Weighted Avg.		**40**	**16.00**	**6.32**	**5.22**	**29.66**	**1.79**	**1.59**
Greengram (rainfed)								
Virudhunagar	VBN 3	15	6.00	7.30	6.30	15.87	2.83	2.45
Cowpea (rainfed)								
Virudhunagar	VBN(CP) 2	15	6.00	8.60	7.20	19.44	2.96	2.58
Total		**211**	**73.20**					
Rabi total		**479**	**201.20**					

most. Therefore, it is utmost importance to enhance the resilience of Indian agricultural to climate change.

Though a focused and long term research is required to find solutions to the problems specific to our country, there is a scope to improve the resilience of agriculture by application of existing knowledge and technology on farmers' field as a holistic package. In this backdrop, a scheme on National Initiative on Climate Resilient Agriculture (NICRA) 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 the resilience. It is being implemented in nine most vulnerable districts namely, Belgaum (drought/heat), Davangere(drought/heat), Kolar(drought/heat) and Tumkur (drought) in Karnataka, Namakkal (drought), Villupuram (drought/flood/cyclone), Ramanathapuram (drought/flood/cyclone/salinity) and Nagapattinam (drought/flood/salinity) in Tamil Nadu and Alleppey (water inundation/drainage) in Kerala through KVKs of respective districts since 2010-11.

The interventions being implemented are based on four modules, i.e (1) crop production, (2) natural resource management, (3) livestock and fisheries and (4) institutional. The salient achievements are detailed as under:

Module I: Natural resources

This module consists of interventions related to *in-situ* moisture conservation, water harvesting and recycling for supplemental irrigation, improved drainage in flood prone areas, conservation tillage where appropriate, artificial ground water recharge and water saving irrigation methods. A total of 1313.74 ha area has been treated with NRM related treatments covering 1285 farmers in 9 villages under NICRA. District wise details are presented in Table 67.

Module II: Crop Production

This module consists of introducing drought/ temperature tolerant varieties, advancement of planting dates of rabi crops in areas with terminal heat stress, water saving paddy cultivation methods (SRI, aerobic, direct seeding), frost management in horticulture through fumigation, community nurseries for delayed monsoon, and custom hiring centres for timely planting and location specific intercropping systems. A total of 2082 technology demonstrations were carried out in an area of 649.9 ha in nine villages. The per cent increase in yield under technology demonstration ranged from 12.93 per cent in Nagapattinam to 32.42 per cent in Belgaum district. KVK wise details are detailed in Table 68.

Module III: Livestock and fisheries

Use of community lands for fodder production during droughts/floods, improved fodder/feed storage methods, preventive vaccination, improved shelters for reducing heat stress in livestock, management of fish ponds/tanks during water scarcity and excess water etc. are the activities carried out under the module. The nine KVKs of Zone-VIII have introduced 1242 number of improved breeds of animals with vaccination, 535 poultry birds, 63 units of vermicomposting and azolla and 9.88 ha under improved fodder cultivation in the community lands of selected villages during drought period benefiting 1126 farmers. KVK wise details are furnished in Table 69.

Finger millet crop field day in NICRA village

Table 67: Effect of demonstrations on NRM technologies

KVK	Technology demonstrated	No. of farmers	Area (ha)	Effect
Tumkur	In-situ moisture conservation, water harvesting and recycling, water saving irrigation methods, and soil health card.	460	535.91	(i) Increased cropping intensity (ii) Increased groundwater table recharge
Alleppey	Soil health card	200	75.00	(i) Reduced fertilizer usage and cost of input.
Kolar	In-situ moisture conservation, water harvesting and recycling, water saving irrigation methods, and desilting of village tank	169	36.20	(i) Introduced broad bed furrow system (ii) Obtained 16.29 q/ha of yield in finger millet, 9.25 q/ha in groundnut, 13.80 q/ha in horsegram and 14.50 q/ha in redgram
Davanagere	In-situ moisture conservation, water harvesting and recycling, conservation tillage, and soil and moisture conservation.	166	239.58	(i) Increase irrigation intervals from 6-7 day to 15-20 days (ii) Obtained 50-54 q/ha of yield in maize
Belgaum	In-situ moisture conservation and water harvesting and recycling	124	381.18	(i) Raised groundwater table by 22 feet
Namakkal	Water harvesting and recycling, and water saving irrigation methods	68	7.00	(i) Increased water table by 5 to 6 ft. in open wells (ii) Increased irrigated area by > 40 cent per day per farmer.
Villuppuram	Water harvesting and recycling, and water saving irrigation methods	58	11.67	(i) Increased in cropping area and intensity
Nagapattinam	Water harvesting and recycling, Improved drainage in flood prone areas, and water saving irrigation methods	33	26.80	(i) Improved cropping intensity, (ii) Enhanced rice (Swarna sub 1) yield by 15% as compared to traditional ADT 38.
Ramanatha puram	Water harvesting and recycling	7	0.40	-
	Total	**1285**	**1313.74**	

Module IV: Institutional interventions

This module consist of institutional interventions either by strengthening the existing ones or initiating new ones 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. All the nine villages put together, 104.9 ha area was developed as seed and fodder bank to meet the drought related situations, 16 commodity groups were formed in the villages for better coordination in technology adoption, nine custom hiring centres were established to provide required farm implements to the farmers to carry out timely farm operations besides educating the farmers on weather aspects through establishment of village level weather stations and providing need based trainings to farmers on all the new technologies to facilitate their faster adoption (Table 70).

Table 68: Effect of demonstrations on crop production techniologies

KVK	No. of farmers	Area (ha)	Yield increase (%)	BCR	
				Demo.	Check
Tumkur	688	199.50	23.17	2.66	2.00
Kolar	331	128.40	24.90	2.74	2.22
Namakkal	325	22.00	19.34	1.56	1.14
Davanagere	195	91.00	14.95	2.29	1.89
Belgaum	175	83.00	32.42	2.78	2.36
Nagapattinum	150	79.00	12.93	1.75	1.58
Alleppey	148	19.00	18.70	2.48	2.13
Ramanathapuram	25	10.00	29.03	2.79	2.31
Villuppuram	45	18.00	23.34	1.87	1.68
Total	**2082**	**649.90**			

Table 69: Effect of demonstrations on production technologies of livestock and fisheries

KVKs Name	Farmers	Animals vaccinated/ introduced (sheep, goat, cow etc)	Poultry birds	Fodder area (ha)	Composting/ vermicompost / azolla unit
Belgaum	328	392	-	2.00	53
Namakkal	281	171	485	3.41	-
Alleppey	182	97	50	0.65	-
Davanagere	130	180	-	0.50	-
Villupuram	111	101	-	-	10
Nagapattinam	56	-	-	2.90	-
Ramanathapuram	38	88	-	0.42	-
Kolar	-	213	-	-	-
Total	**1126**	**1242**	**535**	**9.88**	**63**

Table 70: KVK wise details of institutional interventions implemented

KVK	Seed/fodder bank (ha)	Commodity (No.)	Custom (area in ha serviced)	Climate literacy level weather station (ha)	No of courses	Farmers involved
Belgaum	34.00	4	-	-	17	1019
Nagapattinam	31.50	-	15.90	-	11	747
Davanagere	27.20	2	198.00	174.20	21	1231
Villuppuram	8.00	-	-	-	13	185
Ramanathapuram	4.20	-	-	8.00	37	959
Tumkur	-	-	-	-	9	600
Kolar	-	7	-	-	4	136
Alleppey	-	-	-	-	30	807
Namakkal	-	3	135.10	-	10	584
Total	**104.90**	**16**	**349.00**	**182.20**	**152**	**6268**

3.4.3 Effect of Thane cyclone on KVKs

A severe cyclonic storm *Thane* had affected the coastal districts of Tamil Nadu and Puducherry especially Cuddalore, Villupuram and Puducherry on December 30, 2011. Agricultural scenario in all these districts were severely affected causing damage to crops, livestock, fisheries and infrastructure. Dr.K.D.Kokate, Deputy Director General (Agricultural Extension), ICAR, New Delhi visited the cyclone affected Krishi Vigyan Kendras in Villuppuram, Puducherry and Cuddalore districts on January 12-13, 2012 and assessed the damage caused to the KVKs and to the farming community. Accordingly, ICAR had sanctioned an amount of Rs.65 lakh to KVK Puducherry, Rs.11 lakh to KVK Cuddalore and Rs.6 lakh to KVK Villupuram for carrying out relief measures.

During the visit, Dr.Kokate gave the following suggestions for quick revival of agro-ecosystem in the districts affected by Thane:

- Contingent plan need to be formulated for cultivation of short duration paddy varieties, pulses like blackgram, vegetables etc in paddy fallow.
- NICRA project operated by KVK Villuppuram need to be modified according to the existing situation.
- NICRA project may be recommended to KVK Puducherry as the district is vulnerable for cyclones.
- Integrated Farming System (IFS) need to be promoted by KVK Cuddalore in contingent planning.
- Efforts need to be taken up for production and supply of cashew grafts for replanting in cyclone affected areas in Cuddalore district and farmers to be advised about raising of alternative crops like bamboo and to undertake other enterprises like poultry.
- Appropriate technical programme and infrastructural development in the affected KVKs need to be included in XII plan proposals.

Dr.K.D.Kokate, Deputy Director General (Agricultural Extension), ICAR, New Delhi visiting the cyclone affected cashew plantation

Measures taken up by the KVK Puducherry for revamping the farm women groups in cyclone affected areas through contingent planning

Chapter 4

Human Resource Development

The Zonal Project Directorate (ZPD) has taken up a number of human resources development activities for the benefit of staff of Directorate as well as KVKs. Details are presented hereunder.

ZPD has organized three orientation training courses on technology assessment, refinement and demonstration and trained 55 newly recruited KVK staff of Zone VIII at KVK Namakkal from January 31, 2012 to February 4, 2012 with 23 participants, at KVK Mysore during February 7 to 11, 2012 with 17 participants and at KVK Gadag during February 14 to 18, 2012 with 15 participants. Further, ZPD organized three meetings for Computer Programmers on data base management at ZPD, Bangalore on 3rd and 12th of May, 2011 and on 12th of January, 2012. A training programme on SQL and .NET was organised at KVK Nilgiris during May 23 to 28, 2011 wherein 27 Computer Programmers of KVKs of Zone VIII participated.

Similarly, KVK staff have also participated in HRD activities through their respective host organizations. KVK staff attended different training courses of varied duration viz., short, medium and long duration as a part of HRD programmes organized by NARS in the country on the thematic areas viz., crop improvement, capacity building and group dynamics, livestock production and management, soil health and fertility management, home science and women empowerment, crop production, plant protection, horticulture, agricultural engineering, fisheries and IFS. A total of 601 KVK staff consisting of 42 Programme Coordinators, 477 Subject Matter Specialists, 69 Programme Assistants and 13 Farm Managers have been trained in these programmes.

Hands on experience on Participatory Rural Appraisal Techniques during orientation training course

Training of Computer Programmers on data base management

A view of HRD programmes organized by Zonal Project Directorate-Zone VIII

Publications

Staff of Zonal Project Directorate have involved in documentation of various activities. Publications brought out are listed below.

5.1 Books/Folders

Farm Innovators-2010 (English). Second Edition (2012). Kokate K.D (Chief Editor), V.Venkatasubramanian, S.Prabhu Kumar and A.K.Gogoi (Editors), A.K.Mehta, A,M.Narula, A.K.Singh, N.Sudhakar, Y.V.Singh, U.S.Gautam,Krishna Srinath, B.T.Rayudu, M.V.Sajeev, P.Adhiguru and V.P.Chahal (Members), (2010). Published by Division of Agricultural Extension, Indian Council of Agricultural Research, New Delhi.211p.

Farm Innovators-2012 (Hindi). First Edition(2012). Kokate K.D (Chief Editor), V.Venkatasubramanian, S.Prabhu Kumar and A.K.Gogoi (Editors), A.K.Mehta, A,M.Narula, A.K.Singh, N.Sudhakar, Y.V.Singh, U.S.Gautam,Krishna Srinath, B.T.Rayudu, M.V.Sajeev, P.Adhiguru and V.P.Chahal (Members), (2010). Published by Division of Agricultural Extension, Indian Council of Agricultural Research, New Delhi.211p.

Krishi Vigyan Kendra – A Unique System. Edited by S.Prabhu Kumar, B.T.Rayudu, and J.Mathew. Published by Dr.K.D.Kokate, Deputy Director General (Agricultural Extension),Division of Agricultural Extension, ICAR, New Delhi.

5.2 Research Articles

Kalidas P, C.V.Sairam and K.J.Prabhakara Rao, (2011). Scientific formula for fixing the price of oil palm (*Elaeis guineensis*). Journal of Oilseed Research. 28(2), 143-148 pp.

Singh Moolchand, C.V.Sairam, M.B.Hanji, S.Prabhu Kumar and Nand Kishor, (2012).Crop weed competition and weed management studies in direct seeded rice (*Oryza sativa*). Indian Journal of Agronomy 57(1): 1-5 p

5.3 Reports

Annual Report 2010-11, Zonal Project Directorate, Zone-VIII, Bangalore, India. B.T.Rayudu (Chief Editor), D.V.S.Reddy, C.V. Sairam and J.Mathew, (Editors), R.S.Ramamurthy, and Mallikarjun B. Hanji (Members). Published by S.Prabhu Kumar, Zonal Project Director, ZPD-Zone VIII, Hebbal, Bangalore. 94 p.

5.4 Papers Presented in Seminars/ Conferences

Sriram N, E.Vadivel, N.Anandaraj, R.Venkatachalam and S.Prabhu Kumar (2011). Expert System for Agriculture and Animal Enterprises for Improving Productivity and Livelihood Status of the Farming Community. Abstracts of International Conference on Innovative Approaches for Agricultural Knowledge Management : Global Extension Experiences held during November 9-12, 2012 at New Delhi, India. 356 p.

Sriram.N, E.Vadivel, R.Venkatachalam S.Prabhukumar and N.Ananadaraja (2011) Development of Expert System for Agriculture and Animal Husbandry for Improving Farm Advisory Services paper accepted and invited as invited paper during National Conference on Innovations in Farming Systems Research and Extension for Inclusive Development organized by SEE and TANUVAS, Chennai during November 24-25, 2011.

Sriram.N, E.Vadivel, R.Venkatachalam S.Prabhukumar and N.Ananadaraja (2011) Development of Expert System for Agriculture and Animal Husbandry project has invited to present at MANAGE during

National Workshop on ICT in Agriculture during December 2011.

Prabhu Kumar S and B.T.Rayudu (2011). Innovative Experiences of KVK in Empowering Farmers on Secondary Agriculture (2011). Souvenir. 6th National Conference on Krishi Vigyan Kendra-2011 held at JNKVV, Jabalpur (MP) during December 3-5 , 2011. 40-42 pp

Prabhu Kumar S, C.V.Sairam and B.T.Rayudu (2011). Technology Application through Frontline Extension by KVKs in Zone VIII. Paper presented in the 6th National Extension Education Congress on Emerging Models of Technological Application for Agricultural rural Development held at Goa during November 26-28, 2011..

Sriram.N, E.Vadivel, R.Venkatachalam S.Prabhukumar, N.Ananadaraja, I.Muthuvel (2012) Paddy Expert System – A New Tool for Extension paper accepted for presentation in the International Rice Symposium organized by TNAU during January 2012.

Prabhu Kumar S, B.T.Rayudu, C.V.Sairam, D.V.S.Reddy and R.S.Ramamurthy (2012).Performance of Safflower Technologies under Frontline Demonstrations in Karnataka. Paper presented in the International Safflower Conference held at Directorate of Oilseed Research, Hyderabad during January 19-23, 2012.

Sairam C.V, S.Prabhu Kumar, B.T.Rayudu, D.V.Srinivasa Reddy, M.J.Chandre Gowda, R.S.Ramamurthy and Mallikarjun B.Hanji (2012). Problems and Prospects of Self Help Groups in Agricultural Sector-Experiences of Krishi Vigyan Kendras. Lead paper presented in the National Seminar on Socio-Economic Implications of SHGs in 2020 held at Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu during March 28 - 29, 2012.

5.5 Publications by KVKs

KVK staff have documented and published 300 research articles, 104 technical reports, 203 newsletters, 34 training manuals, 61 books/book chapters/booklets, 478 extension literature, 638 popular articles, 52 technical bulletins and 66 CD/DVD on various technological aspects of agriculture and its allied enterprises.

Workshops, Meetings, Conferences

The staff of Zonal Project Directorate-Zone VIII have actively involved in organization/ participation in various workshops, meetings and conferences organized in Zone VIII as well as ICAR which are listed here under.

6.1 Organization of Meetings/Workshops

6.1.1 Meetings

- Three meetings of Computer Programmers for Database preparation held at ZPD, Bangalore on 3rd and 12th May, 2011 and January 12, 2012.
- Launching of NICRA Project held at KVK, Davanagere on May 20, 2011.
- QRT Travel workshop held at Dharwad during June 23-26, 2011.
- State Level Interface Meeting at KAU, Thrissur on July 7 , 2011.
- Launching of NICRA Project held at KVK, Alleppey on July 8, 2011.
- Visit cum interaction programme held at TNAU, Coimbatore on July 29, 2011.
- Launching of NICRA Project held at KVK, Namakkal on July 30, 2011.
- Visit cum interaction programme held at KVK, Erode on July 31, 2011.
- Visit cum interaction programme held at KVKs – Mysore and Chamrajnagar during August 26-27, 2011.
- Site Selection Committee visit for the establishment of new KVK in the additional district of Gulbarga held during October 28-30, 2011.
- State Level Interface Meeting on Convergence held at Thanjavur on November 18, 2011.
- Review of Network Project on Expert System held at TNAU, Coimbatore on January 19, 2012.
- KVK Site Selection Committee Meeting held at Yanam during January 20-21, 2012.
- Meeting of Farmers' First Committee held at TNAU, Coimbatore on January 27-28, 2012.
- NICRA Launching at KVK, Ramanathapuram held on February 2, 2012.
- Meeting of NGO Chairpersons of KVK held at KVK, Gadag on February 13, 2012.
- Visit cum interaction programme held at KVKs- Tumkur, Chitradurga, Davangere and Tiptur during February 21-22, 2012.
- Annual Review and Action Plan Meeting for KVKs of Karnataka held at UAS, Raichur during February 23-25, 2012.
- Annual Review and Action Plan Meeting for KVKs in Tamil Nadu and Puducherry held at TNAU, Coimbatore during March 6-9, 2012.
- Annual Review and Action Plan Meeting for KVKs in Kerala, Lakshadweep and Goa held at KAU, Thrissur during March 10-11, 2012.

6.1.2 Workshops

- Travel Workshop of QRT held at Pondicherry during August 3-9, 2011.
- Travel Workshop of QRT held KVKs at Namakkal, held during October 21-25, 2011.
- Travel Workshop of QRT held at KVKs Kasaragod, during November 13-17, 2011.

6.2 Participation in Meetings/Workshops/ Conferences/Seminars

The Zonal Project Director/officials of this Directorate have participated in the following meetings/workshops/conferences/seminars held during the reporting period:

6.2.1 Meetings

- Scientific Advisory Committee meetings and Technology Weeks organized by KVKs.
- Budget BE meeting held at Division of Agricultural Extension, ICAR, New Delhi held during April 14-15, 2011
- Convocation held at UAS, Raichur on April 16, 2012
- Annual report proforma meeting held at Division of Agricultural Extension, ICAR, New Delhi held during May 9-10, 2011.
- Planning Commission meeting held at Chennai on July 1, 2011.
- Review meeting held at KVK, Virudhunagar on July 4, 2011.

- Selection Committee meeting held at KVK, Tuticorin on July 5, 2011.
- Review meeting held at KVK, Pathanamthitta on July 8, 2011.
- Farmers' Day held at TNAU on July 22, 2011
- Farmers interaction meeting held at KVK, Erode on July 31, 2011.
- National Consultation on Gender Issues held at NASC, New Delhi during August 9-10, 2011.
- ERNET Committee visit cum review meeting held at KVK, Puducherry on August 3, 2011.
- KVK Guidelines Committee meeting held at NASC, New Delhi during August 15-16, 2011.
- Selection Committee Interview held at KVK, Theni on August 24, 2011.
- NICRA Stakeholders meet held at CRIDA, Hyderabad on September 20, 2011.
- KVK Interaction during VC Conference, RE meeting and ERNET meeting, and XII Plan discussion with Director General, ICAR held at NASC, New Delhi during September 25 -30, 2011.
- Selection Committee meeting in respect of KVK, Belgaum held on October 18, 2011.
- Selection Committee meeting in respect of KVK, Erode held on November 3, 2011.
- KVK Guidelines meeting held at NASC, New Delhi on November 19, 2011.
- Meeting on Administrative aspects held at NASC, New Delhi on November 22, 2011.
- Meeting on Finalization and submission of QRT final report held at Division of Agricultural Extension, ICAR, New Delhi during November 23-25, 2011.
- Selection Committee meeting in respect of KVK, Thiruvananthapuram held on November 28, 2011.
- Selection Committee meeting in respect of KVK, Coimbatore held on November 29, 2011.
- NICRA meeting held at NASC, New Delhi during December 13-14, 2011.
- KVK guidelines meeting held at NASC, New Delhi during December 15-16, 2011.
- Selection Committee interview for KVKs of Thanjavur and Tirunelveli held on January 10, 2012.
- KVK Guidelines meeting held at ZPD-Zone VI on January 16, 2012.
- XII Plan Discussion Meetings held at ZPD-Zone VI during January 17-18, 2012.
- Selection Committee Meetings for Additional KVK, Belgaum held during March 17-19, 2012.
- Selection Committee Meeting in respect of KVK Theni held on March 22, 2012.
- Selection Committee Meeting in respect of KVK Dindigul held on March 23, 2012.

6.2.2 Workshops

- Workshop on testing of expert system for validation held at KAU, Thrissur on June 9, 2011.
- Workshop on XII Plan proposals with KVKs held at TNAU, Coimbatore on October 4, 2011.
- Workshop on XII Plan proposals with KVKs held at UAS, Raichur on October 10, 2011.
- Workshop on XII Plan proposals with KVKs held at UAS, Dharwad on October 11, 2011.
- Workshop on XII Plan proposals with KVKs held at UAS, Bangalore on October 13, 2011.
- Workshop with KVKs having e connectivity of Zone VIII held at ZPD-Zone VIII, Bangalore on October 20, 2011.
- Workshop on XII Plan proposals with KVKs of KAU held at Thrissur on November 2, 2011.
- Workshop of NGO Chairpersons and XII Plan Proposals held at KVK, Gadag on February 13, 2012.

6.2.3 Conferences

- Directors' Conference and ICAR Foundation Day held at NASC, New Delhi during July 15-17, 2011.
- International Conference on Extension organized by International Society of Extension Education held at New Delhi during November 9-12, 2011.
- Sixth National Conference on KVKs held at Jabalpur during December 3-5, 2011.
- Directors' Conference and XII Plan Meeting held at NASC, New Delhi during February 16-20, 2012.
- Global Conference on Women in Agriculture held at NASC, New Delhi during March 13-15, 2012.

6.2.4 Seminars

- National Seminar held at NASC (Dhanuka) during May 31 to June 3, 2011

Chapter 7

Personnel

Existing staff position of the Zonal Project Directorate-Zone VIII, Bangalore as on March 31, 2012 is presented below:

7.1 Staff in Position

Research Management Position	Dr.S.Prabhu Kumar	Zonal Project 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	Senior Scientist (Agricultural Extension)
Technical	Shri.R.S.Ramamurthy	Field Officer
	Dr.Mallikarjun B.Hanji	Computer Programmer
	Shri.M.N.Prasad	Driver
Administrative	Mrs. Sunanda C	Assistant Finance and Accounts Officer
	Shri.J.Mathew	Assistant Administrative Officer
	Mrs. Ramola Pinto	Stenographer
	Shri. J.Prabu Kumar	Assistant
	Shri. N.Vinod Kumar	LDC
	Ms. K. Roopakala	LDC
Supporting	Shri.Chennakeshava	SSS (Gr-II)

7.2 Joining/Superannuation/Promotion

- Shri N.Vinod Kumar joined as LDC on 18.07.2011
- Ms K.Roopakala joined as LDC on 03.08.2011
- Shri.T.Dasappa superannuated on 31.10.2011from the post of Assistant Administrative Officer
- Dr.M.J.Chandre Gowda joined as Principal Scientist (Agricultural Extension) on 30.12.2011
- Shri J.Mathew promoted from Personal Assistant to Assistant Administrative Officer through LDCE w.e.f 05.03.2012