

वार्षिक प्रतिवेदन
ANNUAL REPORT
2010-11



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

क्षेत्रिय परियोजना निशालय - क्षेत्र ८
भारतीय कृषि अनुसंधान परिषद
बेंगलूर - ५६० ०२४



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



PREFACE

Agriculture in India plays a vital role on food front to meet the ever-increasing demand. Indian agriculture is very complex, diverse and risk prone and in the context of growing public concern for the environment, globalization, household food security and eco-regional imbalances, there is a need to concentrate on different production systems for making viable and vibrant agricultural system in the country. In this direction, Krishi Vigyan Kendras (KVKs) are those institutions working with farmers, scientists and other stakeholders at grass root level reaching the unreached villages by empowering agricultural technology information to meet the future challenges of growing demand of food production but with egalitarian consideration.

The Zonal Project Directorate-Zone VIII is coordinating and monitoring 77 KVKs and 10 Agricultural Technology Information Centres (ATICs) functioning in Karnataka, Tamil Nadu, Kerala, Goa, Puducherry and Lakshadweep. At the outset, I feel proud and congratulate three KVKs namely Kannur, Kancheepuram and Cuddalore of this Directorate for bagging all the three National KVK Awards for the year 2009 through their concerted efforts for the prosperity of farming community in their respective districts.

KVKs of this Directorate have taken up various need based programmes by involving all stakeholders for the development of agriculture sector at field level. The Annual Report of this Directorate for the year 2010-11 contains the information and data on various programmes implemented and executed by KVKs of Zone VIII. The data clearly indicated that the programmes of KVKs have contributed in augmenting productivity and production in different farming systems for the betterment of farming community. I am happy to share here that KVK activities have reached from Namakkal to Namibia and Nigeria. Besides, achievements of Directorates of Extension in State Agricultural Universities (SAUs) with respect to technological backstopping and human resources development for KVKs as well as technology services, inputs and information extended by ATICs are documented and briefly presented in this Annual Report.

Further, this report embodies with the activities and flagship programmes of this Directorate such as organization of National Farm Innovators Meet 2010 which is first of its kind by the Indian Council of Agricultural Research (ICAR) in India, development of expert system for agriculture and animal husbandry enterprises, impact studies, special programme on pulse crop demonstrations and National Initiative on Climate Resilient Agriculture (NICRA).

I wish to acknowledge with gratitude the encouragement, support and guidance provided by Dr.S.Ayyappan, Secretary, DARE & Director General, ICAR, Dr.K.D.Kokate, Deputy Director General (Agrl. Extn.), Assistant Director Generals, Dr.A.K.Mehta, Dr.V.Venkatasubramanian of ICAR, New Delhi. I complement staff of KVKs, Zonal Project Directorate and Directorates of Extension for carefully and systematically implementing the action plan and achieving the targets of the year and also the editorial board of this publication.

I am sure that the information and data provided in this report will be of use to researchers, administrators, policy makers, extension personnel, farmers and other stakeholders.

Place : **Bangalore**
Date : **30th June, 2011**



(S.PRABHU KUMAR)

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कार्यकारी सारांश

भारतीय कृषि विविध कृषि-पारिस्थितिकीय परिस्थितियों और निर्वहनीयता की ओर प्रयास करते हुए बेजोड़ है। राष्ट्रीय कृषि अनुसंधान प्रणाली (एनएआरएस) भारतीय कृषि में निर्वाहनीय के रूप में विकास करने के लिए पणधारकों के बीच वृद्धिशील उत्पादकता, उत्पादन, लाभदेयता के लिए प्रौद्योगिकियों को सतत् रूप से सृजित तथा प्रसारित कर रही है। इस दिशा में, आईसीएआर ने विभिन्न संस्थागत संगठनों नामतः भारतीय कृषि अनुसंधान परिषद (आईसीएआर), राज्य कृषि विश्वविद्यालयों (एसएयू), गैर-सरकारी संगठनों (एनजीओ), मानद विश्वविद्यालयों (डीयू) तथा देश भर में जिला स्तरीय राज्य कृषि विभागों (एसडीए) के अंतर्गत कृषि विज्ञान केन्द्रों (केवीके) का नेटवर्क स्थापित किया है। केवीके इस प्रणाली में साझेदारों को रूप में किसानों, खेतिहर महिलाओं, ग्रामीण युवाओं तथा अन्य भागीदारों के साथ क्षेत्र स्तर पर कार्यरत हैं।

प्रांतीय परियोजना निदेशालय - प्रांत ऋष्य कर्नाटक (28), तमिलनाडु (30) केरल (14), गोवा (2), पुडुचेरी (2) और लक्ष्यद्वीप (1) में स्थित 77 केवीके प्रौद्योगिकीय हस्तक्षेपों तथा विस्तार कार्यक्रमों का समन्वयन, आयोजन, निगरानी तथा मूल्यांकन करता है। केवीके को एसएयू के तहत विस्तार निदेशालय के प्रौद्योगिकीय आश्रय के ज़रिए प्रौद्योगिकी निर्धारण, परिष्कारण तथा प्रदर्शन के कार्य सौंपे गए हैं। केवीके के कार्यक्रम किसानों से, किसानों द्वारा और किसानों के लिए नियोजित, कार्यान्वित, निष्पादित और मूल्यांकित किए जा रहे हैं। यह जानकर खुशी होती है कि आईसीएआर की ओर से वर्ष 2009 के सभी तीन राष्ट्रीय केवीके पुरस्कार इस निदेशालय के तीन केवीके नामतः कन्नूर, कांचीपुरम और कड्डलूर ने प्राप्त किए हैं।

केवीके ने सर्वश्रेष्ठ संभावित प्रौद्योगिकीय समाधान प्रदान करने तथा इसके द्वारा अपने संबंधित जिलों में कृषि संबंधी प्रणाली में सुधार लाने के लिए कृषि तथा संबंधित क्षेत्रों में विभिन्न कार्यक्रमों पर कार्य किया है जिसका अंतिम लक्ष्य किसानों में गरिमा, लाभ और साझेदारी लाना है।

रिपोर्ट की गई अवधि के दौरान इस निदेशालय की उपलब्धियों को नीचे सारबद्ध किया गया है-

कृषि तथा पशुपालन उद्यम के लिए विशेषज्ञ प्रणाली का विकास

आईसीटी सक्षम यंत्र-व्यवस्था के ज़रिए किसानों, विस्तारण कामगारों, वैज्ञानिकों तथा अन्य पणधारकों की अंग्रेजी को सुकर बनाने वाली त्वरित निर्णय लेने की प्रक्रिया में धान, केला, गन्ना, रागी और नारियल के लिए

एक विशेषज्ञ प्रणाली का अभिकल्प तैयार कर उसे विकसित किया गया।

एकल बिंदु निर्णय में परिणाम या समाधान पर पहुँचने के लिए ज्ञान-आधार, निष्कर्ष इंजिन तथा प्रयोक्ता अंतरापृष्ठ निर्मित करते हुए विशेषज्ञ प्रणाली का अभिकल्प तैयार कर उसे विकसित किया गया।

- विशेषज्ञ प्रणाली का होम पेज कंप्यूटरीकृत निर्णय समर्थन प्रणाली के साथ का अभिकल्प तैयार कर उसे विकसित किया गया जिसमें मौसम, विभिन्नता, मृदा, जल, भूमि की तैयारी नर्सरी प्रबंधन, खेती, सिंचाई, पोषक प्रबंधन, खेत संबंधी कार्यान्वयन, फसलोत्तर प्रौद्योगिकी, विपणन, संस्थान एवं योजनाएँ तथा अक्सर पूछे जाने वाले प्रश्न, निदान करने की प्रणाली (क्रॉप डॉक्टर) के बारे में ब्यौरे प्रदान किए गए हैं, जो प्रतिबिम्बों/ विडियो आधारित नियंत्रण माननों के साथ-साथ प्रतिबिम्ब आधारित लक्षणों या क्षतियों का अभिचिह्नन तथा सूचना प्रणाली जो प्रौद्योगिकियों की उन्नति के आधार पर तब और वहीं इन स्वरूपों को गतिशील रूप से अद्यतन करना सक्षम बनाती है, का प्रदर्शन करती है।

तमिलनाडु के पेरम्बलुर जिले में कपाह खेती का आर्थिक विश्लेषण

- सूत खेती के आर्थिक विश्लेषण पर किए गए अध्ययन ने यह दर्शाया कि कपास ६ मक्का वर्षापोषित परिस्थितियों में किसानों द्वारा अपनाई गई प्रभावी खेती विधि है जिसमें उपज की बढ़ोतरी 1.28 से 2.48 के बीच के बीसी अनुपात के साथ 30 से 60३ के बीच अलग-अलग होती है।

देश में दाल उत्पादन को सुसज्जित करने के लिए प्रौद्योगिकी प्रदर्शन के तहत दाल फसल प्रदर्शनों पर विशेष कार्यक्रम

- दलहन फसलों पर कुल 455 प्रदर्शन किए गए नामतः खरीफ 2010 के दौरान 215.8 हेक्टेयर के क्षेत्रफल में कर्नाटक के 13 जिलों एवं तमिलनाडु के एक जिले में काला चना (46), हरा चना (132) तथा अरहर (277)। परिणामों ने यह दर्शाया कि कर्नाटक के बीदर और गुलबर्गा जिलों में काला चना (डीयू-1) में 25 से 136३ तक, कर्नाटक के गदक, बेल्लारी, बेलगॉम, धारवाड़, कोप्पल, बीदर एर गुलबर्गा जिलों में 18.45 से 83.33३ तक, हरा चना (एसईएल-4, चीनी मूंग), तमिलनाडु के नमक्कल जिले में हरा चना (वीबीएन-2) में 15.57 से 20.28३ तक, कर्नाटक

के रायचूर, धारवाड़, कोप्पल, मैसूर एर तुमकूर जिलों में अल्प अवधि में पीजनपी (टीएस-3 आर, आईसीपी-8863, बीआरजी-1) में 11.68 से 50.48 तक और कर्नाटक के गुलबर्गा, चित्रदुर्गा, बेल्लारी, बेलगॉम और बीदर जिलों में दीर्घ अवधि में पीजनपी (टीएस-3 आर, बीआरजी-2, बीएसएमआर-736) में 16.00 से 98.67 तक की औसत उपज में वृद्धि हुई है।

- दलहन फसलों पर कुल 382 प्रदर्शन आयोजित किए गए, नामतः रबी 2010-11 के दौरान 155.10 हेक्टेयर क्षेत्रफल में कर्नाटक के 10 और तमिलनाडु के 12 दलहन पैदा करने वाले जिलों में काला चना (113), हरा चना (64) और पीला मटर (205)। परिणामों ने यह दर्शाया कि कर्नाटक के रायचूर, धारवाड़, मैसूर, कोप्पल, गदग, गुलबर्गा, चित्रदुर्गा, बेलगॉम, बेल्लारी और बीदर जिलों में एकीकृत फसल प्रबंधन (आईसीएम) पद्धतियों से पीला मटर (जेजी-11) में 18.15 से 70.00 तक, तमिलनाडु के तूतीकोरिन, इरोड, तिरुवरूर, नामक्कल, विरुदुनगर, तिरुवनमलै, विल्लुपुरम, नागापट्टिनम, तिरुवल्लूर एर वेल्लूर जिलों में आईसीएम पद्धतियों के साथ काला चना (वीबीएन-3, वीबीएन-4, वीबीएन-1 एडीटी-3, सीओ-6) में 17.09 से 124.0 तक, तमिलनाडु के तिरुवरूर, तिरुवल्लूर, वीरुनगर और वेल्लूर जिलों तथा कर्नाटक के गदग जिले में आईसीएम पद्धतियों के साथ हरा चना (वीबीएन(डु)-2, वीबीएन(डु)-1 एसईएल-4, एडीटी(डु)-3) में 11.76 से 73.08 तक की औसत उपज वृद्धि हुई।

जलवायु अतिस्कंदी कृषि पर राष्ट्रीय पहल (एनआईसीआरए)

- 2010-11 के दौरान एनआईसीआरए 9 केवीके में कार्यान्वित किया गया था नामतः कर्नाटक में कोलार, तुमकूर, दावणगेरे, बेलगॉम, तमिलनाडु में रामनाथपुरम, विल्लुपुरम, नागापट्टिनम, नामक्कल तथा केरल में अलेप्पी। इन केवीके के तकनीकी कार्यक्रमों को अंतिम रूप देया गया था और आवश्यकता आधारित भाड़े के लिए खरीदे गए लघु कृषि उपकरणों, ड्रिप/स्प्रिंकलर प्रणालियों आदि जैसी अवसंरचना तथा जिले के किसानों के लिए मौसम आधारित परामर्श प्रादन करने के लिए प्रत्येक केवीके में एक स्वचालित मौसम स्टेशन स्थापित किया गया।

प्रौद्योगिकी मूल्यांकन तथा परिशुद्धीकरण

- केवीके द्वारा 945 स्थलों में 5807 प्रयोगात्मक परीक्षण संचालित करते हुए कुल 587 प्रौद्योगिकियों का मूल्यांकन तथा परिशुद्धीकरण किया गया।

फसलों के संबंध में, 785 स्थलों में 2933 प्रयोगात्मक परीक्षणों के ज़रिए विभिन्न थिर्मेटिक क्षेत्रों पर 461 प्रौद्योगिकियों का मूल्यांकन किया गया। उपजातीय मूल्यांकन (82), एकीकृत फसल प्रबंधन (आईसीएम) (72), एकीकृत कीटनाशक प्रबंधन (आईपीएम) (65), एकीकृत रोग प्रबंधन (आईडीएम) (58), खेत मशीनरी (22), खरपतवार प्रबंधन (19), मूल्य वर्धन (13), लघु पैमाने पर आय सृजन उद्यम (11), एकीकृत खेती प्रणाली (आईएफएस) (10), भंडारण तकनीकें (8), संसाधन संरक्षण (आरसी) प्रौद्योगिकी (6), बीज/पादप उत्पादन (6) तथा मशरूम खेती (5) के बाद एकीकृत पोषक प्रबंधन (आईएनएम) (84) पर अनेक संख्या में प्रौद्योगिकियों के मूल्यांकन किए गए।

- पशुधन के मामले में, 113 स्थलों में 2684 प्रयोगात्मक परीक्षणों के ज़रिए 90 प्रौद्योगिकियों का मूल्यांकन किया गया जिनमें से अनेक प्रौद्योगिकियों को उत्पादन एवं प्रबंधन (25), तदुपरांत रोग प्रबंधन (23), पोषण प्रबंधन (21), नस्लों का मूल्यांकन (11) तथा फीड एवं फीडर (10) पर आँका गया।
- 47 स्थलों में 190 प्रयोगात्मक परीक्षण करते हुए विभिन्न थिर्मेटिक क्षेत्रों जैसे कठिन परिश्रम में कटौती, आईसीएम, आईएनएम, आईपीएम, आरसी प्रौद्योगिकी, लघु पैमाने पर आय सृजन उद्यम, भंडारण तकनीक, मूल्य वर्धन, मशरूम खेती और बीज/पादप उत्पादन से संबंधित कुल 36 फसल प्रौद्योगिकियों का परिष्करण किया गया।

कुछेक चयनित प्रौद्योगिकी विकल्पों की स्थल विशिष्टता के लिए उनके परिणाम

- चावल की श्रेणी पीएमके (आर)4 (अन्ना 4) ने एडीटी 39/36/सीओ 43 (8799 कि.ग्रा./हे.) की तुलना में उच्चतम औसत उपज (9461 कि.ग्रा./हे.) दिया और किसानों ने तमिलनाडु के कड्डलूर, तिरुवल्लूर और विल्लुपुरम जिलों के बाढ़ संभावित क्षेत्रों में खेती (8396) की।
- तमिलनाडु में किसानों द्वारा कड्डलूर, विल्लुपुरम, धर्मपुरी, रामनाथपुरम, कांचीपुरम, तिरुवल्लूर, विल्लोर जिलों में की गई खेती (490.10 कि.ग्रा./हे.) के समक्ष वंडर नामक दाल के अनुप्रयोग ने काले चने में 760.70 कि.ग्रा./हे. की उच्चतम औसत उपज दी।
- कर्नाटक के बेलगॉम और गदग जिलों में सिंचाईयुक्त और वर्षाजल दोनों परिस्थितियों में दीएमवी-2 की तुलना में मूंगफली की श्रेणियाँ

नामत: जीपीबीडी-4 और आईसीजीवी-91114 का प्रदर्शन बेहतर पाया गया। इसके अतिरिक्त, आंकड़े दर्शाते हैं कि जीपीबीडी-4 टिक्का पत्ती स्पॉट बीमारी के लिए प्रतिरोधक था।

- केरल के अलेप्पी और कोट्टायम जिलों में क्रमशः 36.62 और 31.87 टन/हे. की औसत उपज के साथ केएयू, त्रिशूर द्वारा संस्तुत उर्वरक की मात्रा से केला विशेष और केला शक्ति के फोलियर छिड़काव को समान रूप से प्रभावी पाया गया।
- कर्नाटक के बीदर, गुलबर्गा, कोप्पल और रायचूर जिलों में लाल चने में औसतन 12.01 टन/हे. मात्रा तक पॉड मशी क्षति को कम करने में पॉड भरण अवस्था में और दोबारा पहले इस्तेमाल के 15 दिनों बाद ऐसेफेट 70 एसपी के इस्तेमाल को प्रभावी पाया गया।
- मादा पुष्प के खुलने के समय मेनकोजेब 2.5₀/ट के छिड़काव को कर्नाटक के चिकमगलूर, दक्षिण कन्नड़ा और उडुपी जिलों में जिनेब 4/ट (24.4 ट) की तुलना में अरकानट में इनफ्लोरोसेंस डाई बैक में 26 ट कटौती करने में प्रभावी पाया गया।
- यूलोफिड पैरासिटॉएड (एसरोफेगस पपाया) 50 पैरासिटॉएय / हे. के टीका छोड़ने को मीली कीट संख्या की 100 ट कटौती करने में प्रभावी पाया गया और इससे पपीते की 26.30 टन/हे. उपज प्राप्त हुई। नीम तैल इमल्शन छिड़काव तथा वी. लेकानी के छिड़काव से मीली कीट ग्रसन की कटौती करने में मदद मिली परन्तु 2-3 सप्ताह के बाद प्रकट हुए मीली कीट का पुनर्ग्रसन बारंबार छिड़काव में परिणामित हुआ। परन्तु पैरासिटॉएड ए पपाए के टीका छोड़ने से मीली कीट की संख्या दोबारा प्रकट होने का निवारण हुआ। इसके अतिरिक्त, निर्मुक्त क्षेत्र से तथा साथ ही निर्मुक्त क्षेत्रों के समीप के क्षेत्रों से प्राप्त पैरासिटॉएड ने पैरासिटॉएड के प्रसार को दर्शाया।
- बहु पंक्ति शक्ति वीडर ने तमिलनाडु के अरियार, इरोड, नागापट्टिनम, सालेम, तिरुवरूर और तंजावूर जिलों जहाँ एसआरआई चावल की खेती अधिक प्रचलित थी, में सभी प्रकार की मिट्टियों में बेहतर निष्पादन किया और कोनो वीडर (5617 कि.ग्रा./हे.) तथा चक्रीय वीडर (5174.16 कि.ग्रा./हे.) की तुलना में 5804.5 कि.ग्रा./हे. की उच्चतम औसत उपज दर्ज की।
- डेयरी पशुओं के खाद्य में क्षेत्र विशिष्ट खनिज मिश्रण के अनुपूरण को तमिलनाडु के कडलूर, धर्मपुरी, दिन्दुगल, कांचीपुरम, पुडुकोट्टई, शिवगंगई और तिरुवरूर जिलों में डेयरी गाय की औसत दूध उपज

में वृद्धि करने (10 ट) के लिए प्रभावी पाया गया।

- कृत्रिम वीर्यसेचन करना (एआई) जब वे विभिन्न अवधियों में मदचक्र के लिए आते हैं, नियंत्रित आंतरिक औषधि निर्मोचन (सीआईडीआर) साधित्र के साथ मदचक्र तुल्यकालन तथा ओवो सिन्क प्रौद्योगिकी के साथ मदचक्र तुल्यकालन ने डेयरी पशुओं में तमिलनाडु के कोयम्बतूर, इरोड, कांचीपुरम जिलों में क्रमशः 40 ट, और 60 ट का परिधारण दर प्रदाऽ किया। इस प्रकार, सीआईडीआर डेयरी पशुओं में मदचक्र के तुल्यकालन के लिए प्रभावी है।
- अवरुद्ध कार्प अंगुलिमीन ने जलाशय में डुबाने पर लगभग दोगुना उत्पादन दिया ऐर तमिलनाडु के नामक्कल जिले में वर्ष पर्यंत किसानों को बीज की निरंतर आपूर्ति भी सुनिश्चित किया।

अग्रणी प्रदर्शन

केवीके ने विभिन्न प्रकार के नव-निर्मोचित फसल, फसलों में उत्पादन प्रौद्योगिकियाँ, पशुपालन तथा 3127.98 हे. में 10203 एफएलडी के संगठन जिसने विभिन्न प्रणालियों में उत्पादन एवं उत्पादकता को बढ़ाया, के माध्यम से अन्य कृषि संबंधी उद्यमों को प्रारंभ किया।

- 2295.35 हे. में विभिन्न फसलों में विभिन्नताओं तथा उत्पादन प्रौद्योगिकियों पर कुल 6268 एफएलडी किए गए जिनमें से 735.72 हे. में अनाज और ज्वार-बाजरा आदि (धान, गेहूँ, सोरघम, बाजरा, जवार, ज्वार-बाजरा आदि, फॉक्सटेल ज्वार-बाजरा आदि और छोटे ज्वार-बाजरा आदि) पर 1591 एफएलडी, तदुपरांत 493.10 हे. में दालों (बंगाल चना, काला चना, हरा चना, घोड़ा चना और लाल चना) पर 1149 एफएलडी, 138 हे. में कपास पर 372 एफएलडी, 648.59 हे. में बागवानी फसलों (फल, शाक-भाजी, पौधारोपण, पुष्प, चिकित्सकीय तथा सुगंधि, ट्यूबर, मसाले और तुरंत खाने योग्य फसले) पर 2308 एफएलडी, 51.70 हड़. में वाणिज्यिक फसलों (गन्ना और कॉफी) पर 111 एफएलडी तथा 55.04 हे. में चारा फसलों पर 260 एफएलडी।
- संकर के संबंध में, 480.18 हे. में विभिन्न (अनाज और ज्वार-बाजरा आदि, तैल बीज, बागवानी फसलें ऐर चारा) पर 1214 एफएलडी संचालित किए गए।
- खेत संबंधी विभिन्न उपकरणों पर विभिन्न फसलों में 317.61 हे. पर उनका सफलतापूर्वक कार्य-निष्पादन प्रदर्शित करते हुए कुल 469 एफएलडी संचालित किए गए।

- 5917 यूनितों के विभिन्न पहलुओं पर पशुधन पर 2039 एफएलडी संचालित किए गए जिनमें से सार्वधिक प्रदर्शन डेयरी क्षेत्र में, तदुपरान्त मुर्गीपालन, भे। और बकरी पालन, सूअर पालन और बत्तख पालन में किए गए।
- मत्स्य पालन के संबंध में, 34.84 हे. के खेत तथा गांव के तालाब में विभिन्न पहलुओं जैसे सम्मिश्रित मत्स्य पालन, सम्मिश्रित कार्प चालन, आलंकरिक मत्स्य पालन और झींगा पालन पर 136 एफएलडी संचालित किए गए।
- उद्यम के मामले में, किसानों की आय में वृद्धि करने के लिए विभिन्न पहलुओं पर मत्स्यपालन, मशरूम खेती तथा मधुमक्षीपालन पर 166 एफएलडी संचालित किए गए।

एफएलडी के परिणाम

- केवीके ने अग्रणी प्रदर्शनों के माध्यम से विभिन्न फसलों के कुल 57 उच्च उपज के प्रकार सफलतापूर्वक प्रारंभ किए। इनमें से 11 अनाज और ज्वार, बाजरा आदि, नामतः धान (चंपका, आईईटी-13901 (तुंगा), आईईटी-7191, अन्ना-4), ज्वार, बाजरा आदि (सीओ(आरए)14), सोरगम (सीएसवी-22, सीओ एस28), गेहूँ (डीडबल्यूआर-225, यूएस-415, राज-4037) और बाजरा (एमएच-946); के उच्च उपज के प्रकार थे; 17 दलहन फसलों के उच्च उपज के प्रकार थे - नामतः बंगाल-चना (जेजी 11, जीबीएस-964), काला चना (डीयू-1, वीबीएन (बीजी)5, सीओ6, वंबन (बीजी3), हरा चना (एसईएल-4, चमकदार मूँघ, वीबीएन-2, वीबीएन (जीएम)3, सीओ (जीजी)7, वंबन (जीजी3), लाल चना (बीआरजी-2, डीएस-3 आर, वीबीएन (जीएम)3, सीओ (जीजी)7, वंबन (जीजी3), लाल चना (बीआरजी-2, टीएस-3आर, वीबीएन 2, सीओ (आरजी) 7, वीबीएन (आरजी)-3), तैल बीजों की उच्च उपज वाली दो बीजें थी - नामतः मूँगफली (टीएमवी-13, जीपीबीडी-4), बागवानी फसलों के नौ उच्च उपज वाले प्रकार थे नामतः चूना (कागज़ी), गेंदा (ओरेंज डबल, पूसा नारंगी), क्रिसन्तेमम (कामिनी, अर्क स्वर्ण), गैलार्डिया (डीजीएस-1), तथा ग्लेडियोलस (अमेरिकी सुंदरता), टेपिओका (एच266 और श्री प्रकाश), एक कोलियस (निधि) का एचवाईवी था, 2 एचवाईवी जीव-जंतुओं के थे नामतः काली मिर्च (बीएसआर 2), अदरक (वर्धा); पाँच वाणिज्यिक फसल गन्ने (सीओसी (एससी) 24, सीओसी-96017, सीओ-8011, सीओ-86032, सीओ 86037), चारा फसलों के तीन एचवाईवी थे (हेड्ज ल्यूसर्न, डेसमन्तस और सुबाबुल) और सात कपास के एचवाईवी (रासी 2, एमआरसी-6918, बनी, आरसीएच-20 बीटी 2, आरसीएच 708, एमसीयू7) थे।
- अनाज और ज्वार, बाजरा आदि, दलहन, तैल-बीज, बागवानी फसल जैसे फल, पुष्प, साग-भाजी, ट्यूबर, औषधीय एवं सुगंधी, मसाले और खाद्य पदार्थ, पौधारोपण, वाणिज्यिक फसल, चारा फसल और कपास से संबंधित 61 फसलों में आईसीए, आईएनएम, आईडीएम, आईपीएम, आईपीडीएम, आईडबल्यूडी, संसाधन संरक्षण, मशीनीकरण, मृदा प्रबंधन मूल्य वर्धन जैसे विभिन्न थ्रिमेंटिक क्षेत्रों के अंतर्गत कुल 111 आधुनिक उत्पादन पद्धतियों का सफलतापूर्वक प्रदर्शन किया गया।
- केवीके ने किसानों के खेतों में धान (CORH3), मक्का (NAH-2049, NAH-1137, COHM 5) और ज्वार, बाजरा आदि (Co (Ra)14), बैंगन (COBH2) टमाटर (COTH 2, यूएस एग्री.-698), प्याज (नासिक लाल), सूरजमुखी (KBSH 53, KBSH44, KBSH41, DRSH-1), एरंड (YRCH 1), चारा (CO (CN)4), ट्यूबरोज (प्रजवल), गेंदा (ऐरोगोल्ड F1 संकर) जैसी विभिन्न फसलों के संकरों को भी सफलतापूर्वक प्रारंभ किया।
- खेत संबंधी उपकरणों तथा मशीनों के प्रदर्शन से समय और कष्टसाध्य श्रम में समुचित कटौती के अलावा विभिन्न फसलों के प्रमुख प्रचालनों में 40-85% के बीच श्रम की कटौती हुई।
- केवीके द्वारा पशुधन में संचालित प्रदर्शन डेयरी क्षेत्र में और उसके बाद मुर्गी-पालन, भेड़-पालन, बकरी-पालन, सूअर-पालन और बत्तख-पालन में किए गए। भरण प्रबंधन हस्तक्षेप के साथ जर्सी संकर ने प्रति दिन प्रति गाय 40% अधिक दूध की उपज दी। मलाबरी संकर तथा टेल्लीचेरी बकरी का सफलतापूर्वक प्रदर्शन किया गया और अवर्णित बकरियों के साथ बोएर संकर बकों के संकर करने से उनके शरीर के भार में 92.30% की वृद्धि हुई। देशी पक्षियों में मौखिक पैलेट टीकाकरण ने रानीखेत बीमारी में 41% की कटौती हुई। सूअर के बच्चों में जनदनाशन के साथ-साथ वर्धित प्रबंधन ने 20 तथा 11.68% अधिक शरीर वजन दिया।
- कतला, रोहू और मृगाल के साथ अंतर्देशीय जलकृषि में सामान्य कार्प प्रबंधन पर प्रदर्शन से शरीर के वजन में 30% की वृद्धि दर्ज की गई। झींगी खेती में श्वेत-बिंदु बीमारी की पहचान के लिए निदान-किट से झींगा के वजन में 54% की वृद्धि परिणामित हुई।

मत्स्यपालन (सीएसआर (2x4) के विभिन्न पहलुओं पर किए गए प्रदर्शन शहतूत की उपज में वृद्धि परिणामित हुए। इसके अतिरिक्त, मशरूम के एपीके 2 प्रकार के प्रारंभ किए जाने से 50% अधिक उपज मिली जिससे किसानों के लिए अतिरिक्त आय हुई।

प्रशिक्षण कार्यक्रम

- केवीके द्वारा कृषि तथा संबंधित क्षेत्रों में कुल 13828 प्रशिक्षण कार्यक्रम आयोजित किए गए और विभिन्न ग्राहक वर्गों के 4.36 लाख प्रतिभागियों को प्रशिक्षित किया गया। इनमें से, 11354 पाठ्यक्रम आवश्यकता पर आधारित थे, 1949 प्रायोजित थे और 525 व्यावसायिक थे जिसमें क्रमशः 360230, 64625 और 11395 प्रतिभागियों को प्रशिक्षित किया गया।
- राज्य-वार आंकड़ों के विश्लेषण से यह ज्ञात हुआ कि केवीके द्वारा विभिन्न राज्यों में आयोजित प्रशिक्षण कार्यक्रम प्रत्येक राज्य में स्थापित केवीके की संख्या के अनुरूप हैं।
- यह देखा गया कि लक्ष्यद्वीप में भाग लेने वाले 100% तथा गोवा में 44.10% किसान अ.जा. / अ.ज.जा. वर्ग के हैं।
- किसानों के लिए फसल उत्पादन में अधिक पाठ्यक्रम (34.32%) आयोजित किए गए 27.28% पाठ्यक्रम ग्रामीण युवाओं के लिए गृह विज्ञान / महिला सशक्तीकरण पर, 25.8% पाठ्यक्रम विस्तारण कार्मिकों के लिए घरेलू खाद्य सुरक्षा पर, 63.06% फसल उत्पादन पर प्रायोजित प्रशिक्षण पाठ्यक्रम तथा 50.29% पाठ्यक्रम उद्यमिता विकास पर केन्द्रीत व्यावसायिक प्रशिक्षण पर केन्द्रित थे।
- लिंग विश्लेषण ने दर्शाया कि केरल और पुडुचेरी में परिसर प्रशिक्षण पाठ्यक्रमों के अंदर और बारह दोनों में महिलाओं का प्राधान्य था। किसानों (72.22%), ग्रामीण युवा (50.07%) तथा गृह विज्ञान / महिला सशक्तीकरण पर प्रायोजित पाठ्यक्रमों (84.14%) में भी महिलाओं की प्रधानता दर्ज की गई। घरेलू खाद्य सुरक्षा पर आयोजित पाठ्यक्रमों में महिला विस्तारण कार्मिकों की प्रधानता (50.19%) रही। फसलोत्तर प्रौद्योगिकी तथा मूल्य वर्धन में व्यावसायिक प्रशिक्षण पाठ्यक्रमों में महिलाओं की सहभागिता (68.53%) अधिक रही।
- ग्रामीण युवाओं के लिए आयोजित परिसर के अंदर और बारह के प्रशिक्षण पाठ्यक्रम सभी राज्यों में समान रहे जिसने गांवों में युवाओं

को सुअवसर प्रदान की महत्ता दर्शाई।

- प्रशिक्षण के माध्यम से, ग्रामीण युवाओं को कृषि तथा संबंधित क्षेत्रों के ऐसे संभावित क्षेत्रों के बारे में जागरूक किया गया जहाँ वे आय सृजित करने वाले कार्यकलापों के लिए उद्यम कर सकते हैं।
- राज्य स्तरीय आंकड़ों ने यह तथ्य उद्घाटित किया कि तमिलनाडु में केवीके 57.77% की दर से प्रायोजित पाठ्यक्रम तथा व्यावसायिक पाठ्यक्रम (50.67%) दोनों के आयोजन में सक्रिय रूप से संलग्न रहे।
- केवीके द्वारा आयोजित व्यावसायिक पाठ्यक्रम प्रतिभागियों की जरूरतों और इच्छाओं के अनुसार हैं और इसीलिए ये पाठ्यक्रम प्रतिभागियों के लिए पूरी तरह उपयोगी हैं।
- केवीके, नामक्कल के कार्यकलाप विदेश मंत्रालय, भारत सरकार द्वारा प्रायोजित इंडो-अफ्रीकी फोरम सम्मेलन के तहत स्मालहोल्डर लाइवस्टॉक तथा वाणिज्यिक मुर्गी-पालन पर अंतर्राष्ट्रीय प्रशिक्षण कार्यक्रमों के आयोजन द्वारा नामीबिया और नाईजीरिया तक पहुँच गए। प्रशिक्षण की समाप्ति पर, प्रशिक्षु समूहों ने अपने संबंधित देशों में कार्यक्रम के दौरान सीखी गई प्रौद्योगिकियों के अनुप्रयोग पर पाँवर प्वाइंड प्रस्तुतीकरण दिए।

विस्तारण कार्यक्रम

- केवीके द्वारा विभिन्न विधियों एवं उपायों के आधार पर कुल 1.10 लाख विस्तारण कार्यक्रम एवं सेवाएँ आयोजित की गईं जिसके संपर्क 93.91 लाख किसान एर 2.01 लाख विस्तारण कार्मिक आए और कम समयाविधि में किसानों के खेतों में प्रदर्शित नई प्रौद्योगिकियों की उपयुक्तता के बारे में उन्हें अवगत कराया गया।
- केवीके 6722 कार्यक्रमों को आयोजित करते हुए जनसंचार उपयोगिता तथा लोकप्रिय प्रौद्योगिकियों में अग्रणी हैं।
- कुल 35 केवीके ने सरकारी और गैर-सरकारी संगठनों दोनों की 526 एजेन्सियों के सहयोग एवं सहकार तथा सक्रिय भागीदारी से प्रौद्योगिकी सप्ताह समारोह मनाया जिसमें 1.14 लाख किसानों को कृषि और संबंधित क्षेत्रों के विभिन्न पहलुओं के बारे में बताया गया।
- कुल 7035 किसानों ने केवीके के साथ किसान मोबाइल परामर्शदात्री

सेवाओं के लिए पंजीकरण कराया और कृषि संबंधित विभिन्न पहलुओं और मामलों को शामिल करते हुए 2957 संदेश भेजे

- केवीके की ई-कनेक्टिविटी से किसानों और अन्य भागीदारों को आसान और किफायती रूप से सूचना तक पहुँच बनी। केवीके बह, नई दिल्ली ओर से कुल 26 ई-संगोष्ठियों को वेब में डाला गया जिसमें केवीके के लिए हितकारी विभिन्न विषयों को शामिल करते हुए विशेषज्ञों की सेवाएँ शामिल की गईं। परिषद द्वारा विकसित एनी टाइम केवीके साफ्टवेयर के लिए दिनांक 4.8.2010 को एक ऑन-लाइन प्रशिक्षण कार्यक्रम आयोजित किया गया।

बीज एवं पादप संबंधी सामग्रियाँ

- केवीके ने विभिन्न की फलसों के 6657.83q बीजों का, फसल संकर के 227.40q बीजों का, 8231.21q जैव-उत्पाद, फसल संकरों की 67.32 लाख पादप सामग्रियों का, 1.43 लाख लाइवस्टॉक तथा मत्स्यापलन जिनकी लागत 382.12 लाख रु. थी. का उत्पादन किया और 2.66 लाख किसानों को इनकी आपूर्ति की गई।
- एटीआईसी ने 6280 किसानों को बीज (803.54q), पादपरोपण सामग्रियाँ (21442 नग), जैव-उत्पादन (1700.35q) तथा मूल्य वर्धन उत्पादन (14782 पैकेट) सहित अनेक प्रौद्योगिकीय निर्वेशों का विक्रय किया।

मृदा, जल एवं पादप परीक्षण

- केवीके द्वारा 1296 गांवों के 29808 किसानों से प्राप्त 26.92 लाख रु. मूल्य के मृदा, जल, पादप, गोबर, चूना आदि के कुल 35696 नमूनों का विश्लेषण किया गया और पोषक-तत्व आधारित सिफारिशें और सुझाव दिए।

मानव संसाधन विकास (एचआरडी)

- विस्तारण निदेशालयों द्वारा कृषि एवं संबंधित क्षेत्रों के विभिन्न

पहलुओं पर कुल 16 प्रशिक्षण कार्यक्रम तथा 26 कार्यशालाएँ, बैठकें एवं संगोष्ठियाँ आयोजित की गईं जिनमें उन्होंने प्रौद्योगिकीय बैकस्टॉपिंग कार्यक्रम के तहत केवीके के स्टाफ के बीच नवीनतम प्रौद्योगिकियों के बारे में अवगत कराया।

- कुल 808 केवीके स्टाफ जिनमें 30 कार्यक्रम समन्वयक, 465 विषय-विशेषज्ञ तथा 65 कार्यक्रम सहायक शामिल थे, ने मासंवि कार्यक्रमों में भाग लिया और उन्हें अपने दैनंदिन कामकाज को अधिक प्रभावी और कार्यक्षम रूप से करने के लिए आवश्यक ज्ञान एवं कौशल को समझने और अर्जित करने का अवसर मिला।
- इसके अलावा, 183 केवीके स्टाफ को विभिन्न संगठनों नामतः यूएएस, धारवाड़, मैनेज, राजेन्द्रनगर, हैदराबाद, एनएएआरएम, राजेन्द्रनगर, हैदराबाद, एनबीएआईआई, हेब्बाल, बेंगलूर और डीआरडब्ल्यूए, भुवनेश्वर द्वार आयोजित कृषि तथा संबंधित क्षेत्रों के विभिन्न पहलुओं पर विभिन्न प्रशिक्षण कार्यक्रमों के लिए मंडल परियोजना निदेशालय द्वारा नामित किया गया।

कार्यशालाएँ, बैठकें एवं संगोष्ठियाँ

- मंडल परियोजना निदेशालय-मंडल ऋच्छ क्षेत्रीय केवीके अंतरापृष्ठ बैठक 2010, राष्ट्रीय खेत नवाचारी बैठक 2010 तथा नवाचार प्रदर्शनी 2010 के आयोजन में सक्रिय रूप से संलग्न था।
- मंडल ऋच्छ में आईसीएआर द्वारा देश में पहली बार खेत नवाचार बैठक-2010 का आयोजन किया गया जिसमें 25 राज्यों का प्रतिनिधित्व करते हुए 221 खेत नवाचारियों ने हिस्सा लिया जिनमें से 104 किसानों ने अपने संबंधित नवोन्मेष के बारे में बताया और देश भर से आए अपने साथी किसानों को अपने अनुभव सुनाए और शेष किसानों ने अपने नवोन्मेष पोस्टर प्रदर्शित कर प्रस्तुत किए।
- इस प्रदर्शनी में किसानों के कुल 196 नवोन्मेष सजीव हस्ताक्षरों तथा मॉडलों के साथ पोस्टर के माध्यम से प्रदर्शित किए गए।

Executive Summary

Indian agriculture is unique with diverse agro-ecological conditions and striving towards sustainability. The National Agricultural Research System (NARS) continuously generating and disseminating technologies for increasing productivity, production, profitability among stakeholders to make growth in Indian agriculture as sustainable. In this direction, Indian Council of Agricultural Research (ICAR) has established a network of Krishi Vigyan Kendras (KVKs) at district level under different host organizations viz., ICAR, State Agricultural Universities (SAUs), Non-Governmental Organizations (NGOs), Deemed Universities (DUs) and State Department of Agriculture (SDA) throughout the country. KVKs are working at field level with farmers, farm women, rural youth and other stakeholders in the system as partners in their mandated activities.

The Zonal Project Directorate-Zone VIII coordinates, plans, monitors and evaluates the technological interventions and extension programmes of 77 KVKs located in Karnataka (28), Tamil Nadu (30), Kerala (14), Goa (2), Puducherry (2) and Lakshadweep (1). KVKs are vested with the tasks to carry out technology assessment, refinement and demonstration through the technological backstopping of Directorate of Extension under SAUs. KVK programmes are being planned, implemented, executed and evaluated with the farmers, by the farmers and for the farmers. It is heartening to note that all three National KVK Awards for the year 2009 from the ICAR were bagged by three KVKs viz. Kannur, Kancheepuram and Cuddalore of this Directorate.

KVKs have undertaken various programmes in agriculture and allied sectors for providing the best possible technological solutions and thereby improving the agricultural system in their respective districts, which ultimately aiming for bringing prestige, profit and partnership among the farmers.

Accomplishments of this Directorate during the period under report are summarized here under.

Development of expert system for agriculture and animal husbandry enterprises

- Expert system was designed and developed for paddy, banana, sugarcane, ragi and coconut in English facilitating instant decision-making process of the farmers, extension workers, scientists and other stakeholders through ICT enabled mechanism.
- Expert system was designed and developed through building of knowledge base, inference engine and user interface for arriving result or solution at a single point decision.
- Home page of expert system was designed and developed with computerized decision support system, wherein details were provided about season, variety, soil, water, land preparation, nursery management, cultivation, irrigation, nutrient management, farm implements, post harvest technology, marketing, institutions and schemes and FAQ's, diagnosing system (crop doctor), which displays image based identification of symptoms or damages as well as images/video based control measures, and information system that enables updating of these contents dynamically then and there based on the advancement of the technologies.

Economic analysis of *Bt* cotton cultivation in Perambalur district of Tamil Nadu

- A study on economic analysis of *Bt* cotton cultivation indicated that cotton + maize is the predominant cropping pattern adopted by the farmers in rainfed conditions with *Bt* cotton wherein yield increase varied between 30 to 60% with BC Ratio between 1.28 to 2.48.

Special programme on pulse crop demonstrations under technology demonstration for harnessing pulse production in the country

- A total of 455 demonstrations were conducted on pulse crops viz., blackgram (46), greengram (132)

and pigeonpea (277) in 13 districts of Karnataka and one district of Tamil Nadu in an area of 215.8 ha during *kharif* 2010. Results indicated that the average yield increase ranged from 25 to 136% in blackgram (DU-1) in Bidar and Gulbarga districts of Karnataka, 18.45 to 83.33% in greengram (Sel-4, China moong) in Gadag, Bellary, Belgaum, Dharwad, Koppal, Bidar and Gulbarga districts of Karnataka, 15.57 to 20.28% in greengram (VBN-2) in Namakkal district of Tamil Nadu, 11.68 to 50.48% in short duration pigeonpea (TS-3R, ICP-8863, BRG-1) in Raichur, Dharwad, Koppal, Mysore and Tumkur districts in Karnataka and 16.00 to 98.67% in long duration pigeonpea (TS -3R, BRG 2, BSMR 736) in Gulbarga, Chitradurga, Bellary, Belgauma and Bidar districts of Karnataka.

- A total of 382 demonstrations were conducted on pulse crops namely blackgram (113), greengram (64) and chickpea (205) in 10 districts of Karnataka and 12 districts of Tamil Nadu in an area of 155.10 ha during *rabi* 2010-11. Results revealed that the average yield increase ranged from 18.15 to 70.00% in chickpea (JG-11) with Integrated Crop Management (ICM) practices in Raichur, Dharwad, Mysore, Koppal, Gadag, Gulbarga, Chitradurga, Belgaum, Bellary and Bidar districts of Karnataka, 17.09 to 124.0% in blackgram (VBN- 3, VBN-4, VBN-5, ADT-3, Co-6) with ICM practices in Tuticorin, Erode, Thiruvarur, Namakkal, Virudhunagar, Thiruvanamalai, Villupuram, Namakkal, Nagapattinam, Tiruvallur and Vellore districts of Tamil Nadu, 11.76 to 73.08% in greengram (VBN(Gg)- 2, VBN(Gg)-3, Sel-4, ADT(Gg)-3) with ICM practices in Thiruvarur, Tiruvallur, Virudhunagar and Vellore districts of Tamil Nadu and Gadag district of Karnataka.

National Initiative on Climate Resilient Agriculture (NICRA)

- NICRA was implemented in 9 KVKs namely Kolar, Tumkur, Davanagere, Belgaum in Karnataka, Ramanathapuram, Villupuram, Nagapattinam, Namakkal in Tamil Nadu and Alleppey in Kerala

during 2010-11. Technical programme of these KVKs was finalized and infrastructure like small agricultural implements, drip/sprinkler systems etc procured for custom hiring and one automatic weather station was established at each KVK to provide weather based advisories to the district farmers.

Technology assessment and refinement

- A total of 587 technologies were assessed and refined by KVKs through conducting 5807 trials in 945 locations.
- With regard to crops, 461 technologies were assessed on various thematic areas through 2933 trials in 785 locations. More number of technologies were assessed on Integrated Nutrient Management (INM) (84) followed by varietal evaluation (82), Integrated Crop Management (ICM) (72), Integrated Pest Management (IPM)(65), Integrated Disease Management (IDM)(58), farm machineries (22), weed management (19), value addition (13), small scale income generation enterprises (11), Integrated Farming System (IFS) (10), storage techniques (8), Resource Conservation (RC) technology (6), seed/plant production (6) and mushroom cultivation (5).
- In case of livestock, 90 technologies were assessed through 2684 trials in 113 locations of which more number of technologies were assessed on production and management (25) followed by disease management (23), nutrition management (21), evaluation of breeds (11) and feed and fodder (10).
- A total of 36 crop technologies were refined pertaining to different thematic areas viz., drudgery reduction, ICM, INM, IPM, RC Technology, small scale income generating enterprises, storage technique, value addition, mushroom cultivation and seed/plant production by laying out 190 trials in 47 locations.

Results of few selected technology options for their location specificity

- Rice variety PMK(R)4 (Anna 4) gave the highest average yield (94.61 q/ha) as compared to ADT 39/36 (87.99 q/ha) and Farmers practices (83.96 q/ha) in drought prone areas of Cuddalore, Thiruvallur and Villupuram districts in Tamil Nadu.
- Application of pulse wonder gave highest average yield of 7.60 q/ha in blackgram as against farmers practices (4.90 q/ha) in Cuddalore, Villupuram, Dharmapuri, Ramanathapuram, Kancheepuram, Thiruvallur, Vellore districts in Tamil Nadu.
- Performance of groundnut varieties viz., GPBD-4 and ICGV-91114 were found superior as compared to TMV-2 in both irrigated and rainfed conditions in Belgaum and Gadag districts of Karnataka. Further, data showed that GPBD-4 was resistant to tikka leaf spot disease.
- Foliar spray of banana special and banana sakthi were found to be equally effective along with the fertilizer dose recommended by KAU, Thrissur with an average yield of 326.2 and 318.7 q/ha, respectively in Alleppey and Kottayam districts of Kerala.
- Application of acephate 70 SP at pod filling stage and again 15 days after first application found to be superior in reducing pod fly damage to the extent of 12.01% in pigeonpea in Bidar, Gulbarga, Koppal and Raichur districts of Karnataka.
- Spraying of Mancozeb @ 2.5 g/l at the time of opening of female flower found effective in reduction of 26% of inflorescence die back in arecanut as compared to Zineb @ 4 g/l (24.4%) in Chickmagalore, Dakshina Kannada and Udupi districts of Karnataka.
- Inoculative release of *Eulophid* parasitoid (*Acerophagus papaya*) @ 50 parasitoids/ha found to be effective in reducing 100% mealy bug population and gave yield of 263 q/ha of papaya. Neem oil emulsion sprays and sprays of *V. lecanii* helped to reduce the mealy bug infestation, but reinfestation of mealy bugs occurred after 2-3 weeks resulting in repeated sprays. But the inoculative release of the parasitoid *A. papayae* prevented reoccurrence of mealy bug population. Further, parasitoids were recovered from released area as well as from areas adjacent to released sites indicated the spread of parasitoids.
- Multi row power weeder performed better in all types of soils in Ariyalur, Erode, Nagapattinam, Salem, Thiruvarur and Thanjavur districts of Tamil Nadu where SRI rice cultivation was more prevalent and recorded highest average yield of 58.04 q/ha as compared to cono weeder (56.17 q/ha) and rotary weeder (51.74 q/ha).
- Supplementation of area specific mineral mixture in feed of dairy animals found effective to increase average milk yield of dairy cow (10%) in Cuddalore, Dharmapuri, Dindugal, Kancheepuram, Pudukottai, Shivagangai and Thiruvarur districts in Tamil Nadu.
- Doing Artificial Insemination (AI) when they come for estrus at different periods, estrus synchronization with Controlled Internal Drug Releasing (CIDR) device and estrus synchronization with Ovo sync technology gave 40%, 80% and 60% conception rate in dairy animals, respectively in Coimbatore, Erode, Kancheepuram districts of T district of Tamil Nadu.

Frontline demonstrations

- KVKs have introduced newly released crop varieties, production technologies in crops, animal husbandry and other agriculture related enterprises through organization of 10203 FLDs in 3127.98 ha that augmented production and productivity in different farming systems.
- A total of 6179 FLDs were carried out on varieties and production technologies of various crops in 2295.35 ha. Out of which, 1591 FLDs on cereals and millets (paddy, wheat, sorghum, bajra, jowar, finger millet, foxtail millet and little millet) in 735.72 ha followed by 1149 FLDs on pulses (Bengalgram, blackgram, greengram, horsegram and redgram) in 493.10 ha, 388 FLDs on oil seeds (groundnut, sesame, soybean and sunflower) in 138ha, 372 FLDs

on cotton in 173.2 ha, 2308 FLDs on horticultural crops (fruit crops, vegetable crops, plantation crops, flower crops, medicinal and aromatic plants, tuber crops, spices and condiments) in 648.59 ha, 111 FLDs on commercial crops (sugarcane and coffee) in 51.70 ha and 260 FLDs on fodder crops in 55.04 ha.

- With regard to hybrids, 1214 FLDs were conducted on different crops (cereals and millets, oil seeds, horticultural crops and fodder) in 480.18 ha.
- A total of 469 FLDs were conducted on various farm implements by successfully demonstrating their performance on 317.61 ha in different crops.
- Conducted 2039 FLDs on livestock on various aspects with 5917 units of which highest number of demonstrations were in dairy sector followed by poultry, sheep and goat, piggery and duckery.
- With respect to fisheries, 136 FLDs were conducted on various aspects like composite fish culture, composite carp culture, ornamental fish culture and prawn culture in 34.84 ha of farm and village ponds.
- In case of enterprises, 166 FLDs were conducted on sericulture, mushroom cultivation and apiculture on various aspects for increasing the income of the farmers.

Results of FLDs

- KVKs have successfully introduced a total of 57 high yielding varieties of different crops through frontline demonstrations. Out of which, 11 were high yielding varieties of cereals and millets viz., paddy (Champaka, IET-13901 (Thunga), IET-7191, Anna 4), finger millet (CO(Ra) 14), sorghum (CSV-22, Co S 28), wheat (DWR-225, UAS-415, Raj-4037) and bajra (MH-946); 17 were high yielding varieties of pulse crops viz., bengalgram (JG 11, GBS-964), blackgram (DU-1, VBN (Bg)5, CO6, Vamban (Bg)3), greengram (Sel-4, Shining Moong, VBN-2, VBN (Gg)3, Co (Gg)7, Vamban (GG3), redgram (BRG- 2, TS-3R, VBN2, CO (Rg) 7, VBN(Rg)-3); two were high yielding varieties of oil seeds viz., groundnut (TMV-13, GPBD-4), nine were high yielding varieties of horticultural crops viz., lime (Kagzhi), marigold (orange double, Pusa Narangi), chrysanthemum (Kamini, Arka Swarna), gaillardia (DGS-1), and gladiolus (American beauty), tapioca (H266 and Sri Prakash), one was HYV of coleus (Nidhi), 2 HYVs of spices viz., pepper (BSR 2), ginger (Varadha); five were HYVs of commercial crop sugarcane (COC(SC)24, COC - 96017, CO-8011, CO-86032, CO 86037), three were HYVs of fodder crops Hedge Lucerne, Desmanthus and Subabul) and seven were HYVs of cotton (Rasi 2, MRC-6918, Bunny, RCH-20 Bt 2, RCH 708, MCU 7, Brahma Bg II).
- A total of 111 modern production practices under different thematic areas viz., ICM, INM, IDM, IPM, IPDM, IWD, resource conservation, mechanization, soil management, value addition were successfully demonstrated in 61 crops belonging to cereals and millets, pulses, oilseeds, horticultural crops like fruits, flower, vegetables, tuber, medicinal and aromatic, spices and condiments, plantation, commercial crops, fodder crops and cotton.
- KVKs have also successfully introduced hybrids of different crops viz., paddy (CORH3), maize (NAH-2049, NAH-1137, COHM 5) and finger millet (Co (Ra).14), brinjal (COBH2), tomato (COTH 2, US Agri.-698), onion (Nasik red), sunflower (KBSH 53, KBSH44, KBSH41, DRS-1), castor (YRCH 1), fodder (CO (CN)4), tuberose (Prajwal), marigold (Arrowgold F1 hybrid) in farmers fields.
- Demonstrations on farm implements and machineries reduced labour between 40-85% in carrying out major operations of different crops as well as time and drudgery of labour.
- Highest number of demonstrations conducted by KVKs in livestock were on dairy sector followed by poultry, sheep, goat, piggery and duckery and demonstrated successfully the technological interventions. Jersey cross with feed management intervention gave 40% more milk yield per day/cow. Malabari cross and Tellechery goat were

successfully demonstrated and crossing boer cross bucks with non descript goats gave 92.30% increase in body weight. Oral pellet vaccination gave 41% reduction in ranikhet disease in desi birds. Improved manangement as well as castration in piglets (Yorkshire) gave 20 and 11.68% body weight.

- Demonstrations on common carps management in inland acquaculture with Catla, Rohu and Mrigal gave an increase of 30% yield by body weight. Diagnostic kit for detection of white spot disease in shrimp farming resulted 54% increase in body weight of prawn.
- Demonstrations conducted on various aspects of sericulture (CSR (2x4) resulted an increase of cocoon yield and introduction of mushroom variety APK 2 gave 50% more yield which provided additional farm income to the farmers.

Training programmes

- A total of 13828 training courses were organized by KVKs on various aspects of agriculture and allied sectors and trained 4.36 lakh participants of different clientele. Out of which, 11354 courses were need based, 1949 were sponsored and 525 were vocational wherein 360230, 64625 and 11395 participants were trained, respectively.
- State wise data analysis indicated that the training courses organized by KVKs in different states are in tune to the number of KVKs established in each state.
- It was observed that 100% participating farmers belonging to SC/ST category in Lakshadweep followed by 44.10% in Goa.
- More courses (34.32%) were organized in crop production for farmers, 27.28% courses on home science/women empowerment for rural youth, 25.80% courses on house hold food security for extension personnel, 63.06% of sponsored training courses on crop production and 50.29% courses of vocational training focused on entrepreneurship development.

- Gender analysis indicated that female dominated in both on and off campus training courses in Kerala and Puducherry. Female domination was recorded in courses organized for farmers (72.22%), rural youth (50.07%) and sponsored courses (84.18%) on home science/women empowerment. Women extension personnel dominated (50.19%) in courses on house hold food security. Female participation in vocational training courses was dominated on post harvest technology and value addition (68.53%).
- On and off campus training courses organized for rural youth were on par in all states which indicated the importance given to provide opportunity to the youth in the villages.
- Through training, rural youth were made aware of potential areas in agriculture and allied sectors where they can venture for income generating activities.
- State level data revealed that KVKs in Tamil Nadu actively involved in organization of both sponsored courses at the rate of 57.88% and vocational courses (50.67%).
- Vocational courses organized by KVKs are in line with the needs and desires of the participants and therefore courses found to be fully useful to the participants.
- Activities of KVK Namakkal reached to Namibia and Nigeria by organization of International Training Programmes on Smallholder Livestock and Commercial Poultry Farming under Indo-African Forum Summit sponsored by Ministry of External Affairs, Government of India. At the end of training, trainee groups made power point presentations on the application of technologies learnt during the programme in their respective countries.

Extension programmes

- A total of 1.10 lakh extension programmes and services were organized / provided on the needs through based on different methods and means by the KVKs which brought contacts to 93.91 lakh farmers and 2.01 lakh extension personnel and made

them aware about suitability of new technologies demonstrated in the farmers fields in a short period of time.

- KVKs are in the forefront of mass media utilization and popularized technologies through organization of 6722 programmes.
- A total of 35 KVKs conducted technology week celebrations with cooperation and collaboration and active involvement of 526 agencies both government and NGOs in which 1.14 lakh farmers were exposed to various aspects of agriculture and allied sectors.
- A total of 7035 farmers registered for Kisan Mobile Advisory Services with KVKs and sent 2957 messages covering various aspects and issues of agriculture.
- E-connectivity of KVKs has made access to the information easy and cost effective to the farmers and other stakeholders. A total of 26 e-seminars were webcasted from KVK hub Delhi involving experts in the field covering various topics of interest to KVKs. One on-line training programme for Any Time KVK software developed by the Council was conducted on 4.8.2010.

Seeds and planting materials

- KVKs have produced 6657.83 q seeds of crop varieties, 227.40 q seeds of crop hybrids, 8231.21 q bio-products, 67.32 lakh planting materials of crops, 110.79 lakh planting materials of crop hybrids and 1.43 lakh livestock and fisheries which worth Rs.382.12 lakh and supplied to 2.66 lakh farmers.
- ATICs have sold technological inputs including seeds (803.54 q), planting materials (21442 numbers), bio-products (1700.35 q) and value added products (14782 packets) to 6280 farmers.

Soil, water and plant testing

- A total of 35696 samples of soil, water, plant, manure, lime etc., received from 29808 farmers belonging to 1296 villages were analysed worth Rs.26.92 lakh by KVKs and provided nutrient based recommendations and advices.

Human Resources Development (HRD)

- A total of 16 training programmes and 26 workshops, meetings and seminars were conducted by Directorates of Extension on various aspects of agriculture and allied sectors wherein they appraised latest technologies among KVK staff under technological backstopping programme.
- A total of 808 KVK staff consisting of 30 Programme Coordinators, 465 Subject Matter Specialists and 65 Programme Assistants have underwent HRD programmes there by acquainted and acquired knowledge and skills to carry out their day to day assignments more efficiently and effectively.
- Besides, 183 KVK staff nominated from the Zonal Project Directorate for different training programmes on various aspects of agriculture and allied sectors organized by various organizations viz., UAS, Dharwad, MANAGE, Rajendranagar, Hyderabad, NAARM, Rajendranagar, Hyderabad, NBAIL, Hebbal, Bangalore and DRWA, Bhubaneswar.

Workshops, meetings and conferences

- The Zonal Project Directorate–Zone VIII was involved in organization of Regional KVK Interface Meeting 2010, National Farm Innovators Meet 2010 and Innovators Exhibition 2010.
- Farm Innovators Meet-2010 was organized for the first time in the country by the ICAR at National level in Zone VIII wherein a total of 221 farm innovators representing 25 states of which 104 farmers spoke about their respective innovations and shared their experiences to other fellow farmers across the country and remaining farmers presented their innovations in the form of poster display.
- A total of 196 innovations of farmers were depicted through posters in the exhibition with live specimens as well as models.

1. About Zonal Project Directorate

The Division of Agricultural Extension Division, one of the eight Divisions of Indian Council of Agricultural Research (ICAR), New Delhi has established a network of Krishi Vigyan Kendras (Farm Science Centres) all over the country under the umbrella of ICAR, SAUs, State Department of Agriculture and NGOs with an aim to offer specialized need based teaching to the farming community through technological interventions on various aspects of agriculture and allied sectors. The Division of Agricultural Extension headed by the Deputy Director General (Agricultural Extension) monitor and review the progress of KVKs through its eight Zonal Project Directorates (earlier known as Zonal Coordinating Units) located in eight Zones in the country (Table 1).

1. 1 Genesis

Lab to Land programme (LLP) was launched in 1979 by ICAR on the occasion of its Golden Jubilee celebrations and it was implemented by establishing eight Zones in the country. As a result, Zonal Coordinating Unit-Zone VIII was established in September 1979 as a Cess Fund Scheme under Transfer of Technology Projects (TOT) of ICAR at Tamil Nadu Agricultural University (TNAU), Coimbatore to monitor the activities of LLP for the states of Karnataka, Kerala, Tamil Nadu and Union Territories of Puducherry and Lakshadweep.

Subsequently, the Unit was transferred to the Campus of Regional Station of National Dairy Research Institute (NDRI) at Audugodi, Bangalore in September, 1981 with the same objective of monitoring LLP in the Zone VIII.

The Unit was converted as a Plan Scheme with additional staff in 1986 and additional objective of monitoring other TOT 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 Oil Seeds in 1987 onwards. During 1990-91, added another objective of implementing and monitoring of National Pulse Project in Zone VIII including Goa as additional state to the Unit.

Zonal Coordinating Units were upgraded as Zonal Project Directorates (ZPDs) during the XIth Five Year Plan in the year 2009 with same staffing pattern as well as infrastructure and keeping in view the proper management, monitoring and financial support to the KVKs in the country, Zonal Coordinators were designated as Zonal Project Directors with financial and administrative power akin to other ICAR institutes. Accordingly, Zonal Coordinating Unit- Zone VIII was renamed as Zonal Project Directorate- Zone VIII.

Campus of ZPD-Zone VIII is located 0.5 km away from Western side of Hebbal flyover, 3 km from Mekhri

Table 1 : Zonal Project Directorates and States

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

Circle, 12 km from Bangalore Central Railway Station, 6 km from Yeswanthapur Railway Station, 12 km from Magestic Bus Stand and 25 km from Bangalore International Air Port.



Campus of Zonal Project Directorate - Zone VIII, Bangalore

1.2 Mandate

The Zonal Project Directorates are established by the ICAR to cater the needs of farming community through effective functioning of KVKs at zonal level in the country. The 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 development departments.
- Coordinate with state/central government agencies, credit institutions and any other organization for successful implementation of programmes.
- Serve as feedback mechanism from the projects to research and extension systems.
- Help in implementation of other projects on oilseeds, pulses, maize, cotton, popularizing improved implements and 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 16 (Table 2).

Table 2 : Staff of Zonal Project Directorate-Zone VIII

Category	Sanctioned	Filled
Zonal Project Director (RMP)	1	1
Scientific	4	4
Technical	2	2
Administrative	8	5
SSS (Gr-II)	1	1
Total	16	13

1.4 Organizational Structure

The organizational structure of Zonal Project Directorate-Zone VIII and KVKs functioning in this Directorate starting from Director General, ICAR is depicted in Fig.1.

1.5 Research Projects

1.5.1 Development of expert system for agriculture and animal husbandry enterprises

Keeping the importance of ICT enabled interventions in agriculture and providing timely expert advise to farmers, a net work 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 and 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

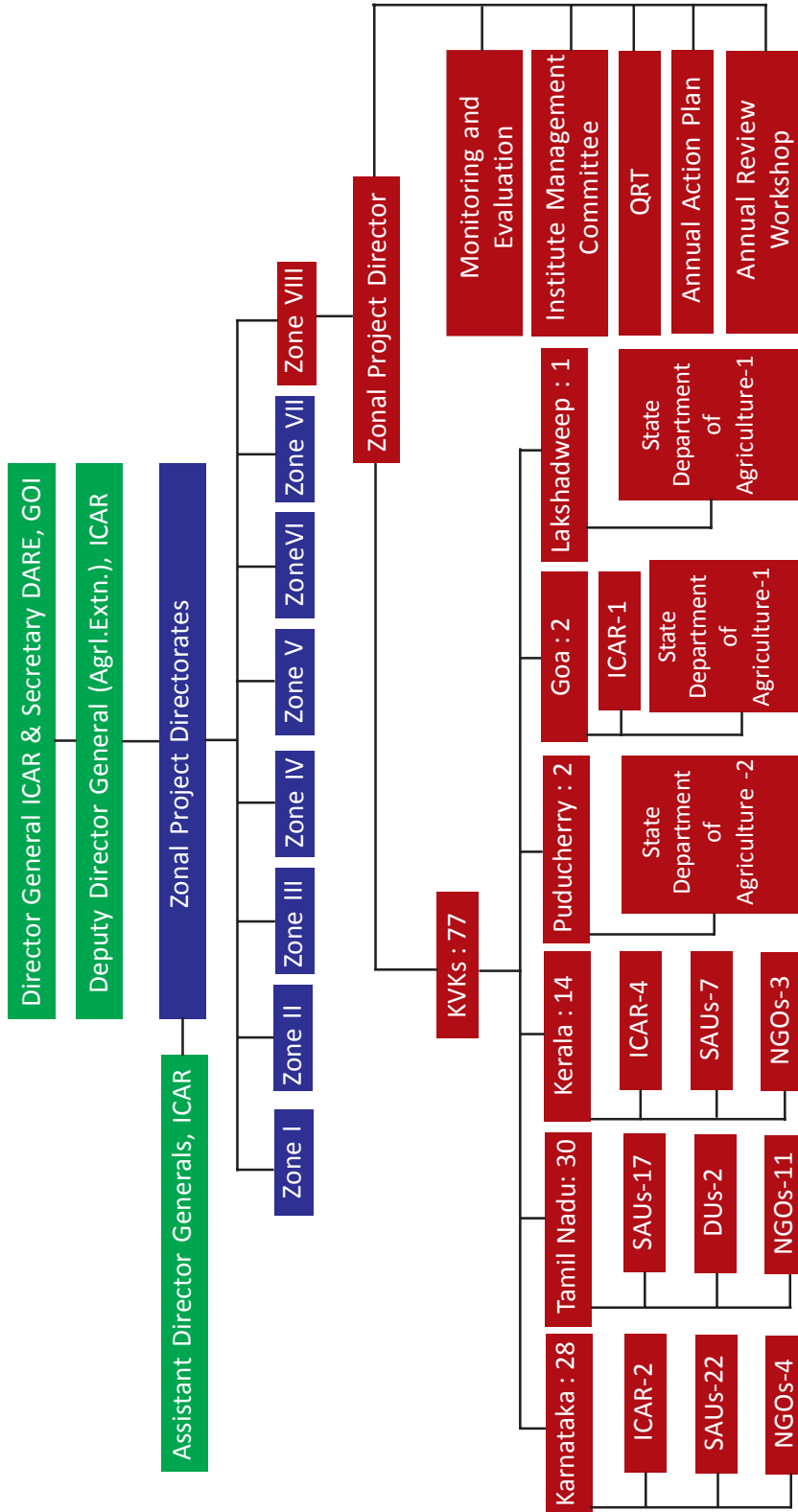


Fig.1 : Organizational structure of Zonal Project Directorate –Zone VIII

is to develop expert system for agriculture (paddy, sugarcane, banana, ragi and coconut) and animal husbandry for the farmers of three states viz., Tamil Nadu, Karnataka and Kerala in their respective languages i.e., Tamil, Kannada and Malayalam.

Salient achievements

Expert system was designed and developed for paddy, banana, sugarcane, ragi and coconut in English facilitating instant decision-making process of the farmers, extension workers, scientists and other stakeholders through ICT enabled mechanism and translation of contents for these crops are in progress. The process of expert system development and its home page are discussed in brief here under.

Process of expert system development

It underwent three steps viz., knowledge base, inference engine and user interface.

Knowledge base: A critical aspect of building an expert system is formulating the scope of the problem and gleaning from the source expert the domain information needed to solve the problem. The translation of the knowledge possessed by the expert into a knowledge base is the bottleneck in the process of knowledge acquisition. In the present work, knowledge has been obtained from different sources. Knowledge base in the form of contents has been collected from the SAUs, ICAR institutes, research stations, KVKs and innovative farmers. The series of interactive meetings were organized to know the farmers need on selecting subject and frequently asked questions. The stage by stage symptoms and growth of plants were also documented in the form of image, video and audio formats. The collected contents were organized and validated with the help of concerned expert scientists.

Inference engine: Inference engine is the component that manipulates the knowledge found in the knowledge base as needed to arrive at a result or solution. An expert system's rule base is made up of many such inference rules. They are entered as separate rules and it is the inference engine that uses them together to draw conclusions. Because each rule is a unit, rules may be

deleted or added without affecting other rules (though it should affect which conclusions are reached). One advantage of inference rules over traditional programming is that inference rules use reasoning which more closely resemble human reasoning. Therefore, care has taken while developing expert system for paddy, banana, sugarcane, ragi and coconut and made rule base.

User interface: The user interface is the component that allows the user to query the system and receive the results of those queries. It also have an explanation facility which explains why a problem was occurred and how could be solved with appropriate action. It use the rule based, were the experience and knowledge of a human expert is captured in the form of if-then rules and facts. Here it is designed in image based expert system. Farmers can have a look and feel, by viewing the photos in form of slide shows and video clippings. It helps them in comparing with their field symptoms and they will get a single point decision.

Home page of expert system

There are three important components in home page of the expert system viz., decision support system, diagnosing system (crop doctor) and information system.

Decision support system (DSS): It is a computerized system for making decisions. A decision is a choice between alternatives based on estimates of the values of those alternatives. Supporting a decision means helping farmers working alone or in a group gathers intelligence, generate alternatives and make choices. Accordingly, the DSS has been contemplated and designed to get best possible options and decision by farmers themselves for the day-to-day agriculture operation. Drop down formula or multiple combo boxes have been created using simple dot net programme. Each boxes in the DSS are correlated with each one for retrieving the best possible decision support for crop cultivation.

The DSS is consisting of details about season, climate, variety, soil, water, land preparation, nursery management, cultivation, irrigation, nutrient management, weed management, farm implements, post harvest

technology, marketing, institutions & schemes, grants & subsidies from various institutions and frequently asked questions. Therefore, farmers can increase their productivity by raising yield per ha there by enhance their economic growth through DSS. It will keep track of farmer's all type of information related to above said crops. The DSS page of expert system for coconut is depicted in Fig.2. The DSS helps the farmers to:

- Choose the suitable variety for the particular location based on the soil, climate and water.
- Give solution whether the particular farm is suitable for crop cultivation or whether soil/water/existing climate is suitable for establishing concerned crop cultivation. Based on the decision given in the DSS, farmers can take further decision or consultation with scientists for further action.
- Give decision support for better nutrient management. It will also calculate automatically the nutrient requirement with cost based on the type of soil and water.
- Provide direction to the farmer for adopting correct crop production technology as well as how to avail the grants and subsidies from various institutions.
- Guides the farmers to sell their commodities to the market through proper channels and so on.



Fig.2: Decision support system page of expert system for coconut

Key features of DSS

- User friendly navigation.
- Image and video based information, so even illiterate can use this system and get image based information.
- Instant decision support for key information on crop production technologies.
- Automatic calculation of nutrient requirement for different stages of crops based on the soil, water and other parameters.
- Scientific information about the crop, botanical characteristics, varietal characteristics with images are added features in the DSS.

Diagnosing system (crop doctor): It is a vital component in the expert system which act as artificial intelligence. It is picture and image based if and then rule based programme which has written using dot net programme. It deals with diagnosing the pest, disease and nutritional disorders affecting the selected crops. The first obvious sign is given as thumbnail images in the key visual symptoms (primary symptom) with multiple stages (secondary symptoms). Primary and secondary symptoms have been documented in stage by stage and loaded in the expert system shell by using if and then rule based programme. The concerned experts have validated all the symptoms which loaded in the expert system shell. A view of diagnosing system for coconut is depicted in Fig. 3.

How to use

- The first page of the crop doctor will display the key visual affected symptoms of pest or diseases or nutrient deficiency or nematode in the form of thumbnail icon.
- The farmers or user can look and feel the key visual affected symptoms as expert system is picture based. The user can compare images with their affected field symptoms and they can choose three images which are similar to their field symptom.

- The system will allow choosing only three pictures and asking is this your symptoms? If click yes, system will show next frame which will be secondary symptoms of primary symptoms.
- It may be more than two icons. Again farmers can click the relevant symptoms which are similar to their field symptoms and can choose up to three images in each icon.
- Again the system will ask is this your symptoms? If click no, again the system frame will go back and show the other symptoms to be selected. If click yes, the system will show all images which were captured by the users and gets reconfirmation. Now the user can click the diagnose button if they are satisfied with the clicked symptoms.
- The system will show the diagnose report, as it may be due to single pest or may be due to pest and disease or may be due to combination of pest, disease and nutrient disorders based on the images clicked by the users. The illiterate farmers can also use this symptom since it is purely image and video based programme.
- Then the system will also show the nature of pest/disease/nutrient disorders symptoms, identification of pest/disease/nutrient disorders.
- Farmers by selecting the symptoms, they will make a conclusion on the causes for the damage, identification of pest or pathogens, nutritional disorders and control measures to be taken in the field.



Fig.3: A view of diagnosing system for coconut

- Images/video based control measures, image based identification of symptoms or damages will be displayed for the benefit of the users.

Key features of diagnosing system

- Crop doctor is purely if and then image based programme, so it can be used by all the stakeholders. Even illiterate users can sit in front of the system and use the crop doctor for diagnosing the field related problems and get the suitable solution for managing the field problems.
- Single item diagnosis or two items diagnosis or multiple combination of diagnosis of pests/diseases/nematode/nutrition disorders are possible in the crop doctor.
- It is available in English, Tamil, Malayalam and Kannada languages and can be scaled up to all the regional languages of India.
- Voice based image or video integration is possible.
- Information with images on nature of damage and identification of symptoms are available in the crop doctor.
- Management practices namely cultural, chemical, biological, mechanical, physical methods are also available in the control measure components.
- It can be updatable then and there, if it needs to be refined any technologies in the crop doctor.
- Most of the then developed expert system across the world were mostly text based which could be use only extension officials, scientists and rarely by innovative farmers.

Information system: Information system is web based static information wherein all the technological information and complementary information about the selected crops have been loaded in this component. The validated contents and images have organized based on the package of practices. Special feature of the information system is user-friendly navigation with image based presentation. The static information system is highly useful for the

extension officials, scientists, policy makers and administrators as ready reference material and bibliography of concerned crop. These contents can be updated dynamically then and there based on the advancement of the technologies.

1.5.2 Economic analysis of *Bt* cotton cultivation in Perambalur district of Tamil Nadu

Research project entitled Economic Analysis of *Bt* Cotton Production at Perambalur District in Tamil Nadu was undertaken in coordination with KVK Perambalur. Cotton is one of the major commercial crop of Perambalur district. The crop is cultivated in about 20280 ha. So far cotton farmers in the district were realizing marginal profit with desi cotton/older HYV/hybrids mainly due to high incidence of pest particularly pink boll worm and white fly. The major share of cost of cultivation was incurred towards pest management. Further, increase in number of pesticide sprays also created environmental hazards.

In order to sustain cotton cultivation in the district, KVK Perambalur took initiation for promotion of *Bt* cotton in scientific manner. During early phase of *Bt* entry, farmers were reluctant to accept the technology. The continuous efforts taken by KVK to create awareness that paved the way for changing the mind sets of farmers and they got convinced. At present average seed cotton yield of 22 q/ha and lesser cost towards pesticide spray due to lesser bollworm incidence has been witnessed by the farmers.

A study on economic analysis of *Bt* cotton cultivation was undertaken in order to assess the economic impact of *Bt* cotton in the district. Data from 60 sample farmers were collected through personal interview method from four villages using cluster-cum-random sampling technique. Preliminary analysis indicated that cotton + maize is the predominant cropping pattern adopted by the farmers. The realized cost of cultivation varied between Rs.13000 to 21100/ha under rainfed conditions. The increase in yield realized varied between 30 to 60% and the Benefit Cost Ratio ranged between 1.28 to 2.48.

1.6 Budget

A total of Rs. 9299.52 lakh was sanctioned for the Zone VIII for the year 2010-2011 and 100% of the sanctioned budget was incurred as expenditure, out of which 98.03% by KVKs, 1.40% by Zonal Project Directorate-Zone VIII and 0.57% by Directorates of Extension. Head wise details of budget and expenditure are furnished in Table 3.

Table 3 : Head wise budget and expenditure of Zone VIII for 2010-2011

(Rs. in Lakh)

Heads	Sanction				Expenditure			
	ZPD	KVKs	Support to DEE at SAUs	TOTAL	ZPD	KVKs	Support to DEE at SAUs	TOTAL
(A) Recurring								
Pay & Allowance	98.25	6476.09	-	6574.34	98.25	6476.09	-	6574.34
T.A	11.75	86.35	11.00	109.10	11.75	86.35	11.00	109.10
HRD	1.00	-	10.50	11.50	1.00	-	10.50	11.50
Contingencies	19.00	694.50	32.00	745.50	19.00	694.50	32.00	745.50
Total	130.00	7256.94	53.50	7440.44	130.00	7256.94	53.50	7440.44
(B) Non Recurring								
Works	-	893.49	-	893.49	-	893.49	-	893.49
Furniture & Equipment	-	519.15	-	519.15	-	519.15	-	519.15
Vehicle	-	50.00	-	50.00	-	50.00	-	50.00
Library	-	7.70	-	7.70	-	7.70	-	7.70
Revolving Fund	-	1.00	-	1.00	-	1.00	-	1.00
Total	-	1471.34	-	1471.34	-	1471.34	-	1471.34
(C) Special Programmes								
Soil Testing Labs	-	196.00	-	196.00	-	196.00	-	196.00
Minimal Processing Units	-	9.24	-	9.24	-	9.24	-	9.24
Rain Water Harvesting Units	-	40.00	-	40.00	-	40.00	-	40.00
Portable Carp Hatchery	-	22.50	-	22.50	-	22.50	-	22.50
Plant Diagnostic Centre	-	120.00	-	120.00	-	120.00	-	120.00
Total	-	387.74	-	387.74	-	387.74	-	387.74
Grand Total (A+B+C)	130.00	9116.02	53.50	9299.52	130.00	9116.02	53.50	9299.52

2. About Krishi Vigyan Kendras

Krishi Vigyan Kendra (KVK) is an agro-based educational institution as it offers specialized need based teaching to the farming community on various aspects of agriculture and allied sectors. KVK imparts latest technical know-how and do-how to the different clientele by formulating various programmes with the principles of learning by doing, seeing is believing and earn while you learn to achieve the desirable changes pertaining to their knowledge, skills and attitude with a view to help them live better by improving their farm and allied enterprises. KVK plan, implement, execute and evaluate its programmes with the farmers, by the farmers and for the farmers.

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 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 XIth Five Year Plan envisaged

establishing additional KVK in larger districts. Zone VIII had the privilege of establishing first additional KVK in Tumkur district, Karnataka under Indian Institute of Horticultural Research, Bangalore.

The Zonal Project Directorate-Zone VIII, earlier known as Zonal Coordinating Unit-Zone VIII, started with establishing, monitoring and coordination of 8 KVKs during Vth Five Year Plan. Gradually added 7, 5, 20, 34 and 3 KVKs during VIth, VIIth, VIIIth, Xth and XIth Five Year Plans, respectively. It shows that establishment of KVKs in Zone VIII had exhibited significant increase during VIIIth and Xth Five Year Plan periods with 25.97 and 44.16%, respectively. So far a total of 77 KVKs established under different host organizations viz., ICAR, SAUs, NGOs, DUs and State Department of Agriculture and functioning in Zone VIII. The state wise and host organization wise KVKs are presented in Table 4.

2.2 Mandate

Krishi Vigyan Kendras are mandated with technology assessment, refinement and demonstration of technology/products to cater the needs of farming community, extension personnel and other stakeholders in the district. In order to accomplish the mandate, KVKs are carrying out the following activities:

Table 4: State and host organization wise KVKs

States	Host organizations				Total
	SAUs	NGOs	ICAR	DUs/SDA	
Karnataka	22	4	2	-	28
Tamil Nadu	17	11	-	2	30
Kerala	7	3	4	-	14
Goa	-	-	1	1	2
Puducherry	-	-	-	2	2
Lakshadweep	-	-	-	1	1
TOTAL	46	18	7	6	77

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

- Conducting on-farm testing to identify the location specificity of agricultural technologies under various farming systems.
- Organizing frontline demonstrations to establish production potential of various crops and enterprises on the farmers' fields.
- Organizing need based training for farmers to update their knowledge and skills in modern agricultural technologies related to technology assessment, refinement and demonstration, and training of extension personnel to orient them in the frontier areas of technology development.
- Creating awareness about improved agricultural technologies among various clientele through an appropriate extension programmes.
- Production of quality seeds, planting materials, livestock breeds, animal products, bio-products etc as per the demand and supply the same to different clientele.
- Work as resource and knowledge 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

Approved strength of manpower for each KVK is 16 which include different category of staff viz., one

Programme Coordinator, six Subject Matter Specialists, three Programme Assistants, two Administrative Staff, two Drivers and two Supporting Staff in order to carry out the mandated activities in the district. Accordingly, the total sanctioned staff for 77 KVKs of Zone VIII is 1232, out of which 1088 (88.09%) are in position. Details of state wise and category wise staff strength of KVKs are furnished in Table 5 and host organization wise staff strength of KVKs in Table 6.

2.4 Infrastructure Facilities

Out of 77 KVKs in Zone VIII, 63 KVKs have administrative building, 58 KVKs have farmer's hostel and there are 288 staff quarters in 48 KVKs, 142 demonstration units in 64 KVKs, 52 KVKs have established Soil, Water and Plant Testing Laboratories (SWPTL), 37 KVKs have been equipped with E-connectivity and 14 KVKs have rain water harvesting units. In case of vehicles, 69 KVKs have jeep, 43 KVKs have tractor and there are 136 two wheelers all together in KVKs. Details are furnished in Table 7.

2.5 Scientific Advisory Committee

Scientific Advisory Committee (SAC) is a district level advisory body for the KVKs, which guides and reviews their activities. Head of host organization is the Chairman and other members include Zonal Project Director, Director of Extension, officials from all line departments pertaining to the district, officials from

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

Staff category	Karnataka		Tamil Nadu		Kerala		Goa		Puducherry		Lakshadweep		Total	
	S	F	S	F	S	F	S	F	S	F	S	F	S	F
Programme Coordinators	28	27	30	24	14	12	2	2	2	1	1	-	77	66
Subject Matter Specialists	168	146	180	163	84	76	12	11	12	8	6	4	462	408
Programme Assistants	84	75	90	87	42	33	6	3	6	5	3	-	231	203
Administrative Staff	56	51	60	59	28	25	4	3	4	4	2	2	154	144
Drivers	56	52	60	58	28	9	4	2	4	4	2	-	154	125
SSS (Gr-II)	56	53	60	59	28	21	4	4	4	4	2	1	154	142
Total	448	404	480	450	224	176	32	25	32	26	16	7	1232	1088

S - Sanctioned, F - Filled

Table 6: Host organization wise staff strength of KVKs

Staff category	SAUs		ICAR		NGOs/DUs		SDA		Total	
	S	F	S	F	S	F	S	F	S	F
Programme Coordinators	46	45	7	6	20	13	4	2	77	66
Subject Matter Specialists	276	251	42	41	120	99	24	17	462	408
Programme Assistants	138	123	21	19	60	55	12	6	231	203
Administrative Staff	92	84	14	13	40	39	8	8	154	144
Drivers	92	76	14	8	40	36	8	5	154	125
SSS (Gr-II)	92	81	14	13	40	41	8	7	154	142
Total	736	660	112	100	320	283	64	45	1232	1088

S-Sanctioned, F-Filled

Table 7: State wise details of infrastructure in KVKs

Infrastructure	Karnataka	Tamil Nadu	Kerala	Goa	Puducherry
Administrative Buildings	23	25	12	1	2
Farmers Hostels	22	25	9	1	1
Staff Quarters	16	24	7	-	1
Demo Units	37	66	27	8	4
Soil, Water and Plant Testing Labs	19	19	11	1	1
Rain Water Harvesting Units	9	1	4	-	-
Jeeps	26	28	3	-	2
Two Wheelers	53	54	22	1	4



Administrative building of KVK Thrissur



Staff quarters of KVK Perambalur

SHGs and progressive farmers. Each year SAC meets and discusses the progress of work done in various mandatory activities and provide guidance for planning activities for the forthcoming year. All KVKs have constituted the Committee and conducting the meeting as envisaged.

2.6 Revolving Fund

Revolving fund is in operation at 74 KVKs of this zone. All these KVKs are utilizing revolving fund for production of technological products and 6 KVKs with net balance more than 10 lakh followed by 31 KVKs with 3 - 10 lakh, 21 KVKs with 1-3 lakh and 16 KVKs with less than one lakh during the reporting period.

2.7 Thrust Areas

As per the agro-ecological and existing cropping & farming systems, KVKs are working with the following identified broad thrust areas:

- Introduction and upscaling 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 as a mechanism of crop diversification, 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 rain fed farming
- Small scale mechanization for saving time 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



A view of KVK demonstration units

3. Achievements

The Krishi Vigyan Kendras are established at district level to provide technological backstopping on agriculture and allied sectors to farmers. In order to achieve the mandate, KVKs are carrying out various activities that include conducting on-farm trials to identify the location specificity of technologies in various farming systems, frontline demonstrations to establish the production potential of improved agricultural technologies in farmers fields, training of farmers to update their knowledge and skills and training of extension personnel to orient them in the frontier areas of technology development. Further, KVKs organize a large number of extension programmes to create awareness about improved agricultural technologies among the farmers.

Apart from the above, KVKs implement special programmes like mitigation of drought, rain water harvesting, Kisan Mobile Advisory Services etc. Technology week is being organized by KVKs across the country in order to showcase the potentiality of technologies in terms of technological inputs, services and information at single point to the farmers and extension

personnel. KVKs produce and made available quality seeds, planting material and bio-products to the farmers.

3.1 Krishi Vigyan Kendras

Achievements of KVKs during the reporting year are briefly presented under different heads based on the activities envisaged in their programmes.

3.1.1 Technology Assessment and Refinement

A total of 587 technologies were assessed and refined by KVKs through conducting of 5807 trails in 945 locations. Details are presented here under.

3.1.1.1 Technology assessment: KVKs have assessed 461 technologies on various crops under different thematic areas through 2933 trials in 785 locations (Table 8). Out of which, 205 technologies were assessed in Karnataka through 1278 trials in 506 locations followed by 139 technologies through 803 trials in 146 locations in Tamil Nadu, 73 technologies through 610 trials in 117 locations in Kerala, 32 technologies through 172 trials in 9 locations

Table 8: Thematic area wise technologies assessed under crops

Thematic areas	Technology assessment under crops		
	No. of technologies	No. of trials	No. of locations
Varietal evaluation	82	410	112
Integrated Crop Management	72	409	124
Integrated Nutrient Management	84	501	118
Integrated Disease Management	58	364	120
Integrated Pest Management	65	407	131
Integrated Farming System	10	53	8
Resource Conservation Technology	6	52	7
Weed management	19	88	21
Farm machanization	22	185	32
Seed/plant production	6	27	6
Storage techniques	8	70	24
Value addition	13	149	50
Mushroom cultivation	5	160	9
Small scale income generating enterprises	11	58	23
Total	461	2933	785

Table 9 : State wise technology assessment under crops and animal husbandry

States	Technology assessment					
	Crops			Animal husbandry		
	No. of technologies	No. of trials	No. of locations	No. of technologies	No. of trials	No. of locations
Karnataka	205	1278	506	20	630	29
Tamil Nadu	139	803	146	45	1808	45
Kerala	73	610	117	17	180	31
Goa	32	172	9	2	4	2
Puducherry	3	19	3	2	20	2
Lakshadweep	9	51	4	4	42	4
Total	461	2933	785	90	2684	113

in Tamil Nadu, 9 technologies through 51 trials in 4 locations in Lakshadweep and 3 technologies through 19 trials in 3 locations in Puducherry (Table 9).

In case of animal husbandry, KVKs have assessed 90 technologies on different thematic areas through 2684 trials in 113 locations (Table 10). Out of which, 45 technologies assessed in Tamil Nadu through 1808 trials in 45 locations followed by 20 technologies through 630 trials in 29 locations in Karnataka, 17 technologies through 180 trials in 31 locations in Kerala, 4 technologies through 42 trials in 4 locations in Lashadweep, 2 technologies through 20 trials in 2 locations in Puducherry and 2 technologies through 4 trials in 2 locations in Goa (Table 9).

3.1.1.2 Technology refinement: KVKs have refined 36 technologies under crops on different thematic areas

by laying out 190 trials in 47 locations (Table 11). Out of which, 19 technologies refined through 96 trials in 27 locations in Karnataka followed by 8 technologies through 50 trials in 8 locations in Tamil Nadu, 8 technologies through 39 trials in 11 locations in Kerala and one technology through 5 trials in one location in Goa (Fig 4.)

3.1.1.3 Location specificity of technologies: Salient findings of selected on farm trials conducted by KVKs are briefly described here under.

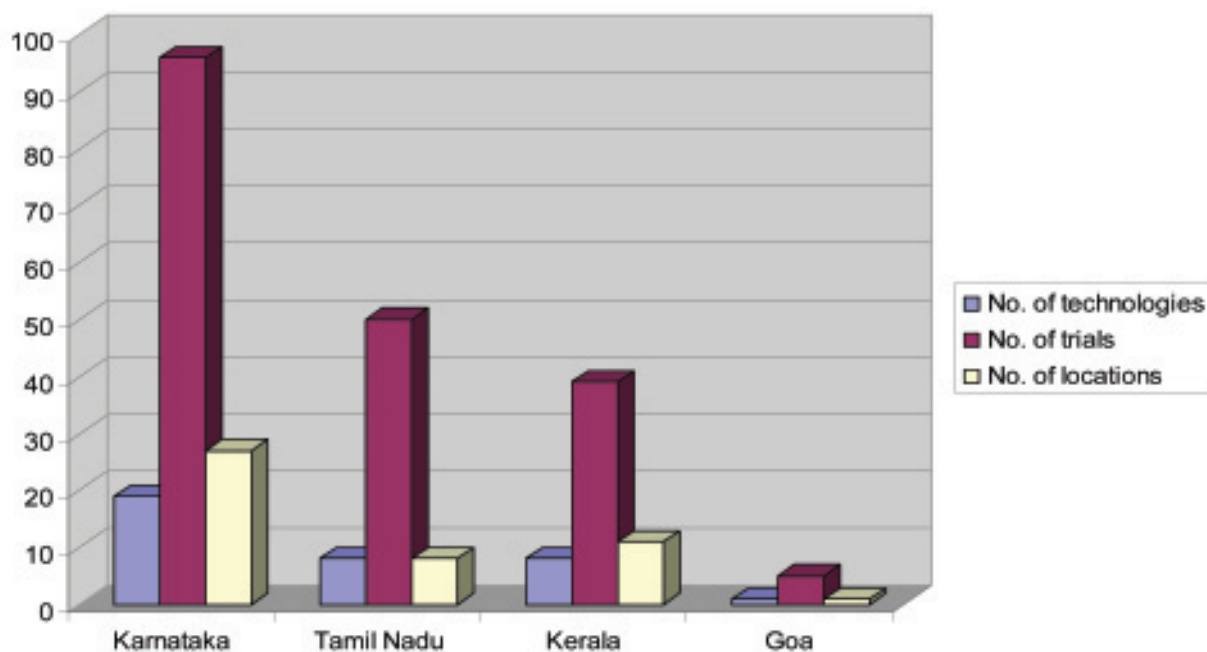
3.1.1.3.1 Assessment of rice variety PMK(R)4 (Anna 4) in drought prone areas : PMK(R)4 is a new rice variety released by Tamil Nadu Agricultural University, Coimbatore for drought prone areas. As a technological intervention, PMK(R)4 was taken up by three KVKs viz., Cuddalore, Thiruvallur and Villupuram under technology assessment programme. A total of 20

Table 10: Thematic area wise technologies assessed under animal husbandry

Thematic areas	Technology assessment under animal husbandry		
	No. of technologies	No. of trials	No. of locations
Disease management	23	1995	27
Evaluation of breeds	11	68	18
Feed and fodder	10	64	16
Nutrition management	21	265	23
Production and management	25	292	29
Total	90	2684	113

Table 11: Thematic area wise technologies refined under crops

Thematic areas	Technology refinement under crops		
	No. of technologies	No. of trials	No. of locations
Drudgery reduction	4	23	8
Integrated Crop Management	5	34	7
Integrated Nutrient Management	7	36	8
Integrated Pest Management	6	36	6
Resource Conservation Technology	5	16	6
Small scale income generating enterprises	1	2	2
Storage Technique	2	15	2
Value addition	3	10	5
Mushroom cultivation	2	15	2
Seed/plant production	1	3	1
Total	36	190	47

*Fig 4 : State wise technology refinement*

trials were conducted with 20 farmers in 6 ha. Experiments were laid out with three technology options viz., farmers practices, ADT 39/36 with seed treatment and PMK (R) 4 with seed treatment in drought prone areas of Cuddalore, Thiruvallur and Villupuram districts. Results indicated that PMK (R) 4 gave highest average yield (94.61 q/ha) followed by ADT 39/36/CO 43 (87.99

q/ha) and farmers practices (83.96 q/ha) (Table 12). Farmers feedback revealed that the new rice variety PMK (R) 4 had yielded more with less incidence of pest and diseases and withstand terminal drought.

3.1.1.3.2 Assessment of pulse wonder in blackgram:

Pulse wonder is a new technology released by Tamil

Table 12: Performance of rice variety PMK(R)4 (Anna 4) in drought prone areas

KVks	Yield (q/ha)		
	Farmers practice	ADT 39/36	PMK (R) 4
Cuddalore	28.50	30.40	35.30
Thiruvallur	29.59	23.27	22.03
Villupuram	25.87	34.32	37.28
Average	83.96	87.99	94.61


Performance of rice variety Anna 4 in drought prone areas


Nadu Agricultural University, Coimbatore for nutrient management in pulses. This intervention was taken up for technology assessment in black gram by seven KVks viz., Cuddalore, Villupuram, Dharmapuri, Ramanathapuram, Kancheepuram, Thiruvallur and Vellore in Tamil Nadu. A total of 45 trials were taken up by these KVks with 45 farmers in 12 ha. Experiments were conducted during 2010-11 with three technology options viz., farmers practices, foliar spray of DAP 2% and NAA 40 ppm at flowering stage and 15 days after first spray and foliar spray of pulse wonder

Table 13: Performance of pulse wonder in blackgram

KVks	Yield (q/ha)		
	Farmers practice	DAP & NAA	Pulse wonder
Cuddalore	3.75	5.71	10.88
Villupuram	3.20	5.60	7.60
Dharmapuri	6.78	7.40	8.25
Ramanathapuram	2.88	3.60	4.22
Kancheepuram	6.86	8.22	8.65
Thiruvallur	4.03	4.52	5.29
Vellore	6.80	7.90	8.35
Average	4.90	6.13	7.60


Performance of pulse wonder in blackgram


@ 6.25 kg/ha and 40 ppm at flowering stage and 15 days after first spray.

Results presented in Table 13 indicated that the application of pulse wonder (6.25 kg/ha) at peak flowering stage in blackgram through foliar spray had the highest average yield of 7.60 q/ha when compared to

Table 14: Performance of different groundnut varieties in irrigated and rainfed conditions

Parameters	KVK Belgaum (Irrigated)			KVK Gadag (Rainfed)			
	TMV-2	GPBD-4	ICGV-91114	TMV-2	GPBD-4	ICGV-91114	Kadiri-6
No. of pods/plant	68.00	102.00	82.00	26.00	23.00	30.00	30.00
100 grain wt. (g)	29.50	33.50	43.00	24.00	26.00	37.00	41.00
Yield (q/ha)	15.02	23.82	24.36	10.21	11.47	16.81	17.99

farmers practices (4.90 q/ha). Economic analysis indicated that the application of pulse wonder increased the highest net return due to highest yield. Farmers’ feedback indicated that flower dropping was reduced due to pulse wonder spray and subsequently pod setting increased. Further they are of the opinion that seed size, number of pods/plant and number of seeds/pod were also increased.

3.1.1.3.3 Assessment of different groundnut varieties: Trials were conducted to assess the performance of groundnut varieties in irrigated and rainfed conditions. A total of 4 trials were carried out by KVK Belgaum with groundnut varieties viz., TMV-2, GPBD-4 and ICGV-91114 in irrigated condition, in 4 farmers fields in 1.6 ha and 4 trials were taken up by KVK Gadag with TMV-2, GPBD-4, ICGV-91114 and Kadiri-6 in rainfed condition in 4 farmers fields in 3.6 ha. Results indicated that GPBD-4 and ICGV-91114 both performed better as compared to TMV-2 in both conditions, though yielded more in irrigated condition. In case of Kadiri-6 it was



Performance of groundnut varieties in rainfed condition

performed better than other three varieties under rainfed conditions (Table 14). In irrigated condition, TMV-2 yielded low and found susceptible to tikka leaf spot disease. Whereas medium and uniform size seeds obtained in GPBD-4 and it was resistant to tikka leaf spot disease. Seeds of ICGV-91114 bold and uniform size. In rainfed condition, average number of pods per plant (30) and seed weight (41g) were more in Kadiri-6 compared to other varieties.



Performance of groundnut varieties in irrigated condition

3.1.1.3.4 Assessment of nutrient management in banana

Income of banana farmers is declining due to low productivity because of deficiencies of micronutrients. In this regard, KVKs namely Alleppey and Kottayam have taken up 10 trials on nutrient management with four technology options viz., farmers practice @ 500 g factomphos + organic manure, recommended dose of NPK @190:115:300 g + 10 kg organic manure, recommended dose of NPK @190:115:300 g +10 kg organic manure + banana special and recommended dose of NPK @190:115:300 g+ 10 kg organic manure + banana shakti in 0.7 ha of 10 farmers fields for improving the productivity of banana in their respective districts. Results presented in Table 15 indicated that recommended dose of NPK + organic mannure + banana special recorded highest average yield of 326.2 q/ha followed by recommended dose of NPK + organic mannure + banana shakti (318.7 q/ha), recommended dose of NPK + organic mannure (283.7 q/ha) and farmers practice (251.2 q/ha). Thus, data clearly revealed that foliar spray of banana special developed by IIHR, Bangalore and banana sakthi developed by NRCB, Trichy found to be equally effective along with the recommended fertilizer dose by KAU, Thrissur in increasing the bunch yield of banana.

Table 15: Effect of nutrient management on banana bunch yield

KVKs	Farmers practice	Yield (q/ha)		
		NPK+ OM	NPK+ OM Banana special	NPK+ OM Banana shakti
Alleppey	202.50	255.00	302.50	287.50
Kottayam	300.00	312.50	350.00	350.00
Average	251.20	283.70	326.20	318.70

3.1.1.3.5 Assessment of IPM against pod fly in pigeonpea

Podfly is a major menace in long duration varieties which causes loss up to 25-30% and in late sown early varieties which causes damage up to 20-25%. Therefore, KVKs have taken up technological intervention on IPM against pod fly of redgram under assessment programme. A total of 41 trials were conducted by four KVKs viz., Bidar,



Performance of banana special & banana shakti

Gulbarga, Koppal and Raichur in 22 farmers fields in 16.2 ha. Experiments were carried out with three technology options viz., farmers practices spray of systemic insecticides and spray of systemic + contact insecticide at milky stage of crop (Acephate70 SP @ 1 kg/ha) and if necessary one more application. Results presented in Table 16 showed that application of Acephate 70 SP at pod filling stage and again 15 days after first application found to be superior resulting in higher average yield (16.40 q/ha) and less average pod fly damage (12.01%).

3.1.1.3.6 Management of inflorescence die back in arecanut

Inflorescence die back is a major disease causes 30-40% yield loss in arecanut. In this direction, three KVKs viz., Chickmagalur, Dakshina Kannada and Udupi carried out 20 trials on management of inflorescence die back in arecanut with three technology options viz., farmers practices, spraying of mancozeb @ 2.5 g/l at the time of opening of female flower and sanitation & spraying of zineb @ 4 g/l at the time of opening of female flower in 20 farmers fields in 6.5 ha area. Results indicated that the disease reduced more with spraying of mancozeb @ 2.5 g/l (26%) and in case of spraying of zineb @ 4 g/l, it was 24.4%. Whereas with farmers practice the disease reduction was not noticed. Cleaning of infected bunches as well as spraying of zineb @ 4g/l resulted in high fruit set, reduced disease incidence

Table 16 : Effectiveness of Acephate70 SP against pod fly in pigeonpea

KVKs	Pigeonpea pod fly management					
	Incidence of pod fly (%)			Yield (q/ha)		
	Farmers practice	Systemic insecticide (SI)	SI+ Acephate 70 SP	Farmers practice	Systemic insecticide (SI)	SI+ Acephate 70 SP
Bidar	32.89	14.76	8.84	15.43	23.06	25.59
Gulbarga	40.00	25.00	15.00	8.00	10.00	13.00
Koppal	28.97	20.59	11.84	10.87	12.33	14.21
Raichur	31.20	26.13	12.34	10.10	11.24	12.82
Average	33.26	21.62	12.01	11.10	14.15	16.40

*Effectiveness of Acephate70 SP against pod fly in pigeonpea*

and increased yield of 38.52 % over farmers practices. Results presented in Table 17 showed that average chali yield obtained with zineb gave more (68.70 q/ha) followed by mancozeb (56.10 q/ha) and farmers practice (41.60 q/ha). Farmers convinced with the technology and expressed that timely spraying of zineb has reduced the disease incidence.

Table17 : Management of inflorescence die back in arecanut

KVKs	Chali yield (q/ha)		
	Farmers practice	Mancozeb	Zineb
Chickmagalur	42.00	58.00	71.00
Dakshina Kannada	37.50	54.50	61.00
Udupi	44.50	56.00	74.20
Average	41.60	56.10	68.70

*Inflorescence dieback of arecanut*

3.1.1.3.7 Assessment of the performance of *Eulophid* parasitoid against papaya mealy bug: Papaya mealy bug (*Paracoccus marginatus*) is a recently occurred pest in our country. Though its primary host is papaya, it is found to attack various other vegetables like brinjal, tapioca, cowpea, etc and ornamentals. In this regard, KVK Malapuram has taken up 35 trials in 5 ha area with three technology options

viz., neem oil emulsion sprays @ 2%, *Verticillium lecanii* sprays @ 5gm/l and inoculative release of *Eulophid* parasitoid (*Acerophagus papaya*) @ 50 parasitoids/ha. Results indicated that release of parasitoids were found to be effective in reducing 100% mealy bug population and gave yield 263.0 q/ha (Table 18). Further, observations revealed that neem oil emulsion sprays and sprays of *V. lecanii* helps to reduce the mealy bug infestation but reinfestation of mealy bugs occurs after 2-3 weeks resulting in repeated sprays. But the inoculative release of the parasitoid *A. papayae* helped to not to repeat the mealy bug population. Parasitoids were recovered from the released area, thus proving that parasitoids had indeed established in the area and also parasitoids were recovered from areas adjacent to the released sites that indicate the spread of parasitoids. Feedback and matrix scoring of different technology parameters showed that the farmers were not satisfied with the sprays of neem oil emulsion and *V. lecanii* as the infestation reoccurred and they expressed that inoculative release of the parasitoids was hassle free and easy to adopt (Table 19).

Table 18: Effectiveness of *Acerophagus papaya* against *papaya mealy bug*

Technology options	Reduction of infestation (%)	Yield (q/ha)
Neem oil emulsion	42	120
<i>Verticillium lecanii</i>	68	153
<i>Acerophagus papayae</i>	100	263



Eulophid parasitoids

Table 19: Matrix scoring on technology attributes

Technology attributes	Average score (out of 10)		
	Neem oil emulsion sprays	Spraying of <i>V. lecanii</i>	Release of <i>A. papayae</i>
Sustainability	4	7	9
Economic viability	4	8	10
Eco friendly	10	10	10
Increase in yield	5	6	9
Total	23	31	38



Papaya mealy bug attack

3.1.1.3.8 Assessment of weeders for SRI: Weeding is a major concern in SRI of rice cultivation. Many weeders are available for weeding in rice but all are not suitable and efficient for SRI. Therefore, different weeders viz., rotary weeder, cono weeder and power weeder were assessed by 6 KVKs viz., Ariyalur, Erode, Nagapattinam, Salem, Thiruvavur and Thanjavur where SRI rice cultivation was more prevalent. A total of 24 trials were conducted with 24 farmers in 10.4 ha in their respective districts. Data from Table 20 indicated that the TNAU developed power weeder performed better in all type of soils and recorded an average yield of 58.04 q/ha followed by cono weeder field (56.17 q/ha) and rotary weeder field (51.74 q/ha). Farmers said that modified power weeder with multi row performed well as it saved labour and time (50 man hrs) as compared to manual weeders (162 man hrs). Thus, multi row power weeder developed by TNAU found suitable for SRI cultivation of rice.

Table 20: Effectiveness of different weeders in SRI

KVKs	Rotary weeder	Yield q/ha)	
		Cono weeder	Power weeder
Ariyalur	57.40	58.20	59.00
Erode	47.25	50.62	49.87
Nagapattinam	61.00	65.00	66.00
Salem	62.00	67.00	68.60
Thiruvarur	40.80	46.20	47.80
Thanjavur	42.00	50.00	57.00
Average	51.74	56.17	58.04

*Performance of power operated weeder*

3.1.1.3.9 Assessment of area specific mineral mixture for dairy cows: Quality of feed is one of the factors for health and milk yield of dairy cows. Supplementation of mineral mixture is one of the ways to provide quality feed. In this direction, seven KVKs viz., Cuddalore, Dharmapuri, Dindugal, Kancheepuram, Pudukottai, Shivagangai and Thiruvarur have taken up technological intervention on area specific mineral mixture for dairy cows under technology assessment programme. A total of 140 trials on dairy cows were conducted with three technology options viz., farmers practice, mineral mixture supplementation and area specific mineral mixture supplementation in 109 farmers dairies. Data presented in Table 21 indicated that supplementation with area specific mineral mixture found to be effective to increase average milk yield of dairy cow (10%). Further, it was observed that milk density increased, gain in body

Table 21 : Effectiveness of area specific mineral mixture on milk yield of dairy cows

KVKs	Milk yield (l/day/cow)		
	Farmers practice	Mineral mixture	Area specific mineral mixture
Cuddalore	5.00	6.00	8.00
Dharmapuri	11.00	11.50	12.10
Dindugal	3.00	6.25	7.30
Kancheepuram	6.00	6.30	6.50
Pudukottai	6.00	7.00	8.00
Shivagangai	6.00	8.00	15.00
Thiruvarur	4.00	5.50	5.50
Average	5.86	7.38	9.18

*Area specific mineral mixture**Interaction of KVK staff with dairy farmers*

weight, early onset of estrum after calving and number of insemination for conception was reduced. Farmers themselves observed milk yield variation in morning and evening. Farmers expressed that area specific mineral mixture may be demonstrated during local animal health camps for the benefit of dairy farmers.

3.1.1.3.10 Assessment of synchronization of estrus in dairy cows : Farmers are not following timely insemination for dairy cows that leads to increased inter calving period which in turn causes loss of milk production. Most of the farmers are not aware of synchronization of estrus using hormone for induction of estrus. Three KVKs viz., Coimbatore, Erode, and Kancheepuram conducted trials on synchronization of estrus in dairy cows with three technology options viz., doing AI when they come for estrus at different periods, Estrus synchronization with Controlled Internal Drug Releasing Device (CIDRD) and estrus synchronization with ovo sync technology. Data indicated that in all three locations all these technology options gave 40, 80 and 60% average conception rate with these technology options, respectively. It clearly indicates both technologies are effective for estrus synchronization in dairy animal. Thus, ovo sync is practically possible present day conditions because of its easy accessibility to the farmers as compared to CIDR.



Ovo sync technology

3.1.1.3.11 Assessment of stunted carp fingerlings: There is a scarcity of fish fingerlings in semi intensive system of fish culture. In this regard, KVK Namakkal has taken up technological intervention under assessment

programme on production and performance of stunted carp fingerlings. Experiments were carried out in three farmers ponds with stocking size-1.5" and stocking density of 1500 number in a tank of 1200 sq.ft. Stocking duration was given three months. Results indicated that production of stunted carp fingerlings gave nearly double the production when stocked in the ponds and also ensured constant supply of seeds to the farmers. Thus, production of stunted carp fingerlings could facilitate availability of fingerlings throughout the year.



Stunted carp fingerlings

3.1.2 Frontline Demonstrations

Field demonstration conducted under the close supervision of the scientists is called frontline demonstration (FLD). The technologies are demonstrated for the first time by the scientists themselves before being fed into the main extension system of the state department of agriculture. In this direction, KVKs are actively involved in introduction of newly released crop varieties, production technologies in crops, animal husbandry and other agriculture related enterprises through FLDs for augmenting the production and productivity in a given farming system.

During the reporting year, a total of 10203 FLDs were carried out by KVKs of Zone VIII in 3127.98 ha. Out of which, 6179 FLDs were conducted on varieties and production technologies of various crops in 2295.35 ha, 1214 FLDs on hybrids of different crops in 480.18 ha, 469 FLDs on farm implements and mechanization in 317.61 ha, 2039 FLDs on livestock technologies through 5917 units, 136 FLDs on fisheries technologies in 34.84 ha and 166 FLDs on different farm enterprises. Details of these demonstrations are presented here under.

3.1.2.1 FLDs on crop categories: During the reporting year, a total of 6179 FLDs were carried out on different crop categories viz., cereals and millets, pulses, oil seeds, cotton, horticultural crops, commercial crops and fodder crops by KVKs in 2295.35 ha. Data revealed that more FLDs (3277) were conducted in Karnataka in 1363.07 ha followed by Tamil Nadu (2228) in 792.48 ha., Kerala (457) in 72.60 ha, Goa (107) in 18.50 ha, Puducherry (82) in 36.20 ha and Lakshadweep (28) in 12.50 ha (Table 22). Data in Fig.5 shows that more number of demonstrations were conducted on horticultural crops (2308) followed by cereals and millets (1591), pulses (1149), oil seeds (388), cotton (372), fodder crops (260) and commercial crops (200). Crop wise FLDs are discussed below.

3.1.2.1 Cereals and millets: A total of 1591 demonstrations conducted in 735.72 ha area covering major cereal crops and millets viz., paddy, wheat, sorghum, pearl millet, jowar, finger millet, foxtail millet and little millet during the year. Out of which, 1029 demonstrations were conducted on paddy in 443.12 ha followed by 257 on finger millet in 139.6 ha, 159 on sorghum in 66 ha, 52 on foxtail millet in 25 ha, 42 on wheat in 34 ha, 35 on

Table 22 : State wise FLDs carried out on different crop categories

States	No. of demonstrations	Area (ha)
Karnataka	3277	1363.07
Tamil Nadu	2228	792.48
Kerala	457	72.60
Goa	107	18.50
Puducherry	82	36.20
Lakshadweep	28	12.50
Total	6179	2295.35

pearl millet in 15 ha and 17 on little millet in 13 ha (Fig 6). Major findings of these demonstrations are as follows:

Highest number of demonstrations on paddy were conducted to demonstrate ICM (279) followed by INM (210), IPM (145), high yielding varieties (115), IDM (93), IPDM (70), mechanization (60), IWM (20), resource conservation (17) and soil management (20).

Introduced paddy varieties viz., Champaka, IET-13901 (Thunga), IET-7191 and Anna 4 gave an increase of 27.52% yield over the farmers practice where as demonstrations on ICM with varieties viz., ASD16,

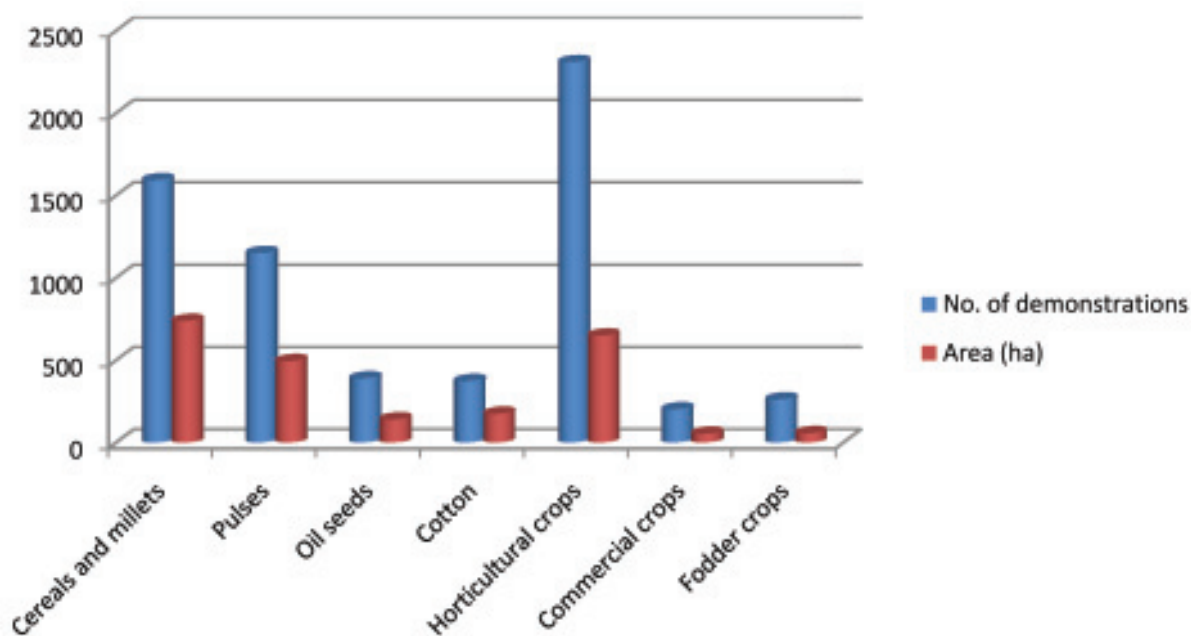


Fig. 5 : FLDs conducted on different crop categories

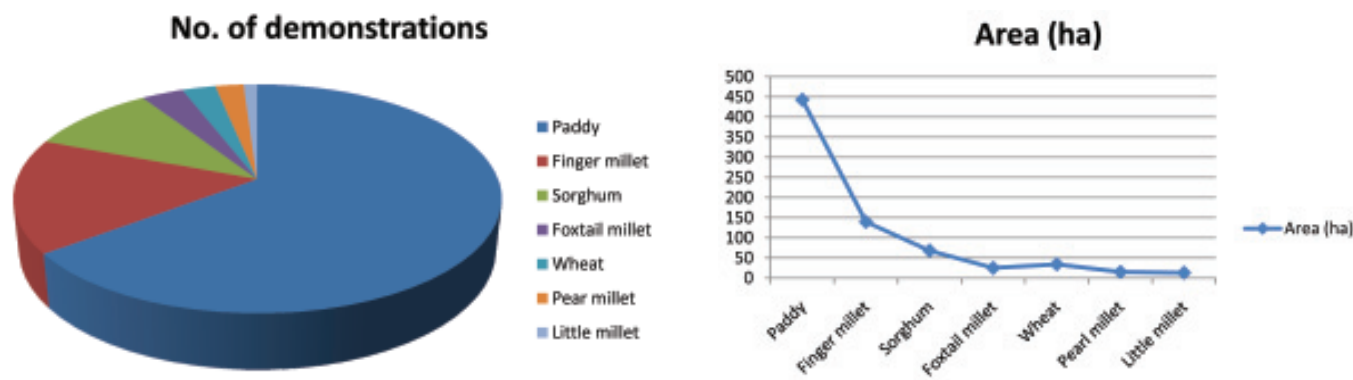


Fig.6 : FLDs conducted on cereals and millets

BPT 5204, Co 49, ADT-39, ADT 43, ADT-48, Revati, MO-9, Njavara, Uma, Samyuktha-makaram, Vaisakh, TRY 1, MAS-946-1 and PMK – 4 gave an increase of 16.86% yield, IDM with Jyothi, Sona and BR-2655 gave an increase of 22.10% yield, INM with ASD 16, TPS 3, VBN-4, TRY 1, Uma, Jaya, KMP-105, IR-30864, Jyothi, MTU-1001, BPT-5204 and MO-4 gave an increase of 23.29% yield, IPDM with varieties viz., BPT 5204, ADT 36, ADT 45, CR1009, Mo -4 and Jaya gave an increase of 24.77% yield, IPM with TPS 3, ADT 43, ADT 36, ADT 45, BPT 5204, White Ponni, MTU-1001, Jyothi and Intan gave an increase of 19.92% yield, IWM with BPT -5203 and BR-2655 gave an increase of 9.12% yield, mechanisation with BPT 5204, MO-4, ADT-43, CR1009, Co 49, Jyothi, TRY-1 gave an increase of 16.50% yield, resource conservation with MO-4 and Aerobic-153 gave an increase of 25.95% yield, soil management with IR-30864 and Gangavati Sona (UASR) gave an increase of 23.32% yield over the farmers practices. Thus, it is found that highest yield increase was with varietal introduction followed by IPDM and minimum yield increase was with IWM.

More number of demonstrations on finger millet were on high yielding varieties (140) in 41.60 ha, followed by ICM (103) in 88.20 ha, INM (12) in 4.80 ha and IWM (2) in 5.00 ha. Introduction of high yielding variety of finger millet CO(Ra) 14 gave an increase of 41.91% yield where as demonstrations on ICM gave 13.71%, INM gave 15.33% and IWM gave 24.71% yield increase over the farmers practices.

A total of 122 demonstrations were conducted on high yielding varieties of sorghum viz., CSV-22 and Co S 28 in 48 ha which gave yield increase of 31.14 % where as 37 demonstrations conducted on ICM with M-35-1 variety in 20 ha gave 19.62% yield increase over the farmers varieties and practices. Demonstrations on foxtail millet gave an increase of 34.02% yield over the farmers practice.

A total of 30 demonstrations were conducted on high yielding varieties of wheat viz., DWR-225, UAS-415, Raj-4037 in 29 ha which gave an increase of 20.74% yield and 12 demonstrations on ICM with Co W1 in 5 ha gave 23.08% yield increase over the farmers practices.

A total of 10 demonstrations were conducted on high yielding variety of pearl millet MH-946 in 5 ha that gave an increase of 53.59% yield where as



Field day on paddy

25 demonstrations conducted on ICM with Co(Cu) 9 in 10 ha gave an increase of 34.45% yield over the farmers practice. In case of little millet, 12 demonstrations were conducted on high yielding variety in 12 ha gave yield increase of 18.52% and 5 demonstrations on ICM in 5 ha gave 25.58% yield increase over the farmers practices.

3.1.2.2 Pulses: A total of 1149 FLDs on pulse crops viz., bengalgram, blackgram, greengram, horsegram and pigeonpea were carried out by the KVKs in an area of 493.1 ha with various technological interventions like high

Performance of high yielding varieties of pulse crop bengalgram (JG 11 and GBS-964) showed an increase of 19.63% yield, blackgram with DU-1, VBN (Bg)5, Co6, Vamban (Bg)3 gave an increase of 24.46% yield, greengram with Sel-4, shining moong, VBN-2, VBN (Gm)3, Co (Gg)7, Vamban (gg)3 gave an increase of 19.91% yield and pigeonpea with BRG- 2, TS-3R, VBN2, CO (Rg) 7, VBN(Rg)-3 gave an increase of 31.05% yield over the farmers practicing varieties. In case of demonstrations on ICM practices, highest per cent of yield increase (52.81) was observed in bengalgram followed by 41.35 % in blackgram, 40.30% in greengram, 37.79% in pigeonpea and 37.23% in horsegram. Demonstrations on IPM increased 22.37 % in bengalgram and 12.34% in pigeonpea where as IPDM demonstrations increased 57.14% yield in bengalgram. INM



FLD on IPM in pigeonpea

yielding varieties, ICM, IPDM, ICM mechanization and seed production. Out of these demonstrations, highest number of demonstrations were conducted on pigeonpea (444) in 182.6 ha followed by bengalgram (277) in 113.2 ha, greengram (214) in 92.6 ha, blackgram (187) in 87.5 ha and horsegram (27) in 17.20 ha (Fig.7).



Visibility of FLD on sesame through media

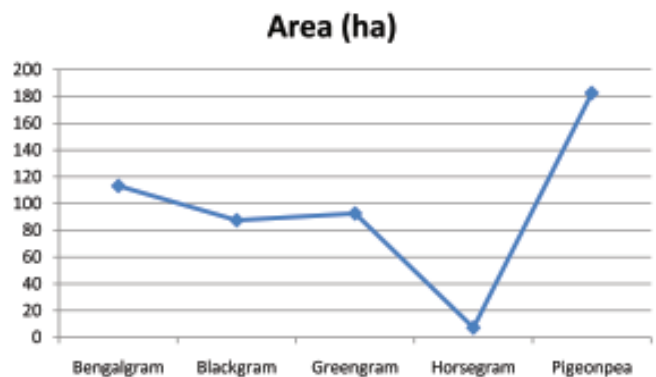
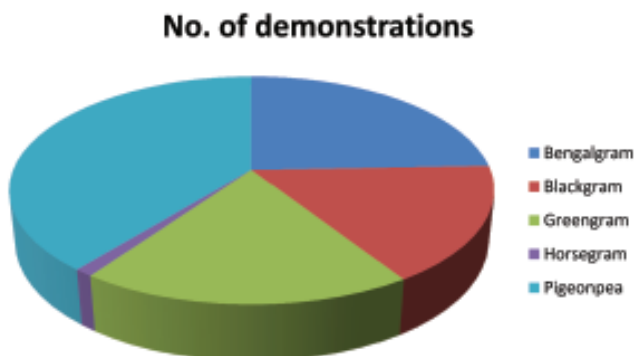


Fig.7: FLDs conducted on pulses

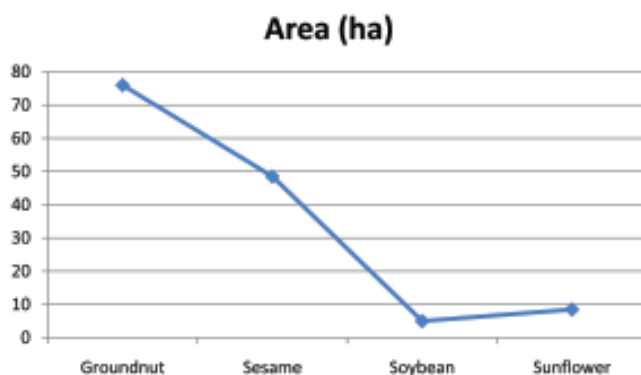
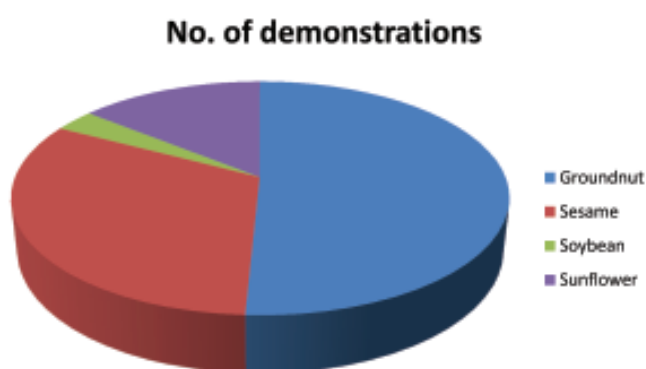


Fig.8: FLDs conducted on oil seed crops

demonstrations on blackgram increased 36.58% of yield where as INM demonstrations on pigeonpea gave an increase of 19.95% yield over the farmers practices.

3.1.2.3 Oil seeds: A total of 388 demonstrations were conducted on oil seed crops namely groundnut, sesame, soybean and sunflower in 138 ha. Out of which, highest number of demonstrations were conducted on sunflower (197) in 76 ha followed by sesame (124) in 48.5 ha, sunflower (55) in 8.5 ha and soybean (12) in 5 ha with various technological interventions like high yielding varieties, ICM, INM, IPM, IPDM and mechanization in both rainfed and irrigated conditions (Fig 8).

Results of demonstrations on high yielding varieties of groundnut gave an increase of 8.43 % yield , sesame (27.38%), soybean (28.46 %) and sunflower (25.88%) over the farmers varieties. Further, demonstrations on groundnut with ICM gave an increase of 26.18% yield, INM (21.23 %) and mechanization (29.19%) over the farmers practices. In case of sesame, ICM demonstrations gave an increase of 44.49 % yield where as INM gave 32.27% yield increase over the farmers practices. Demonstrations on sunflower with IPM gave 18.15% yield increase and with IPDM gave 34.94% yield increase over the farmers practices.

3.1.2.4 Cotton : A total of 372 demonstrations were conducted on cotton by KVKs in 173.2 ha in Karnataka and Tamil Nadu. Technological interventions on ICM and IPM were carried out with different varieties/hybrids of cotton (Rasi 2, mallika, MRC-6918, Bunny, RCH-20 Bt 2, RCH 708, MCU 7). Demonstrations on ICM gave an increase of 25.60% yield where as IPM



FLD on ICM in cotton

demonstrations gave 23.77% yield increase over the farmers practices.

3.1.2.5 Horticultural crops: A total of 2308 demonstrations were conducted by KVKs on horticultural crops with different technological interventions in 648.59 ha. Out of which, more number of demonstrations were carried out by KVKs of Karnataka (1198) followed

Table 23 : FLDs conducted on horticultural crops

States	No. of demonstrations	Area (ha)
Karnataka	1198	367.05
Tamil Nadu	740	234.64
Kerala	309	37.20
Goa	38	6.00
Puducherry	10	1.20
Lakshadweep	13	2.50
Total	2308	648.59

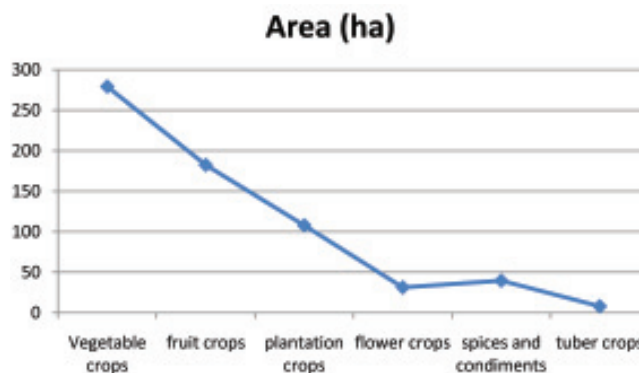
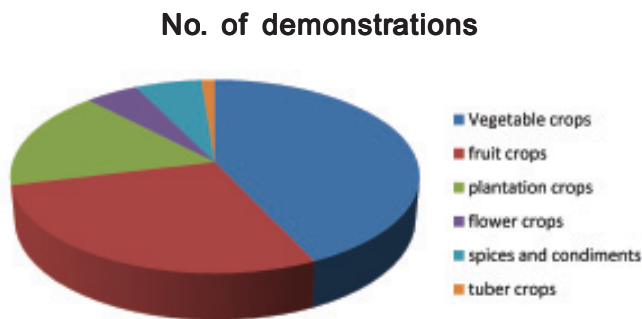


Fig. 9 : FLDs conducted on horticultural crops

by Tamil Nadu (740), Kerala (309), Goa (38), Lakshadweep (13) and Puducherry (10) (Table 23). Data depicted in Fig.9 indicated that more number of demonstrations were carried out on vegetable crops (1119) followed by fruit crops (511), plantation crops (348), spices and condiments (159), flower crops (151) and medicinal and aromatic plants (20). Details of these demonstrations are discussed here under.



FLD on banana bunch stalk feeding

3.1.2.5.1 Fruit crops: Demonstrations on fruit crops included lime, banana, grape, mandarin, mango, papaya, pomegranate, sweet orange and water melon. Highest number of demonstrations (296) were conducted on banana using varieties like Robusta, Nendran, Nattu Valai, Poovan, G-9, Puttabale, Pacchabale and Yelakki in 94.9 ha with various technological interventions viz., ICM (121) in 35 ha, IDM (66) in 28 ha, INM (88) in 22.9 ha, IPM (16) in 7 ha and soil management (5) in 2 ha.

Results indicated that 31.94 % yield increase was

found with ICM, 29.49% with IDM, 27.87% with INM, 19.57 % with IPM and 22.41% with soil management over the farmers practices. A total of 48 demonstrations were conducted on lime with variety Kagzi that gave an increase of 14.28% yield. Further, demonstrations conducted on lime with ICM gave an increase of 27.91% and with IDM gave 14.29% yield increase over the farmers practices. Demonstrations on mango (43) with INM interventions in 10 ha resulted 27.01% yield increase over the farmers practices. Demonstrations on grape with IPM resulted an increase of 16.34% yield where as demonstrations on mandarin with IPM gave 38.94% yield increase, papaya with IPM gave 42.06% yield increase over the existing farmers practices. In case of pomegranate, demonstrations with IDM gave 19.95% yield increase, sweet orange with INM gave 17.51% yield increase, water melon with ICM gave 15.4% yield increase, sapota with ICM gave 7.26% yield increase over the farmers practices.

3.1.2.5.2 Flower crops: Demonstrations on flower crops included chrysanthemum, gaillardia and marigold with high yielding variety interventions and gladiolus, jasmine and tuberose with ICM interventions. Highest number of demonstrations were conducted on jasmine (50) with ICM and INM followed by marigold (45), chrysanthemum (26), gladiolus (12), gaillardia (10) and tuberose (8).

Results indicated that Udupi Mallige variety with ICM intervention gave an increase of 32.37 % yield and with INM gave 11.29% yield increase over the farmers existing practices. Demonstrations on marigold with orange double and Pusa Narangi gave an increase of

13.21% yield, chrysanthemum with Kamini, Arka Swarna gave an increase of 16.05% yield, gaillardia with DGS-1 gave an increase of 15.38% yield, tuberose (Prajwal) with ICM practices gave an increase of 114.58% yield and gladiolus with American beauty gave an increase of 23.64% yield over the farmers practices.

3.1.2.5.3 Vegetable crops: Demonstrations were conducted on different vegetable crops like onion, frenchbean, snakegourd, chilli, okra, tomato, ashgourd, cauliflower, cowpea, cucumber, cabbage, small onion, brinjal, carrot, polebeans and drumstick with need based technological interventions like high yielding varieties, ICM, INM, IPM, IDM and resource conservation.

Highest number of demonstrations were conducted on onion (150) in 58.4 ha followed by frenchbean (128) in 20.3 ha and snakegourd (91) in 19 ha. Demonstrations on remaining vegetable crops ranged from 5 to 65. Onion demonstrations with IDM gave an increase of 67.86% yield followed by 30.95% yield increase with ICM, 22.40% yield increase with INM and 19.68% yield increase with high yielding variety over the farmers practices. In case of frenchbean, demonstrations with high yielding variety gave an increase of 28.99% yield followed by 28.26% yield increase with ICM and 12.80% yield increase with INM over the farmers practices. Demonstrations on snakegourd variety PLR 2 gave 31.39% yield increase over the farmers practices.

Demonstrations on chilli with ICM gave an increase of 51.43% yield followed by 24.52% with high yielding

variety and 16.03% with IDM over the farmers practices. Demonstrations on okra with high yielding variety gave an increase of 51.35% yield where as in case of demonstrations with ICM, yield increase was 8.57% over the farmers practices.

Demonstrations on tomato with high yielding variety gave an increase of 53.60% yield and 13.26% with ICM over the farmers practices. Demonstrations on ashgourd with IPM gave 56.25% yield increase and it was 29.44% yield increase in case of demonstrations with INM. Demonstrations on cauliflower with ICM gave an increase of 34.53% yield followed by 5.56% yield increase with IPM over the farmers practices. Demonstrations on resource conservation in cowpea gave an increase of 45.27% yield followed by 23.58% yield increase with high yielding variety and 7.40% yield increase with INM over the farmers practices. Demonstrations on cucumber with IPM gave an increase of 6.55% yield, 50.19% with ICM in cabbage, 59.57% with ICM in carrot and 9.65% with resource conservation in drumstick over the farmers practices. Demonstrations on small onion with high yielding variety gave an increase of 32.16% yield and in case of demonstrations with ICM, the yield increase was 25.78%.

Demonstrations on brinjal with IDM gave an increase of 19.99% yield followed by 16.67% with high yielding variety and 3.67% with IPM over the farmers practices. In case of polebeans, demonstrations with ICM gave an increase of 27.92% yield and 18.67% yield increase with high yielding variety over the farmers practices.

3.1.2.5.4 Plantation crops: Highest demonstrations on plantation crops were conducted on coconut (171) in 37.44 ha followed by arecanut (115) in 24.8 ha and cashew (50) in 13 ha. Demonstrations on coconut (West Coast Tall) with IDM gave an increase of 40.68% yield followed by 38.6% with ICM, 33.73% with INM and 30.70% with IPM over the farmers practices.

Demonstrations conducted on arecanut (Mangala and Sumangala) with ICM gave an increase of 36.21% yield



FLD on IPM in brinjal

followed by 35.59% with IDM, 12.54% with INM, 27.15% with IPM and 11.75% with IWM against farmers practices. In case of cashew (VRI 1 and 3), demonstrations with ICM gave 128.00 % yield increase and with IPM gave 48.55% yield increase over the farmers practices.

3.1.2.5.5 Spices and condiments: Highest demonstrations were conducted on pepper (105) in 17.68 ha followed by turmeric (78) in 20.07 ha and ginger (40) in 8.50 ha. Pepper demonstrations were conducted with interventions on varieties viz., Sreekara, Karimunda, Panniyur-1, Panchami, Pournami, Arkkalamunda, Vellayani Athulya and practices like ICM, IDM and INM. Results showed that 11.44% yield increase with varieties, 15.71% with ICM, 38.72% with IDM, and 20.51% with INM was found against farmers practices. Demonstrations on pepper variety BSR 2 resulted an increase of 38.93% yield and ginger variety Varadha gave 40.78 % yield increase over farmers practices.

3.1.2.5.6 Medicinal and aromatic plants: A total of 20 demonstrations were conducted on coleus variety Nidhi with ICM intervention and results indicated that 30.77% yield increase was observed over the farmers practices.

3.1.2.6 Commercial crops: A total of 111 demonstrations were conducted on commercial crops in 51.70 ha. Out of which 91 demonstrations were on sugarcane with technological interventions like high yielding variety, ICM, INM, IPM and resource conservation. Results showed that COC(SC)24, COC-96017, Co-8011, CO-86032 and CO 86037 varieties gave an increase of 33.63% yield followed by 25.26% with ICM, 13.53% with INM, 27.02% with IPM and 1.85% with resource conservation over the farmers practices. Remaining 20 demonstrations were conducted on coffee with IPM practices and results revealed that 12.71% yield increased against the farmers practices.

3.1.2.7 Fodder crops: A total of 260 demonstrations on fodder crops were conducted in 55.04 ha. Demonstrations on gunea grass, hedge lucerne, CO (GG) 3, desmanthus and subabul gave 80.61% yield increase where as with ICM, it was 54.25% against farmers practices.



FLD on mixed fodder crops

3.1.2.8 Hybrids: KVKs have conducted 1214 demonstrations on hybrids of different crop category like cereals and millets, oil seeds, horticultural crops and fodder in 480.18 ha.

Out of these, more demonstrations were carried out on cereals (556) in 242.3 ha on paddy (CORH3), maize (NAH-2049, NAH-1137, COHM 5) and finger millet (Co (Ra).14) followed by vegetables (301) in 86.8 ha brinjal- COBH2 and tomato (COTH 2, US Agri.-698), onion (Nasik red), commercial crops (126) in 52 ha, oil seed crops (111) in 59 ha (sunflower (KBSH 53, KBSH44, KBSH41, DRSH-1) and castor (YRCH 1), fodder (87) in 29.08 ha (hybrid Napier), flower crops (18) in 6 ha (tuberose -Prajwal , marigold -Arrowgold F1 hybrid) and fruit crops (15) in 5 ha.

Paddy hybrid gave 36.72% yield increase with



FLD on sunflower hybrid KBSH-53

2.04 BC ratio. Among maize hybrids, NAH-2049 gave highest 18.42% yield increase with 2.80 BC ratio. Vegetable hybrids gave increased yield ranging from 9.18 to 86.90%. Sunflower hybrid KBSH-53 gave 39.84% yield increase with 2.48 BC Ratio where as castor hybrid YRCH 1, it was 76.19% yield increase with 6.22 BC Ratio. Fodder hybrid CO (CN)4, gave 43.29% yield increase with 2.32 BC Ratio. Tuberose hybrid Prajwal gave best performance with BC Ratio 3.81 where as marigold hybrid Arrow gold F1 hybrid gave 48.57% yield increase with 2.95 BC Ratio.

3.1.2.9 Farm implements and mechanization: A total of 469 demonstrations were conducted on various farm implements viz., groundnut decorticator, CRIDA groundnut pod stripper, maize thresher cum dehusker, paddy transplanter, paddy power weeder, paddy combined harvester, paddy rotovator, paddy cage wheel, cono weeder, paddy harvester, paddy rotary tiller, paddy helical blade puddler, combine harvester, sugarcane power weeder, motorized sugarcane sett cutter, mini mobile sprinkler, pulses hulling machine, turmeric boiler, CRIDA vegetable preservator, udyanamithra garden transplanter, banana clump remover, coconut de-husking machine, white pepper processing machine, chaff cutter, feed mixing unit and egg incubator and successfully demonstrated their performance on 317.61 ha in different crops namely groundnut, maize, paddy, blackgram, sugarcane, turmeric, vegetables, banana, coconut, pepper, fodder and preparation of mineral mixture and egg hatching.



FLD on groundnut stripper

Results indicated that demonstrations on chaff cutter and feed mixing unit saved 61% labour with 2.80 BC Ratio. Decortication of groundnut using groundnut decorticator saved labour, time and drudgery reduction with 1.07 BC Ratio. Separating the groundnut pods using groundnut stripper saved labour, time and drudgery reduction with 1.20 BC Ratio. Maize thresher cum dehusker reduced the grain damage and saved energy with 1.32 BC Ratio. Mechanization of paddy with various implements and machines reduced 75 to 85 % of labour in major operations as well as time and drudgery of labour. Mini mobile sprinkler in blackgram saved 40% labour with 2.11 BC Ratio. Use of CRIDA vegetable preservator gave shelf life increase for the vegetables from 5 to 7 days as against 2 to 3 days. Improved TNAU turmeric boiler reduced the boiling time of rhizome there by saved time and fuel with 7.80 BC Ratio. Udyanamithra garden transplanter, white pepper processing, coconut de-husker and pulses hulling machine were saved the time, labour and reduced drudgery of labour.

3.1.2.10 Livestock: A total of 2039 demonstrations were conducted on livestock with 5917 units. Out of these, highest demonstrations were in dairy sector (911) with 1020 units followed by poultry (536) with 2647 units, sheep and goat (515) with 2148 units, piggery (69) with 94 units and duckery (8) with 8 units on various aspects (Fig. 10).

Jersey cross gave 40% more milk yield per day with 6.0 BC Ratio as against farmers practicing breed with 1.02 BC Ratio. Mineral mixture intervention resulted in not only increased body weight but also animal became healthy and gave more milk as well as increased rate of

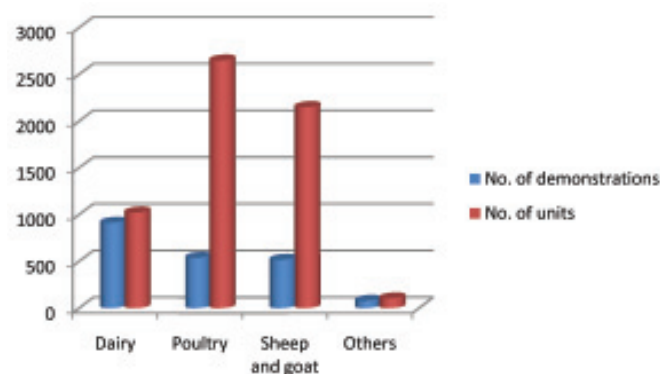


Fig. 10 : FLDs conducted on live stock



Swarnadhara backyard poultry

conception. Post AI administration of sterile ceftriaxone sodium on conception rate in milch cows (cross bred) responded to oestrus and conception rate increased.

FLDs on poultry brought out the performance of Rhodo white chicken, Nanthanam turkey, Aseel, Kaveri, Nandanam-1 among farmers. Swarnadhara was successfully introduced and performed well with better survivability, body weight and egg laying. Oral pellet vaccination gave 41% reduction in ranikhet disease in desi birds. Fowl pox vaccination in desi birds gave 12% body weight increase by 4 months. In case of ducks, rearing in cages for homesteads with indigenous breeds (Chara and Chemballi) resulted in increased egg laying capacity.

Integrated nutrient and disease management in sheep and goat with deworming, salt lick mineral cak and supplementation of vitamins & minerals gave 70% increase in body weight with 2.2 BC Ratio as well 75% increase in milk yield. Demonstrations on Tellicherry goat shown high performance on kids birth weight as well as increase of body weight. Demonstrations on crossing boer cross bucks with local non descript goats gave 92.30% increase in the body weight. Controlled breeding as well as feed management in male kids for improving meat production potential of Malabari cross were successfully demonstrated. Farmers were made aware of control of internal and external parasites in sheeps (Bannur, local sheep).

Improved management of pigs (Yorkshire) gave an increase of 20% body weight with 1.18 BC Ratio where

as castration in piglets of Yorkshire increased 11.68% body weight with 2.36 BC Ratio.

3.1.2.11 Fisheries : A total of 136 demonstrations on fisheries were conducted on various aspects like composite fish culture, composite carp culture, ornamental fish culture and prawn culture in 34.84 ha of farm and village ponds. Demonstrations on common carps management with species Catla, Rohu, Mirgal in inland aquaculture performed better and gave an increase of 30% fish yield by body weight with 1.9 BC Ratio where as in case of mixed fresh water fish culture in village ponds with same species, BC Ratio was 3.8 and fish culture in village ponds with same species, BC Ratio was 1.7. BC Ratio 3.6 was realized for composite fish culture with Catla, Rohu, Mirgal, Common carp, Silver carp and Grass carp in 40:20:30:10 ratios. Demonstrations on ornamental fishes with specie *Betta splendens* performed better and convinced farmers. Demonstrations on diagnostic kit for detection of white spot disease in shrimp farming resulted 54% increase in body weight of prawn and reduced disease incidence.



Azolla as a feed to grass carp culture pond

3.1.2.12 Enterprises: Conducted 166 FLDs on different enterprises like sericulture, mushroom cultivation and apiculture on various aspects for increasing the income of the farmers (Fig. 11). Demonstrations were conducted on sericulture (141) on interventions like silkworm breed CSR (2X4), IPDM, improved cultivation practices in silkworm rearing, Ecdysone hormone indicated that the per cent increase of cocoon yield ranged from 10.5 to 65.3 over the farmers practices. Demonstrations on



Fig . 11: FLDs conducted on enterprises

stingless bee keeping practices in homesteads showed 30% increase in honey yield with 1.33 BC Ratio. Demonstration of high yielding and longer shelf life mushroom variety APK 2 performed better and gave 50% more yield on fresh weight of mushroom.

3.1.3 Training

Training is a need based, systematic, planned and continuous process for the production of desirable behavioural changes of an individual. In this regard, our country has made substantial investment and vigorous efforts on creation of training infrastructure in agricultural sector for upgradation of human skills and change in their attitude towards productivity through a planned approach. Over the years, training and re-training are going on in different organizations and in various connections for capacity building of different personnel in agriculture sector.

In this direction, training is formulated as one of the main activities of KVKs to impart technical know-how

and do-how to the farmers, farm women, rural youth, and field level extension functionaries by following the principle of learning by doing. Further, provide training and communication support to the line departments and voluntary organizations to update the knowledge of recent advances and skills in agriculture and allied sectors. Training courses of KVKs are being formulated based on the training need analysis, in order to make them relevant to the participants.

3.1.3.1 Training courses at a glance: A total of 13828 training courses organized by KVKs during the year on various aspects of agriculture and allied sectors and trained 4.36 lakh participants of different clientele. Out of which, 11354 courses are need based, 1949 sponsored and 525 vocational wherein trained 3.60, 0.64 and 0.11 lakh participants, respectively (Table 24). Need based training courses broadly grouped as training courses organized for farmers, rural youth and extension personnel. From the data it is observed that female participation was dominated in vocational courses.

State wise data analysis indicated that more training courses (7273) were organized by KVKs in Tamil Nadu followed by 3902 in Karnataka and 1769 in Kerala and trained 2.34, 1.22 and 0.53 lakh participants, respectively. Further, it was observed that in all three categories of training viz., need based, sponsored and vocational, KVKs in Tamil Nadu organized more courses as compared to other states. Data further revealed that KVKs in Kerala organized more vocational courses (125) and trained less

Table 24 : State wise training courses organized

States	Need based training		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
Karnataka	3401	104156	431	15541	70	2328	3902	122025
Tamil Nadu	5879	195732	1128	32795	266	6057	7273	234584
Kerala	1332	39417	312	11973	125	2079	1769	53469
Goa	214	4141	3	166	11	93	228	4400
Puducherry	167	7452	64	3548	21	30	252	11030
Lakshadweep	361	9332	11	602	32	808	404	10742
Total	11354	360230	1949	64625	525	11395	13828	436250

participants (2079) as compared to Karnataka wherein organized 70 courses and trained 2328 participants.

3.1.3.1.1 Need based training: It includes training for farmers, rural youth and extension personnel. KVKs have conducted number of training courses on various aspects of agriculture and allied sectors for the benefit of different clientele. Details are presented here under.

Farmers training: It was organized based on the need of farmers on various thematic areas viz., crop production, management of horticulture crops, soil health and fertility management, livestock production and management, home science, women empowerment, farm mechanization, plant protection, fisheries, production of inputs at site, capacity building and group dynamics and agro-forestry. During the year, a total of 8807 training courses were organized and trained 2.81 lakh farmers and farm women. Out of these, 4125 were on-campus and 4682 off-campus with the participation of 1.31 (0.82 male and 0.49 female) and 1.49 (0.90 male and 0.58 female) lakh farmers, respectively.

From the data depicted in Fig. 12 shows that KVKs in Tamil Nadu and Lakshadweep conducted more on-campus training courses whereas remaining four states viz., Karnataka, Kerala, Goa and Pudu cherry conducted more off-campus training courses. Gender analysis indicated that female participation was more in on-campus courses in Kerala and Puducherry and remaining all courses male participation was dominated (Fig.13).

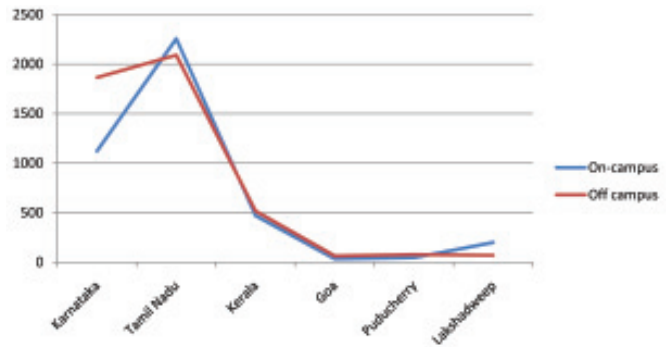


Fig.12 : State wise on and off campus training courses organized for farmers

State wise data analysis indicated that around 50% of trainings for farmers were organized by KVKs in Tamil Nadu followed by Kerala (33.90%), Karnataka (11.21%), Lakshadweep (3.06%), Puducherry (1.40%) and Goa (1.09%) and the same trend was observed in number of farmers trained (Table 25). Data further indicated that the percentage of farmers in these training courses was 61.81 male and 38.19 female. Male and female farmers ranged from 51.45 to 63.08% and 35.15 to 48.55%, respectively in different states. From the data, it is observed that 100% of participant farmers belonging to SC/ST category in Lashadweep followed by 44.10% in Goa.

Data in Table 26 indicated that around 50% of courses were organized in crop production (34.32%) and management of horticulture crops (14.36%) followed by home science/women empowerment (10.61%) and

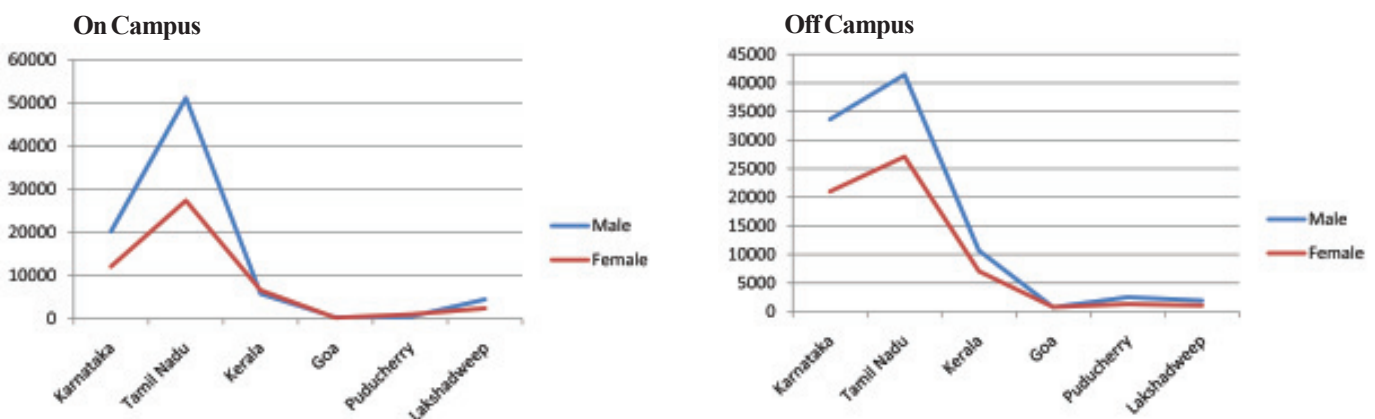


Fig. 13 : Gender wise on and off campus trainee farmers

Table 25 : State wise training courses (on and off campus) organized for farmers

States	No. of courses	Grand total			SC/ST		
		Male	Female	Total	Male	Female	Total
Karnataka	2986	56996	34232	91228	13368	10808	24176
Tamil Nadu	4345	91958	53815	145773	17779	14588	32367
Kerala	987	16433	13646	30079	2597	2332	4929
Goa	96	1065	1005	2070	561	352	913
Puducherry	123	2936	2283	5219	528	489	1017
Lakshadweep	270	4443	2408	6851	4443	2408	6851
Total	8807	173831	107389	281220	39276	30977	70253

Table 26 : Thematic area wise training courses (on and off campus) organized for farmers

Thematic areas	No. of courses	Grand total			SC/ST		
		Male	Female	Total	Male	Female	Total
Crop production	3021	62796	29894	92690	13854	8752	22606
Management of horticulture crops	1265	32308	15884	48192	6697	4009	10706
Soil health and fertility management	635	15907	6421	22328	4253	2223	6476
Livestock production and management	810	14367	10742	25109	3494	3307	6801
Home science/women empowerment	935	7022	18252	25274	1460	4691	6151
Farm mechanization	339	8075	3818	11893	1716	1141	2857
Plant protection	819	17490	6821	24311	3854	1862	5716
Fisheries	133	2745	2195	4940	747	614	1361
Production of inputs at site	461	8817	5065	13882	2203	1522	3725
Capacity building and group dynamics	313	2895	7478	10373	678	2653	3331
Agro-forestry	76	1409	819	2228	320	203	523
Total	8807	173831	107389	281220	39276	30977	70253

livestock production and management (9.19). Least courses organized in agro forestry (0.86%). Further it was observed that the male and female participation ratio is around 60:40. Female domination was recorded in capacity building and group dynamics and 27.78% male participation was observed in home science courses. Participation of farmers both male and female belonging to SC/ST ranged from 22.21 to 32.11% and highest female

SC/ST farmers participation (35.47%) was observed in capacity building and group dynamics.

Training for rural youth: Training courses for rural youth were mainly focused on development of entrepreneurship in agriculture and allied sectors at farm level or home level units to sustain the farm income as well to generate additional income. Data presented in



Training on light trap for pest managment in paddy

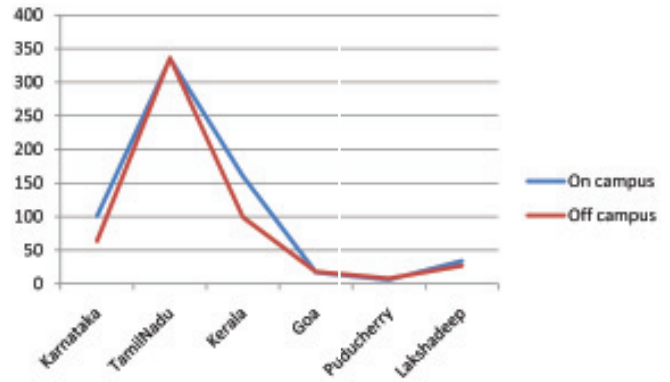


Fig. 14 : State wise on and off campus training coursed organised for rural youth

Fig. 14 indicated that organization of training courses for rural youth at on campus and off campus were on far in all states in Zone VIII that reflects the importance given to provide opportunity to the youth in the villages. Gender analysis indicated that female dominated in both on and off campus training courses in Kerala and Puducherry and remaining states male dominated (Fig.15).

State wise data indicated that 65.49% of courses were organized by KVKs in Tamil Nadu followed by Kerala (16.74%), Karnataka (10.66%), Lakshadweep (3.94%), Goa (2.27%) and Puducherry (0.9%). Female youth was dominated in Kerala, Goa and Puducherry. Youth belonging to SC/ST category participation ranged from 15.10% in Goa to 23.22% Tamil Nadu (Table 27).

Training courses for rural youth covered various

topics of interest viz., integrated farming, nursery management of horticulture crops, training and pruning of orchards, protected cultivation of vegetable crops, commercial fruit production, seed production, production of organic inputs, planting material production, vermiculture, mushroom production, bee-keeping, sericulture, tailoring and stitching, rural crafts, repair and maintenance of farm machinery and implements, value addition, small scale processing, post harvest technology, production of quality animal products, dairying, sheep and goat rearing, quail farming, piggery, rabbit farming, poultry production, ornamental fisheries, composite fish culture, freshwater prawn culture, shrimp farming, pearl culture, cold water fisheries, fish harvest and processing technology, fry and fingerling rearing which specially formulated for development of skill so as to establish small scale units. These topics were grouped in to broad headings like crop

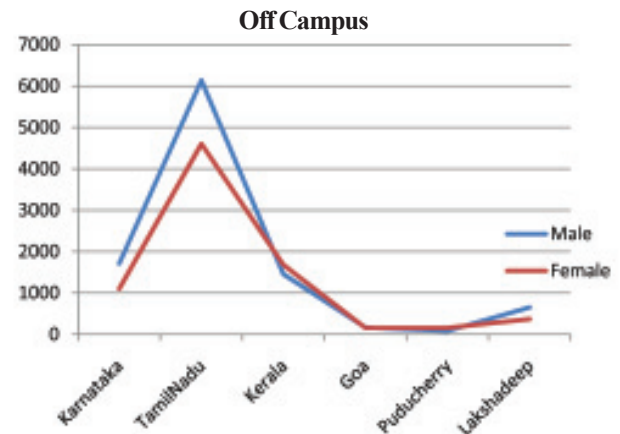
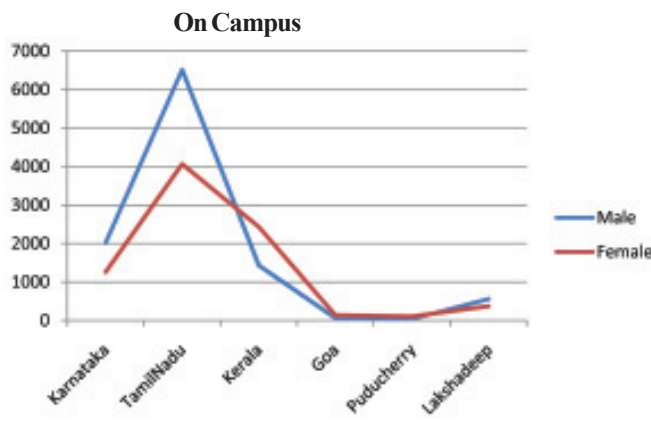


Fig. 15: Gender wise on and off campus trainee rural youth

Table 27 : State wise training courses (on and off campus) organized for rural youth

States	No. of courses	Grand total			SC/ST		
		Male	Female	Total	Male	Female	Total
Karnataka	165	3662	2199	5861	804	517	1321
Tamil Nadu	1013	19355	12723	32078	3975	3474	7449
Kerala	259	2877	4076	6953	486	697	1183
Goa	35	229	294	523	50	29	79
Puducherry	14	120	262	382	17	49	66
Lakshadweep	61	1209	741	1950	1209	741	1950
Total	1547	27452	20295	47747	6541	5507	12048

Table 28 : Thematic area wise training courses (on and off campus) organized for rural youth

Thematic areas	No. of courses	Grand total			SC/ST		
		Male	Female	Total	Male	Female	Total
Crop production	47	977	352	1329	189	108	297
Management of horticulture crops	268	5606	3832	9438	1481	1064	2545
Production of inputs at site	123	2427	1219	3646	501	301	802
Plant protection	21	433	259	692	116	59	175
Home science/women empowerment	422	5715	5732	11447	1324	1439	2763
Farm mechanization	24	430	232	662	47	32	79
Post harvest processing and value addition	261	4152	4436	8588	788	1022	1810
Live stock production and management	232	5241	2800	8041	1729	1160	2889
Fisheries	74	1021	547	1568	151	118	269
Capacity building and group dynamics	75	1450	886	2336	215	204	419
Total	1547	27452	20295	47747	6541	5507	12048

production, management of horticulture crops, production of inputs at site, home science/women empowerment, farm mechanization, post harvest processing and value addition, live stock production and management, fisheries, capacity building and group dynamics for easy scouting of technological interventions and details are presented in Table 28. It indicated that more courses were organized on home science/women empowerment (422) followed by management of horticulture crops (268), post harvest processing and value addition (261), live stock production and management (232) and production of


Hands on training on coconut climbing

inputs at site (123). This trend clearly indicate that the rural youth were made aware of potential areas in agriculture and allied where they can venture for income generating activities.

Training for extension personnel: Training for extension personnel mainly focused on latest advancements in agriculture and allied sectors to update their day to day knowledge. In fact they are at field level to the doorstep of farmers to communicate and transfer the technologies without any time lag. In this direction, KVKs have formulated viable training courses for officials of various line departments in the district. During the year, a total of 31263 extension personnel were trained by the KVKs through organization of 1000 courses. Out of which, 618 courses were on campus and 382 were off campus and trained 20054 (13103 male and 6951 female) and 11209 (6371 male and 4838 female), respectively. It is observed from Fig 16 that more number of off campus training courses were organized in Goa. Further data in Fig.17 indicated that

female participation dominated in Goa and Pudhucherry and in case of Kerala, female dominated in off campus training courses.

State wise data indicated 52.10% training courses were organized by KVKs in Tamil Nadu followed by Karnataka (25.00%), Kerala (8.60%), Goa (8.30%), Puducherry and Lakshadweep (3%). Female officials were more participated in Puducherry (80.56%) followed by Goa (77.85). In case of participation from officials belonging to SC/ST category ranged from 15.84 to 30.29% (Table 29).

A wide range of subject matter areas covered to train extension officials. The topics includes productivity enhancement in field crops, IPM,INM, rejuvenation of old orchards, protected cultivation technology, production and use of organic inputs, care and maintenance of farm machinery and implements, gender mainstreaming through SHGs, formation and management of SHGs, women and child care, low cost and nutrient efficient diet designing ,

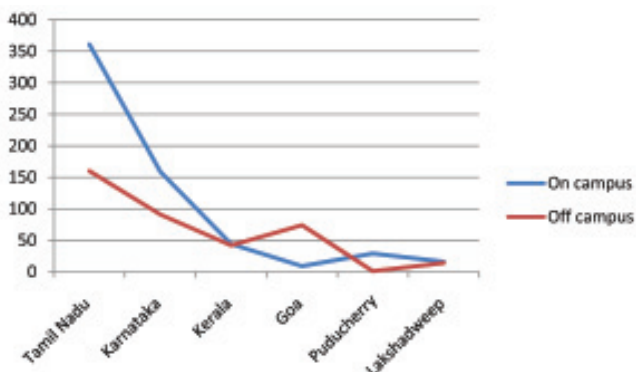


Fig. 16. State wise on and off campus training programmes organised for extension personnel



Training for extension personnel

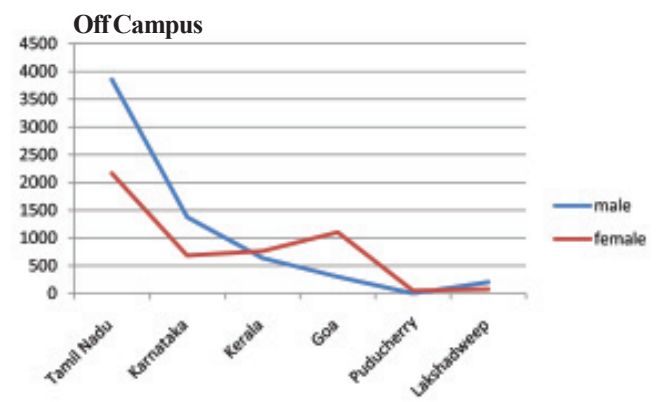
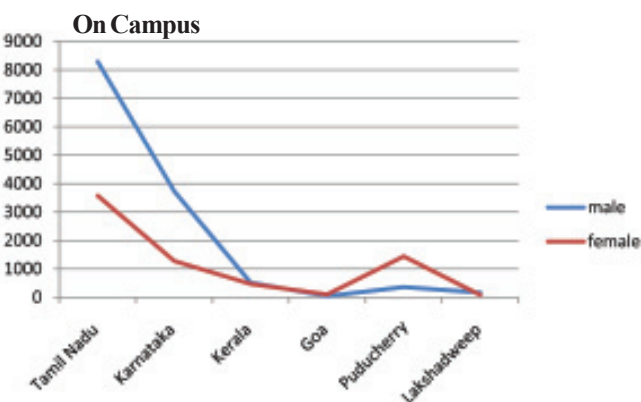


Fig. 17. Gender wise on and off campus trainee extension personnel

Table 29 : State wise training courses (on and off campus) organized for extension personnel

States	No. of courses	Grand total			SC/ST		
		Male	Female	Total	Male	Female	Total
Tamil Nadu	521	12143	5738	17881	2225	1328	3553
Karnataka	250	5103	1964	7067	767	374	1141
Kerala	86	1154	1231	2385	169	209	378
Goa	83	343	1205	1548	210	259	469
Puducherry	30	360	1491	1851	130	390	520
Lakshadweep	30	371	160	531	371	160	531
Total	1000	19474	11789	31263	3872	2720	6592

Table 30 : Thematic area wise training courses (on and off campus) organized for extension personnel

Thematic areas	No. of courses	Grand total			SC/ST		
		Male	Female	Total	Male	Female	Total
Productivity enhancement in field crops	144	3197	988	4185	444	244	688
Integrated Pest Management	128	3385	1400	4785	668	294	962
Integrated Nutrient Management	89	2111	688	2799	411	133	544
Rejuvenation of old orchards	17	522	186	708	126	56	182
Protected cultivation technology	28	636	199	835	164	58	222
Production and use of organic inputs	36	928	746	1674	268	274	542
Care and maintenance of farm machinery and implements	27	464	257	721	90	71	161
Gender mainstreaming through SHGs	16	255	143	398	30	28	58
Formation and Management of SHGs	18	134	384	518	33	97	130
Women and child care	23	7	731	738	7	175	182
Low cost and nutrient efficient diet designing	14	72	769	841	-	55	55
Group dynamics and farmers organization	38	678	272	950	116	89	205
Information networking among farmers	31	583	317	900	124	80	204
Capacity building for ICT application	48	1115	386	1501	232	103	335
Management in farm animals	36	772	358	1130	201	93	294
Livestock feed and fodder production	49	1191	514	1705	280	141	421
Household food security	258	3424	3451	6875	678	729	1407
Total	1000	19474	11789	31263	3872	2720	6592

group dynamics and farmers organization, information networking among farmers, capacity building for ICT application, management in farm animals, livestock feed and fodder production and household food security and all these topic are very much relevant at present days of agriculture. Data indicated that most of the training courses were conducted on house hold food security (259) followed by productivity enhancement in field crops (144) and Integrated Pest Management (128) (Table 30).

3.1.3.1.2 Sponsored training: It was mainly organized through linkages with other line departments in the district working for the development of agriculture and betterment of the farming community. KVKs had functional relationship with both government and NGO for better cooperation and coordination while organizing the sponsored courses. During the year, a total of 1949 courses were organized by KVKs which are sponsored by different agencies on various aspects in agriculture and allied sectors viz., agronomic packages of crops, vegetables production package, fruit plants production, ornamental plants production, spices crops production, soil health and fertility, seed production, protective cultivation, value addition, processing, farm mechanization, animal nutrition management, animal disease management, fisheries nutrition, fisheries management, aqua culture, nutrition garden, women empowerment, drudgery reduction, capacity building, group dynamics and trained 13872 participants. These topics are grouped under five broad heads.

State level data revealed that KVKs in Tamil Nadu actively involved in organization of sponsored courses at the rate of 57.88% followed by Karnataka (22.12%), Kerala (16.01%) and Puducherry (3.28%). It is noticed that less per cent of sponsored programmes were organized in Lakshadweep and Goa. Female domination was observed in Kerala, Puducherry and Lakshadweep. It is note worthy that 154.35% of participants in Lakshadweep are belonging to SC/ST category. This may be due to the people residing there are mainly from that category (Table 31).



Sponsored training on value addition in cashew apple

Data presented in Table 32 revealed that 63.06% sponsored training courses were organized on crop production. Further, it was observed that female participation was dominated in home science and women empowerment (84.18%), livestock and fisheries (66.45%)

Table 31 : State wise sponsored courses organized

States	No. of courses	Grand total			SC/ST		
		Male	Female	Total	Male	Female	Total
Karnataka	431	8124	7795	15919	1468	2473	3940
Tamil Nadu	1128	22930	9935	32865	3386	2131	5517
Kerala	312	5522	6448	11970	836	1190	2026
Goa	3	103	63	166	47	14	61
Puducherry	64	1283	2265	3548	273	607	880
Lakshadeep	11	180	210	390	327	275	602
Total	1949	38142	26716	64858	6337	6690	13027

Table 32 :Thematic area wise sponsored training courses organized

Thematic areas	No. of courses	Grand total			SC/ST		
		Male	Female	Total	Male	Female	Total
Crop production and management	1229	27742	12049	39791	4078	2302	6380
Post harvest technology and value addition	226	3822	3965	7787	845	927	2617
Livestock and fisheries	200	2463	4851	7341	663	1867	2530
Home science and women empowerment	90	456	2426	2882	159	526	685
Capacity building and group dynamics	204	3659	3425	7084	592	1068	1660
Total	1949	38142	26716	64858	6337	5690	13872

and post harvest technology and value addition (50.92%). It is noted that 15.82% of male participated in home science related training courses. In case of participation from SC/ST categories, it was observed that their participation ranged from 5.78 to 25.43% and 75.80% of female participated in training courses organized on livestock and fisheries.

3.1.3.1.3 Vocational training: KVKs of Zone VIII have organized medium to long duration vocational training courses for creating motivation and encouragement among farm youth by imparting them with technical knowledge and skill. Areas of the training were identified based on the need and interest of the participants. Topics covered under vocational training were agronomic packages , floriculture, fruit production, vegetable production, ICM, organic farming, value addition, processing, dairy farming, composite fish culture, sheep and goat rearing, piggery, poultry farming, processing, dairy farming, composite fish culture, sheep and goat rearing, piggery, poultry farming, vermicomposting, bio-products production, farm mechanization, rural crafts, seed production, sericulture, mushroom cultivation , nursery production, women empowerment, self employment, capacity building and group dynamics. These topics were further grouped into five broad heads viz., crop production and management, post harvest technology and value

addition, livestock and fisheries, entrepreneurship development and capacity building and group dynamics.

During the year, a total of 525 vocational training courses were organized by KVKs and trained 11395 participants (5540 male and 5855 female). Data from the Table 33 showed that 50.67% of vocational courses during the year were organized by KVKs in Tamil Nadu followed by Kerala (23.81%), Karnataka (13.34%), Lakshadweep (6.09%), Puducherry (4.00) and Goa (2.09). Female participation dominated in Kerala, Karnataka and equally participated in Puducherry. Participation of SC/ST personnel ranged from 13.75 to 33.33%.

Data from the Table 34 shows that female dominated in both general (51.39%) and SC/ST (26.47%) categories of participants. It is noted from the data that 50.29% of vocational training courses were organized on entrepreneurship development programmes. More female participation was observed in post harvest technology and value addition (68.53%) in general category and in case of SC/ST category it was livestock and fisheries (40.04%). This trend clearly indicates that vocational courses organized by KVKs are in line with the needs and desires of the participants and therefore courses will be fully useful to the participants.

Table 33 : State wise vocational training courses organized

States	No. of courses	Grand total			SC/ST		
		Male	Female	Total	Male	Female	Total
Karnataka	70	849	1479	2328	142	458	600
Tamil Nadu	266	3449	2608	6057	560	650	1210
Kerala	125	710	1369	2079	83	203	286
Goa	11	57	36	93	6	14	20
Puducherry	21	15	15	30	5	5	10
Lakshadweep	32	710	350	1060	710	350	1060
Total	525	5540	5855	11395	1145	1550	2695

Table 34 : Thematic area wise vocational training courses organized

Thematic areas	No. of courses	Grand total			SC/ST		
		Male	Female	Total	Male	Female	Total
Crop production and management	100	1512	679	2191	317	191	508
Post harvest technology and value addition	56	378	823	1201	47	174	221
Livestock and fisheries	64	1020	924	1944	300	370	670
Entrepreneurship development	264	2282	3019	5301	411	726	1137
Capacity building and group dynamics	41	348	410	758	70	89	159
Total	525	5540	5855	11395	1145	1550	2695



Training on crab culture for women SHG

3.1.3.1.4 International training: Activities of KVK Namakkal reached to Namibia and Nigeria by organization of International Training Programme on

Smallholder Livestock and Commercial Poultry Farming under Indo-African Forum Summit during 07-20 February, 2011 at KVK Campus in Tamil Nadu. Programme was sponsored by Ministry of External Affairs, Government of India. A total of 13 participants including 5 women working in Ministry of Agriculture and Allied fields from Nigeria, Sudan, Namibia, Ethiopia, Zambia, Mali, Ghana and Kenya attended the programme.

During 15 days programme, 27 topics were covered mainly related to 10 broad areas viz., cattle, sheep and goat farming, broiler and layer farming, alternative poultry, piggery, rabbitary, ethno veterinary medicine, meat technology; livestock feed mill, livestock and poultry service providers/advisors and livestock and poultry farm



Field visit to dairy farm



Field visit to poultry farm



Presentations by trainees



Group photo of resource experts and trainees

waste management. Visit to poultry units, hatcheries in and around Namakkal district, which is the highest producer of poultry products in India and visit to College of Veterinary & Animal Science, Thrissur, Kerala were the other attractions. In these sessions 14 farmers contributed their practical experience as resource persons.

Interactive sessions were conducted on different technologies related to replicable small scale feed mill units, importance of feed analytical laboratory, role of PDDSL to control poultry diseases, impact of weather on poultry, effective disposal of soil and liquid waste for eco-friendly farming for the benefit of trainees. Further, participant trainees were exposed to replicable small, medium and large scale dairy, sheep, goat, broiler, layer, piggery and rabbit farming enterprises during the programme.

Trainees were divided into five groups based on their interest. At the end of training, these groups were made power point presentations on the application of technologies learnt during the programme in their respective countries on the following topics:

- Alternative poultry for Nigeria
- Broiler farming suitable for Africa
- Innovations learnt in India and possible technological transfer in dairy production
- Technologies learnt and possible interventions on back home sheep and goat farming
- Technologies to be adopted in layers farming in Africa

3.1.4 Extension Programmes

In an information age the appropriate information package and its dissemination is equally important. It is not enough to generate information but also to see that the required information is delivered to the end users at the earliest and with least dissemination loss. In this direction, KVKs in the country are functioning with the main aim of reducing the time lag between generation of technology at the research institution and its transfer to the farmer fields for increasing production, productivity and income from the agriculture and allied sectors on a sustained basis. In order to achieve this aim in general and mandate in particular, KVKs are actively involved in various extension activities to accelerate the process of transfer of technology in better way for the overall development of the farming community. The various extension programmes carried out by KVKs in co-ordination and collaboration with other line departments/agencies working in the district during the year are briefly presented here under.

3.1.4.1 Individual and group contacts: KVKs made efforts to create awareness about recent developments in agriculture and allied sectors among farmers, extension personnel and other stakeholders through different individual and group contact methods. Individual services are rendered at on station as well as on-farm by individual contact methods like KVK staff visit to fields, farmers visits to office, help-line services through telephone calls, individual letters, etc. for providing appropriate recommended solutions to the specific problems faced by individual farmers. These services are being extended for developing closer acquaintance with individual farmers as well to gain confidence among farmers. Whereas group services were extended through community need analysis, farmers group discussion/meetings, agricultural seminars, workshops, celebration of important events, visitors advisory services etc to arrive at common interest of farming community as well as to provide opportunity to farmers and other stakeholders to exchange the experiences and points of view and to develop the habit of talking, thinking, planning and working together with their traditional knowledge blended with modern technologies.

A total of 1.10 lakh extension programmes and services were organized based on different methods and means by the KVKs during the reporting period wherein technologies related to agriculture and allied sectors were appraised among 93.91 lakh farmers and 2.01 lakh extension personnel (Table 35). Data presented in the Table 35 revealed that KVKs in Karnataka organized maximum extension programme (46434) followed by Tamil Nadu (36295), Kerala (25770), Puducherry (1016), Goa (844) and Lakshadweep (125). Details of activity wise extension programmes organized are furnished in Table 36. Data could imply that KVKs efforts through extension programmes made contacts to a large number of farmers and made them aware about suitability of new technologies demonstrated in the farmers fields in a short period of time.

3.1.4.2 Mass contacts: KVKs are in the forefront of mass media utilization through print and electronic as well as methods like exhibitions, kisan melas etc in disseminating timely and relevant technologies to the farming community without any time lag. During the year, KVKs have popularized many technologies through organization of 6722 programmes (Fig 18). Data indicated that KVKs have engaged more in production of extension literature (2086) followed by newspaper coverage (1995), radio talks (1024), popular articles (633), exhibitions (478) and kisan melas (113) for the benefit of a large number of farmers as well as public.

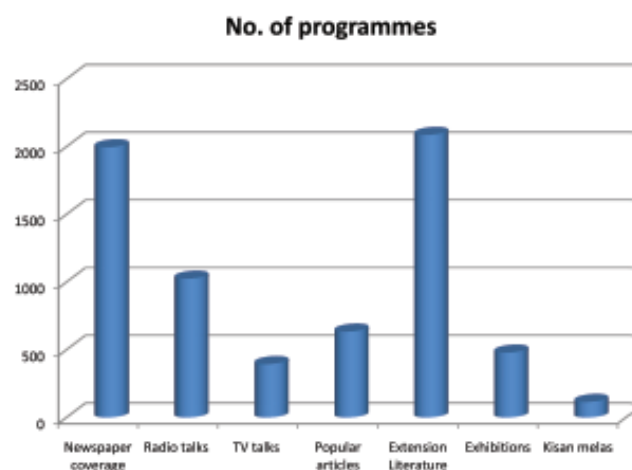


Fig. 18 : Extension programmes organized for mass contacts

Table 35 : State wise extension programmes organised

States	No. of programmes	Farmers	Extension personnel
Karnataka	46434	8858242	135000
Tamil Nadu	36295	320668	48786
Kerala	25770	138873	4654
Goa	844	26271	8824
Puducherry	1016	31786	2799
Lakshadweep	125	15274	1255
Total	110484	9391114	201318

Table 36 : Activity wise extension programmes organized

Activities	No. of programmes	Farmers	Extension personnel
Field days	2197	34643	12521
Kisan melas	113	292333	59635
Kisan ghosthies	114	8728	5550
Exhibitions	478	567066	76708
Film shows	1024	27612	2083
Method demonstrations	1610	28912	2096
Farmers seminars	266	17902	1553
Workshops	682	13750	3343
Group meetings	995	17014	1792
Lectures delivered as resource persons	3031	44001	4752
Advisory services	41131	42812	2561
Scientific visit to farmers fields	7866	27678	1686
Farmers visit to KVKs	35621	62926	3561
Diagnostic visits	5135	15032	931
Exposure visits	643	10951	1114
Ex-trainees sammelans	383	2693	258
Soil health camps	118	4066	511
Animal health camps	714	10249	287
Agri mobile clinic advisories	206	2440	659
Soil test campaigns	270	7094	259
Conveners meetings of committees	1621	25879	934
Celebration of important days	2163	105802	13992
Help line services	4103	21531	4532
Total	110484	9391114	201318



Animal health camp



Video conferencing



Interview with farmer

3.1.4.3 Technology week: The technology week was organized by the KVKs under public-public and public-private partnership mode in which a series of activities such as seminars, skill demonstrations, field visits on result demonstrations, exhibitions and scientists-extension personnel-farmer interactive sessions were included. A total of 35 KVKs conducted technology week celebrations with cooperation and collaboration and active involvement of 526 agencies both government and NGOs in which 114076 farmers were exposed to various aspects of agriculture and allied sectors.

During the technology week celebration, need based technologies on crop improvement, crop production, crop protection, post harvest processing, horticulture, livestock, farm implements & machineries, fisheries and allied sectors were demonstrated and explained to farmers, members of SHGs, extension officials and others.

Seminars were conducted on thematic areas of local importance with a focus on agro-based enterprises and income generation activities. Agricultural exhibitions involving SAUs, ICAR Institutes, public sector organizations etc., were organized by KVKs to disseminate technologies among the farmers. Sales counters for agricultural inputs like seeds, bio-fertilizers, bio-pesticides, improved implements, publications etc. were provided valuable technology products to the farmers.

3.1.4.4 Kisan Mobile Advisory Services: Kisan Mobile Advisory Service of the ICAR was launched by Hon'ble Governor of Karnataka, Shri. Hans Raj Bhardwaj at XIII Regional Committee Meeting held at Bangalore on 13th May 2010 as it is one of the Information and Communication Technology (ICT) tools for dissemination of requisite and need based information at the right time to the right people. M/S Netcore Solutions Pvt. Ltd. was

Table 37 : Kisan Mobile Advisory Services rendered

States	KVKs (No.)	Messages sent (No.)
Karnataka	21	1155
Tamil Nadu	21	945
Kerala	9	728
Puducherry	2	104
Lakshadweep	1	25
Total	54	2957

identified as bulk service provider for KVKs for the year 2010-11 and fifty four KVKs published SMS under the technical guidance of the Group Manager, Netcore Solutions, Bangalore. These KVKs are sending information via SMS to the farmers advising them on the vital issues of agricultural importance and remaining KVKs are in the process of starting the same. Till date 7035 farmers including few extension functionaries registered with above said KVKs and sent 2957 messages covering various aspects and issues of agriculture (Table 37). It clearly indicates that Kisan Mobile Advisory Service has made access to the information easy and cost effective to the farmers and other stakeholders.

3.1.4.5 E-Connectivity: The Indian Council of Agricultural Research as a part of its mega ICT driven technology application strategy has provided e-linkage to its network of KVKs and Zonal Project Directorates during XI plan. Under the project, E-Linkage facility was established in 37 KVKs along with Zonal Project Directorate, Bangalore during XI plan with technical guidance and execution of work by ERNET India consisting of following hardware and software facilities in every KVK/ZPD (Table 38).

These KVKs were connected electronically through VSAT and connected to Hub established at New Delhi. The communication between KVKs across the country through IP phones was enabled by providing IP phone numbers. KVK staff are regularly apprised of the latest technologies through guest lectures by eminent scientists

in the respective fields and other communications through e-connectivity/video conferencing. In this direction during the year, 26 e-seminars were webcasted from KVK hub New Delhi involving experts in the field covering various topics of interest to KVKs. One on-line training program for Any Time KVK software developed by the Council was conducted on 4.8.2010.

3.1.5 Production of Technological Products

To achieve the potential yield in agriculture and allied sectors, timely availability of good quality seeds, planting materials, livestock breeds and bio-products are primary requirement. In this direction, KVKs are actively involved in the production of quality seeds, planting materials, livestock materials and bio-products and supplying them timely to the desired farmers. During the period under report, KVKs have produced 6657.83 q seeds of crop varieties, 227.4 q seeds of crop hybrids, 8231.21 q bio-products, 67.31 lakh number planting materials of crops, 11.07 lakh number planting materials of crop hybrids and 1.43 lakh livestock and fisheries which worth Rs.382.12 lakh and supplied to 2.65 lakh farmers (Table 39).

3.1.5.1 Crops seed: A total of 6657.83 q quality crops seed was produced by KVKs which worth Rs. 143.19 lakh and supplied to 0.90 lakh farmers. Out of which more quantity was produced on cereals (5352.24 q) followed by pulses (480.24 q), flower crops (242.53 q), vegetables (221.77 q), oil seeds (169.32 q), spices (97.47 q), fodder crops (28.42 q), fiber crops (25.98 q), forest crops

Table 38 : KVKs with E-linkage facility

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

Table 39 : Production and supply of technological products

Category	Quantity	Value (Rs. in lakh)	No. of farmers
Seeds of crop varieties (q)	6657.83	143.19	90762
Seeds of crop hybrids (q)	227.4	3.18	419
Bio- products (q)	8231.21	49.44	53416
Planting materials of crops (No.s)	6731732	142.68	105816
Planting materials of crop hybrids (No.s)	1107928	7.26	8821
Livestock and fisheries (No.s)	143431	36.37	6318
Total		382.12	265552

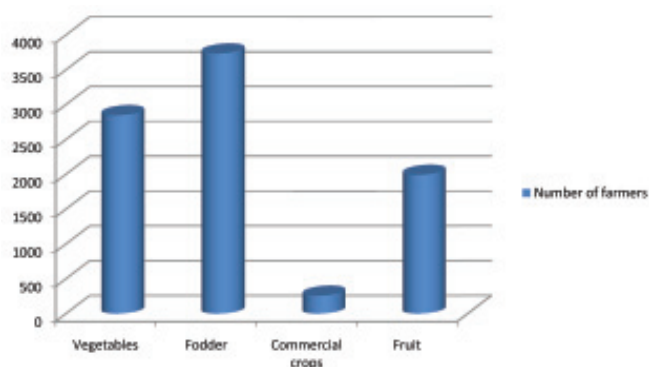
(23.33 q), commercial crops (11.04 q) and green manure crops (5.49 q). Vegetable crops seed was supplied to more farmers(24744) and least in green manure crops (18).

3.1.5.2 Planting materials : A total of 67.31 lakh seedlings were produced by KVKs of Zone VIII which worth Rs. 142.68 lakh and supplied to 105816 farmers. Out of which more number of seedlings were produced on fodder crops (16.95 lakh), vegetables (15.45 lakh), forest species (14.55 lakh), medicinal and aromatic plants (1260723), ornamental plants (2.14 lakh), commercial crops (1.96 lakh), fruits crops (1.71 lakh, plantation crops (1.58 lakh), spices (0.24 lakh) and tuber crops (0,08 lakh). Planting materials of fruit crops were supplied to more farmers (25706) and least on tuber crops (18).

*Nursery unit*

3.1.5.3 Hybrid seed and planting materials: A total of 227.40 q hybrid seed was produced by KVKs which worth Rs.3.18 lakh and supplied to 419 farmers. Out of

which, 208.15 q hybrid seed of oil seeds, pulses and commercial crops and 19.25 q hybrid seed of cereals and vegetables that worth Rs.1.96 lakh and 1.22 lakh and supplied to 259 and 160 farmers, respectively. In case of hybrid planting materials, a total of 11.07 lakh hybrid planting materials were produced by KVKs which worth Rs. 7.26 lakh and supplied to 8821 farmers. Out of which more number of hybrid planting materials produced were on vegetables (5.61 lakh) followed by fodder crops (5.27 lakh), fruit crops (0.09) and commercial crops (0.91 lakh). More number of hybrid planting materials were supplied on fodder crops and least was on commercial crops (Fig. 19).

*Fig. 19 : Supply of hybrid planting materials to farmers*

3.1.5.4 Bio-products : A total of 8231.21 q bio- products were produced by KVKs which worth Rs.49.44 lakh and supplied to 0.53 lakh farmers. Out of which, more quantity was produced on organic manure (7362.08 q) followed by earth worms (409.2 q), bio Agents (338.17 q), micro nutrient based mixture/special (59.14 q), bio-fungicide

(32.51q), bio-fertilizers (27.32 q) and bio pesticide (2.79 q). Earth worms were supplied to more number of farmers (0.15 lakh) and least on organic manure (0.01 lakh) (Fig. 20).

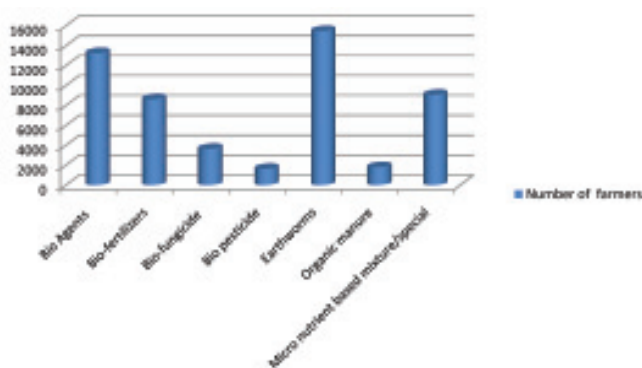


Fig. 20 : Supply of bio- products to farmers

3.1.5.5 : Livestock and fisheries: A total of 1.43 lakh number of livestock strains were produced by KVKs which worth Rs.36.31 lakh and supplied to 6318 farmers. Out of which, more number were produced on fisheries (1.05 lakh) followed by poultry (0.37 lakh), sheep and goat (282), piggery (144) and dairy animals (55). Poultry strains were given to more number of farmers (4917) and least was on dairy animals (54) (Fig.21).

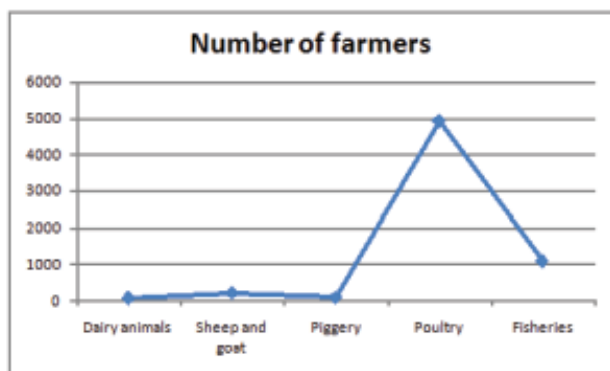


Fig. 21 : Supply of livestock and fisheries strains to farmers

Table 40 : State wise soil, plant, water analysis

States	No. of samples	No. of farmers	No. of villages	Amount realized (Rs. in lakh)
Karnataka	17908	15999	781	14.77
Tamil Nadu	10252	6948	267	2.50
Kerala	7122	6712	157	9.40
Goa	30	30	4	-
Puducherry	384	119	87	0.24
Total	35696	29808	1296	26.92

3.1.6 Soil, Water and Plant Analysis

A total of 52 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 35696 samples of soil, water, plant, manure, lime etc received from 29808 farmers belonging to 1296 villages have been analysed and realized an amount of Rs. 26.92 lakh. Out of these samples, 27220 were soil followed by water (7758), chemicals (484) and manure (234) (Fig. 22).

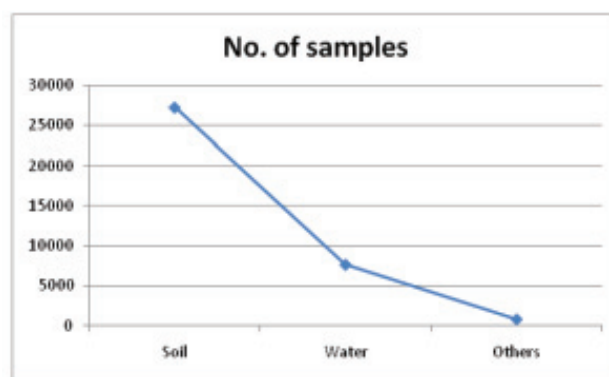


Fig. 22 : Analysis of different samples

State wise data showed that KVKs in Karnataka analyzed more samples (17908) followed by Tamil Nadu (10252), Kerala (7122), Puducherry (384) and Goa (30) (Table 40).

3.1.7 Rain Water Harvesting Unit

Rain water harvesting unit with micro irrigation system was established in 16 KVKs. During the year, a total of

77 training programmes, 82 demonstrations were conducted utilizing this facility and produced 0.93 lakh planting materials. Further, 20413 farmers and 475 officials visited these units and got acquainted with the system.

3.1.8 Prosperity of Farmers through KVKs

Need based technological interventions are being carried out by the KVKs for the benefit of farming community. The success and feedback given by the farmers becomes the testimony to the KVKs. In this direction KVK are being documenting data on successful technologies which have created prosperity among farmers. During the reporting year many successful technological interventions were documented by KVKs and few of them are presented briefly here under.

3.1.8.1 Homestead poultry rearing: Poultry industry through commercial broiler and layer farming has made rapid strides and the contribution of poultry sector to the agricultural GDP is considerably high. However, resource poor farmers are confronting with huge investment, fluctuating market and disease incidence. Yet, backyard poultry rearing is gaining popularity among both urbanites and rural people and the demand for country chicken meat and eggs are increasing daily. In this direction, KVK, Kancheepuram has established a model unit on backyard poultry with locally available materials on low cost basis and the same model was successfully introduced among farmers. This model consists of three types of poultry viz., Rhodo white chicken, Nandanam quails and Nandanam turkeys. Technical know-how and do-how was imparted to farmers and farm women on backyard poultry rearing. A total of 91 farmers (45 Rhodo white chicken, 27 quails and 19 turkeys) belonging to Kandigai, Thirumanikuppam, Sogandi, Nookampalayam Old Perungalathur, Tambaram, Ayyempettai, Chinna Kancheepuram, Konathi, Thirukalukundram villages in Kancheepuram district have established backyard poultry rearing units as home scale enterprise under the technical backstopping of KVK. Timely and regular vaccination of birds is being carried out by farmers under the supervision of KVK Subject Matter Specialists especially for Ranikhet disease.

Rhodo white chicken laid more eggs (140 - 160)



Rhodo white chicken



Nandanam Quails



Nandanam Turkeys

per laying season with eggs weighing 50-55 g as compared to a country chicken lay about 40 - 60 eggs per laying season. Farmers are selling Rhodo white pullet eggs (table eggs), hatching eggs and day old chick at the

rate of Rs. 3 per egg, Rs.6 per egg and Rs. 15 per chick, respectively and they are getting a sizeable income of Rs.1000 to 2500 per month through sale of egg, chicks and poultry meat. Further, farmers get both table eggs for their household consumption and hatching eggs for artificial hatching of chicks. In case of quails, Nandanam quails on an average attained a market weight of 180 - 200 g by the marketing age of 35 days. Farmers are selling Quails at the rate of Rs.20 - 25 per bird and they are getting a sizeable income of Rs. 2000 - 2300 per unit size of 500 birds with less investment, less floor space requirement and shorter generation interval. Nandanam turkeys are attained a body weight of 3 kg by 4 months of age. Farmers are selling birds at the rate of Rs. 140 per kg and they are getting a profit of Rs. 150 - 200 per bird. A farmer on an average can rear 25 turkeys as a homestead backyard poultry unit along with desi chicken and on an average can earn a income of Rs. 6000 - 8000 per annum in 3 batches.

Besides, KVK imparted hands-on training on value addition of poultry produce such as Quail egg pickle, Quail meat pickle, Turkey meat patties, and other value added products. Thus, there is a tremendous opportunity and growth for empowering resource poor farmers and farm women to engage in homestead poultry rearing like Rhodo white chicken, Turkeys and Japanese Quails for income generation and livelihood in Kancheepuram.

3.1.8.2 Precision farming : Precision farming is a hi-tech approach which consolidates available technologies relating to soil, water, inputs and varieties and integrates them in an appropriate order so as to enhance the productivity up to the genetic potential of the crop. KVK Salem implemented precision farming project under NADP in five clusters @ twenty farmers per cluster viz., Thevur, Thedavur, Keeripatty, Sukkampatty and Siruvachur in Sankagiri, Gangavalli, Attur, Ayothiyapattinam and Thalaivasal villages and all put together covered hundred farmers in Salem district during 2008-09. In the study area, the participating farmers were exposed to trainings and demonstrations organized by KVK which enhanced their knowledge on drip system

fertigation and net house installation. Apart from this, the precision farmers have been taken on exposure visit to Jain Irrigation Company at Jalgaon, Maharashtra. Further, KVK arranged study tours to precision farming groups to Bangalore and Hosur markets through which farmers have enhanced knowledge level on marketing sectors.

Technology assessment on precision farming technological packages has been studied and analyzed. A general trend of increased awareness and adoption has been observed as a significant impact of the introduction of the programme in the study area (Table 41). The participation of the beneficiaries in the TNPFPP helped them to get awareness for more than 90 per cent of the respondents on all the components. Among the components, the awareness on use of protrays (94%), chisel plough was more (93%) followed by fertigation (91%) and drip irrigation (90%).

Table 41 : Awareness and adoption on precision farming technologies

Technology	(n=100)	
	Awareness (%)	Adoption (%)
Shade net	85	56
Protrays	94	38
Chisel plough	93	45
Drip irrigation	90	46
Fertigation	91	40

The adoption of components such as shade net, use of drip irrigation and structures, chisel plough and installation of fertigation unit was found to be comparatively more. Low level of adoption was seen for the use of protrays (38%). On enquiry, it was revealed by the farmers that the amount allotted for shade net installation may have to be enhanced to include purchase of protray also.

Information was collected regarding the facilitating factors, which made the beneficiaries of precision farming to participate in the project and adoption of recommended precision farming technologies. Data indicated that most of the beneficiaries (95%) revealed increased water

Table 42 : Impact of precision farming

(n=100)

Impact	Frequency	Ranking
Technological		
Developed skill on drip system maintenance	98	II
Improved knowledge on fertigation technologies	71	III
Enhanced knowledge on drip and net house materials selection	45	IV
Increased knowledge on marketing	33	I
Social		
Developed communication skill	89	I
Gained status of opinion leaders	68	II
Involved in group activities	39	III

saving as the major facilitator to the extent of 40-50 % followed by decreased cost of labour (60%), less weed growth (57%), time saving (50%), enhanced level of yield (40%), maintenance of soil fertility (37%) and feasible technologies (9%).

The adoption of precision farming technologies has created substantial impact among the respondents. From the Table 42, it could be understood that major impacts like skill development on drip system maintenance, improved knowledge on fertigation technologies, enhanced knowledge on drip and net house materials selection and increased knowledge on marketing secured first, second, third and fourth ranks respectively.

Further, it could be inferred that most of the respondents (89) had developed communication skill, while 68 respondents gained status of opinion leadership followed by 39 farmers involved in group activities after they became beneficiaries of the precision farming.

The farmers had their net income raised to the tune of 20 fold after adopting the precision farming. Apart from realizing the enhanced and regular income, they are also cultivating the crops during summer season in entire area through single bore well by water saving drip system. Interesting point from this project is that additional area has been brought under the cultivation and mutual water

sharing concept has been promoted among the brothers to reap the ultimate benefit of more income from the every drop of water for the livelihood security of poor farmers in the present day traditional farming system, which owes less profitability.

As a follow up of this success, precision farming training was conducted at KVK, Sandhiyur during 2010 for 1240 beneficiaries of State Department of Agriculture and Horticulture of Salem, Erode and Coimbatore districts. As an outcome of the precision farming trainings nearly 4500 ha cropped area is under drip system in Salem district. Awareness has been created about drip fertigation among the farmers in 11 blocks out of the 20 blocks in the district.



A field view of precision farming adopted by farmers under the technical guidance of KVK, Salem

3.1.8.3 Banana special : Banana is one of the important fruit crops of Davanagere district. Substantial number of farmers are growing banana crop. The district has 2,167.2 ha. area under banana with total production of 60075 t and average productivity of the district is 27.72 t/ha. Farmers are spending more than required money on fertilizers. It is of great concern that each farmer is spending 60-70 % of cost of production only on fertilizers. KVK has conducted a survey on banana area and cost of production of crop in the Siddanur cluster of Davanagere taluk. Survey revealed that farmers are applying fertilizers indiscriminately. Farmer had less knowledge of recommended dosage of fertilizers for banana. The role of micronutrients was known to very few farmers. At this stage, KVK, Davanagere has taken up banana special developed by IIHR as technological intervention in Siddanur and Kandanakovi villages of Davanagere taluk. Twelve farmers were selected for the demonstration on use of banana special, six farmers under grand naine and six farmers under yelakki bale variety. While implementing the intervention, group meetings, trainings, field visits were conducted. An exposure visit was organized for the group to precision farming area at Dharmapuri district to know the precision farming activities and direct interaction with practicing farmers.

Foliar application of banana special was undertaken as per schedule and observations were recorded. Foliar spray schedule includes six sprays at 5th, 6th, 7th and 8th month of planting. Fifth spray on emerged bunch and sixth spray was given one month after bunch emergence. The spray concentration should be 5 grams per liter water. For the better results of spray, one shampoo and one lemon liquid should be mixed in 20 liters of spray solution.



It is clear that there was a 33.44% increase in productivity of G9 variety and 39.27% in case of yelakki bale as compared to farmers practice with BC Ratio of 2.65 and 2.67, respectively (Table 43). Farmers have accepted the technology, as it increases productivity and reduces cost of production particularly on fertilizers. Demonstrated technology helped in increasing the bunch weight and shelf life, there by fetching good market price and increased income to farmers. The direct impact of technology resulted in purchase of more than 200 kg of banana special by other than demonstrated farmers in Siddanur cluster.

More than 550 kg of banana special has been provided to farmers as technology backstopping through KVK. About 62 families practiced the technology under the supervision and guidance of KVK Subject Matter Specialists through the formation of Siddanuru Bale Belegarara Sangha (Siddanuru Banana Growers Association) and Sri Done Siddeshwara Vegetable Growers Association. Banana Growers Association has been linked with SAFAL market, Bangalore. Farmers were taken to SAFAL market during the exposure visit arranged by KVK. They are selling the produce to wholesale merchants as well as SAFAL market. These two Common Interest Groups (CIGs) are supported by NABARD for many agricultural activities. A documentary study on use of banana special by our SMS (Horiculture) was telecasted in Annadata programme of E-TV Kannada.

Table 43 : Effectiveness of banana special on yield

Technology options	Yield (q/ha)	
	G9	Yelakki
Banana cultivation with IIHR banana special	533.90	225.90
Banana cultivation with farmers practice	400.10	162.20
BC Ratio	2.65	2.67

3.1.8.4 Appropriate rice production technology package : Palakkad taluk is one of the dominant agricultural taluks of the Palakkad district in Kerala. However, in recent year's rice cultivation in Palakkad is

shrinking to the tune of about 40% with a rough estimate of 2 lakh tonnes of rice production due to various factors of which improper utilization of appropriate rice production technologies. At this stage, KVK Palakkad has taken up appropriate rice production technologies as intervention in 17 farmers fields belonging to Kondoorkkara and Valliyathkulamb padashekharas in Pattambi block during mundakan and at Kondoorkkara padashekharas and Vilayur during Punched seasons of 2009-10. Appropriate rice production technology package includes-

- High yielding short duration variety Uma with a duration of 115-120 days was used.
- As incidence of Lakshmi disease is severe during viruppu season, prophylactic measure was adopted by soaking seeds in Bavistin.
- In order to carry out timely transplanting a common nursery was raised with an approach of resource sharing was followed. Method demonstration sessions on seedling dip with *Pseudomonas* was also carried out.
- As the demand of tractor during peak season is high, to finish land preparation well ahead in time, fuel and time saving helical blade puddler was made use of.
- Seedlings were transplanted at the age of 24 days and spacing of 20x10 cm at a depth of 3-4 cm with 2-3 seedlings/hill.
- Along with last ploughing , the recommended dose



Implementation and execution of rice production technology package



of organic manure and basal dose of fertilizer were applied and land was leveled. Split application of fertilizer as basal and at 10 days before panicle initiation were done for getting higher yield

- Strengthening of outer bunds was carried out for effective water management. Water level was maintained up to 1.5 cm during transplanting and thereafter it was increased gradually to 5 cm until flowering with occasional draining and flooding during vegetative phase.
- As weed infestation was severe, a pre emergent and post emergent herbicide application was resorted to so as to maintain weed free during the critical stage of crop weed competition. Method demonstration on use of herbicide application was also carried out.
- Farmer empowerment in the use of various eco friendly bio agents in pest and disease management was carried out. Use of trichocards for control of leaf roller and stem borer were adopted in the project area.
- On-field farmer-expert interaction at timely intervals helped to identify pests, natural enemies and ensured timely management with minimum use of pesticides.

Regular on-field trainings were organized as part of the programme in the selected area involving all the participating farmers in the Padashekharam on all management aspects of rice production. Regular field visits, farmer-scientist interaction and group discussions on various sustainable cultivation practices have exposed to participant farmers that will sustain rice production. Skill training on operation of puddler, power sprayer, identification of weeds, calibration of spray solution and mechanized harvesting were also organized.

Results indicated that the farmers realized the importance of time as a critical input. The idea of raising common nursery was well perceived and has motivated them for group action and provided opportunity for sharing of resources apart from helping for timely transplanting. Land preparation with KAU helical blade puddler has

helped to save 35-40 % diesel and about 40-45 % time compared with a tractor with cage wheels. Use of power sprayer has indicated an overall saving of 40 % in man days in spraying for pest management. Programme enabled the evolution of a location specific agronomic package for the area that reduced cost of cultivation and popularized the use of bioagents. After adopting the package the yield realized was twice the average yield of that area with much saving in inputs and labour leading to higher profit levels (Table 44).

Table 44 : Effectiveness of appropriate rice production technology package on yield

Technology options	Cultivation cost (Rs.)	Yield (q/ha)	Net income (Rs.)
Farmers practice	23000	32	17700
Appropriate rice production technology package	21000	56	40600

A field day cum harvest festival was organized which was inaugurated by Ongallur panchayath President. The whole paddy produced is procured by Civil Supplies Corporation. A booklet on ‘Effective agronomic package for rice’ was also prepared. In brief the programme has assessed existing field problems, demonstrated appropriate technologies suited to the locality and helped to evolve an effective agronomic package with respect to the yield constraints.

3.1.9 Awards and Recognition

The Indian Council of Agricultural Research has initiated three National level KVK awards to encourage and recognize the efforts of KVKs for the betterment of farming communities in the districts across the country. Due to its farmer-centric approaches and interventions, 11 KVKs of Zone VIII have bagged ICAR best KVK award since initiation of awards in 1996-97.

During the period under report, all three awards for the year 2009 have been bagged by the KVKs of Zone VIII viz., KVK Kannur, KVK Kancheepuram and KVK Cuddalore from among the 589 KVKs in the country. The awards carry a memento, citation and cash amount of Rs.100000. These KVKs made outstanding



KVK Kannur receiving Award



KVK Kancheepuram receiving Award



KVK Cuddalore receiving Award

contribution for convergence among the players of public extension systems for the swift spread of technologies as a model for other districts by KVK Kannur, for providing strong technology support in agriculture, animal husbandry and allied activities by KVK Kancheepuram and for various capacity building exercises among farmers and other stakeholders by KVK Cuddalore. The Programme Coordinator of the above KVKs received the Award and

Citation from Her Excellency President of India during the 5th National Conference on KVKs held at MPUA&T, Udaipur during 21-24 December, 2010.

3.2 Agricultural Technology Information Centres (ATICs)

During X Five Year Plan, Indian Council of Agricultural Research (ICAR) had established Agricultural Technology Information Centres (ATICs) with the mandate of providing technology services, input services and information services to the farming community based on Single Window System. There are 10 ATICs established and functioning in Zone VIII (Table 45). The services provided by ATICs are briefed here under.

Table 45 : Agricultural Technology Information Centres

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



A view of ATIC

3.2.1 Technology services

A total of 29396 technical bulletins were made available for farmers at ATICs followed by 13293 DVDs/CDs, 8302 books, 105 audio CDs and 20 technology inventory. Generated revenue of Rs.9.25 lakh by provided these services to 5961 farmers. Further, trained 466 farmers/extension personnel on various aspects of agriculture and allied sectors and provided analytical



Visit of farmers group to ATIC

services to 16129 farmers. A total of Rs.7.679 lakh was generated by ATICs by providing technology services.

3.2.2 Inputs provided

Technological inputs were provided to 6280 farmers by ATICs. Inputs include seeds (803.54 q), planting materials (21442 numbers), bio-products (1700.35 q) and value added products (14782 packets) with which generated an income of Rs. 67.54 lakh.

3.2.3 Information provided

A total of 24647 personnel consisting farmers, trainees, students and other stakeholders visited ATICs of which majority (6656) were visited for the purpose of technical advises followed by study tour (9578) and other purposes like general enquiry (2133). Further, ATICs



Sales Counter at ATIC

rendered services to 0.97 lakh farmers, majority through exhibitions (0.38 lakh) followed by website hits (0.30 lakh), audio and video shows (0.17 lakh), phone calls from farmers (0.06 lakh), letters from farmers (0.02 lakh) and reply letters to farmers (0.02 lakh). Besides, ATICs 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 are the major source for providing technological backstopping to the KVKs in the form of HRD programmes, conducting seminars, workshop etc and through supply of various technology products. There are six Directorates in Zone VIII under University of Agricultural Sciences, Bangalore for Southern Karnataka, University of Agricultural Sciences, Dharwad and Raichur for Northern Karnataka and Goa, Karnataka Veterinary Animal and Fisheries Sciences University for Karnataka, Kerala Agricultural University for Kerala and Lakshadweep, Tamil Nadu Agricultural University for Tamil Nadu and Puducherry, Tamil Nadu Veterinary and Animal Sciences University for Tamil Nadu and Puducherry. Technological backstopping and the major ways and means of support extended to KVKs by Directorate of Extension are as follows:

- Providing inputs especially that of HYV and hybrids to all KVKs under their jurisdiction for undertaking various technological interventions



Planting materials in the premises of ATIC

- 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 KVKs staff in various seminars, workshops, kisan mela and other extension programmes conducted by the State Agricultural Universities.

During the year, a total of 16 training programmes were conducted by Directorates of Extension on various aspects of agriculture and allied sectors and trained 310 KVK staff. In addition, the Directorates of Extension organized 26 workshops, meetings and seminars wherein 502 KVK staff participated.



*Training course in progress at Directorate of Extension,
UAS, Bangalore*

3.4 Special Programmes

The Zonal Project Directorate-Zone VIII has involved in implementing and executing the special programmes viz., National Farm Innovators Meet 2010, Farm Innovators Exhibition, Pulse Crop Demonstrations and National Initiative on Climate Resilient Agriculture (NICRA) during the year under report. Details are discussed below.

3.4.1 National Farm Innovators Meet 2010

Keeping the importance of farmers knowledge and their innovations for sustainable agriculture in view, the

Division of Agricultural Extension, ICAR, New Delhi has organized the National Farm Innovators Meet 2010 at JSS Krishi Vigyan Kendra, Suttur, Mysore District, Karnataka during 12-13 November, 2010. Zonal Project Directorate was actively involved in organizing the meet successfully by providing all logistics as well as technical arrangements.

His holiness Shri Shivarathri Deshikendra Mahaswamiji of Jagadguru Veerasimhasana Mahasamastana Math, Suttur in his blessings inaugurated the meet by lighting lamp and poring holi water in the presence of Dr S.Ayyappan, Secretary, DARE & Director General, ICAR, Dr K.D.Kokate, Deputy Director General (Agricultural Extension), ICAR, Dr M.Mahadevappa, Director (Rural Development), JSS Mahavidyapeetha, Mysore and Ex-Chairman (ASRB), Dr S.Prabhu Kumar, Zonal Project Director, Zonal Project Directorate, Zone-VIII (ICAR) and 300 officials and farmers across the country.



Inauguration of National Farm Innovators meet 2010



A view of participating farm innovators

Farm Innovators Meet-2010 was organized for the first time in the country by the ICAR at National level. This meet was organized with an aim to give a scientific recognition for farmers innovations and provide a platform for the farm innovators to share their experiences with other farmers and scientists. A total of 221 farm innovators representing 25 states viz., Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand, West Bengal and 68 Official dignitaries from ICAR and SAUs have participated in the meet.

During the meet five Technical Sessions were conducted viz., Crop Improvement, Crop Production, Crop Diversification, Crop Protection and Farm Machinery - I on first day and four Technical Sessions viz., Farm Machinery-II, Water Management, Livestock and Fisheries Management, and Post Harvest Technologies and Value Addition on second day, wherein a total of 104 farmers spoke about their respective innovations and shared their experiences to other fellow farmers across the country. Besides, 36 farmers presented their innovations in the form of poster display.

3.4.2 Farm Innovators Exhibition

Farm Innovators Exhibition was organized at JSS Krishi Vigyan Kendra, Suttur, Mysore District, Karnataka during 12-13 November, 2010 on the occasion of National Farm Innovators Meet-2010. It was inaugurated by his holiness Shri Shivarathri Deshikendra Mahaswamiji of Jagadguru Veerasimhasana Mahasamstana Math, Suttur, Mysore in the presence of Dr S.Ayyappan, Secretary, DARE and DG, ICAR, Dr K.D.Kokate, Deputy Director General (Agricultural Extension), ICAR, various official dignitaries and farmer delegates.

A total of 196 innovations of farmers were depicted through posters in the exhibition comprising of crop

improvement (12), crop production (36), crop diversification (11), water management (13) farm machinery (68), crop protection (18), livestock & fisheries management (13), and Post harvest technology & value addition (25). More than 60 innovators displayed live specimens as well as models. Some farmers made live demonstrations of farm machinery and some are showed video for the benefit of other participants. Information on various innovations was diffused among the farmers across the country.

Exhibition was opened for two days 12-13 November, 2010. Many farm innovations were attracted by the media personnel. Doordarshan Kendra, Bangalore, documented the exhibition in the form of documentary film. Besides, Doordarshan interviewed around 23 individual farmers on their respective innovations in agriculture and allied sectors.

Shri Gurnam Singh from the Ambala district, Haryana, Shri S.R Arun Kumar from the Tumkur district in Karnataka, Shri Heramb Ganapathi Bhat from Uttara Kannada district in Karnataka, Shri A.S. Joy from Thrissur district in Kerala and farm women from Bhubaneswar in Orissa gifted their exhibits namely sugarcane seed cutter, rat control device, water lifting device for open well, seeds of ash gourd variety *Ekalavya* and handicrafts, respectively to the JSS KVK for display in the KVK museum for the benefit of farmers of Mysore district.



Inauguration of farm innovators exhibition

3.4.3 Pulse crop demonstrations

Technology demonstrations were carried out for harnessing pulse production in Zone VIII in two seasons viz., *kharif* and *rabi* during 2010-11 and details are presented below.

3.4.3.1 Kharif pulses 2010: A total of 455 demonstrations on pulse crops namely blackgram (46), greengram (132) and pigeonpea (277) covering an area of 215.8 ha were implemented in the pulse growing districts of Karnataka and Tamil Nadu states under technology demonstration for harnessing pulse production in the country during *kharif* 2010 (Table 46).

Blackgram: A total of 46 demonstrations on integrated crop management practices (ICM) in DU-1 variety of blackgram covering an area of 31.7 ha were undertaken in two districts, namely Bidar and Gulbarga of Karnataka state. Average yield increase ranged from 25 to 136 % in demonstrations in these districts recording an average yield of 7.7 q/ha as against 4.93 q/ha under farmers practice. BCR recorded under demonstrations was 2.35 as against 1.58 under farmers practice.

Greengram: A total of 134 demonstrations on ICM practices in selection-4, China moong, VBN-2 and VBN-

3 varieties of greengram covering an area of 61.3 ha were undertaken in seven districts, namely Gadag, Bellary, Belgaum, Dharwad, Koppal, Bidar and Gulbarga of Karnataka and Namakkal in Tamil Nadu states. Average yield increase ranged from 18.45 to 83.33% in Karnataka recording an average yield of 8.26 q/ha as against 6.08 q/ha under farmers practice. BCR recorded under demonstrations in Karnataka was 2.62 as against 2.12 under farmers practice. Similarly, in Tamil Nadu the yield increase ranged from 15.57 to 20.28% in Namakkal district recording an average yield of 12.4q/ha under demonstrations against 10.60q/ha under farmers practice.

Pigeonpea: A total of 273 demonstrations on ICM practices in TS-3R, ICP-8863, BRG-1, BSMR-736 and BRG-2 varieties covering an area of 119.3 ha were conducted in 10 districts of Karnataka state. Of this, 124 demonstrations on short duration pigeonpea indicated average yield increase ranging from 11.68 to 50.48% recording an average yield of 13.0 q/ha as against 10.12 q/ha under farmers practice. BCR recorded under demonstrations in Karnataka was 3.60 as against 3.0 under farmers practice. As far as long duration pigeonpea, a total of 149 demonstrations covering an area of 60.5 ha were implemented in the pigeonpea growing districts of

Table 46 : Results of demonstrations on ICM practices in pulse crops during *kharif* 2010

KVKs	Crops	Varieties	Technologies demonstrated	No. of farmers	Area (ha)	Yield (q/ha)	% Increase	BCR	
						Demo	Check		
Karnataka									
Bidar	Blackgram	DU-1	ICM	23	9.2	11.25	4.75	136.84	1.90
Gulbarga	Blackgram	DU-1	ICM	23	22.5	6.25	5.00	25.00	2.74
Total/Wt. Av.				46	31.7	7.70	4.93	56.29	2.35
Gadag	Greengram	Sel-4	ICM	22	8.8	7.8	6.1	27.87	1.46
Bellary	Greengram	China moong	ICM	10	4.0	10.5	8.1	29.63	2.53
Belgaum	Greengram	China moong	ICM	15	6.0	7.56	4.72	60.17	2.47
Dharwad	Greengram	China moong	ICM	20	8.0	10.08	8.51	18.45	6.61
Koppal	Greengram	Sel-4	ICM	20	8.0	6.63	5.29	25.33	3.13
Bidar	Greengram	China moong	ICM	15	6.0	13.75	7.5	83.33	2.94
Gulbarga	Greengram	Sel-4	ICM	20	20.0	6.5	5	30.00	2.40
Total/Wt. Av.				122	60.8	8.26	6.08	35.80	2.62

Contd....

Raichur	Pigeonpea	TS-3R	ICM	30	12.0	17.01	12.4	37.18	6.05
Dharwad	Pigeonpea	ICP-8863	ICM	15	12.0	8.21	6.14	33.71	3.37
Koppal	Pigeonpea	TS-3R	IPM	26	10.5	13.86	12.41	11.68	5.29
Mysore	Pigeonpea	BRG-1	ICM	21	10.0	15.8	10.5	50.48	2.86
Tumkur	Pigeonpea	BRG-1	ICM	32	12.8	10.82	9.53	13.56	1.86
Total/Wt.Av.				124	57.3	13.00	10.12	28.45	3.60

Karnataka (long duration)

Gulbarga	Pigeonpea	TS-3R	ICM	35	14	11.74	10.12	16.01	5.95
Chitradurga	Pigeonpea	BRG2	ICM	28	12	10.5	8.2	28.05	3.56
Bellary	Pigeonpea	BSMR 736	ICM	26	10.5	21.32	16.25	31.20	3.33
Belgaum	Pigeonpea	TS-3R	ICM	30	12	12.97	9.4	37.98	3.21
Bidar	Pigeonpea	BSMR 736	ICM	30	12	29.8	15	98.67	7.70
Total/Wt.Av.				149	60.5	16.98	11.63	46.05	4.67

Tamil Nadu

Namakkal	Greengram	VBN-2	Introduction of HYV VBN-2	7.0	3	12.25	10.6	15.57	3.40
Namakkal	Greengram	VBN-3	Introduction of HYV VBN-3	3.0	1	12.75	10.6	20.28	3.54
Total/Wt.Av.				10.0	4	12.40	10.60	16.98	3.44

Karnataka. Average yield increase ranged from 16.00 to 98.67% under demonstrations recording an average yield of 16.98 q/ha as against 11.63 q/ha under farmers practice. BCR recorded under demonstrations was 4.67 as against 3.82 under farmers practice.

3.4.3.2 Rabi pulses 2010-11 : A total of 382 demonstrations on pulse crops namely blackgram (113), greengram (64) and chickpea (205) covering an area of 155.1 ha were implemented in the pulse growing districts of Karnataka and Tamil Nadu states under technology demonstration for harnessing pulse production in the country during *rabi* 2010-11 (Table 47).

Chickpea: A total of 205 demonstrations on ICM practices in JG-11 variety covering an area of 82.0 ha were conducted in 10 districts of Karnataka state. As a part of ICM demonstrations, the participating farmers were supplied with seed, bio-fertilizers and plant protection chemicals. Crop was sown during 1st week of November to 1st FN of December, 2010. Crop was harvested during March and April, 2011.

Average yield increase ranged from 18.15 to 70.00% under demonstrations recording an average yield of 13.76 q/ha as against 10.69 q/ha under farmers practice. BCR recorded under demonstrations was 3.15 as against 2.70 under farmers practice.

Blackgram: A total of 113 demonstrations on ICM practices in VBN- 3, VBN-4, VBN-5, ADT-3 and Co-6 varieties covering an area of 47.1 ha were conducted in 10 districts of Tamil Nadu state. Under the demonstration, the participating farmers were supplied with seed, bio-fertilizers and plant protection chemicals. Crop was sown during 1st week of November, 2010 onwards. and it was harvested from March to May, 2011.

Average yield increase ranged from 17.09 to 124.0% under demonstrations recording an average yield of 6.92 q/ha as against 4.81 q/ha under farmers practice. BCR recorded under demonstrations was 2.15 as against 1.57 under farmers practice.

Greengram: A total of 64 demonstrations on ICM practices in VBN(Gg)- 2, VBN(Gg)-3, Sel-4 and

Table 47 : Results of demonstrations on pulse crops during *rabi* 2010-11

KVKS	Crops	Varieties	Technologies demonstrated	No. of farmers	Area (ha)	Yield (q/ha)		% Increase	BCR
						Demo	Check		
Tuticorin	Black gram	Vamban-4	ICM	15	6	7.5	5	50.00	1.79
Erode	Black gram	VBN-5	ICM	10	4	8.36	7.14	17.09	1.84
Thiruvavur	Black gram	ADT 3	ICM	15	6	3.7	2.1	76.19	2.07
Namakkal	Black gram	Co.6	Popularization of variety	6	2.4	9	7.4	21.62	2.83
Virudhunagar	Blackgram	VBN(Bg)3	Seed production	10	4	7.1	5.8	22.41	2.68
Thiruvananthapuram	Blackgram	VBN-3	ICM	10	4	8.2	6.45	27.13	1.66
Villupuram	Blackgram	VBN4	ICM	12	5	11.2	5	124.00	3.96
Namakkal	Blackgram	VBN-5	Popularization of variety	4	1.6	8.7	7.4	17.57	2.73
Nagapattinam	Blackgram	ADT 3	ICM	16	6.5	4.3	2.5	72.00	1.86
Tiruvallur	Blackgram	VBN-5	ICM	15	6	5.3	4.17	27.10	1.45
Vellore	Blackgram	VBN4	ICM	10	4	8.63	7.02	22.93	2.29
Total/Wt.Av.				113	47.1	6.92	4.81	44.04	2.15
Raichur	Chickpea	JG-11	ICM	20	8	13.99	10.62	31.73	2.93
Dharwad	Chickpea	JG-11	ICM (Rainfed)	20	8	11.7	9.5	23.16	7.60
Dharwad	Chickpea	JG-11	ICM(Irrigated)	20	8	12.5	10.3	21.36	8.01
Mysore	Chickpea	JG 11	ICM	10	4	6.33	5	26.60	4.08
Koppal	Chickpea	JG-11	ICM	25	10	16.15	13.45	20.07	3.45
Gadag	Chickpea	JG-11	ICM	20	8	13.04	10.5	24.19	1.38
Gulberga	Chickpea	JG-11	ICM	20	8	12.5	10.1	23.76	5.00
Chitradurga	Chickpea	JG 11	ICM	10	4	8.2	6.4	28.13	2.80
Belgaum	Chickpea	JG-11	ICM	20	8	19.88	14.75	34.78	5.55
Bellary	Chickpea	JG-11	Popularization of variety	25	10	11.26	9.53	18.15	1.78
Bidar	Chickpea	JG-11	ICM	15	6	21.25	12.5	70.00	2.32
Total/Wt.Av.				205	82	13.76	10.69	28.75	3.15
Thiruvavur	Greengram	ADT 3	ICM	12	5	4.5	2.6	73.08	1.95
Tiruvallur	Greengram	VBN-2	ICM	10	4	7.13	6.38	11.76	1.87
Gadag	Greengram	Sel-4	ICM	22	9	7.8	6.1	27.87	1.46
Virudhunagar	Greengram	VBN(Gg)3	Seed production	10	4	7.1	6.1	16.39	2.75
Vellore	Greengram	VBN2	ICM	10	4	7.84	6.53	20.06	2.14
Total/Wt.Av.				64	26	6.96	5.54	25.73	1.81

ADT(Gg)-3 varieties covering an area of 26 ha were conducted in 5 districts of Tamil Nadu state. Under the demonstration, the participating farmers were provided with seed, bio-fertilizers and plant protection chemicals

as critical inputs. Crop sown started from 1st week of November, 2010 and continued upto January, 2011. Crop was harvested during March to May, 2011.



Dr.K.D.Kokate, Deputy Director General (Agrl. Extn.), ICAR, New Delhi interacting with farmers on pulse crop demonstrations

Average yield increase ranged from 11.76 to 73.08% under demonstrations recording an average yield of 6.96 q/ha as against 5.54 q/ha under farmers practice. BCR recorded under demonstrations was 1.81 as against 1.55 under farmers practice.

3.4.4 National Initiative on Climate Resilient Agriculture (NICRA)

The Indian Council of Agricultural Research has launched a scheme on National Initiative on Climate Resilient Agriculture to take up strategic research and technology demonstration on climate resilient agriculture practices in the country during 2010-11. The scheme is being implemented with CRIDA, Hyderabad as lead institute under over all supervision of NRM division of ICAR at 100 selected KVKs in different parts of the country.

Under Zone VIII, 9 KVKs *viz.*, four KVKs from Karnataka (Kolar, Tumkur, Davanagere & Belgaum), four KVKs from Tamil Nadu (Ramanathapuram, Villupuram, Nagapattinum & Namakkal) and one KVK from Kerala (Allepey) have been identified and approved for implementation of technology demonstration on farmer's fields.

A workshop for finalizing action plan of KVKs under technology demonstration component of NICRA was held on 9th February, 2011 at ZPD, Zone VIII, Bangalore. Meeting was Co-chaired by Dr. B. Venkateshwaralu, Director, CRIDA, Hyderabad and Dr. S. Prabhu Kumar, ZPD, Zone-VIII, Bangalore and attended by scientists from CRIDA, scientists of ZPD, DEs of SAUs, Chief scientists of AICRPDA centres located in Zone-VIII together with Dr. P. K. Mishra, Project Coordinator, AICRPDA, CRIDA, Hyderabad and all the PCs of 9 KVKs implementing NICRA.

About 278.15 lakhs (30.35 lakhs for each KVK) have been allocated to Zonal Project Directorate, Zone VIII for technology demonstration on farmers fields, purchase of agricultural implements, drip/sprinkler systems etc. through custom hiring in each KVK. Out of this 56.25 lakh were utilized for purchase of small implements. The total expenditure of 74.17 lakh incurred during 2010-11 by nine KVKs and balance amount of 203.97 lakh will be utilized during the current year. One automatic weather station has been established at each of the KVK to provide weather based advisories to the district farmers.



Workshop on NICRA held at ZPD-Zone VIII, Bangalore

4. Human Resources Development

Human resources are the greatest asset of every Nation. Therefore, Human Resource Development (HRD) is a relatively modern management term used to describe the individuals who make up the trained manpower of an organization. Hence, it is important to implement HRD programmes to keep employees abreast with the latest technological developments, acquiring specific technical knowledge and skill and update in their subject matter so as to make them efficient to carry out their assignments in the organization as well as for their career development. Hence, employers and staff are conscious of the importance of human resources development. In this direction, this Directorate has taken up a number of human resources development programmes for the benefit of ZPD as well as KVK staff. Details are presented here under.

Zonal Project Directorate has organized 4 training courses, out of which 3 training courses on production of banana special, vegetable special and other one on neem and pongamia soap organized at IIHR, Bangalore during, 12 May, 2010 and 22 May 2010 wherein trained 21 KVK staff. Further, one training-cum-workshop on farm mechanization in collaboration with CIAE, Bhopal organized at KVK, Mysore during 17-18 June, 2010

Table 48 : Participation of KVK staff in HRD programmes organised by NARS during 2010-11

States	Courses attended (No.)	KVK staff participated (No.)			
		PCs	SMSs	PAs	Total
Karnataka	89	3	134	21	247
Tamil Nadu	112	19	257	34	422
Kerala	31	8	60	4	103
Puducherry	16	-	14	6	36
Total	248	30	465	65	808

PCs: Programme Coordinators; SMSs: Subject Matter Specialists; PAs: Programme Assistants

wherein trained 30 KVK staff.

Similarly KVKs staff is also participating HRD activities through their respective host organizations. During the year, KVKs staff attended different training courses of different duration viz., short, medium and long duration as a part of HRD programme 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 808 KVK staff consisting of 30 Programme Coordinators, 465 Subject Matter Specialists and 65 Programme Assistants were underwent HRD programmes during the year. State wise details are presented in Table 48.

Besides, 183 KVK staff nominated from the Zonal Project Directorate to training programmes on various aspects of agriculture and allied sectors organized by various organizations viz., UAS, Dharwad, MANAGE, Rajendranagar, Hyderabad, NAARM, Rajendranagar, Hyderabad, NBAII, Hebbal, Bangalore and DRWA, Bhubaneswar.



Training-cum-workshop on farm mechanization in progress

5. Publications

Staff of Zonal Project Directorate have involved in documentation of various activities. Publications brought out during the period under report are listed below.

5.1 Books

K.D.Kokate (Chief Editor), S.Prabhu Kumar (Co-Editor), A.K.Mehta, V.Venkatasubramanian, C.V.Sairam, V.P.Chahal, D.V.Srinivasa Reddy, B.T.Rayudu and J.Mathew (Members) (2010). Proceedings of 4th National Conference of KVKs held at TNAU, Coimbatore, 6-8 November, 2009. Published by Division of Agricultural Extension, Indian Council of Agricultural Research, New Delhi. 268 p.

K.D.Kokate (Chief Editor), V.Venkatasubramanian, A.K.Gogoi, S.Prabhu Kumar (Editors), A.K.Mehta, A.M. Narula, A.K.Singh, N.Sufhakar, Y.V.Singh, U.S.Gautam, Krishna Srinath, B.T.Rayudu, Sajeev M.V, P.Adhiguru and V.P.Chahal (Members) (2010). Farm Innovators-2010. Published by Division of Agricultural Extension, Indian Council of Agricultural Research, New Delhi. 161p.

K.D.Kokate (Chief Editor), A.K.Mehta, B.T.Rayudu, S.Prabhu Kumar (Editors), V.Venkatasubramanian, A.M.Narula, A.K.Singh, A.K.Gogoi, A.K.Singh, N.Sudhakar, Y.V.Singh, U.S.Gautam, Krishna Srinath, Keshava, P.P.Pal, A.K.Singha, Lakhan Singh, K.Dattatray, R.P.Rohilla, Prem Chand, C.V.Sairam, Suman Aggarwal, V.P.Chahal, P.Adhiguru (Members) (2010). Agritech Interventions – Harbingers of Prosperity. Published by Division of Agricultural Extension, Indian Council of Agricultural Research, New Delhi. 219 p.

5.2 Research Articles

Singh, Moolchand, S.Prabhukumar and C.V.Sairam (2010). Integrated weed management in okra. *Annals of Plant Protection Sciences*.18(2): pp 481-483

Singh, Moolchand, S.Prabhukumar and C.V.Sairam (2010). Effect of slow release nitrogen fertilizers on the growth and yield of tomato. *Crop Research*. 39(1-3).pp 88-90.

5.3 Reports

Annual Report 2009-10, Zonal Project Directorate, Zone-VIII, Bangalore, India. (ed.) Sairam, C.V., Reddy, D.V.S., Rayudu, B.T., Mathew, J., Ramamurthy, R.S and Mallikarjun B. Hanji. Published by S.Prabhu Kumar, Zonal Project Director, ZPD-Zone VIII, Hebbal, Bangalore. 44 p.

5.4 Papers Presented in Seminars/Conferences

Prabhu Kumar, S., Reddy D.V.S, Sairam C.V and Rayudu B.T. (2010) ICT in Krishi Vigyan Kendra- A Transformational Technology for Indian Farmers – Lead Paper presented at National Seminar on Extension Management Reforms -Initiatives and impact at TNAU, Coimbatore, 11-12 December, 2010.

Krishnakumar, V., Regeena, S., Jacob John, Geetha, K. and Reddy, D.V.S., 2010. An assessment of floral diversity in the homestead farms of Kerala, India. *In: Abstracts*. International Conference on Coconut Biodiversity for Prosperity. CPCRI, Kasaragod, India, 25-28 October, 2010.

Maheshwarappa, H.P., Srinivasa Reddy, D.V., Krishnakumar, V., Zachariah, T.J. and Dhanpal, R. 2010. Yield and quality attributes of black pepper (*piper nigrum* L.) varieties/hybrids when grown as mixed crop in coconut garden. *In: Abstracts*. International Conference on Coconut Biodiversity for Prosperity. CPCRI, Kasaragod, India, 25-28 October, 2010.

Prabhu Kumar, S, Sairam, C.V., Rayudu, B.T. and Reddy, D.V.S. (2010). Technology delivery mechanism in coconut through Krishi Vigyan Kendras. *In : Abstracts*.

International Conference on Coconut Biodiversity for Prosperity. pp 174-175.

Rayudu, B.T, Leena, S., Manikandan, K., Sanal Kumar, R., Jayashree, M.P., and Manojkumar, T.S. (2010). Impact of training programmes on adoption of vermicomposting technology utilizing palm wastes among farmers of Kasaragod district, Kerala. *In : Abstracts. International Conference on Coconut Biodiversity for Prosperity.* pp 188.

Sairam, C.V., Prabhu Kumar, S., Reddy, D.V.S., and Rayudu, B.T. (2010). Issues on farmer led community nursery in coconut biodiversity (2010). *In : Abstracts. International Conference on Coconut Biodiversity for Prosperity.* pp 187

5.5 Book Chapter

Srinivasa Reddy, D.V. and Krishnakumar, V. (2010). Status and Development of Coconut Based Homesteads

in Kerala. In: *Coconut based cropping/farming systems.* (ed.) George V. Thomas, Krishna Kumar, V., Maheshwarappa, H.P. and Palaniswamy, C., CPCRI, Kasaragod, India. pp 194-207.

5.6 Preparation of Electronic Media

The National Farm Innovators Meet 2010 organized at KVK, Suttur was documented in the form of DVD and it was released during the 5th National Conference of KVKs held at MPUA&T, Udaipur during 21-24 December, 2010.

5.7 Publications by KVKs

Apart from the above, KVK staff involved in documentation and published 186 research articles, 125 technical reports, 76 Newsletters, 9 training manuals, 60 books/book chapters/booklets and 18 VCD/DVD on various technological aspects of agriculture and its allied enterprises (Fig. 23).

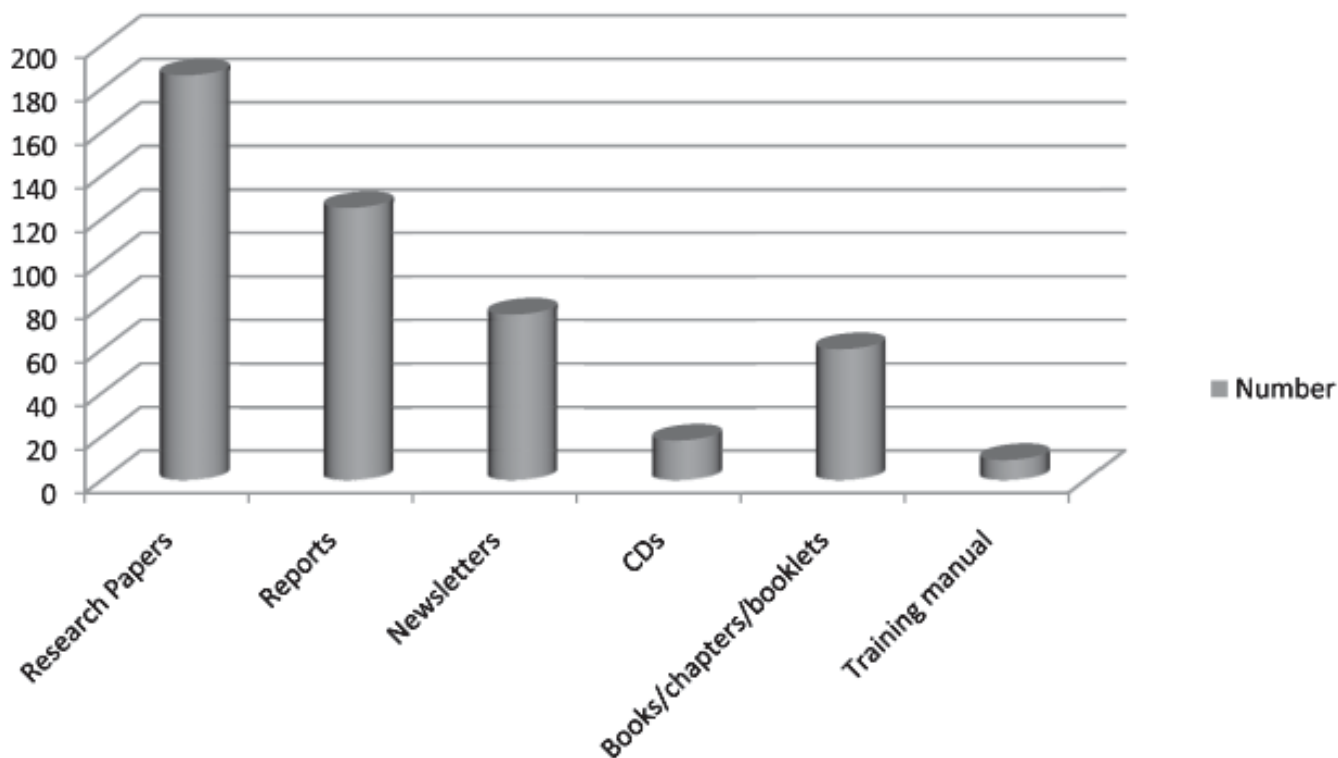


Fig 23: Publications, reports and CDs prepared

6. 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 this Zone VIII as well as ICAR which are listed here under.

6.1 Organization of Meetings

The following meetings were organised during the reporting period.

- Regional KVK Interface Meeting 2010 was organized along with the 22nd ICAR Regional Committee Meeting of Region VIII of ICAR on 15th May 2010 at IVRI Regional Station, Bangalore.
- National Farm Innovators Meet 2010 was organized at JSS Krishi Vigyan Kendra, Suttur, Mysore District, Karnataka during 12-13 November, 2010.
- Innovators Exhibition was organized on the occasion of National Farm Innovators Meet-2010 at JSS Krishi Vigyan Kendra, Suttur, Mysore District, Karnataka during 12-13 November, 2010
- Action plan meeting of KVKs in Zone VIII was conducted in four phases viz., first phase during 12-13 April, 2011 for KVKs in Northern Karnataka and Goa at ZPD-Zone VIII, Bangalore, second phase during 15-16 April, 2010 for KVKs in Southern Karnataka at ZPD-Zone VIII, Bangalore, third phase during 20-21 April, 2010 for KVKs in Kerala and Lashadweep at KAU, Thrissur, , fourth phase during 3-6 May, 2010 for KVKs in Tamil Nadu and Puducherry at TNAU, Coimbatore. The action plan of individual KVK was presented by the respective Programme Coordinator followed by discussions were held. Finalized a need based technical programme including all mandated activities of KVK through active interactions for the year 2010-11.
- Annual review workshop of KVKs in Zone VIII was conducted during 5- 8 October, 2010 at KVK

Dharwad. About 120 participants including ICAR officials, Directors of Extension from different States of Zone VIII, Zonal Project Director, Bangalore and officials from ZPD-Zone VIII were participated in the workshop. Each Programme Coordinator presented work done report of their respective KVK for the year 2009-2010 and reviewed the progress by the ICAR officials and DEs. This workshop was planned in such a way that it coincides with the final day of Krishi Mela 2010 of UAS Dharwad and that enabled Programme Coordinators to expose to such a huge Mela.

6.2 Participation in Meetings

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

- Participated in Scientific Advisory Committee meetings organized by KVKs in Zone VIII and provided technical guidance.
- KVK interface meeting with DG held at Division of Agricultural Extension, ICAR, New Delhi during 26 - 27 May, 2010
- GB meeting and meeting with Secretary regarding new KVK in Mahe & Yanam held at Puducherry on 9 May, 2010
- Divisional meeting held at Division of Agricultural Extension, ICAR, New Delhi on 1 June, 2010
- Interface programme by Planning Commission held at TANUVAS on 22 June, 2010
- ATIC interface meeting held at Division of Agricultural Extension, ICAR, New Delhi on 3 July, 2010
- Directors Conference held at ICAR, New Delhi during 15-16 July, 2010

- Interaction on agricultural mechanization held at CIAE, Bhopal during 23-24 July, 2010
- Divisional review meeting held at Division of Agricultural Extension, ICAR, New Delhi during 4-5 August, 2010
- National workshop entitled Augmenting outreach programmes in Animal Husbandry and Fisheries Sectors held at KVAFSU, Bidar on 7 August, 2010
- KVK guideline meeting organized by Division of Agricultural Extension, ICAR, New Delhi at KVK Ahmednagar during 8-9 September, 2010
- National conference on agriculture for *rabi* campaign held at ICAR, New Delhi during 17-18 September, 2010
- Divisional review meeting held at Division of Agricultural Extension, ICAR, New Delhi on 20 September, 2010
- 21st Meeting of ICAR Regional Committee No. VII of ICAR held at CIAE, Bhopal during 1-5 December, 2010
- National seminar on Extension Management Reforms -Initiatives and Impact held at TNAU, Coimbatore during 11-12 December, 2010
- 5th National conference of KVKs held at MPUA&T Udaipur during 21-24 December, 2010
- Meeting at Kerala Legislative Assembly on Private Members Bill on KVK held at Trivandrum on 20 January, 2011
- NICRA launching workshop held at ICAR, New Delhi on 1 February, 2011
- Interface meeting of Zone VIII NICRA KVKs held at KVK, Ahmednagar on 4 February, 2011
- International training programme ‘Smallholder Livestock and Commercial Poultry Farming’ under Indo-African Forum Summit sponsored by Ministry of External Affairs, Govt. of India held at KVK, Namakkal during 18 - 19 February, 2011
- Directors conference held at ICAR, New Delhi during 23 to 24 February, 2011
- QRT meeting held at Division of Agricultural Extension, ICAR, New Delhi on 17 March, 2011
- Extension Advisory Committee meeting of TANUVAS held at Chennai during 28 -29 March, 2011

7. Personnel

Existing staff position of the Zonal Project Directorate-Zone VIII, Bangalore as on 31 March, 2011 are 13. Details are presented below.

7.1 Staff in Position

Research Management Position	Dr.S.Prabhu Kumar	Zonal Project Director
Scientific	Dr.D.V.Srinivasa Reddy	Principal Scientist (Agronomy)
	Dr.C.V.Sairam	Principal Scientist (Ag.Economics)
	Dr.B.T.Rayudu	Senior Scientist (Ag.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.T.Dasappa	Assistant Administrative Officer
	Shri.J.Mathew	Personal Secretary
	Mrs. Ramola Pinto	Stenographer
	Shri. J.Prabu Kumar	Assistant
Supporting	Shri.Chennakeshava	SSS (Gr-II)

7.2 Transfers/Promotions

- Shri.T.Dasappa promoted from Assistant to Assistant Administrative Officer w.e.f 7 September, 2010
- Shri J.Mathew promoted from Personal Assistant to Personal Secretary w.e.f 7 September, 2010
- Shri. J.Prabu Kumar promoted from UDC to Assistant w.e.f 7 September, 2010