

# वार्षिक प्रतिवेदन Annual Report 2018-19



भाकृअनुप-कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान  
जोन-VIII, पुणे-411005, महाराष्ट्र  
ICAR-Agricultural Technology Application Research Institute  
Zone-VIII, Pune-411005, Maharashtra

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Annual Report  
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Zone-VIII, Pune-411005, Maharashtra





# Annual Report 2018-19

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# Contents

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	<b>Preface</b>	i
	<b>कार्यकारी सारांश</b>	iii
	<b>Executive Summary</b>	v
1	<b>Introduction</b>	1-11
2	<b>Technology Assessment through on Farm Trials</b>	12-36
3	<b>Front Line Demonstrations</b>	37-88
	▪ <i>Cluster Frontline Demonstrations on Pulses</i>	
	▪ <i>Cluster Frontline Demonstrations on Oilseeds</i>	
4	<b>Training of Farmers and Extension Personnel</b>	89-102
5	<b>Extension Activities</b>	103-107
6	<b>Seed and Planting Material Production</b>	108-112
7	<b>Farmers Centric and Skill Oriented Programs</b>	113-140
	▪ <i>National Innovations in Climate Resilient Agriculture</i>	
	▪ <i>Farmer FIRST Project</i>	
	▪ <i>Attracting and Retaining Youth in Agriculture (ARYA) Project</i>	
	▪ <i>Seed Hub Project</i>	
	▪ <i>Tribal Sub Plan</i>	
	▪ <i>Skill Training</i>	
8	<b>Case Studies</b>	141-155
9	<b>Special Programs</b>	156-162
	▪ <i>Webcast of Inauguration of PM Kisan Samman Nidhi Scheme</i>	
	▪ <i>Interaction of Hon'ble Prime Minister with Members of SHGs and Women Groups</i>	
	▪ <i>World Soil Day Celebration</i>	
	▪ <i>Celebration of Cleanliness Drive Program</i>	
	▪ <i>Mera Gaon Mera Gaurav</i>	
	▪ <i>Rashtriya Mahila Kisan Divas Celebration</i>	
	▪ <i>Kisan Mobile Advisory Services</i>	
	▪ <i>Soil, Water and Plant Analysis</i>	
10	<b>HRD, Publications and Linkages</b>	163-175
11	<b>Status of Budget and Staff</b>	176





**ICAR-Agricultural Technology  
Application Research Institute, Zone-VIII**  
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Pune 411005



**Dr. Lakhan Singh**  
Director

## Preface

Frontline extension is in-built in the national agricultural research system. ICAR gave major focus on conducting extension research, developing methodology/extension approaches, demonstrating latest technologies, giving feedback to scientists and training support for state line departments of agriculture. It has a catalytic force for general extension system and having close interaction between research and extension along with farming community. A large network of 715 KVKs has been developed by the ICAR across the country with major mandate of Technology Assessment and Demonstration for its Application and Capacity Development. Considering large number of KVKs, 11 ATARIs have been created to coordinate and monitor the technology application and frontline extension programs in their respective zones. ATARI, Pune is looking after 79 KVKs (47 in Maharashtra, 30 in Gujarat and 2 KVKs in Goa).

Faith of the farmers has been build up in the KVK system over the years. Different ministries at national and state level are heavily dependent on KVKs for technological backstopping and facilitating their agricultural development programs. KVK is working as *One Stop Solution* for agricultural technology application and integration. KVK has proved its existence in the district and moving towards transformational extension without

sufficient required resources/support. KVKs are giving focus on doubling farmers' income, technological empowerment of farmers/extension workers, ensuring quality seed/planting materials, nutri-sensitive agriculture, climate resilient technologies, organic farming for sustainable agriculture, attracting and retaining youth in agriculture, post harvest processing and value addition, skill development, cluster approach, facilitating farmers producers organizations, identifying and documenting farm innovations, etc. KVKs are working in convergence mode and sharing resources for the common cause.

ICAR-ATARI, Pune has brought out its second Annual Report based on output and outcome of the KVKs in the zone. I express my sincere gratitude to Dr. Trilochan Mohapatra, Secretary (DARE) and DG, ICAR; Dr. A.K. Singh, DDG (Agril Extension); both ADGs Dr. V.P. Chahal and Dr. Randhir Singh; Principal Scientists; technical and administrative staff of agricultural extension division for their whole hearted support and guidance at every moment. All the Vice Chancellors; Chairmen/ Secretaries of NGO-KVKs; Directors of ICAR institutes; Director Extension Education of SAUs deserve appreciation for their encouragement. I acknowledge the wholehearted support of Dr. M.J. Chandregowda (ATARI, Bengaluru) for his valuable manpower



support. All the Heads of KVKs in the zone created working culture and supporting the ATARI by quick response deserve special thanks. Special appreciation is extended to Shri J. Mathew, AAO and Dr. D.V. Kolekar, Scientist (ATARI, Bengaluru); Shri R.S. Bhatt, AF&AO (DFR, Pune) and Mrs Vijaya Bhumkar, AF&AO (DOGR, Pune) for all round support to the ATARI. I would like to appreciate the service rendered by contractual staff especially (Shri

Somnath Gadade; Ms Pallavi Uttamrao Palve; Ms Shrutika Tukaram Shinde; Ms Komal Dilip Shinde; Shri Deepak Naikwade; Mrs Manjusha Ranaware; Shri Tushar Bhagat and Ms Vaibhavi during compilation of the report. I also acknowledge the help of Dr. S.V. Sonune; Dr. L.R. Tambade and Shri Vinod Jadhav for finalizing format and designing graphs. Executive Summary was typed in Hindi by Mr Shraavan Yadav deserves appreciation.

Date: August 9, 2019

Place: Pune



**(Lakhman Singh)**

# कार्यकारी सारांश

कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, पुणे की मुख्य गतिविधियों व कार्यक्रमों का संक्षिप्त विवरण इस अध्याय में दिया गया है। इसके अतिरिक्त 79 कृषि विज्ञान केन्द्रों द्वारा क्रियान्वित कार्यक्रमों के बारे में भी दर्शाया गया है।

## प्रशिक्षण कार्यक्रम

जोन-8 के अन्तर्गत कृषि विज्ञान केन्द्रों द्वारा कुल 6514 प्रशिक्षण कार्यक्रम आयोजित किये गये, जिसमें 247003 कृषक, ग्रामीण युवक एवं प्रसार कार्यकर्ताओं ने भाग लिया। महाराष्ट्र, गुजरात व गोवा राज्यों में कुल 18708 ग्रामीण युवकों, 175567 प्रसार कार्यकर्ताओं तथा 169510 कृषकों/ग्रामीण महिलाओं ने भागीदारी की।

## प्रथम पंक्ति प्रदर्शन

कुल 19694 प्रथम पंक्ति प्रदर्शन आयोजित कराये गये जिसमें से फसल (11590), उद्यान (2970), मछली व पशुपालन (2910), अन्य व्यवसाय (3221), प्रक्षेत्र उपकरण (1973), आदि पर प्रदर्शन कराये गये। सभी कृषि विज्ञान केन्द्रों द्वारा पोषण वाटिका व कृषकों की दोगुनी आय वृद्धि हेतु विशेष प्रयास किये गये।

## तकनीकी मूल्यांकन

जोन-8 के कृषि विज्ञान केन्द्रों द्वारा कुल 585 विभिन्न तकनीकियों पर प्रक्षेत्र परीक्षण कराये गये। महाराष्ट्र, गुजरात व गोवा में 434 स्थानों पर 7073 कृषक प्रक्षेत्र परीक्षण आयोजित हुये। फसलों में लगभग 80% तकनीकियों पर तथा 20% पशुपालन व मछली पालन तकनीकी पर मूल्यांकन किया गया। फसलों में विभिन्न प्रजाति मूल्यांकन (75), एकीकृत तत्व प्रबंधन (94), एकीकृत कीट/व्याधि प्रबंधन (79), एकीकृत रोग प्रबंधन (37), एकीकृत फसल प्रबंधन (36), फार्म मशीनरी (36), आदि पर परीक्षण आयोजित किये गये। मुख्य रूप से धान, चना, अरहर, सोयाबीन, मूँगफली, आम, मिर्च, प्याज, टमाटर आदि फसलों पर कार्य किया गया। पशुपालन में नस्ल मूल्यांकन, पशु खाद्य प्रबंधन तथा रोग प्रबंधन पर कृषकों की सक्रिय भागीदारी के साथ प्रक्षेत्र परीक्षण कराये गये। महाराष्ट्र में 330 तकनीकियों पर 4675 कृषकों की सक्रिय भागीदारी के साथ प्रक्षेत्र परीक्षण किये गये। गुजरात में 134 तकनीकी 820 कृषकों के साथ तथा गोवा में 2 तकनीकियों पर 30 किसानों के सहयोग से तकनीकी मूल्यांकन किया गया।

## प्रसार कार्यक्रम

महाराष्ट्र, गुजरात व गोवा के कृषि विज्ञान केन्द्रों पर वृहद् स्तर पर अनेक प्रसार कार्यक्रमों का आयोजन किया गया। मुख्य कार्यक्रम जैसे सलाह सेवाएं (16036), रोग-कीट पहचान भ्रमण (3464), प्रक्षेत्र दिवस (688), समूह परिचर्चा (1381), किसान गोष्ठी (720), फिल्म शो (1245), स्वयं सहायता समूह (204), किसान मेला (259), प्रदर्शनी (260), वैज्ञानिक भ्रमण (6741), पशु स्वास्थ्य शिविर (214), फार्म साइंस क्लब (592), पूर्व प्रशिक्षणार्थी सम्मेलन (32), कृषक सेमिनार (272), विधि प्रदर्शन (924), महत्वपूर्ण दिवस आयोजन (656), एक्सपोजर विजिट (445) तथा अन्य गतिविधियों में कुल 6853387 कृषकों एवं 31642 प्रसार कार्यकर्ताओं ने भाग लिया। इसके अतिरिक्त 19828 प्रसार गतिविधियों में जैसे इलेक्ट्रॉनिक मीडिया, प्रसार साहित्य, समाचार प्रकाशन लेख, रेडियो व दूरदर्शन वार्ता तथा मोबाइल द्वारा कृषक सलाह शामिल किये गये।

## बीज व रोपण सामग्री उत्पादन

तीनों राज्यों के कृषि विज्ञान केन्द्रों द्वारा 8323.28 कुन्तल बीज, 3621.90 कुन्तल जैव उत्पाद, 27.95 लाख पौध, 35.62 लाख संकर प्रजातियों की पौध सामग्री तथा 16.23 लाख फिंगरलिम्स, गाय, भैंस व बकरियों के बच्चे उपलब्ध कराये गये।

## राष्ट्रीय जलवायु समुत्थान कृषि में परिवर्तन (NICRA)

महाराष्ट्र में 8 तथा गुजरात में 5 कृषि विज्ञान केन्द्रों द्वारा 2542.3 हे. क्षेत्र पर 2267 कृषक प्रक्षेत्रों पर 36 गाँवों में कृषि जलवायु अनुकूल तथा प्राकृतिक संसाधन प्रबंधन हेतु कार्यक्रम चलाये गये। फसल उत्पादन विषय में 3168 कृषकों की भागीदारी के साथ 1325 हे. क्षेत्र पर 13 कृषि विज्ञान केन्द्रों द्वारा शुष्क जलवायु व अनियमित वर्षा में उगने वाली फसल व प्रजातियों पर प्रदर्शन किये गये। पशुपालन में 8726 पशुओं के स्वास्थ्य प्रबंधन, संतुलित आहार व चारा प्रबंधन पर 3593 कृषकों को लाभान्वित किया गया। इसके अतिरिक्त 578 उन्नत नस्ल तथा 108 उन्नत शेल्टर हाउस प्रदर्शित किये गये जिससे 138 कृषकों को फायदा हुआ तथा पशुओं को विपरीत कृषि जलवायु के असर से बचाव हुआ। लगभग 19 हेक्टेयर सामुदायिक भूमि को चारा उत्पादन हेतु प्रयोग में लाया गया। गाँव कस्टम हाइरिंग सेन्टर के द्वारा 1477 कृषकों के द्वारा 95 कृषि उपकरण व मशीनों को 1185.90 हे. क्षेत्र में उन्नत खेती करने

हेतु उपयोग में लाया गया। इससे छोटे व मझोले कृषकों को लाभ पहुँचा तथा सेन्टर ने 1.70 लाख रुपये किराये के रूप में प्राप्त किये।

### **कृषि में युवकों को आकर्षित व रोकने हेतु योजना (ARYA)**

आर्या कार्यक्रम के तहत दो कृषि विज्ञान केन्द्रों (महाराष्ट्र में नागपुर व गुजरात में राजकोट) को चुना गया। कुल 313 ग्रामीण युवकों को अपना व्यवसाय शुरू करने हेतु सम्बन्धित विषयों की पूर्ण जानकारी दी गई। दोनों केन्द्रों पर कुल 95 युवकों ने अपना व्यवसाय आरम्भ किया है।

### **फार्मर फर्स्ट परियोजना (Farmer FIRST)**

कृषकों की वास्तविक प्रश्न व पारिवारिक परिस्थितियों को ध्यान में रखकर कृषि तकनीकी उपयोग, कृषक व वैज्ञानिकों के बीच सम्बंध व तालमेल, विभिन्न विभागों से समन्वयन तथा जीविकोपार्जन हेतु गतिविधियों का आयोजन किया गया। जोन-8 में तीन फार्मर फर्स्ट प्रोजेक्ट (जूनागढ़ कृषि विश्वविद्यालय, नवसारी कृषि विश्वविद्यालय तथा महात्मा फुले कृषि विद्यापीठ, राहुरी) द्वारा संचालित किया जा रहा है। राहुरी में 750 कृषक परिवार, नवसारी में 602 परिवार तथा जूनागढ़ में 650 परिवारों को भागीदार बनाकर कार्यक्रम को चलाया जा रहा है।

### **दलहनी व तिलहनी फसलों पर प्रथम पंक्ति प्रदर्शन (CFLDs)**

दलहनी व तिलहनी फसलों के उत्पादन व उत्पादकता में वृद्धि हेतु कृषि विज्ञान केन्द्रों द्वारा महाराष्ट्र व गुजरात में दलहन की मुख्य फसलों पर 3667.2 हेक्टेयर क्षेत्र पर 9765 समूह प्रदर्शन तथा तिलहनी फसलों पर 2570.34 हेक्टेयर क्षेत्र में 6592 समूह प्रदर्शन आयोजित किये गये। अरहर, चना, उर्द, मूँग, मूँगफली, तिल, सोयाबीन, अरंडी, कुसुम आदि फसलों पर उन्नत किस्में व पूर्ण वैज्ञानिक तकनीकी अपनाकर प्रदर्शन कराये गये।

### **पल्सेस सीड हब परियोजना (Pulses Seed Hub)**

यह कार्यक्रम महाराष्ट्र में 8 कृषि विज्ञान केन्द्रों (जालना, धुले, सोलापुर-II, बीड-II, अकोला, बुलढाना-II, जलगाँव-II तथा अमरावती-II) तथा गुजरात में 6 केन्द्रों (तापी, नवसारी, खेड़ा, राजकोट-II, पंचमहल तथा दाहोद) पर गुणवत्तायुक्त दलहनी फसलों के बीज उत्पादन करने हेतु शुरू किया गया। खरीफ में 1678 कुन्तल तथा रबी सीजन में 3522.42 कुन्तल बीज पैदा किया गया।

### **ट्राइबल सब-प्लान (Tribal Sub-Plan)**

जन जातीय क्षेत्रों में कृषकों के विकास हेतु कृषि, पशुपालन, मुर्गी पालन, बकरी पालन तथा अन्य कृषि से जुड़े व्यवसायों से सम्बंधित कार्यक्रम 11 कृषि विज्ञान केन्द्रों द्वारा चलाये गये। इन केन्द्रों पर प्रशिक्षण, प्रथम पंक्ति प्रदर्शन, प्रक्षेत्र परीक्षण, बीज उत्पादन तथा अन्य आयवृद्धि हेतु कार्यक्रमों पर जोर दिया गया।

### **मानव संसाधन विकास गतिविधियाँ (HRD Activities)**

अटारी, पुणे द्वारा 15 कार्यशालाएं/प्रशिक्षण आयोजित किये गये। इसके अतिरिक्त 57 वार्षिक/मिड-टर्म समीक्षा तथा बैठकों में भाग लिया। अन्य विभागों, अनुसंधान संस्थानों व विश्वविद्यालयों से तालमेल स्थापित किया गया। कृषक अन्वेषण व महिला कृषक सम्बंधी कार्यक्रमों पर विशेष जोर दिया गया। कृषि विश्वविद्यालयों द्वारा कुल 39 प्रशिक्षण आयोजित किये गये जिसमें 463 वैज्ञानिकों/विषय वस्तु विशेषज्ञों ने भाग लिया। इसके अतिरिक्त 78 कार्यशालाएं व समीक्षा बैठकें आयोजित की गई जिसमें 2467 प्रतिभागियों ने भाग लिया।

### **विशेष कार्यक्रम**

भारत सरकार द्वारा कृषकों के विकास व कल्याण हेतु अनेक पहल की गई। प्रधानमंत्री किसान सम्मान निधि का प्रसारण 68 कृषि विज्ञान केन्द्रों द्वारा किया जिसमें 15890 कृषक लाभान्वित हुये। 76 कृषि विज्ञान केन्द्रों द्वारा विश्व मृदा दिवस मनाया जिसमें 126057 कृषकों ने मृदा स्वास्थ्य हेतु जानकारी प्राप्त की। 77 कृषि विज्ञान केन्द्रों ने स्वच्छता ही सेवा कार्यक्रम चलाया। मेरा गाँव मेरा गौरव (एम.जी.एम.जी.) कार्यक्रम के अन्तर्गत 813 गाँवों को अपनाया गया। 69 केन्द्रों ने राष्ट्रीय महिला किसान दिवस मनाया गया जिसमें 10198 महिलाओं ने भाग लिया।

### **प्रकाशन**

अटारी, पुणे द्वारा तीन बुलेटिन/बुक चैप्टर्स, 4 शोध पत्र तथा 2 सेमिनार पेपर्स प्रकाशित किये गये। कृषि विज्ञान केन्द्रों द्वारा 203 शोध पत्र, 82 तकनीकी बुलेटिन, 539 पॉपुलर आर्टिकल्स, 401 प्रसार साहित्य, 2706 अखबारों में लेख, 47 किताबें, 89 सी.डी./डी.वी.डी तथा 108 न्यूजलेटर्स विकसित किये गये।

### **पुरस्कार/सम्मान**

कृषि विज्ञान केन्द्र, नन्दुरवार (महाराष्ट्र) को सन् 2018 का जोनल बेस्ट एवार्ड पंडित दीन दयाल उपाध्याय राष्ट्रीय कृषि विज्ञान प्रोत्साहन पुरस्कार भारतीय कृषि अनुसंधान परिषद्, नई दिल्ली द्वारा दिया गया। श्री बल्लभभाई बसरमभाई मारवानिया, जूनागढ़ (गुजरात) को महामहिम राष्ट्रपति के कर कमलों द्वारा पद्म श्री पुरस्कार से सम्मानित किया गया।



# Executive Summary

## Training Programmes

In Zone VIII, 6514 courses were organized involving 247003 farmers, farm women, rural youths and extension functionaries. In all, 18708 rural youths, 175567 extension functionaries and 169510 farmers/farm women participated in training programs conducted by KVKs of Maharashtra, Gujarat and Goa.

## Frontline Demonstrations

A total of 19694 frontline demonstrations were organized related to crops (11590), fishery and livestock (2910), other enterprises (3221), farm implements (1973), etc. Nutritional gardening was also given special focus.

## Technology Assessment

In total, 585 technologies were assessed by KVKs through 7073 on-farm trials conducted at 434 locations. About 80% technologies were experimented under crops, 20% under livestock, poultry and fishery enterprises. Under crops, technologies were assessed mainly in integrated nutrient management (94), integrated pest management (79), varietal evaluation (75), integrated disease management (37), etc. Crop technologies were assessed mainly in paddy, chickpea, pigeon pea, soybean, groundnut, mango, chilli, onion, tomato, cumin and ginger. Livestock technologies were assessed mainly under evaluation of breeds, feed management and disease management components.

In zone, KVKs of Maharashtra, Gujarat and Goa organized on farm trials in 14 major thematic areas for crops. In all, 465 technologies were tested involving 5525 farmers. In Maharashtra, 330 technologies were assessed with active participation of 4675 farmers. In Gujarat, 134 technologies were experimented with involvement of 820 farmers. While in Goa, 2 technologies were tested involving 30 farmers. In Zone VIII, KVKs assessed 120 technologies on 4 thematic areas related to livestock and fishery components including disease management (9); evaluation of breeds (9); nutrition management (91) and production & management (11) through 1548 on farm trials.

## Extension Activities

A large number of extension activities were organized by KVKs of Maharashtra, Gujarat and Goa. The major

activities like advisory service (16036), diagnostic visits (3464), field days (688), group discussions (1381), kisan gosthies (720), film shows (1245), self-help groups (204), kisan melas (259), exhibitions (260), scientist visit to farmers field (6741), plant/animal health camps (214), farm science clubs (592), ex-trainees sammelan (32), farmers' seminars (272), method demonstrations (924), celebrations of special days (656), exposure visits (445) etc. with the participation of 6853387 farmers and 31642 extension personnel were performed. 19828 number of other extension activities viz. use of electronic media, extension literature, newspaper coverage, popular articles, animal health camp, radio and TV talks were performed by KVKs. Mobile based agro-advisory was also given by the KVKs to the farmers.

## Seed and Planting Material Production

KVKs are actively involved in production of quality seeds, planting materials, livestock, bio-products and supplying them to the needy farmers. During the period under report, KVKs produced 8323.28 q seeds of crop varieties, 3621.90 q bio-products, 27.95 lakh number of planting materials of varieties, 35.62 lakh number of planting materials of hybrids and 16.23 lakh number livestock and fisheries.

## National Initiatives on Climate Resilient Agriculture (NICRA)

Under NICRA project, 8 KVKs of Maharashtra and 5 KVKs of Gujarat undertook the demonstrations.

A total of 2542.3 ha area has been treated with NRM related interventions covering 2267 farmers' fields in order to build climate resilience in 36 villages. In crop production component, a total of 3168 farmers demonstrated large number of technologies in 1325 ha area spread over in 13 KVKs. In total, about 7003 livestock have been covered under general health check-up and preventive vaccination programme. Under heat stress management through balanced nutrition, 220 animals were covered benefitting 205 farmers in the NICRA villages. About 578 improved breeds of livestock/birds and 108 units of improved shelter/housing were demonstrated to tackle the adverse climatic conditions in the NICRA villages benefitting 138 farmers. In order to enhance the fodder availability to livestock during lean period, about 19 ha of community land was brought



under fodder cultivation. In respect of custom hiring centres, 1477 farmers of NICRA villages have used 95 various implements to cultivate 1185.9 ha area for timely sowing and other cultural operations. The revenue generated by these custom hiring centres was about Rs 1.70 lakh.

### **Attracting and Retaining Youth in Agriculture (ARYA) Project**

ARYA project was started by 2 two centres (KVK, Nagpur and KVK, Rajkot-I) in Zone VIII to empower youth in rural areas to take up agriculture and allied and service sector enterprises for gainful employment in selected districts. Total of 313 rural youths were involved in enterprise based modules. Agriculture and allied products based enterprises were started by 95 youths under ARYA project implemented by KVKs of Nagpur and Rajkot-I during the year.

### **Farmers FIRST Project**

Farmer FIRST aims at enriching farmers-scientists interface for technology development and application. The aim of program is to achieve with focus on innovations; feedback; multiple stakeholders participation; multiple realities; multi method approaches; vulnerability and livelihood interventions. Under Zone VIII, 3 Farmer FIRST projects (MPKV, Rahuri adopted 2 clusters of villages benefitting 750 families; NAU, Navsari covered 3 clusters of villages including 602 farm families; and JAU, Junagadh working in 4 villages facilitating 650 families) are being implemented.

### **Cluster Frontline Demonstrations on Pulses and Oilseeds**

Cluster Frontline Demonstrations of Pulses under NFSM was started to enhance the pulses yield covering major pulse crops viz, pigeon pea, chickpea, black gram and green gram in selected districts through KVKs in Maharashtra and Gujarat. In total, 9765 demonstrations were laid out in cluster mode on 3667.2 ha area. Cluster Frontline Demonstrations of Oilseeds under NMOOP was implemented to enhance productivity of oilseeds. Groundnut, sesame, soybean, niger, castor, linseed, safflower and rapeseed and mustard were demonstrated by the KVKs in selected districts in Maharashtra and Gujarat. A total of 6592 cluster frontline demonstrations were conducted in an area of 2570.34 ha.

### **Seed Hub Project**

Seed Hub Project is being implemented at 8 centres in Maharashtra (Jalna, Dhule, Solapur-II, Beed-II, Amaravati-II, Akola, Buldhana-II, Jalgaon-II) and 6 centres in Gujarat (Tapi, Navsari, Kheda, Rajkot-I, Panchmahal and Dahod) with specific objective of enhancing quality seed production for benefitting the

farmers. In kharif season, seed production of 1678 q was achieved against target of 5132.8 q. In case of rabi season, seed production of 3522.42 q was attained against fixed target of 4522.5 q.

### **Tribal Sub Plan**

Tribal Sub Plan (TSP) is meant for developing strategy for tribal welfare through organizing different activities related to agriculture, livestock, poultry, goat rearing and other rural waste enterprises. In zone, 11 KVKs are involved in organizing several activities like capacity building programs, frontline demonstrations, on farm trials, seed and planting material production and creating income generating activities in tribal dominated areas for their socio economic development.

### **HRD Activities**

Fifteen workshops/trainings, participation in 57 annual/mid-term review workshops, trainings, meetings and interactions were organized and attended. Linkage and coordination with different line departments, research institutions and SAUs was strengthened. Special focus on home science and farm innovations was given. The Directorates of Extension of eight SAUs organized 39 training programs involving 71 KVKs with 463 participants. In total 78 workshops/ review meetings were organized with 2467 participants belonging to 137 KVKs in Maharashtra and Gujarat states.

### **Special Programs**

Webcast of PM Kisan Samman Nidhi Scheme (68 KVKs) benefitted 15890 farmers; World Soil Day (76 KVKs) attended by 126057 farmers; Swachhata Hi Sewa (77 KVKs); MGMG adopted 813 villages; Rashtriya Mahila Kisan Diwas Celebration (69 KVKs) benefitted 10198 participants.

### **Publications**

Three book chapters/bulletins, 4 research papers and 2 seminar papers were published at ATARI level. KVK staff published 203 research papers, 82 technical bulletins and 539 popular articles; KVKs have documented 401 extension literature, 2706 newspaper coverage, 47 books, 89 CD/DVD and 108 newsletters on various technological aspects of agriculture and its allied enterprise.

### **Awards and Recognition**

KVK, Nandurbar (2018) obtained Zonal Best Award 'Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protsahan Puraskar' conferred by ICAR, New Delhi. Padam Shree Award conferred to Shri Vallabh Bhai Vasrambhai Marvaniya of Junagadh (Gujarat) by auspicious hands of Hon'ble President of India on 11th March, 2019.

# Introduction

The Indian Council of Agricultural Research has established 11 Agricultural Technology Application Research Institutes (ATARIs) across the country for monitoring, reviewing and coordinating the KVK system. Agricultural Extension Division, one of the eight divisions of ICAR, New Delhi has established strong network of Krishi Vigyan Kendras (715 KVKs) all over the country. The division is headed by Deputy Director General (Agricultural Extension) and supported by two Assistant Director Generals, four Principal/Senior Scientists, two Directors and one Under Secretary who monitor and review the progress of KVKs through ATARIs. Earlier, there were eight ATARIs (Ludhiana, Kolkata, Barapani, Kanpur, Hyderabad, Jodhpur, Jabalpur and Bengaluru).

Considering more number of KVKs and intricate monitoring/coordination mechanism, three additional ATARIs (Pune, Guwahati and Patna) were established in 2015 for effective monitoring, coordinating and reviewing the KVKs and started functioning from 2017. If you look in the history of ATARI, it was born as Zonal Coordination Unit in 1979 at 8 locations to monitor transfer of technology projects. The Zonal Coordination Unit was upgraded as Zonal Project Directorate (ZPD) in 2009. Again it was upgraded as Agricultural Technology Application Research Institute (ATARI) in 2015. The jurisdiction of each ATARI with number of states/union territories are given in Table 1.1.



**Table 1.1 States and Union Territories covered under ATARIs**

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

### Mandate of ATARI

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

### Major Activities of ATARI

- Planning, monitoring and reviewing of KVK activities in the zone; to identify, prioritize and implement various activities related to technology integration and dissemination.
- Coordinating with SAUs, ICAR institutes, NGOs, line departments and voluntary organizations in the zone for implementation of KVK mandated activities, and
- Facilitating financial and infrastructural support to KVKs for effective functioning.

### KVKs in Zone VIII, ATARI, Pune

In Zone VIII, 79 KVKs have been established by the ICAR, out of which 47 KVKs are in Maharashtra, 30 in Gujarat and 2 KVKs in Goa. The state and host organization-wise distribution of KVKs is given in Table 1.2 and 1.3.

### Network of KVKs in ICAR-ATARI, Pune

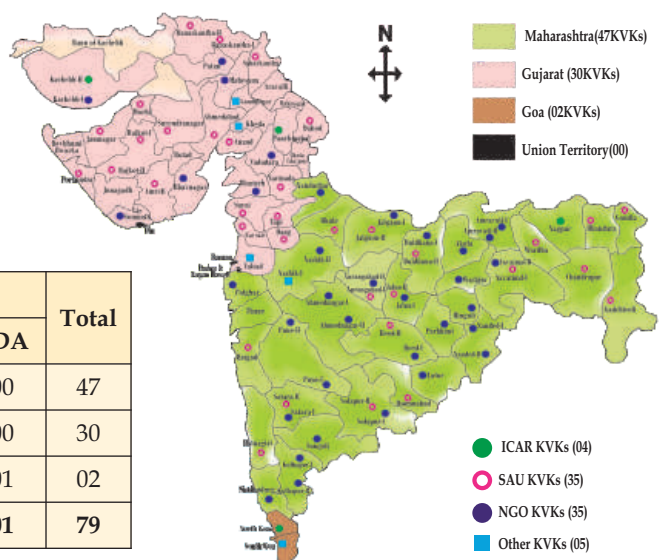


Table 1.2 State and host organization wise KVKs

States	Host Organizations						Total
	SAUs	NGOs	ICAR	DUs	OUs	SDA	
Maharashtra	17	28	01	-	01	00	47
Gujarat	18	07	02	03	-	00	30
Goa	-	-	01	-	-	01	02
<b>Total</b>	<b>35</b>	<b>35</b>	<b>04</b>	<b>03</b>	<b>01</b>	<b>01</b>	<b>79</b>

### Additional KVKs in Larger Districts of the Zone:

In Maharashtra, 14 districts (Amravati, Ahmednagar, Pune, Nashik, Aurangabad, Buldhana, Nanded, Beed, Yavatmal, Solapur, Jalgaon, Satara, Jalna and Kolhapur) are having two KVKs in the district while double KVKs have been established in 3 districts (Banaskantha, Kutch and Rajkot) of Gujarat. It has helped the earlier KVKs to reach the more number of farmers. Additional KVK have also been sanctioned in Sangli and Nagpur district of Maharashtra.



### Krishi Vigyan Kendra (KVK)

Krishi Vigyan Kendra is a frontline extension model at district level, designed and nurtured by the ICAR for the past four decades since 1974 when the first KVK was established at Pondicherry. The KVKs showcase



the frontier technologies, develop the capacity of different stakeholders, front runner in technology application, making available technological information and inputs, practicing participatory approaches in planning, implementing, executing and evaluating the technologies. The centres also pursue assessment of technologies to suit different agro-climatic conditions.

The confidence of the farmers has grown upon KVKs over the years and thus the success of programmes of other related ministries are also heavily dependent on KVKs for technological backstopping. Therefore, the KVKs have to be strengthened as One Stop Solution platform for agricultural technology integration and application. The single window approach of providing diagnostic, input and advisory services will enhance the effectiveness of these centres, whereas the larger interest of sustainability and farm income can be addressed in a holistic way. The problems of Maharashtra, Gujarat and Goa are quite diverse ranging from acute drought to surplus water

### Vision

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

### Mission

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

### Mandate

Technology Assessment and Demonstration for its Application and Capacity Development.

management.

The KVK follows basic concept of imparting learning through work experience, training to extension personnel, flexible, customized syllabus for different areas based on agro-ecological needs.

### Activities of KVK

The activities of KVK include: on-farm testing to identify the location specificity of agricultural technologies under various farming systems; organize frontline demonstrations to establish its production potential on the farmers' fields; conduct training of farmers to update their knowledge and skills in modern agricultural technologies; training of extension personnel to orient them in the frontier areas of technology development and to work as resource and knowledge centre of agricultural technology for supporting initiatives of public, private and voluntary sectors for improving the agricultural economy of the district. In order to create awareness about improved technologies, provide farm advisory using ICT and other means of media on varied subjects of interest of farmers, identify and document farm innovations for converging with ongoing schemes/programs within mandate of KVK, a large number of extension activities are taken up; and to support various activities, the seeds and planting materials are also produced by the KVKs and made available to the farmers.



**Table 1.3 Host Organization wise KVKs**

S.No.	KVKs	Year of Sanction and Host Organization	S.No.	KVKs	Year of Sanction and Host Organization
<b>Maharashtra</b>					
<b>PDKV, Akola</b>					
1.	Wardha	1976 -SAU	2.	Chandrapur	1999 -SAU
3.	Bhandara	2002 -SAU	4.	Gadchiroli	2004-SAU
5.	Gondia	2004 -SAU	6.	Yavatmal-I	2004-SAU
7.	Buldhana-II	2010 -SAU			



S.No.	KVKs	Year of Sanction and Host Organization	S.No.	KVKs	Year of Sanction and Host Organization
<b>VNMKV, Parbhani</b>					
8.	Aurangabad-I	1983 -SAU	9.	Osmanabad	2004-SAU
10.	Beed-II	2010 -SAU	11.	Jalna-II	2018-SAU
<b>MPKV, Rahuri</b>					
12.	Dhule	1983 -SAU	13.	Jalgaon-II	2010-SAU
14.	Satara-II	2010 -SAU	15.	Solapur-II	2011 -SAU
<b>BSKKV, Dapoli</b>					
16.	Ratnagiri	1983 -SAU	17.	Raigarh	2004-SAU
<b>Rural Development &amp; Research Foundation, Akola</b>			<b>Grammonnati Mandal, Pune</b>		
18.	Akola	2010 -NGO	19.	Pune-II	2010-NGO
<b>Manjara Charitable Trust, Latur</b>			<b>Saint Namdeo Sevabhavi Sanstha, Hingoli</b>		
20.	Latur	2005 -NGO	21.	Hingoli	2002-NGO
<b>Dr. Hedgewar Seva Samiti, Nandurbar</b>			<b>Sharam Safayalya Foundation, Amaravati</b>		
22.	Nandurbar	2002 -NGO	23.	Amaravati-I	1995-NGO
<b>Sharam Sadhana Trust, Amaravati</b>			<b>Sindhudurg Zila Krishi Pratishthan, Sindhudurg</b>		
24.	Amaravati-II	1995 -NGO	25.	Sindhudurg	1995-NGO
<b>YCMOU, Nashik</b>			<b>Jeevan Jyoti Charitable Trust, Parbhani</b>		
26.	Nashik-I	1994 -YCMOU	27.	Parbhani	1994-NGO
<b>D.Y. Patil Education Society, Kolhapur</b>			<b>Satpuda Edn. Society Jalgaon, Jamod, Buldhana</b>		
28.	Kolhapur	1994 -NGO	29.	Buldhana-I	1994-NGO
<b>J.N. Instt. of Edn. Sci. &amp; Tech. Research, Pokharni, Nanded</b>			<b>Shabari Krishipratishthan, Solapur</b>		
30.	Nanded-I	1994 -NGO	31.	Solapur-I	1994-NGO
<b>SUVIDE Foundation, Washim</b>			<b>DRI, New Delhi</b>		
32.	Washim	1994 -NGO	33.	Beed-I	1992-NGO
<b>Kalyani Gorakshan Trust, Pune</b>			<b>Agril. Development Trust, Baramati, Pune</b>		
34.	Satara-I	1992 -NGO	35.	Pune-I	1992-NGO
<b>Pravara Instt. of Res. &amp; Edn. in Natural &amp; Soc. Sci., Ahmednagar</b>			<b>Vasant Prakash Vikas Pratisthan, Sangli</b>		
36.	Ahmednagar-I	1992 -NGO	37.	Sangli	1992-NGO
<b>Marathwada Shethi Sahayya Mandal, Jalna</b>			<b>Satpuda Vikas Mandal PO Pal, Jalgaon</b>		
38.	Jalna-I	1992 -NGO	39.	Jalgaon-I	1984-NGO
<b>Gokhale Education Society, Nashik</b>			<b>Rich Field Agro-e-Research &amp; Development Centre, Nashik</b>		
40.	Thane	1976 -NGO	41.	Nashik-II	2011 -NGO
<b>Mahatma Gandhi Mission, Aurangabad</b>			<b>Sanskriti Samvardhan Mandal, Sagroli, Nanded</b>		
42.	Aurangabad-II	2011 -NGO	43.	Nanded-II	2011 -NGO

# Introduction

## 1.1 Introduction

The Indian Council of Agricultural Research (ICAR) has established 11 Agricultural Technology Application Research Institutes (ATARIs) across the country for monitoring, reviewing and coordinating the KVK system. Deputy Director General (Agricultural Extension), supported by two Assistant Director Generals, monitors and reviews the progress of KVKs (at present numbering 720) through ATARIs. Earlier, there were eight ATARIs (Ludhiana, Kolkata, Barapani, Kanpur, Hyderabad, Jodhpur, Jabalpur and Bengaluru). Considering more number of KVKs and intricate monitoring/coordination mechanism, three additional ATARIs (Pune, Guwahati and Patna) were established in 2015 which became operational in 2017. Historically, what was started as Zonal Coordinating Units in 1979 at 8 locations were upgraded as Zonal Project Directorate and further elevated as ATARI in 2015. Besides monitoring of KVKs, ATARI was mandated for research in extension.

### Mandate of ATARI

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

### Objectives of ATARI

- To plan, monitor and review the activities of KVKs
- To identify the production constraints of agro-ecosystems in the operational area for their redressal through KVKs
- To prioritize researchable issues in extension, and technology application in order to formulate research project commensurating with the objectives

### Activities of ATARI

- Planning, monitoring and reviewing of KVK activities in the zone; to identify, prioritize and implement various activities related to technology integration and dissemination
- Formulating projects and conducting research in line with the mandate, involving research organizations and KVKs, wherever necessary
- Coordinating with SAUs, ICAR institutes/organizations, line departments and NGOs in the zone for implementation of KVK mandated activities, and
- Facilitating financial and infrastructural support to KVKs for effective functioning

### KrishiVigyanKendras (KVK)

KrishiVigyan Kendra is a frontline extension model at district level, designed and nurtured by ICAR to disseminate frontier technologies, build capacity of different stakeholders and to provide feedback to different research, extension and policy framework organizations.

ATARI Zone-VIII, covering states of Maharashtra, Gujarat and Goa comprises of 81 KVKs; established by the ICAR, of which 49, 30 and 2 exist in the respective states.

## Special Attainments

### Zonal Review and Action Plan Workshops

#### Annual Zonal Workshop of KVKs at MPKV, Rahuri

Annual Zonal Workshop of KVKs was organized during 5-7 May, 2018 at MPKV, Rahuri. In this program, 79 KVKs of Maharashtra (47), Gujarat (30) and Goa (2) participated and presented their progress (2017-18) and action plan (2018-19). Dr. A.K. Singh, DDG (Agril Extension), ICAR, New Delhi urged the KVKs to connect each village digitally. More focus was given on farmer centric research, assessing location specificity of agricultural technologies under varied farming situations. Dr. K.P. Viswanatha, Vice Chancellor, MPKV, Rahuri stated that KVK is the best model for technology



at KVK, Bhavnagar. Dr. Randhir Singh, ADG (AE) gave focus on status of oilseeds and pulses production, problems in increasing the production, value addition & processing, pest scenario, export scenario, etc. He also discussed about the innovative marketing strategies, residue management, effective utilization of technologies to tackle adverse effect of climate change, developing success stories, demonstrating technologies effectively supported with action photographs. Action plan of ARYA project for attracting and retaining youth in agriculture at 11 centres (6 KVKs in Maharashtra and 5 in Gujarat) was also reviewed.



concerned districts. He advised the KVK experts to identify the technological gap before designing different interventions. His more concern was on reducing cost of cultivation, organizing farmers, adopting latest technologies for enhancing farmers' income.

More focus was given on problem solving approach

application and enhancing farmers' income. KVKs need to popularize the best suited Integrated Farming System (IFS) models for sustaining income of the farmers. Dr. V.P. Chahal, ADG (Agril. Extension), ICAR said that extension models should be developed by SAUs. Mentor KVK may be identified based on performance and leadership of heads to sensitize other KVKs. A brief account of progress was presented by the Director, ATARI.

#### Workshop on Cluster Frontline Demon-strations for Gujarat KVKs at Bhavnagar

A 3 days review workshop-cum-training on “*Cluster Front Line Demonstrations on Pulses and Oilseeds*” for 30 KVKs of Gujarat was organized from 7-9 December, 2018



Right type of enterprise for right type of youth needs to be identified considering its area specific demand and market. In advance, baseline survey, social and economic indicators for all enterprises need to be planned. Dr. Lakhan Singh, urged the KVK experts on linking cluster frontline demonstration program with nutrition sensitive agriculture and using latest technologies of ICAR institutes and SAUs under frontline demonstrations.

#### State Level Annual Action Plan Workshop of KVKs in Gujarat at Navsari

A two days **Annual Action Plan Workshop of KVKs in Gujarat** was organized at Navsari Agricultural University, Navsari during 1-2 March, 2019. In this program, 38 Heads and Scientists representing 30 KVKs of Gujarat participated and presented their action plan for the year 2019-20. In inaugural address, Dr. C.J. Dangaria, Vice Chancellor, NAU, Navsari said that success of the KVK depends on perfect and need based planning. He applauded the efforts of KVKs for frontline extension and creating more visibility in their

through designing on-farm trials, understanding farmers' perspectives, frontline demonstrations in cluster mode, farm family and agro-ecology based planning, enterprise based skill development, crop diversification, varietal diversification, climate resilient technologies, nutri-sensitive agriculture, case studies and personalized agro-advisory for increasing farmers' profit.



## State Level Annual Action Plan Workshop on KVKs of Maharashtra and Goa at Baramati



Two days *State Level Annual Action Plan Workshop of KVKs of Maharashtra and Goa* was organized at KVK, Baramati during 15-16 March, 2019. In this workshop, Heads of 49 KVKs (47 KVKs from Maharashtra and 2 KVKs of Goa) presented their annual work plan for the year 2019-20. In total, 75 participants attended the event.

In inaugural address, Shri Rajendra Pawar, Chairman, Agricultural Development Trust, Baramati said that farmers face many problems and they deal with new ideas. Grapes and other fruit growers are actively engaged in local need based research which replicate further. He urged the participants to develop activities on effective use of water and resource conservation for sustainable livelihood of

farmers. Based on existing agro-ecosystem, technology gap, farm related problems, different categories of farmers; the annual plan should be developed. KVKs should include best technologies of the ICAR institutes and SAUs in their interventions. Conducting on-farm trials for solving major problems of many farmers in defined area is the major strength of the KVK. Common on farm trials were designed to solve the serious but common problems in 4-5 districts for bringing quick alternative solutions.

## State Level Review Workshop Cluster Frontline Demonstrations on Pulses and Oilseeds of Maharashtra KVKs at Dapoli

A two days *Workshop-cum-Training on Cluster Front Line Demonstrations on Pulses and Oilseeds* for 45 KVKs of Maharashtra was organized at BSKKV, Dapoli during 24-25 November, 2018. Dr. V.P. Chahal, ADG (Agril Extension), ICAR gave focus on extension action research, adopting right methodology, reducing technological gap, linking cluster frontline demonstrations with nutritional security, getting best technologies from SAUs/ICAR institutes, etc. Convergence of KVK with other ministries in terms of financial support was discussed. In pulses and oilseed beyond production, KVK should focus on processing, value addition and marketing through organizing farmers.

Proper identification of potential areas for pulses and oilseed crops, diagnosis of real problems, developing location specific technology modules, selection of willing farmers, empowering the participating farmers to conduct

demonstrations in scientific way, training the farmers to record daily observations of crops/interventions, regular supervision of plots by the KVK experts, making the cluster demonstration as platform for technology transfer were suggested. Field day at appropriate time may be organized where all line departments, research institutions and nearby

farmers may be invited for further large scale adoption. Farmer FIRST Project of 3 centres (MPKV, Rahuri; JAU, Junagadh and NAU Navsari) was also reviewed.



### Zonal Action Plan cum Review Workshop of NICRA KVKs at Jalna

Annual Action Plan cum Review Workshop of NICRA KVKs in Maharashtra and Gujarat was organized at KVK, Jalna during 10-11 September, 2018. Heads, Co-PIs and SRFs of 13 KVKs (8 KVKs from Maharashtra and 5 from Gujarat) were participated in the workshop. The workshop was inaugurated by Dr. M.C. Varshneya, Chairman, Zonal Monitoring Committee of NICRA project. In his address, he opined that IFS model with crops, horticulture and livestock may be the workable solution on climate change. Goat rearing, sericulture, cumin are the best options for marginal and small farmers. For cumin, post harvest management, bullock drawn farm machinery may be introduced. Farmers need guaranteed rainfall prediction. Intercrop of black gram/green gram in cotton gave additional return and reduces the risk of adverse effect of weather change. One line of marigold with 6 lines of cotton may be one of the options in dry areas.

Dr. Ashok Dhawan, Vice Chancellor, VNMKV, Parbhani said that under threat of monsoon and having 40-45 days dry spells, we have challenge to

### Operationalizing Farming System for Nutrition through KVKs

ICAR-ATARI, Pune and MSSRF, Chennai jointly organized a workshop on '*Operationalising Farming System for Nutrition*' at KVK, Narayangaon (Pune) on 24<sup>th</sup> April, 2018 to establish Farming System for Nutrition models in KVKs to address the problem of malnutrition in rural areas. In this workshop, KVK experts from 11 KVKs of Maharashtra and 2 KVKs from Gujarat participated. Major focus was given on identifying the prevalent nutrition deficiencies, designing the farming system, processing and storage, sustainability, investing in nutrition literacy and leveraging agriculture for nutrition and developing a monitoring framework, etc. Participants



protect the crops. In Marathwada, sweet orange orchards were saved by the KVKs and others in collaborative mode in drought year. Reducing incidence of pink boll worm in cotton in Marathwada and Vidarbha, KVKs played a greater role. Dr. K. Sammi Reddy, Director, CRIDA, Hyderabad urged the KVKs to give focus on quantification of impact of resilient practices, bringing out quality publications, advisory role in adjacent villages and small video clippings for further up-scaling. Mitigating farm level stress with innovative ways including in-situ moisture conservation, protective irrigation, water harvesting, inter cropping, diversified enterprises, etc. is essential.



were then divided into four groups and asked to develop a FSN model for any one KVK for the forthcoming Kharif season. Models were prepared and presented for discussion.



### IPM for Kharif Crops with Special Focus on Pink Boll Worm in Cotton in Maharashtra

A training course on 'IPM for Kharif Crops with Special Focus on Pink Boll Worm in Cotton in Vidarbha and Marathwada Regions' was organized at KVK, Washim during 30-31 August, 2018. In this course, 35 participants belonging to 22 KVKs of Vidarbha and Marathwada regions were participated. In inaugural address, Dr. V.M. Bhale, Vice Chancellor, PDKV, Akola urged to follow integrated approach for pink boll worm control in cotton. His emphasis was on experimenting different IPM modules at KVK level.

The Director, ICAR-ATARI, Pune said that there is a need to understand the life cycle of insect & pest for developing effective plant protection measures.



Convergence of KVKs with PoCRA, ATMA, SAUs and ICAR institutes made a significant difference in managing pink boll worm through advance micro level planning, selection of early duration Bt hybrid for planting, planting of cotton with refugee and other appropriate measures.

### Training Programme on Developing Entrepreneurship in Floriculture

A training programme for 'Developing Entrepreneurship in Floriculture' was organized at KVK, Baramati from 23-25 January, 2019. In total, 25 trainees from Maharashtra and Gujarat attended the program, out of which 11 were Subject Matter Specialists (SMS) of KVKs and 14 were floriculture entrepreneurs.

In the training course, innovative training methods and simulation games were used. Entrepreneurial motivation of trainees was enhanced through experiential learning based group work. Microlab

was used to facilitate sharing thoughts and feelings. Ring toss and tower building exercises were played for understanding target setting behaviour, achievement need, hope of success, fear of failure, managing feelings, perception of blocks, help, concentration and focus on achievement goal, etc.

Participants were sensitized on entrepreneurial opportunities like ornamental plants, vertical gardening, tissue culture, media, dry flower industry, different options for growing potted plants, etc. Floriculture Entrepreneurs and SMS could identify through group discussion – the qualities of successful floriculture entrepreneurs, requirements and reason for success and or failure in floriculture enterprises.



### Master Trainers' Programme for Developing Entrepreneurship

A four days Master Trainers' Programme for Developing Entrepreneurship was organized at KVK Narayangaon (Pune-II) from 27-30 January, 2019. In

total, 25 Subject Matter Specialists (Agril Extension) from different KVKs of Maharashtra and Gujarat were attended the course. Innovative training methods were used by specially trained Entrepreneurial Motivation Experts to make the training lively and interesting. Simulation games, group exercises and

experiential interactive lecturettes were used. KVK SMSs in Agricultural Extension had reinforced their motivation training skills through practice sessions and feedback. All the SMSs have experienced great

change in their outlook towards training rural youths in 'helping to help themselves' to become entrepreneurs by imbibing entrepreneurial spirit and motivation to enhance their farm income.



### Training on 'Preparation and Dissemination of Agromet Advisories at Block Level'

ICAR-ATARI, Pune in collaboration with IMD, Pune organized a two days orientation training cum workshop on '*Preparation and Dissemination of Agromet Advisories at Block Level*' for 21 KVKs (10 from Maharashtra, 9 of Gujarat and 2 from Goa) during 6-7 July 2018 at KVK, Aurangabad. The participants were oriented about operational Agromet Advisory service under GKMS, observatory network of IMD, AWS, Agromet observatory, different observation like Doppler Weather Radar (DWR) satellite Information, their application, access to data, weather forecasting in spatial and temporal scales, use of agromet products, crop information and components of AAS bulletin and its preparation. Hands on training on the preparation



of Agromet Advisories for sowing, irrigation, fertilizer and pesticide application, harvesting using realized and forecast weather was given. Advisories for extreme weather situations were also prepared using sample data.

### Skill Development Training for Trainers

A three days *Skill Development Training for Master Trainers* was organized at Anand Agricultural University, Anand on 25-27 September 2018, for sowing skills and harnessing opportunities by the rural youths in agriculture and allied sectors. The Director, ICAR-ATARI, Pune emphasized the need of skill development among rural youths especially school and college dropouts for bringing them into mainstream of growth and to make them self-employable and creating the entrepreneurial behaviour for their better livelihood. Interest and capacity of the rural youth, identifying proper trade, understanding market and demand in the area and convergence across sectors in terms of skill training, financial support, etc. need special attention to get success by the entrepreneur, he added. Dr. Arun Patel,



Director of Extension Education, AAU, Anand highlighted the need of skill development and its role in entrepreneurship development by citing examples. Integration of extension efforts, complete training for changing their knowledge, skill and attitude in desired way was highlighted.



## Awards and Recognition

- **Padam Shree Award** conferred to Shri Vallabh Bhai Vasrambhai Marvaniya of Junagadh (Gujarat) by auspicious hands of Hon'ble President of India on 11<sup>th</sup> March, 2019.
- **Zonal Best Award 'Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protsahan Puraskar'** conferred to KVK, Nandurbar (2018) by ICAR, New Delhi.
- **N.G. Ranga Farmer Award for Diversified Agriculture-2018** awarded to Shri Udhav Asaram Khedekar from Jalna (Maharashtra).
- **'Jagjivan Ram Abhinav Kisan Puraskar'** received by Shri Samir Mohanrao Dombe from Pune (Maharashtra) for the year 2018 conferred by the ICAR, New Delhi.
- **'Pandit Deen Dayal Upadhyay Antyodaya Krishi Puruskar'** given to Smt Vasava Ushaben Dineshbhai from Narmada (Gujarat) for the year 2018 awarded by the ICAR, New Delhi.
- Dr. Lakhan Singh obtained **IASWC Fellow Award-2018** conferred by Indian Association of Soil and Water Conservationists, Dehradun at ICAR-IISWC, Research Centre, Koraput on 06 February, 2019.



## Research Projects/Programmes

### Collaborative Research Projects

- Development, Validation and Promotion of Cotton IPM with Major Emphasis on Pink Boll Worm in Jalna, Maharashtra in collaboration with ICAR-NCIPM, New Delhi; ICAR-ATARI, Pune and KVK, Jalna.
- UNICEF funded project on Farming System Nutrition through KVKs in Maharashtra: 19 KVKs in collaboration with MCAER, MSSRF, ATARI and KVKs are actively involved.
- Impact Assessment of Cluster Frontline Demonstration on Pulses in Jalna, Pune, Solapur, Latur districts in Maharashtra (Div. of Agril Economics, IARI).

### Applied Research Based Projects/Technology Application Programmes

- Farmer FIRST Project
- Attracting and Retaining Youth in Agriculture (ARYA)
- National Innovations on Climate Resilient Agriculture (NICRA)
- Cluster Frontline Demonstrations on Pulses

- Cluster Frontline Demonstrations on Oilseeds
- Pulses Seed Hub
- Nutri-sensitive Agricultural Resources and Innovations (NARI)
- Value Addition and Technology Incubation Centres in Agriculture (VATICA)
- Knowledge Systems and Homestead Agriculture Management in Tribal Areas (KSHAMTA)
- ICAR network project on New Extension Methodologies and Approaches (NEMA)

# Technology Assessment Through on Farm Trials

## Chapter 2

### Technology Assessment

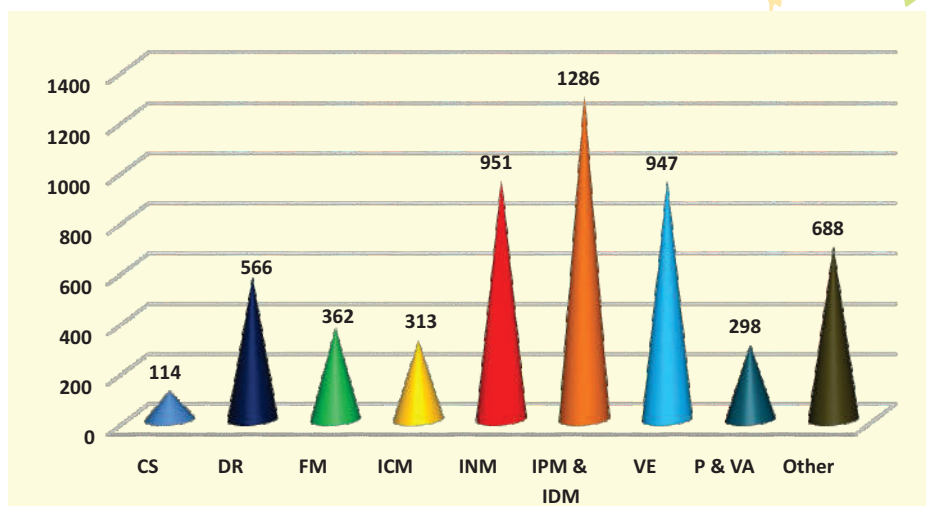
On Farm Trials are conducted to solve the farmers' problems with farmers perspectives by providing best technological options. Technologies evolved by National Agricultural Research System are tested by the KVKs for their location specificity involving farmers as partners through technology assessment process. On farm trials (OFTs) conducted in participatory mode involving farming community, extension personnel and scientists. A total of 585 technologies were assessed by KVKs through 7073 OFTs conducted at 434 different locations. About 80% technologies were experimented under crops, 20% under livestock, poultry and fishery enterprises. Under crops, technologies were assessed mainly in integrated nutrient management (94), integrated pest management (79), varietal evaluation (75), integrated disease management (37), etc. Crop technologies were assessed mainly in paddy, chickpea, pigeon pea, soybean, groundnut, mango, chilli, onion, tomato, cumin, ginger, etc. Livestock technologies were assessed under evaluation of breeds, feed management and disease management aspects.

### Technology Assessment under Crops

KVKs of Maharashtra, Gujarat and Goa organized on farm trials in 14 major thematic areas. In total, 465 technologies were experimented in field situation involving 5525 farmers (Table 2.1). In Maharashtra, 330 technologies were assessed with active participation of 4675 farmers. In Gujarat, 134 technologies were experimented with involvement of 820 farmers. While in Goa, 2 technologies were tested involving 30 farmers. Integrated nutrient management, integrated pest management, integrated disease management, integrated crop management, weed management, varietal evaluation, resource conservation technologies, drudgery reduction, farm machinery, cropping system, post-harvest management, etc. related to crop production were considered for assessment. Cereals, pulses, oilseeds, vegetables, fruits, cash crops, etc. were included under different thematic areas. State wise technologies tested under different components are reported in Table 2.2.

**Table 2.1 Thematic area wise of technology assessment under crops**

Sr. No.	Thematic Areas	No. of KVKs	No. of Technologies	No. of Trials
1	Cropping Systems	13	13	114
2	Drudgery Reduction	32	16	566
3	Farm Machineries	19	36	362
4	Integrated Crop Management	25	36	313
5	Integrated Disease Management	33	37	381
6	Integrated Nutrient Management	46	94	951
7	Integrated Pest and Disease Management	9	11	86
8	Integrated Pest Management	47	79	819
9	Nutrition Security	7	3	98
10	Processing and Value Addition	14	18	298
11	Resource Conservation Technology	15	20	224
12	Storage Technique	16	10	201
13	Varietal Evaluation	56	75	947
14	Weed Management	14	17	165
	<b>Total</b>	<b>346</b>	<b>465</b>	<b>5525</b>



Thematic area wise of technology assessment

Table 2.2 State wise technology assessment

Sr. No	Thematic Areas	Maharashtra			Gujarat			Goa		
		KVK (No.)	Techno. (No.)	Trials (No.)	KVK (No.)	Techno. (No.)	Trials (No.)	KVK (No.)	Techno. (No.)	Trials (No.)
1	Cropping Systems	9	9	93	4	4	21	0	0	0
2	Drudgery Reduction	26	14	518	6	3	48	0	0	0
3	Farm Machineries	17	32	346	2	4	16	0	0	0
4	Integrated Crop Management	17	26	251	8	10	62	0	0	0
5	Integrated Disease Management	18	23	288	15	14	93	0	0	0
6	Integrated Nutrient Management	29	67	790	17	27	161	0	0	0
7	Integrated Pest and Disease Management	5	5	48	4	6	38	0	0	0
8	Integrated Pest Management	28	54	661	19	25	158	0	0	0
9	Nutrition Security	6	2	90	1	1	8	0	0	0
10	Processing and Value Addition	14	18	298	0	0	0	0	0	0
11	Resource Conservation Technology	9	11	135	6	9	89	0	0	0
12	Storage Technique	15	9	195	1	1	6	0	0	0
13	Varietal Evaluation	35	47	818	20	26	99	1	2	30
14	Weed Management	9	13	144	5	4	21	0	0	0
	<b>Total</b>	<b>237</b>	<b>330</b>	<b>4675</b>	<b>108</b>	<b>134</b>	<b>820</b>	<b>1</b>	<b>2</b>	<b>30</b>

### Assessment of Livestock Technologies

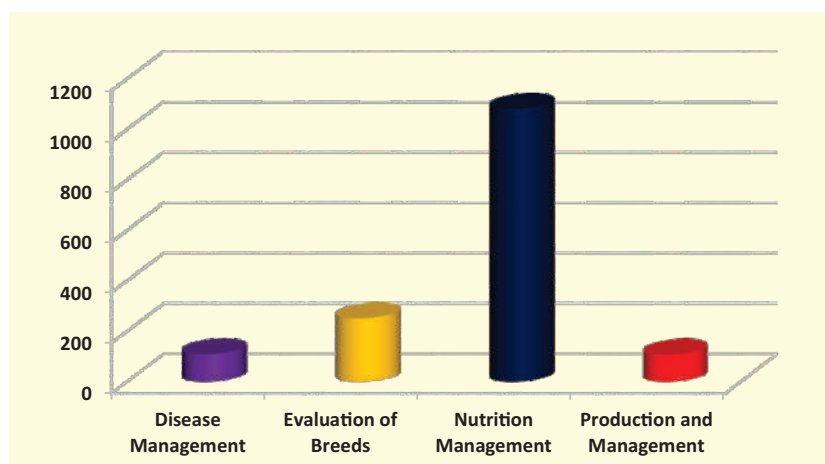
Across the Zone, KVKs assessed 120 technologies on 4 thematic areas related to livestock and fishery

components including disease management (9); evaluation of breeds (9); nutrition management (91) and production & management (11) through 1548 on farm trials (Table 2.3).



**Table 2.3 Thematic area wise technology assessment under livestock and fishery**

Sr. No	Thematic Areas	No. of KVKs	No. of Technologies	No. of Trials
1	Disease Management	8	9	109
2	Evaluation of Breeds	17	9	251
3	Nutrition Management	53	91	1081
4	Production and Management	10	11	107
	<b>Total</b>	<b>88</b>	<b>120</b>	<b>1548</b>



Technology assessment under livestock and fishery

It could be observed from Table 2.4 that 82 technologies in livestock, poultry and fishery sectors were assessed through 1083 trials in Maharashtra followed by assessment of 37 technologies through 457 trials in Gujarat and 2 technologies tested through 8 trials in Gujarat.

**Table 2.4 Livestock and fishery technologies assessment: State-wise**

Sr. No	Thematic Areas	Maharashtra			Gujarat			Goa		
		KVK (No.)	Techno. (No.)	Trials (No.)	KVK (No.)	Techno. (No.)	Trials (No.)	KVK (No.)	Techno. (No.)	Trials (No.)
1	Disease Management	6	6	79	2	3	30	0	0	0
2	Evaluation of Breeds	14	7	206	2	2	40	1	1	5
3	Nutrition Management	34	63	725	18	27	353	1	1	3
4	Production & Management	5	6	73	5	5	34	0	0	0
	<b>Total</b>	<b>59</b>	<b>82</b>	<b>1083</b>	<b>27</b>	<b>37</b>	<b>457</b>	<b>2</b>	<b>2</b>	<b>8</b>

### Results of Selected On Farm Trials: Maharashtra

#### 1. Management of mite in citrus: Ahmednagar-II

Low yield in citrus is due to attack of mite. The intensity of pest is approximately 42% in medium soils. Farmers are using chemical fungicide/miticide viz. Sulphur @ 20 gm / 10 litre of water by spraying after occurrence of pests, but not getting effective control of pest which results in low yield. Systematic use of new generation miticide Propergiate 57 EC @ 250 ml/200 litre of water, Neemark 5% and Sulphur 250 gm/200 litre of water at 15 days interval found to



be effective for control of mites and increased in yield. The OFT was conducted in rain fed and medium soils of Newasa tehsil. By use of Propergiate, Neemark and Sulphur, mite control was observed up to 82.5% over

existing practice (43.5%). Management of citrus mite by using Propergiate 57 EC along with Sulphur and Neemark increased yield by 52 q/ha which was higher over local (22.08 %).

Technology Assessed	No. of trails	% incidence of Mite	Mite control (%)	Productivity (q/ha)	Net Return Rs./ ha
Technology option 1 (Application of Propergiate 57 EC @ 250 ml/200 liter of water Neemark 5% and Sulphur 250 gm/200 liter of water)	10	73	82.50	287.5	156875
Farmer's Practice: Use of Sulphur 20 gm/ 10 litre of water		75	43.50	235.5	98875

## 2. Assessment of grafting technology in capsicum: KVK, Pune-I

Before this intervention, farmers were planting capsicum on mulching paper but they do not use grafted seedlings for plantation. Because of farmer's practice, there was attack of soil borne disease on crops and requires maximum cost for control of these diseases and crop life cycle was completed as earliest.

On farm trial on assessment of tube grafting

technology in capsicum was conducted to control soil borne disease, improve yield and quality of fruits in irrigated medium black soils in villages viz., Naroli and Nimgaon Ketaki of Baramati taluka.

Under using grafting technique in capsicum, higher average yield of 483.70 q/ha was obtained with 8.74% soil borne disease. The farmer was realized and return of Rs 3.68 lakh/ha, which was higher over existing practice. However, 23 days more duration of crop was recorded under grafted capsicum seedlings.

Technology Options	No. of trials	Yield (q/ha)	Net return (Rs.)	% Soil borne disease	Crop duration (Days)
Assessment- Grafted capsicum seedlings	10	483.7	36,85,234	8.74	173 days
Farmer's Practice- Regular non grafted seedlings		442.3	27,02,812	20.52	150 days



## 3. Management of thrips in capsicum: KVK, Baramati

The area receives the rainfall from the returning monsoon in the month of August-September. The conditions become favourable for the thrips with the dry spell and increasing temperature, which results in lower quality of product with reduced yield. Usually,

the farmers use to spray the pesticides without the ETL level, pest infestation level, etc. that results in increased cost of production, enlarged pesticide resistance in pests, etc. So, the proper follow up of the university recommendation was very much needed.

The farmers are not much more aware about the use of non woven covers for the pest management. They



mostly rely on the suggestions from the local shopkeepers/ agri input providers. By adopting technology, there is 9.1% less incidence of thrips with

saving of 9 no. of sprays with increase in B.C ratio. Also, they got the idea for preventive measures for the thrips and other sucking pests with cost effective way.

Technology Option	No. of trials	% Incidence of thrips on leaves	No. of spraying	Yield (q/ha)
T <sub>1</sub> - Improper application of chemical pesticides in 2-3 days duration	10	12.8	16	651
T <sub>2</sub> - Use of non woven 17 GSM crop protection fabric		3.7	07	768



#### 4. Assessment of sapling transplanter for tomato transplanting

KVK, Pune-II conducted on farm assessment of sapling transplanter for tomato transplanting. In assessed technology, transplanting rate with hand operated transplanter was found to be 16 and 11 seedlings/minute against 8 and 5 seedlings/minute in case of manual transplanting for raised bed and plastic mulch bed, respectively. It is simple, light weight, low cost and found suitable for transplanting of vegetable seedlings.



Parameter	Manual transplanting on ridges	Manual transplanting on plastic mulch paper	Transplanting with transplanter on ridges	Transplanting with transplanter on plastic mulch paper
Seedlings/ hr	480	300	960	660
Actual field capacity ha / day	0.07	0.06	0.15	0.1
Labour required man hr/ha	102.85	150.84	52.97	75.4
Cost of operation	2571	3770	1324	1884
Time saving over manual transplanter			51.50%	49.97%

#### 5. Assessment of silver hydrogen peroxide for media sterilization in greenhouse cultivation of capsicum

There is mortality of transplanted seedlings due to root rot, stem rot and Fusarium wilt. The pathogens are present in the soil. Colour capsicum is high value crop. Imported F1 hybrid seeds are used for seedling

raising. The cost of seedlings is also high. If there is mortality of seedlings, there is heavy loss to farmers. If gap filling is done, the new seedling growth is less due to shading effect of nearby tall seedlings.

Media sterilization with Silver Hydrogen Peroxide prior to transplanting of seedlings kills disease causing organisms and as a result protecting plants

from their mortality. Drenching of silver hydrogen peroxide at the rate of 4ml/litre of water is done one day before transplanting. The traces of silver hydrogen peroxide are over within two hours of application. It is not harmful to growing plants. It can be used @ 2 ml/litre of water for drenching to the newly transplanted seedlings. In case of formalin waiting period for transplanting is up to 10 days after application. Formalin is Phytotoxic. The traces of formalin are to be washed away with excess application of water. The process is labour intensive.



Technology Option	No. of trials	Yield (q/ha)	Net return (Rs./ha)	Mortality of seedlings 30 DAT
Assessment- Sterilization of media with Silver Hydrogen Peroxide with dilution in water 1:250	13	500	2625000	5%
Farmers Practice- Sterilization of media with formalin (36%) and dilution with water 1:10		350	1422500	10%

## 6. Assessment of sapling transplanter for vegetable seedlings transplanting: KVK, Aurangabad-I

On farm trial was conducted on assessment of sapling transplanter for vegetable seedlings transplanting with specific objective of reducing drudgery among farm women. Conventional transplanting was practiced with manual sapling transplantation where farm women used to perform transplanting in bending posture leads to heavy drudgery. In assessed technology, vegetable transplanting rate was found 5040 seedlings/day/woman with 21% less drudgery which was quite superior over traditional practice (1904 seedlings/day/woman) with heavy drudgery

among farm women. By using sapling transplanter with sapling carrier, rate of seedling transplanting was increased by 164% with increased 150% area in a day. Drudgery reduction by 21% was recorded during trial.



Parameter	Transplanting with trans planter on ridges	Transplanting with transplanter on plastic mulch paper	Results of assessment
No of seedling transplanted per day/women (8hrs)	1904	5040	By using sapling transplanter with sapling carrier rate of seedling transplanting was increased by 164% also increased 150% area in a day. Reduction in drudgery by 21% was recorded
Area coverage (ha/ day/women)	0.06	0.15	
3Mortality rate (%)	15	3	
Energy Expenditure (Kj/ min)	8.53	7.05	



## 7. High density dibbling of maize

Problem of low grain filling, no uniform growth, poor quality grain and getting low market rate of maize was experienced by the farmers in Baramati taluka of district, Pune. The farmers were practicing seed dibbling with spacing of 75 cm x 22.5 cm. In this context, KVK, Baramati tested high density dibbling of maize seed with 40 x 40 (2 seeds /hill) x 80 cm paired row system with integrated crop management at 10 locations for second time. Due to use of high density dibbling of maize with spacing of 40 x 40 (2 seed /hill) x 80 cm paired row system shelling percent was increased by 6% due to increase in photosynthetic activity and improved pollination. Leaf size and leaf



area was increased by 22%, cob filling improved, grain size and number increased as compared to local check.

Technological Options	No. of trials	Height of plant 75 DAS	Shelling %	Yield (t/ha)	Net Return (Rs./ha)
T <sub>1</sub> -Seed dibbling with recommended Spacing 75x 22.5cm	10	166 cm	82	62.6	26690
T <sub>2</sub> -High density dibbling of seed with 40 x 40 (2 seed /hill) x 80 cm paired row system		193cm	88	95.7	58305

## 8. Effect of polythene mulching with soil test based INM methods on growth and yield of Bt cotton

KVK, Beed-I conducted on farm experiment to assess effect of polythene mulching with soil test based INM methods on growth and yield of Bt cotton. Result

showed that by use of polythene mulching, yield was increased by 55.31% (18.11 q/ha) over local check (11.66 q/ha). Pest population particularly thrips was suppressed due to heat. Spraying cost was reduced marginally. Number of branches, bolls and weight was found more.

Technology Option	No. of trials	Yield (q/ha)	Net return (Rs./ha)	No. of branches	No. of pods/plants	Boll weight
RDF (100:50:50 kg NPK/ha) with planting of cotton on 4x1 or 5x1 feet spacing without polythene mulch	10	11.66	22715	13-16	36-42	13.30
RDF (150:75:75) on soil test based with polythene mulching and planting on 5 x 1 ft		18.11	50477	18-22	59-64	16.84

## 9. Assessment of effect of herbicides on weeds control in Bt cotton

KVK, Ahmednagar-II laid out on farm experiment to assess the performance of herbicides Pyriathiobac sodium 10% EC @ 0.075kg /ha + Quizalofop ethyl 5% EC @ 0.05 kg/ha at 30 days after sowing minimized the population of grassy and broad leaved weeds up to

73.57%. Timely chemical weed management gave higher yield (22.92 q/ha) as compared to hand weeding (21.66 q/ha) which was followed in farmer's practice. Net return of Rs.58531 / ha was obtained with timely herbicide application. Weed dry weight was recorded only 5.40 gm/sqm whereas it was 11.60 gm/sqm in farmer's practice.

Technology Option	No. of trials	Weeds dry weight at harvest (gm/sqm)	Weed control efficiency (%)	Cost on weed management Rs/ha	Yield q/ha	Net return (Rs/ha)
Technology1 (Spray Herbicide- Pyrethiobac sodium 10% EC @ 0.075kg /ha + Quizalofop ethyl 5% EC @ 0.05 kg/ha at 30 DAS)	13	5.40	73.57	6700	22.92	58531
Farmers Practice-2 Hand weeding and 1 Intercultural operation.		11.60	67.86	9500	21.66	52549

### 10. Assessment of planting spacing in pre seasonal sugarcane settling planting on medium soils

Ahmednagar is known as sugarcane bowl of Maharashtra and it was found during the participatory rural appraisal that dense planting with huge quantity seed material is the major problem. In view of that KVK, Ahmednagar-II carried out on farm experiment on planting of pre seasonal sugarcane with wide spacing and sugarcane settling. Planting of sugarcane

at the spacing of 5 x 2 feet provides better opportunity for solar light harnessing, nutrient and water absorption which resulted in higher tillering as compared to 4 x 2 feet which the farmers normally followed. Over all, tested technology resulted in higher yield of 116.60 t/ha as 4 x 2 feet planting spacing (98.18 t/ha). More economic gain (Rs.174137/ha) was attained with 5 x 2 feet planting spacing. This intervention helped in minimizing seed requirement and shown fast multiplication of newly released variety i.e. MS-10001.



Technology Option	No. of trials	No. of internodes/ cane	No. of milialbe canes/ha	Yield t/ha	Net return (Rs/ha)
Technology1: (150 cm row to row x 60 cm settling to settling spacing (4450 settlings/ acre).	13	32.20	88355	116.60	174137
Farmer's Practice: 120 cm row to row x 60 cm settling to settling spacing (5445 settlings)		27.30	77920	98.18	135304

### 11. Assessment of improved okra cultivar Phule Vimukta: KVK, Dhule

KVK, Dhule conducted on farm testing at farmer's fields to observe high yield and Yellow Vain Mosaic Virus resistant performance of okra cultivar Phule

Vimukta. The local check varieties grown by farmers were hybrid such as Samrat and Mahyco-55. Thirty farmers were selected for OFT from villages Devbhane, Dhanur and Dhadare in Dhule Tehsil. Phule Vimukta provided average yield of 183.40 q/ha which was 7.9% higher over farmer's selected hybrid



checks. From Phule Vimukta farmers could earn net income of Rs. 283503/ha which was 27.2% increase in income over control. No incidence of YVMV was observed under Phule Vimukta cultivar while under local check, 16.2% plants were found infected with virus. Considering promising result of three years OFTs on Phule Vimukta, it was included under frontline demonstrations in 2019-20.

### 12. Management of TLCV, early blight and bacterial wilt in tomato

KVK, Beed-I conducted on farm trial to overcome problem of low yield in tomato due to incidence of TLCV, early blight and bacterial wilt by use of resistant tomato cultivar Arka Rakshak. Results showed that under Arka Rakshak cultivar, incidence of TLCV



(9.2%) and early blight (12%) was reduced as compared to farmer's practice (20.6% TLCV and 22.6% early blight incidence). At the same time, 13 q/ha additional yield was also obtained with additional gain of Rs. 11000/ha. In both interventions, incidence of bacterial wilt was found nil.

Technology Assessed	No. of trials	Yield (q/ha)	Net return (Rs./ha)	TLCV incidence (%)	Early blight incidence (%)	Bacterial wilt incidence (%)
Technology option 1: (Use UAS-440 Tomato Var.)	05	68	35900	20.6	22.6	Nil
Technology option 2: (Use of Arka Rakshak tomato Var.)		81	46900	9.2	12	Nil

### 13. Assessment of Crop Cover for Pest and Disease Management in Musk Melon

Problem of high incidence of pests and diseases at early stage of musk melon crop was observed in Parbhani district. To solve this problem, KVK Parbhani organized five trials on farmers' fields. Use of UV stabilized Non woven poly propylene sheet (400 m x 1.65 m) as crop cover in Kundan variety of musk melon was used. Planting distance 2 m x 0.6 m was maintained. Result show that use of crop cover at initial stage of crop is helpful for **reducing crop duration, less attack of pests and diseases and improving quality of produce**. Average yield of 19.5 tons/ha in experimental plot was achieved which was higher over control plot (11.6 tons/ha). Net profit of Rs. 248000 per ha was realized by the farmers which



has doubled the income. Crop cover technology is like as low tunnel miniature structure for creating optimum condition for plant growth. It is also helpful for off season cultivation for fetching higher price to produce.

Technology Options	Seed germination (%)	Mortality (%)	Pest incidence (%)	Yield (t/ha)	Net return (Rs./ha)
T1- Farmers Practice (No use of crop cover)	92	8	31.4	11.6	1,19,800
T2- Technology Assessed (Use of crop cover)	98	2	7.3	19.5	2,48,000



#### 14. Use of di calcium phosphate and mineral mixture to crossbred HF cows to reduce repeat breeding

Repeat breeding and low milk production, retention of placenta in crossbred HF cows in rainfed area is common due to continuous feeding of only cereals, fodder leading to deficiency of calcium and phosphorus and other minerals. There is shortage of leguminous fodder as cultivation of Lucerne is not possible due to shortage of water in the rainfed area of Pune district. To overcome this problem, KVK, Baramati organized on farm trial on use of di-calcium phosphate and mineral mixture to crossbred HF cows

in rainfed area of Pune district continuously for 3 years. Feeding of 100 gm mineral mixture + 50 gm of di-calcium phosphate along with available green fodder 30 kg, 5 kg dry fodder and 400 gm concentrate per litre of milk yield to improve fertility of cows and improve the milk yield in crossbred HF cows in the rainfed area. It is found that due to use of di-calcium phosphate 50 gm and mineral mixture 100 gm per day per cow with existing feeding practices is helpful to increase the milk production by 20% and reduced repeat breeding problem in crossbred HF cows by 50% as compared to farmer's practice. Cows are conceived in 2 AI after feeding of 50 gm di-calcium phosphate and 100 gm mineral mixture per day per cow.

Technology Options	No .of trials	Milk yield (litre per lact. /cow )	Net return (Rs. per lact /cow)	Performance indicators
T1. Farmers practice: Feeding of green fodder 30 kg + 5 kg dry fodder and 350 gm of concentrate per lit. of milk production day/ cow	20	3660	7000	No. of AI per conception 3-4
T2. Recommended Practice: Feeding of green fodder 30 kg + 5 kg dry fodder and 400 gm of concentrate per lit. of milk production , 50 gm mineral mixture per day/ cow		3965	7800	No. of AI per conception 3
T3. Feeding of green fodder 30 kg + 5 kg dry fodder and 400 gm of concentrate per lit of milk and 100 gm mineral mixture + 50 gm di calcium phosphate		4422	15070	No. of AI per conception 2



#### 15. Herbicidal weed management practices in Bt cotton: KVK, Yavatmal-I

In Yavatmal district, low yield of cotton was observed due to heavy weed infestation at critical stages of crop, difficulty in weeding operation during continuous rains and unavailability of labourers for weeding. KVK, Yavatmal-I conducted on farm trials to solve this problem through herbicidal weed management

practices in cotton (Bt) in kharif 2018-19. Trials were laid out at 13 farmers' fields on 05.20 ha area. PE application of Pendimethalin 30 EC @ 1.00 kg a.i./ha followed by direct spray (by using protective shield) of non-selective herbicide Paraquat 20 SL @ 0.60 kg a.i./ha at 45 DAS of cotton (Bt) found significantly superior over farmer's practice and recorded 4.75 % higher yield.

### 16. Mass trapping of pink bollworm moth in cotton

Heavy outbreak of pink bollworm was observed in cotton during 2017-18 which resulted on 40-70% yield losses. To overcome this problem, KVK, Jalna-I conducted On Farm Trial in 2018-19 on mass trapping of pink bollworm moths in cotton. The technology is developed by AAU, Anand. 40 pheromone traps were used per ha for mass trapping of pink bollworm moths along with recommended IPM practices. The trial was

conducted at 10 farmers' fields, the results of which revealed that there was 33.65% yield increase in cotton yield over farmer's practice. Cost of plant protection was reduced by 4% as compared with farmer's practice. In assessed practice, farmers got average net income of Rs. 37424 per ha where as in farmer's practice it was only Rs.16400 per ha. No. of chemical sprays were also reduced in assessed practice along with reduction in % rosette flowers and damaged bolls. The detailed results are shown in the table.

Technology Option	No. of trials	Yield (q/ha)	Net return (Rs./ha.)	% rosette flower	% boll damage by PBW
<b>Assessed Practice (T1)</b> : Installation of 40 pheromone traps per ha for mass trapping of pink bollworm moth with IPM	10	15.37	37424	1.45	11.72
<b>Farmer's Practice (T2)</b> : spraying of Quinalphos and Cypermethrin		11.50	16400	2.81	22.37

### 17. Assessment of the efficacy of Soya-nuts to overcome malnutrition among preschool children

Malnutrition is a major problem among preschool children. To overcome this problem KVK, Jalna-I assessed the efficacy of soya nuts to overcome malnutrition in pre-school children. For this purpose, 10 malnourished preschool children were selected from Kharpudi village with the help of Anganwadi workers. The results show that the daily consumption of 20 gm soya nuts for 90 days with normal diet increased 1.5 kg weight of preschool children. As per feedback received from farm women, it is easy and acceptable diet by the children.



Technology option	No. of trials	Average weight gain in kg	Average height gain in cm
<b>T1:</b> Normal diet (Farmers Practice) Chapati + Rice + Dal + Vegetable	10	9.5	90.55
<b>T2:</b> Normal diet+ Soy + Nuts(20gm)/day/child for 90 days (Assessed Practice)		11.00	90.56

### 18. Backyard poultry for Rajashri birds

KVK, Jalna-I emphasized on backyard poultry with new breeds for meat and egg production like Giriraja, Vanraja, Rajashri, Grampriya since 2013. During 2018-19, dual purpose breed Rajashri developed by PVNRVU, Hyderabad was selected for backyard poultry. Total 100 Rajashri birds of three weeks duration were provided to 10 farmers by giving 10

birds each. It was observed that the average weight of bird attained in assessed practice was 2.10 kg in 12 weeks while it was 0.65 in farmer's practice. The cost of production was Rs. 90/ bird in farmer's practice and Rs. 68/ bird in assessed practice with B:C ratio of 1.85 and 2.10, respectively. Higher net return was gained in assessed practice with reduced mortality rate, the details of which are given in table.



Technology Option	No. of trials	Yield (kg/bird) at 12 wks	Cost of production/ Bird (Rs.)	Net return (Rs./bird)	Mortality %	Market age (wks)
<b>Farmer's Practice:</b> Rearing of non-descript breed	10	0.65	90	160	08	24
<b>Assessed Practice:</b> Introduction of Rajshri birds		2.10	68	300	02	12

### 19. Assessment of CRIDA tractor drawn planter for onion seed sowing

KVK, Jalna-I realized the problem of high labour wages and unavailability of labour for planting of onion. Onion saplings are normally planted manually with the help of female labour. KVK conducted trial on CRIDA tractor drawn planter for Onion seed sowing on 10 farmers' fields with an objective of testing its feasibility and results in terms of labour saving and area coverage. It was second year of trial. The results shown that 35% labour cost was saved as compared with existing practice of planting onion saplings manually



with higher productivity and net return as shown in the table.

Technology Assessed	Cost of operation (Rs./ha)	Cost of production (Rs./ha)	Productivity (q/ha)	Net return Rs./ unit	B:C Ratio
<b>Technology option 1:</b> Transplanting of onion saplings manually (Farmers Practice)	25000	35000	325	235000	7.71
<b>Technology option 2:</b> Sowing of onion seed by onion planter (Assessed Practice)	3000	28000	330	265625	10.48

### 20. Management of stem fly and girdle beetle in soybean

KVK, Amaravati-II conducted on farm trial to control incidence of stem fly and girdle beetle in soybean. Under intervention with use of Thiomethoxam 30 FS @ 10 ml/kg seed followed by spray of Triazophos 40 EC 12.5 ml/10 lit water at 20-25 days after sowing followed by ETL based spray of Lambda Cyhalothrin 5

EC @ 10 ml/10 lit water, stem fly incidence was reduced from 10.20% to 5.66%. Similarly, girdle beetle incidence per MRL was also reduced from 8.75 to 4.33. Average yield of soybean was obtained 17.80 q/ha which was superior over existing practice (15.10 q/ha). Farmer's practice was followed as 2 to 3 chemical pesticide sprays comprising of Profenophos 50 EC 20 ml, Emamectin benzoate 5 SG @ 5 g per 10 lit water.





## 21. Integrated management of pink bollworm in Bt cotton:

KVK, Amarvati-II conducted trial on managing pink boll worm in Bt cotton (variety Ajeet 155) at farmers' fields. Green boll damage was reduced from 28.33% to 16.66% and % of loculi damage was also lessened from

14.33% to 9% under intervention (T2). Average yield of 19.70q/ha attained which was higher by 20.85% over local check. Trap was found as good for the identification and initiation of pest infestation. With this result, it is recommended that use of Azadiractin 300 ppm with pheromone trap can perform well for controlling the pink boll worm.

Treatment	% of green boll damage	% of loculi damage	Average yield (q/ha)	% increase in yield
T1 - 1 or 2 chemical pesticide sprays comprising of Chlorpyrifos 20 EC 30 ml, Triazophos 40 EC 30 ml per 10 lit water	28.33	14.33	16.30	20.85
T2 - Installation of Pheromone Traps @ 2/acre for monitoring at square formation, Spray Azadiractin 300 ppm @ 50 ml/10 lit at flower initiation, 6 to 7 Inundative releases of <i>Trichogramma chilonis</i> 60,000 per acre, Plucking of rosette flowers, ETL based application of Thiodicarb 75 WP 20 g per 10 lit water at boll formation followed by Deltamethrin 2.8 EC 10 ml per 10 lit water	16.66	9.00	19.70	



## 22. Performance of Soybean (Phule Sangam) under rainfed condition

KVK Pune-II conducted on farm experiment to assess the suitable improved high yielding variety of Soybean (Phule Sangam). This variety gave yield of 22.30 q/ha which was higher as compared to local check (18.30 q/ha). Net profit of Rs. 48540/ha was obtained under Phule Sangam variety which was higher with additional return of Rs 17200/ ha over JS-335 cultivar. Golden colour and round shape grains fetches good market price. Due to BBF sowing, the crop was saved due to efficient moisture conservation.



Technology Option	No. of trials	Yield (q/ha)	Net return (Rs.)	B:C ratio	No. of pods/plant
Assessment- Phule Sangam	13	22.30	48540	2.34	100-110
Farmers Practice- JS-335		18.30	31330	1.81	80-90

### 23. Performance of Shrinidhi poultry breed under backyard farming

KVK, Pune-II conducted on farm trial on the performance of Shrinidhi poultry breed under backyard poultry farming. As compared with local poultry birds, Shrinidhi breed shown 33.40% higher weight gain and 15% reduced mortality rate with net profit of Rs. 110 per bird as against Rs. 60 per bird in local birds. Higher B:C ratio of 1.73 was also observed against 1.40 in case of local breeds.



Technology Option	No. of trials	Weight gain after 3 months (in kg)	Net return (Rs./bird)	B:C ratio	Mortality %
Assessment- Improved birds - Shrinidhi	13	2.40	110	1.73	5-7
Farmers Practice- Traditional method of rearing local birds		1.80	60	1.40	20-30

### 24. Assessment of supplementary feeding of bypass fat to dairy animals

KVK, Latur observed problem of low milk yield, longer intercalving period in high yielding dairy animals in Latur district. It is due to feeding of energy deficient diet to dairy animals during early lactation period resulting into lower productivity and profitability of dairy farming which was assessed by supplementary feeding of bypass fat @ 15 gm/kg milk

production/day/animal along with regular feeding practice. The result showed that feeding of bypass fat to early lactating animals increased milk production (10.71% in cows and 16% in buffaloes), conception rate (25% in cows and 66% in buffaloes) and net return (33.71% in cows and 30.93% in buffaloes) compared to farmers practice. Also, there is marked improvement in the general body weight of the animals and due to early conception, there was reduction in intercalving period resulting into increased profitability.

Technology option	No. of trials	Animal	Milk yield lit/day/animal	Milk fat %	Conception rate at 65 days after calving %	Net return Rs./animal
T1 - Regular feeding practice	10	Cow	10	3.6	60	11600
		Buffalo	3.8	6.0	20	9600
T2 - T1+ Bypass fat feeding @ 15 gm/ kg milk production		Cow	11.2	3.8	80	17500
		Buffalo	4.5	6.2	60	13900

### 25. Performance evaluation of paddy transplanter

KVK, Gadchiroli organized trials on performance evaluation of paddy transplanter to solve labour scarcity problem in paddy cultivation. In OFT, conventional method of transplanting, row planting and planting by transplanter was compared for knowing labour saving efficiency and time management. The field capacity, field efficiency and fuel consumption of the paddy transplanter was recorded as 0.12 ha/hr, 72.2% and 3.75 lit/ha,





respectively. The cost of mechanical transplanting was found to be Rs. 1500/ha which was lower as compared to traditional method (Rs. 5000/ha) in the region. The machine was found to be farmer friendly and feasible

### 26. Effect of polythene mulching on growth and yield in Bt cotton under drip irrigation

KVK, Aurangabad had conducted trial on effect of polythene mulching on growth and yield in Bt cotton under drip irrigation with fertigation. With use of RDF (80:40:40 NPK kg/ha) with Polythene mulching 150

in terms of time, money and labour requirement as compared to manual method transplanting of paddy. Now, farmers adopted it on >50 ha in Aheri and Korchi blocks.

cm row to row x 30 cm performed well and gave 23% more yield over farmer's practice. Average yield of 30.93 q/ha was obtained with net income Rs. 117182/ha which was superior over local check. Study revealed that use of polythene mulching with recommended crop management practices helped to enhance cotton profitability.

Treatment	Yield (q/ha)	Cost of cultivation (Rs.)	Gross income (Rs.)	Net income (Rs.)	B:C Ratio
T <sub>1</sub> -Farmers practice -RDF (100:50:50 NPK kg/ha) without polythene mulching 120 cm row to row x 30 cm	23.89	38700	125422	86722	1:3.24
T <sub>2</sub> -Assessment technology : - RDF (80:40:40 NPK kg/ha) with polythene mulching 150 cm row to row x 30 cm	30.93	45200	162382	117182	1:3.59



### 27. Assessment of efficiency of super grain bag to prevent store grain pests during storage

KVK, Aurangabad-I conducted On Farm Trial on assessment of the super grain bag to prevent grain losses during storage. This technology was implemented with 10 farm women. In assessed technology, pest infestation was observed only 2%

though in traditional practise it was 19%. Farm women were happy with this super grain storage technology as their stored grain was 98% free from insects, easy to handle and very low cost technology. It is very useful in rural areas as no use of any chemical for increasing storage life. Super grain bag is a farmer-friendly storage bag which is useful for storage of grains of cereal and other crops.





Parameters of assessment	Data on the parameter	Results of assessment	Feedback from the farmer	
% of pest infestation	19	2	Less infestation observed in storage grains after 9 months of storage	1. Farmwomen were happy with this super grain storage technology as their stored grain was 98% free from insect. 2. Easy to handle 3. It is very useful in rural areas as no use of any chemical for increasing storage life.
Wt. loss in grain (gm)	190	20		

### 28. Assessment of UV stabilized non woven polypropylene sheet as crop cover for papaya seedlings

In Nandurbar district, almost 2000 ha irrigated area comes under papaya cultivation. Out of which, in 80% area, papaya seedlings get transplanted in the month of April and thus, severe heat and wind prevailing in summer causes excess mortality of papaya seedlings. Thus, to protect newly planted papaya seedlings from excess temperature and winds in summer and to minimize mortality of seedlings, an UV stabilized non

woven polypropylene cover of 17 GSM was introduced and mortality was reduced to 14.3% in comparison to local check and also, initiation of harvesting in assessed trial began 29 days before farmer's practice and average yield (699.55q/ha) was achieved in assessed trial, which was higher over farmer's practice (641.25 qt/ha). Due to above shown non woven polypropylene crop cover of 30x25 cm, the mortality in demonstration plot was reduced by 14.3% as well as harvesting of papaya in assessment trial began 29 days earlier.



Treatments	Mortality %	No. of plants infested with viral diseases (%)	Total yield (q/ha)	Initiation of harvesting (in days)	Net return (Rs./ha)
Assessed Trial: Use of crop cover	4	6.3	699.55	213.4	209298
Farmer's practice: Without crop cover	18.3	9.8	641.25	242.4	150500

### 29. Trolley sprayer for efficient spraying

Spraying operation has to be done precisely for effective management of pest and diseases. It should be completed within stipulated time. Proper quantity of pesticides and fungicides should be applied. KVK, Nandurbar experimented trolley sprayer for pesticide application in cotton and bengal gram. The field capacity of the trolley sprayer was 0.4 ha.-1 while the



field capacity of the knapsack sprayer was found 0.1 ha h-1. The cost of operation for trolley sprayer was Rs.200/ha which was 37.5% less than farmer's practice (Knapsack sprayer). As the trolley sprayer has wheels,

it facilitates in transportation. The trolley sprayer has capacity of 160 litres and it reduces the time for filling the spraying solution. It has better coverage from one place.

### 30. Assessment of Phule Samruddhi paddy cultivar for higher productivity in district Dhule

In Dhule district, farmers were raising local variety Indrayani in paddy which was giving lower yield. A varietal option through Phule Samruddhi was given to the farmers through on farm trials. Ten farmers were selected for conducting trials. Prior to implementation, the soil sample analysis was done and training on improved practices of paddy cultivation was organized. Integrated nutrient management and integrated pest, disease management practices were followed during the crop growth. The variety Phule Samruddhi had shown very good result in terms of higher average yield (32.50 q/ha) with more number of tillers (19). Net profit of Rs. 35970/ha was realised



by the farmers which was more as compared to existing variety (Rs. 24330/ha). In local check, the yield (22.50 q/ha) was obtained with 14 number of tillers.

### 31. Assessment of improved rice variety Karjat-9: KVK, Raigadh

In Raigadh, on farm experiment was conducted to assess the suitable improved high yielding variety of rice for better yield. Under trial, variety Karjat - 9 provided higher yield (45.22 q/ha) which was more as compared to existing variety Jaya (38.67 q/ha). Net return of Rs. 45910.2/ha was obtained with Karjat - 9 by the farmers. It is more suitable in local micro agro-climatic condition. It may be promoted in the area to increase the profitability of the farmers in rainfed as well as irrigated situation.



Technology Options	No. of trials	Yield (q/ha)	Net return (Rs./ha)	1000 grain wt (gm)
Assessment- Karjat - 9	05	45.22	45910.2	18.2
Farmers Practice- Jaya		38.67	19123.0	21.3

### 32. Assessment of hybrid napier fodder varieties under scientific management: KVK, Nagpur

As district Nagpur is occasionally prone to the drought. Mitigating the fodder requirement of livestock is always a problem. The availability of quality natural green grasses is very low. The dry roughage and crop residues are the main source of feed and fodder for the livestock in the district. All these factors lead to low productivity of the animals. Therefore, in order to ensure the supply of quality





green fodder to the dairy cows throughout the year, an on farm trial was conducted by KVK Nagpur on 'Assessment of hybrid napier fodder varieties under scientific cultivation'.

In this trial, two multi-cut perennial varieties of hybrid napier i.e. DHN-10 (developed by IGFR, RRS, Dharwad) and BHN-6 (developed by BAIF, Karnataka) were compared with local prevalent variety CO4 on 4.8 ha area at 12 farmers's fields. Both varieties i.e. DHN-10 and BHN-6 showed better results in terms of green fodder yield, number of tillers, number of leaves and milk yield on feeding of greens than locally grown CO4 variety.



S. No.	Parameters of Assessment	Farmer's practice CO4	Technology option: DHN-10	Technology option: BHN-6
1	Green fodder yield in 1st cutting (t/ha)	36.75	39.50	37.95
2	Plant Height (m)	2.21	2.29	2.26
3	No of tillers/clump	29	38	32
4	No. of leaves/tiller	5.82	6.14	5.86
5	Cost (Rs./acre)	54450	54450	54450
6	Gross Return (Rs./acre)	117600	126400	121440
7	Average milk yield of cows on feeding greens (l animal/day)	7.90	8.24	8.12

### 33. Supplementation of probiotic (*Saccharomyces cerevisiae*) to pre-ruminant cross bred calves

Calves are born with innate immune systems that are not fully developed. This makes them highly susceptible to infections during their first few months of life. There are many types of pathogenic bacteria (e.g. E. coli, salmonella, clostridia) that will make calves sick. Severe infections can even lead to high incidences of scour and death. Benefits of feeding probiotic to the calves can include healthy microbial

population in gut, improved feed utilization and enhanced immune responsiveness.

KVK, Nagpur conducted an on farm trial 'Supplementation of probiotic (*Saccharomyces cerevisiae*) to pre-ruminant calves'. 20 g of probiotic was fed to pre-ruminant crossbred calves in addition to their daily milk and feed intake. Thirty calves of 15 farmers were selected for the trial. One calf of each farmer was fed with probiotic in addition to their same



Feeding of probiotic to calf



Calf fed with probiotic



daily feeding schedule. The parameters were studied for body weight gain, feed intake and incidence of scour during 90 days of experimental period.

The study revealed that, the mean body weight gain of the calves in first, second and third months was 9.54, 14.55 & 17.78 kg/month in experimental and 9.12, 13.11 & 16.22 kg/month in farmer's practice group, respectively. The starter/feed intake was 430.20 and

375.25 g/day in experimental and existing practice, respectively. No incidence of scour was found in experimental group, whereas, 3 cases of scour was detected in local check. This indicated that there was an increase in body weight gain and feed intake by 9.62% and 14.64% over farmer's practice due to daily dietary supplementation of probiotic to the calves, respectively.

### 34. Performance of nutri-rich red rice var. Ratnagiri-7 under flood Prone condition

The KVK, Ratnagiri had conducted on-farm experiment on newly released red rice cultivar. Ratnagiri-7. The objective of experiment was to assess the performance of red rice variety in terms of lodging resistant in low lying flood prone area, no. of tillers, height, yield and profitability. There was zero percent lodging of Ratnagiri-7 as compared to local red rice-Bela which was lodged to 47.00%. The number of

tillers in Ratnagiri-7 was higher than the control plot. Ratnagiri-7 gave higher yield (37.80 q/ha) which was quite higher over existing variety Bela (18.00 q/ha). The net return of Rs.71900/ha was realized with Ratnagiri-7. Red rice- Ratnagiri is nutri-rich cultivar having high iron content (13.5 ppm) as against local variety Bela (5.95 ppm). Performance of red rice variety Ratnagiri-7 was very good under low lying flood prone condition. Therefore, the Ratnagiri-7 may be promoted for enhancing yield and income of smallholders in heavy rainfall areas.



Technology options	No. of trials	No. of tillers/hill	Height cm	Lodging %	1000 grain weight gm	Straw yield q/ha	Grain yield q/ha	Iron content ppm	Net return Rs/ha
Assessment-Ratnagiri 7	5	18	94.50	0.00	25.71	48.00	37.80	13.5	71,900
Farmer practice-Bela	5	10	118	47.00	22.23	40.50	18.50	5.95	19,700

### 35. Performance assessment of rice variety Ratnagiri-5 under heavy rainfall situation

The KVK, Ratnagiri had conducted on-farm experiment on newly released fine variety Ratnagiri-5. It has specific features of short slender, semi-dwarf, mid-late and having high yield potential. The main objective of on-farm experimentation was to evaluate the performance of rice variety in terms of number of tillers/hills, height, lodging percentage, 1000 grain weight, yield and economic return. There was zero percent lodging of Ratnagiri-5 as compared to local

rice variety Rupali. The experiment showed that average number of tillers per hill was more in Ratnagiri-5 as compared to local Suvarna. There was 27% lodging observed in local variety and zero percent lodging in trial plot. Ratnagiri-5 gave higher yield of (36.50 q/ha) which was 25.86% higher over the local check and provided net gain Rs. 21700/ha. The performance of fine rice variety Ratnagiri-5 was very good under high rainfall condition. Therefore, the Ratnagiri-5 may be promoted in heavy rainfall areas to increase yield and income of smallholders.

Technology options	No. of trials	No. of tillers/hill	Height cm	Lodging %	Straw yield q/ha	Grain yield q/ha	1000 grain weight gm	Net return Rs./ha
Assessment-Ratnagiri 5	5	20	98.20	0.00	42.90	36.50	13.70	21,700
Farmer practice-Suvarna	5	14	102.50	27.00	38.50	29.00	12.40	2,500



## Results of Selected On Farm Trials: Gujarat

### 1. Assessment of pigeon pea variety GNP-2 for kharif season: KVK, Valsad

Varietal evaluation of pigeon pea GNP-2 was tested in kharif season in district Valsad. The result of the trial indicated that GNP-2 cultivar exhibited higher average yield (9.09 q/ha) with higher economic gain of Rs. 26688/ha. Under local check, average yield 6.19 q/ha was obtained by the farmers with Rs. 12838/ha as net profit.



Treatment	No. of trials	Plant height at harvest (cm)	Days of 50 % flowering	Grain yield (q/ha)	Expenditure (Rs./ha)	Gross income (Rs./ha)	Net profit (Rs./ha)
T <sub>1</sub> - Use of local variety with (Farmer practice)	10	121.7	97.8	6.19	21180	34018	12838
T <sub>2</sub> - Use of GNP-2 Var. with improved practices		192.2	122.2	9.09	23307	49995	26688

### 2. Assessment of different varieties of black gram under unirrigated/rainfed condition

KVK, Vadodara conducted on farm experiment to assess suitable improved high yielding varieties of urdbean for better yield in the area. Urdbean variety PU-31 provided productivity 7.60 q/ha with net

return of Rs. 18000/ha followed by Pant Urd-40 (7.30 q/ha) with net profit of Rs. 16500/ha. Local check variety T-9 gave 6.0 q/ha with net profit of Rs. 10000/ha. It was also found YVM resistance (2-5%) which was more under local check. It may be promoted in the area for increase the profitability of the farmers in rainfed condition.



### 3. Assessment of improved onion varieties

KVK, Bharuch laid out on farm experiment to assess the suitable improved high yielding varieties of onion for better growth and yield. Bhima Kiran gave higher yield of 39.37 t/ha followed by variety Bhima Shakti (37.49 t/ha) which showed superiority over local check. Average yield under improved varieties of onion showed increase in yield ranges from 22-28%. Net return of Rs. 101665/ha was realized by the farmers under Bhima Shakti cultivar which was quite higher over other cultivars.



During visits, it was observed that farmers applied only compost manure and ash in each plot. After harvesting, they were surprised to see the difference in terms of size, weight and colour of onion which found better than local variety.



Technology	No. of trials	Yield (t/ha)	Gross cost (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)
T1: Farmer's practice : Local Variety	05	30.82	67500	138690	71190
T2: Bhima Shakti		39.37	75500	177165	101665
T3: Bhima Kiran		37.49	75500	168705	93205

### 4. Effect of RDF and bio fertilizers on yield and qualitative attributes of acid lime cv. Kagzi lime

KVK, Panchmahal conducted a trial on integrated nutrient management on acid lime cv. Kagzi lime during kharif season 2018-19 in 7-8 years old acid lime orchard involving five farmers. Average yield 92.24 q/ha was obtained with net profit of Rs. 89790/ha under intervention which was quite higher over existing farmer's practice.



Technology Option	No. of trials	Yield (q/ha)	Gross return (Rs./ha)	Net return (Rs./ha)	B:C Ratio
Farmers Practices – Application of imbalance manure and fertilizers	5	71.40	85680	31400	2.49
RDF (Recommended dose of manure (70 kg) and fertilizers N-875g (Urea-1.90kg), P-750g (DAP-1.63 kg) and K-500 g. (KCl (MOP) -833 g)/plant) + Azetobactor (150g) + PSB (150g) +two spray of ZnSo4 @ 0.3% during February – March and October – November.		92.24	130790	89790	3.19



## 5. Effect of bio-fertilizer in groundnut production: KVK, Jamnagar

The productivity of groundnut in India is low due to low consumption of fertilizers. The residual toxicities of chemical fertilizers are creating problems of environmental pollution, depletion of essential nutrients due to indiscriminate use of inorganic



fertilizers which has shown threat to the sustainability of crop production. For sustained groundnut production, the modern farming demand integrated use of organic and inorganic fertilizers along with bio-fertilizers. Hence, an OFT was carried out to find out the suitable low cost input bio-fertilizer to enhance the groundnut productivity and profitability.



The study revealed that the application of 75% RDF + seed treatment of Rhizobium, PSB, KMB (Potash Mobilizing Bacteria) culture each at 25-30 ml/kg seed ( $T_3$ ) produced higher pod yield (21.80 q/ha) and haulm yield (40.83 q/ha) with net return of Rs.

76446/ha. Intervention under  $T_3$  reduced use of chemical fertilizers and increases the use of low cost input bio-fertilizer to enhance the long term groundnut productivity.



Technology Assessed		Productivity kg/ha		Cost of cultivation (Rs./ha)	Net return (Rs./ha)
		Haulm yield (kg/ha)	Pod yield (kg/ha)		
$T_1$	Injudicious use of fertilizers 120-125 kg DAP(22.5 N- 57.5 $P_2O_5$ kg/ha).	3700	1990	48880	65420
$T_2$	Recommended dose of fertilizer (12.5N-25 $P_2O_5$ -50 $K_2O$ kg/ha)	3953	2120	49248	72564
$T_3$	75% RDF + Seed treatment of Rhizobium, PSB, KMB (Potash Mobilizing Bacteria) culture each at 25-30 ml/kg seed	4083	2180	48886	76446

### 6. Mulching in watermelon: KVK, Dang

Watermelon is normally grown during summer season. There is large scarcity of irrigation water in Dang district especially in summer season. Hence, this OFT was planned to overcome the water problem by saving moisture using different mulch materials. It helped in controlling weed growth, low incidence of

pest and disease as well as early maturity of the crop with increase in yield. On the basis of 3 years pooled data, treatment use of plastic mulch: 30 micron, silver-black color in watermelon exhibited highest average yield of 208.22 q/ha with net economic gain of Rs. 104136/ha.

Technology option	Number of trials	Yield q/ha	Gross cost (Rs./ha)	Gross return (Rs./ha)	Net return (Rs./ha)
T <sub>1</sub> : No mulching	06	141.72	42833.33	96484.66	53651.33
T <sub>2</sub> : Paddy Straw		169.35	47300.00	115407.66	68107.66
T <sub>3</sub> : Plastic mulch (30 micron, silver-black color)		208.22	52803.33	156939.66	104136.33



T<sub>1</sub> - No Mulching



T<sub>2</sub> - Paddy Straw mulching



T<sub>3</sub> - Plastic mulching

### 7. Assessment of management techniques against cotton mealy bug

KVK, Narmada conducted on farm experiment to assess the effect of bio intensive module against *Helicoverpa armigera* infesting pigeon pea. The Treatment T3- Bio intensive module was recorded less numbers of *H. armigera* larvae (4.56/pl), as well as the percent pod damage also less and gave higher yield of 19.22 q/ha as compared to T2- Recommended chemical and T1- Farmer's practice i.e. 22.4 to 11.4 % higher respectively.



Technology Assessed	Av. No. of Heliothis larvae/plant	Pod damage (%)	Yield (Kg/ha)	Net return (Rs./ha)
T1- Farmer's practice: Application of Chlorpyriphos 20 EC at 10 days interval	27.89	9.82	15.70	25492
T2- Recommended chemical insecticides (Need based foliar application of Dichlorvos 76EC)	19.5	4.87	17.25	31660
T3- Bio intensive module: Monitoring through the Pheromone traps Installation of Bird perches @30-40/ha. Hand collection of egg mass, neonates, big size larvae. Spraying of neem based pesticides Spraying of HNPV @ 250 LE/ha	4.56	3.23	19.22	39.203



## 8. Integrated nutrient management in summer chili, KVK, Porbandar

Chili growers use high dose of nitrogenous fertilizer for higher productivity and skip on potash fertilizer. Deficiency of micronutrient was also occurring in chili. So, on farm trial on was conducted on integrated nutrient management involving three farmers. There were 3 practices, first farmer's practice (150-50-00 kg

NPK/ha); Second recommended dose of fertilizer (100-50-50 kg NPK/ha) and third intervention (RDF + spraying of banana pseudostem sap @ 1 % thrice. First spray was done at starting of flowering and another at 15 days intervals. Highest yield was obtained under T3 intervention (20.01 t/ha) with net return of Rs. 168610/ha. Under farmer's practice, economic gain was attained with Rs. 138300/ha which was quite low than recommended and other intervention.

Treatment	Yield (t/ha)	Net return (Rs./ha)
T1: Farmer's practice (150-50-00 kg NPK/ha)	19.03	138300
T2: Recommended dose of fertilizers (100-50-50 kg NPK/ha)	19.52	144700
T3: RDF + spraying of banana pseudostem sap @ 1 % thrice. First spray at starting of flowering and another at 15 days intervals)	20.01	168610

## Results of Selected On Farm Trials: Goa

### 1. Assessment of performance of high yielding variety of cowpea: KVK, South Goa

Low yield (14 q/ha) due to use of local variety of cowpea (Alsando) was experienced in South Goa. DC-15 and Konkani Safed cultivars of cowpea were experimented at farmers' fields. DC-15 provided

average yield of 18 q/ha with 4 q/ha additional yield. But in terms of market demand, Alsando cultivar was demanded more and market rate was shown @ Rs. 150 per kg while for DC-15 was taken @ Rs. 80 per kg with moderate demand. Incidence of pod borer was not observed.



### 2. Assessment of improved paddy cultivars

KVK, South Goa experimented three paddy cultivars to give best option to the farmers. Warangal variety performed well and gave higher average yield of 48

q/ha with salt tolerant feature followed by Vaisakha variety (43 q/ha). In terms of pest and diseases tolerance, Warangal found multi disease tolerant as compared to Vaisakha and existing Jyoti cultivar.

Parameters	T1:Farmer's Practice (Jyoti)	T 2: Vaishakha	T3: Warangal
Height of plant (cm)	94	89	102
No of tillers per hill	9-10	13-14	32
Duration of crop (days)	110	122	132
Grain yield (q/ha)	34	43	48
Pest & Disease	Stemborrer	Leaf folder	Multi tolerant
CB Ratio	1:1.1	1:1.4	1:1.6
Other Observations			Salinity tolerant





### 3. Assessment of hybrid napier fodder varieties CO-4 and CO-5 in North Goa

To solve the non-availability of green fodder, on farm trial was conducted in Tambose & Nagargaon villages at farmers' fields. Hybrid napier CO-4 and CO-5 were experimented in comparison to existing Karad and Boro cultivars. CO-5 provided higher fodder yield of 114 t/ha with three cuttings followed by CO-4 with fodder yield of 109.4 t/ha. Under local check, it was quite low with fodder yield of 16.4/ha (Karad) and 20.66 t/ha (Boro) with two cuttings.



## Frontline Demonstrations

Frontline extension is dealt by the KVKs where proven technologies are demonstrated at farmers' fields under close supervision of the scientists/experts. It shows the production potential of improved technologies to the farmers. KVKs played important role to showcase and promote the latest varieties and other technologies related to cereals, oilseeds, pulses, vegetables, fruits, etc. to enhance the production, productivity and profitability.

In total, 19694 frontline demonstrations were conducted on different commodities and

enterprises in the zone covering an area of 4125.91 ha in the states of Maharashtra, Gujarat and Goa (Table 3.1). These included cereals and millets (2212), oilseeds (1121), pulses (1558), commercial crops (194), fodder crops (725), vegetable crops (1863), tuber crops (155), fruit crops (1027), flower crops (80), plantation crops (57), spice crops (532) and hybrids of various crops (2066). KVKs also conducted demonstrations on farm implements (1973), livestock and fisheries (2910) and enterprises (3221).



Table 3.1 Frontline demonstrations at a glance in the zone

Crop category	Maharashtra		Gujarat		Goa		Total	
	Demos (No.)	Area (ha)	Demos (No.)	Area (ha)	Demos (No.)	Area (ha)	Demos (No.)	Area (ha)
Cereals	743	218.4	1465	585.25	4	2	2212	805.65
Commercial crops	128	54.85	56	17.5	10	1	194	73.35
Flower crops	80	18.84	-	-	-	-	80	18.84
Fodder crops	290	33.22	435	82	-	-	725	115.22
Fruit crops	401	115.95	626	200.3	-	-	1027	316.25
Oilseeds	435	189.4	686	424.25	-	-	1121	613.65
Plantation crops	30	9.5	5	0.25	22	9	57	18.75
Pulses	742	290.6	806	460.5	10	1	1558	752.1
Spices	43	14.2	489	183.25	-	-	532	197.45



Crop category	Maharashtra		Gujarat		Goa		Total	
	Demos (No.)	Area (ha)	Demos (No.)	Area (ha)	Demos (No.)	Area (ha)	Demos (No.)	Area (ha)
Tuber crops	28	4.1	127	40	-	-	155	44.1
Vegetables	705	184.8	1158	295.98	-	-	1863	480.78
Hybrids	720	221.57	1346	468.2	-	-	2066	689.77
Farm implements	1530	-	443	-	-	-	1973	-
Enterprises	1383	-	1822	-	16	-	3221	-
Livestock & fisheries	1160	9627 (No.)	1712	3052 (No.)	38	50234 (No.)	2910	62913 (No.)
<b>Total</b>	<b>8418</b>	<b>1355.43</b>	<b>11176</b>	<b>2757.48</b>	<b>100</b>	<b>13</b>	<b>19694</b>	<b>4125.91</b>

## Maharashtra

### FLDs on Pulses and Oilseeds

Technology demonstrations on pulses were organized on an area of 290.6 ha involving 742 farmers and on

#### FLDs on Pulses

In total 470 demonstrations were laid out on chickpea, 25 on dolichos bean, 17 on green gram, 23 on horse gram, 30 on black gram and 177 on pigeon pea covering an area of 290.6 ha at farmers' fields (Table 3.2). In chick pea, on an average 16.79 q/ha yield was obtained with adoption of full package of practices which was 25.17% higher over local check (13.50 q/ha). Among above technologies, integrated pest and disease management gave highest yield of 21.79 q/ha under demonstrations. Under black gram, integrated crop management provided yield of 8.60 q/ha which was 33.33% higher over farmer's practice (6.45 q/ha). In dolichos bean, improved varieties gave yield of 12.00 q/ha which found superior over local check (9.20 q/ha). In green gram, technologies such as integrated crop management gave yield of 7.21 q/ha which was 18.78% more as compared to local check (6.07 q/ha). In horse gram, average yield of 6.61 q/ha was

oilseeds covering an area of 189.4 ha involving 435 farmers. The crop and thematic area wise information is exhibited in tables.



attained which was 34.61% higher over farmer's practice (4.94 q/ha). Adopting integrated nutrients management practices performed better and achieved average yield (8.12 q/ha) under demonstrations. Under pigeon pea mean yield of 11.98 q/ha was attained under demonstrations with net economic gain of Rs. 38474/ha.

**Table 3.2 Thematic area wise physical achievements of FLDs on pulses**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% increase	Net return (Rs./ha)	
								Demo	Check
Blackgram	ICM	1	15	6	8.60	6.45	33.33	22020	12345
	INM	1	15	6	4.15	3.20	29.69	15600	10250
	<b>Sub-Total</b>	<b>2</b>	<b>30</b>	<b>12</b>	<b>6.38</b>	<b>4.83</b>	<b>31.51</b>	<b>18810</b>	<b>11298</b>
Chickpea	ICM	1	30	12	14.73	13.04	12.96	36020	28648
	IDM	2	26	10.2	14.55	12.64	17.37	27560	21373



Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% increase	Net return (Rs./ha)	
								Demo	Check
	INM	7	105	37.6	16.86	13.38	27.08	36497	25133
	IPDM	2	51	25.2	21.79	18.16	20.51	56444	44728
	IPM	14	198	77	16.62	13.12	27.22	46609	29754
	Varietal	1	60	24	15.20	12.65	20.16	47590	37220
	<b>Sub-Total</b>	<b>24</b>	<b>470</b>	<b>186</b>	<b>16.79</b>	<b>13.50</b>	<b>25.17</b>	<b>42949</b>	<b>29280</b>
Dolichosbean	Varietal	1	25	10	12.00	9.20	30.43	56000	38600
Greengram	ICM	1	12	4.8	7.21	6.07	18.78	7405	2385
	Varietal	1	5	1	11.80	8.80	34.09	30800	12800
	<b>Sub-Total</b>	<b>2</b>	<b>17</b>	<b>5.8</b>	<b>9.51</b>	<b>7.44</b>	<b>26.44</b>	<b>19103</b>	<b>7593</b>
Horsegram	ICM	1	13	5	5.10	3.70	37.84	18960	6420
	INM	1	10	1	8.12	6.18	31.39	18952	8290
	<b>Sub-Total</b>	<b>2</b>	<b>23</b>	<b>6</b>	<b>6.61</b>	<b>4.94</b>	<b>34.61</b>	<b>18956</b>	<b>7355</b>
Pigeonpea	IPDM	1	12	4.8	8.75	6.25	40.00	32508	21250
	IPM	6	83	33.2	13.81	11.46	19.72	45651	34566
	Varietal	3	82	32.8	10.03	8.14	25.33	29199	19002
	<b>Sub-Total</b>	<b>9</b>	<b>177</b>	<b>70.8</b>	<b>11.98</b>	<b>9.78</b>	<b>23.60</b>	<b>38474</b>	<b>27696</b>
	<b>Grand Total</b>			<b>742</b>	<b>290.6</b>				

### Performance of Chickpea Demonstrations in Maharashtra

In Maharashtra, 433 chickpea demonstrations were organized with special focus on improved cultivars and full package of practices on 171 ha area with net gain of Rs. 41940/ha. On average 17.03 q/ha was achieved by the farmers with adoption of different improved cultivars. JK-2189 cultivar performed well and provided 19.62 q/ha yield with net profit of Rs. 35950/ha. Under Digvijay cultivar, yield of 18.59 q/ha was attained with economic gain of Rs. 43031/ha (Table 3.3). In Maharashtra, chickpea yield was increased by 60.21% over national and 90.92% at state level (Fig. 3.1).

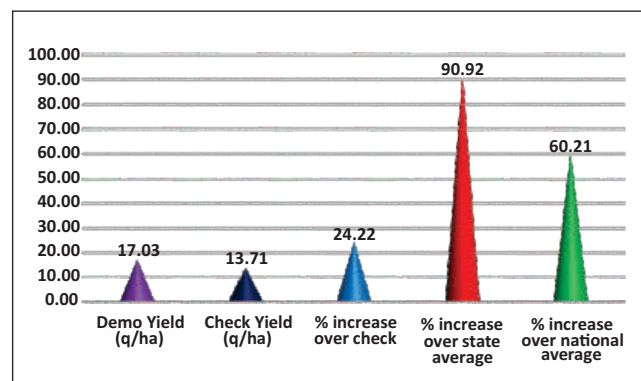


Fig. 3.1 Yield performance of Chickpea in Maharashtra



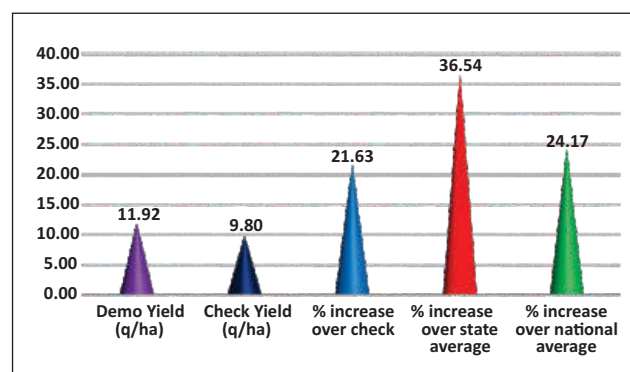
**Table 3.3 Variety wise performance of chickpea in Maharashtra**

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% increase	Net return (Rs./ ha)		% increase
				Demo	Check		Demo	Check	
BDNG 797	Aurangabad -I	24	60	15.20	12.65	20.16	47590	37220	27.86
Digvijay	Nashik-II, Sangli, Satara-II, Jalgaon-II, Hingoli, Jalgaon-I, Nashik-II, Solapur-I	45.4	118	18.59	14.38	29.62	43031	26503	67.06
JAKI 9218	Wardha, Beed-I, Akola, Chandrapur, Buldhana-I, Amaravati-II, Yavatmal-I, Gondia, Washim, Nanded-I	83.4	209	16.77	13.94	20.50	48060	34853	40.76
JK-2189	Osmanabad	4	10	19.62	14.62	34.20	35950	21298	68.80
Vijay	Satara-I, Amaravati-I, Jalna-I	14.2	36	14.96	12.96	18.66	35068	26270	91.32
	<b>Total</b>	<b>171</b>	<b>433</b>	<b>17.03</b>	<b>13.71</b>	<b>24.63</b>	<b>41940</b>	<b>29229</b>	<b>59.16</b>

### Performance of Pigeon pea Cultivars in Maharashtra

Under technology demonstrations on pigeon pea, five cultivars BDN-711, BSMR-736, ICPL-87119, Richa and PKV TARA were demonstrated on 65.6 ha area at farmers' fields. On an average 11.92 q/ha productivity

was attained under demonstrations which was higher (23.67%) over local cultivars. Highest yield of 14.15 q/ha was achieved under PKV TARA in Wardha and Washim districts with net profit of Rs. 46407/ha (Table 3.4). In Maharashtra, pigeon pea yield was increased by 24.17% over national and 36.54% at state level (Fig. 3.2).


**Fig. 3.2 Yield performance of Pigeon Pea in Maharashtra**
**Table 3.4 Variety wise performance of pigeon pea in Maharashtra**

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
BDN 711	Aurangabad -I, Nanded-I, Beed-I	36.8	92	12.33	9.63	28.26	36552	23013	74.74
BSMR 736	Amaravati-I	5.2	13	14.05	12.10	16.12	54360	42120	29.06
ICPL 87119	Buldhana-I	10	25	10.32	8.58	20.28	37142	25998	42.86
PKV TARA	Wardha, Washim	8.8	22	14.15	12.45	13.67	46407	39382	19.11
Richa	Aurangabad -II	4.8	12	8.75	6.25	40.00	32508	21250	52.98
	<b>Total</b>	<b>65.6</b>	<b>164</b>	<b>11.92</b>	<b>9.80</b>	<b>23.67</b>	<b>41394</b>	<b>30353</b>	<b>43.75</b>

## Oilseed Crops

In Maharashtra, frontline demonstrations were conducted on groundnut (35), sesame (21), niger (30), soybean (349) covering an area of 189.4 ha at farmers' fields (Table 3.5). In groundnut, 28.65 q/ha mean yield was achieved under demonstrations which was 39.49% higher over local practice (20.45 q/ha). Net profit of Rs. 43022/ha was obtained by the farmers. Under sesame, 4.35 q/ha yield was achieved with net of profit of Rs. 23526/ha. In soybean, productivity of 17.1 q/ha was realised by the farmers under demonstrations which was 37.08% more as compared to local check. Under demonstrations, 4.10 q/ha average yield was attained in niger crop with net gain of Rs. 5516/ha.



**Table 3.5 Thematic area wise physical achievements of FLDs on oilseeds in Maharashtra**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% increase	Net return (Rs./ha)	
								Demo	Check
Groundnut	ICM	1	13	5	32.46	23.70	36.96	51136	30068
	INM	1	12	5	21.50	16.65	29.13	35930	24190
	IPM	1	10	4	32.00	21.00	52.38	42000	32000
	<b>Sub-Total</b>	<b>3</b>	<b>35</b>	<b>14</b>	<b>28.65</b>	<b>20.45</b>	<b>39.49</b>	<b>43022</b>	<b>28753</b>
Niger	Varietal	1	30	10	4.10	2.95	38.98	5516	1555
Sesame	ICM	1	21	10	4.35	3.12	39.42	23526	11150
Soybean	ICM	1	13	5.2	21.40	16.23	31.85	51909	41327
	IDM	1	13	5.2	15.20	13.90	9.35	29920	23565
	INM	4	48	19.2	17.11	13.81	26.54	28476	20152
	IPDM	1	13	5.2	15.29	14.09	8.52	21523	18031
	IPM	6	107	58.6	16.71	14.08	18.68	29955	20719
	Varietal	3	155	62	17.30	12.93	37.08	30525	17215
	<b>Sub-Total</b>	<b>12</b>	<b>349</b>	<b>155.4</b>	<b>17.01</b>	<b>13.93</b>	<b>23.41</b>	<b>30501</b>	<b>21189</b>
	<b>Grand Total</b>		<b>435</b>	<b>189.4</b>					

## Performance of Soybean Cultivars in Maharashtra

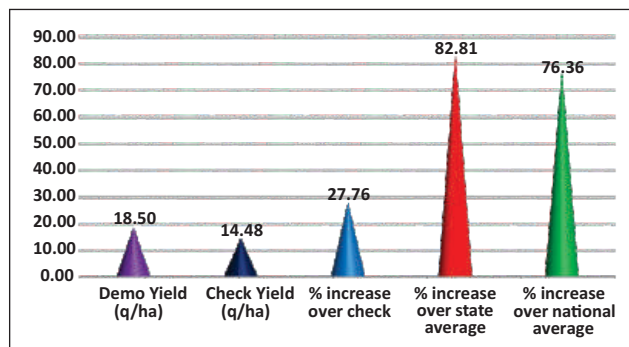
Under soybean, average yield of 18.50 q/ha was attained with adoption of improved varieties and earned of Rs. 34702/ha by the farmers. Highest yield was obtained under MAUS-71 cultivar in Nanded

followed MAUS-162 in Osmanabad and Latur districts (Table 3.6). In Maharashtra, soybean yield was increased by 76.36% over national and 82.81% at state level (Fig. 3.3).



**Table 3.6 Variety wise performance of soybean in Maharashtra**

Varieties	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
Greengold	Ahmednagar-II	4	10	16.20	12.00	35.00	19500	9852	97.93
JS 335	Washim, Yavatmal-I, Solapur-I, Washim, Akola, Amaravati-I, Sangli	61.2	113	14.92	12.82	16.99	21695	15501	62.98
JS 9560	Amaravati-II	5	13	17.90	15.80	13.29	38650	30000	28.83
MAUS-158	Akola, Osmanabad, Latur, Aurangabad -I	31.2	78	17.14	14.44	23.16	39161	32285	58.37
MAUS-162	Latur, Osmanabad	50	125	22.38	16.85	35.53	40955	24053	79.40
MAUS-71	Nanded-I	4	10	22.50	15.00	50.00	48250	19100	152.62
	<b>Total</b>	<b>155.4</b>	<b>349</b>	<b>18.50</b>	<b>14.48</b>	<b>28.99</b>	<b>34702</b>	<b>21798</b>	<b>80.02</b>



**Fig. 3.3 Yield performance of Soybean in Maharashtra**

### Cereals and Millets

Farmers' profit can be increased by adopting latest technologies under different crops of cereals and millets. Frontline demonstrations were conducted on paddy (358), wheat (170), maize (28), sorghum (114) and finger millet (73) covering an area of 218.3 ha in field situations (Table 3.7). In finger millet demonstrations, average yield of 14.49 q/ha was obtained with economic gain of Rs. 13119/ha which was superior by 36.58% over local practice. Under

sorghum, mean yield of 19.41 q/ha was realised by the farmers by following full package of practices which was higher (29.98%) as compared to farmer's practice. Net profit of Rs. 36323/ha was obtained. In maize, 44.42 q/ha average yield was obtained by the farmers with net economic gain of Rs. 22414/ha. In paddy, 38.34 q/ha yield was attained which was more by 23.01% over local check. Under wheat, 36.43 q/ha yield was achieved with improved practices which showed better performance as compared to farmer's practice.



Table 3.7 Thematic area wise physical achievements of FLDs on cereals and millets in Maharashtra

Varieties	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
Finger millet	ICM	1	15	2	13.00	9.00	44.44	22750	12300
	INM	1	20	4	12.36	8.22	50.36	4614	336
	Varietal	2	38	11	16.30	13.08	25.76	12555	3553
	<b>Sub-Total</b>	<b>4</b>	<b>73</b>	<b>17</b>	<b>14.49</b>	<b>10.85</b>	<b>36.58</b>	<b>13119</b>	<b>4936</b>
Jowar	ICM	2	43	17	13.31	10.21	30.38	29383	21206
	INM	1	13	5.2	16.25	12.50	30.00	33100	23750
	IPM	1	13	5	17.00	13.88	22.48	32200	23928
	Varietal	4	45	15	22.97	17.58	31.31	40569	20992
	<b>Sub-Total</b>	<b>6</b>	<b>114</b>	<b>42.2</b>	<b>19.41</b>	<b>14.97</b>	<b>29.98</b>	<b>36323</b>	<b>21672</b>
Maize	INM	1	13	2.6	55.33	47.59	16.26	27276	19671
	IPM	1	15	6	33.50	27.82	20.42	17552	13367
	<b>Sub-Total</b>	<b>2</b>	<b>28</b>	<b>8.6</b>	<b>44.42</b>	<b>37.71</b>	<b>18.34</b>	<b>22414</b>	<b>16519</b>
Paddy	ICM	4	110	22	34.26	28.53	22.58	27007	13891
	INM	5	95	24	40.88	33.59	21.98	23092	12812
	IPDM	1	20	8	33.25	28.10	18.33	8650	4220
	IPM	3	36	11.4	36.28	30.97	17.00	21963	15043
	Varietal	2	97	34	40.81	31.60	29.13	8146	878
	<b>Sub-Total</b>	<b>10</b>	<b>358</b>	<b>99.4</b>	<b>38.34</b>	<b>31.30</b>	<b>23.01</b>	<b>19045</b>	<b>9799</b>
Wheat	ICM	1	24	4.8	29.65	19.98	48.40	41230	21956
	INM	4	59	19.4	41.34	36.48	13.75	38888	31749
	IPM	3	49	14.4	39.64	32.30	22.84	35380	22893
	Varietal	3	38	12.6	27.30	23.19	17.04	23154	15225
	<b>Sub-Total</b>	<b>9</b>	<b>170</b>	<b>51.2</b>	<b>36.43</b>	<b>30.74</b>	<b>19.73</b>	<b>34273</b>	<b>24588</b>
	<b>Grand Total</b>			<b>743</b>	<b>218.4</b>				

### Varietal Performance under Paddy in Maharashtra

Daptari cultivar of paddy provided highest yield of 53.18 q/ha in Nashik area which was 24.99% higher over local check. Karjat-2 cultivar performed well in Ratnagiri district with average yield of 42.00 q/ha (Table 3.8). In Maharashtra, paddy yield was increased by 45.97% over national and 104.29% at state level (Fig. 3.4).

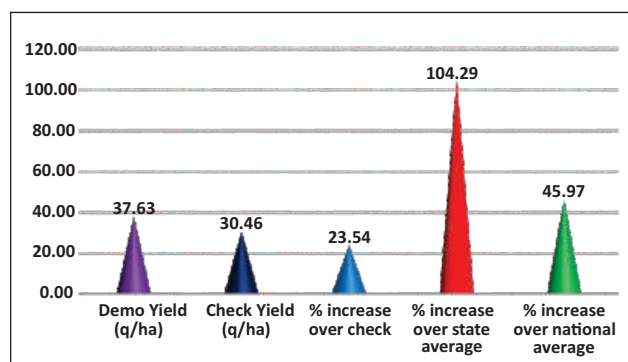


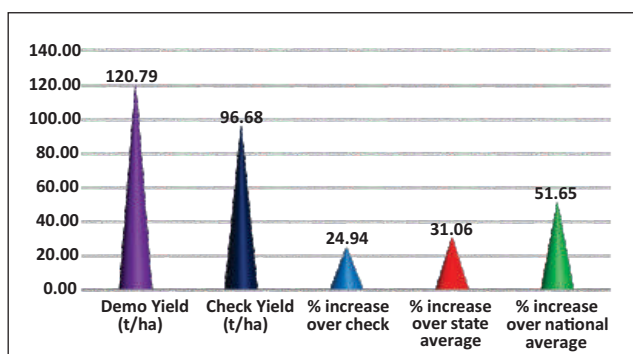
Fig. 3.4 Yield performance of Paddy in Maharashtra

**Table 3.8 Variety wise performance of paddy in Maharashtra**

Varieties	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
Daptari	Nashik-I	6	30	53.18	42.55	24.99	69364	45364	52.91
Indrayani	Nashik-I	10	50	32.08	23.63	35.76	37019	17665	109.57
Karjat-2	Ratnagiri	5	42	42.00	28.00	50.00	23000	4000	475.00
Karjat-3	Thane	18	40	36.48	32.00	14.26	7887	2820	201.94
Karjat-5	Raigadh	5	12	40.00	32.00	25.00	10000	3000	233.33
Karjat-6	Sindhudurg	1	10	38.80	30.60	26.80	11040	5780	91.00
Karjat-7	Raigadh, Thane	17	40	38.55	32.97	18.51	7037	210	192.00
Karjat-9	Sindhudurg, Raigadh, Thane	15	60	41.26	32.19	28.17	9793	2319	621.83
Phule Samruddhi	Satara-II	2	10	31.50	24.20	30.17	15229	4429	243.85
PKV-Akshad	Gadchiroli	5	13	27.65	25.10	10.16	35944	30264	18.77
PKV-HMT	Gondia	5.2	13	40.24	35.10	14.64	24150	16050	50.47
SHRIRAM	Chandrapur	5.2	13	29.80	27.20	9.56	30700	23300	31.76
	<b>Total</b>	<b>94.4</b>	<b>333</b>	<b>37.63</b>	<b>30.46</b>	<b>24.00</b>	<b>23430</b>	<b>12933</b>	<b>193.54</b>

### Commercial Crops

In total, 67 frontline demonstrations on sugarcane were conducted covering an area of 26.5 ha at farmers' fields. Average yield of 1207.90 per ha was achieved which was 23.26% higher over local check. Net profit of Rs. 201777 per ha was earned by the farmers. Under different components, yield obtained is reported in Table 3.9. In Maharashtra, sugarcane yield was increased by 51.65% over national and 31.06% at state level (Fig. 3.5).



**Fig. 3.5 Yield performance of Sugarcane in Maharashtra**





**Table 3.9 Thematic area wise physical achievements of FLDs on commercial crops in Maharashtra**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return(Rs./ha)	
								Demo	Check
Sugarcane	ICM	2	27	10	1319.00	1060.00	22.09	199212	164504
	INM	2	20	8	1103.25	898.00	20.97	205765	3881
	IPM	1	20	8.5	1195.00	918.00	30.17	198930	131528
	<b>Total</b>	<b>4</b>	<b>67</b>	<b>26.5</b>	<b>1207.90</b>	<b>966.80</b>	<b>23.26</b>	<b>201777</b>	<b>93660</b>

## Flower Crops

A total of 05 demonstrations in Aster, 23 in Gaillardia, 15 in Chrysanthemum, 13 in Jasmine and 5 demonstrations in Marigold were conducted covering area of 18.45 ha at farmers' fields (Table 3.10). In Aster, technologies such as varietal introduction gave yield of 30 q/ha which was quite higher (50%) as compared to 20 q/ha in local check. In Gaillardia, varietal introduction gave yield of 82.11 q/ha which was also superior over local check. In Marigold, technologies such as varietal introduction gave yield of 150 q/ha which was more by 25%. In Chrysanthemum, integrated nutrient management related technologies gave average yield of 67.86 q/ha



which showed superiority (38.83%) over farmers' practice (48.88 q/ha).

**Table 3.10 Thematic area wise physical achievements of FLDs on flower crops in Maharashtra**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Aster	Varietal	1	5	0.25	30.00	20.00	50.00	55000	20000
Chrysanthemum	INM	1	15	6	67.86	48.88	38.83	76926	45708
Gaillardia	Varietal	2	23	5	82.11	76.17	8.04	119541	108966
Jasmine	Varietal	1	13	5.2	87.20	81.50	6.99	110916	103700
Marigold	Varietal	1	5	2	150.00	120.00	25.00	110000	85000
	<b>Total</b>		<b>61</b>	<b>18.45</b>					

## Fodder Crops

Frontline demonstrations on berseem (13), marvel (20), lucerne (05), maize (33), napier grass (122) and oat (13) were organized covering an area of 28.09 ha in field situations (Table 3.11). In berseem, technologies such as varietal introduction gave yield of 37.00 q/ha which was higher as compared to local check. In marvel, technologies such as varietal introduction provided yield of 15 q/ha while local check yielded 9.00 q/ha. In lucerne, technologies such as varietal introduction shown yield of 960 q/ha whereas in local



check 780 q/ha was attained by the farmers. In maize, interventions such as varietal demonstration gave yield of 35.33 q/ha while in farmer's practice got yield of 29.20 q/ha. In napier grass, varietal demonstrations got yield of 1337.14 q/ha which was higher over local

check (1116.71 q/ha). In oat, varietal demonstrations gave yield of 551 q/ha which was superior over local check (499 q/ha). In sorghum, varietal demonstrations gave yield of 927.33 q/ha which was higher over local check (461.33 q/ha).

**Table 3.11 Thematic area wise physical achievements of FLDs on fodder crops in Maharashtra**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Berseem	Varietal	1	13	2.6	37.00			52522	
Lucerne	Varietal	1	5	1	960.00	780.00	23.08	419500	327500
Maize	Varietal	2	33	4.6	35.33	29.20	22.10	27842	24493
Marvel	Varietal	1	20	0.4	15.00	9.00	66.67	15000	15000
Napier	Varietal	7	122	12.24	1337.14	1116.71	20.40	76857	47980
Oat	Varietal	1	13	0.65	551.00	499.00	10.42	33149	20285
Sorghum	Varietal	3	33	6.6	927.33	461.33	81.05	114013	41061
	<b>Total</b>		239	28.09					

### Fruit Crops

In fruit crops, banana (94) guava (15), papaya (10), sapota (20), lime (45), mango (38), orange (50), pomegranate (72) and sweet orange (10) frontline demonstrations were conducted covering area of 104.6 ha at farmers' fields (Table 3.12). In banana,

146.69 q/ha was obtained. In mango, technologies such as ICM and IPM provided yield of 46.98 q/ha. Among above technologies, ICM gave highest yield of 54.15 q/ha under demonstrations. In orange, ICM and INM related interventions reported productivity of 207.41 q/ha which was 22.51% higher over local check (169.78



technologies such as ICM and INM gave yield of 690.70 q/ha which was higher (19.44%) than local check (582.00 q/ha). Among above technologies, INM provided highest yield of 725.50 q/ha in demonstration plot. In guava, IPM provided yield of 200 q/ha which performed better. In sapota, IPDM component gave yield of 182.20 q/ha which showed superiority. In lime, ICM and INM components reported yield of 176.48 q/ha which was more as compared to local check (144.75 q/ha). Under ICM component, highest yield of



q/ha). Among above technologies, ICM gave highest yield of 179.61 q/ha in demonstration plot. In pomegranate, ICM, IDM, INM, IPDM and IPM components shown good result and furnished yield of 161.31 q/ha which was quite higher (15.94 %) than local practice (139.47 q/ha). Among above interventions, INM gave highest yield of 265 q/ha. In sweet orange, technologies such as ICM gave yield of 233.75q/ha. It is proved that integrated management of crops played a greater role in harnessing higher productivity of crops.

Table 3.12 Thematic area wise physical achievements of FLDs on fruit crops in Maharashtra

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return(Rs./ha)	
								Demo	Check
Banana	ICM	1	52	4	551.50	472.00	16.84	419000	340000
	INM	3	42	16.8	725.50	609.50	20.09	511085	300550
	<b>Sub-Total</b>	<b>4</b>	<b>94</b>	<b>20.8</b>	<b>690.70</b>	<b>582.00</b>	<b>19.44</b>	<b>492668</b>	<b>308440</b>
Guava	ICM	1	5	1	3.94	2.59	52.12	61431	8595
	IPM	1	10	4	200.00	175.00	14.29	225000	175000
	<b>Sub-Total</b>	<b>2</b>	<b>15</b>	<b>5</b>	<b>101.97</b>	<b>88.80</b>	<b>33.20</b>	<b>143216</b>	<b>91798</b>
Lime	ICM	2	20	6	184.33	146.69	25.69	298468	205088
	INM	1	25	5	160.79	140.86	14.15	559030	465940
	<b>Sub-Total</b>	<b>3</b>	<b>45</b>	<b>11</b>	<b>176.48</b>	<b>144.75</b>	<b>21.84</b>	<b>385322</b>	<b>292039</b>
Mango	ICM	2	33	12	54.15	43.90	27.21	93379	70374
	IPM	1	5	1	32.65	22.50	45.11	22675	12620
	<b>Sub-Total</b>	<b>3</b>	<b>38</b>	<b>13</b>	<b>46.98</b>	<b>36.77</b>	<b>33.18</b>	<b>69811</b>	<b>51122</b>
Orange	ICM	1	10	2	212.42	179.61	18.27	170341	123137
	INM	3	40	12	205.73	166.50	23.93	345613	245917
	<b>Sub-Total</b>	<b>4</b>	<b>50</b>	<b>14</b>	<b>207.41</b>	<b>169.78</b>	<b>22.51</b>	<b>301795</b>	<b>215222</b>
Papaya	ICM	1	10	2	807.82	704.25	14.71	245410	170000
Pomegranate	ICM	1	10	2	97.20	77.22	25.87	239391	145886
	IDM	2	19	11.2	165.90	145.00	16.24	421870	345125
	INM	1	10	4	265.00	238.80	10.97	714175	618225
	IPDM	1	10	4	182.75	142.00	28.70	638750	360000
	Varietal	2	23	6.6	130.00	116.00	11.06	729038	462550
	<b>Sub-Total</b>	<b>5</b>	<b>72</b>	<b>27.8</b>	<b>161.31</b>	<b>139.47</b>	<b>15.94</b>	<b>556305</b>	<b>391352</b>
Sapota	IPDM	1	20	8	182.20	161.00	13.17	140672	127232
Sweet Orange	ICM	2	10	3	233.75	226.50	7.25	52470	46330
	<b>Grand Total</b>		<b>354</b>	<b>104.6</b>					

### Plantation Crops

Demonstrations on cashew (10) and coconut (20) were organized covering area of 9.5 ha in field conditions (Table 3.13). In cashew, technologies such as IPM and INM gave yield of 10.85 q/ha which was higher (61.47

%) as compared to local practice (6.73 q/ha). INM component performed better and gave yield of 10.90 q/ha. In coconut, technologies such as IPDM reported yield of 11080 nut/ha which showed superiority over check (9560 nut/ha) with 15.90 % increase in yield.

Table 3.13 Thematic area wise physical achievements of FLDs on plantation crops in Maharashtra

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Cashew	INM	1	5	0.5	10.90	6.55	66.41	74090	27488
	IPM	1	5	1	10.80	6.90	56.52	63700	29300
	<b>Sub-Total</b>	<b>1</b>	<b>10</b>	<b>1.5</b>	<b>10.85</b>	<b>6.73</b>	<b>61.47</b>	<b>68895</b>	<b>28394</b>



Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Coconut	IPDM	1	20	8	11080 (No. of nuts/ha)	9560 (No. of nuts/ha)	15.90	46715	36515
	<b>Grand Total</b>		<b>30</b>	<b>9.5</b>					

## Spices Crops

Under spices 43 frontline demonstrations were organized including ajwain (26) and turmeric (17) with covering area of 14.2 ha at farmers' fields (Table 3.14). In

ajwain, under varietal demonstrations reported average yield of 11.03 q/ha which was 20.52 % higher with net gain of Rs. 144200/ha. In turmeric, technologies such as IPDM provided average yield of 187.50 q/ha with Rs. 313140/ha under demonstrations.



**Table 3.14 Thematic area wise physical achievements of FLDs on spices crops in Maharashtra**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Ajwain	Varietal	2	26	7.4	11.03	9.29	20.52	144200	119170
Turmeric	IPDM	2	17	6.8	187.50	140.00	27.98	323140	217275
	<b>Total</b>		<b>43</b>	<b>14.2</b>					

## Tuber Crops

Under tuber crops, demonstrations on potato (18) and sweet potato (10) were conducted at farmers' fields covering 4.1 ha area (Table 3.15). In potato, technologies such as varietal introduction and INM

components gave yield of 215 q/ha which was 22.89% higher over local check and realised with net profit of Rs. 96000/ha. Component of varietal introduction in sweet potato yielded 130 q/ha under demonstrations with economic gain of Rs. 153000/ha.

**Table 3.15 Thematic area wise physical achievements of FLDs on tuber crops in Maharashtra**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Potato	INM	1	13	2.6	290.00	210.00	38.10	117000	47000
	Varietal	1	5	1	140.00	130.00	7.69	75000	37000
	<b>Sub-Total</b>	<b>2</b>	<b>18</b>	<b>3.6</b>	<b>215.00</b>	<b>170.00</b>	<b>22.89</b>	<b>96000</b>	<b>42000</b>

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Sweet potato	Varietal	1	10	0.5	130.00	92.00	41.30	153000	96000
	<b>Grand Total</b>		<b>28</b>	<b>4.1</b>					

## Vegetable Crops

Under vegetables demonstrations on amaranthus (10), bitter gourd (55), brinjal (78), green chilli (10), coriander (30), cowpea (5), dolichos bean (20), drumstick (10), french bean (14), muskmelon (5), onion (343), okra (37), pumpkin (10) and snake gourd (10) were organized covering area of 173 ha in the farmers' fields (Table 3.16). In amaranthus, technologies such as varietal demonstrations reported yield of 95 q/ha which was higher (35.71 %) as compared to local check (70 q/ha). In



cowpea, technologies such as ICM gave yield of 112.40 q/ha which was higher (63.85 %) over farmer's practice. In dolichos bean, technologies such as varietal introduction reported yield of 239 q/ha with net profit of Rs. 239740/ha. In muskmelon, varietal introduction gave yield of 250 q/ha with net gain of Rs.

bitter gourd, technologies such as varietal introduction shown yield of 77.90 q/ha with net profit of Rs. 139818 per ha. In brinjal, technologies such as ICM, IPM and varietal introduction components gave yield of 299.67 q/ha. Varietal demonstration component provided highest yield of 322.20 q/ha with economic gain of Rs.90500/ha. In green chilli, technologies such as ICM gave yield of 110 q/ha. In coriander, technologies such as varietal demonstrations gave yield of 113.50 q/ha which was more by 25.55 %.



310000/ha. In okra, ICM and varietal component provided yield of 180 q/ha with profit of Rs. 341000/ha. In onion, on an average yield of 238.56 q/ha was obtained with economic gain of Rs.149134/ha.

**Table 3.16 Thematic area wise physical achievements of FLDs on vegetable crops in Maharashtra**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Amaranthus	Varietal	1	10	0.1	95.00	70.00	35.71	65000	40000
Bittergourd	Varietal	3	55	5.1	77.90	62.89	23.66	139818	88234
Brinjal	ICM	1	10	4	197.00	156.00	26.28	145000	107000
	IPM	4	53	18.9	319.71	287.32	37.19	194452	155657
	Varietal	1	15	6	322.20	252.53	27.59	90500	66500
	<b>Sub-Total</b>		<b>6</b>	<b>78</b>	<b>28.9</b>	<b>299.67</b>	<b>259.64</b>	<b>16.14</b>	<b>168885</b>

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Chilli green	ICM	1	10	0.4	110.00	85.00	29.41	51000	27000
Corianderleaf	Varietal	1	30	6	113.50	90.40	25.55	88500	64400
Cowpea	ICM	1	5	0.1	112.40	68.60	63.85	206060	58400
	Varietal	1	5	1	12.50	9.30	34.41	30000	15800
	<b>Sub-Total</b>	<b>2</b>	<b>10</b>	<b>1.1</b>	<b>62.45</b>	<b>38.95</b>	<b>49.13</b>	<b>118030</b>	<b>37100</b>
Cucumber	ICM	1	5	0.1	217.40	156.20	39.18	225260	127400
Dolichosbean	Varietal	1	20	8	239.00	181.20	31.90	239740	226160
Garlic	Varietal	2	20	0.9	155.30	135.75	12.41	96804	71391
Muskmelon	IPDM	1	5	2	250.00	90.00	177.78	310000	32000
Okra	ICM	1	24	8	180.00	140.00	28.57	341000	136000
	INM	1	20	2	160.70	148.90	7.92	268085	199019
	Varietal	1	13	2.6	124.17	111.50	11.36	63316	55550
	<b>Sub-Total</b>	<b>3</b>	<b>57</b>	<b>12.6</b>	<b>154.96</b>	<b>133.47</b>	<b>15.95</b>	<b>224134</b>	<b>130190</b>
Onion	ICM	3	53	17.6	292.66	260.12	12.11	187529	156434
	IDM	1	10	2	172.50	159.00	8.49	51949	28896
	INM	7	124	37.6	209.30	178.51	19.53	156297	125736
	IPDM	1	10	2	77.80	62.90	23.69	37488	23044
	IPM	2	28	11.2	255.25	228.90	11.48	91104	77756
	IWM	1	10	4	211.40	189.30	11.67	58970	41590
	Varietal	9	108	32.3	262.26	218.41	20.55	166756	100534
	<b>Sub-Total</b>	<b>18</b>	<b>343</b>	<b>106.7</b>	<b>238.56</b>	<b>205.07</b>	<b>17.43</b>	<b>149134</b>	<b>109559</b>
Pumpkin	Varietal	1	10	0.5	121.00	82.10	47.38	77500	40000
Snakegourd	Varietal	1	10	0.6	146.00	110.00	32.73	119000	75000
	<b>Grand-Total</b>		<b>663</b>	<b>173</b>					

## Hybrids

Under hybrids, demonstrations on bajra (15), maize (55), paddy (23), cotton (187), napier (46), brinjal (65), cabbage (10), chilli dry (13), chilli green (65), okra (26), onion (119), tomato (48) and watermelon (25) were conducted covering area of 215.67 ha at farmers' fields (Table 3.17). In cotton, average yield of 19.16 q/ha was obtained under demonstrations with net economic gain of Rs. 59691/ha. In okra, mean yield of 155.54 q/ha was attained which was higher (26.57 %) over local check. In onion, ICM, INM, IPDM, IWM and hybrid components reported average yield of 141.18 q/ha which was higher (22.02%) as compared to local check (122.72 q/ha). In tomato, mean yield of 457.79



q/ha was obtained with net profit of Rs. 286516/ha under demonstrations.



Table 3.17 Thematic area wise physical achievements of FLDs on hybrid crops in Maharashtra

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Bajra	INM	1	15	6	29.50	23.10	27.71	39130	33620
Maize	ICM	2	35	14	52.01	45.79	11.21	32325	25760
	INM	1	20	8	67.50	57.40	17.60	22550	16452
	<b>Sub-Total</b>	<b>3</b>	<b>55</b>	<b>22</b>	<b>57.17</b>	<b>49.66</b>	<b>13.34</b>	<b>29067</b>	<b>22657</b>
Paddy	INM	1	23	5	70.10	49.20	42.48	43910	32910
Cotton	ICM	1	15	6	8.95	6.30	42.06	23355	11445
	INM	1	13	5	23.18	18.52	25.16	84934	64054
	IPM	8	134	64.84	21.13	15.98	31.49	66667	43933
	IWM	1	25	10	9.60	8.30	15.66	14980	10740
	<b>Sub-Total</b>	<b>10</b>	<b>187</b>	<b>85.84</b>	<b>19.16</b>	<b>14.63</b>	<b>30.44</b>	<b>59691</b>	<b>39791</b>
Napier	Hybrid	3	46	2.88	871.67	733.33	26.63	65590	51486
Brinjal	IDM	1	10	2.25	281.30	221.90	26.77	163338	90197
	INM	1	10	4	420.00	320.00	31.25	225000	180000
	IPM	3	45	13.5	270.50	230.17	19.52	183583	121150
	<b>Sub-Total</b>	<b>5</b>	<b>65</b>	<b>19.75</b>	<b>302.56</b>	<b>246.48</b>	<b>23.32</b>	<b>187818</b>	<b>126729</b>
Cabbage	INM	1	10	2	739.00	691.00	6.95	183989	162269
Chilli dry	INM	1	13	2.6	147.83	122.41	20.77	123310	74045
Chilli green	ICM	1	5	1	213.00	129.00	65.12	241500	128500
	IDM	1	13	5	170.77	147.46	15.81	203136	158828
	INM	3	27	5.6	312.33	261.33	21.14	497924	388923
	IPDM	1	10	4	280.00	227.50	23.08	423750	314250
	IPM	1	10	1	131.00	112.00	16.96	109900	69400
	<b>Sub-Total</b>	<b>7</b>	<b>65</b>	<b>16.6</b>	<b>247.40</b>	<b>199.99</b>	<b>26.76</b>	<b>353151</b>	<b>262535</b>
Okra	INM	1	13	2.6	150.00	115.00	30.43	140000	82000
	IPM	1	13	2.6	161.07	131.26	22.71	154793	75243
	<b>Sub-Total</b>	<b>2</b>	<b>26</b>	<b>5.2</b>	<b>155.54</b>	<b>123.13</b>	<b>26.57</b>	<b>147397</b>	<b>78622</b>
Onion	Hybrid	1	40	5	150.00	140.00	7.14	71250	43550
	ICM	2	26	10.4	46.86	36.98	39.88	20895	3681
	INM	2	20	6.6	238.50	214.60	11.04	109591	90144
	IPDM	1	13	2.6	179.38	141.15	27.08	14120	-10930
	IWM	1	20	8	88.20	74.70	18.07	12124	7861
	<b>Sub-Total</b>	<b>5</b>	<b>119</b>	<b>32.6</b>	<b>141.18</b>	<b>122.72</b>	<b>22.02</b>	<b>51209</b>	<b>32590</b>
Tomato	Hybrid	4	38	5.1	502.44	395.51	20.18	323173	254550
	IDM	1	10	3.1	279.20	235.90	18.36	139885	81625
	<b>Sub-Total</b>	<b>5</b>	<b>48</b>	<b>8.2</b>	<b>457.79</b>	<b>363.59</b>	<b>19.82</b>	<b>286516</b>	<b>219965</b>
Watermelon	ICM	3	25	7	460.61	376.20	22.24	215952	66525
	<b>Grand Total</b>		<b>697</b>	<b>215.67</b>					

## Livestock and Fisheries

Livestock and fisheries are major components for livelihood security. Under these sectors, 1021 demonstrations (108 on dairy buffaloes; 500 on dairy cow; 154 on goats; 237 on poultry; 10 on sheep and 10 on fisheries) were conducted covering 7766 livestock (Table 3.18). In dairy buffaloes and cows, technologies like area specific mineral mixture, probiotics, fodder, rumen bypass fat, urea treatment, chaff cutting, ration balancing, management of mastitis, management of infertility, etc. provided higher yield over respective local checks. In sheep and goat, technologies such as deworming, ration balancing, mineral mixture, parasite management, disease management, etc. gave higher yield over respective local checks. In case of poultry, technologies such as improved breeds gave



higher yield over respective local check. In fishery, technologies such as Catla, Rohu, Grass carp, Common carp, IFS, composite culture, etc. provided higher yield over respective local practice.

**Table 3.18 Frontline demonstrations on livestock & fisheries conducted by KVKs of Maharashtra**

Livestock	Thematic Areas	KVK	Demos (No.)	Livestock (No.)	Unit of Yield	Demo yield	Check yield	% Increase
Dairy Buffalo	Disease Management	1	10	10	Milk yield L/anim./day	4.85	3.64	33.24
	Nutrition Management	1	10	10	kg/animal	5.77	4.83	19.46
	Nutrition Management	4	46	354	Milk yield L/anim./day	9.08	6.96	39.00
	Nutrition Management	4	42	338	q/ha	171.06	121.05	161.56
	<b>Sub-Total</b>		<b>10</b>	<b>108</b>	<b>712</b>			
Dairy Cow	Disease Management	6	76	147	Milk yield L/anim./day	7.62	6.23	37.79
	Disease Management	2	23	323	No. of ectoparasites/sq inch	15.5	21	-44.13
	Nutrition Management	1	5	10	kg/animal	540	450	20.00
	Nutrition Management	2	30	50	kg/animal weight gain	5.67	4	41.48
	Nutrition Management	14	238	467	Milk yield L/anim./day	9.03	7.89	16.26
	Nutrition Management	8	128	241	q/ha	609.89	284.00	115.13
	<b>Sub-Total</b>		<b>33</b>	<b>500</b>	<b>1238</b>			
Fishery	Production and Management	1	10	30	Hatchability rate %	75	45	66.67
	Production and Management	1	2	600	kg of fish	163.5	105	55.42
	<b>Sub-Total</b>	<b>2</b>	<b>12</b>	<b>630</b>				
Goat	Disease Management	2	17	105	kg/animal	12.48	11.89	5.91
	Disease Management	1	10	40	kg/animal weight gain	4.9	3.7	32.43

Livestock	Thematic Areas	KVK	Demos (No.)	Livestock (No.)	Unit of yield	Demo yield	Check yield	% Increase
	Nutrition Management	6	66	274	kg/animal	18.16	14.41	25.26
	Nutrition Management	2	35	90	kg/animal weight gain	2.975	2.795	9.35
	Production and Management	3	26	26	kg/animal	21.453 33333	14.52	57.22
	<b>Sub-Total</b>	<b>14</b>	<b>154</b>	<b>535</b>				
Poultry	Disease Management	1	5	500	Survival rate %	98	78	25.64
	Nutrition Management	5	53	672	kg/bird	2.166	1.55	36.69
	Production and Management	8	131	2560	kg/bird	1.66	1.12	52.94
	Production and Management	4	48	719	No. of eggs /bird/year	184.25	100	112.36
	<b>Sub-Total</b>	<b>18</b>	<b>237</b>	<b>4451</b>				
Sheep	Disease Management	1	10	200	kg/animal	28.63	25.47	12.41
	<b>Grand Total</b>	<b>78</b>	<b>1021</b>	<b>7766</b>				

## Gujarat

### FLDs on Pulses

Pulses demonstrations are important to have nutritional security in India. In this context, 348 demonstrations on chick pea, 179 green gram, 12 horse gram, 10 black gram and 146 on pigeon pea were organized at farmers' fields covering 423.25 ha area (Table 3.19). In chick pea, technologies such as IPM, IDM, INM, IPDM, varietal and ICM gave mean yield of 14.98 q/ha which was 16.72% higher over farmer's practice with average net return of Rs. 31901/ha. Under varietal demonstrations, yield of 18.41 q/ha was attained with net profit of Rs. 46386/ha. In green gram, ICM gave yield of 11.18 q/ha which found higher over local check (5.10 q/ha). In pigeon pea, ICM,



IPM and varietal components provided average yield of 11.35 q/ha with economic gain of Rs. 30564/ha. Under varietal demonstrations, pigeon pea performed well (13.09 q/ha) and showed their potentiality.

**Table 3.19 Thematic area wise physical achievements of FLDs on pulses crops in Gujarat**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Blackgram	Varietal	1	10	4	5.75	4.90	17.35	13700	7830
Chickpea	ICM	3	70	133	12.93	10.72	20.26	29507	20436
	IDM	3	70	28	12.49	11.44	9.62	17471	13419
	INM	1	8	4	8.50	7.03	20.91	12950	8499
	IPDM	1	10	4	15.50	13.40	15.67	41600	34600
	IPM	3	70	26	14.50	12.55	15.74	25090	18961



Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
	Varietal	6	120	39.25	18.41	15.45	19.37	46386	35365
	<b>Sub-Total</b>	<b>13</b>	<b>348</b>	<b>234.25</b>	<b>14.98</b>	<b>12.84</b>	<b>16.72</b>	<b>31901</b>	<b>24074</b>
Greengram	ICM	3	174	72.5	11.18	11.19	16.98	35210	27328
	Varietal	1	5	2	7.80	6.30	23.81	10331	6467
	<b>Sub-Total</b>	<b>4</b>	<b>179</b>	<b>74.5</b>	<b>10.33</b>	<b>9.56</b>	<b>19.26</b>	<b>28991</b>	<b>20374</b>
Horsegram	Varietal	2	12	14	26.17	22.04	18.39	63243	49780
Pigeonpea	ICM	3	68	69.5	11.33	9.52	22.29	35995	26184
	IPM	1	10	4	6.20	5.50	12.73	11250	8800
	Varietal	3	68	23	13.09	10.89	21.87	29760	22457
	<b>Sub-Total</b>	<b>6</b>	<b>146</b>	<b>96.5</b>	<b>11.35</b>	<b>9.53</b>	<b>20.94</b>	<b>30564</b>	<b>22613</b>
<b>Grand Total</b>			<b>695</b>	<b>423.25</b>					

### Varietal Performance of Pigeon Pea in Gujarat

Different improved varieties of pigeon pea were demonstrated and highest yield of 17.75 q/ha was attained with GT 103 cultivar in Bharuch followed by BDN-711 (13.65 q/ha) in Narmada and Surat districts with net profit of Rs. 44296 per ha. In Gujarat, GT-103 variety yield was increased by 84.90% over national and 42.68% at state level (Fig. 3.6).

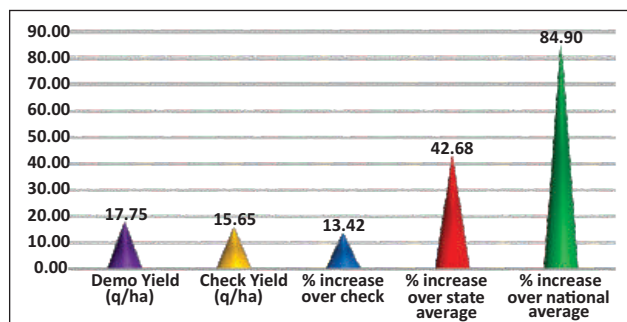


Fig. 3.6 Yield performance of Var. GT 103 (Pigeon Pea) in Gujarat

Table 3.20 Variety wise performance of pigeon pea in Gujarat

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
AGT-2	Dahod	10	25	9.43	7.88	19.67	26005	19875	30.84
BDN-711	Narmada, Surat	58	40	13.65	11.38	19.21	44296	32609	34.07
GNP-2	Dang, Surat	11.5	38	11.80	9.98	19.41	26650	20935	30.98
GT 103	Bharuch	8	18	17.75	15.65	13.42	40975	32105	27.63
Vaishali	Tapi	9	25	6.35	5.00	28.59	17819	10919	57.45
<b>Total</b>		<b>96.5</b>	<b>146</b>	<b>11.80</b>	<b>9.98</b>	<b>20.06</b>	<b>31149</b>	<b>23289</b>	<b>36.19</b>

### Performance of Chickpea Varieties in Gujarat

Technology demonstrations of chickpea with GJG-3, GG-5, GG-3, GJG-5, GJG-6, and Karnal Chana-1 were conducted on 230.25 ha area benefitting 338 farmers. Higher yield of (18.96 q/ha) was achieved under GJG-6 cultivar in Surendranagar followed by GG-5 (16.82 q/ha) in Dang, Morbi and Rajkot-II districts (Table 3.21). In Gujarat, chickpea yield was increased by 39.32% over national and 18.20% at state level (Fig. 3.7).



Table 3.21 Yield wise performance of chickpea in Gujarat

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
GG-3	Ahmedabad, Tapi, Panchmahal	18	50	13.98	11.71	19.33	34510	25690	35.96
GG-5	Morbi, Dang, Rajkot-II	13	45	16.82	13.86	21.40	31512	21064	49.85
GJG-3	Rajkot-I, Dahod, Amreli, Porbandar	66.25	175	15.78	13.93	12.80	33046	26177	24.03
GJG-5	Narmada	125	50	14.80	11.80	25.42	34621	25258	37.07
GJG-6	Surendranagar	4	10	18.96	16.55	14.56	54870	45540	20.49
Karnal Chana-1	Bharuch	4	8	8.50	7.03	20.91	12950	8499	52.37
	<b>Total</b>	<b>230.25</b>	<b>338</b>	<b>14.81</b>	<b>12.48</b>	<b>19.07</b>	<b>33585</b>	<b>25371</b>	<b>36.63</b>

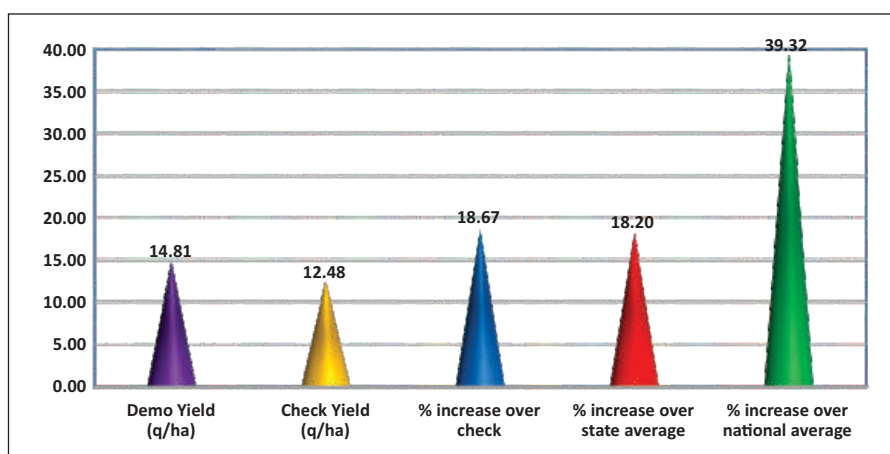


Fig. 3.7 Yield performance of Chickpea in Gujarat

### FLDs on Oilseeds

Different technology demonstrations on oilseed crops were conducted especially on groundnut (372), mustard (37), sesame (90) and soybean (112) on 382 ha area at farmers' fields (Table 3.22). In groundnut, IDM, IPM and varietal components provided yield of 17.77 q/ha which was more as compared to farmer's practice (15.67 q/ha). Among above technologies, ICM gave highest yield of 22.92 q/ha in demonstration plots. In mustard, INM, IPDM and varietal related interventions contributed yield of 17.24 q/ha which was greater than local check (14.58 q/ha). In sesame, ICM gave yield of 11.50 q/ha which was bit higher over local practice (10.70 q/ha). In soybean, average yield of 14.95 q/ha was obtained with adoption of



different package of practices like ICM, INM, IPM and improved varieties. Among above technologies, ICM component gave higher yield of 15.23 q/ha.

**Table 3.22 Thematic area wise physical achievements of FLDs on oilseed crops in Gujarat**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Groundnut	ICM	2	130	115	22.92	19.90	15.47	84152	56372
	IDM	2	25	10	11.42	9.91	12.76	22384	14885
	IPM	4	82	25.5	20.05	18.06	12.57	64436	50740
	Varietal	6	95	30	17.38	15.15	15.35	49690	38995
	<b>Sub-Total</b>	<b>11</b>	<b>372</b>	<b>196.5</b>	<b>17.77</b>	<b>15.67</b>	<b>13.80</b>	<b>53397</b>	<b>40694</b>
Mustard	INM	1	15	5	22.30	18.80	18.62	67724	51434
	IPDM	1	10	4	15.52	13.24	17.22	32500	26475
	Varietal	1	12	5	13.89	11.71	18.62	29170	21330
	<b>Sub-Total</b>	<b>3</b>	<b>37</b>	<b>14</b>	<b>17.24</b>	<b>14.58</b>	<b>18.15</b>	<b>43131</b>	<b>33080</b>
Sesame	ICM	1	30	75	11.50	10.70	7.48	18720	10345
	INM	1	20	8	7.70	6.20	24.19	62292	47391
	Varietal	2	40	14.5	6.18	5.13	20.08	48015	36142
	<b>Sub-Total</b>	<b>3</b>	<b>90</b>	<b>97.5</b>	<b>7.55</b>	<b>6.46</b>	<b>18.38</b>	<b>45011</b>	<b>33232</b>
Soybean	ICM	3	45	60	15.23	12.88	17.91	31844	24155
	IPM	1	25	10	14.56	13.24	9.97	22808	19972
	Varietal	1	42	20	14.50	12.75	13.73	21675	17262
	<b>Sub-Total</b>	<b>2</b>	<b>112</b>	<b>90</b>	<b>14.95</b>	<b>12.93</b>	<b>15.48</b>	<b>28003</b>	<b>21940</b>
<b>Grand Total</b>		<b>571</b>	<b>382</b>						

### Varietal Performance of Groundnut in Gujarat

Groundnut cultivars were demonstrated at farmers' fields and higher yield (19.40 q/ha) was obtained under TG-37-A in Bharuch district followed by GG-20 (17.72 q/ha) in Jamnagar, Surendranagar, Porbandar and Rajkot districts. Net profit of Rs. 56367/ha was earned by the farmers under demonstrations.


**Table 3.23 Variety wise performance of Groundnut in Gujarat**

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
GG-20	Jamnagar, Surendranagar, Porbandar, Rajkot-II	56	140	17.72	15.70	11.43	56367	38906	29.95
GG-22	Narmada	75	30	15.70	13.50	16.30	41975	33398	25.68
GJG-22	Morbi, Amreli, Porbandar, Rajkot-I, Rajkot-II	21	60	17.24	14.95	16.22	49292	37239	44.34



Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
GJG-9	Surendranagar, Rajkot-I	8	20	13.70	12.49	10.23	37108	32907	22.28
TG-37-A	Bharuch	5	25	19.40	16.30	19.02	41380	31400	31.78
	<b>Total</b>	<b>165</b>	<b>275</b>	<b>16.75</b>	<b>14.59</b>	<b>14.64</b>	<b>45224</b>	<b>34770</b>	<b>30.81</b>

### Performance of Soybean Cultivars in Gujarat

Frontline demonstrations on soybean were conducted with four improved varieties NRC-37, JS-95-60, GJS-3 and JS-335 in Surat, Bharuch, Panchmahal, Narmada and Dahod. JS-335 performed well and provided higher yield of 17.50 q/ha followed by NRC-37 with productivity of 17.03 q/ha. On an average, net gain of Rs. 27523/ha was realised by the farmers (Table 3.24). In Gujarat, soybean yield was increased by 37.56% over national and at 83.12% state level (Fig. 3.8).

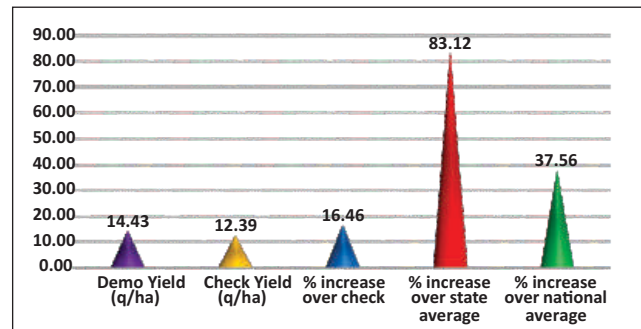


Fig. 3.8 Yield performance of Soybean in Gujarat

Table 3.24 Variety wise performance of soybean in Gujarat

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
GJS-3	Bharuch	20	42	14.50	12.75	13.73	21675	17262	25.56
JS 335	Panchmahal	5	13	17.50	14.20	23.24	47675	36370	31.08
JS-95-60	Surat	5	12	8.69	7.55	15.10	10820	5650	91.50
NRC-37	Narmada, Dahod	60	45	17.03	15.07	12.68	29922	25209	17.92
	<b>Total</b>	<b>90</b>	<b>112</b>	<b>14.43</b>	<b>12.39</b>	<b>16.19</b>	<b>27523</b>	<b>21123</b>	<b>41.52</b>

### Cereals and Millets

Different technology demonstrations were laid out at farmers' fields mainly on paddy (910), wheat (405), finger millet (105), maize (20) and little millet (25) on 585.25 ha area (Table 3.25). In finger millet, ICM, improved variety gave yield of 12.41 q/ha which was more (26.92%) than local check (9.75 q/ha). Among above technologies, improved variety gave highest yield of 13.76 q/ha under demonstration plots. In little millet, improved variety provided yield of 13.12 q/ha

as compared to 9.46 q/ha in local check with 38.69% increase. In paddy, technologies such as ICM, IDM, INM, IPDM, IPM, improved variety gave yield of 39.20 q/ha as compared to 33.81 q/ha in local check with 17.71% increase. Among above technologies, INM gave highest yield of 58.00 q/ha in demo plot. In wheat, technologies such as ICM, INM, improved variety gave yield of 38.97 q/ha as compared to 33.56 q/ha in local check with 16.34% increase. Among above technologies, ICM gave highest yield of 40.44 q/ha in demo plot.



**Table 3.25 Thematic area wise physical achievements of FLDs on cereal and millet crops in Gujarat**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Finger millet	ICM	1	80	16	11.05	9.45	16.93	12405	9645
	Varietal	1	25	5	13.76	10.05	36.92	10640	7075
	<b>Sub-Total</b>	<b>2</b>	<b>105</b>	<b>21</b>	<b>12.41</b>	<b>9.75</b>	<b>26.92</b>	<b>11523</b>	<b>8360</b>
Little millet	Varietal	1	25	5	13.12	9.46	38.69	9680	6190
Maize	ICM	1	20	8	30.26	21.95	37.86	23827	12495
Paddy	ICM	4	713	275	42.69	36.15	20.55	45679	30994
	IDM	1	10	4	56.80	48.00	18.33	64400	48000
	INM	1	10	4	58.00	50.00	16.00	68000	47500
	IPDM	3	26	20	31.86	27.66	14.76	28448	22433
	IPM	3	40	10	43.02	36.60	15.71	37094	26073
	Varietal	4	111	87	26.18	24.59	13.28	20934	18757
	<b>Sub-Total</b>	<b>10</b>	<b>910</b>	<b>400</b>	<b>39.20</b>	<b>33.81</b>	<b>17.71</b>	<b>39304</b>	<b>28223</b>
Wheat	ICM	4	130	44	40.44	34.56	17.32	50806	37098
	INM	5	74	31	36.01	32.12	11.92	41791	34294
	Varietal	9	201	76.25	39.92	33.89	18.31	52421	39896
	<b>Sub-Total</b>	<b>16</b>	<b>405</b>	<b>151.25</b>	<b>38.97</b>	<b>33.56</b>	<b>16.34</b>	<b>49155</b>	<b>37732</b>
<b>Grand Total</b>			<b>1465</b>	<b>585.25</b>					

### Commercial Crops

Technology demonstrations under sugarcane were taken up covering 56 farmers on 17.5 ha area at farmers' fields (Table 3.26). Under different components of ICM, INM and IPM, mean yield of 1010.26 q/ha was obtained which was higher over local check (910.63 q/ha) with net profit of Rs. 137349/ha. Under IPM component, highest yield of 1160 q/ha was attained. In tobacco, varietal component gave yield of 43.20 q/ha which was greater as compared to local check (28.00 q/ha) with net profit of Rs. 58840/ha.


**Table 3.26 Thematic area wise physical achievements of FLDs on commercial crops in Gujarat**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Sugarcane	ICM	2	17	2.5	823.50	695.00	19.35	128680	100160
	INM	1	17	6	1122.16	1059.07	5.95	140493	126544
	IPM	1	12	5	1160.00	1045.00	11.00	148400	129325
	<b>Sub-Total</b>	<b>3</b>	<b>46</b>	<b>13.5</b>	<b>1010.26</b>	<b>910.63</b>	<b>12.32</b>	<b>137349</b>	<b>116546</b>
Tobacco	Varietal	1	10	4	43.20	28.00	54.29	58840	31300
<b>Grand-Total</b>			<b>56</b>	<b>17.5</b>					



## Fodder Crops

Fodder crops played an important role towards livestock management and gave higher milk yield. Different frontline demonstrations on bajra (35), barley (10), jowar (275), lucerne (30) and oat (50) were conducted covering an area of 75 ha at farmers' fields (Table 3.27). In bajra, average yield of 392.00 q/ha was obtained under varietal component which proved superior to local check (337.50 q/ha). In jowar, ICM component reported highest yield of 632.50 q/ha which was greater as compared to local check (505.50 q/ha). In lucerne, ICM component gave yield of 513.20 q/ha which was higher (34.09%) over farmer's practice (378.50 q/ha). In oat, improved variety gave yield of 493.00 q/ha with net profit of Rs. 46068/ha.



**Table 3.27 Thematic area wise physical achievement of FLDs on fodder crops in Gujarat**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Bajra	Varietal	2	35	5	392.00	337.50	16.19	34545	27698
Barley	Varietal	1	10	4	472.00	-	-	82800	-
Lucerne	ICM	2	30	9	513.20	378.50	35.09	70925	45669
Oat	Varietal	1	50	10	493.00	-	-	46068	-
Sorghum	ICM	3	60	9	632.50	505.50	25.59	72674	59392
	Varietal	7	215	38	552.23	453.13	17.28	70028	50882
	<b>Sub-Total</b>	<b>10</b>	<b>275</b>	<b>47</b>	<b>578.98</b>	<b>470.58</b>	<b>20.05</b>	<b>70910</b>	<b>53718</b>
<b>Grand Total</b>			<b>400</b>	<b>75</b>					

## Fruit Crops

In horticultural crops, demonstrations on banana (16) and mango (272) were conducted on 118 ha area at farmers' fields (Table 3.28). In banana, INM gave yield

of 573.50 q/ha which was greater than local check (500 q/ha). In mango, technologies such as INM and IPM gave yield of 69.39 q/ha and found good over check. Among above technologies, INM gave highest yield of 79.50 q/ha under demonstrations.





**Table 3.28 Thematic area wise physical achievements of FLDs on Fruit crops in Gujarat**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Banana	INM	2	16	16	573.50	500.00	14.92	265150	214850
Mango	INM	2	238	91	79.50	67.30	18.76	209420	173465
	IPM	2	34	11	62.64	52.60	20.40	186715	143910
	<b>Sub-Total</b>	<b>3</b>	<b>272</b>	<b>102</b>	<b>69.39</b>	<b>58.48</b>	<b>19.74</b>	<b>195797</b>	<b>155732</b>
	<b>Grand Total</b>		<b>288</b>	<b>118</b>					

### Plantation Crops

Coconut demonstrations (05) were organized covering an area of 0.25 ha in field conditions (Table

3.14). In coconut, technologies such as INM gave yield of 46863 nut/ha which was higher (9.54%) as compared to local practice (42780 nut/ha).

### Spices Crops

Under spices, ajwain (37), coriander (95), cumin (207), fennel (110), isabgul (20), dilseed (10) and turmeric (10) were demonstrated covering an area of 179.25 ha in the farmers' fields (Table 3.29). In coriander, IDM gave yield of 19.80 q/ha with net profit of Rs. 65400/ha. In cumin, INM, ICM, IDM, varietal introduction and IPM provided yield of 9.08 q/ha which was higher over local check (7.98 q/ha) with net economic gain of Rs. 97159/ha. Among above technologies, IPM gave highest yield of 11.10 q/ha in demonstration plots. In fennel, IDM, IDM, ICM, IPM and varietal introduction gave yield of 18.31 q/ha which was greater than local check (14.81 q/ha). Among above technologies, INM



gave highest yield of 24.50 q/ha in demonstration plots. In turmeric, varietal introduction gave yield of 117.80 q/ha with profit of Rs. 54730/ha.

**Table 3.29 Thematic area wise physical achievements of FLDs on spices crops in Gujarat**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Ajwain	ICM	2	37	15	15.49	13.26	16.78	95884	77733
Coriander seed	ICM	2	45	15	12.06	10.55	15.99	71815	55557
	IDM	1	20	8	19.80	17.36	14.06	65400	53700
	INM	1	20	8	17.50	15.45	13.27	71300	60700
	<b>Sub-Total</b>	<b>4</b>	<b>95</b>	<b>35</b>	<b>14.63</b>	<b>12.76</b>	<b>15.67</b>	<b>62765</b>	<b>49881</b>
Cumin	ICM	2	75	30	10.54	9.33	13.91	114309	90144
	IDM	5	102	37.25	8.33	7.25	15.27	92673	76253
	INM	1	10	4	6.60	6.10	8.20	49800	46800
	IPM	1	10	4	11.10	10.00	11.00	102940	90600
	Varietal	1	10	4	9.68	8.20	18.05	114200	93640
	<b>Sub-Total</b>	<b>10</b>	<b>207</b>	<b>79.25</b>	<b>9.08</b>	<b>7.98</b>	<b>14.21</b>	<b>97159</b>	<b>79916</b>

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Dilseed	Varietal	1	10	4	8.00	7.10	12.68	34300	28700
Fennel	ICM	3	55	22	15.49	13.28	17.16	72755	58068
	IDM	1	25	10	18.10	15.20	19.08	106575	87300
	INM	1	10	4	24.50	17.00	44.12	111325	82000
	Varietal	1	20	5	20.80	16.80	23.81	97000	59950
	<b>Sub-Total</b>		<b>5</b>	<b>110</b>	<b>41</b>	<b>18.31</b>	<b>14.81</b>	<b>23.08</b>	<b>88861</b>
Isabgul	ICM	1	10	4	8.20	6.90	18.84	46530	30932
	Varietal	1	10	4	10.75	9.60	11.98	60840	51800
	<b>Sub-Total</b>	<b>2</b>	<b>20</b>	<b>8</b>	<b>9.48</b>	<b>8.25</b>	<b>15.41</b>	<b>53685</b>	<b>41366</b>
Turmeric	Varietal	1	10	1	117.80	104.30	12.94	54730	15010
	<b>Grand Total</b>		<b>479</b>	<b>179.25</b>					

### Tuber Crops

In tuber crops, demonstrations on potato (110) conducted covering an area of 39 ha in the farmers' field conditions (Table 3.30). In potato, components of ICM, IDM and INM gave yield of 307.27 q/ha which showed superiority over existing practice (268.20

q/ha). Following integrated nutrient management provided highest yield of 370 q/ha under demonstrations. Sweet potato gave average yield of 146/ha with net profit of Rs. 121947/ha in Valsad district.



Table 3.30 Thematic area wise physical achievements of FLDs on tuber crops in Gujarat

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Potato	ICM	1	75	25	302.24	260.00	16.25	192000	139000
	IDM	1	25	10	249.58	229.61	8.70	67348	51526
	INM	1	10	4	370.00	315.00	17.46	440860	313497
	<b>Sub-Total</b>	<b>3</b>	<b>110</b>	<b>39</b>	<b>307.27</b>	<b>268.20</b>	<b>14.13</b>	<b>233403</b>	<b>168008</b>
Sweet potato	ICM	1	17	1	146.00	120.10	21.57	121947	85652
	<b>Grand-Total</b>		<b>127</b>	<b>40</b>					

## Vegetable Crops

A total of 118 frontline demonstrations in brinjal, 33 green chilli, 20 cabbage, 106 okra, 127 tomato, 35 cluster bean, 98 onion, 20 pointed gourd, 345 field bean, 10 ridge gourd and 18 demonstrations on watermelon were conducted covering 209.5 ha area at farmers' fields (Table 3.31). In brinjal, varietal, ICM, INM, IPDM and IPM gave yield of 268.82 q/ha which was greater than existing practice (240.47 q/ha). Improved variety gave highest yield of 340.15 q/ha under demonstration plots. In cabbage, IPM provided yield of 332 q/ha. In green chilli, varietal, IPM and ICM components gave yield of 159.89 q/ha. In cluster

bean, varietal introduction gave yield of 10.43 q/ha which was more than local check with 9.01% increase. In okra, varietal introduction provided yield of 104.16 q/ha which was at par with local check (104.13 q/ha). In onion, ICM, IPM and varietal introduction gave yield of 292.25 q/ha which was more than local check (253.18 q/ha). Among above technologies, varietal introduction gave highest yield of 313.45 q/ha in demonstration plots. In tomato, technologies such as INM, IPM, ICM and improved varieties harvested yield of 327.25 q/ha which showed better performance as compared to existing practice (293.45 q/ha). IPM in tomato attained highest yield of 460.32 q/ha under demonstrations.



Table 3.31 Thematic area wise physical achievements of FLDs on vegetable crops in Gujarat

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Brinjal	ICM	1	6	12	267.00	239.00	11.72	49387	41136
	INM	2	35	14	178.35	165.05	8.05	147054	116686
	IPDM	1	10	4	161.55	143.55	12.54	139976	116896
	IPM	3	32	13.04	287.83	254.63	13.06	106073	87971
	Varietal	3	35	10	340.15	304.68	14.76	298971	249476
	<b>Sub-Total</b>	<b>9</b>	<b>118</b>	<b>53.04</b>	<b>268.82</b>	<b>240.47</b>	<b>12.44</b>	<b>164061</b>	<b>135611</b>
Cabbage	IPM	1	20	5	332.00	328.00	1.22	203174	198411
Chilli green	ICM	2	11	14	186.25	162.00	11.93	76746	68875
	IPM	2	17	7	161.74	140.36	15.22	256061	202963
	Varietal	1	5	2	103.50	94.00	10.11	134275	116500
	<b>Sub-Total</b>	<b>4</b>	<b>33</b>	<b>23</b>	<b>159.89</b>	<b>139.74</b>	<b>12.88</b>	<b>159977</b>	<b>132035</b>
Clusterbean	IDM	1	25	10	6.80	5.50	23.64	64000	42050
	Varietal	1	10	4	10.43	9.01	15.76	38388	30813
	<b>Sub-Total</b>	<b>2</b>	<b>35</b>	<b>14</b>	<b>8.62</b>	<b>7.26</b>	<b>19.70</b>	<b>51194</b>	<b>36431</b>
Fieldbean	ICM	3	212	17.9	24.41	19.25	26.13	81270	60606
	INM	1	10	4	28.45	22.65	25.61	70920	52430



Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
	Varietal	3	123	22.3	35.47	26.58	33.32	59344	38767
	<b>Sub-Total</b>	<b>6</b>	<b>345</b>	<b>44.2</b>	<b>29.77</b>	<b>22.88</b>	<b>29.27</b>	<b>70375</b>	<b>49991</b>
Okra	Varietal	7	106	26	104.16	104.13	0.45	165400	163302
Onion	ICM	1	20	2	205.70	166.90	23.25	145600	80620
	IPM	1	5	2	294.00	276.00	6.52	106570	95710
	Varietal	3	73	17.2	313.45	269.05	16.26	150892	125034
	<b>Sub-Total</b>	<b>5</b>	<b>98</b>	<b>21.2</b>	<b>292.25</b>	<b>253.18</b>	<b>15.80</b>	<b>142623</b>	<b>112744</b>
Pointed gourd	INM	1	10	4	142.02	135.10	5.12	228050	217250
	IPDM	1	10	4	145.50	130.50	11.49	233750	203250
	<b>Sub-Total</b>	<b>1</b>	<b>20</b>	<b>8</b>	<b>143.76</b>	<b>132.80</b>	<b>8.31</b>	<b>230900</b>	<b>210250</b>
Ridgegourd	IPDM	1	10	2	351.00	310.00	13.23	435250	368500
Tomato	ICM	2	55	22	193.63	176.86	10.62	132933	118243
	INM	1	10	4.04	269.00	248.80	8.12	141250	121562
	IPM	4	42	17	460.32	408.13	12.31	269458	218016
	Varietal	1	20	4	254.12	229.14	10.90	191670	170090
	<b>Sub-Total</b>	<b>7</b>	<b>127</b>	<b>47.04</b>	<b>327.25</b>	<b>293.45</b>	<b>11.12</b>	<b>201061</b>	<b>168716</b>
Watermelon	INM	1	6	12	493.00	433.00	13.86	128000	92300
	IPM	1	12	5	267.00	243.00	9.88	97050	84550
	<b>Sub-Total</b>	<b>2</b>	<b>18</b>	<b>17</b>	<b>380.00</b>	<b>338.00</b>	<b>11.87</b>	<b>112525</b>	<b>88425</b>
	<b>Grand Total</b>		<b>930</b>	<b>260.48</b>					

## Hybrid Crops

More attention on promoting hybrids under different crops for getting higher productivity was given by KVKs in the zone. Frontline demonstrations on paddy (95), cotton (640), castor (201), bitter gourd (25), brinjal (50), green chilli (76), okra (26), tomato (10) and maize (70) were conducted covering an area of 454.2 ha at farmers' fields (Table 3.32). In paddy, technological

interventions such as ICM and hybrid gave yield of 33.21 q/ha which was higher (11.78%) over check (30.07 q/ha). Among above technologies, ICM gave highest yield of 35.61 q/ha in demonstration plots. In okra, technologies such as IPDM provided mean yield of 146.88 q/ha which was more than (123.38 q/ha) check. In tomato, interventions like ICM and IDM reported yield of 577.50 q/ha which was greater than existing practice (371 q/ha).



Table 3.32 Thematic area wise physical achievements of FLDs on hybrid crops in Gujarat

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Bajra	Hybrid	1	10	4	41.50	33.63	23.40	45134	34541
Maize	Hybrid	1	50	10	19.10	14.36	33.01	13558	7966
	IPM	1	20	8	59.20	55.00	7.64	88600	78800
	<b>Sub-Total</b>	<b>2</b>	<b>70</b>	<b>18</b>	<b>39.15</b>	<b>34.68</b>	<b>20.32</b>	<b>51079</b>	<b>43383</b>
Paddy	Hybrid	1	10	4	28.40	25.20	12.70	17620	13210
	ICM	2	85	25	35.61	32.51	11.33	32044	24942
	<b>Sub-Total</b>	<b>3</b>	<b>95</b>	<b>29</b>	<b>33.21</b>	<b>30.07</b>	<b>11.78</b>	<b>27236</b>	<b>21031</b>
Cotton	Hybrid	4	65	44	19.51	16.24	18.51	55952	39523
	ICM	8	172	64	19.56	17.10	14.86	64958	50406
	INM	6	107	43	22.38	19.46	13.93	78864	60829
	IPDM	2	35	14	19.55	16.55	17.11	70280	54098
	IPM	12	261	105.5	22.60	19.29	17.03	77129	59833
	<b>Sub-Total</b>	<b>21</b>	<b>640</b>	<b>270.5</b>			<b>16.10</b>	<b>71102</b>	<b>54530</b>
Sunhemp	ICM	1	5	2	32.50	25.20	28.97	135100	97870
Bajra	Hybrid	2	46	6	424.50	396.00	7.25	20573	18894
	ICM	1	10	1	398.00			70850	
	<b>Sub-Total</b>	<b>3</b>	<b>56</b>	<b>7</b>	<b>415.67</b>	<b>396.00</b>	<b>7.25</b>	<b>37332</b>	<b>18894</b>
Napier	Hybrid	1	7	2	1850.00	1570.00	17.83	121400	96450
Castor	Hybrid	2	40	7	472.38	288.00	13.19	64058	26970
	Hybrid	4	126	45.2	23.66	20.35	16.77	80608	65204
	ICM	3	55	15	33.51	28.45	17.55	120481	99066
	IDM	1	20	8	23.30	19.00	22.64	82150	63750
	<b>Sub-Total</b>	<b>8</b>	<b>201</b>	<b>68.2</b>	<b>26.28</b>	<b>22.31</b>	<b>18.05</b>	<b>91762</b>	<b>74175</b>
Bittergourd	ICM	1	25	2.5	211.10	178.56	18.22	123700	97850
Brinjal	Hybrid	1	10	1	314.53	269.93	16.52	24951	16025
	ICM	1	10	4	342.50	265.20	29.15	143375	100860
	IPDM	2	30	9	305.10	271.25	13.01	188319	145463
	<b>Sub-Total</b>	<b>4</b>	<b>50</b>	<b>14</b>	<b>316.81</b>	<b>269.41</b>	<b>17.92</b>	<b>136241</b>	<b>101953</b>
Chilli green	Hybrid	1	20	4	93.24	75.15	24.07	135980	100700
	ICM	1	10	4	172.60	128.70	34.11	185270	93005
	INM	1	20	5	235.21	214.37	9.72	82918	69441
	IWM	1	26	5	365.00	335.00	8.96	876600	778500
	<b>Sub-Total</b>	<b>4</b>	<b>76</b>	<b>18</b>	<b>216.51</b>	<b>188.31</b>	<b>19.21</b>	<b>320192</b>	<b>260412</b>
Okra	IPDM	2	26	8	146.88	123.38	19.69	219750	164550
Tomato	ICM	1	5	2	577.50	371.00	55.66	315250	148900
	IDM	1	5	2	577.50	371.00	55.66	315250	148900
	<b>Sub-Total</b>	<b>1</b>	<b>10</b>	<b>4</b>	<b>577.50</b>	<b>371.00</b>	<b>55.66</b>	<b>315250</b>	<b>148900</b>
	<b>Grand Total</b>		<b>1311</b>	<b>454.2</b>					

## Livestock and Fisheries

Integrating livestock and fisheries as components in integrated farming system models is very important for sustainable agriculture and livelihood security. In this context, KVKs had demonstrated different interventions on different components. A total of 1587 demonstrations (524-dairy buffalo; 700-dairy cow; 40 in goat; 88 in poultry and 235 in fisheries) were conducted covering 2822 livestock (Table 3.33). In dairy buffalo and cow, technologies such as area specific mineral mixture, probiotics, fodder, rumen

bypass fat, urea treatment, chaff cutting, ration balancing, management of mastitis, management of infertility, etc. provided higher yield over respective local checks. In sheep and goat, technologies such as deworming, ration balancing, mineral mixture, parasite management, IDM, etc. gave higher yield over respective local checks. In case of poultry, technologies such as improved breeds gave higher yield over respective local check. In case of fishery, technologies such as Catla, Rohu, Grass carp, Common carp, IFS, composite culture, etc. performed well as compared to local check.



**Table 3.33 Frontline demonstrations on livestock and fisheries conducted by KVKs of Gujarat**

Livestock	Thematic Area	KVK	Demos (No.)	Livestock (No.)	Unit of Yield	Intervention	Check	% Increase over Check
Dairy Buffalo	Disease Management	1	20	20	Infertility rate %	26.00	75.00	-65.33
	Disease Management	2	40	40	Milk yield L/anim./day	9.93	8.10	9.88
	Disease Management	1	20	20	Morbidity rate %	10.00	30.00	-66.67
	Nutrition Management	1	35	35	Conception rate %	23.00	18.00	27.78
	Nutrition Management	1	20	20	kg/animal	6.90	5.82	18.56
	Nutrition Management	1	15	15	kg/animal/day weight gain	0.36	0.29	23.32
	Nutrition Management	12	294	306	Milk yield L/anim./day	9.39	8.20	14.01
	Nutrition Management	2	20	20		351.00	290.00	19.36
	Production and Management	2	40	40	Conception rate %	67.50	10.00	500.00
	Production and Management	1	20	20	Milk yield L/anim./day	8.60	8.40	2.38
	<b>Sub-Total</b>			<b>524</b>	<b>536</b>			



Livestock	Thematic Area	KVK	Demos (No.)	Livestock (No.)	Unit of Yield	Intervention	Check	% Increase over Check
Dairy Cow	Disease Management	1	20	20	Fertility rate %	55.00		
	Disease Management	3	120	170	Milk yield L/anim./day	7.39	6.70	11.47
	Disease Management	2	35	35	Morbidity rate %	26.67	43.33	-39.28
	Nutrition Management	2	40	40	kg/animal	100.14	83.04	20.26
	Nutrition Management	1	10	10	kg/animal weight gain	50.00	43.00	16.28
	Nutrition Management	9	305	530	Milk yield L/anim./day	10.38	9.06	14.91
	Nutrition Management	1	20	20	q/ha	392.00		
	Production and Management	1	150	150	Conception rate %	58.00	47.00	23.40
	<b>Sub-Total</b>			<b>700</b>	<b>975</b>			
Fishery	Production and Management	1	5	2	Numbers	32000.00	18600.00	72.04
	Production and Management	2	230	51	q/ha	1981.50	1303.25	47.37
	<b>Sub-Total</b>		<b>235</b>	<b>53</b>				
Goat	Disease Management	1	10	10	Milk yield L/anim./day	1.90	1.00	90.00
	Disease Management	1	10	10	Morbidity rate %	0.70	2.10	-66.67
	Nutrition Management	1	20	60	g/day/animal	26.06	22.70	14.80
	<b>Sub-Total</b>		<b>40</b>	<b>80</b>				
Poultry	Nutrition Management	1	20	600	kg/bird	1.05	0.95	10.53
	Production and Management	3	68	578	kg/bird	1.63	1.27	28.79
	<b>Sub-Total</b>		<b>88</b>	<b>1178</b>				
<b>Grand-Total</b>			<b>1587</b>	<b>2822</b>				

## Goa

### Crops

Different technology demonstrations were laid out at farmers' fields especially on paddy (04) on 2 ha area. In paddy, technologies such as improved variety gave yield of 20.9 q/ha as compared to 12.7 q/ha in local check with 64.57 % increase. In plantation crops like

cashew (10) and coconut (10) demonstrations were laid out at farmers' fields and covered 7 ha area. In cashew, technologies such as IPDM gave yield of 13.3 q/ha as compared to 6.28 q/ha in local check with 111.78% increase with net profit of Rs. 103618/ha (Table 3.34).



**Table 3.34 Thematic area wise physical achievements of FLDs on crops in Goa**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo yield (q/ha)	Check yield (q/ha)	% Increase	Net return (Rs./ha)	
								Demo	Check
Paddy	Varietal	1	4	2	20.9	12.7	64.57	32920	9970
Cashew	IPDM	1	10	5	13.3	6.28	111.78	103618	28750
Coconut	IDM	1	10	2	15550 (Nut/ha)	13120 (Nut/ha)	18.52	66200	49980
	<b>Total</b>		24	9					

### Livestock and Fisheries

A total of 20 FLDs in dairy cow covering 200 animals were conducted in the farmers' fields (Table 3.35). In

dairy cow, technologies such as disease management and nutrition management gave higher yield over respective local check.

**Table 3.35 Frontline demonstrations on livestock & fisheries conducted by KVKs of Goa**

Livestock	Thematic Area	No. of KVKs	Demos (No.)	Livestock (No.)	Unit of Yield	Demo yield	Check yield	% Increase over check
Dairy Cow	Disease Management	1	10	100	Milk yield L/anim./day	13.89	12.4	12.02
Dairy Cow	Nutrition management	1	10	100	Milk yield L/anim./day	12.8	11.93	7.29
	<b>Total</b>		<b>20</b>	<b>200</b>				

### Farm Implements

A total of 1958 FLDs (1515 in Maharashtra and 443 in Gujarat) were organized on farm implements. In chickpea, major implements demonstrated were wheel hand hoe, solar sprayer, PKV mini dall mill, tractor drawn multicrop planter, three row CRIDA planter, BBF planter. In cotton, major implements demonstrated were cotton uprooting stalk, hoe, mobile shredder, cotton picking apron, tractor drawn

shedder, bullock drawn ridger, manually operated dibbler, cycle boom sprayer, mini power tiller, cotton slasher, solar sprayer, power weeder, B/D operated sprayer, mobile shredder. In paddy, major implements demonstrated were paddy reaper, cono weeder, self-propelled reaper, paddy transplanter, vertical conveyor reaper, seed cum fertilizer drill. The crop-wise and state-wise details of farm implements demonstrated are given in Table 3.36.


**Table 3.36 Implements used by the KVKs with number of demonstrations**

Crop	Implement/equipment used	No. of KVKs	No. of demos
<b>Maharashtra</b>			
Brinjal	Mittens, zero energy fruit & veg preserver, sapling transplanter	3	70
Chickpea	Wheel hand hoe, solar sprayer, PKV mini dall mill, tractor drawn multicrop planter, three row CRIDA planter, BBF planter	7	79
Chilli green	Rotary tiller	1	13
Cotton	Cotton uprooting stalk, hoe, mobile shredder, cotton picking apron, tractor drawn shedder, bullock drawn ridger, manually operated dibbler, cycle boom sprayer, mini power tiller, cotton slasher, solar sprayer, power weeder, B/D operated sprayer, mobile shredder	9	316
Custard apple	Deseeding machine	1	13
Garlic	Garlic planter	1	100
Groundnut	Mogi wheel hoe, groundnut decorticator, motorised groundnut strippper, BBF planter, ground nut stripper	7	113
Maize	Bullock operated three tyneweeder, hand operated rotary maize sheller	2	21
Mango	Post hole digger	1	15
Mulberry	Cocoon harvester	3	52
Okra	Okra mitten	3	43
Paddy	Paddy reaper, cono weeder, self-propelled reaper, paddy transplanter, vertical conveyor reaper, seedcum fertilizer drill	5	166
Pigeonpea	Spiral separator, grain cleaner cum grader	2	20
Pomegranate	pomegranate sheller	1	18
Soybean	BBF planter, spiral seperator, mittens, grain cleaner cum grader, save grain bags, twin wheel hoe, B/D 3 tyneferti hoe, three row CRIDA planter	14	316
Sugarcane	Mulcher	1	10
Vegetables	Zero energy cool chamber, janta fridge	2	18
Wheat	Insect probe trap, bullock drawn multicrop planter, supar grain bag, spiral gravity separator	8	132
	<b>Total</b>		<b>1515</b>



Crop	Implement/equipment used	No. of KVKs	No. of demos
<b>Gujarat</b>			
Bajra	Roto till drill	1	5
Castor	Dibbler, power weeder, secutter	3	30
Chickpea	Twin wheel hoe weeder	3	130
Chilli green	Transplanter	1	5
Cotton	Cotton shredder	1	12
Cumin	Wheel hoe	1	5
Fodder Sorghum	Chaff cutter	1	20
Greengram	Hand weeder, wheel hoe	2	35
Okra	Hand weedar	1	50
Paddy	Paddy thresher	2	65
Potato	Power harrow	1	5
Wheat	CIAE double screen cleaner, power Reaper, serrated sickle	6	81
	<b>Total</b>		<b>443</b>
	<b>Grand Total</b>		<b>1958</b>

### Other Enterprises

A total of 3191 FLDs (1383 in Maharashtra, 1792 in Gujarat and Goa 16) were organized on other enterprises such as mushroom production, nutrition garden, drudgery reduction, vermi compost, storage loss minimization techniques and processing and value addition in crops like introduction of soya nuts for eradication of malnutrition among pre-schoolers, preparation of Iron and B-Carotene rich bajra cookies, finger millet biscuit, etc. Demonstrations were also conducted on production and management of mushroom, sericulture, apiary for income generation mainly for farm women by the KVKs of Maharashtra



and Gujarat through establishment of SHGs and production units during the year. The enterprise-wise and state-wise details are given Table 3.37.

**Table 3.37 Enterprises demonstrated by KVKs**

Enterprise	No. of KVKs	No. of Demonstrations
<b>Maharashtra</b>		
Drudgery reduction	13	296
Mushroom Production	4	48
Nutrition Garden	13	449
Nutrition security	6	160
Processing and Value Addition	13	305
Storage loss minimization techniques	1	25
Vermicomposting	4	100
<b>Total</b>		<b>1383</b>

Enterprise	No. of KVKs	No. of Demonstrations
<b>Gujarat</b>		
Drudgery Reduction	3	160
Mushroom Production	2	42
Nutrition Garden	15	1580
Vermicompost	1	10
<b>Total</b>		<b>1792</b>
Processing and Value Addition	1	6
Nutrition Garden	1	10
<b>Total</b>		<b>16</b>
<b>Grand Total</b>		<b>3191</b>

## Cluster Frontline Demonstrations

### Cluster Frontline Demonstrations of Pulses under NFSM

Cluster Frontline Demonstrations of Pulses under NFSM 2018-19 was sanctioned by Ministry of Agriculture & Farmers Welfare, Government of India with an aim to enhance the pulses production in the

country. ICAR-ATARI, Pune implemented the project on major pulse crops viz. pigeonpea, chickpea, black gram, horse gram, wal and green gram in selected districts through respective KVKs in the states of Maharashtra and Gujarat during year 2018-19. Details of cluster frontline demonstrations are presented as under:



### Target and Achievements

#### Target

A target of 9525 cluster frontline demonstrations was fixed with coverage of 3810 ha of area in the states of Maharashtra and Gujarat, which was approved for *kharif*, *rabi* and *summer* seasons during 2018-19. Out of which 4175 demonstrations with coverage of area 1670 ha for crops viz., green gram, black gram and pigeon pea in *kharif* season, 4500 demonstrations in an area of 1800 ha for crops viz., chickpea and green gram during *rabi* season, and 850 cluster frontline demonstrations with area of 340 ha on green gram during summer were proposed.

#### Achievements

In total, 9765 demonstrations were laid out in cluster mode on 3667.2 ha area out of targeted 9525 CFLDs (3810) ha.

**(i) Kharif Season:** A total of 4084 technology demonstrations were conducted on three pulse crops viz., green gram, black gram and pigeon pea in an area of 1553.8 ha covering two states Maharashtra and Gujarat.

**(a) Green gram:** Cluster FLDs were implemented in an area of 360 ha with active involvement of 895 farmers in Maharashtra.

- (b) Black gram:** Cluster FLDs were implemented in an area of 340 ha with the involvement of 832 farmers of which 210 ha with 520 farmers in Maharashtra and 130 ha with 312 farmers in Gujarat.
- (c) Pigeon pea:** Cluster FLDs were laid out in an area of 833.8 ha with participation of 2307 farmers of which 652.8 ha with 1754 farmers in Maharashtra and 181 ha with 553 farmers in Gujarat.
- (ii) Rabi Season:** For making larger impact in the area, 4611 demonstrations were conducted in cluster mode on three pulse crops viz., chickpea, horse gram and wal in an area of 1773.4 ha covering two states Maharashtra and Gujarat.
- (a) Chick pea:** Cluster FLDs were implemented in an area of 1733.4 ha with the involvement of 4359 farmers, out of which 1232.4 ha with 3069 farmers in Maharashtra and 501 ha with 1290 farmers in Gujarat.
- (b) Horse gram:** Cluster FLDs were implemented in area of 30 ha with the involvement of 227 farmers.
- (c) Wal:** Cluster FLDs were implemented in area of 10 ha with the involvement of 25 farmers.
- (ii) Summer Season:** A total of 1070 cluster frontline demonstrations were conducted on pulse crop green gram in an area of 340 ha in Gujarat.
- (a) Green gram:** Cluster FLDs were implemented in an area of 340 ha with 1070 participating farmers in Gujarat.

Abstract of approved CFLDs on pulses under NFSM and their achievements during 2018-19 is presented in Table 3.38.

**Table 3.38 Abstract of approved cluster FLDs on pulses under NFSM and their achievements**

Sl. No.	Crops	State	Approved CFLDs		Achievements of CFLDs	
			Area (ha)	No. of Demos	Area (ha)	No. of Demos
<b>Kharif</b>						
1	Green gram	Maharashtra	410	1025	360	895
		Gujarat	20	50	20	50
	<b>Total</b>		<b>430</b>	<b>1075</b>	<b>380</b>	<b>945</b>
2	Black gram	Maharashtra	240	600	210	520
		Gujarat	130	325	130	312
	<b>Total</b>		<b>370</b>	<b>925</b>	<b>340</b>	<b>832</b>
3	Pigeon pea	Maharashtra	680	1700	652.8	1754
		Gujarat	190	475	181	553
	<b>Total</b>		<b>870</b>	<b>2175</b>	<b>833.8</b>	<b>2307</b>
	<b>Grand Total (Kharif)</b>		<b>1670</b>	<b>4175</b>	<b>1553.8</b>	<b>4084</b>
<b>Rabi</b>						
1	Chickpea	Maharashtra	1220	3050	1232.4	3069
		Gujarat	540	1350	501	1290
	<b>Total</b>		<b>1760</b>	<b>4400</b>	<b>1733.4</b>	<b>4359</b>
2	Horse gram	Maharashtra	30	75	30	227
3	Wal	Maharashtra	10	25	10	25
	<b>Grand Total (Rabi)</b>		<b>1800</b>	<b>4500</b>	<b>1773.4</b>	<b>4611</b>
<b>Summer</b>						
1	Green gram	Maharashtra	10	25	0	0
		Gujarat	330	825	340	1070
	<b>Grand Total (Summer)</b>		<b>340</b>	<b>850</b>	<b>340</b>	<b>1070</b>
	<b>Total (Kharif+Rabi+Summer)</b>		<b>3810</b>	<b>9525</b>	<b>3667.2</b>	<b>9765</b>



## Technologies Demonstrated

Under CFLD on Pulses, improved and latest varieties along with full package of practices for each pulse crop were adopted and followed. Details are given as under:

## Varieties

The varieties of different pulse crops were demonstrated. Crop-wise and season-wise varieties demonstrated are presented in Table 3.39.

**Table 3.39 Crop-wise varieties demonstrated under NFSM during 2018-19**

Region	KVKs	Name of Crop Varieties							
		Pigeon pea	Urdbean	Mungbean	Chickpea	Horse gram	Cowpea	Wal	Moth Bean
<b>Maharashtra</b>									
Vidarbha	Amaravati-I, Amaravati-II, Akola, Bhandara, Buldhana-I, Buldhana-II, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Washim, Yavatmal-I, Yavatmal-II	PKV-TARA, BDN 716, PKV-ASHA	Black Gold, AKU-15, AKU-10-1	BM-2003-2	Digvijay, RVG-202 / PDKV Kanchan, RVG 203, JAKI-9218, Raj Vijay-203, PKV- Harita				
Marathwada	Aurangabad -I, Aurangabad -II, Beed-I, Beed-II, Hingoli, Jalna-I, Jalna-II, Latur, Nanded-I, Nanded-II, Osmanabad, Parbhani	BDN-711, BDN-716	Vijay, BDU-2, AKU-15, BDU-1	Utkarsha, BM-2003-2, BPMR-145	BDNG-797, Akash, Phule Vikram, Digvijay, RVG-203				
Khandesh	Dhule, Jalgaon-I, Jalgaon-II, Nandurbar, Nashik-I, Nashik-II	Rajeshwari, BDN-711	AKU-15, Vishwas (NUL-7)	BM 2003-2, Utkarsha	Phule Vikram, Digvijay, RVG-202, Akash, Krupa				
Western Maharashtra	Ahmednagar-I, Ahmednagar-II, Kolhapur-I, Pune-I, Pune-II, Sangli, Satara-I, Satara-II, Solapur-I, Solapur-II	BDN-711	TPU-4	BM-2003-2	Digvijay, Phule Vikram, RVG-203, RVG-202, Jaki-9218				
Konkan	Raigadh, Ratnagiri, Sindhudurg, Thane	Dapoli Tur No. 1		Dapoli Moong No. 1		Dapoli -I	Konkan Sadabahar and Konkan safed	Konkan Wal No. 2	
<b>Gujarat</b>									
North Gujarat	Banaskantha-I, Banaskantha-II, Gandhinagar, Mehsana, Patan, Sabarkantha	GT-103	GU-1	GM-4, GAM-5	GJG-3, GJG-5				GM-2
Central Gujarat	Ahmedabad, Anand, Bharuch, Dahod, Kheda, Narmada, Panchmahal, Vadodara	BDN-711, AGT-2	PU-1, GJU-1, NUL-1	GAM-5, GNM-6, IPM-2-03, GAM-5	GJG-3, GJG-5				
South Gujarat	Dang, Navsari, Surat, Tapi, Valsad	GNT-2, BSMR- 853, Vaishali, BDN -711		Meha, GNM-6, GM-5, Co-4	GJG-5, GG-3				
Saurashtra	Amreli, Bhavnagar, Jamnagar, Junagadh, Morbi, Porbandar, Rajkot-I, Surendranagar		Gujarat Urd-1	GAM-5, GM-4	GJG-3, GG-5, GG-6				

## Production Technologies

The general and specific production technologies demonstrated for pulse crops under CFLDs were integrated crop management; integrated nutrient, pest, disease management; seed treatment with bio agents; foliar application of micro nutrient mixtures like pulse wonder; pheromone traps, yellow stick traps; line sowing; utilization of residual moisture after cereals; mechanical harvesting in chickpea, etc.

## Results

Cluster FLDs were implemented on major pulse crops viz., green gram, black gram, pigeon pea, chickpea, horse gram and wal under NFSM during 2018-19 in an area of 3667.2 ha by involving 9765 farmers covering from two states namely Maharashtra and Gujarat. Season-wise and crop-wise results are presented hereunder:

**Performance of CFLDs on *kharif* pulses:** Cluster FLDs on three pulse crops viz., green gram, black gram and pigeon pea were implemented during *kharif* 2018-19. The demonstrations on green gram were laid out by 20 KVKs and average yield of 6.35 q/ha obtained which was higher (24.27%) over local check (5.11 q/ha). In black gram, 17 KVKs laid out demonstrations

and got mean yield of 6.71 q/ha which was more than local practice (5.50 q/ha). Under pigeon pea, 40 KVKs conducted cluster FLDs and obtained average yield of 11.97 q/ha which showed superiority (27.61%) over check (9.38 q/ha). State-wise and centre wise data is presented in Table 3.40.

**Performance of CFLDs on *Rabi* pulses:** Technology demonstrations on three pulse crops viz., chick pea, horse gram and wal were implemented during *rabi* season. Chickpea was demonstrated by 60 KVKs and average yield obtained was 16.57 q/ha which was greater (13.31%) than existing practice. While horse gram was demonstrated by 3 KVKs that resulted average yield of 7.65 q/ha which was more (42.72%) than farmer's practice (5.36 q/ha). Wal was demonstrated by one KVKs that resulted average yield of 12 q/ha which was more (37.93 %) than farmer's practice (8.70 q/ha). State-wise and KVK wise data is presented in Table 3.40.

**Performance of CFLDs on *Summer* pulses:** Green gram demonstrations (1070) were conducted on 340 ha area in *summer* season. Average yield of 9.86 q/ha was attained under demonstrations which was more by 28.72% over local check (7.66 q/ha). Net profit was gained of Rs. 35603/ha. State-wise and KVK wise data is presented in Table 3.40.

**Table 3.40 State-wise and KVK wise data on pulses in different seasons**

State	KVK	Season	Crop	Area (ha)	Demo (No.)	Average Yield (q/ha)		Increase (%)	Net Return (Rs./ha)		Increase (%)
						Demo	Check		Demo	Check	
Maharashtra	12	Kharif	Black gram	210	520	5.94	4.85	22.47	14677	9648	52.12
Gujarat	5	Kharif	Black gram	130	312	7.48	6.15	21.63	18651	13614	37.00
<b>Total</b>	<b>17</b>			<b>340</b>	<b>832</b>	<b>6.71</b>	<b>5.50</b>	<b>22.00</b>	<b>16664</b>	<b>11631</b>	<b>43.27</b>
Maharashtra	19	Kharif	Green gram	360	895	6.14	4.77	28.72	16842	9993	68.54
Gujarat	1	Kharif	Green gram	20	50	6.56	5.45	20.37	10331	6467	59.75
<b>Total</b>	<b>20</b>			<b>380</b>	<b>945</b>	<b>6.35</b>	<b>5.11</b>	<b>24.27</b>	<b>13587</b>	<b>8230</b>	<b>65.09</b>
Maharashtra	32	Kharif	Pigeon pea	652.8	1754	11.57	8.62	34.22	31942	21243	50.36
Gujarat	8	Kharif	Pigeonpea	181	553	12.37	10.15	21.87	37690	26484	42.31
<b>Total</b>	<b>40</b>			<b>833.8</b>	<b>2307</b>	<b>11.97</b>	<b>9.38</b>	<b>27.61</b>	<b>34816</b>	<b>23864</b>	<b>45.89</b>
Maharashtra	42	Rabi	Chick pea	1232.4	3069	16.30	12.94	25.97	43035	29722	44.79
Gujarat	18	Rabi	Chickpea	501	1290	16.84	13.68	23.10	46462	33956	36.83
<b>Total</b>	<b>60</b>			<b>1733.4</b>	<b>4359</b>	<b>16.57</b>	<b>13.31</b>	<b>24.49</b>	<b>44748</b>	<b>31839</b>	<b>40.54</b>
Maharashtra	3	Rabi	Horsegram	30	227	7.65	5.36	42.72	21430	8370	156.03
Maharashtra	1	Rabi	Wal	10	25	12.00	8.70	37.93	37000	22200	66.67
Gujarat	13	Summer	Green gram	340	1070	9.86	7.66	28.72	35603	22970	55.00

## Training Courses Conducted on Pulses

Different on campus and off-campus training courses were organized to orient the participating farmers about pulses production and protection technologies. In total, 546 training courses were organized with the

participation of 16223 farmers (13479 male and 2754 female) that consists of 238 on campus with 7711 participants (6400 male and 1311 female) and 308 off-campus with 8512 participants (7079 male and 1443 female). Details are given in Table 3.41.

**Table 3.41 Training programs conducted on pulses production technologies**

State	No. of KVKs	Area (ha)	Dem (No.)	On campus training				Off campus training				Total No. of Trainings and Farmers			
				C	M	F	T	C	M	F	T	C	M	F	T
<b>Kharif: Black gram</b>															
Maharashtra	12	210	520	11	343	46	389	12	313	49	362	23	656	95	751
Gujarat	5	130	312	9	251	40	291	7	148	35	183	16	399	75	474
<b>Total</b>	<b>17</b>	<b>340</b>	<b>832</b>	<b>20</b>	<b>594</b>	<b>86</b>	<b>680</b>	<b>19</b>	<b>461</b>	<b>84</b>	<b>545</b>	<b>39</b>	<b>1055</b>	<b>170</b>	<b>1225</b>
<b>Kharif: Green gram</b>															
Maharashtra	19	360	895	19	646	61	707	21	753	78	831	40	1399	139	1538
Gujarat	1	20	50	1	42		42	1	23	0	23	2	65	0	65
<b>Total</b>	<b>20</b>	<b>380</b>	<b>945</b>	<b>20</b>	<b>688</b>	<b>61</b>	<b>749</b>	<b>22</b>	<b>776</b>	<b>78</b>	<b>854</b>	<b>42</b>	<b>1464</b>	<b>139</b>	<b>1603</b>
<b>Kharif: Pigeon pea</b>															
Maharashtra	32	652.8	1754	57	1143	223	1366	47	1379	226	1605	104	2522	449	2971
Gujarat	8	181	553	14	455	145	600	13	375	203	578	27	830	348	1178
<b>Total</b>	<b>40</b>	<b>833.8</b>	<b>2307</b>	<b>71</b>	<b>1598</b>	<b>368</b>	<b>1966</b>	<b>60</b>	<b>1754</b>	<b>429</b>	<b>2183</b>	<b>131</b>	<b>3352</b>	<b>797</b>	<b>4149</b>
<b>Rabi: Chick pea</b>															
Maharashtra	42	1232.4	3069	67	1775	166	1941	77	2336	351	2687	144	4111	517	4628
Gujarat	18	501	1290	34	1120	351	1471	31	946	189	1135	65	2066	540	2606
<b>Total</b>	<b>60</b>	<b>1733.4</b>	<b>4359</b>	<b>101</b>	<b>2895</b>	<b>517</b>	<b>3412</b>	<b>108</b>	<b>3282</b>	<b>540</b>	<b>3822</b>	<b>209</b>	<b>6177</b>	<b>1057</b>	<b>7234</b>
<b>Rabi: Horse gram</b>															
Maharashtra	2	30	227	2	25	15	40	77	44	117	161	79	69	132	201
<b>Rabi: Wal</b>															
Maharashtra	1	10	25	0	0	0	0	2	22	18	40	2	22	18	40
<b>Summer: Green gram</b>															
Gujarat	15	340	1070	24	600	264	864	20	740	177	907	44	1340	441	1771
<b>Total</b>	<b>155</b>	<b>3667.2</b>	<b>9765</b>	<b>238</b>	<b>6400</b>	<b>1311</b>	<b>7711</b>	<b>308</b>	<b>7079</b>	<b>1443</b>	<b>8512</b>	<b>546</b>	<b>13479</b>	<b>2754</b>	<b>16223</b>

## Extension Activities

For making wide exposure and awareness, different extension activities on cluster frontline demonstrations for farmers and extension functionaries were organized by KVKs during season (Table 3.42). A total

of 22061 participants (20644 farmers and 1417 extension officials) attended in different extension activities and got benefitted about pulses demonstrations organized on pigeon pea, chickpea, black gram, green gram, horse gram and wal in cluster mode.



Table 3.42 Extension activities and number of participants

State	KVK	Area (ha)	Demo (No.)	Extension Activities and Participants								Total			
				Farmers				Extension Personnel				Extn Act.	M	F	T
				Extn Act.	M	F	T	Extn Act.	M	F	T				
<b>Kharif: Black gram</b>															
Maharashtra	12	210	520	27	719	88	807	19	88	6	94	46	807	94	901
Gujarat	5	130	312	20	538	106	644	7	38	0	38	27	576	106	682
<b>Total</b>	<b>17</b>	<b>340</b>	<b>832</b>	<b>47</b>	<b>1257</b>	<b>194</b>	<b>1451</b>	<b>26</b>	<b>126</b>	<b>6</b>	<b>132</b>	<b>73</b>	<b>1383</b>	<b>200</b>	<b>1583</b>
<b>Kharif: Green gram</b>															
Maharashtra	19	360	895	41	1247	118	1365	26	119	18	137	67	1366	136	1502
Gujarat	1	20	50	2	16	0	16				0	2	16	0	16
<b>Total</b>	<b>20</b>	<b>380</b>	<b>945</b>	<b>43</b>	<b>1263</b>	<b>118</b>	<b>1381</b>	<b>26</b>	<b>119</b>	<b>18</b>	<b>137</b>	<b>69</b>	<b>1382</b>	<b>136</b>	<b>1518</b>
<b>Kharif: Pigeon pea</b>															
Maharashtra	32	652.8	1754	151	3636	249	3885	39	260	25	285	190	3896	274	4170
Gujarat	8	181	553	37	590	265	855	29	27	4	31	66	617	269	886
<b>Total</b>	<b>40</b>	<b>833.8</b>	<b>2307</b>	<b>188</b>	<b>4226</b>	<b>514</b>	<b>4740</b>	<b>68</b>	<b>287</b>	<b>29</b>	<b>316</b>	<b>256</b>	<b>4513</b>	<b>543</b>	<b>5056</b>
<b>Rabi: Chick pea</b>															
Maharashtra	42	1232.4	3069	138	7077	1271	8348	65	513	82	595	203	7590	1353	8943
Gujarat	18	501	1290	96	2024	641	2665	53	121	16	137	149	2145	657	2802
<b>Total</b>	<b>60</b>	<b>1733.4</b>	<b>4359</b>	<b>234</b>	<b>9101</b>	<b>1912</b>	<b>11013</b>	<b>118</b>	<b>634</b>	<b>98</b>	<b>732</b>	<b>352</b>	<b>9735</b>	<b>2010</b>	<b>11745</b>
<b>Rabi: Horse gram</b>															
Maharashtra	2	30	227	65	148	181	329	7	5	8	13	72	153	189	342
<b>Rabi: Wal</b>															
Maharashtra	1	10	25	4	45	90	135	10	8	2	10	14	53	92	145
<b>Summer: Green gram</b>															
Gujarat	15	340	1070	128	1167	423	1595	110	66	11	77	238	1233	434	1672
<b>Total</b>	<b>155</b>	<b>3667.2</b>	<b>9765</b>	<b>709</b>	<b>17207</b>	<b>3432</b>	<b>20644</b>	<b>365</b>	<b>1245</b>	<b>172</b>	<b>1417</b>	<b>1074</b>	<b>18452</b>	<b>3604</b>	<b>22061</b>

### Yield performance of pigeon pea cultivars in Maharashtra

Technology demonstrations on pigeon pea were conducted in cluster mode with adoption of improved cultivars and full package of practices at farmers' fields. Highest yield of 12.05 q/ha was obtained under BDN-711 in Aurangabad, Jalgaon, Ahmednagar, Solapur and Pune districts with net profit of Rs. 36685.5/ha. It also gave 38.03% higher yield over state average and 25.52% over at national average yield (Fig.

3.10). PKV TARA also performed well in Akola, Amaravati, Bhandara, Buldhana, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha and Yavatmal district where 11.88 q/ha yield was attained with net gain of Rs. 31532/ha (Table 3.43). In pigeonpea, overall demonstration yield 11.57 q/ha was achieved which was quite higher over local check (8.62 q/ha) and also reflected 34.22% higher over at state average and 20.52% at national average yield (Fig. 3.9).



**Table 3.43 Yield performance of pigeonpea cultivars**

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
BDN-708	Hingoli	16.8	42	11.45	8.82	29.82	24855	14364	73.04
BDN-708	Washim	20	50	10.75	9.1	18.13	29450	20750	41.93
BDN-712	Beed-I, Beed-II, Hingoli, Jalna-I, Nanded-I, Parbhani	113.2	282	11.31	8.44	34.02	31337	19956	57.03
BDN-711	Ahmednagar-II, Aurangabad -I, Aurangabad -II, Jalgaon-I, Nundurbar, Pune-I, Solapur-I, Solapur-II	162.8	413	12.05	8.67	38.86	36685	23131	58.60
BDN-716	Latur	20	42	10.43	8.5	22.71	33326	28825	15.61
BDN-716	Dhule	20	50	10.42	6.37	63.58	32002	13542	136.32
PKV-TARA	Akola, Amaravati-I, Amaravati-II, Bhandara, Buldhana-I, Buldhana-II, Chandrapur, Gadchiroli, Gondia, Nagpur, Wardha, Yavatmal-I, Yavatmal-II	280	825	11.88	8.97	32.35	31532	22619	39.40

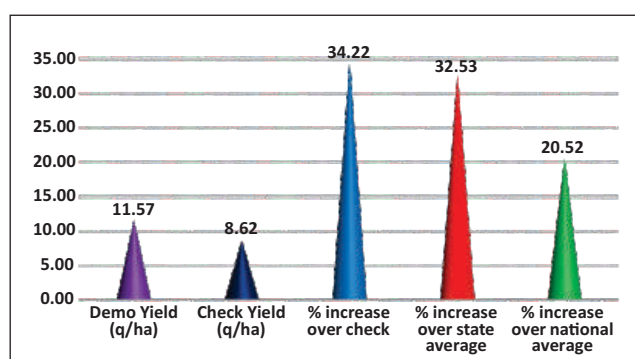


Fig. 3.9 Yield performance of Pigeon pea under CFLDs in Maharashtra

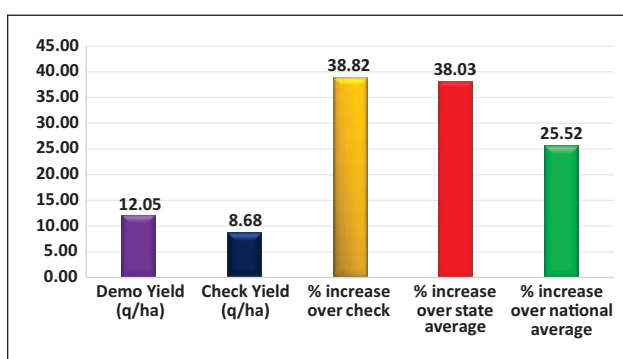


Fig. 3.10 Yield performance of Var. BDN 711 (Pigeon pea) in Maharashtra

### Performance of chickpea cultivars in Maharashtra

On an average 16.30 q/ha yield of chickpea was obtained in Maharashtra by following improved varieties and district specific technologies under

cluster frontline demonstrations (Table 3.44). It was shown 82.74% more over state average and 53.34% higher over national average yield (Fig. 3.11). Region wise and variety wise performance of chickpea cultivars i.e. JAKI- 9218 and Digvijay are given in Fig. 3.12 and 3.13.



Table 3.44 Performance of chickpea cultivars in Maharashtra

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs/ha)		% Increase
				Demo	Check		Demo	Check	
BDNG-797 (Akash)	Aurangabad I, Aurangabad-II, Beed-II, Jalna-I, Nanded-II, Parbhani	160	410	11.20	8.16	37.30	30713	18505	65.97
Digvijay	Hingoli	16.8	40	14.8	10.98	34.79	42775	26420	61.90
Digvijay	Ahmednagar-I, Ahmednagar-II, Dhule, Jalgaon-I, Jalgaon-II, Kolhapur-I, Nashik-I, Nashik-II, Pune-I, Pune-II, Sangli, Satara-I, Satara-II, Solapur-I, Solapur-II, Thane	472	1164	19.15	15.28	25.30	48565	34376	41.27
Digvijay	Amaravati-I, Buldhana-I, Nagpur	70	175	19.52	16.1	21.24	57083.33 333	41865.33 333	36.35
JAKI-9218	Beed-I, Latur, Nanded-I	120	292	16.87	13.243 33333	27.38	47516.66 667	36361.66 667	30.68
JAKI-9218	Nundurbar	20	50	14.52	11.19	29.76	34220	24095	42.02
JAKI-9218	Bhandara, Chandrapur, Gadchiroli, Gondia, Washim	140	359	10.56	8.824	19.67	28290.8	21010.8	34.65
Rajvijay	Buldhana-II, Wardha, Yavatmal-I, Yavatmal-II	80	200	17.125	14.442 5	18.57	47007.5	30342.25	54.92
RVG-202	Pune-I	35.6	84	23.4	18.6	25.81	59390	40685	45.98
RVG-202	Akola, Amaravati-II	60	150	18.31	14.65	24.98	47587.5	32550	46.20
RVG-203	Osmanabad	50	125	9.5	8	18.75	15750	7750	103.23
RVG-203	Solapur-I	8	20	14.19	10.35	37.10	41613	26220	58.71

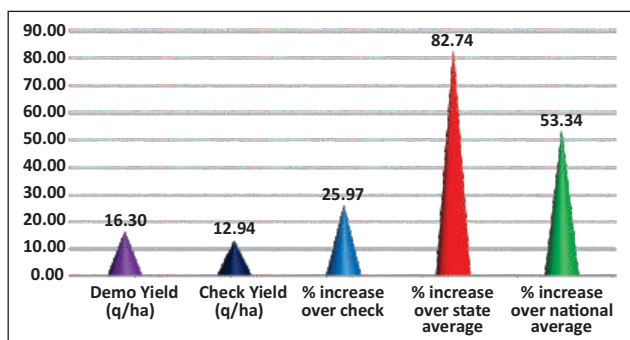


Fig. 3.11 Yield performance of Chickpea under CFLDs in Maharashtra

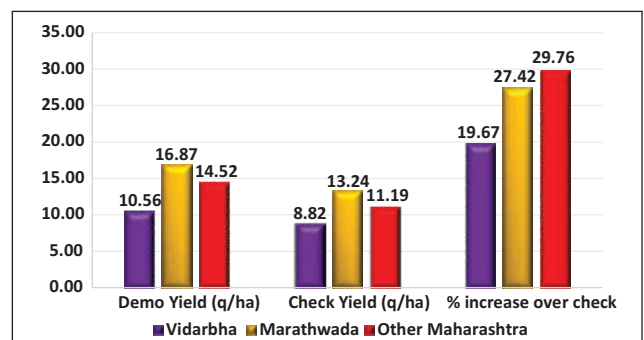


Fig. 3.12 Yield performance of Var. Jaki 9218 (Chick Pea) in Maharashtra



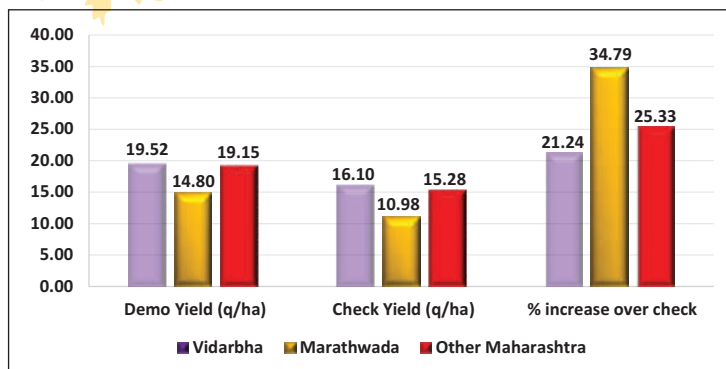


Fig. 3.13 Yield performance of Var. Digvijay (Chick Pea) in Maharashtra

### Yield performance of Chickpea in Gujarat

In Gujarat, 619 cluster demonstrations on GJG-3 cultivar were conducted on 266 ha. Mean yield of 18.72 q/ha was attained under demonstrations which was

20.77% higher over existing practice (15.5 q/ha) 49.20% higher over state and 76.11% over national average yield (Fig. 3.14). Net economic gain of Rs. 48118/ha was realised by the farmers which was 31.96 % more than local check (Table 3.45).

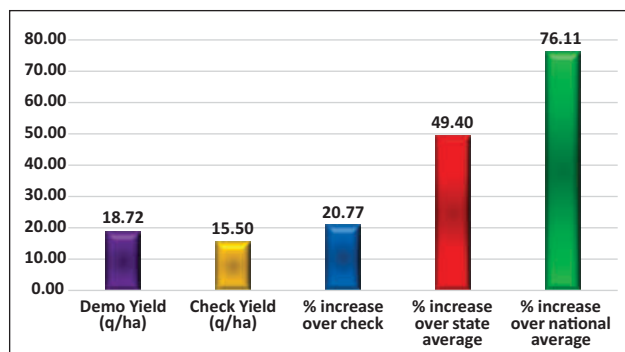


Fig. 3.14 Yield performance of Var. GJG-3 (Chickpea) in Gujarat

Table 3.45 Yield performance of chickpea in Gujarat

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs/ha)		% Increase
				Demo	Check		Demo	Check	
GJG-3	Valsad, Amreli, Bhavnagar, Ahmedabad, Bharuch, Dahod, Mehsana, Porbandar, Porbandar, Rajkot-I	266	619	18.72	15.5	20.77	48118	36462	31.96

### Yield Performance of Pigeon pea Cultivars in Gujarat

Under cluster frontline demonstrations, average yield of 12.98 q/ha was attained which was 22.62% over local check. BDN- 711 cultivars performed well exhibited 47.60% increase in yield over national average yield (Fig. 3.15)



Table 3.46 Yield level of pigeon pea cultivars in Gujarat

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
BDN-711	Valsad, Narmada, Bharuch	80	195	14.17	11.42	24.08	40116	28397	41.26
BSMR-853	Jamnagar, Navsari	41	188	11.79	9	21.17	38081	25628	48.59

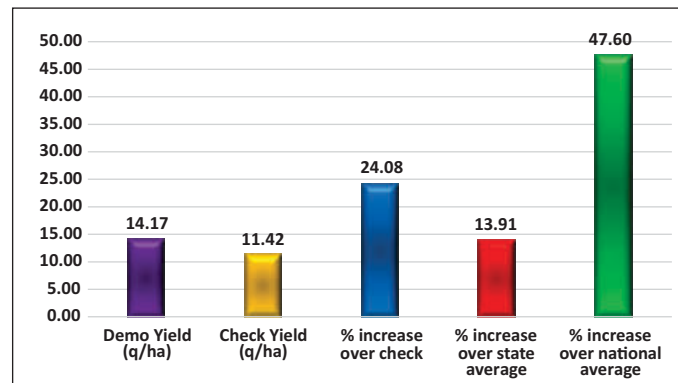


Fig. 3.15 Yield performance of Var. BDN 711 (Pigeon Pea) in Gujarat

## Cluster Frontline Demonstrations of Oilseeds under NFSM

Cluster Frontline Demonstrations of Oilseeds under NFSM 2018-19 was sanctioned by Government of India, Ministry of Agriculture & Farmers Welfare with an aim to enhance the production of oilseeds in the

country. As a part of this project, ICAR-ATARI, Pune implemented the project on oilseeds crops viz, groundnut, sesame, soybean, niger, castor, linseed, safflower and rapeseed and mustard in selected districts through respective KVKs in the states of Maharashtra and Gujarat during the year 2018-19. Details are presented here under:



## Target and Achievements

### Target

In total, 7625 demonstrations on oilseed crops in cluster mode were targeted covering 3050 ha area in Maharashtra and Gujarat during *kharif*, *rabi* and *summer* seasons. Out of which 4725 demonstrations in area of 1890 ha for crops viz., Groundnut, Sesame, Soybean, Castor and Niger was target during *kharif* season. A total of 950 demonstrations on 380 ha area

for crops rapeseed and mustard, sesame, groundnut, linseed and safflower during *rabi* season and 1950 CFLDs in an area of 780 ha for crop groundnut and sesame during *summer* was targeted.

### Achievements

A total of 6592 cluster frontline demonstrations were implemented in an area of 2570.34 ha, out of targeted 7625 CFLDs (3050 ha) in Maharashtra and Gujarat during 2018-19.

**(i) Kharif Season:** A total of 4113 CFLDs were conducted on five oilseeds crops viz., groundnut, sesame, soybean, castor and niger in an area of 1715.14 ha covering two states Maharashtra and Gujarat.

**(a) Groundnut:** Cluster FLDs were implemented in an area of 307.14 ha with active involvement of 745 farmers in Gujarat.

**(b) Sesame:** Cluster FLDs were organized in an area of 90 ha with 128 participating farmers of which 20 ha with 43 farmers in Maharashtra and 70 ha with 175 farmers in Gujarat.

**(c) Soybean:** Cluster FLDs were laid out on area of 1078 ha benefitting 2558 farmers of which 890 ha with 2174 farmers in Maharashtra and 188 ha with 384 farmers in Gujarat.

**(d) Castor:** Castor demonstrations were carried on 230 ha area with involvement of 542 farmers in Gujarat.

**(e) Niger:** Demonstrations on niger were conducted in cluster mode on 10 ha area at 50 farmers' fields in Maharashtra.

**(ii) Rabi Season:** A total of 636 CFLDs were conducted on five oilseed crops viz rapeseed and mustard, sesame, groundnut, linseed and safflower in an area of 253 ha covering two states Maharashtra and Gujarat.

**(a) Rapeseed and Mustard:** In total, 287 demonstrations were conducted on rapeseed and mustard covering an area of 115 ha in two states Maharashtra and Gujarat.

**(b) Linseed:** 192 farmers demonstrated linseed technologies on an area of 68 ha in Maharashtra.

**(c) Safflower:** 157 farmers laid out demonstrations on sunflower with coverage of 70 ha area in Maharashtra.

**(iii) Summer Season:** A total of 1843 CFLDs were conducted on two oilseed crops viz., groundnut and sesame in an area of 602.2 ha covering two states Maharashtra and Gujarat.

**(a) Groundnut:** Cluster FLDs were implemented in an area of 421 ha with the involvement of 1393 farmers of which 301 ha with 1077 farmers in Maharashtra and 120 ha with 316 farmers in Gujarat.

**(b) Sesame:** Cluster FLDs were implemented in an area of 181.2 ha with the involvement of 450 farmers of which 55.6 ha with 145 farmers in Maharashtra and 125.6 ha with 305 farmers in Gujarat.

Crop-wise data for three seasons of 2018-19 viz., *Kharif*, *Rabi* and *Summer* on approved CFLDs and achievements are presented in Table 3.47.

**Table 3.47 Abstract of approved Cluster FLDs on Oilseeds under NFSM and their achievements**

Sl. No.	Crops	State	Approved CFLDs		Achievements of CFLDs	
			Area (ha)	No. of Demos	Area (ha)	No. of Demos
<b>Kharif season</b>						
1	Groundnut	Gujarat	340	850	307.14	745
		Maharashtra	40	100	0	0
	<b>Total</b>		<b>380</b>	<b>950</b>	<b>307.14</b>	<b>745</b>
2	Sesame	Maharashtra	40	100	20	43
		Gujarat	80	200	70	175
	<b>Total</b>		<b>120</b>	<b>300</b>	<b>90</b>	<b>218</b>
3	Soybean	Maharashtra	970	2425	890	2174
		Gujarat	170	425	188	384
	<b>Total</b>		<b>1140</b>	<b>2850</b>	<b>1078</b>	<b>2558</b>
4	Castor	Gujarat	240	600	230	542
5	Niger	Maharashtra	10	25	10	50
	<b>Grand Total (kharif)</b>		<b>1890</b>	<b>4725</b>	<b>1715.14</b>	<b>4113</b>



Sl. No.	Crops	State	Approved CFLDs		Achievements of CFLDs	
			Area (ha)	No. of Demos	Area (ha)	No. of Demos
<b>Rabi season</b>						
1	Rapeseed & Mustard	Maharashtra	10	25	10	25
		Gujarat	170	425	105	262
	<b>Total</b>		<b>180</b>	<b>450</b>	<b>115</b>	<b>287</b>
2	Linseed	Maharashtra	70	175	68	192
3	Safflower	Maharashtra	80	200	70	157
4	Groundnut	Maharashtra	30	75	0	0
5	Sesame	Maharashtra	20	50	0	0
	<b>Grand Total (Rabi)</b>		<b>380</b>	<b>950</b>	<b>253</b>	<b>636</b>
<b>Summer season</b>						
1	Groundnut	Maharashtra	400	1000	301	1077
		Gujarat	170	425	120	316
	<b>Total</b>		<b>570</b>	<b>1425</b>	<b>421</b>	<b>1393</b>
2	Sesame	Maharashtra	60	150	55.6	145
		Gujarat	150	375	125.6	305
	<b>Total</b>		<b>210</b>	<b>525</b>	<b>181.2</b>	<b>450</b>
	<b>Grand Total (Summer)</b>		<b>780</b>	<b>1950</b>	<b>602.2</b>	<b>1843</b>
	<b>Total (Kharif+Rabi+Summer)</b>		<b>3050</b>	<b>7625</b>	<b>2570.34</b>	<b>6592</b>

### Technologies Demonstrated

Improved varieties and latest technologies were

included under cluster frontline demonstrations on oilseed crops. Details are given in Table 3.48.

**Table 3.48 Crop-wise and season-wise varieties demonstrated under NFSM during 2018-19**

Crop	Varieties		
	Kharif	Rabi	Summer
Groundnut	JL776, Konkan Gaurav, GG 2, GG 5 and GG 20.	-	JL-501, Konkan Bhuratna, Konkan Tapora, LGN-1, TAG- 24, TAG- 37, TG-38, GG-2, AGG-20, TG 37A.
Sesame	AKT-64, JLT-408, GT- 3, GT-4, Guj. Til-3.	-	PKV NT - 11, G.Til-3, GT - 3.
Soybean	MAUS-158, JS-9560, AKT-64, PKV NL-260, MAUS-162, JS-9305, Phule Agrani, GJS-3, NRC-37, JS-3 RVS-2001-04.	-	-
Castor	GCH 7.	-	-
Niger	Savana.	-	-
Linseed	-	LSL-93, NL-260, PKV NL-260, PKV NL-260.	-
Rapeseed and Mustard	-	GDM-4, NRCHB- 101.	-
Safflower	-	PBNS-12, SSF-748.	-

## Production and Protection Technologies

Specific production and protection technologies of oilseed crops were identified and adopted under demonstrations to show the potential of improved varieties.

- Integrated crop management
- Integrated nutrient, pest, disease management
- Seed treatment with bio agents
- Foliar applications of micro nutrient mixtures.
- Pheromone traps, yellow stick traps
- Line sowing
- Utilization of residual moisture after cereals
- Relay cropping, etc.

## Results

Eight oilseed crops viz., groundnut, sesame, soybean, castor, niger, rapeseed and mustard, linseed and safflower under NFSM during 2018-19 in an area of 2570.34 ha by involving 6592 farmers covering two states namely Maharashtra and Gujarat. Season-wise and crop-wise results are presented hereunder:

**Performance of Kharif Oilseeds:** Cluster FLDs on 5 oilseed crops viz., groundnut, sesame, soybean, castor and niger were implemented during *kharif* 2018-19. Demonstrations on groundnut were executed by 14 KVKs and provided mean yield of 18.25 q/ha which was greater (21.10%) than farmer's practice (15.07 q/ha). In sesame, 5 KVKs laid out demonstrations and obtained average yield of 5.85q/ha which showed superiority (19.35%) over existing practice (4.91 q/ha).

In soybean, 39 KVKs demonstrated latest technologies which provided average yield of 17.23 q/ha which was higher over check (13.64 q/ha). Niger was demonstrated at one KVK got mean yield of 4.20 q/ha which was more than local check (3.10 q/ha). In case of castor, 9 KVKs demonstrated the latest technologies, resulted average yield of 27.46 q/ha which was better against local practice (22.97 q/ha). State-wise and KVK wise data is presented in Table 3.49.

**Performance of Rabi Oilseeds:** Technology demonstrations on linseed, safflower, rapeseed and mustard were organized during rabi 2018-19. Linseed technology was demonstrated at 5 KVKs and resulted 4.15 q/ha yield which was more (22.78%) than farmer's practice (3.38 q/ha). In safflower, 5 KVKs demonstrated latest technologies that provided yield of 12.80 q/ha which was greater (20.28%) than existing practice (10.64 q/ha). In rapeseed and mustard, 6 KVKs organized demonstrations in field situations which gave average yield 11.22 q/ha which was superior over check (10.61q/ha). State-wise and KVK wise data is presented in Table 3.49.

**Performance of Summer Oilseed Crops:** Groundnut and sesame were taken up under cluster demonstrations in summer 2018-19. A total of 1393 demonstrations were laid out on summer groundnut.

On an average of 16.26 q/ha yield was achieved under summer groundnut which was about 30.08% higher over local practice. Average net gain was of Rs. 41015.81/ha was obtained by the farmers. Similarly, under sesame average yield of 4.77 q/ ha was recorded which was almost 21.07% more over local check with net profit of Rs. 19982.33/ha

**Table 3.49 Performance of oilseed crops**

State	KVK	Season	Crop	Area (ha)	Demo (No.)	Average yield (q/ha)		Increase (%)	Net return (Rs./ha)		Increase (%)
						Demo	Check		Demo	Check	
Gujarat	9	Kharif	Castor	230	542	27.46	22.33	22.97	100072	76681	30.50
Gujarat	14	Kharif	Groundnut	307.14	745	18.25	15.07	21.10	48972	34109	43.58
Maharashtra	1	Kharif	Niger	10	50	4.20	3.10	35.48	15500	8250	87.88
Maharashtra	1	Kharif	Sesame	20	43	3.95	3.00	31.67	9009	3386	166.07
Gujarat	4	Kharif	Sesame	70	175	7.76	6.82	13.78	69173	57329	20.66
<b>Total</b>	<b>29</b>			<b>90</b>	<b>218</b>	<b>5.86</b>	<b>4.91</b>	<b>19.35</b>	<b>39091</b>	<b>30358</b>	<b>28.77</b>
Maharashtra	32	Kharif	Soybean	890	2174	19.46	14.71	32.29	30274	17595	72.06
Gujarat	7	Kharif	Soybean	188	384	15.01	12.56	19.51	28108	21102	33.20
<b>Total</b>	<b>39</b>			<b>1078</b>	<b>2558</b>	<b>17.23</b>	<b>13.64</b>	<b>26.32</b>	<b>29191</b>	<b>19348</b>	<b>50.87</b>

State	KVK	Season	Crop	Area (ha)	Demo (No.)	Average yield (q/ha)		Increase (%)	Net return (Rs./ha)		Increase (%)
						Demo	Check		Demo	Check	
Maharashtra	5	Rabi	Linseed	68	192	4.15	3.38	22.78	11350	7784	45.81
Maharashtra	1	Rabi	Rapeseed & Mustard	10	25	5.10	4.40	15.91	6045	3832	57.75
Gujarat	6	Rabi	Rapeseed & Mustard	105	262	17.33	16.81	3.09	38554	27538	40.00
<b>Total</b>	<b>12</b>			<b>115</b>	<b>287</b>	<b>11.22</b>	<b>10.61</b>	<b>5.75</b>	<b>22299</b>	<b>15685</b>	<b>42.17</b>
Maharashtra	5	Rabi	Safflower	70	157	12.80	10.642	20.28	29165	19868	46.79
Maharashtra	18	Summer	Groundnut	301	1077	16.72	12.32	35.71	37459	21166	76.97
Gujarat	9	Summer	Groundnut	120	316	15.79	12.68	24.53	44573	28224	57.93
<b>Total</b>	<b>32</b>			<b>421</b>	<b>1393</b>	<b>16.26</b>	<b>12.50</b>	<b>30.08</b>	<b>41016</b>	<b>24695</b>	<b>66.09</b>
Maharashtra	4	Summer	Sesame	55.6	145	3.49	3.02	15.56	13335	9137	45.95
Gujarat	7	Summer	Sesame	125.6	305	6.04	4.85	24.54	26630	17310	53.84
<b>Total</b>	<b>11</b>			<b>181.2</b>	<b>450</b>	<b>4.77</b>	<b>3.94</b>	<b>21.07</b>	<b>19982</b>	<b>13224</b>	<b>51.11</b>

### Training Courses on Oilseed Crops

On and off campus training courses were organized by KVKs on full package of practices for groundnut, sesame, soybean, castor, niger, linseed, safflower and rapeseed and mustard. A total of 299 training courses

were structured with the participation of 10849 farmers (9395 male and 1500 female) that consists of 125 on-campus with 4603 participants (3941 male and 662 female) and 174 off-campus with 6292 participants (5454 male and 838 female). Details are given in Table 3.50.

Table 3.50 Training courses organised on oilseed crops

State	KVK	Area (ha)	Demo (No.)	On campus training				Off campus training				Total training programmes for CFLD farmers			
				programmes for CFLD farmers				programmes for CFLD farmers							
				C	M	F	T	C	M	F	T	C	M	F	T
<b>Kharif: Groundnut</b>															
Gujarat	14	307.14	745	17	524	117	641	19	764	50	814	36	1288	167	1455
<b>Kharif: Sesame</b>															
Maharashtra	1	20	43	0	0	0	0	1	28	0	28	1	28	0	28
Gujarat	4	70	175	0	0	0	0	4	139	0	139	4	139	0	139
<b>Total</b>	<b>5</b>	<b>90</b>	<b>218</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>167</b>	<b>0</b>	<b>167</b>	<b>5</b>	<b>167</b>	<b>0</b>	<b>167</b>
<b>Kharif: Soybean</b>															
Maharashtra	32	890	2174	29	1321	113	1434	53	1794	137	1931	82	3115	250	3365
Gujarat	7	188	384	10	286	22	308	9	186	61	247	19	472	83	555
<b>Total</b>	<b>39</b>	<b>1078</b>	<b>2558</b>	<b>39</b>	<b>1607</b>	<b>135</b>	<b>1742</b>	<b>62</b>	<b>1980</b>	<b>198</b>	<b>2178</b>	<b>101</b>	<b>3587</b>	<b>333</b>	<b>3920</b>
<b>Kharif: Niger</b>															
Maharashtra	1	10	50	1	17	4	21	2	33	14	47	3	50	18	68
<b>Kharif: Castor</b>															
Gujarat	9	230	542	19	443	85	528	17	381	88	469	36	824	173	997



State	KVK	Area (ha)	Demo (No.)	On campus training				Off campus training				Total training programmes for CFLD farmers			
				programmes for CFLD farmers				programmes for CFLD farmers							
				C	M	F	T	C	M	F	T	C	M	F	T
<b>Rabi: Linseed</b>															
Maharashtra	5	68	192	4	178	39	217	7	155	40	195	11	333	79	412
<b>Rabi: Safflower</b>															
Maharashtra	5	70	157	1	50	0	50	4	145	0	145	5	195	0	195
<b>Rabi: Rapeseed &amp; Mustard</b>															
Maharashtra	1	10	25	1	22	12	34	1	22	12	34	2	44	24	68
Gujarat	6	105	262	5	103	21	124	8	207	12	219	13	310	33	343
Total	7	115	287	6	125	33	158	9	229	24	253	15	354	57	411
<b>Summer: Groundnut</b>															
Maharashtra	23	301	1077	19	456	85	500	30	875	346	1221	49	1331	431	1721
Gujarat	8	120	316	9	253	65	318	8	340	39	379	17	593	104	697
Total	31	421	1393	28	709	150	818	38	1215	385	1600	66	1924	535	2418
<b>Summer: Sesame</b>															
Maharashtra	5	55.6	145	3	65	17	77	4	110	23	133	7	175	40	210
Gujarat	9	125.6	305	7	223	82	305	7	275	16	291	14	498	98	596
Total	14	181.2	450	10	288	99	382	11	385	39	424	21	673	138	806
<b>Grand total</b>	<b>130</b>	<b>2570.34</b>	<b>6592</b>	<b>125</b>	<b>3941</b>	<b>662</b>	<b>4603</b>	<b>174</b>	<b>5454</b>	<b>838</b>	<b>6292</b>	<b>299</b>	<b>9395</b>	<b>1500</b>	<b>10849</b>

### Extension Activities Organized

Different extension activities were organized by KVKs for creating more awareness and exposure among participating farmers and extension workers especially on oilseed crops. A total of 12722 personnel

(14875 farmers and 1028 extension officials) participated in different extension activities organized by KVKs on groundnut, sesame, soybean, castor, niger, linseed, safflower and rapeseed and mustard. Details are given in Table 3.51.

**Table 3.51 Extension activities conducted on oilseed crops**

State	KVK	Area (ha)	Demo (No.)	Extension Activities and Participants								Total			
				Farmers				Extension personnel							
				Extn Act.	M	F	T	Extn Act.	M	F	T	Extn Act.	M	F	T
<b>Kharif: Groundnut</b>															
Gujarat	14	307.14	745	159	1072	206	1278	43	99	5	104	202	1171	211	1382
<b>Kharif: Sesame</b>															
Maharashtra	1	20	43	2	68	8	76	1	14	4	18	3	82	12	94
Gujarat	4	70	175	11	277	0	277	20	20	0	20	31	297	0	297
Total	5	90	218	13	345	8	353	21	34	4	38	34	379	12	391
<b>Kharif: Soybean</b>															
Maharashtra	32	890	2174	134	6315	354	6669	68	360	80	440	202	6675	434	7109

State	KVK	Area (ha)	Demo (No.)	Extension Activities and Participants								Total			
				Farmers				Extension personnel				Extn Act.	M	F	T
				Extn Act.	M	F	T	Extn Act.	M	F	T				
Gujarat	7	188	384	111	509	281	790	12	17	4	21	123	526	285	811
Total	39	1078	2558	245	6824	635	7459	80	377	84	461	325	7201	719	7920
<b>Kharif: Niger</b>															
Maharashtra	1	10	50	2	42	22	64	2	4		4	4	46	22	68
<b>Kharif: Castor</b>															
Gujarat	9	230	542	39	738	216	954	21	67	10	77	60	805	226	1031
<b>Rabi: Linseed</b>															
Maharashtra	5	68	192	24	279	39	318	3	20	0	20	27	299	39	338
<b>Rabi: Safflower</b>															
Maharashtra	5	70	157	3	113	0	113	6	51	0	51	9	164	0	164
<b>Rabi: Rapeseed &amp; Mustard</b>															
Maharashtra	1	10	25				0				0	0	0	0	0
Gujarat	6	105	262	23	542	218	760	8	28	1	29	31	570	219	789
Total	7	115	287	23	542	218	760	8	28	1	29	31	570	219	789
<b>Summer: Groundnut</b>															
Maharashtra	23	301	1077	49	1098	563	1661	24	132	15	147	73	1230	578	147
Gujarat	8	120	316	30	466	372	838	40	26	7	33	70	492	379	33
Total	31	421	1393	79	1564	935	2499	64	158	22	180	143	1722	957	180
<b>Summer: Sesame</b>															
Maharashtra	5	55.6	145	7	169	24	193	2	27	2	29	9	196	2	53
Gujarat	9	125.6	305	73	513	371	884	66	29	6	35	139	542	6	406
Total	14	181.2	450	80	682	395	1077	68	56	8	64	148	738	8	459
<b>Grand Total</b>	<b>130</b>	<b>2570.34</b>	<b>6592</b>	<b>667</b>	<b>12201</b>	<b>2674</b>	<b>14875</b>	<b>316</b>	<b>894</b>	<b>134</b>	<b>1028</b>	<b>983</b>	<b>13095</b>	<b>2413</b>	<b>12722</b>

## Yield Performance of Soybean Cultivars in Maharashtra

Soybean is one of major oilseed crop in Maharashtra.



Different varieties of soybean with improved package of practices were demonstrated in clusters. On average yield of 19.09 q/ha was obtained which was 36.64% higher over local check (Table 3.52).



**Table 3.52 Yield obtained under Soybean demonstrations**

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
JS 335	Hingoli	24.8	62	20.29	17.34	17.01	33612	21914	53.38
JS 9560	Nundurbar	20	50	11.67	8.80	32.61	23346	15211	53.48
JS 9561	Amaravati-I, Amaravati-II, Chandrapur, Yavatmal-II	110	275	15.36	12.40	23.87	21022	14222	47.81
MACS-1188	Ahmednagar-I, Kolhapur-I, Nashik-I, Nashik-II, Pune-I, Pune-II	190	460	22.14	16.17	36.92	32879	17745	85.29
MACS-1188	Buldhana-I	20	50	15.54	12.36	25.73	23193	13597	70.57
MAUS-158	Nanded-I	50	125	21.87	16.25	34.58	37340	21525	73.47
MACS-1188	Jalgaon-I, Jalgaon-II, Solapur-I	62	140	15.34	10.51	45.96	25476	12776	99.41
MAUS-158	Akola, Buldhana-II, Wardha, Washim, Yavatmal-I	120	300	20.14	16.54	21.77	30891	22843	35.23
MAUS-162	Hingoli, Jalna-I, Latur, Osmanabad, Parbhani	155.2	373	20.76	16.13	28.70	35688	21653	64.82
MAUS-162	Solapur-I	28	70	26.40	11.28	134.04	51978	12634	311.41
MAUS-162	Nagpur	20	50	17.39	14.47	20.18	22995	15195	51.33
Phule Agrani(KDS-344)	Nanded-II	20	50	17.17	14.15	21.34	23470	9030	159.91
Phule Agrani(KDS-344)	Dhule, Satara-II	40	100	17.55	12.98	35.21	26418	11462	130.48
Phule Sangam (KDS-726)	Ahmednagar-II, Satara-I	30	69	25.77	19.08	35.06	34929	21012	66.23

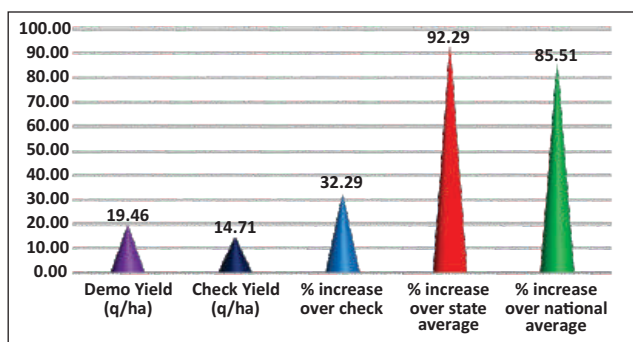


Fig. 3.16 Yield performance of Soybean under CFLDs in Maharashtra

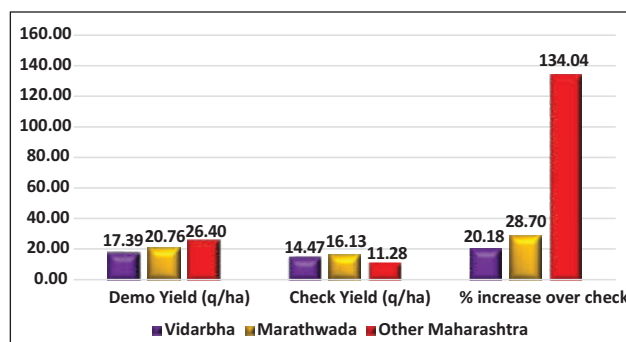


Fig. 3.17 Yield performance of Var. MAUS-162 (Soybean) in Maharashtra

### Groundnut Yield under CFLDs in Gujarat

Under cluster frontline demonstrations of groundnut, GJG-22 cultivar performed well and provided 17.49 q/ha which was about 20.53% higher over farmer's

practice in Amreli, Surendranagar, Sabarkantha and Rajkot. Net income of Rs. 46618/ha was realised by participating farmers which was 43.32% more over check. (Table 3.53).





Table 3.53 Yield obtained under groundnut demonstrations

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
GJG-22	Rajkot-I, Rajkot-II, Sabarkantha, Amreli, Surendranagar	150	350	17.49	14.51	20.53	46618	32526	43.32

### Performance of Castor in Gujarat

Castor technologies were demonstrated in cluster mode in Panchmahal, Ahmedabad, Anand, Banaskantha-I, Gandhinagar, Kutch-II, Mehsana and

Patan at farmers' fields. Yield of 27.96 q/ha was attained which was about 22.84% higher over check and gave net profit of Rs. 100478/ha to the farmers (Table 3.54).



Table 3.54 Yield performance under castor demonstrations

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
GCH-7	Panchmahal, Ahmedabad, Anand, Banaskantha-I, Gandhinagar, Kutch-II, Mehsana, Patan	200	478	27.96	22.76	22.84	100478	76568	31.23

### Performance of Soybean in Gujarat

In Dahod, Tapi and Narmada districts soybean cultivar NRC-37 was demonstrated at 174 farmers' fields.

Average yield of 15.47 q/ha under demonstrations plots was obtained which was about 28.21% higher over local practice (Table 3.55).



Table 3.55 Yield level and economics under soybean demonstrations

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
NRC-37	Dahod , Tapi, Narmada	68	174	15.47	12.47	28.21	31238	22521	38.71

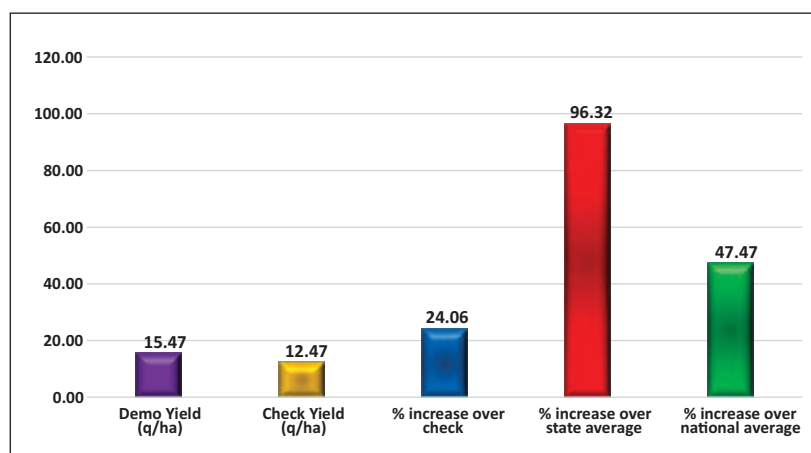


Fig. 3.18 Yield performance of Var. NRC 37 (Soybean) in Gujarat

# Training of Farmers and Extension Personnel

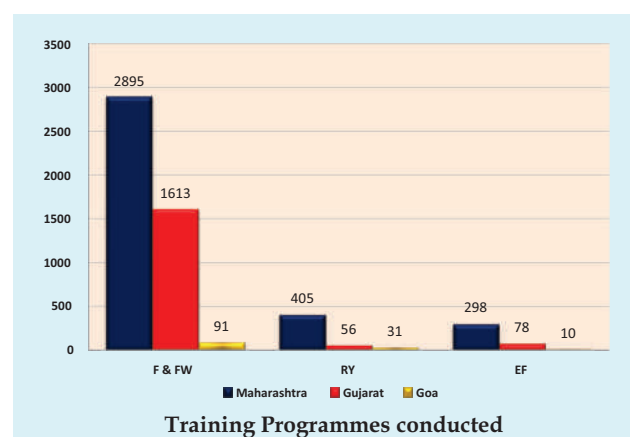
Capacity building of farmers and extension workers on latest technologies and methodology is required at KVK level. In Zone VIII, 79 KVKs organized 6514 training courses with the participation of 247103 farmers, farm women, rural youths, extension functionaries, sponsored and vocational trainings involving Maharashtra, Gujarat and Goa states. Out of this, 68242 participants represented SC/ST category with 42943 male and 25299 female. The farmers and farm women were represented in a proportion of 70%

and 30%, respectively. In all 169510 farmers and farm women and 18708 rural youths were trained on different skills in different enterprises. Similarly, 17556 extension workers were also trained in different areas. In addition, 788 sponsored courses were organized for benefiting 34468 stakeholders. In all, 249 vocational trainings were conducted by the KVKs with 6861 rural youths for developing their entrepreneurial capability and skills (Table 4.1).

**Table 4.1 Physical achievement of training programs**

Clientele	Maharashtra				Gujarat				Goa				Grand Total			
	C	M	F	Total	C	M	F	Total	C	M	F	Total	C	M	F	Total
Farmers & Farm Women	2895	83810	31418	115228	1613	33222	18550	51772	91	1143	1367	2510	4599	118175	51335	169510
Rural Youths	405	11690	4242	15932	56	1174	780	1954	31	388	434	822	492	13252	5456	18708
Extension Functionaries	298	10554	3430	13984	78	2578	730	3308	10	173	91	264	386	13305	4251	17556
Sponsored	500	17339	3014	20353	288	9341	4774	14115	0	0	0	0	788	26680	7788	34468
Vocational	188	2994	2129	5123	61	708	1030	1738	0	0	0	0	249	3702	3159	6861
<b>Total</b>	<b>4286</b>	<b>126387</b>	<b>44233</b>	<b>170620</b>	<b>2096</b>	<b>47023</b>	<b>25864</b>	<b>72887</b>	<b>132</b>	<b>1704</b>	<b>1892</b>	<b>3596</b>	<b>6514</b>	<b>175114</b>	<b>71989</b>	<b>247103</b>

C: Courses, M: Male, F: Female





## Farmers and Farm Women

In all 4599 training courses were conducted by the KVKs in the Zone with 169510 participants including 118175 male and 51335 female. Almost one-third participants represented female category. The state wise data related to capacity building of farmers and farm women are given below:

### Maharashtra

In Maharashtra, 115228 farmers and farm women were trained through 2895 trainings. About 27%

female represented the trainees. In total 33049 farmers and farm women belonged to SC/ST category represented 28.68% of the total participants. Majority of courses were conducted on different components such as crop production (983) with 37579 participants, plant protection (543) involving 24764 participants, livestock production and management (333) benefiting 12279 participants, soil health and fertility management (245) with 12069 farmers and women empowerment (228) with 8694 farm women, etc. Area-wise and category-wise details of training programs are furnished in Table 4.2.

**Table 4.2 Training courses for farmers and farm women in Maharashtra**

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group Dynamics	111	1995	702	2697	635	433	1068	2630	1135	3765
Crop Production	983	24680	3375	28055	7555	1969	9524	32235	5344	37579
Entrepreneurship Development	70	1180	749	1929	457	439	896	1637	1188	2825
Farm Implements	124	1836	662	2498	961	371	1332	2797	1033	3830
Livestock Production and Management	333	6792	1839	8631	2329	1319	3648	9121	3158	12279
Natural Resource Management	67	1758	188	1946	574	141	715	2332	329	2661
Nutrition Security	80	373	1456	1829	90	433	523	463	1889	2352
Plant Protection	543	14702	3068	17770	5083	1911	6994	19785	4979	24764
Processing and Value Addition	89	816	1499	2315	355	824	1179	1171	2323	3494
Production of Inputs at site	22	635	82	717	134	65	199	769	147	916
Soil Health and Fertility Management	245	7209	1556	8765	2332	972	3304	9541	2528	12069
Women Empowerment	228	747	4280	5027	582	3085	3667	1329	7365	8694
<b>Total</b>	<b>2895</b>	<b>62723</b>	<b>19456</b>	<b>82179</b>	<b>21087</b>	<b>11962</b>	<b>33049</b>	<b>83810</b>	<b>31418</b>	<b>115228</b>



## Gujarat

In Gujarat, 51772 farmers and farm women were trained under 1613 training programs. More than 35.83% of the participants were from female group. In all, 17962 participants belonged to SC/ST category representing 34.69% of total trainees. The major focus was given on crop production technologies (547 courses with 18147 trainees), plant protection (322

courses with 10073 participants), and livestock management (286 courses with 8514 beneficiaries). Similarly, women empowerment, soil health and fertility management, farm mechanization and capacity building with group dynamics were covered under different farmers' empowerment programs, etc. The details of training courses with male/ female participants are reported in Table 4.3.



Table 4.3 Training courses for farmers and farm women in Gujarat

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group Dynamics	39	378	243	621	476	312	788	854	555	1409
Crop Production	547	9103	2281	11384	4882	1881	6763	13985	4162	18147
Entrepreneurship Development	25	309	305	614	72	62	134	381	367	748
Farm Implements	44	659	117	776	352	94	446	1011	211	1222
Livestock Production and Management	286	2809	2202	5011	1609	1894	3503	4418	4096	8514
Natural Resource Management	22	299	18	317	293	47	340	592	65	657

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Nutrition Security	16	104	255	359	2	91	93	106	346	452
Plant Protection	322	6905	681	7586	1812	675	2487	8717	1356	10073
Processing and Value Addition	21	114	410	524	3	253	256	117	663	780
Production of Inputs at site	9	231	63	294	104	86	190	335	149	484
Soil Health and Fertility Management	80	1596	188	1784	632	210	842	2228	398	2626
Women Empowerment	202	240	4300	4540	238	1882	2120	478	6182	6660
<b>Total</b>	<b>1613</b>	<b>22747</b>	<b>11063</b>	<b>33810</b>	<b>10475</b>	<b>7487</b>	<b>17962</b>	<b>33222</b>	<b>18550</b>	<b>51772</b>

### Goa

Both KVKs (North Goa and South Goa) organized 91 training courses with involvement of 2510 farmers and farm women. In total participants, SC/ST category farmers/farm women represented about 28.68%. More than 50% of the participants were belonged to females. Major attention was given on livestock management (30 courses with 669 trainees), crop

production technologies (23 courses with 845 beneficiaries) followed by processing and value addition (14 courses with 436 trainees). In addition, entrepreneurship development, soil health management, on site input management and plant protection components were also emphasized. The details of trainings with participants are reported in Table 4.4.



Table 4.4 Training courses for farmers and farm women in Goa

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Crop Production	23	207	322	529	101	215	316	308	537	845
Entrepreneurship Development	4	16	16	32	36	24	60	52	40	92



Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Livestock Production and Management	30	436	183	619	40	10	50	476	193	669
Plant Protection	13	93	58	151	80	62	142	173	120	293
Production of Inputs at site	2	22	8	30	16	4	20	38	12	50
Soil Health and Fertility Management	5	61	14	75	35	15	50	96	29	125
Processing and Value addition	14	0	354	354	0	82	82	0	436	436
<b>Total</b>	<b>91</b>	<b>835</b>	<b>955</b>	<b>1790</b>	<b>308</b>	<b>412</b>	<b>720</b>	<b>1143</b>	<b>1367</b>	<b>2510</b>

### Training of Rural Youths

Special attention was given on skill development of rural youths to initiate their enterprises/agri-business to become self-depend. In the zone including Maharashtra, Gujarat and Goa, 492 training programs were conducted where 18708 rural youths were benefited on different areas of enterprises based on agriculture, horticulture, bio-fertilizer/ bio-pesticides and value addition, etc. In total participants, 26.20% represented SC/ST categories of rural youths. About 29.16% rural youths were belonged to female group. In Maharashtra, 405 training courses were organized with involvement of 15932 rural youth with ratio of male-female participation of 2.75:1. In capacity building of SC/ST category, 23.7% rural youths were trained. About 26.62% of rural youths were belonged to female of total participants. Main focus was given on livestock management, crop production, plant protection and processing and value addition towards developing skill among rural youths. In case of



Table 4.5 Training courses for rural youths in Maharashtra

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group Dynamics	18	377	119	496	111	59	170	488	178	666
Crop Production	111	2686	768	3454	861	228	1089	3547	996	4543

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Entrepreneurship Development	55	953	415	1368	277	97	374	1230	512	1742
Farm Implements	9	226	0	226	72	0	72	298	0	298
Livestock Production and Management	61	2168	510	2678	605	209	814	2773	719	3492
Plant Protection	61	1129	320	1449	369	88	457	1498	408	1906
Processing and Value Addition	26	209	381	590	71	73	144	280	454	734
Production of Inputs at site	10	127	14	141	69	18	87	196	32	228
Soil Health and Fertility Management	15	270	48	318	43	14	57	313	62	375
Women Empowerment	26	237	489	726	52	67	119	289	556	845
Natural Resource Management	13	496	213	709	282	112	394	778	325	1103
<b>Total</b>	<b>405</b>	<b>8878</b>	<b>3277</b>	<b>12155</b>	<b>2812</b>	<b>965</b>	<b>3777</b>	<b>11690</b>	<b>4242</b>	<b>15932</b>

Gujarat, 56 training courses were arranged with participation of 1954 rural youths. In total participants, more than 39% female trainees attended the programs and showed keen interest on agri-business / enterprises. About 39.76% SC/ST category people were represented in the course. In Goa, 31 training programs were organized with 822 participants involving 388 male and 434 female. Major training

areas considered for capacity building of rural youths were entrepreneurship development, women empowerment, livestock management and plant protection techniques. About 42.45% participants were represented SC/ST category of rural youths. Details of state wise rural youths training courses are given in Table 4.5 to 4.7.

**Table 4.6 Training courses for rural youths in Gujarat**

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group Dynamics	1	0	0	0	15	7	22	15	7	22
Crop Production	23	317	152	469	186	81	267	503	233	736
Entrepreneurship Development	3	45	26	71	20	0	20	65	26	91
Soil Health and Fertility Management	2	32	0	32	48	8	56	80	8	88

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Livestock Production and Management	9	55	48	103	138	70	208	193	118	311
Natural Resource Management	3	84	0	84	22	10	32	106	10	116
Plant Protection	6	73	39	112	72	28	100	145	67	212
Processing and Value Addition	2	0	58	58	0	5	5	0	63	63
Women Empowerment	4	0	134	134	0	41	41	0	175	175
Nutrition security	3	64	50	114	3	23	26	67	73	140
<b>Total</b>	<b>56</b>	<b>670</b>	<b>507</b>	<b>1177</b>	<b>504</b>	<b>273</b>	<b>777</b>	<b>1174</b>	<b>780</b>	<b>1954</b>

Table 4.7 Training courses for rural youths in Goa

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Entrepreneurship Development	10	58	79	137	73	81	154	131	160	291
Farm implements	1	15	0	15	15	10	25	30	10	40
Livestock Production and Management	3	32	11	43	23	9	32	55	20	75
Crop Production	10	85	51	136	56	58	114	141	109	250
Processing and Value addition	6	15	116	131	1	14	15	16	130	146
Production of Inputs at site	1	9	2	11	6	3	9	15	5	20
<b>Total</b>	<b>31</b>	<b>214</b>	<b>259</b>	<b>473</b>	<b>174</b>	<b>175</b>	<b>349</b>	<b>388</b>	<b>434</b>	<b>822</b>

### Training of Extension Personnel

In total 386 training courses were organized for developing capacity of 17556 extension functionaries in the zone. About 21.81% of the extension workers were represented the SC/ST category. The participation of female extension workers was 24.21%. The state-wise information is furnished in Table 4.8 to 4.10.

### Maharashtra

In Maharashtra, 298 training programs were organized with participation of 13984 extension functionaries on crop production (114 courses), plant protection (66 courses), capacity building and group dynamics (37 courses), women empowerment (23 courses), etc. Major focus was given on areas of training specially protected cultivation, micro



irrigation, processing and value addition, soil health, organic farming and women empowerment, etc.

Details of trainings, participants representing male female and SC/ST category officials are provided in Table 4.8.



**Table 4.8 Training courses for extension personnel in Maharashtra**

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group Dynamics	37	804	152	956	100	54	154	904	206	1110
Crop Production	114	4443	996	5439	891	224	1115	5334	1220	6554
Farm Implements	5	110	11	121	15	3	18	125	14	139
Livestock Production and Management	16	304	39	343	71	13	84	375	52	427
Natural Resource Management	4	100	7	107	35	6	41	135	13	148
Nutrition Security	13	44	401	445	9	122	131	53	523	576
Plant Protection	66	2353	459	2812	684	215	899	3037	674	3711
Processing and Value Addition	10	191	135	326	37	36	73	228	171	399
Soil Health and Fertility Management	10	190	15	205	35	13	48	225	28	253
Women Empowerment	23	118	398	516	20	131	151	138	529	667
<b>Total</b>	<b>298</b>	<b>8657</b>	<b>2613</b>	<b>11270</b>	<b>1897</b>	<b>817</b>	<b>2714</b>	<b>10554</b>	<b>3430</b>	<b>13984</b>

### Gujarat

Technological backstopping of 3308 extension functionaries was done through organizing 78 training courses. Majority of courses were organized in areas such as crop production (38 courses) with 1397

participants, capacity building and group dynamics (12 courses) with 458 participants, plant protection (11 courses) with 348 participants, livestock production and management (7 courses) with 189 participants, etc. Information about trainings is given in Table 4.9.



Table 4.9 Training courses for extension personnel in Gujarat

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group Dynamics	12	262	26	288	95	75	170	357	101	458
Crop Production	38	895	118	1013	301	83	384	1196	201	1397
Livestock Production and Management	7	54	39	93	76	20	96	130	59	189
Nutrition Security	2	91	1	92	14	45	59	105	46	151
Plant Protection	11	165	12	177	155	16	171	320	28	348
Soil Health and Fertility Management	1	15	1	16	3	0	3	18	1	19
Women Empowerment	7	0	176	176	33	61	94	33	237	270
Entrepreneurship Development	0	369	45	414	50	12	62	419	57	476
<b>Total</b>	<b>78</b>	<b>1851</b>	<b>418</b>	<b>2269</b>	<b>727</b>	<b>312</b>	<b>1039</b>	<b>2578</b>	<b>730</b>	<b>3308</b>

## Goa

In Goa, 2 KVKs (North Goa and South Goa) organized 10 training programs for 264 extension workers. Major

attention was given on soil health and fertility management and crop protection technologies (Table 4.10).



**Table 4.10 Training courses for extension personnel in Goa**

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group Dynamics	3	33	12	45	18	12	30	51	24	75
Nutrition security	1	10	29	39	0	0	0	10	29	39
Plant Protection	3	45	6	51	12	12	24	57	18	75
Soil Health and Fertility Management	3	42	11	53	13	9	22	55	20	75
<b>Total</b>	<b>10</b>	<b>130</b>	<b>58</b>	<b>188</b>	<b>43</b>	<b>33</b>	<b>76</b>	<b>173</b>	<b>91</b>	<b>264</b>

### Sponsored Trainings

In Maharashtra and Gujarat, 34468 participants were trained through 788 training courses, which were sponsored by different agencies/organizations. Regarding SC/ST category, 6307 participants were involved in training courses. State-wise training details are given below:



### Maharashtra

In Maharashtra, 500 sponsored training programs were conducted with participation of 20353 trainees. Majority of courses represented training areas like crop production (234 courses) with 10590 participants, livestock management (58 courses) with 1880 participants, entrepreneurship development (46 courses) with 1236 trainees, etc. Component wise and category-wise training details are reported in Table 4.11.


**Table 4.11 Training courses for sponsored trainings in Maharashtra**

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group Dynamics	22	502	145	647	95	43	138	597	188	785
Crop Production	234	8422	623	9045	1375	170	1545	9797	793	10590
Entrepreneurship Development	46	858	163	1021	175	40	215	1033	203	1236



Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Farm Implements	1	11	0	11	3	0	3	14	0	14
Livestock Production and Management	58	1268	308	1576	215	89	304	1483	397	1880
Nutrition security	5	0	135	135	0	15	15	0	150	150
Plant Protection	37	1506	248	1754	391	60	451	1897	308	2205
Processing and Value Addition	26	444	408	852	49	89	138	493	497	990
Production of Inputs at site	12	264	174	438	15	9	24	279	183	462
Soil Health and Fertility Management	39	1103	146	1249	110	38	148	1213	184	1397
Women Empowerment	2	0	40	40	0	17	17	0	57	57
Natural Resource Management	18	344	30	374	189	24	213	533	54	587
<b>Total</b>	<b>500</b>	<b>14722</b>	<b>2420</b>	<b>17142</b>	<b>2617</b>	<b>594</b>	<b>3211</b>	<b>17339</b>	<b>3014</b>	<b>20353</b>

## Gujarat

In case of Gujarat, 288 training courses were conducted with active participation of 14115 trainees. Major attention was given on crop production (84 courses with 3789 participants), capacity building and

group dynamics (63 courses 3790 participants), Livestock Production and Management (46 courses with 1903 participants), plant protection (36 courses 2329 participants), etc. Training area-wise and category-wise details are given in Table 4.12.

**Table 4.12 Training courses for sponsored trainings in Gujarat**

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group Dynamics	63	2242	1146	3388	283	119	402	2525	1265	3790
Crop Production	84	2439	458	2897	619	273	892	3058	731	3789
Entrepreneurship Development	3	28	29	57	20	2	22	48	31	79
Farm Implements	6	81	128	209	12	24	36	93	152	245
Livestock Production and Management	46	665	389	1054	288	561	849	953	950	1903

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Nutrition Security	5	4	59	63	4	21	25	8	80	88
Plant Protection	36	1742	248	1990	241	98	339	1983	346	2329
Production and value addition	10	161	165	326	46	67	113	207	232	439
Production of Inputs at site	1	0	0	0	20	0	20	20	0	20
Soil Health and Fertility Management	10	360	13	373	24	63	87	384	76	460
Women Empowerment	24	58	604	662	4	307	311	62	911	973
<b>Total</b>	<b>288</b>	<b>7780</b>	<b>3239</b>	<b>11019</b>	<b>1561</b>	<b>1535</b>	<b>3096</b>	<b>9341</b>	<b>4774</b>	<b>14115</b>



### Vocational Trainings

In Maharashtra and Gujarat, 6861 participants were trained through 249 courses on different areas of vocations/enterprises. State-wise details are reported as under:

#### Maharashtra

Vocational trainings are very important to organize at district level especially for rural youths to start their

agri-business or enterprise. In Maharashtra, 5123 participants were trained through 188 courses. Major emphasis was given on areas like entrepreneurship development (56 courses with 1348 participants), livestock production and management (42 courses with 1290 participants), crop production (34 courses with 979 participants), etc. Training area-wise and category-wise details are given in Table 4.13.



Table 4.13 Training courses for vocational trainings in Maharashtra

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group Dynamics	2	34	7	41	9	2	11	43	9	52
Crop Production	34	594	161	755	170	54	224	764	215	979
Entrepreneurship Development	56	537	587	1124	87	137	224	624	724	1348
Farm Implements	2	24	0	24	10	0	10	34	0	34
Livestock Production and Management	42	667	241	908	213	169	382	880	410	1290
Plant Protection	7	279	28	307	39	2	41	318	30	348
Processing and Value Addition	26	100	449	549	45	91	136	145	540	685
Production of Inputs at site	5	87	45	132	10	3	13	97	48	145
Soil Health and Fertility Management	4	71	18	89	8	2	10	79	20	99
Women Empowerment	10	9	103	112	1	30	31	10	133	143
<b>Total</b>	<b>188</b>	<b>2402</b>	<b>1639</b>	<b>4041</b>	<b>592</b>	<b>490</b>	<b>1082</b>	<b>2994</b>	<b>2129</b>	<b>5123</b>

## Gujarat

To develop entrepreneurship among rural youths, 61 vocational trainings were organized for benefitting the 1738 participants. Main focus was given on training

areas such as women empowerment (17 courses with 565 participants), crop production (10 courses with 236 participants), livestock production (10 courses with 262 participants), etc. Training area-wise and category-wise details are given in Table 4.14.

Table 4.14 Training courses for vocational trainings in Gujarat

Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Capacity Building and Group dynamics	1	33	0	33	0	0	0	33	0	33
Crop Production	10	147	8	155	56	25	81	203	33	236
Entrepreneurship Development	9	55	147	202	0	39	39	55	186	241
Farm Implements	3	86	0	86	11	0	11	97	0	97



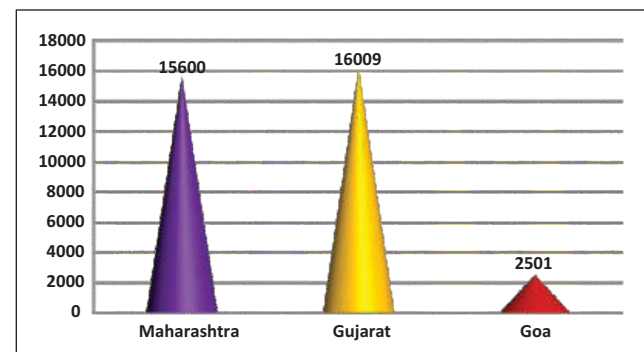
Training Areas	No. of Courses	No. of Participants			No. of Participants			No. of Participants		
		General			SC/ST			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Livestock Production and Management	10	174	37	211	37	14	51	211	51	262
Plant Protection	3	52	31	83	18	1	19	70	32	102
Processing and Value Addition	6	0	149	149	0	10	10	0	159	159
Production of Inputs at site	2	15	0	15	24	4	28	39	4	43
Women Empowerment	17	0	414	414	0	151	151	0	565	565
<b>Total</b>	<b>61</b>	<b>562</b>	<b>786</b>	<b>1348</b>	<b>146</b>	<b>244</b>	<b>390</b>	<b>708</b>	<b>1030</b>	<b>1738</b>



# Extension Activities

Extension activities are very important for creating awareness, exposure and large scale adoption among farmers and extension functionaries. In Zone-VIII, a large number of extension activities were organized by KVKs of Maharashtra, Gujarat and Goa. The major activities like advisory services (16036), diagnostic visits (3434), field days (688), group discussions (1381), kisan gosthies (720), film shows (1245), self-help groups (204), kisan melas (259), exhibitions (260), scientists visit to farmer's fields (6741), plant/animal health camps (214), farm science clubs (592), ex-trainees sammelan (32), farmers' seminars (272), method demonstrations (924), celebrations of special days (656), exposure visits (445), etc. with the participation of 6853387 farmers and 31642 extension personnel were performed. Out of total participants, about 10.16% farmers represented the SC/ST category. Similarly, about 8.74% farmers belonged to female group under different extension activities (Table 5.1). In addition, 19828 number of other extension activities

*viz.* use of electronic media, extension literature, newspaper coverage, popular articles, animal health camps, radio and TV talks were performed by KVKs (Table 5.5). Mobile based agro-advisory was also given by the KVKs to the farmers. By sending text and voice messages by mobile will be helpful to reach to unreached farmers in distant and remotely located areas. KVK portal is being used by the KVKs in the zone to upload daily activities for wide circulation.



No. of Extension Activities Organised



Table 5.1 Number of extension activities and participants

State	No. of Programmes	No. of Participants (General)			No. of Participants (SC/ST)			Total Farmers (General + SC/ST)			No. of Extension Personnel		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Maharashtra	15600	2362409	343377	2705786	335724	78843	414567	2698133	422220	3120353	19028	5924	24952
Gujarat	16009	3366580	69932	3436512	179085	101794	280879	3545665	171726	3717391	4865	1163	6028
Goa	2501	9360	5027	14387	566	690	1256	9926	5717	15643	402	260	662
<b>Total</b>	<b>34110</b>	<b>5738349</b>	<b>418336</b>	<b>6156685</b>	<b>515375</b>	<b>181327</b>	<b>696702</b>	<b>6253724</b>	<b>599663</b>	<b>6853387</b>	<b>24295</b>	<b>7347</b>	<b>31642</b>

## Extension Activities in Maharashtra

Extension activities played a major role to popularize the farm and livestock related technologies. In Maharashtra, 15600 extension programs were organized where 3120353 farmers and 24952 extension personnel benefited. Major extension activities were covered such as advisory services (5716 programs)

with participation of 1573553 farmers and 2289 extension officials; scientists' visit to farmers' fields (3827) with 23782 farmers and 1264 extension workers participation; diagnostic visits (2257) with involvement of 13426 farmers and 986 extension officials; etc. Activity-wise details of extension programs are reported in Table 5.2.



Table 5.2 Extension activities organized by KVKs in Maharashtra

Extension Activities	No. of Programs	No. of Participants (General)			No. of Participants (SC/ST)			Total Farmers (General + SC/ST)			No. of Extension Personnel		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Advisory services	5716	1283930	76555	1360485	192679	20389	213068	1476609	96944	1573553	1767	522	2289
Celebration of important days	369	18014	9034	27048	4642	3841	8483	22656	12875	35531	1692	696	2388
Diagnostic visits	2257	9161	1229	10390	2353	683	3036	11514	1912	13426	805	181	986
Exhibitions	122	758512	207206	965718	75713	30301	106014	834225	237507	1071732	6507	1769	8276
Exposure visits	259	5873	1688	7561	993	357	1350	6866	2045	8911	180	50	230
Ex-trainees sammelan	11	284	68	352	53	11	64	337	79	416	7	0	7
Farm Science Clubs	111	1540	303	1843	394	217	611	1934	520	2454	120	33	153
Farmers' seminar/workshops	170	10449	2280	12729	1437	664	2101	11886	2944	14830	898	144	1042
Field days	320	10399	1631	12030	2271	767	3038	12670	2398	15068	732	171	903
Film shows	257	31922	3822	35744	2395	702	3097	34317	4524	38841	511	91	602
Group discussions	906	12549	2982	15531	3567	1606	5173	16116	4588	20704	605	204	809
Kisan goshes	429	11306	2297	13603	3477	1052	4529	14783	3349	18132	546	150	696
Kisan melas	202	142923	28156	171079	37754	13791	51545	180677	41947	222624	2978	1568	4546
Method demonstrations	410	40254	990	41244	2178	927	3105	42432	1917	44349	389	68	457
Plant/animal health camps	80	8258	1329	9587	1945	768	2713	10203	2097	12300	128	37	165
Scientists' visit to farmers fields	3827	16365	2604	18969	3602	1211	4813	19967	3815	23782	1087	177	1264
SHGs	154	670	1203	1873	271	1556	1827	941	2759	3700	76	63	139
<b>Total</b>	<b>15600</b>	<b>2362409</b>	<b>343377</b>	<b>2705786</b>	<b>335724</b>	<b>78843</b>	<b>414567</b>	<b>2698133</b>	<b>422220</b>	<b>3120353</b>	<b>19028</b>	<b>5924</b>	<b>24952</b>



## Extension Activities Organized in Gujarat

In Gujarat, 16009 extension programs were organized by the KVKs where 3717391 farmers and 6028 extension officials participated. Main extension activities such as advisory services (8271) with participation of 3414908 farmers and 535 extension

personnel; scientists' visit to farmers' fields (2774) benefited 11824 farmers and 416 extension personnel; method demonstrations (458) helping 8895 farmers and 190 extension workers, etc. were conducted for large scale technology dissemination and application. Extension activity-wise and category-wise details are furnished in Table 5.3.



Table 5.3 Extension activities organized by KVKs in Gujarat

Extension Activities	No. of Programs	No. of participants (General)			No. of participants (SC/ST)			Total Farmers (General + SC/ST)			No. of Extension Personnel		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Advisory services	8271	3244664	10129	3254793	116841	43274	160115	3361505	53403	3414908	445	90	535
Celebration of important days	272	15068	9880	24948	8796	12476	21272	23864	22356	46220	687	190	877
Diagnostic visits	1019	2070	180	2250	1165	427	1592	3235	607	3842	131	28	159
Exhibitions	133	27774	16036	43810	12776	15409	28185	40550	31445	71995	458	154	612
Exposure visits	180	2386	584	2970	827	986	1813	3213	1570	4783	97	35	132
Ex-trainees Sammelan	21	536	88	624	197	168	365	733	256	989	50	12	62
Farm Science Clubs	481	768	432	1200	211	53	264	979	485	1464	39	10	49
Farmers' seminar/workshops	95	3990	958	4948	1946	1428	3374	5936	2386	8322	175	31	206
Field days	363	6837	1992	8829	3517	2677	6194	10354	4669	15023	201	42	243
Film shows	970	12889	9790	22679	8198	5137	13335	21087	14927	36014	965	209	1174
Group discussions	469	5676	2294	7970	2297	1772	4069	7973	4066	12039	181	61	242
Kisan gothas	285	8548	2185	10733	3211	1695	4906	11759	3880	15639	218	40	258
Kisan melas	54	22268	13238	35506	12084	11670	23754	34352	24908	59260	619	165	784
Method demonstrations	458	2105	686	2791	3234	2870	6104	5339	3556	8895	147	43	190
Plant/animal health camps	133	1882	264	2146	891	615	1506	2773	879	3652	48	4	52
Scientists' visit to farmers fields	2774	9091	895	9986	2733	859	3592	11824	1754	13578	382	34	416
SHGs	31	28	301	329	161	278	439	189	579	768	22	15	37
<b>Total</b>	<b>16009</b>	<b>3366580</b>	<b>69932</b>	<b>3436512</b>	<b>179085</b>	<b>101794</b>	<b>280879</b>	<b>3545665</b>	<b>171726</b>	<b>3717391</b>	<b>4865</b>	<b>1163</b>	<b>6028</b>

## Extension Activities in Goa

Farmers of Goa have lot of potential to create agriculture related enterprises. In state, 2501 extension programs were conducted in which 15643 farmers and 662 extension personnel got benefitted. Major

extension activities such as advisory services (2049) benefitting 2910 farmers; diagnostic visits (158) helped 429 farmers; method demonstrations (56) facilitated 1108 farmers and 29 extension personnel, etc. Extension activity-wise and category-wise details are given in Table 5.4.



Table 5.4 Extension activities organized by KVKs in Goa

Extension Activities	No. of Programs	No. of participants (General)			No. of participants (SC/ST)			Total Farmers (General + SC/ST)			No. of Extension Personnel		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Advisory services	2049	1908	1002	2910	0	0	0	1908	1002	2910	20	15	35
Celebration of important days	15	375	282	657	24	21	45	399	303	702	23	22	45
Diagnostic visits	158	279	138	417	12	0	12	291	138	429	12	3	15
Exhibitions	5	1413	787	2200	175	190	365	1588	977	2565	74	40	114
Exposure visits	6	198	133	331	0	0	0	198	133	331	3	4	7
Farmers' seminar/workshops	7	397	117	514	200	111	311	597	228	825	61	45	106
Field days	5	62	58	120	9	8	17	71	66	137	15	15	30
Film shows	18	193	102	295	48	45	93	241	147	388	28	14	42
Group discussions	6	102	86	188	0	0	0	102	86	188	8	4	12
Kisan gosthes	6	25	28	53	15	25	40	40	53	93	20	12	32
Kisan melas	3	2827	1339	4166	28	35	63	2855	1374	4229	77	41	118
Lecture delivered as a resource person	7	256	195	451	0	0	0	256	195	451	2	3	5
Method demonstrations	56	613	466	1079	22	7	29	635	473	1108	16	13	29
Plant/animal health camps	1	26	13	39	6	2	8	32	15	47	2	0	2
Scientists' visit to farmers fields	140	577	233	810	15	26	41	592	259	851	33	24	57
Self-help groups	19	109	48	157	12	220	232	121	268	389	8	5	13
<b>Total</b>	<b>2501</b>	<b>9360</b>	<b>5027</b>	<b>14387</b>	<b>566</b>	<b>690</b>	<b>1256</b>	<b>9926</b>	<b>5717</b>	<b>15643</b>	<b>402</b>	<b>260</b>	<b>662</b>



## Other Extension Activities

Mass communication is very important to reach to unreached people resided in distant locations. Electronic media, print media, digital media and other related extension activities were used for wider

dissemination of farm/livestock and other allied enterprise related technologies among different stakeholders. During the year under report, 19828 were organized by KVKs in the zone. State-wise and activity-wise details are reported in Table 5.5.



**Table 5.5 Other extension activities organized by KVKs across the zone**

Other Extension Activities	Maharashtra (No.)	Gujarat (No.)	Goa (No.)	Total (No.)
Animal health camps (No. of animals treated)	10853	4291	213	15357
Electronic media (CD./DVD)	74	89	16	179
Extension literature	241	187	8	436
Newspaper coverage	2132	402	12	2546
Popular articles	353	101	3	457
Radio talks	609	42	3	654
TV talks	138	59	2	199
<b>Total</b>	<b>14400</b>	<b>5171</b>	<b>257</b>	<b>19828</b>



# Seed and Planting Material Production

## Chapter 6

### Production of Technological Inputs

Quality seeds, planting materials, livestock, fisheries and bio-products are the primary requirement of the farmers to attain higher productivity and profitability in agriculture and allied sectors. KVKs are actively involved in production of quality seeds, planting

materials, livestock, bio-products and supplying them to the farmers and extension workers. During the period under report, KVKs produced 8323.28 q seeds of crop varieties, 3621.90 q bio-products, 27.95 lakh number of planting materials, 35.62 lakh number of planting materials of hybrids and 16.24 lakh number livestock and fingerlings (Table 6.1).



**Table 6.1 Production and supply of technological inputs**

Category	Quantity	Value (Rs. in lakh)	Farmers (No.)
Seeds of crop varieties (q)	8323.28	337.78	10380
Bio-products (q)	3621.90	286.67	39845
Planting material of crops (No. in lakh)	27.95	237.18	56562
Planting material of crop hybrids (No. in lakh)	35.62	36.27	6644
Livestock and fisheries (No. in lakh)	16.24	123.13	3045
<b>Total</b>		<b>1021.03</b>	<b>116476</b>

### Seeds

During 2018-19, the quality seed production by KVKs of Maharashtra, Gujarat and Goa was 5285 q, 3001 q

and 36.80 q, respectively. The crop category-wise information of seed production is given in Table 6.2.



Table 6.2 Quality seed produced by the KVKs in the zone

Crop Category	Quantity (kg)	Total Value (Rs.)	Sold to No. of Farmers
<b>Maharashtra</b>			
Cereals	69882	6650471	1040
Commercial crops	253000	594200	-
Fodder crops	7969.4	94560	111
Oilseed crops	134788	7725410	1449
Pulses	55412.9	4139406	-
Spices	6662	170290	-
Vegetable crops	833.66	411304	-
<b>Total</b>	<b>528547.96</b>	<b>19785642.1</b>	<b>2600</b>
<b>Gujarat</b>			
Cereals	135654	6242676.2	5481
Commercial crops	47684.1	194867.5	13
Fiber crops	900	52000	20
Fodder crops	750	74500	115
Oilseed crops	51337.6	1886358	840
Pulses	59957.25	4863772.63	896
Spices	2208	224694.06	135
Vegetable crops	1619.75	33260	-
<b>Total</b>	<b>300110.7</b>	<b>13572128.39</b>	<b>7500</b>
<b>Goa</b>			
Cereals	3500	366148	180
Pulses	180	13860	100
<b>Total</b>	<b>3680</b>	<b>380008</b>	<b>280</b>

### Bio-products

The KVKs of Maharashtra have produced 1088 q quality bio-products, 2509 q by KVKs in Gujarat and 24.81 q by North and South Goa KVKs. Farmers got benefited by using bio-fertilizers and bio-pesticides that reduced cost of cultivation. The category-wise details of bio-products production is given in Table 6.3.



Table 6.3 Bio-products produced by the KVKs and sold to the farmers

Category	Quantity (kg)	Total Value (Rs.)	Sold to No. of Farmers
<b>Maharashtra</b>			
Bio fertilizers	71590.45	14321385.64	5824
Bio fungicides	2320.03	277734.25	670
Bio pesticides	29750.5	3136220	6065
Micro nutrient mixture	5140	307000	683
<b>Total</b>	<b>108800.98</b>	<b>18042339.89</b>	<b>13242</b>

Category	Quantity (kg)	Total Value (Rs.)	Sold to No. of Farmers
<b>Gujarat</b>			
Bio fertilizers	131153	1608039.5	6276
Bio fungicides	73455	4259450	8240
Bio pesticides	46050	4710680	12081
Micronutrient mixture	250	-	-
<b>Total</b>	<b>250908</b>	<b>10578169.5</b>	<b>26597</b>
<b>Goa</b>			
Bio fertilizers	2476	45270	4
Bio fungicides	5	1000	2
<b>Total</b>	<b>2481</b>	<b>46270</b>	<b>6</b>

### Planting Material of Crops

During year 2018-19, the quality planting material production of crops by KVKs of Maharashtra, Gujarat

and Goa was 20.74 lakh, 6.8 lakh and 0.39 lakh, respectively. The crop category-wise details of planting material production of crops are reported in Table 6.4.



Table 6.4 Planting material produced by the KVKs

Crop Category	Quantity (No.)	Total Value (Rs.)	Sold to No. of Farmers
<b>Maharashtra</b>			
Commercial crops	431176	1133385	201
Flower crops	14115	72825.5	1155
Fodder crops	522699	524280.9	426
Forest species	3661	47468	30
Fruit crops	421132	16981055	15811
Medicinal and aromatic crops	3696	53292	8
Ornamental plants	17786	123450	83
Plantation crops	6766	482850	187
Spices	2	70	-
Vegetable crops	653237	1133148	10132
<b>Total</b>	<b>2074270</b>	<b>20551824.4</b>	<b>28033</b>
<b>Gujarat</b>			
Commercial crops	3500	700	1



Crop Category	Quantity (No.)	Total Value (Rs.)	Sold to No. of Farmers
Flower crops	2023	37930	122
Fodder crops	72000	21000	235
Fruit crops	27873	859802	890
Medicinal and aromatic crops	200	5000	-
Plantation crops	1748	19339	27
Tuber crops	60173	30432.5	17
Vegetable crops	514204	330868.605	-
<b>Total</b>	<b>681721</b>	<b>1305072.105</b>	<b>1292</b>
<b>Goa</b>			
Fruit crops	8305	366148	5924
Medicinal and aromatic crops	142	5680	89
Ornamental plants	6601	222045	6024
Plantation crops	16150	1130500	9150
Spices	4350	115500	2650
Vegetable crops	3500	22000	3400
<b>Total</b>	<b>39048</b>	<b>1861873</b>	<b>27237</b>

### Planting Material of Crop Hybrids

In Zone-VIII, the quality planting material production of crop hybrid by KVKs of Maharashtra, Gujarat and

Goa was 25.34 lakh, 10.25 lakh and 0.25 lakh, respectively. The crop category-wise details of planting material production of crop hybrids are reported in Table 6.5.



Table 6.5 Planting material of hybrid crops produced

Crop Category	Quantity (No.)	Total Value (Rs)	Sold to No. of Farmers
<b>Maharashtra</b>			
Flower crops	13000	13000	-
Fodder crops	304997	297460.2	439
Vegetable crops	2214748	2097033.6	2254
Ornamental plants	1668	18348	32
<b>Total</b>	<b>2534413</b>	<b>2425841.8</b>	<b>2725</b>
<b>Gujarat</b>			
Flower crops	780	780	3

Crop Category	Quantity (No.)	Total Value (Rs)	Sold to No. of Farmers
Vegetable crops	1024428	1099962	3716
<b>Total</b>	<b>1025208</b>	<b>1100742</b>	<b>3719</b>
<b>Goa</b>			
Vegetable crops	25000	100000	200

## Livestock and Fisheries

During the reporting period, the quality livestock and fisheries production by KVKs of Maharashtra, Gujarat

and Goa was 1622609, 44 and 1166, respectively. The category-wise information of livestock and fisheries production is given in Table 6.6.



Table 6.6 Quality livestock and fisheries production

Category	Quantity (No.)	Total Value (Rs)	Sold to no. of farmers
<b>Maharashtra</b>			
Dairy Buffalo	3	120000	3
Dairy Cow	8	110000	8
Fishery	1450700	1450700	74
Goat	346	1347604.8	122
Poultry	171552	9085059.08	2817
<b>Total</b>	<b>1622609</b>	<b>12113363.88</b>	<b>3024</b>
<b>Gujarat</b>			
Dairy Cow	14	69200	11
Goat	24	10500	-
Poultry	6	1200	-
<b>Total</b>	<b>44</b>	<b>80900</b>	<b>11</b>
<b>Goa</b>			
Poultry	1166	118242	10
<b>Total</b>	<b>1166</b>	<b>118242</b>	<b>10</b>

# Farmer Centric and Skill Oriented Programs

In this chapter, farmer centric and skill oriented programs are discussed and salient results are given. Projects like NICRA, Farmer FIRST, ARYA, TSP and skill oriented programs supported with ASCI are highlighted. These programs have reflected their contribution for minimizing climate resilience, creating entrepreneurship, focusing on farm household level farming, capacity building of input dealers, etc.

## National Innovations in Climate Resilient Agriculture (NICRA)

In changing climatic scenario, focus on climate resilient technologies is needed. In order to deal with climatic change under technology demonstration component of NICRA, demonstrations of location-specific technologies contributing to climate resilience were organized in Maharashtra and Gujarat. The project is being implemented in identified districts by respective KVKs. The specific objectives of technology demonstration component are:

- To enhance the resilience of Indian agriculture

covering crops, livestock and fisheries to climatic variability and climate change through development and application of improved production and risk management technologies.

- To demonstrate site specific technology packages on farmers' fields for adapting to current climate risks.
- To enhance the capacity building of scientists and other stakeholders in climate resilient agricultural research and its application.

In Zone-VIII, it is being implemented in 13 most vulnerable districts through KVKs namely Ahmednagar-I, Aurangabad-I, Amravati-II, Buldhana-II, Jalna-I, Nandurbar, Pune-II and Ratnagiri in Maharashtra. Amreli, Banaskantha-I, Rajkot-I, Kutch-I and Valsad in Gujarat state. In Maharashtra, 8 KVKs adopted 24 villages benefitting 8174 farm families. In Gujarat, 5 KVKs adopted 12 villages benefitting 4721 farm families. Brief profile of identified villages of each NICRA center is given in Table 7.1 and 7.2.

**Table 7.1 Brief profile of identified villages under NICRA in Maharashtra**

Name of KVK	Adopted Villages	No. of Families	Population	Major crops grown	Rainfall (mm)	Vulnerability situation
Ahmednagar-I	Pimpri Lokai	194	1185	Soybean, pearl millet, fodder chick pea, onion, sorghum and pomegranate	123	Drought
	Nirmal Pinpri	1177	5466	Soybean, pearl millet, fodder chick pea, onion, sorghum and pomegranate	267	Drought
Amravati-II	Takali (Bk)	472	1973	Cotton, soybean, pigeon pea, chick pea and wheat	877	Drought
	Ajani	169	770	Cotton, soybean, pigeon pea, chick pea and wheat	831	Drought
	Morgaon	327	2022	Cotton, soybean, pigeon pea, chick pea and wheat	831	Drought



Name of KVK	Adopted Villages	No. of Families	Population	Major crops grown	Rainfall (mm)	Vulnerability situation
Aurangabad-I	Shekta,	115	780	Cotton, maize and pigeon pea	644	Drought
	Wajnapur	135	810	Cotton, maize and pigeon pea	644	Drought
	Gopalwadi	101	650	Cotton, maize and pigeon pea	644	Drought
	Saigaon	108	550	Cotton, maize and pigeon pea	644	Drought
	Buttewadgain	141	1250	Cotton, maize and pigeon pea	644	Drought
	Shankarapur	171	1450	Cotton, maize and pigeon pea	644	Drought
Buldhana-II	Chautha	350	1678	Soybean, bengal gram	693	Drought
	Umarani	257	1548	Sorghum, maize, black gram, pigeon pea, soybean, chick pea, wheat	702	Drought
Nandurbar	Bhujgaon	133	777	Sorghum, maize, black gram, pigeon pea, chick pea, wheat	702	Heat stress drought
	Roshamal	875	1688	Sorghum, maize, black gram, pigeon pea, soybean, chick pea, wheat	702	Heat stress drought
	Suryapur	108	502	Sorghum, maize, black gram, pigeon pea, chick pea, wheat	702	Heat stress drought
Pune-I	Jalgaon kadepathar	398	2578	Sorghum, maize, green gram, red gram, bajara, onion	353.60	Drought
	Jalgaon supe	474	3254	Sorghum, maize, green gram, red gram, bajara, onion	353.60	Drought
	Karhati	738	4597	Sorghum, maize, green gram, red gram, bajara, onion	353.60	Drought
Ratnagiri	Haral,	271	527	Rice, finger millet, horse gram, cow pea, groundnut,	3505.6	Flood
	Parule	202	735	Mango, cashew, watermelon, cucumber	3505.6	Flood
	Raipatan	466	2225	Rice, finger millet, horse gram, cow pea, groundnut,	3505.6	Flood
Jalna	Kadegaon	355	3150	Cotton, soybean, maize, bajara & sorghum	468.4	Drought
	Warudi	437	2346	Cotton, soybean, maize, bajara & sorghum	468.4	Drought
<b>Total</b>	<b>24</b>	<b>8174</b>	<b>42511</b>			

Table 7.2 Brief profile of identified villages under NICRA in Gujarat

Name of KVK	Adopted Villages	No. of Families	Population	Major crops grown	Rainfall (mm)	Vulnerability situation
Amreli	Karjala	404	1740	Cotton, groundnut, onion, sesame, wheat, bajara, mango, banana	580	Drought
	Nesdi	957	4604	Cotton, groundnut, onion, sesame, wheat, bajara, mango, banana	580	Drought

Name of KVK	Adopted Villages	No. of Families	Population	Major crops grown	Rainfall (mm)	Vulnerability situation
Banaskantha-I	Fatepura	96	491	Castor, pearl millet, potato, wheat, lucerne, maize, cumin, fennel	241.3	Drought
Kutch-I	Bhalot	177	761	Bt. cotton, castor, sorghum, greengram, sesamum, Wheat, Cumin, Lucerne	360	Drought
	Lafara	128	677	Bt. cotton, castor, sorghum, greengram, sesamum, wheat, cumin, lucerne	360	Drought
	Bagada	204	845	Bt. cotton, castor, sorghum, greengram, sesamum, wheat, cumin, lucerne	360	Drought
Rajkot-I	Magharvada	300	1543	Groundnut, cotton, cumin	648	Drought
	Rafala	692	13613	Groundnut, cotton, cumin, gram	641	Drought
	Targhadia	475	1748	Groundnut, cotton, cumin, gram	652	Drought
Valsad	Amdha	481	2660	Paddy, gram	2525	Flood
	Khutli	349	1922	Paddy, gram	2525	Flood
	Panas	458	2354	Paddy, gram	2525	Flood
<b>Total</b>	<b>12</b>	<b>4721</b>	<b>32958</b>			

**Rainfall in NICRA Villages:** The month wise rainfall received, no. of dry spells, intensive rain spells and waterlogging observed during the crop growth period are varied and that resulted adverse effect on crops/livestock.

Water logging was observed for 10 days during monsoon period in Jalna and Ratnagiri districts of Maharashtra. In Ahmednagar-I, Jalna-I, Pune-I and Amravati-II the number of dry spells of 10-15 days were observed 1, 2, 4 and 3, respectively. The intensive rain spell of > 60 mm was recorded maximum in Ratnagiri (each month of June to July) with 4 spells in June and 15 spells in July. In Ratnagiri, highest rainfall of 1719 mm was recorded in July.

In Gujarat, inadequate moisture stress was

experienced in Kutch (6 dry spells) and Amreli (3 dry spells) during 2018. In Banaskantha district, identified village experienced four events of high intensity rain in July. In Kutch, dry spell of more than 10 days were occurred 4 times during June to September months. In Valsad, maximum rainfall (1495 mm) was achieved in July.

### Technology Modules and Interventions

Climate resilient practices and technologies implemented are categorized under four modules: natural resource management, crop production systems, livestock & fisheries production systems and institutional mechanism. Summary of activities carried over under NICRA project in Maharashtra and Gujarat states is given in Table 7.3.

**Table 7.3 Summary of activities carried out during 2018-19 by KVKs under Zone-VIII**

Name of KVK	NRM		Crop		Livestock		Capacity Building		Extension Activities	
	Demo (No.)	Area (ha)	Demo (No.)	Area (ha)	Demo (No.)	No. of animals /Units	No. of trainings	Farmers	No. of Programs	Farmers
<b>Maharashtra (08 KVKs)</b>										
A. Nagar-I	100	105	155	60	256	256	4	231	19	405
Amravati-II	909	1536.2	1132	651.5	335	340	23	1747	19	1816

Name of KVK	NRM		Crop		Livestock		Capacity Building		Extension Activities	
	Demo (No.)	Area (ha)	Demo (No.)	Area (ha)	Demo (No.)	No. of animals /Units	No. of trainings	Farmers	No. of Programs	Farmers
Aurangabad-I	190	105	215	86	70	520	26	676	57	1548
Buldhana-II	15	6	141	56.4	283	869	67	765	29	1561
Jalna	230	226.1	283	113.2	329	972	30	993	15	558
Nandurbar	60	32	180	72	323	470	17	437	62	1343
Pune-I	100	40	212	92.2	437	945	15	316	03	71
Ratnagiri	82	64	275	34	69	334	2	40	23	272
<b>Sub-Total</b>	<b>1686</b>	<b>2114.3</b>	<b>2593</b>	<b>1165.3</b>	<b>2102</b>	<b>4706</b>	<b>184</b>	<b>5205</b>	<b>227</b>	<b>7574</b>
<b>Gujarat (05 KVKs)</b>										
Amreli	35	48	80	30.1	125	110	5	380	46	978
Banaskantha-I	102	130.5	70	26.2	239	193	9	229	46	438
Kutch-I	107	124	26	24.4	550	1399	03	65	22	760
Rajkot-I	73	80	70	20	177	280	8	149	18	374
Valsad	264	45.5	329	59	400	2038	10	436	25	1975
<b>Sub-Total</b>	<b>581</b>	<b>428</b>	<b>575</b>	<b>159.7</b>	<b>1491</b>	<b>4020</b>	<b>35</b>	<b>1259</b>	<b>157</b>	<b>4525</b>
<b>Zone-Total</b>	<b>2267</b>	<b>2542.3</b>	<b>3168</b>	<b>1325</b>	<b>3593</b>	<b>8726</b>	<b>219</b>	<b>6464</b>	<b>384</b>	<b>12099</b>

## Module I: Natural Resources Management

Surface and sub-surface storage structures are major sources for creating resilience at the field level in agricultural system. This form of infrastructure development plays important role in low to medium rainfall zones as rainfall variability and occurrence of intense rainy events are considered to be high. Farmers in NICRA villages were adopted an integrated approach including the resource conservation interventions, in-situ moisture conservation, water harvesting and recycling for



supplemental irrigation, water saving practices, moisture conservation technologies, strengthening of water storage structures, organic input production and usage and agroforestry. Village climate risk management committees (VCRMCS) in NICRA villages played an important role in the participatory decision making for on-site solving the problems and enriching farm resources in the villages.

A total of 2542.3 ha area was treated with NRM related interventions covering 2267 farmers' fields in order to build climate resilience in 36 villages. Different resource conservation practices were followed in identified villages as given in sub-heads.

## Performance of Natural Resource Conservation Practices

### In-situ soil moisture conservation practices Pune-I

Adoption of compartmental bunding (10×10 m) in kharif fallows prepared across the slope in medium black soils in 100 farmers' fields covering 40 ha area led





to conservation of soil moisture and successful raising of rabi sorghum variety Phule Vasudha with increased productivity of 16.9 q/ha as compared to 11.1 q/ha under no compartmental bunding.

### Aurangabad-I

Opening of furrow after every fourth row in pigeon

pea gave additional seed yield of 1.90 q/ha which was superior over cultivating pigeon pea without conservation furrows. In cotton, conservation furrows gave additional yield of 1.60 q/ha with net income of Rs.20221/ha.



Technology demonstrated	No. of farmers benefitted	Area (ha)	Measurable indicators	Remarks
Bt Cotton Treatment: Opening of furrows in alternate rows	120	65	Demo - 8.50q/ha Local - 6.90 q/ha	BCR: 1.71
Pigeon pea Treatment: Opening of furrows in alternate rows	50	32	Demo - 9.10q/ha Local - 7.20 q/ha	BCR: 2.18

### Jalna-I

The NICRA village in Jalna experienced erratic rainfall during the season. The village did not receive any rain in July against a normal of 120.4 mm and reflected 50% deficit rainfall during August and excess rainfall in September. Cotton with conservation furrows performed better with yield of 13.49 q/ha over farmer's practice (12.50 q/ha). Broad bed furrow system of sowing in soybean gave yield advantage of 15.25% over flatbed method of sowing (12.87 q/ha).



### Module II: Crop Production

Under this module, several practices were applied and demonstrated like drought/ high temperature tolerant varieties, improved drought tolerating measures, short duration varieties, crop diversification, flood tolerant varieties, etc. Location specific intercropping systems were also experimented and demonstrated for sustainable production. In addition, cultivation practices to overcome flooded situations, resource conservation and eco-friendly management practices and water saving cultivation methods (SRI, aerobic, direct seeding) were included under interventions. A total of 3168 farmers' demonstrated large number of technologies in 1325 ha area spread over in 13 KVKs.

### Drought Tolerant Varieties

#### Amaravati-II

To minimize adverse effect of terminal drought under rainfed conditions, short duration variety of soybean

(JS-9305) was demonstrated in selected village. In demonstration plot, farmers attained higher yield (22.50 q/ha) over existing variety JS-335 (16.87 q/ha). In chick pea, introduction of short duration and drought tolerant variety Jaki-9218 provided higher yield (22.10 q/ha) over local variety (19.25q/ha) with net income of Rs. 70740/ha. In pigeon pea, improved variety (BDN-711) recorded higher yield of 19.20 q/ha with net income of Rs. 62000/ha.



Interventions	No. of farmers	Area (ha)	Yield (q/ha)		% increase in yield	Economics of demo (Rs./ha)		Economics of check (Rs./ha)	
			Demo	Local		Cost of cultivation	Net return	Cost of cultivation	Net return
Soybean (JS-9305)	5	12	22.50	16.87	33.33%	30700	52775	29250	31988
Pigeon pea (BDN-711)	45	7.5	19.20	14.60	31.50%	37675	62000	28850	46250
Chick pea (Jaki-9218)	25	10	22.10	19.25	14.80%	26500	70740	27230	59470

### Aurangabad-I

Short duration variety of chick pea (Akash) gave yield of 5.25 q/ha, over traditional varieties with net return of Rs. 11325/ha. Parbhani Moti a short duration variety of rabi sorghum performed better under drought situation with net gain of Rs. 17900 over local variety. In safflower, variety (PBNS -12) gave better performance by recording 4.25q /ha with net return of Rs. 11800/ha.



Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)		% increase in yield	Economics of demo (Rs./ha)		Economics of check (Rs./ha)	
			Demo	Local		Cost of cultivation	Net return	Cost of cultivation	Net return
Gram (Akash/BDNG-797)	30	12	5.25	3.50	50	12300	11325	8950	6800
Rabi Sorghum (Parbhani Moti)	20	08	7.10	5.30	34	6950	17900	5500	13050
Safflower (PBNS -12)	20	08	4.25	2.50	70	5200	11800	4500	5500

### Pune-I

Bajra is grown under dry land condition. Alternative varieties of bajra were identified for higher profit to the farmers. Early maturity variety of bajra ICTP- 8203 recorded a yield of 11.25 q/ha over local variety (7.60 q/ha).





Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)		% increase in yield	Economics of demo (Rs./ha)		Economics of check (Rs./ha)	
			Demo	Local		Cost of cultivation	Net return	Cost of cultivation	Net return
Bajara ICTP- 8203	25	10	11.25	7.60	48.0	12650	7600	11530	2120

## Improved Variety and Drought Tolerable Measures

### Amravati-II

The NICRA village in Amravati-II has been facing the problem of continuous dry spells and water shortage

at critical growth stages of crops. Improved wheat variety (PDKV-Washim-1472) was assessed for its performance in medium black soils. The improved variety recorded a yield of 30.50q/ha which was better over local variety (23.75q/ha) with economic gain of Rs. 27445/ha. It was also found rust resistant.

Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)		% increase in yield	Economics of demo (Rs./ha)		Economics of check (Rs./ha)	
			Demo	Local		Cost of cultivation	Net return	Cost of cultivation	Net return
Wheat (PDKV-Washim-1472)	10	5	30.50	23.75	36.11	36600	27445	33664	15261

### Valsad

In chickpea, improved variety GJG-3 was assessed for its performance in heavy black soils under irrigated

conditions. The improved variety gave yield of 10.60 q/ha which was quite higher over local variety (7.70 q/ha) with net return of Rs. 31350/ha.

Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)		% increase in yield	Economics of demo (Rs./ha)		Economics of check (Rs./ha)	
			Demo	Local		Cost of cultivation	Net return	Cost of cultivation	Net return
Gram-GJG-3	50	10	10.60	7.70	37.66	21650	31350	20120	18380

## Crop Diversification

### Jalna-I

Crop diversification with sericulture and cotton realized higher net income of Rs. 178000/ha. KVK introduced sericulture in the village as an alternative to climate change situation. The KVK also supported them by providing dusters for dusting disinfectant, chandrika for spinning, heaters for maintain temperature in silkworm rearing house in addition to their existing practice. The crop requires less water



and less input. Total 63 farmers are involved in sericulture and there is more scope for up scaling.

Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)		% increase in yield	Economics of demo (Rs./ha)		Economics of check (Rs./ha)	
			Demo	Local		Cost of cultivation	Net return	Cost of cultivation	Net return
Traditional cotton to mulberry sericulture	63	25.2	5.60	4.10	36.58	46000	178000	17500	4640



## Ratnagiri

Crop diversification with lodging resistant finger millet variety Dapoli-1 was introduced to overcome the problem of lodging in finger millet. Higher yield was achieved (13.50 q/ha) with profit of Rs. 22450/ha.



Technology demonstrated	No. of farmers	Area (ha)	Yield (q/ha)		% increase in yield	Economics of demo (Rs./ha)		Economics of check (Rs./ha)	
			Demo	Local		Cost of cultivation	Net return	Cost of cultivation	Net return
Lodging resistant Finger millet, Dapoli-1	45	2.00	13.50	9.80	37.75	24800	22450	22100	12200

## Flood Tolerant Varieties

### Valsad

Flood tolerant Paddy-Naveen was demonstrated in 100 farmers' fields covering 20 ha area resulted net return of Rs. 25250/ha. Average yield of 37.50 q/ha was recorded in field condition which was about 30% higher over local check.



Interventions	No. of farmers	Area (ha)	Yield (q/ha)		% increase in yield	Economics of demo (Rs./ha)		Economics of check (Rs./ha)	
			Demo	Local		Cost of cultivation	Net return	Cost of cultivation	Net return
Paddy-Naveen	100	20	37.50	28.91	29.71	31000	25250	33000	10365

Flood tolerant variety of paddy Karjat-2 and Ratnagiri-6 were introduced in water logged areas. The flood tolerant variety Karjat-2 and Ratnagiri-6 provided 42.20% and 42.40% increase in yield with net return of Rs. 20600/ha and Rs. 30560/ha, respectively. Similarly in Valsad district, paddy variety GAR-13 gave higher yield of 37.50 q/ha with net return of Rs. 25250/ha.



## Drought Tolerant Varieties

### Aurangabad-I

For mitigating terminal drought under rainfed conditions, drought tolerant variety of safflower (PBNS -12) was demonstrated in identified village. In



demonstration plot, farmers got higher yield (4.25 q/ha) over local variety (2.50 q/ha). Net income of Rs. 11800/ha was achieved by the farmers. The safflower yield increased by 70% over traditional variety of safflower.

### Module III: Livestock and Fisheries

Under this module several practices were undertaken and promoted through organizing animal health camps, preventive vaccination, heat stress management in livestock through nutrition, breed upgradation, improved fodder/feed storage methods, use of community lands for fodder production during droughts/floods, improved shelters for reducing heat stress in livestock, model dairy unit for stress and feed management and management of fish ponds/tanks during water scarcity and excess water etc. During year, about 7003 livestock were covered under general health check-up and preventive vaccination

programme. Under heat stress management through balanced nutrition, 220 animals were covered benefitting 205 farmers in the NICRA villages. About 578 improved breeds of livestock/birds and 108 units of improved shelter/housing were demonstrated to tackle the adverse climatic conditions in the NICRA villages benefitting 138 farmers. To ensure the fodder availability to livestock during lean period, about 19 ha of community land was brought under fodder cultivation.

### Improved fodder/feed storage methods

#### Ahmednagar-I

Cultivation of fodder sorghum variety Phule Godhan for green fodder was initiated and produced mean yield of 34.5 t/ha which was higher over conventional fodder sorghum in kharif season.

Technology demonstrated	No. of farmers	Unit/No./ Area (ha)	Fodder yield t/ha		
			demo	local	%increase
Fodder sorghum variety- Phule Godhan	75	4	34.5	32.43	6.38

#### Nandurbar

In district, shortage of fodder in summer season was observed. To cope with such problem, KVK introduced multi cut green fodder lucerne variety Anand-2 in NICRA village at 13 farmers' fields. In demonstration plot, the green fodder yield recorded 650 q/ha. The green fodder yield was increased by (58%) over farmer's practice (410 q/ha).

#### Ratnagiri

Unavailability of green fodder during lean period is a serious problem under rainfed situation in NICRA village of district. Hence, Azolla a protein rich aquatic fern, which needs less water for its propagation and serves as protein supplement for livestock was demonstrated. Azolla is also reported to be rich in essential minerals, vitamins and contains 21-23% crude protein and increases the milk productivity by 10-15%. About 35-40 % livestock owners were adopted cultivation of Azolla in the village after observing the impact.

In village Haral, Ratnagiri most of the milch animals are being fed on dry fodder which was low in nutritional value. Azolla cultivation was demonstrated for reduction in feeding cost (concentrate) of milch



animals. Use of Azolla combined with mineral mixture resulted increase in milk yield (6.30 lit/ day) which was more against existing practice (5.50 lit/ day).



## Ahmednagar-I

In Nirmal Pimpri, Ahmednagar the green fodder is available for feeding animals till the end of November–December and farmers are unable to cultivate multi-cut annual or perennial fodder crops due to water scarcity. Farmers are forced to purchase green fodder like lucerne, maize from neighbouring villages at higher rate (Rs. 3 to 4 /kg) which increases cost of milk production. Considering the importance of green fodder feeding in milch animals, silage making was demonstrated using polythene bags. Silage was prepared during August–September and used for feeding the animals during December, January and February. It helped in maintenance of good animal health and higher milk yield (0.25-0.5 liter /day) during the peak winter months. One farmers group is also providing service of making silage bags available as well as their filling at village level. Recently co-operative and private dairies of the districts also started promoting the silage by providing silage bags at subsidy rates and bringing farmers to the NICRA villages.

### Animal Health Camps

Mortality and morbidity losses due to abiotic and biotic stresses in livestock results in loss of income for



small and marginal farmers in water stressed villages. Animal health camps were organized for improving the health of animals. Animals were treated for various ailments/ diseases including parasitic infestation, mastitis, repeat breeding etc.



Intervention	No. of farmers	No. of animals/Units
Animal health checkup and Deworming	1678	2735
Prevention vaccination	1816	4268
Breed-upgradation	128	578

### Heat Stress Management through Balanced Nutrition

#### Nandurbar

Abiotic stress caused by higher humidity and temperature in summer severely affects the productivity of goats at Nandurbar. Apart from low milk yield, anoestrous and repeat breeding are two major problems that add to the turmoil of farmers. More than 80% goats in NICRA villages were affected

from this problem. Demonstrations on supplementation of mineral mixture to mitigate heat stress in goats reduced anoestrous and repeat breeding problem in the area and enhanced productivity. A dietary supplement, having both minerals and vitamins not only alleviated problem of anoestrus and repeat breeding to a large extent but also 42.85 % increase in body weight and 60 % twinning in the villages of Nandurbar district.

Technology demonstrated	Name of KVK	No. of farmers	No. of animal	Measurable indicators of output		% increase
				Demo	Local	
Area specific mineral mixture	Nandurbar	100	100	20 kg average wt.	14 kg average wt.	42.85 % increase in body weight, twinning % increased by 60 %.



## Ahmednagar

Demonstrations were conducted on area specific mineral mixture supplementation, improved cultivars for green fodder and silage making in Nirmal Pimpri village. Feeding of area specific mineral mixture (50 g/animal/day) for four months resulted in improvement in general and reproductive health of 150 lactating cows. Introduction of new fodder varieties in the kharif and rabi season along with perennial grasses and tree fodder resulted in substantial increase in milk yield. The practice of green fodder supplementation along with dry crop residues was continued for 8-10 months in a year while earlier it was only for 5-6 months.



Technology demonstrated	Name of KVK	No. of farmers	No. of animal	Measurable indicators of output		% increase
				Demo	Local	
Use of mineral mixture to lactating cows	Ahmednagar-I	50	50	Ave. milk production (lit./day/cow) 15.2	Ave. milk production (lit./day/cow) 14.62	3.96
				Fat % 3.62	Fat % 3.53	0.09

## Stress Tolerant Breeds

Productive and stress tolerant breeds of animals were introduced in NICRA adopted villages. Improved poultry breeds of Vanraja (Baramati), Shrinidhi (Ahmednagar), Grampriya (Aurangabad), Giriraja and Kadaknath (Jalna) and Kaveri (Ratnagiri) were promoted. Improved breeds of goat such as Konkan Kanyal (Ratnagiri) resistant to heavy rain was adopted by farmers. For livelihood security, livestock along with crop husbandry is essentially required in dry areas. Backyard poultry and goat farming are very helpful for small and marginal formers.

## Aurangabad-I

Egg and poultry meat production in Marathwada region is mainly depend on backyard farming with indigenous chicken breed. The genetic potential of these local chickens for egg and meat production was very poor with annual egg production of 30-50 eggs per hen and low body weight gain. To improve the productivity of backyard poultry, Grampriya dual purpose breed was promoted which produced more eggs (180) and meat as compared to local birds.

## Ratnagiri

In Konkan area, Konkan Kanyal goat suitable for grazing and resistant to heavy rainfall areas with

twinning was introduced in NICRA village of Ratnagiri district. Income of farmers was increased by introduction of Konkan Kanyal goats due to twinning and increased live weight gain. These breeds are regular breeders and breed round the year. Twinning percentage (66%) was observed as higher in summer and lower in winter kidding. The mortality percentage of kids got reduced because of tolerance to heavy rains.



## Housing for Backyard Poultry

### Pune-I

Backyard poultry farming plays an important role in improving the economic status and fulfilling the protein requirement of the household. Farmers do not use shelters for poultry birds in a scientific way due to



which mortality is increased. The birds are also suffered from enemies and thefts. In Jalgaon supe and karhati villages of Baramati district about 100 farmers' families adopted rearing of Vanraja and desi poultry breed. Farmers were advocated to adopt low cost poultry housing made from locally available materials like bamboo and thatch grass. The low cost housing improved survival of birds, their weight gain and egg production compared to local breeds without housing. On an average Rs. 11500 per member was obtained as net profit.

### Module IV: Institutional Interventions

Under this module, interventions for strengthening the existing or initiating new institutional mechanism related to seed bank, fodder bank, commodity groups, custom hiring centres, collective marketing groups, introduction of weather index based insurance and climate literacy through a village weather station are being created. The NICRA implementing centres have

established one unit of fodder bank and six units of seed banks to meet the drought and flood related issues during reporting period. With reference to custom hiring centres (CHCs), 1477 farmers of NICRA villages used 95 different farm implements to cover 1185.9 ha area for timely sowing and other cultural operations. Rs. 1.70 lakh revenue was generated. The details are given in Table 7.4 and 7.5.



Table 7.4 Details of Custom Hiring Centre (CHC)

KVK	Implement (No.)	Area covered (ha)	No. of Farmers	Revenue generated through CHCs (Rs.)
Ahmednagar-I	10	60.2	51	15780
Aurangabad-I	09	179	227	15780
Buldhana-II	02	21.5	29	2900
Jalna	05	112	176	22450
Nandurbar	10	112	98	7320
Pune-I	28	287	112	6000
Ratnagiri	06	12.9	108	7750
Amreli	09	145	197	29310
Kutch-I	07	89	285	26526.4
Rajkot-I	07	156.3	186	5170
Valsad	02	11	8	32000
<b>Total</b>	<b>95</b>	<b>1185.9</b>	<b>1477</b>	<b>170986.4</b>

**Table 7.5 Crops/Commodity wise groups and farmers**

KVK	Name of crops/ Commodity groups	Area covered (ha)	No. of Farmers
Jalna-I	Fodder bank Sorghum Kadbi Kutti	2	5
Pune-I	Seed bank Sorghum (Phule Revati), (Phule Vasudha) and (Phule Anuradha)	24	60
Nandurbar	Seed bank (Maize-GM-6), Chick pea (JAKI-9218, Digvijay), Sorghum (CSV-27)	43	103
Aurangabad-I	Seed bank of Soybean- MAUS -15162 and Pigeon pea- BDN-711	2	55

### Capacity Building of Farmers

In total, 189 training courses were conducted on different thematic areas benefitting 6708 farmers

involving 1131 farm women. Major focus was given on climate resilient technologies and contingency planning to combat with unexpected weather aberrations. The details are reported in Table .6.

**Table 7.6 Capacity building of farmers**

Thematic area	Number of Trainings	No. of beneficiaries		
		Male	Female	Total
Agro forestry	01	65	5	70
Composting techniques	4	44	49	93
Crop diversification	4	111	3	114
Crop production	12	379	194	573
Drought tolerant varieties with ICM	6	230	27	257
Farm implements and machineries	15	402	48	450
Fodder and feed management	10	301	75	376
Income generating activities	21	221	113	334
In-situ moisture conservation	10	376	9	385
Integrated crop management	25	753	166	919
Integrated nutrient management	13	435	53	488
Integrated pest and disease management	8	552	3	555
Integrated pest management	12	243	21	264
Intercropping system	2	85	12	97
Livestock management	21	513	142	655
Moisture conservation	8	416	29	445
Resource conservation technologies	6	123	43	166
Soil health management	4	198	31	229
Value addition	3	57	97	154
Water management	3	58	11	69
Water resource development	1	15	0	15
<b>Total</b>	<b>189</b>	<b>5577</b>	<b>1131</b>	<b>6708</b>





**Extension Activities:** In all, 339 extension activities were organized to create awareness among the community about the climate related adverse impact on the agriculture and related sectors and measures need to be initiated to combat these adverse effects. A total of 11524 farmers were benefitted through their

participation in these programmes including 9162 men and 2362 women farmers. About 477 farmers including 76 women farmers were taken on exposure visits to various places/ intuitions by the NICRA KVKs during the year. The details are given in Table 7.7.



**Table 7.7 Extension activities conducted under NICRA**

Name of activity	Number of programs	No of beneficiaries		
		Men	Women	Total
Agro advisory services	61	1009	215	1224
Animal health Camp	20	1342	270	1612
Celebration of important days	14	628	229	857
Diagnostic visit	75	434	85	519
Exposure visit	17	401	76	477
Field days	37	1518	174	1692
Field Visit	11	163	0	163
Group meeting	40	1922	427	2349
Integrated farming system	2	28	0	28
Interaction of RAWE students with farmers	6	314	540	854
Method demonstration	46	1209	197	1406
SHGs activities	6	139	149	288
Survey	4	55	0	55
<b>Total</b>	<b>339</b>	<b>9162</b>	<b>2362</b>	<b>11524</b>

## Farmers FIRST Project

Farmer FIRST (Farm, Innovation, Resource, Science and Technology) is an ICAR initiative to move beyond the reductionism of production and productivity and to privilege the complex, diverse & risk prone realities of majority of the farmers through enhancing farmers-scientists contact with multi stakeholders-participation. Farmer FIRST aims at enriching farmers-scientists interface for technology development and application. The aim of program is to achieve with focus on innovations; feedback; multiple stakeholders participation; multiple realities; multi method approaches; vulnerability and livelihood interventions.

The project is focused on enriching farmers-scientist interface; technology assemblage, application and feedback; partnership and institutional building; content mobilization.

Farmer centric approach is only the way to have sustainable agriculture and development. Farmers have their own traditional wisdom, so there is need to integrate indigenous knowledge with modern science. Farmers have to keep as active partners in research for technology development and application. The innovations done by farmers should be documented and shared among other farmers for further up-scaling. There is need to shift from production to demand driven approach. Doubling the farmer's income is a major challenge. It can only be possible by conserving natural resources, institutional building, farmer's involvement, creating market network and having workable convergence with different national and state level developmental schemes. Under Zone VIII, 3 Farmer FIRST projects (MPKV, Rahuri; NAU, Navsari; and JAU, Junagadh) are being implemented. The progress of the project during reporting period is given below:

### Centre wise cluster of villages and farm families

S. No.	Centre	Cluster of Villages	No. of Farm Families
1.	MPKV, Rahuri	2 (Chinchvihire and Kangar)	750
2.	NAU, Navsari	3 (Hanspor, Chijgam and Pathri)	602
3.	JAU, Junagadh	4 (Hadala, Deri Pipalia, Mav Jinjava and Nava Vaghaniya)	650

## Crop Production based Module

The module consists of introducing improved high yielding varieties, cultivation practices, plant protection measures, high density planting and assessment of micronutrients, PGR application to

sustainable production etc. A total of 830 farmers demonstrated number of technologies on 247 ha area spread over in different cluster of villages under jurisdiction of MPKV, NAU and JAU agricultural universities. The technology wise details are presented in Table 7.8.



Table 7.8 Technology wise interventions under crop production module

Title of intervention / technology demonstrated	No. of farmers benefited	Area (ha)	Yield (q/ha)		% increase in yield	Economics of demo		Economics of check	
			Demo	Local		Gross return	Net return	Gross return	Net return
Red gram production technology	50	20	19	12.50	34.22	85500	53500	42500	22050
Chickpea Production technology	50	20	21.50	13.38	37.77	96750	63750	62100	27300
Five point rabi sorghum production technology	100	40	Grain - 18.3 Fodder - 45.9	Grain - 10.28 Fodder - 38.6	43.83	61600	34600	41790	11690
Bajra production technology	100	40	30.5	24.12	20.92	73200	46700	57888	27688
Sugarcane variety CoN 13073 (GNS 10)	100	40	47.68	42.14	13.14	105292	56216	92708	41006
Assessment of new released sugarcane variety by NAU	20	5	787.0	698.5	12.67	212490	118490	187245	92595
Bt. Hybrid GTHH-49. Closed planting technology and detopping. Management of pink bollworm.	160	32	22.77	20.14	13.04	125208	79594	110763	65149
Groundnut: Improved variety GG-22. White grubs and stem rot management.	100	20	Pod yield: 17.35 Haulm yield: 24.29	Pod yield: 15.21 Haulm yield: 20.53	Pod yield: 14.11 Haulm yield: 18.34	79119	45234	69032	38918
Wheat: Improved variety (GW-366). Black point management.	100	20	46.08	42.11	9.41	106894	67743	97701	64750
Chickpea: Improved variety GJG-3. Management of wilt and pod borer.	50	10	12.18	10.29	18.38	48752	27502	41184	21932
<b>Total</b>	<b>830</b>	<b>247</b>							



## Horticulture based module

In horticulture based module total 100 farmers demonstrated two technologies on 40 ha area spread



over cluster of villages under jurisdiction of MPKV agricultural university. The technology wise details are presented in Table 7.9.



**Table 7.9 Technology wise interventions under horticulture based module**

Title of intervention/ technology demonstrated	No. of farmers benefited	Area (ha)	Yield (q/ha)		% increase in yield	Economics of demo		Economics of check	
			Demo	Local		Gross return	Net return	Gross return	Net return
Pomegranate production technology	50	20	76.1	54.5	28.39	400801	344551	260523	194046
Assessment of micronutrients and PGR application to check fruit drop in mango	50	20	105.5	80.6	30.8	316500	2,56,720	225680	1,93,230
<b>Total</b>	<b>100</b>	<b>40</b>							

## Livestock Based Module

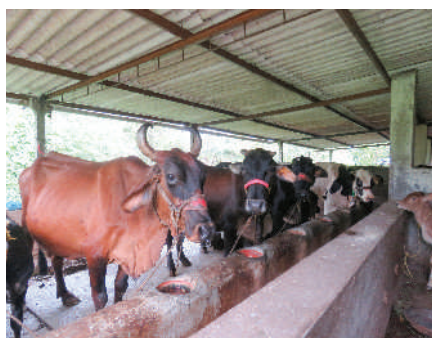
During year, 110 animals including buffaloes and cows were covered under various livestock

interventions through 110 demonstrations. Cost effective intervention by using mineral mixture to the buffaloes was tested and found economical (Table 7.10).

**Table 7.10 Technology wise interventions under livestock based module**

Title of intervention /technology demonstrated	No. of farmers	No. of animal	Measurable indicators of output			% increase
			Measurable indicators	Demo	Local	
Application of rubber mat, supplementation of mineral mixture and deworming	60	60	Daily milk production	8.04 Kg/cow	7.35 Kg/cow	Daily milk production increased by 9.38%
			Daily milk fat	4.41 %	4.20%	Daily fat % increased by to 2%
			Animal hygiene score	1.57	1.72	Hygiene score has improved by 9%
			Lameness scoring	1.23	2.39	Lameness score has been reduced by 94.31%

Title of intervention /technology demonstrated	No. of farmers	No. of animal	Measurable indicators of output			% increase
			Measurable indicators	Demo	Local	
			Hock and knee injury score	1.47	1.60	Hock and knee injury has reduced by 9%
			Mastitis cases	13	22	Mastitis cases reduced upto 69%
			Increase net income	Rs. 11.67/day/cow	--	BCR has improved to 92%
Artificial Insemination. Chelated mineral mixture + Calcium supplement + Dewormer	50	50 Jaffraba di buffaloes		14.82% increase in milk yield/ buffalo/ day (Farmers earned additional net income of Rs.1109/ buffalo/year) -improvement in general and reproductive health		
<b>Total</b>	<b>110</b>	<b>110</b>				



### Integrated Farming Systems (IFS) Module

A model of integrated farming system to suit the small and marginal farmers of under dryland condition was implemented by MPKV, Rahuri and NAU, Navsari during the year 2018-19. An area of 0.30 ha was selected for IFS covering 275 farmers and compared with conventional cropping system of farmers. The details are presented in Table 7.11



Table 7.11 Different integrated farming system modules

Details of intervention/ technology demonstrated	Area covered (ha)	Farmers covered	Income per farmer due to this intervention (Rs.)	Annual income per farmer before intervention (Rs.)	Annual income per farmer after intervention (Rs.)
Fishery (2017-18)	0	40	50000	85000	135000
Backyard Poultry	0	100	29550	60000	89550

Details of intervention / technology demonstrated	Area covered (ha)	Farmers covered	Income per farmer due to this intervention (Rs.)	Annual income per farmer before intervention (Rs.)	Annual income per farmer after intervention (Rs.)
Inter cropping of lucerne with young sapota orchard +Livestock + Vermicompost	0.15	45	61550	27060	61550
Inter cropping of greengram with young mango orchard +Livestock + Vermicompost	0.15	45	46254	27060	46254
Boundary plantation of drum stick	0	45	400	-	600
<b>Total</b>	<b>0.30</b>	<b>275</b>			

## NRM Module

This module consists of interventions related to resource conservation technologies, organic input production and usage and application of soil amendments for soil reclamation. A total of 32.04 ha area has been treated with NRM related treatments covering 110 farmers field in order to increase agricultural production through demonstrations. The details are presented in Table 7.12.



**Table 7.12 Natural resource management related interventions**

Title of intervention / technology demonstrated	No. of farmers benefitted	Area under practice (ha)	Measurable indicators	Remarks
Improving soil properties through soil amendment			Average productivity of treated plots (t/ha)	Average productivity of untreated plots (t/ha)
Rice	20	10.10	9.48	12.08
Sugarcane	20	8.54	179	142.56
Sapota	20	3.4	1.68	1.50
Groundnut + Pigeonpea relay cropping system: <ul style="list-style-type: none"> <li>Improved variety of groundnut (GG-22) and pigeonpea (GJP-1).</li> </ul> Soil health management by enriched compost.	50	10	Groundnut: Increase in pod yield: 24.98%. Increase in haulm yield: 19.33%. Pigeon pea: Increase in grain yield: 16.98%. Increase in stalk yield: 15.99%. Soil health: Reduction in EC, pH & BD. Increase in OC, available nutrients.	
<b>Total</b>	<b>110</b>	<b>32.04</b>		



## Enterprise Based Module

The beekeeping, vermi composting and PKV Mini Dal mill based enterprises modules were implemented by



three centres viz., JAU, Junagadh, NAU, Navsari and MPKV, Rahuri during 2018-19 by covering 144 farmers. The details are presented in Table 7.13.



Table 7.13 Different enterprises based modules

Enterprise	Details of intervention / technology demonstrated	Area covered (ha)	Farmers covered	Income per farmer due to this intervention (Rs.)	Annual income per farmer before intervention (Rs.)	Annual income per farmer after intervention (Rs.)
Beekeeping	Bee hive and its training provided to the farmers	40	100	19139	123458	142597
Vermi composting	Providing the inputs in term of earthworms	-	24	11000	0	11000
PKV Mini Dal mill	Provided two PKV Dal mills to Women's Self Help Groups	-	20	2500	63000	70500
Total		40	144			

## Capacity Building Programs

Capacity building programs were organized under seven thematic areas related to agriculture and allied sector enterprises, crop production, livestock production, natural resource management, etc. benefiting 7618 farmers including 2264 women farmers. Major emphasis was given on soil health component and high value crops. The details are presented in Table 7.14.



Table 7.14 Trainings organized for farmers

Thematic areas	Number of programmes	No. of beneficiaries		
		Male	Female	Total
Crop diversification	6	203	87	290
Integrated crop management	67	2218	963	3181
Integrated nutrient management	18	592	251	843

Thematic areas	Number of programmes	No. of beneficiaries		
		Male	Female	Total
Integrated pest management	14	506	184	690
Integrated pest and disease management	29	970	276	1246
Livestock management	15	409	324	733
Natural resource management	13	456	179	635
<b>Grand Total</b>	<b>162</b>	<b>5354</b>	<b>2264</b>	<b>7618</b>

### Extension Activities

For creating awareness among farmers about adverse impact of climate change in agriculture and allied sectors, different extension activities were organized by the centres. In total, 1350 farmers were benefitted through their participation in different extension programs including 853 men and 497 women farmers. About 224 farmers including 87 women farmers were taken on exposure visits to various places/ institutions under the project during the year (Table 7.15).



**Table 7.15 Extension activities organized for benefitting farmers**

Name of activity	Number of programmes	No. of Beneficiaries		
		Male	Female	Total
Animal health camps	11	129	153	282
Diagnostic visits	9	95	33	128
Exposure visits of farmers	11	137	87	224
Field days	23	401	54	455
Integrated farming system	3	51	85	136
Participation of ICAR FFP farmers in exhibition	3	30	65	95
SHGs activities	2	10	20	30
<b>Total</b>	<b>62</b>	<b>853</b>	<b>497</b>	<b>1350</b>

### Backyard poultry

In the Chinchvhire village, 100 demonstrations on backyard poultry were conducted with involvement of landless, marginal and small farmers for their economic empowerment. Among 100 farm families, 6000 chicks were distributed and orientation training was also given. Grampriya breed found more

profitable than local poultry birds. Grampriya breed produced 180 – 210 eggs in a year/ bird. The farmers enhanced their income level and met the expenses of their children's education. On an average net profit of Rs. 29550 per family was realized. Total income of Rs. 2955000 was generated among 100 families. The detailed economics of backyard poultry unit is given on next page.

## Economics of Grampriya

Total Birds – 60      Average mortality – 6 (5-10 %)

Total Expenditure		Total Income	
Particular	Rs.	Particular	Rs.
Construction of Shed (10x10 ft.)	2500	Selling of 24 male birds @ Rs 350 per bird	8400
Vaccination	200	Egg production (30 female birds ) - 185 eggs per birds and @ Rs. 7 per egg	38850
First 5 month expenditure on feed (54 birds)	6000		
Next 12 month expenditure on feed (30 birds)	9000		
<b>Total Expenditure</b>	<b>17700</b>	<b>Total Income</b>	<b>47250</b>

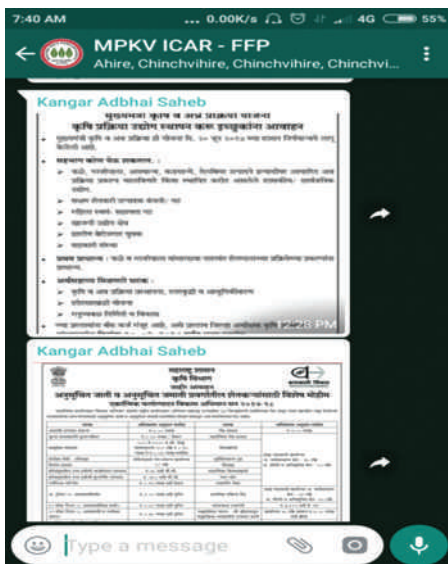


### Content Mobilization and Publications

Under this component, mobile based agro-advisory was given to the farmers in identified villages. Whats App groups of farmers were also created by the centres for technology sharing. Appropriate text messages

based on latest technologies were developed by the concerned experts. Different extension literatures were distributed among farmers. CDs on different modules were created and provided to the farmers for their knowledge enhancement.

### Content Mobilization through WhatsApp and YouTube: Farmer FIRST, MPKV, Rahuri





## Attracting and Retaining Youth in Agriculture (ARYA) Project

Attracting and Retaining Youth in Agriculture (ARYA) was initiated by the ICAR to empower youth in rural areas to take up agriculture and allied service sector enterprises for sustainable income and gainful employment in selected districts. It enables youths to establish network groups to take up resource and capital intensive activities like processing, value addition and marketing. It helps to demonstrate functional linkage with different institutions and stakeholders for convergence of opportunities available under various schemes/programs for sustenance of efforts.

It was started in 25 states through KVKs where one district selected from each state. In one district, 200-300 rural youths were identified for their skill development in entrepreneurial activities and establishment of micro-enterprise units in the area of apiary, mushroom, seed processing, soil testing, poultry, dairy, goat rearing, carp hatchery, vermi-compost, etc. KVKs have involved the State Agricultural Universities and ICAR Institutes as Technology Partners. At KVK, one or two enterprise units were being established and serving as entrepreneurial training units for farmers. The purpose is to establish economic models for youths in the villages so that youths get attracted in agriculture and improved overall rural situation. Skill development of rural youths will help in building confidence and encouraging them to pursue farming as profession, generate additional employment

opportunities. In Zone VIII, two KVKs (Nagpur and Rajkot-I) are implementing ARYA project.

**Enterprise based Module:** Total of 313 rural youths were involved in enterprise based modules and the agriculture and allied products based enterprises were started by 95 youths under ARYA project implemented by KVKs of Nagpur and Rajkot-I during the year. The details are presented in Table 7.15:



**Table 7.15 Details about enterprises based modules**

Name of Enterprise	No. of youths involved	Products generated with units	No. of youths started enterprise	Average income of farmers before ARYA project (Rs.)	Average income of farmers after ARYA project (Rs.)	Increase in average income (Rs.)
<b>Nagpur</b>						
Production of disease free planting material of citrus	120	Nagpur Mandarin & Sweet Orange Saplings	18	421000	770000	350000
Fruit & vegetable processing unit	90	Orange Squash	8	130000	393000	263000
<b>Rajkot</b>						
Mini Oil Mill unit for groundnut processing at Targhadi village (One group of 15 youth)	28	Groundnut oil and cake	15	175000	310000	135000

Name of Enterprise	No. of youths involved	Products generated with units	No. of youths started enterprise	Average income of farmers before ARYA project (Rs.)	Average income of farmers after ARYA project (Rs.)	Increase in average income (Rs.)
Mini Oil Mill unit for groundnut processing at Raningpar village (One group of 15 youth)	25	Groundnut oil and cake	15	155000	275000	120000
Spice processing (Pulverizer Masala mill) unit (one group of 7 youth)	10	Chilly, coriander & cumin powder	7	155000	265000	110000
Milk processing (Milk-Mava making) unit (one group of 8 youth)	10	Milk Mava, Penda (sweet) from milk	8	125000	242000	117000
Namkin (Farsan) making unit (one group of 5 youth)	8	Various flavoured Namkeen (Farsan) and chips	5	125000	223000	98000
Vegetable plug nursery unit	5	Vegetable saplings	2	145000	287000	142000
Mini Dall Mill Unit (One group of 10 youth)	10	Various type of "Dal" from pulses	10	145000	250000	105000
Mini Grading and Cleaning Machine Unit (One group of 7 youth)	7	Grading & cleaning of wheat, chick pea, cumin, etc,	7	140000	235000	95000
<b>Total</b>	<b>313</b>		<b>95</b>			

**Capacity Building Programmes:** In all, 134 capacity building courses were organized under different themes by two implementing centres. Major focus was given on enterprises related to agriculture and allied sectors including crop production, nursery management, processing and value addition, etc. benefiting 313 youths. Benefitting with training programmes, 110 rural youths started their enterprises to become self-depend. The details are presented in Table 7.16.



**Table 7.16 Capacity building program for rural youths**

Name of training/ awareness programmes	No. courses	No. of youths	No. of youth started enterprise	Average income Rs. of farmers		Increase income Rs./ year
				Before ARYA	After ARYA	
<b>Nagpur</b>						
Preparation technique of disease free citrus saplings	51	77	16	370000	680000	310000
Preparation and packing technique of citrus fruit squash and pickle	76	46	6	90000	180000	90000

Name of training/ awareness programmes	No. courses	No. of youths	No. of youth started enterprise	Average income Rs. of farmers		Increase income Rs./ year
				Before ARYA	After ARYA	
<b>Rajkot</b>						
Post-harvest technology and value addition	1	28	7	140000	235000	95000
Processing and value addition of pulses	1	29	10	145000	250000	105000
Processing and value addition of oilseed crops	1	32	35	165000	292500	127500
Processing and value addition of spices crops	1	25	10	155000	265000	110000
Value addition of pulses by making Namkeen	1	17	10	125000	223000	98000
Value addition through processing of milk	1	27	11	115000	232000	117000
Nursery management	1	32	5	132000	252000	120000
<b>Total</b>	<b>134</b>	<b>313</b>	<b>110</b>			

### Seed Hub Project

For quality seed production of pulses, Seed Hub Project was implemented at 8 centres in Maharashtra (Jalna-I, Dhule, Solapur-II, Beed-II, Amaravati-II, Akola, Buldhana-II, Jalgaon-II) and 6 centres in Gujarat (Tapi, Navsari, Kheda, Rajkot-I, Panchmahal and Dahod). Major pulse crops namely pigeon pea, chick pea, black gram and green gram were cultivated for producing seed in selected districts through KVKs

during the year 2018-19. In kharif season, seed production of 1678 q was achieved against target of 5132.8 q. In case of rabi season, seed production of 3522.42 q was attained against fixed target of 4522.5 q. For seed processing of pulses, a provision of having Seed Processing Plant is made at identified centres. In addition, quality seed is also being produced at farmer fields in other villages. The details are presented in Table 7.17.

**Table 7.17 Seed produced under Seed Hub project in year 2018-19**

State	Name of KVK	Crop	Area (ha)	Target of Seed Production (q)	Achievement in Seed Production (q)
<b>Kharif</b>					
Maharashtra	07	Black gram	54.57	1150	236.45
Maharashtra	12	Green gram	104.9	1782.8	519.76
Maharashtra	05	Pigeon pea	83.8	850	376.04
Gujarat	04	Pigeon pea	93	1350	545.75
<b>Total</b>	<b>28</b>		<b>336.27</b>	<b>5132.8</b>	<b>1678</b>
<b>Rabi</b>					
Maharashtra	09	Chick pea	215.9	3722.5	3137.42
Gujarat	02	Chick pea	31.6	800	385
<b>Total</b>	<b>11</b>		<b>247.5</b>	<b>4522.5</b>	<b>3522.42</b>





### Tribal Sub Plan (TSP)

Special focus is being given for socio economic development of tribal people in tribal dominated districts through different agencies. In this context, Tribal Sub Plan (TSP) was initiated through KVKs which meant for developing strategy for tribal welfare through organising different activities related to

agriculture, livestock, poultry, goat rearing and other rural waste enterprises. In zone, 11 KVKs are involved in organising several activities like capacity building programs, frontline demonstration, on farm trials, seed and planting material production and creating income generating activities in tribal dominated areas for their socio economic development. The details of achievements are reported in Table 7.18 and 7.19.



**Table 7.18 Achievements under TSP in the zone**

Sl. No.	Description	Achievement
1	On-farm trials (Number of farmers)	842
2	Frontline demonstrations (Number of farmers)	5229
3	Farmers training (Number of farmers)	20690
4	Training of Extension Personnel (No.)	1390
5	Participants in extension activities (No.)	254136
6	Production of seed (q)	870.01
7	Production of Planting material (No.)	634342
8	Production of Live-stock strains and finger lings (No.)	135751
9	Testing of Soil, water, plant, manures samples (No.)	8161
10	Mobile agro-advisory to farmers (Number of farmers)	765244

Table 7.19 Centre wise activities conducted under Tribal Sub Plan

KVK	OFT (No. of Farmers)	FLD (No. of Farmers)	Farmers trained (No.)	Training of Extension Personnel (No.)	Participants in extension activities (No.)	Seed produced (q)	Planting material (No.)	Live- stock strains, etc. (No.)	Soil, water, plant, samples (No.)	Mobile agro- advisory to farmers (No.)
Valsad	40	820	3496	236	13617	204.62	133100	0	818	88745
Raigadh	18	75	386	25	928	0.17	400	1000	165	180
Tapi	58	824	2779	285	67805	256.72	110792	0	705	325344
Nandurbar	153	650	1164	143	2784	0.36	250000	114749	248	17314
Dang	128	450	3665	197	21591	210	4550	0	198	3796
Narmada	55	354	2101	50	90872	140.14	50000	20000	212	294000
Bharuch	31	707	1188	13	11585	18	80000	0	5036	250
Nashik-I	62	632	956	0	1256	0	5500	2	343	1308
Amravati-I	109	147	444	20	350	0	0	0	0	56
Thane	120	90	1821	148	4712	0	0	0	436	14598
Dahod	68	480	2690	273	38636	40	0	0	0	19653
Total	842	5229	20690	1390	254136	870.01	634342	135751	8161	765244

## Skill Training

Agriculture Skill Council of India (ASCI) was set up to work towards building capacity in the agriculture industry and bridge the gap between laboratories and farms. ASCI envisions to touch/ upgrade skills of direct and indirect labour engaged in organized, unorganized agriculture, allied industry and creating a sustainable industry aligned ecosystem for entrepreneurship development.

The main objectives of ASCI are i) End to end approach on skilling and linking all the stakeholders of agriculture value chain; ii) Creating more non-agricultural jobs; iii) Achieving rapid growth in the agriculture sector through intensive skill development; iv) Linking and generating maximum



number of entry-level jobs; v) Enhancing the economic value of time and labour of landless workforce; vi) Making farmers of the country Agriculture entrepreneurs through Market Information; vii) Linking the farm labour with wage related employment in agriculture sector, during non-farming months.

The project entitled skill training through Krishi Vigyan Kendras under Ministry of Skill Development and Entrepreneurship (MSDE) being implemented through ATARIs in KVKs/SAUs/ICAR institutes since 2016-17. Under this project each center has targeted to organize two skill training programmes with 200 hours duration each as per the Cost Norms notified by MSDE. During the year 2018-19, 41 KVKs, 1 SAUs & 1 ICAR institutes under zone VIII conducted 95 skill training programmes benefitting 1715 farmers. The details are given in Table 7.20.



Table 7.20 Details of skill training programmes

State	No. of Training Programmes	Job Role/QPs of trainings	Number of farmers trained
Goa	1	Dairy Farmer - Entrepreneur	20
Goa	1	Vermicompost Producer	20
<b>Sub- total</b>	<b>2</b>		<b>40</b>
Gujarat	1	Agricultural Extension Service Provider	20
Gujarat	1	Artificial Insemination Technician	16
Gujarat	2	Assistant Gardener	40
Gujarat	1	Community Service Provider	20
Gujarat	3	Dairy Farmer - Entrepreneur	60
Gujarat	1	Mango Grower	20
Gujarat	2	Micro Irrigation Technician	36
Gujarat	2	Mushroom Grower	40
Gujarat	1	Nursery Worker	20
Gujarat	5	Organic Grower	100
Gujarat	8	Quality Seed Grower	138
Gujarat	2	Shrimp Farmer	40
Gujarat	2	Tractor operator	20
Gujarat	1	Vermicompost Producer	19
<b>Sub- total</b>	<b>32</b>		<b>589</b>
Maharashtra	3	Agricultural Extension Service Provider	58
Maharashtra	2	Agricultural Machinery Repair and Maintenance Service Provider	40
Maharashtra	3	Assistant Gardener	56
Maharashtra	1	Citrus Fruit Grower	20
Maharashtra	1	Community Service Provider	20
Maharashtra	5	Dairy Farmer - Entrepreneur	95
Maharashtra	2	Floriculturist - Open cultivation	37
Maharashtra	2	Floriculturist - Protected cultivation	20
Maharashtra	1	Gardner	20
Maharashtra	1	Mango Grower	16
Maharashtra	2	Mushroom Grower	39
Maharashtra	6	Nursery Worker	114
Maharashtra	1	Organic Grower	18
Maharashtra	6	Quality Seed Grower	107
Maharashtra	10	Sericulturist	192
Maharashtra	7	Small Poultry Farmer	137
Maharashtra	7	Vermicompost Producer	139
Maharashtra	1	Watershed Supervisor	18
<b>Sub- total</b>	<b>61</b>		<b>1146</b>
<b>Grand Total</b>	<b>95</b>		<b>1775</b>



## Case Studies

Case studies written in scientific way have more transformational value among different stakeholders. KVKs have developed successful cases on different enterprises and commodities. In addition, focus on combating farm level stress faced by the farmers is given while documenting cases. KVKs, SAUs, ICAR institutes and other line departments are taking efforts to increase the profit along with sustained productivity. In this context, successful cases on different aspects especially floriculture, intercropping, protected cultivation, poultry farming, resource conservation, hi-tech nursery, integrated pest management, sericulture, etc. were documented, which are described in this chapter.



**Planning and Capacity Building:** Technical support was given to the farmers about tuberose cultivation through training and exposure visits to the DFR, Pune. In-depth discussion with DFR scientists was done. Knowledge about government back-end subsidy of Rs. 12500/ha from ATMA was given. Use of bioagents and adoption of scientific cultivation practices for tuberose was focused. As the farmers growing tuberose first time, so they started facing problem of insect-pest incidence. But the DFR scientists gave onsite advisory for managing/controlling nematode and other pests.

**Technical Intervention:** With efforts of KVK experts, Shri Alpesh Bapurao Phalke, Bhushan Anil Phalke and Aniket Sanjeevan Phalke from village Padali Tal Koregaon of district Satara took a bold decision to start tuberose cultivation in scientific

### 1. Tuberose Farming a Profitable Enterprise: KVK, Satara-II

**Situation Analysis:** Varied agro-ecology with diversified cropping pattern is observed. In Koregaon tehsil, due to availability of water through canal and deep black soil, most of the farmers grow high water and fertilizer consuming sugarcane crop with long duration (12-18 months). There is salinity problem in both soil and water. In sugarcane, income starts after 15 months. So, to have regular income at different intervals, KVK pursued the farmers about raising less water consuming crop like tuberose.



mode. Seeing their success in cultivation of tuberose, 42 farmers were motivated to begin tuberose cultivation for attaining higher profit. More than 20 ha area is covered under tuberose in the Koregaon tehsil. Farmers planted single type of tuberose bulbs on 4.5 feet raised bed at a spacing of 40 cm x 40 cm. Arka Prajwal and Phule Rajani were planted. Water soluble fertilizers were applied through 2 lph drip system. *Jivamrut* was used as bioagent. Yield of flowers started after 70-82 days of planting. Initially up to 4 months, on daily basis yield of 4 kg/acre/day was obtained. Afterward, yield of 14-15 kg/day/acre was achieved. There is lean period from November to February due to low temperature. Two - three female labourers pluck flowers of an acre in one hour without much drudgery. Average labour cost incurred on plucking of flowers is Rs. 10/kg.

**Marketing:** Farmers in this village produced more than 400 kg of tuberose flowers every day and sent to the Washi (Mumbai) flowers market. They have identified buyers for regular purchase. There is good demand for tuberose flowers which are extensively used in garland making. Farmers sold the flowers @ Rs. 60-150 per kg, On an average Rs. 80/kg was fetched by the farmers depending on market demand.

**Economics:** Cost of tuberose cultivation was estimated at Rs. 186000/acre with major share of human labour, plant protection and initial cost on drip installation. These farmers are harvesting 15 kg of flowers from one acre daily. After meeting all the expenses, they earned minimum of Rs.500 to Rs. 600 a day. The yield of loose tuberose flowers was 3.6 MT/acre. Net return of Rs. 66000/acre was earned by the farmers which was 188% higher than sugarcane crop. Farmers are practicing ratoon farming thereby reducing cost of cultivation in succeeding year. Thus, crop diversification has brought changes in the income of rural youth and mind set towards farming.

## 2. Innovative Cowpea Cultivation made him Brand Ambassador of Cowpea Madhu variety: KVK, Banaskantha-I

Shri Kanvarji Ramsiji Vaghaniya, a resident of village Ranpur Aathmanavas, taluka Deesa, district Banaskantha possessed 3 ha land and cultivating groundnut, potato and vegetables. He is having 3 cows and 2 buffaloes. Low market price is a major problem due to huge quantity of vegetables.

**Plan, Implement and Support:** Under the guidance of KVK experts, the farmer started to grow off seasonal vegetables by adopting mulching and different intercropping practices. In 2016-17, he raised cow pea with plastic mulching and crop cover in 0.25 ha area along with relay cropping of chilli hybrid. Improved hybrid of cowpea Madhu (Matru Seed



Company) was cultivated in December. The farmer practiced 2 lines of cowpea and one line of chilli. Cowpea grown in December and harvested till January. Chilli sown after 2 months of cowpea and started harvesting in February till September. Though, the company has recommendation to cultivate the cowpea Madhu in kharif season. But the farmer tried to cultivate in late rabi season with scientific practices.

**Yield and Economics:** Yield of cowpea (60 q) and chilli (100 q) was obtained by the farmer from 0.25 ha area. A net profit of Rs. 4 lakh from both the crops was realized. Now, he is cultivating cowpea (Madhu variety) since last 3 years and getting more yields with economic gain due to higher market prices in off season. >120 farmers have visited his farm and inspired to adopt at their farms. He has been nominated as brand ambassador of Matru Seed Cowpea. Such planning and sense of market with scientific cultivation practices, the farmer's real income can be doubled.

## 3. Organic and High-tech Vegetable Cultivation: KVK, Jamnagar

An enthusiastic farmer (Shri Laljibhai Parmar, village Siddhpur of Jam Khambhalia block in Devbhumi Dwarka district) was dependent on farming. In the village, very less rainfall (350-400 mm) is received in a year. He was engaged in cultivating groundnut, sorghum, pearl millet and other fodder crops with old practices. Cost of cultivation was increased due to use of more pesticides and organic fertilizers and ultimately net profit per unit area declined.

In 2005, the farmer came in to contact of university scientists during Krishi Mahotshav. He was encouraged to have few animals for their livelihood support. He got convinced to follow Jalkranti and having Gir cow. Afterward, he attended different trainings and exposure visits at the KVK related to agriculture and livestock rearing. Finally, his mindset changed to practice organic farming and growing vegetables for sustaining his farm income.

He is using homemade products for compost, cow urine, *jivamrut* and *agnihotra* mantra every day morning and evening on his farm. He also applied bio-products viz., *Trichoderma*, *Beauveria*, *Azotobactor*, PSB, *Rhizobium*, NPV, MDP Technology, Pheromone trap, Fruit fly trap, Yellow sticky trap, light trap decomposed FYM, vermi-compost and bio pesticide were used at his farm.





He started Kamdhenu Gaushala at Gadhka with 15 Gir cows and now having 60 cows. He is preparing ghee and selling @ Rs. 700-1100 per kg. Demand of ghee is increasing. He has also started to produce organic groundnut and wheat. In this way, value is added to wheat and sold it @ Rs. 700 per 20 kg. He has added value by extracting groundnut oil through small scale oil mill and packing himself which sold @ Rs. 2800 per 15 kg groundnut oil. On an average, the farmer is getting Rs. 6 lakh/ha as net profit.

Micro irrigation was used at his farm. He has started *Mandap Paddhati* for vegetable (viz., bottle gourd, ridge gourd, sponge gourd, bitter gourd) cultivation. He is also practicing mixed cropping with this technology and brinjal, chilli, cabbage, beet, carrot, coriander, fenugreek, pulses inter cropping, garlic, onion cultivation. Marketing of his farm produces is being done by himself and making contact with end users.

Many farmers made visit to his organic farm and got motivated to follow. He has newly introduced to grow passion fruit and dragon fruit. He has also started potato growing above ground which have higher price for Jain people.

#### 4. Kadaknath Backyard Poultry- Life Saver for Migrating Farmers: KVK, Nandurbar

Shri Dhakal Singh is a tribal and small farmer from remote village of Umarani situated in Satpuda ranges at 150 km from Nandurbar. He possesses 3 acre land. His family primarily depends on the rainfed agriculture and few forestry plants like Mango, Moha, and Custard Apple. He heard about Kadaknath breed from KVK experts. KVK has been working in this village under NICRA project from last couple of years. The centre provided him 13 small birds and 3 fully grown male birds. Now, he is having more than 100 Kadaknath birds. He is earning about Rs. 10000 per month by selling meat and eggs. KVK bought Kadaknath poultry birds worth of Rs. 17500 from him



last year. He has recognition and known as "Kadaknath Man" of Umarani.

**Climatic vulnerability:** Local poultry is highly susceptible to viral diseases in extreme hot climate in summer and extreme cold in winter, water borne diseases in rainy season. Therefore, farmers are discouraged to keep larger flock sizes and look at backyard poultry as an additional source of income for their families. High mortality of poultry chicks and birds due to viral infection was observed.

**KVK's intervention:** Availability of vaccinated and brooded 25 days old chicks of Kadaknath poultry breed was assured to farmers by the KVK. Readymade poultry feed was also made available to farmers for good growth of poultry. For minimizing the stress on poultry birds due to adverse climatic conditions like cold and heat, KVK provided area specific mineral mixture to farmers at nominal rate. The problem of mortality was reduced drastically.





Kadaknath birds are ready to sale after four months gaining body weight up to 1 kg. The birds sold in retail by farmer at his own farm with rate of Rs. 800 per bird. The unsold birds are kept for egg production. Kadaknath birds start laying eggs at age of 6 months. There is huge demand of eggs for consumption purpose in area. The sale of Kadaknath eggs is done by farmer at price of Rs. 30 per egg in retail from his own farm. From one Kadaknath bird average 92 eggs are

collected. The ideal flock size maintained can be up to 300 birds round the year.

Huge mortality occurred during sudden increase of temperature due to outbreak of Ranikhet disease, cold stress increase mortality in poultry chicks and birds. KVK intervention of poultry farming helps in reducing the losses in poultry

**Economics**

Poultry breed	Total cost of feeding in backyard (Rs/bird)	Egg Production (No./bird)	Income from egg sale (Rs/bird)	Income from bird sale (Rs/bird)	Net Income (Rs/bird)
Kadaknath	600	104	3120	800	3,380
Giriraja	540	135	1350	260	1,070
Local poultry	540	62	620	330	4,10

**5. Protected Cultivation of Colour Capsicum under Polyhouse : KVK, Pune-II**

Mr Vikas Wagh, a young farmer from Pimplwandi village from Junnar tehsil of Pune district has come up a successful polyhouse farmer. He possesses 5 acre land. He is diploma holder in agriculture. Earlier, was doing traditional farming and could not get higher return from crop husbandry.

Afterward, he joined Agriclincs and Agribusiness course at KVK, Narayangaon and completed within two months. He learnt many new avenues and got confidence during course. He started growing colour capsicum (red and yellow chilli) under polyhouse (10 R area) in scientific mode.



Inspiration and Bachata varieties of colour capsicum were grown. In mid of July, transplanted the nursery into the polyhouse. Focus on day to day observation and proper management was given. After two months production was started. He obtained about 10 tons of export quality colour capsicum from polyhouse of 10 R area.

For polyhouse construction, he spent Rs. 12 lakh where he got Rs.10 lakh as loan from bank and made own investment of Rs. 2 lakh. In first crop, he achieved good yield (10 tons) and sold @ Rs. 45/kg. Gross profit of Rs.4.50 lakh was obtained by him. He also got subsidy of Rs 5.35 lakh from Agri. Department. In this way, he returned loan amount within a year. For second crop, total expenditure (labour, input cost and marketing cost) will be incurred about Rs.1.50 lakh and average yield will be around 10 tons in 10 R.

Many farmers and extension workers came to visit his polyhouse. Two other farmers got motivated and erected their polyhouses in his village. He gave advisory to such farmers.

Average rate of colour capsicum is Rs. 150/kg, so the farmer got Rs. 8 lakh as gross profit with net economic gain of Rs. 6 lakh in same area. Meanwhile, he got an idea of new start-up and established unit for preparation of yellow sticky cards with investment of Rs.7 lakh. He purchased yellow card and glue as raw material. He processed and made yellow card sheets. It is innovative technology to every farmer for controlling sucking insects. Within 6 months, he sold 3000 bundle of sticky cards to the farmers. He is having vermi beds and produced about 4 tons of vermi compost. He has also started growing exotic vegetables i.e. red cabbage at his farm. He has transformed his life by adopting protected farming.

## 6. Performance of Sequence Cropping System using Resource Conservation Technologies: Case of NICRA Intervention in Ratnagiri

Ratnagiri district has typical livelihood system such as staple rice farming system and horticultural crops like mango, cashew, minor fruits and species. Rainfed agriculture, lateritic soil, small and marginal land holdings are the characteristics feature of farming system in Konkan. Exodus of rural population to metropolitan city like Mumbai is a socio-economic phenomenon due to fragmentation of land. Mitigating climate change, depleting natural resource base and, attracting & retaining youths in agriculture are key challenges before the policy makers and technocrats.

**Climatic vulnerability:** Ratnagiri receives average annual rainfall of 3500-4000 mm. However, there is heavy surface runoff due to hilly area, undulated land and low water holding capacity of lateritic soil. This leads to water scarcity during rabi hot weather.

Natural streams, wells and tube wells are hardly irrigation sources available during rabi hot weather. Therefore, most of the farmers either kept their land fallow or some cultivates pulses, leafy vegetables after harvest of less remunerative kharif rice crop.

**Objectives:** To make crop diversification through sequence cropping of high-value horticultural crops by using resource conservation technologies and to overcome water scarcity by using micro-irrigation system & polythene mulching technology.

### Resilient technology

Sequence cropping of watermelon followed by cucumber + Broad Bed Furrow (BBF) + Drip irrigation + Polythene mulching + Fertigation + IPM

### Advantages

- **Broad Bed Furrow:** BBF system helps in-situ moisture conservation and stimulates crops growth.
- **Drip irrigation:** Helps to save water up to 30 percent. Further, Fertilizer Use Efficiency (FUE) is enhanced due to fertigation.
- **Mulching:** Helps in-situ moisture conservation, reduce weed infestation which in turns decrease the cost of cultivation.
- **Sequence cropping:** It is time saving & labour-intensive technology. Second crop is sown immediately after harvest of first crop on same field using same resources. This reduces expenses on land preparation, drip, mulching, labour etc.
- **IPM:** Aims to suppress pest population below Economic Threshold Level (ETL) and gives assured Hope of Harvest.

## Results

Interventions	Crop & Variety	No of farmers	Area (ha)	Pest Infestation %	Fruit yield (q/ha)	Net return (Rs/ha)
Farmers practice No mulching + Irrigation through ring & basin	Watermelon-Augusta	4	2	22	220	169000
Intervention- Improved varieties + BBF+ Drip+ Mulching + IPM	Watermelon-Augusta & Namdhari	10	10	8	360	312000
	Cucumber-Shital	10	10	7	195	164000



## Outputs

- Farmers realized higher yield of watermelon (360 q/ha) by using RCTs as compared to no mulching (220 q/ha).
- There was 63.63 per cent increase in yield of watermelon demo plot over a farmer's practice.
- Net income of Rs.3.12 lakh/ha was achieved under RCT plot (check plot Rs.1.69 lakh/ha).
- The C:B ratio of RCTs plot (1:3.60) was significantly higher than check plot 1:2.77.
- Sequence cropping of cucumber was recorded better yield of 195 q/ha.
- Cucumber sequence crop gave additional income of Rs.1.64 lakh/ha with C:B ratio of 1:3.34 using same RCTs.

## 7. Entrepreneurship Development through High-Tech Nursery: A Case of Young Farmer

Mr. Madhukar Gavali of village-Ugaon, tehsil Niphad of Nashik is a marginal farmer with 44 R land holding. He joined one month horticulture nursery training in July 2008 at Krishi Vigyan Kendra, Nashik. Initially he started grape raisin processing unit in 4 R area as additional income source. Later on, he converted raisin shed in to shed-net house for vegetable seedling raising in 2009. He started 10,000 -12,000 vegetable seedlings production in portrays. He continued to make contact with KVK experts. Every year, he was expanding producing vegetable seedlings up to 2.5 lakh. His major focus was on modernising and mechanising the nursery with high-tech modern tools, equipments, techniques and poly-houses. Now he is raising > 50-55 lakh seedlings annually.

**Nursery development with high-tech measures:** Erected modern poly houses for rearing, protecting from environment, managing pests and hardening seedlings. To increase efficiency, to save



time, labours. Innovative ideas in house seedlings movement, loading and unloading were used. Use of modern poly houses with précised atomized irrigation systems for water and nutrient management at seedling stage was done. Advanced technologies were followed for specific seedlings and moisture requirement to increase efficiency, to save time, costly seed with minimum space with reducing drudgery. Automatic tray filling machine with coco peat increased efficiency was introduced. He has established high-tech tray manufacturing machine to reduce the cost and timely availability of resources at the unit 500 trays/day. Now he is supplying trays to other growers. Grafting in vegetable seedling: Problems persisting in the soil like high salinity, soil born fungus, soil born insects, high pH, salty lands in higher yield of crops. Grafting is done to get a normal and sufficient yield of vegetables, fruits and flowers. High quality grafted seedlings and plants tend to maximize high-quality crop yield.



**Annual seedling production:** Annually in all seasons, he is producing > 55 lakh of seedlings with turnover of Rs.50-55 lakh.

**Impact & upscaling:** He has made reach to more than 12000 farmers in Maharashtra and 3 adjoining



Name of Crop	Seedlings in Lakh	Rate/Seedling (Rs.)
Tomato	14-15	0.80-1
Brinjal	1.8-2.0	0.70-0.80
Cabbage/flower	3.2-3.5	0.80-0.90
Capsicum	7.0-7.5	1.5-2.0
Chilli	6.5-7.0	1-1.5
Sugarcane	1.4-1.5	2-2.5
Papaya	3-4	10-11
Watermelon	2-3	2.5-3

states. Guidance and advisory is being given to the farmers through trainings and field visits for commercial and high value crops. Every year 2000 farmers, students and extension workers used to visit the horticulture nursery. He is one of the prominent exporters of fruits and vegetables in Maharashtra. He has created direct employment to 200 persons including 65-70 skilled workers and office staff.

## 8. Mass Trapping of Pink Bollworm in Cotton with IPM: KVK, Jalna-I

**Need Identification:** Cotton is one of the main cash crop of Jalna district which grown on almost 65-70% cropped area (2.80 lakh ha). During 2017-18 there was heavy outbreak of Pink Bollworm in cotton which resulted in 30-70% yield losses in cotton. As Pink Bollworm has developed resistance against Bt cotton, it was essential to provide immediate technological support to farmers for solution of control of Pink Bollworm in cotton

**Efforts Made By KVK:** KVK, Jalna-I took initiative to organise farmers seminar on Pink Bollworm jointly with ATMA in which total 820 farmers were participated from 70 villages. KVK developed literature on Pink Bollworm management which was distributed in 460 villages covering around 10000

**Infrastructure development:** Constructed the farm pond with 20-25 lakh litre capacity with PH and EC control unit. He has established soil-water testing laboratory to advise the farmers for nutrient management. Started input Agri-mall to supply quality inputs to the farmers in minimum margin. Initiated Farmer Producer Company for marketing produce with 250 farmers and Mall for agri. inputs for common purchase.

farmers. In addition, KVK scientists visited 51 different villages. Training on Pink bollworm management was also conducted at KVK and in villages for farmers and extension functionaries of the district. On Farm Trials and large scale demonstrations on Mass Trapping of Pink Bollworm with IPM was conducted in two villages. A joint project with ICAR-NCIPM, New Delhi and ICAR-ATARI is also initiated for this purpose.

**Technology Details:** Anand Agril. University, Anand, Gujarat has recommended to use 40 pheromone traps per ha for mass trapping of Pink bollworm with already recommended IPM components. The traps should be first installed 15 days after sowing, 30 cm above the plant height and *Pectinophora lures* changed after every 60 days during the period of infestation. The male moths caught in the traps were destroyed every day.



**Salient findings and economics:** It has been observed that 33.65% cotton yield was increased with 4% cost in plant protection over farmer's practice. A net income of Rs 37424/ha was realised in improved practice as against Rs.16400/ha in farmer's practice who had not used mass trapping. The farmers could harvest average yield of 15.50 q/ha under protective irrigated condition.

**Adoption and Spread:** During 2018-19, farmers adopted different IPM components and more than 2 lakh Pheromone Traps were used in the district for mass trapping of Pink Bollworm in cotton. The technology was reached to almost every village with the help of Department of Agriculture and other agencies.

**Future Scope:** As it is a very simple and affordable technology, can be reached to large number of framers through line departments in the district. More work is needed.

### 9. Preparation of Decorative Articles from Degraded Cocoons as a Source of Income Generation for Farm Women: KVK, Jalna-I

**Need Identification:** The area under sericulture grown considerably in Jalna district during last two years. About 500 farm families are likely to be engaged in this business. Jalna is drought prone area and the sericulture is one of the best options for farmers as agro based entrepreneurship. The farmers are taking 4-5 batches in a year and earned about 1.5 lakh income. At the time of harvesting, 5-10% of cocoons are degraded cocoons and the rate is very less i.e. Rs.100-150/kg. Many times farmers are not harvesting such cocoons.

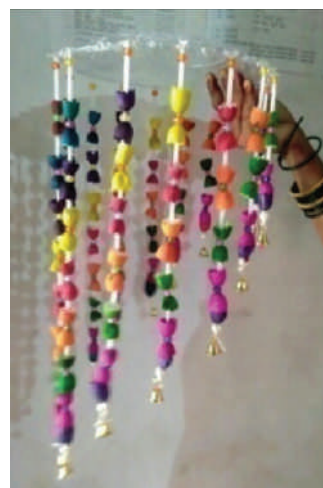
**Efforts of KVK:** The KVK, Jalna-I took initiative to prepare different articles from degraded cocoons and it is one of the best income generation activity for farm women. We can prepare different flowers, garlands, bouquets, necklace, bracelets, key chains, wall piece, toran, flower pots, night lamps, etc. from degraded cocoons. KVK has trained around 50 farm women during last two years. KVK has also organized 3 days special training for Home Science experts for KVKs in Maharashtra in which total 27 KVKs were participated.

**Technology Details:** This technology is developed by Central Sericulture Research Institute, Mysore and commercialised with the help of VNMKV, Parbhani in Marathwada region. The technology includes conversion of degraded cocoons in value added products which helps for additional income to farm women growing sericulture.

**Economics:** It has been observed that the value added products has given the income of Rs. 1000-2000 per kg of cocoons which otherwise would have sold at Rs. 100-150 per kg. The SHG members have earned Rs.1000-1500 additional income per month based on products availability and market.

**Adoption and Spread:** Two SHGs from Ambad and Kachrewadi villages had started preparing different articles from the degraded cocoons and selling during different exhibitions as well as at local area. Around 50-60 women are involved.

**Future Scope:** This may prove very potential agri-based enterprise in future. The organised support and market facilitation may be provided by line departments in the district.





## 10. IT Graduate Turned into Agricultural Entrepreneurship: KVK, Beed-I

A youth, after completion of masters' degree in computer application, joined android software development course at Hyderabad. He was Vaijanath Nirmal, a youth from poor family. After completion of course, he started working as assistant professor in private degree college in Latur (Maharashtra). But he was not happy with tedious and monotonous kind of teaching job. He wanted to do something different in which he can use his talent and skill. Moreover he wanted to become an agricultural entrepreneur. His thinking was that serving for others is a kind of slavery. Only his own business/entrepreneurship can give him real happiness, economic stability and special identity in his life. He was the only son in his family, so he always wanted to be with his parents at Ambajogai.

**Plan, Implement and Support:** In November 2016 he received text message on mobile about the training programme of tomato processing, at KVK Ambajogai. Mr. Vaijnath along with his mother, who was very interested and expert in recipies, enrolled them for training and completed it successfully. He studied the market behavior and requirements and noticed that there were various types of tomato value added products are available besides tomato chatni. He also observed that some of the tomato byproducts of multinational brands were very costly. He processed tomato as bi-products and sent value added products in local market. In local market he faced various problems regarding quality, packaging, leveling. He then started working on those problems. He learned about durable, attracting packaging and labeling and he also applied for FSSI license, brand name, and full filled all the formalities to register his company as a private limited company. Meanwhile, he also attended a training programs at Bengaluru organized by MANAGE Hyderabad with collaboration of KVK Ambajogai entitled "Processing of Anola & fig along with bakery product".

**Output:** In year 2017, he established a processing unit to produce the Anola bi-products anola candy, supari, murmba, etc. He also invested Rs 3.5 lakh for the purchasing of different type of machineries like containers packaging, anola breaking and punching machines.

**Outcome:** During the year 2017-19 he produced 1800 kg anola candy and earned around Rs. 4.00 lakh against an investment of Rs.1.43 lakh.

## 11. Group Approach in Sericulture leads to Sustainable Income: KVK, Solapur-I

Climate and soil are suitable for the cultivation of mulberry plant and rearing of silkworms in district Solapur. The rural youth of village Kalegaon and other adjacent villages from Solapur district were engaged in traditional farming but want to start agricultural based enterprises. During rabi season, sorghum is major crop cultivated on 288.40 ha in medium to deep black soils followed by sugarcane (138 ha). Yield of rabi sorghum was low due to use of traditional practices hence there is need to introduce another crop for fulfilment of family needs. They were getting 30-35 tons of sugarcane in 14 months /acre in which they were getting profit of Rs 22-25 thousand in 14 months i.e. in instalments by local sugar factories which is not sufficient to cater the whole family because of that KVK expert suggested to cultivate the mulberry for earning sustainable income from sericulture.



**KVK Intervention:** KVK Solapur had imparted 1 skilled training to 20 willing youths as well as 4 vocational trainings for selected 145 rural youth in sericulture. The efforts were made to make this training very interactive through exposure visit, interaction with experts, progressive farmers, video clips, etc. Among 145 rural youths, 24 were from a single village Kalegaon of Barshi taluka hence KVK Solapur-I gave special attention to make a functional group i.e. Laxmi Narsinha Sericulturists group Kalegaon to provide a common platform for further progress. Training manual on sericulture was also provided them for further reference. KVK had also provided institutional backstopping with the help of Department of District Sericulture Development for erection of sericulture unit under MREGS scheme. Govt of Maharashtra provided Rs. 2.95 lakh grants (100% subsidy) for subsequent three years.

**Output:** After the completion of training 44 (33%) rural youths had started the sericulture units. Each



unit has earned Rs. 25000 to 30000 per batch. On an average each trainee who started unit had completed 3-4 batches in a 12 months after the completion of training. In the village Kalegaon till now the Sericulture department had distributed grant amount of Rs 36.00 lakh amongst the 24 members of Laximi Narsinha Sericulturists Group. The success story of Kalegaon village was broadcasted on DD Sahyadri Channel in 2018.

**Outcome:** Out of 145 trainees, 44 trainees have started the sericulture units had utilized 90 labours and generated 1350 labour days in village itself which leads to stop the migration to metropolitan cities like Pune, Mumbai and Hyderabad. Under sericulture, 6154 kg cocoons produced and attained net income of Rs. 9 68000 in a year.

**Impact:** Each unit becomes the model demonstration unit where nearby villagers had started to visit and having orientation on sericulture. This has given economical stability to the 44 families with on an average income of Rs. 25,000 to 30000 per batch. This can be the best way of doubling the farmer's income. Money flow through cocoon sales has also improved leading to the improvement in economic status and living conditions of the rural youths in the village. It served as additional income generating source. The functioning of Laxmi Narsinha Sericulturists group has developed group approach in other crops also viz, Soybean, Pigeonpea, Sorghum, etc.

## 12. Crop diversification: Promotion of Drumstick in Solapur district

Solapur has the dubious distinction of being identified as one of the 99 districts in India as drought prone. Some of the extreme weather patterns here can be attributed to climate change. As global temperatures increase, extended periods of drought, heat waves, and unpredictable rainfall have intensified. The annual average rainfall tremendously varies from year to year, directly impacting agriculture and horticulture activities. While the eastern zone comprising Barshi, North Solapur, South Solapur and Akkalkot talukas has assured but scanty rainfall, the central zone comprising Mohol, Mangalwedha, eastern part of Pandharpur and Madhatalukas and the western zone, which comprises the scarcity areas of Karmala, Sangola and Malshiras talukas, and the western parts of Madha and Pandharpur talukas, have uncertain rainfall.

**Problem Identified:** Dependent upon scanty rainfall, 91.5% of the total cultivated area in the district

is under dry land farming. The annual rainfall is 625 mm. The farmers are cultivating the vegetable crops like onion, chilli, brinjal, tomato, okra, cucurbits, etc. which requires more water and costly inputs and as such reduces their profitability. By considering the constraints in vegetable production and marketing, KVK decided to introduce drumstick crop with improved technologies for sustainable income in drought prone area.

**KVK's Intervention:** By considering the problems of the vegetable growers, the KVK introduced the drought tolerant and high yielding variety of Drumstick (PKM-2). The centre conducted demonstrations on PKM-2 variety in very light soil (10-20 cm depth) on 8 x 8 ft spacing (row to row and plant to plant) under very less irrigation water on farmers' fields as well as KVK instructional farm as against the recommended spacing of 15-16 feet. Farmers under demonstrations, obtained average 125 & 195 pods per plant in first (6 months after transplanting) and second (10-12 months after transplanting) bearing with least investment. Water used for irrigation was very less (1-12 litre/plant). The farmers used all preventive and curative measures for conservation of soil moisture. As net income of Rs. 71,500/ha was realized by the farmers from 2 bearing of demonstration plots. For high density (8 x 8 ft.) planting, KVK developed training and pruning techniques; so as to maintain the ideal distance between plants in every bahar and plant should produce maximum number of pods from less area. The KVK also promoted the technologies like pruning, use of growth hormones for inducing the flowering, micro irrigation and plant protection measures through training and massive extension activities. During the year 2011-12, KVK also introduced recent variety KDM-01 (Bhagya) which is released by UHS, Bagalkot (Karnataka). The variety was promoted through FLDs in KVK operational area. The seed production of KDM-01 was taken on KVK instructional farm and provided to the farmers of Solapur as well as adjoining districts of Maharashtra.

**Process:** KVK Solapur has conducted 14 OFTs, 58 FLDs, 12 trainings, 4 field days and different extension activities for horizontal spread of this technology. As combined results of FLDs, OFTs, trainings and extension activities conducted by KVK Solapur improvement in yield of drumstick was observed.

### Output:

- Farmers are using KDM-01 Bhagya variety of drumstick and ICM technology on more than 52 ha



area in Vairag cluster of Barshi tehsil & Kalaman cluster of north Solapur tehsil.

- Due to use of technology given by KVK Solapur yield had been increased upto 11330 kg/ha as compare to 9020 kg/ha in farmer's practice.
- Drumstick- Onion cropping system was promoted in KVK adopted villages.
- Farmers are securing Rs/ha 121822 net profit due to KVK intervention with 2.06 % B.C ratio.

**Outcome:** KVK conducted 58 demonstrations on drumstick using improved variety KDM-01 Bhagya & ICM practices resulting in 27.20% yield improvement over traditional cultivar Odisee grown by farmers as local practice. Average yield of 11.33 ton/ha was obtained from demonstration plots as compared to 9.02 ton/ha in farmer's practice. During the year kharif 2015 due to dry spell during critical growth stages of drumstick the yield was decreased. Gross income was increased by Rs.2,91,967/ha by investing additional cost of Rs.66858/ha. Highest B:C ratio of 2.03 was obtained due to use of improved cultivar KDM-01 Bhagya and drip irrigation in drumstick cultivation.

### Horizontal spread of the technology:

- During the year 2014 to 2018 KVK had produced seed of KDM-01 variety at KVK farm and supplied to 13 KVKs of Maharashtra, 5 institutes and 310 farmers from different districts.
- This technology is spreading in the Solapur district with six major onion growing tahsil i.e. North Solapur, South Solapur, Madha, Mohol, Akkalkot and Barshi Tahsil of Solapur district.
- Due to the convergence with line department & ATMA the drumstick variety KDM-01 Bhagya with improved production technology spread on more than 450 farmers field on 280 ha area of 9 tehsils of Solapur district.

- The gross benefits due to spreading of improved variety on 280 ha & more than 450 farmers has been Rs. 3.41 crore additionally in the district.

### 13. Poultry Hatchery in Pune region: A Successful Case in Pune

A Mayur Hatchery was established in Manchar, taluka Ambegaon of district Pune in the year 2013 by Mr. Ravi Jadhav. He is educated 10<sup>th</sup> standard, 36 years old and living in joint family of 12 members. He is having 3 acres cultivable land. Hatchery business was started as subsidiary enterprise with 1000 eggs capacity initially.

**Technical Support from KVK:** He is associated with KVK, Pune -II since 2012. KVK expert suggested him to start a poultry hatchery as subsidiary occupation and technical backstopping was given to start the poultry hatchery. He started hatchery with



1000 capacity hatchery in 2013. Initially, he faced problems in hatching like low hatching percentage, mortality in chicks and marketing of the chicks. Again KVK intervened for updating hatchery unit and marketing strategies. Linkage with good parental poultry farms was developed that resulted increase in



hatching percent. He has set up own parental stock farm in 2018 as suggested by the KVK. More than 100000 chicks were sold to the various farmers. Social media was also used for advertising and marketing of their chicks. He was awarded by the KVK, Pune-II for promoting such enterprises among rural youths.

**Economic Gain:** Mayur Hatchery started its agri-business in 2013 and by selling only 4500 chicks, he realized a profit of Rs. 41850. As per demand of market, he increased the production of chicks also increased the capacity of hatchery. Now, capacity of hatchery is 32000 eggs/batch (hatching period of every batch is 21 days). The average hatching percentage is 78%. In 2018-19, he sold 72000 chicks from its hatchery and obtained net profit of Rs. 2.88 lakh.

#### 14. Use of Spiral Separator for Soybean Cleaning: KVK, Pune-II

Traditional method of cleaning grains (soybean and pigeon pea) leads heavy drudgery, pain in fingers, hand, shoulder and more time consuming. After threshing lot of stones and sticks are present in soybean and ultimately farmers get fewer prices to their product.

**Plan, Implement and Support:** For tackling problem, KVK distributed spiral separators to SHGs

with financial support of ATMA. Training program for SHG on demonstration of soybean cleaning was organized. Extension literature on cleaning of grains was prepared and distributed.

**Output and Outcome:** Previously one labor was used to clean 32-35 kg soybean in one hour but due to use of spiral separator, it can be cleaned 200 kg in one hour with 90 to 95% cleaning efficiency. Some farmers have started their business of cleaning grains by taking 1 Rs per kg and doing custom hiring at Rs 150 per day. By seeing result in 2016, 2017 and 2018, ATMA has announced financial assistance for supplying of spiral separators to 55 SHGs in Junnar, Ambegoan, Khed, Shirur talukas. Some farmers have started buying with their own resources.



Year	No. of Demonstrations	No. of spiral separator provided	No. of trainings	Number of beneficiaries	Soybean cleaned
2016	5	5	1	100	850 q
2017	25	25	2	670	5360 q
2018	25	25	1	1230	9960 q

#### 15. Silage Making and Feeding to Cross Bred Cows in Rainfed Area of Baramati to Increase Milk Productivity

Dairy enterprise is a major income generating activity in the rainfed and irrigated area of the Pune district in Maharashtra. Maize and sorghum are major fodder crops grown by the dairy farmers. Out of total population of cattle in the Pune district 50% population is crossbred animals. For maximum milk production, crossbred animals require green fodder throughout the year. Area under fodder crops is 5% of total area of the district. Green fodder is not available

throughout the year. Sugarcane tops are also available from November to March in the area due to Sugar factories. There is shortage of green fodder during March to July for dairy animals. Livestock farming is secondary source of income for medium, small and marginal farmers.

**Process:** Under National Dairy Plan-I of Fodder Development Project (NDDDB), KVK Baramati selected 90 farmers from 90 villages of Pune district from 6 tehsils and training on silage making was given to all selected farmers. Rs. 25000 support was given to the farmers under the project. Silage making method was





demonstrated for the farmers and exposure visit to successful farmer was organized for the farmers.

Mr. Pandurang Wabale, Mr. Sanjay Wabale, Mr. Bajrang Wabale and Mr. Parshuram Vaman Gawade and Mrs. Savita Shirke from Jalgaon KP, Medad and Malegaon in Baramati taluka of Pune district in Maharashtra were focussed. This technology was also adopted first time by the KVK. These farmers started preparing silage first time and fed to their crossbred HF cows in the area under the guidance of KVK.

**Technology:** Maize green fodder was cultivated during July to October. Maize green fodder was harvested in month of November at the age of 85-90 days at half milk line stage. Green fodder crop having 30% dry matter and 70% moisture was used for silage making. Chopping of green fodder by tractor mounted Chopper loader was practiced for large scale silage making; the chop length of fodder was considered at 2-2.5 cm and uniform for proper pressing and silage making. The chopped fodder was filled in to the silo tank and silage culture at the rate of 1 litre for 10 ton of fodder was used during the filling of tanks. Daily same

procedure was repeated and within 3-5 days the total silo tank was filled and sealed with 300 micron HDPE film.

**Opening of Silo Pit:** Silo pit was opened after 45 days and sealed the silo pit from one side and required silage was removed and fed to the crossbred cows. 25 kg silage + 5 kg dry fodder + 300 gm of concentrate per kg of milk production was given to crossbred animals and mineral mixture was fed as per need. It is found that silage quality was very good and animals liked it and aroma of the silage was pleasant. Palpability was also very good. The dry fodder intake was improved due to mixing of silage in dry fodder.

**Impact:** Due to results of demonstration of silage making technology, neighboring 210 farmers started the silage making in Jalgaon KP, Jalgaon Supe and Medad village. 14 farmers were started Silo tanks construction looking towards the positive results of the silage making. Total 801 farmers have adopted the technology till year 2018. Silage making activity is becoming popular in Satara, Solapur and Ahmadnagar districts of Maharashtra.

Name of the farmer	No. of cows in milking	Milk yield litre /day		Fat %	
		Before	After	Before	After
Mrs. Savita Shirke	24	275	310	3.4	3.6
Mr. Sandeep Lonkar	2	36	42	3.3	3.5
Mr. Gawade Parshuram	1	20	25	3.4	3.8
Mr. Wabale Pandurang	4	44	50	3.6	3.8
Mr. Pandurang Wabale	6	90	102	3.5	3.7
<b>Total</b>	<b>37</b>	<b>465</b>	<b>529</b>	<b>17.2</b>	<b>18.4</b>
<b>Average /cow/day and fat%</b>		<b>12.56</b>	<b>14.29</b>	<b>3.44</b>	<b>3.69</b>



**Economic Gains:** There is increase in milk yield by 1.75 to 2 litre per day per cow. There is 25% saving on concentrate, as it is very nutritious as compared to traditional feeding practice. There is Increase in net income by Rs.12000 to 15000 per year per cow.

**Employment Generation:** Seven farmers have purchased the tractor mounted chopper loaders for large scale silage making. Three farmers have purchased the silage bag filling machines and three farmers have started selling of silage in Pune city. Two rural youths have started providing services for silage making to dairy farmers.

### 16. Modern Strawberry Farming with Eco-Friendly Approach for Higher Return: KVK, Satara-II

A farmer (Shri Ganpat Ramchandra Parthe) resides in joint family with 15 members at village Bhilar, taluka Mahabaleshwar of district Satara. He is graduate and having 7 ha land with open well, bore well and drip irrigation facilities. Strawberry is a delicious fruit consumed fresh. Excellent ice cream and jam are made from strawberry fruits on account of its rich aroma and good source of vitamin C. Mahabaleshwar contributes to 85% of the total strawberry production in India. In Mahabaleshwar, strawberry season begins around 15 November and lasts till the middle of April. Shri Ganpat Parthe, himself a farmer and Chairman of Shriram Fruit Processing Cooperative Society had introduced the concept of modern strawberry farming with eco friendly approach in village Bhilar which is located between hill station Panchgani and Mahabaleshwar.

**Planting method adopted:** Earlier, the farmer was importing mother plants from California and Italy in June to harvest the fruits in November. Strawberry varieties planted are Nabella, Camarosa, Aroma and Vivara. He had planted self prepared strawberry runners on 3.5 feet raised bed with spacing of 30 cm x 22.5 cm. The raised beds are laid with silver black mulching paper of 30 micron thickness. Water soluble fertilizers are applied through 2 lph drip system. Bioagents are also applied through *Jivamrut* media and farm yard manure.

**Vertical farming:** With a view to apply modern farming technique Shri Parthe planted strawberry plants using vertigo technique. In this method he was using coco peat as growing media. Plants were grown hydroponically. All the nutrients were applied

through fertigation with soluble, balanced hydroponic nutrients. The ideal schedule was prepared to get strawberries during the third week of November. Daily fertigation was given from planting to establishment of strawberry. After 15 days of planting, fertigation was given on alternative days and during fruiting stage it was given at 4 days interval. The most obvious advantage of this technique was the ability to grow many plants on a small plot of land. Using vertigo, he is able to plant nearly 2500 plants on 0.03 ha with yield of 700 gm fruits per plant. In traditional system of planting, 2500 plants would have required space of 0.10 ha. Water requirement in this method is comparatively very less i.e. 200 litre per day. Soil borne diseases are also minimized.

**Utilization of green house for production of strawberry planting material:** Traditionally mother plants were imported from California in June and planted in places like Wai, Koregaon and other plain region. Heavy rainfall in Mahabaleshwar is big problem in strawberry propagation. The runners produced by each of this mother plants were brought to Mahabaleshwar area and replanted in the month of September. Every year lot of money was spent on propagation. Farmers of Mahabaleshwar were dependent on farmers of neighbouring taluka for supply of planting material. Shri Parthe found solution on this dependency of plant propagation on other farmers by constructing three green house structures on 0.20 ha. Every year he produced about one lakh runners of strawberry which were utilized for planting on his own field and excess material was supplied to fellow farmers. Strawberry fruits are harvested early from left over mother plants, fetches high price due to early arrival in the market. From 0.20 ha area of green house about 2800 kg yield was obtained. Due to his innovative idea, he is able to save money on purchase of planting material and earning additional income from selling of planting material. Prolong chilling hours enables for more production in green house.

**Agro tourism a profitable enterprise:** Every year thousands of tourists visit the hill station. To take advantage of visitors, he established agro tourism in the year 2005-06 with residential capacity of 15 members. Later on with positive feedback, he increased residential capacity up to 40 persons in 2014. Guests staying at agro tourism are served with organically grown fresh strawberry fruits and vegetables. About 30% of his farm produce is sold at agro tourism centre itself.



**Institution building and agro-advisory:** He is involved in giving technical guidance to strawberry producers. He is motivator for organic farming and marketing of strawberry. He has formed Agro Organic India Farmers Group of 60 members. He has trained many female farmers in post harvest management of strawberry. He was coordinated for Geographical Indication of Mahabaleshwar Strawberry and got Geographical Indication in 2007-2008. He is Chairman of Shriram Fruit Processing Cooperative Society, Bhilar.



Vertical farming of strawberry

**Economics:** The farmer is getting about 140 q/acre strawberry with a net profit of Rs. 4.64 lakh per acre. The rate of strawberry was on an average of Rs. 80 per kg. Cost of production was Rs. 6.56 lakh per acre. More expenses were on runners, labour, packing and transportation.

**Recognition:** He was recognised with different awards viz., Krishi Parytan Gaurav Purushkar; Udyan Pandit; Krishak Samrat Samman; Yashwantrao Chavan Krishi Parytan Gaurav Purushkar; and appreciation from Asian Development Bank.



Strawberry grown on mulching

### 17. Piggery through Artificial Insemination (AI): KVK, North Goa

Mr. William Afanso is 45-year agri-entrepreneur, resides at Agassaim, Tiswadi Goa. He has a piggery unit. Earlier he used to do piggery in traditional way and obtained low average weight (30-35 kg) of adult local pig. Expert of KVK, North Goa advised him to adopt artificial insemination technology developed.

**Technologically Empowered:** Firstly, AI was done in 7 local sows using semen of Large White Yorkshire Boar from Semen lab established by Animal Division of ICAR-CCARI, Goa. Mr. Afanso was also trained about AI procedure and technique. He was oriented about significance of correct time of

insemination and became technologically empowered.

**Good Result:** AI technology was standardised by scientist of ICAR-CCARI, Goa. Artificial insemination in sows gave good results as piglets born were healthy with good weight and reached around 70-80 kg at the marketable age of 8 -9 months. Ten nearby piggery owners started practicing of artificial insemination in their local pigs.

**Economic Gain:** The piglets were ready to be marketed at 8-9 months with average body weight of 70-80 kg. Earlier, he was getting negligible profit of Rs. 1622 by selling pigs. Now he is obtaining a profit of Rs. 5357/pig. On an average, a sow delivers eight piglets, so he gets a profit of Rs. 42856 per sow.





# Special Programs

Special programs were celebrated and organised by the KVKs. Under these programs, awareness latest technologies, national and state level agricultural development schemes, etc. were focused. The details of events organised are given in this section.

## Webcast of Inauguration of PM Kisan Samman Nidhi Scheme

On the occasion of inauguration of PM Kisan Samman

Nidhi Scheme, Prime Minister interacted with the farmers on 24<sup>th</sup> February, 2019 through webcast at 68 KVKs across the zone (41 Maharashtra, 26 Gujarat and one KVK from Goa). In these programs, 5 Union Ministers, 8 MPs, 3 State Ministers, 9 MLAs, 15890 farmers and other stakeholders participated. The state-wise details of programs are given in Table 9.1.



Table 9.1 State-wise details of participants under webcast of launch of PM Kisan Samman Nidhi Scheme

State	No. of KVKs	No. of Union Ministers	No. of MPs	No. of State Govt. Ministers	No. of MLAs	Total participants
Maharashtra	41	3	1	0	4	6381
Gujarat	26	2	7	3	5	9459
Goa	1	0	0	0	0	50
<b>Total</b>	<b>68</b>	<b>5</b>	<b>8</b>	<b>3</b>	<b>9</b>	<b>15890</b>

## Interaction of Hon'ble Prime Minister with Members of SHGs and Women Groups

Hon'ble Prime Minister interacted with the members of SHGs and women groups on 12<sup>th</sup> June, 2018 through

webcast at 70 KVKs across the zone (42 Maharashtra, 26 Gujarat and 2 KVKs from Goa). At this occasion, 4715 farmers (2869 Maharashtra, 1786 Gujarat and 60 farmers from Goa) viewed the program and benefitted.





### World Soil Day Celebration

Good soil health is essentially required for sustainable agriculture. Every year, World Soil Day is celebrated on 5<sup>th</sup> December for creating mass awareness among farmers towards enriching soil health. In this context, 76 KVKs across the zone (45 Maharashtra, 29 Gujarat

and 2 KVKs from Goa) celebrated World Soil Day program on 5<sup>th</sup> December, 2018. At this occasion, 126057 soil health cards were distributed among farmers and knowledge about maintaining soil health was shared. The state-wise details of the event are reported in Table 9.2.





**Table 9.2 Details of World Soil Day organized by the KVKs**

State	No. of KVKs	Events organized	Soil Health Cards Distributed
Goa	2	Awareness on soil health and SHC distribution	345
Maharashtra	45	Soil health management awareness programme Distribution of soil health cards Kisan melas	124413
Gujarat	29	Kisan sangosthi and method demonstration Farmers training Distribution of soil health cards	1299
<b>Total</b>	<b>76</b>		<b>126057</b>

### Celebration of Cleanliness Drive Program

Effort for making Clean India was the second dream of Bapu ji. To achieve it, oath was taken by different KVKs and ATARI officials for making surroundings clean and changing their attitude and behavior. The participants were motivated to change their mind-set and also change the age old habits. It is the responsibility of everyone to make the success of

cleanliness drive. By 2019, whole India is to be transformed in to Clean India. In all, 77 KVKs of the zone including 45 KVKs from Maharashtra, 30 Gujarat and 2 KVKs of Goa organized the Swachhata hi Sewa Program during 15<sup>th</sup> September to 2<sup>nd</sup> October, 2018 and Swachhta Pakhwada during 16<sup>th</sup> to 31<sup>st</sup> December, 2018. On this occasion, several activities were organized for having sense of cleanliness drive. The activity-wise details of programs are given in Table 9.3 and 9.4.


**Table 9.3 Programs on Swachhata hi Sewa organized by KVKs**

S. NO.	Activities	No. of activities	No. of participants
1.	Toilet pit-digging exercise and other toilet construction activities	17	89
2.	Cleaning of streets, drains and back alleys through awareness drives	195	854
3.	Waste collection drives in households and common or shared spaces	80	400
4.	Door-to-door meeting to drive behavior change with respect to sanitation behaviors	51	280
5.	Awareness campaigns around better sanitation practices like using a toilet, hand washing, health and hygiene awareness	141	685
6.	Performa Swachhata related Nukkad Nataks/street plays, folk song and dance performances	19	155
7.	Village or School-level rallies to generate awareness about sanitation	66	361
8.	Wall paintings in public places on the theme of Swachhata	24	116



S. NO.	Activities	No. of activities	No. of participants
9.	Volunteer for segregation of solid waste into non-biodegradable and biodegradable waste	32	174
10.	Mobilize action of community to build compost pits, where organic matter decomposes to form manure	59	295
	<b>Total</b>	<b>684</b>	<b>3409</b>

**Table 9.4 Programs on Swachhta Pakhwada organized by KVKs**

Date	Activities	No. of KVKs involved	No. of Participants
16.12.2018	Display and Banner at prominent places; Swachhta pledge; Stock taking and briefing of the activities.	39	2315
17.12.2018	Stock taking on digitization of office records/e-office implementation. Cleanliness drive including cleaning of offices, corridors and premises. Weeding out old records, obsolete furnitures, junk materials and white washing/ painting.	47	1081
18.12.2018	Sanitation and solid waste management. Cleanliness and sanitation drive within campuses, surroundings, residential colonies, common places. Stock taking of biodegradable and non-biodegradable waste disposal.	45	1849
19.12.2018	Sanitation and solid waste management. Cleanliness and sanitation drive in the villages adopted under the MGGM program or other schemes by ICAR Institutes.	46	2528
20.12.2018	Stock taking of waste management.	53	2495
21.12.2018	Campaign on cleaning of sewerage and water lines, awareness on recycling of waste water, water harvesting for agriculture/ horticulture/kitchen gardens in residential colonies.	45	2054
22.12.2018	Organizing workshops, exhibitions, technology demonstrations on agricultural technologies for conversion of waste to wealth, safe disposal of all kinds of wastes.	26	1209
23.12.2018	Celebration of Special Day – Kisan Diwas on 23 <sup>rd</sup> December. Experience sharing on Swachhta initiatives by farmers and civil society officials.	59	4729
24.12.2018	Swachhta awareness at local level.	21	834
25.12.2018	Cleaning of public places, community market places and nearby tourist spots.	12	245
26.12.2018	Organized competition and rewarded best offices/ residential areas on cleanliness. Quiz, essay and drawing competitions for school children, village youth.	24	725
27.12.2018	Stock taking of waste management. Promoting clean and green technologies and organic farming practices in community places.	18	546
28.12.2018	Campaign on cleaning of sewerage and water lines, awareness on recycling of waste water, water harvesting for agriculture/ horticulture in residential colonies outside campuses/ nearby villages with the involvement of village communities.	25	747
29.12.2018	Visits of community waste disposal sites/ compost pits, cleaning and creating awareness on treatment & safe disposal of bio-degradable/non bio-degradable wastes by involving farming community.	2	143

Date	Activities	No. of KVKs involved	No. of Participants
30.12.2018	Involvement of VIP/ VVIPs in the Swachhta activities, involvement of print and electronic media.	8	203
31.12.2018	Organization of press conference for highlighting the activities of Swachh Bharat Pakhwada.	5	216
	<b>Total</b>	<b>475</b>	<b>21919</b>

### Mera Gaon Mera Gaurav (MGMG)

An innovative scheme Mera Gaon Mera Gaurav (MGMG) was launched by the Prime Minister on July 25, 2015 to promote the direct interface of scientists with the farmers to accelerate the lab to land process. Major objective of the scheme is to make more contacts with farmers and scientists, developing linkages with line departments, providing on-spot advisory on regular basis by adopting villages by the scientists. In the zone, 14 ICAR institutes (Maharashtra-11, Gujarat-2 and Goa-1) were actively involved under MGMG scheme. Under this scheme, at institute level, many

groups of multi-disciplinary scientists were constituted. One group is consisted of 4-5 scientists and adopted 5 villages within a radius of 50-100 km from their place of working. In these adopted villages, different types of activities like field visits, trainings, frontline demonstrations, on farm trials, exhibitions, etc. were organized. Extension literature was provided to the farmers. In all 177 groups of scientists in the zone (Maharashtra- 40 groups, Gujarat-133 groups and Goa-4 groups) were constituted by 726 scientists. In total, 813 villages were adopted and 85382 farmers were benefitted through different activities. State-wise details are given in Table 9.5.

**Table 9.5 Number of teams of scientists formed, villages adopted and farmers oriented**

Sl. No.	State	No. of teams	No. of scientists	No. of villages	No. of farmers oriented
1	Maharashtra				
	ICAR Institutes	40	181	134	31375
2	Gujarat				
	ICAR Institutes	5	17	25	3945
	SAUs	128	508	650	50022
3	Goa	04	20	04	40
	<b>Total</b>	<b>177</b>	<b>726</b>	<b>813</b>	<b>85382</b>

### Rashtriya Mahila Kisan Diwas Celebration

The Ministry of Agriculture and Farmers Welfare had decided to observe 15<sup>th</sup> October every year as Rashtriya Mahila Kisan Diwas by all SAUs, ICAR institutes and KVKs. Agricultural and entrepreneurship development. In the zone, 69 KVKs celebrated Rashtriya Mahila Kisan Diwas on 15<sup>th</sup> October, 2018 and 10198 farm women/participants attended the

program. At this occasion, different activities like special lectures, exhibitions, quiz/drawing competitions, innovative farm women's experience sharing, exposure visits, etc. were organized for benefitting the farm women. They were also provided certificates for their recognition and making significant contribution in farming, animal husbandry, bee keeping, home management, etc.



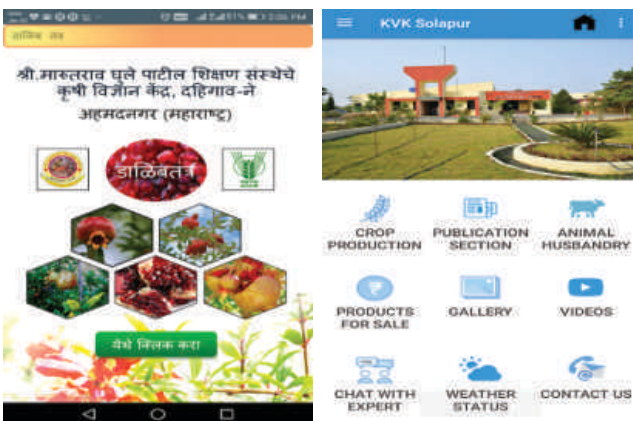




### Kisan Mobile Advisory Services

Kisan Mobile Advisory Service is one of the Information and Communication Technology (ICT) tools for dissemination of need based information and knowledge at the right time to the needy farmers. KVKs are sending information through text and voice messages to the registered farmers with important agricultural operations, weather, market, events, programs, etc. Accordingly, KVKs advised farmers regularly on crops, livestock, other enterprises,

weather, marketing and awareness of latest agricultural technologies, events and programs through personalized advisory. During the reporting period, 3785 text messages, 278 text and 294 voice messages were sent to 72.58 lakh farmers. Among these advisories, major share was of crops (1697) followed by awareness (617), livestock (517), other enterprises (395), weather (359) and marketing (200) in case of text messages. The information on mobile based advisories is presented in Table 9.6.





**Table 9.6 Kisan mobile advisory services and categories of messages sent to farmers**

State	No of Registered farmers	Kisan Mobile Advisory Services							
		Message Type	Category of messages						
			Crop	Livestock	Weather	Marketing	Awareness	Other enterprise	Total Messages
Maharashtra	6543181	Text only	1052	261	225	128	455	244	2365
Gujarat	713916	Text only	645	256	134	72	162	147	1416
Goa	666	Text only	0	0	0	0	0	4	4
<b>Total</b>	<b>7257763</b>	<b>Text only</b>	<b>1697</b>	<b>517</b>	<b>359</b>	<b>200</b>	<b>617</b>	<b>395</b>	<b>3785</b>
Maharashtra		Voice & Text both	42	26	28	12	10	6	124
Gujarat		Voice & Text both	24	32	0	0	83	15	154
<b>Total</b>		<b>Voice &amp; Text both</b>	<b>66</b>	<b>58</b>	<b>28</b>	<b>12</b>	<b>93</b>	<b>21</b>	<b>278</b>
Maharashtra		Voice only	48	30	17	15	28	25	163
Gujarat		Voice only	48	19	13	14	19	18	131
<b>Total</b>		<b>Voice only</b>	<b>96</b>	<b>49</b>	<b>30</b>	<b>29</b>	<b>47</b>	<b>43</b>	<b>294</b>

### Soil, Water and Plant Analysis

Major focus is being given on soil test based application of nutrients in different crops. Mini soil testing kits are being used at each centre. KVKs have also established soil, water and plant analyzing laboratory and analyzing soil, water and plant samples for the benefit of farming community. Further, KVKs are also utilizing this facility for carrying out the soil test based nutrient recommendations for conducting

FLDs and OFTs as well providing advisory services on nutrient based recommendations to the farmers. In 2018-19, a total of 211341 samples of soils, 5346 samples of water, 493 samples of plants and 115 samples of organic manures were analyzed by the KVKs in the zone. In total, 684627 Soil Health Cards were distributed among farmers with specific recommendations in local language. State-wise data on various parameters are given in Table 9.7.

**Table 9.7 Number of soil, water and plant analysis at KVKs**

State	Soil & Water Testing Labs					
	Samples	No. of Samples	No. of Farmers	No. of Villages	Amount realized (Rs.)	No. of Soil Health Card issued
Maharashtra	Soil	200214	323544	4463	31047236	674736
Gujarat	Soil	10152	9829	798	1134420	8916
Goa	Soil	975	650	15	0	975
<b>Total</b>	Soil	<b>211341</b>	<b>334023</b>	<b>5276</b>	<b>32181656</b>	<b>684627</b>
Maharashtra	Plant	399	211	58	99600	0
Gujarat	Plant	94	107	33	0	0
<b>Total</b>	Plant	<b>493</b>	<b>318</b>	<b>91</b>	<b>99600</b>	<b>0</b>
Maharashtra	Water	4023	3859	960	464450	0
Gujarat	Water	1323	1207	407	43600	0
<b>Total</b>	Water	<b>5346</b>	<b>5066</b>	<b>1367</b>	<b>508050</b>	<b>0</b>
Maharashtra	Manure	115	60	51	40250	0

# HRD, Publications and Linkages

## Workshops/Conferences/Trainings Organized

- Workshop on '*Farming System for Nutrition*' in collaboration with M.S. Swaminathan Research Foundation, Chennai at KVK, Narayangaon on 24 April, 2018.
- '*Annual Zonal Workshop of KVKs*' organized at MPKV, Rahuri during 05-07 May, 2018.
- '*Action Plan and Review Workshop of NICRA*' at KVK, Jalna-I during 10-11 September, 2018.
- '*Skill Development Training of Trainers*' organized at AAU, Anand from 25-27 September, 2018 in collaboration with ASCI, New Delhi.
- '*Workshop-cum-Training on Cluster Front Line Demonstrations on Pulses and Oilseeds*' for 45 KVKs of Maharashtra at BSKKV, Dapoli during 24-25 November, 2018.
- '*Review Workshop of Farmer FIRST Project of the Zone*' on 25 November, 2018 at BSKKV, Dapoli.
- '*Review Workshop of CFLD on Oilseeds and Pulses for KVKs of Gujarat*' at KVK, Bhavnagar during 07-09 December, 2018.
- '*Review Workshop of ARYA Project of Maharashtra and Gujarat*' organized at KVK, Bhavnagar on 8 December, 2018.
- '*State Level Annual Action Plan Workshop of Gujarat KVKs*' organized at NAU, Navsari during 1-2 March, 2019.
- '*State Level Annual Action Plan Workshop of Maharashtra and Goa KVKs*' during 15-16 March, 2019 at KVK, Baramati.
- '*Management Development Program for Newly Recruited Heads of KVKs*' organized at ICAR-ATARI, Pune during 4-8 January, 2019.
- Training on '*Developing Entrepreneurship in Floriculture*' organized jointly with ICAR-DFR, Pune at KVK, Baramati from 23-25 January, 2019.
- '*Master Trainers Program for Developing Entrepreneurship*' organized at KVK, Narayangaon from 27-30 January, 2019.
- Orientation Training on "*Preparation and Dissemination of Agromet Advisories at Block level*" on 6 July, 2018 at KVK, Aurangabad-I.
- Training on '*IPM for Kharif Crops with Special Focus on Pink Bollworm in Cotton*' from 30-31 August, 2018 at Washim.

## Organized Meetings

- '*First Institute Management Committee (IMC) Meeting of ICAR-ATARI, Pune*' organized on 28 January, 2019.
- Meeting with MEDA official (Rohini Patil, Project Officer) at ATARI, Pune on 12 September, 2018 organized for conducting trainings at KVKs in Maharashtra in collaboration with BEE, New Delhi.
- '*Hindi Pakhwada Closing Ceremony*' at ICAR-ATARI, Pune on 28 September, 2018.

## Attended Workshops/Conferences

- '*National Consultation on Leveraging Agriculture for Nutrition*' at MSSRF, Chennai on 29 July, 2018.
- Workshop on '*Doubling of Farmers Income*' jointly organized by MPKV, Rahuri and Department of Agriculture, Government of Maharashtra on 31 July, 2018 at College of Agriculture, Pune.
- '*National ARYA Review Workshop*' at New Delhi on 24-25 August, 2018.
- '*Brainstorming Session cum Workshop on Good Agricultural Practices (GAP) - Current Status and Way Forward*' at NASC Complex, New Delhi on 26 November, 2018.
- '*Global Farmers- Live Demos, Agriculture Exhibition and Conference*' at KVK, Narayangaon on 03 January, 2019.
- '*Directors Conference*' at NASC, Complex New Delhi during 31 January-2 February, 2019.



- National Conference on '*Farmer FIRST for Conserving Soil and Water Resources*' at ICAR-IISWC, Research Centre, Sunabeda, Koraput during 6-8 February, 2019.
- Brainstorming Session on Network Project on '*Performance of Selected NARS Technologies*:

### Participation in Trainings/ Meetings/ Visits/ Interaction by ATARI Officials

- Meeting about developmental issues in the Konkan region in Maharashtra on 1 April, 2018 at Ratnagiri under Chairmanship of Union Minister of Commerce and Industry and Civil Aviation.
- Inaugural function of International Conference on 'Doubling the Farmers Income through Innovative Approaches' at KVK, Baramati on 9 April, 2018.
- Review meeting in Agril. Extension Division, ICAR, New Delhi during 08-09 May, 2018.
- Orientation workshop on NICE system in Pro-SOIL for content creators, content managers and CRPs on 16 May, 2018.
- Review meeting at ATARI, Pune with Shri Harish Nayar, Deputy Secretary, ICAR, New Delhi on 19 May, 2018.
- World Honey Bee Day on 20 May, 2018 at KVK, Baramati.
- Video Conferencing on PFMS on 30 May, 2018 at ICAR-NRCC, Pune. Five KVKs, AF&AO and Director, ATARI attended the event.
- Meeting with DDG, ADGs and Director Extension to discuss issues related to ICAR-ATARI, Pune at ICAR, New Delhi on 31 May, 2018.
- Meeting for organizing 'National Consultation on Agriculture' was attended at office of Vice-President of India on 01 June, 2018.
- Meeting with IMD officials for implementing DAMU at 21 KVKs held at ATARI, Pune on 05 June, 2018.
- National Consultation on Making Agriculture Sustainable and Profitable during 21-22 June 2018 at VAMNICOM, Pune, organized by the Vice President of India.
- Co-chaired one session on 'Transfer of Technology: Lab to Land', which was chaired by Dr K.P. Viswanatha, VC, MPKV, Rahuri during National Consultation on Making Agriculture Sustainable and Profitable during 21-22 June 2018 at VAMNICOM, Pune.
- Submitted rough draft of ATARI office building and estimate of office building of 2 KVKs to the Director (Works), ICAR, New Delhi on 28 June, 2018
- Submitted information and report relevant to visit of HRD Minister, Govt. of India to the PS to the HRD Minister in Shastri Bhawan on 29 June, 2018.
- Cadre Strength Review meeting at New Delhi on 18 July, 2018.
- Divisional meeting under chairmanship of DDG (Agril Extension), ICAR, New Delhi towards Cadre Strength Review of ATARIs and other new frontline extension programs being implemented through KVKs on 18 July, 2018.
- Meeting chaired by the Special Secretary (DARE) and Secretary (ICAR), New Delhi at ICAR-NRCC, Pune on 20 July, 2018 along with all the Directors of ICAR Institutes/ Heads of Centers of nearby Pune.
- PFMS training and meeting at Horticulture College, Pune on 26 July, 2018. Smt. Krishna Tyagi, Chief Controller of Accounts, Ministry of Agriculture; Comptrollers of SAUs; PAOs; KVK Heads and concerned staff attended the program.
- Meeting with Shri Sanjay Dhotre, Vice Chairman, MCAER, Pune and ICAR GB Member at MCAER, Pune on 8 August, 2018.
- Meeting on incubation & vocational training centre at MCAER, Pune on 27 August, 2018 under chairmanship of DG, MCAER, Pune.
- Brainstorming session on finalizing, 'Social Science Module Content for the PG Diploma for Climate Smart Agriculture and Water Management' on 28 August, 2018 at College of Agriculture, Pune.
- Pre-discussion meeting on 'Doubling Farmer's Income-2018' at Pune on 08 September, 2018.
- Dr. M.C. Varshneya, Ex- Vice Chancellor (AAU, Anand & Kamdhenu University, Gandhinagar) and Chairman, Zonal Management Committee, NICRA visited NICRA villages in Aurangabad and Jalna KVKs during 9-11 September, 2018.
- Rabi Krishi Mela at VNMKV, Parbhani on 17 September, 2018.



- Meeting with Secretary Agriculture and Director of Horticulture (Govt. of Gujarat) was attended where strategy for strengthening convergence of KVKs with line departments was discussed on 21 September, 2018 at Tapi.
- Meeting with CPWD Executive Engineer, Facilitator CPWD, AAO, ATARI, Pune regarding ATARI office building of E-Tender at ICAR-ATARI, Pune on 27 September, 2018.
- Meeting with Executive Engineer, CPWD, Pune; Senior Architect, Nagpur, Asst. Engineer, CPWD, Pune; Director, DFR and other Scientists of DFR was attended on 12 October, 2018 at DFR, Pune.
- Meeting with Commissioner (Agriculture), Maharashtra State, Pune and input dealers for DAESI on 23 October, 2018 at KVK, Baramati.
- Addressed the participants as Chief Guest during 'Leadership Development and Team Building Skills' at College of Agriculture, Pune on 31 October, 2018.
- Inaugurated Certified Farm Advisor Training (Floriculture, Module-II) at DFR, Pune on 14 November, 2018.
- Research Centre CHES of CIAH, Bikaner at Godhra was visited on 02 December, 2018.
- Inauguration of administrative building of KVK, Panchmahal by DDG (Agril. Extension), ICAR, New Delhi on 03 December, 2018.
- Attended 9<sup>th</sup> Foundation Day of ICAR-DFR, Pune on 10 December, 2018.
- Participated as Chief Guest during 'Chrysanthemum Day Celebration' as chief guest at DFR Farm, Pune on 11 December, 2018.
- Kisan Diwas Celebrated jointly by ICAR-ATARI, DFR and NRCCG, Pune on 23 December, 2018 at DFR farm.
- Zonal Monitoring Committee (ZMC) visited NICRA villages under KVK, Nandurbar and KVK, Ahmednagar-I during 8-10 January, 2019.
- Meeting with Commissioner Agriculture on 'Making Extension Strategy for Effective Technology Application in Maharashtra' on 11 January, 2019.
- Orientation of newly joined KVK staff at KVK, Kolhapur-II on 16 January, 2019.
- Attended inaugural function of KRUSHIK- 2019 at KVK, Baramati on 17 January, 2019.
- Attended inaugural function of 'Master Trainers Program for Developing Entrepreneurship' and conducted technical session on Soft Skill Development on 27 January, 2019 at KVK, Narayangaon.
- Review meeting on Doubling Farmers Income under chairmanship of DDG, Agril. Extension, ICAR, New Delhi on 29 January, 2019 at New Delhi.
- Regional Committee Meeting at AAU, Anand on 04 February, 2019.
- Chaired the Technical Session on Dr. K.G. Tejwani Memorial Lecture during National Conference on 'Farmer FIRST for Conserving Soil and Water Resources' held at ICAR-IISWC, Research Centre, Sunabeda, Koraput on 06 February, 2019.
- Attended IMC meeting at ICAR-ATARI, Jodhpur on 28 February, 2019.
- Reviewed the NICRA villages and accompanied ZMC team on 9 March, 2019 at KVK, Baramati.
- Attended Golden Jubilee Celebration program of MPKV, Rahuri at College of Agriculture Campus, Pune on 26 March, 2019.
- Nominee of ICAR for DPC meeting of Dr. Dhananjay N. Gawande, ARS Scientist at ICAR-NRCCG, Pune on 29 March, 2019.

### **KVK and Field Visits by the Director, ATARI, Pune**

- KVK Nanded-I and Nanded-II on 14 April, 2018.
- KVK, Amravati-II on 26 May, 2018.
- KVK, Amravati-I on 27 May, 2018.
- KVK, Akola and meeting with Chairman and Secretary of KVK was attended on 27 May, 2018.
- KVK, Buldhana-I and KVK, Buldhana-II on 28 May, 2018.
- Meeting with farmers practicing group farming (IFS and Sericulture) was attended in village near by KVK, Buldhana-I on 28 May, 2018.
- Visited progressive farmer's field and an entrepreneur on fruit production agro tourism at Bhilar village in Satara district on 10 June, 2018.
- Field visit under KVK, Aurangabad-I on 14 June, 2018.
- KVK, Jalna-II a newly established KVK visited along with Director Extension Education, VNMKV, Parbhani on 15 June, 2018.

- Visited KVK, Solapur for facilitating Video Conferencing of PM's interaction with farmers held on 20 June, 2018.
- Visit of Vice President of India (Shri Venkaiah Naidu) to KVK, Baramati on 22 June, 2018.
- Coordinated visit of HRD Minister (Shri Prakash Javadekar) to KVK, Ahmednagar-I on 23 June, 2018.
- HRD Minister (Shri Prakash Javadekar) visited and reviewed the KVK, Pune-II on 24 June, 2018. Scientists-Farmers Interface was also attended.
- Visited KVK instructional farm and demonstration units at KVK, Satara-I on 5 August, 2018.
- Reviewed KVK activities in the field organised by KVK, Narayangaon on 13 August, 2018.
- Facilitated the visit of Cabinet Minister (Shri Anant Gite) at KVK, Kolhapur-I on 15 September, 2018.
- Visited Ralegan Sidhhi watershed and discussion with Shri Anna Hazare about success of sustainable watershed management and community participation on 16 September, 2018.
- Brief discussion with Chairman, KVK and all the staff of KVK, Patan on 20 September, 2018.
- Coordinated the visit of Cabinet Minister Smt Smriti Irani at KVK, Tapi on 21 September, 2018.
- KVK activities in different villages carried over by KVK, Tapi on 22 September, 2018.
- KVK, Anand and field activities in the village on 25 September, 2018.
- Inaugural function of Agriculture Technology Week at KVK, Thane on 2 October, 2018.
- Visited different farm entrepreneurs in villages facilitated by KVK, Thane on 3 October, 2018.
- Attended Kisan Mela at KVK, Satara-I on 23 November, 2018 along with Dr. V.P. Chahal, ADG (Agril Extension), ICAR, New Delhi.
- KVK activities in the field at KVK, Satara-II on 23 November, 2018.
- KVK activities in the field at KVK, Beed-I with Shri Abhay Mahajan, Organizing Secretary, DRI, New Delhi on 30 November, 2018.
- Scientist - Farmer's interface meeting organized by KVK, Latur in the village on 30 November, 2018.
- KVK, Dahod on 02 December, 2018 and field activities visited in the villages.
- Farmers Goshthi on Integrated Farming System and Doubling Farmers Income organized by KVK, Panchmahal on 03 December, 2018.
- World Soil Day on 05 December, 2018 at KVK, Narayangaon.
- Visited KVK, Rajkot-I on 06 December, 2018.
- Visited different units and farms of Pargaon, Khutav and Dombewadi villages and interacted with innovative farmers on 21 December, 2018.
- Visited KVK, South Goa on 14 January, 2019.
- KVK, Bajwa (Najafgarh) with Director, ICAR-ATARI, Jodhpur on 30 January, 2019



### Interview Conducted at KVKs

- KVK, Latur for the post of SMS (Horticulture), SMS (Agril. Engineering), SMS (Agronomy) and Driver on 12-13 April, 2018.
- KVK, Thane for selection of Programme Assistant (Computer Science) and Programme Assistant (Farm Manager) on 17-18 April, 2018 at Mumbai.
- KVK, Amravati-II for selection of SMS (Agronomy) on 27 May, 2018.
- KVK, Pune-II for the post of Senior Scientist & Head and SMS (Plant Protection) on 10 July, 2018.
- KVK, Satara-I for SMS (Horticulture), SMS (Home Science) and Programme Assistant (Computer) on 4 & 5 August, 2018.

- KVK, Mehsana for the post of Senior Scientist and Head on 20 September, 2018.
- KVK, Nashik-II for the selection of Senior Scientist and Head at Nashik on 26 October, 2018.
- KVK, Buldhana-I for the post of Senior Scientist & Head; Driver and Skilled Supporting Staff during 3-4 November, 2018.
- KVK, Akola for the post of Senior Scientist & Head and SMS (Agronomy) on 5 November, 2018.
- KVK, Beed-I for the post of Senior Scientist and Head, SMS (Home Science), SMS (Animal Science) and Farm Manager during 29-30 November, 2018.
- KVK, Kolhapur-II for the selection of Head and Senior Scientist and SMSs (6) of different disciplines during 15-17 December, 2018.
- KVK, Akola for the post of Stenographer and Driver on 16 February, 2019 at Akola.

### SAC Meetings Attended

KVK, Nashik-I (25 May, 2018); KVK, Aurangabad-II (14 June, 2018); KVK Jalna-I (15 June, 2018); KVK, Nandurbar (20 August, 2018); KVK, Washim (29 August, 2018); KVK, Hingoli (31 August, 2018); KVK, Solapur-I (04 September, 2018); KVK, Baramati (6

October, 2018); KVK, Malegaon (25 October, 2018); KVK, Akola (5 November, 2018); KVK, Nanded-II (19 November, 2018); KVK, Surendranagar (06 December, 2018); KVK, North Goa (15 January, 2019); KVK, Narayangaon (25 February, 2019); KVK, Solapur-II (20 March, 2019).



### SAC Meetings conducted by KVKs

Sr. No	KVK	Date	Sr. No	KVK	Date
1	Ahmednagar-II	28-02-2019	34	Kolhapur-II	05-03-2019
2	Amaravati-II	11-06-2018	35	Jalna	15-06-2018
3	Aurangabad-I	27-02-2019	36	Ahmedabad	11-03-2019
4	Aurangabad -II	14-06-2018	37	Amreli	26-03-2019
5	Beed-II	22-01-2019	38	Anand	11-03-2019
6	Bhandara	10-07-2018	39	Banaskantha-I	09-05-2019
7	Buldhana-I	14-04-2018	40	Banaskantha-II	09-05-2019
8	Buldhana-II	16-08-2018	41	Bharuch	08-03-2019
9	Chandrapur	11-07-2018	42	Bhavnagar	18-03-2019
10	Dhule	13-03-2019	43	Dahod	07-03-2019
11	Gadchiroli	11-07-2018	44	Dang	12-03-2018
12	Gondia	10-07-2018	45	Jamnagar	25-03-2019
13	Jalgaon-II	14-03-2019	46	Kheda	28-02-2018
14	Hingoli	31-08-2018	47	Kutch-I	18-02-2019
15	Kolhapur-I	20-03-2019	48	Kutch-II	11-04-2019



Sr. No	KVK	Date	Sr. No	KVK	Date
16	Latur	24-01-2019	49	Mehsana	21-01-2019
17	Nagpur	31-07-2018	50	Morbi	19-13-2019
18	Nanded-I	15-12-2018	51	Narmada	09-03-2018
19	Nanded-II	19-11-2018	52	Navsari	20-03-2019
20	Nundurbar	20-08-2018	53	Panchmahal	10-03-2019
21	Nashik-I	26-05-2018	54	Patan	22.02-2019
22	Nashik-II	25-10-2018	55	Porbandar	25-03-2019
23	Osmanabad	11-01-2019	56	Rajkot-I	09-03-2019
24	Parbhani	15-02-2019	57	Rajkot-II	19-03-2019
25	Pune-I	06-10-2018	58	Sabarkantha	14-05-2019
26	Pune-II	22-02-2019	59	Surat	20-03-2019
27	Raigadh	29-07-2018	60	Surendranagar	06-12-2018
28	Sindhudurg	10-10-2018	61	Tapi	16-03-2019
29	Solapur-I	04-09-2018	62	Vadodara	26-02-2019
30	Solapur-II	20-03-2019	63	North Goa	15-01-2019
31	Wardha	03-04-2018 09-07-2018	64	South Goa	22-02-2019
32	Washim	11-01-2019	65	Junagadh	29-03-2019
33	Yavatmal-I	09-07-2018			

### Capacity Building Programmes by Directorate of Extension of SAUs

In total, 39 training programmes were organized by different State Agricultural Universities like MPKV, Rahuri (16); VNMKV, Parbhani (1); PDKV, Akola (2); BSKKV, Dapoli (1); NAU, Navsari (1); AAU, Anand (1); SDAU, SK Nagar (3) and JAU, Junagadh (14) with the participation of 71 KVKs. In all 463 KVK officials

were trained and technologically empowered (Table 10.1). The major themes considered for the organization of capacity building courses were protected cultivation, advanced horticulture, fisheries, animal husbandry, home science and agricultural extension, etc. Several on site visits were made by the Directors of Extension Education of different SAUs along with their staff for facilitating and improving KVK activities.

**Table 10.1 Training Courses Organized for KVKs**

Name of SAUs	Name of the Training	No. of Training	No. of Participants	No. of KVKs
PDKV, Akola	HRD Training programme on Soil Testing and Nutrient Management, HRD Training on Agro based Entrepreneurship Development	2	33	10
VNMKV, Parbhani	HRD Training Programme on Food Processing & Value Addition	1	26	12
BSKKV, Dapoli	Training on IPDM in horticulture crops	1	14	7
MPKV, Rahuri	Zonal Agricultural and Extension Advisory Committee Meeting Kharif, Rabi and Summer -2018. Research Review Committee Meetings, Seed Production Planning Meeting, RKVY Farmer First Review meetings	16	44	16
NAU, Navsari	Workshop on "PRA tools and Techniques for SREP Development" in collaboration with EEI, Anand.	1	35	7

**Table 10.1 Training Courses Organized for KVKs**

Name of SAUs	Name of the Training	No. of Training	No. of Participants	No. of KVKs
AAU, Anand	Workshop for KVKs of Middle Gujarat at Extension Education Institute, AAU, Anand.	1	35	6
SDAU, SK Nagar	PFMS training, New Dimension in Agricultural Marketing, Training on Nematode management.	3	22	4
JAU, Junagadh	Bi Monthly Training Programme, Pre Seasonal Training Programme, Agriculture AGR-6	14	254	9
<b>Total</b>		<b>39</b>	<b>463</b>	<b>71</b>

State Agricultural Universities played an important role to review the KVK activities and also to enhance their capacity by organizing trainings, workshops and review meetings. In total 78 workshops/review meetings were organized with 2467 participants

belonging to 137 KVKs in Maharashtra and Gujarat states (Table 10.2). They helped in making close bond among other organizations/agencies working in the district. Such linkage and convergence are making difference in transforming farming community.

**Table 10.2 Workshop/ Meetings Organized**

Name of SAUs	Workshop/ Review Meetings	No. of Programs	No. of Participants	No. of KVKs
Dr. PDKV, AKOLA	Action Plan Workshop, Review meetings, Establishment of Incubation and Vocational Centre at KVKs	8	225	14
VNMKV, Parbhani	Action Plan Workshop	01	95	12
	Review Workshop of NICRA	01	28	05
BSKKV, Dapoli	Midterm review workshop of KVKs	2	16	4
	Annual Action Plan Workshop, Review meeting of KVK	1	17	4
	Workshop on CFLD on Oilseeds and Pulses of KVKs	1	153	52
MPKV, Rahuri	Annual Zonal Workshop during May 5-7, 2018. Action Plan Workshop for KVKs during March 7-8, 2019	2	342	16
NAU, Navsari	ATMA convergence meetings: Interface meetings, ZREAC meeting, Monthly Review meetings of KVKs.	17	660	7
AAU, Anand	SAC meetings, AGRESCO meeting, ZREAC meetings, Review meetings, Regional Committee meeting, Workshop on DFI.	14	182	6
SDAU, SK Nagar	Review workshops, Workshop on DFI, ZREAC meeting, etc.	19	364	8
JAU, Junagadh	National seminar on DFI, Review meetings & trainings.	12	385	9
<b>Total</b>		<b>78</b>	<b>2467</b>	<b>137</b>

### Convergence and Linkages

During the period under report, KVKs continued their linkages with different organizations and agencies while discharging their responsibilities as farm science centres at the district level. KVKs worked closely with most of state line departments for technology sharing through bi-monthly workshops, seminars, technology weeks, frontline demonstrations, field days, farmers-scientists interface and kisan goshti/ mela, etc.

Capacity building of extension workers was ensured through trainings, farm schools and farmer's field schools. Extension activities involved all stakeholders including media, local institutions, district administration and people's representatives. Diagnostic field visits and joint field visits with state line departments to farmers' fields were arranged to solve their problems. Technological backstopping to the farming community was extended by the KVKs.

**Convergence with ATMA:** Convergence with ATMA enabled KVKs to promote various technologies in their respective districts. KVK is being used as good platform to converge different developmental

schemes at district level. Altogether, KVKs participated in 3045 programmes of ATMA during the year and KVKs organized 2307 programmes in collaboration with ATMA (Table 10.3).

**Table 10.3 Linkage and convergence of KVK with ATMA**

No of KVKs	Programmes	Attended by KVK Experts (No.)	No. of Programs organized by KVKs
18	Agri-preneurs development	38	54
18	Animal health campaigns	28	31
21	Capacity development	38	43
41	Demonstrations	259	344
57	Exhibitions	109	73
42	Exposure visits	158	142
32	Extension literature	73	126
46	Extension programmes	581	399
36	Farmers field schools	239	129
57	Kisan melas	96	68
69	Meetings	640	183
10	Research projects	10	5
34	Soil health camps	72	104
30	Technology week	22	32
71	Training programmes	602	475
13	Video films	56	78
7	Watershed approach	24	21
602	<b>Total</b>	3045	2307

### Monitoring and Linkage Mechanism of KVKs

Monitoring of KVKs is being done at different platforms. It includes the visits of Cabinet/State Ministers, Zonal Monitoring committee, ATARI/SAUs, DAC/ICAR Institutes. Scientific Advisory Committee (SAC) members as formed in each KVK for suggestions and review of works in their area jurisdiction.

**External Funding Obtained:** External funding was obtained by the KVKs to organize various programmes and activities for benefitting the farmers and extension workers. Rashtriya Krishi Vikas Yojana (RKVY), National Horticultural Mission, projects of various ICAR Institutes and National Bank for Agriculture and Rural Development (NABARD) were the major agencies that funded/supported several KVK activities. Different Boards and Directorates also supported the KVK interventions.

### External funding received by KVKs through convergence and linkages

Name of external funding agency	No. of KVKs	Amount received (Rs. in Lakh)
Agricultural Technology Management Agency (ATMA)	14	75.0522
Department of Biotechnology, New Delhi	1	65.48
ICAR Institutes	2	9.155



Name of external funding agency	No. of KVKs	Amount received (Rs. in Lakh)
MANAGE, Hyderabad	6	80.0775
MANAV VIKAS	1	358.14
National Bank for Agriculture and Rural Development (NABARD)	2	14.60409
National Fishery Development Board (NFDB)	1	9.665
National Horticulture Board (NHB)	1	8.4
National Horticulture Mission (NHM)	4	27.431
National Skill India Council (NSIC)	1	1.5552
RARDS (NGO - KVK Host Organization)	1	0.8
Rashtriya Krishi Vikas Yojana (RKVY)	10	93.4924
Sponsored Programme by NGOs	1	0.74
State Agricultural Universities	2	13.5
<b>Total</b>		<b>758.09239</b>

### Monitoring Mechanism

Krishi Vigyan Kendra at District	Level-1	<ul style="list-style-type: none"> <li>Scientific Advisory Committee Meeting</li> <li>Visit by ATARI, SAUs, Line departments, other monitoring and reviewing committees</li> <li>Visits by local Member of Parliament (MP)</li> <li>Member of Legislative Assembly (MLA)</li> <li>People's representatives</li> </ul>
State Agricultural Universities (SAUs)	Level-2	<ul style="list-style-type: none"> <li>Review Workshops</li> <li>Interface meetings</li> <li>Joint visits by SAUs, ATARI and line departments</li> </ul>
State level	Level-3	<ul style="list-style-type: none"> <li>Review workshops</li> <li>Interface meetings with different stakeholders</li> <li>Meetings at Commissionerate / ATARI level</li> </ul>
Zonal level	Level-4	<ul style="list-style-type: none"> <li>Zonal workshop/ field visits with SAUs and line department officials, action plan workshop, zonal monitoring committee visits, midterm review workshops and online monitoring system</li> <li>National workshop of Krishi Vigyan Kendra, monitoring by national level committees/team, visits by DG, DDG, ADGs and scientists from ICAR head quarters</li> </ul>
National level	Level-5	<ul style="list-style-type: none"> <li>Divisional review meeting at ICAR, monitoring by cabinet/state ministers</li> <li>Quinquennial Review Team (QRT)</li> <li>Monitoring by external agencies/organizations (NITI Ayog, NELRD, IFPRI)</li> <li>Online monitoring through KVK portal</li> </ul>

## Publications

### Research Papers

- Lakhan Singh, Rajesh Bishnoi, Bankey Bihari, D. M. Kadam, Madan Singh, Anil Kumar Malik, S.S. Shrimali and Raman Jeet Singh (2019). Effectiveness of mKRISHI@ Personalised Advisory on Water and Soil (PAWS) in dissemination of agricultural information in north-western Himalayan region. **Indian Journal of Agricultural Sciences**, 89 (2): 246-52, February 2019.
- Trisha Roy, Suresh Kumar, Lakh Chand, D.M. Kadam, Bankey Bihari, S.S. Shrimali, Rajesh Bishnoi, U.K. Maurya, Madan Singh, M. Muruganandam, Lakhan Singh, SK Sharma, Rakesh Kumar, Anil Malik (2019). Impact of Pusa Hydrogel application on yield and productivity of rainfed wheat in North West Himalayan region. **Current Science** Vol. 116, No.7, 10 April, 2019.
- Shantanu Kumar Dubey, Ashok Kumar Singh, Lakhan Singh, Atar Singh, Vijai Kumar Kanaujia and Bhupendra Kumar Singh (2019). How crop diversification matter to small holders? A micro level evidence from Uttar Pradesh state. **Indian Journal of Agricultural Sciences** (Accepted of).
- Ishwar Singh, Jagannath Pathak, M.V. Mahajan, D.S. Nehte, Lakhan Singh (2018). Enhancing soybean yield through improved production technology under frontline demonstration in Madhya Pradesh and Maharashtra. **Journal of Community Mobilization and Sustainable Development**, Vol: 13, Issue: 3, 2018 pp. 442-446.

### Popular Article

- Bankey Bihari, Lakhan Singh, Rajesh Bishnoi and Suresh Kumar (2018). Innovative market mechanism. LIESA India, Vol. 20 no. 4, December 2018 pp 18-21

### Seminar/Conference Papers

- Lakhan Singh and S.V. Sonune (2019). **Impact assessment and socio-economic perspective of Kadwanchi watershed in Jalna district of Maharashtra**. Published in FFCSWR-2019 at Koraput, Odisha, pp. 137. Presented in Farmers First for Conserving Soil and Water Resources in Eastern Region (FFCSWR-2019) February 6-8, 2019 at Koraput, Odisha.
- Presented a paper on '*Role of Technology and Extension for Farming System Nutrition*' at MSSRF, Chennai during 'National Consultation on Leveraging Agriculture for Nutrition' on 29 July, 2018.

### Book Chapters/Bulletins

- Lakhan Singh and Rajesh Bishnoi (2019). Doubling Farmers Income through Frontline Extension. Book Chapter in *Extension Approaches for Agricultural Development*. Published by Biotech Books, New Delhi, Pages 15-30.
- Ashok K. Singh, Lakhan Singh, J.P. Sharma and Rashmi Singh (2018) *Managing Farm Level Stress*. Published by ICAR-ATARI, Pune, pp 62.
- P.K. Mishra, Lakhan Singh, Ambrish Kumar, D. Mandal, Rajesh Kaushal, Gopal Kumar, Trisha Roy (2018). *Soil and Water Conservation Bulletin No. 3/2018*, published by Indian Association of Soil and Water Conservationists, Dehradun.

### Annual Report

- ATARI-Pune Annual Report (2017-18). ICAR-Agricultural Technology Application Research Institute, Zone-VIII, Pune, pages 181.

### Publications by KVKs

- KVK staff published 203 research papers, 82 technical bulletins and 539 popular articles. KVKs have documented 401 extension literature, 2706 newspaper coverage, 47 books, 89 CD/DVD and 108 newsletters on various technological aspects of agriculture and its allied enterprises.

### ATARI Website Developed

- First time ATARI Website: [ataripune.icar.gov.in](http://ataripune.icar.gov.in). Mrs Sheetal Kakade, Programme Assistant, KVK, Satara-II associated in designing the website.

### Published at ICAR Website

- Operationalizing Farming System for Nutrition through KVKs on 24 April, 2018.
- Annual Zonal Workshop of KVKs of Maharashtra, Gujarat and Goa organized by ATARI, Pune on 5-7 May, 2018.
- Shri Mansukhbhai Mandaviya visits KVK-Bhavnagar on 24 May, 2018.
- Smt Smriti Zubin Irani reviewed KVK, Navsari on 1 June, 2018.
- Shri Prakash Javadekar reviewed the KVKs in Maharashtra on 23-24 June, 2018.
- Sensitization Workshop on "Preparation and Dissemination of Agromet Advisories at Block Level" on 6-7 July, 2018.
- Shri Parshottam Rupala interacted with farmers at KVK, Amreli on 13 August, 2018.

- Zonal Action Plan-cum-Review Workshop of NICRA KVKs in Maharashtra and Gujarat on 10-11 September, 2018.
- Union Textiles Minister reviewed the KVK, Tapi on 21 September, 2018.
- Shri Mansukhbhai Mandaviya reviews the KVK, Rajkot on 25 September, 2018.
- Global Farmers-Live Demos, Agriculture Exhibition and Conference organized on 3 January, 2019.
- ZMC Team Reviewed Livelihood Associated Changes through NICRA on 10 January, 2019.
- KRUSHIK Mela - 2019 at KVK, Baramati inaugurated on 17 January, 2019.
- Training Program on Developing Entrepreneurship in Floriculture organized at ICAR-ATARI & ICAR-DFR on 25 January, 2019.
- State Level Annual Action Plan Workshop of KVKs in Gujarat on 1-2 March, 2019.
- State Level Annual Action Plan Workshop on KVKs of Maharashtra and Goa organized on 15-16 March, 2019.
- Compilation of Special Days Celebrations Reports for 79 KVKs (PM Kisan Samman Nidhi Scheme - 68 KVKs; World Soil Day Programme- 76 KVKs; Swachhta hi Sewa Programme- 77 KVKs; Mahila Kisan Divas- 69 KVKs; Swachhata Pakhwada- 77 KVKs)
- Krishi Kalyan Abhiyan-I and II carried over in 6 aspirational districts benefited 4663 farmers.
- 8 Cabinet Minister's visit to 13 KVKs.
- Parliamentary Questions: Reports from concerned KVKs obtained and compiled.
- TSP report for 11 KVKs (quarterly and yearly compiled).
- Soil Health Card report: Soil samples tested and SHC cards distributed to the farmers.
- Quarterly Progress Report of 79 KVKs for 2018-19 obtained, compiled and edited at zonal level.
- Monthly Progress Report of 79 KVKs obtained and pursued to upload on KVK Portal.
- 41 Video Clippings prepared.
- Telephone Directory of 79 KVKs, DEEs, VCs, Directors in Zone VIII.
- MGMG Reports (14 ICAR institutes) compiled.

### Lectures Delivered

- Delivered lecture on 'Team Building and Achievement Motivation' during training program on Developing Entrepreneurship in Floriculture on 23 and 25 January, 2019.
- 'On Farm Trials - Concept, Problem Cause Analysis and Steps' during State Level Annual action Plan Workshop held at Navsari (1-2 March, 2019) and Baramati (15-16 March 2019).

### Radio Talk

- Live Telephone Question- Answer Program on 'How KVKs system works for farmers' answering to farmers doubt at All India Radio, Pune on 21 February, 2019 at 7.15-8.00 pm.

### Compilation/Documentation

- 57 Success stories on large scale adoption
- 21 Farm Innovations documented and compiled.
- Results of Cluster Frontline Demonstrations on Pulses-2018-19 compiled.
- Results of Cluster Frontline Demonstrations on Oilseeds-2018-19 compiled.
- Results of National Innovation on Climate Resilient Agriculture (NICRA)- 13 Centres for the year 2018-19.

### Awards and Recognition

- **Padam Shree Award** conferred to Shri Vallabh Bhai Vasrambhai Marvaniya of Junagadh (Gujarat) by auspicious hands of Hon'ble President of India on 11<sup>th</sup> March, 2019.
- **Zonal Best Award 'Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protsahan Puraskar'** conferred to KVK, Nandurbar (2018) by ICAR, New Delhi.
- **'Jagjivan Ram Abhinav Kisan Puraskar'** received by Shri Samir Mohanrao Dombe from Pune (Maharashtra) for the year 2018 conferred by the ICAR, New Delhi.
- **'Pandit Deen Dayal Upadhyay Antyodaya Krishi Puruskar'** received by Smt Vasav Ushaben Dineshbhai from Narmada (Gujarat) for the year 2018 awarded by the ICAR, New Delhi.
- **N.G. Ranga Farmer Award for Diversified Agriculture-2018** awarded to Shri Udhav Asaram Khedekar from Jalna (Maharashtra).
- Dr. Lakhan Singh obtained **IASWC Fellow Award-2018** conferred by Indian Association of Soil and Water Conservationists, Dehradun at ICAR-IISWC, Research Centre, Koraput on 06 February, 2019.



- Member, Institute Management Committee of ICAR-ATARI, Zone-VI Jodhpur for 3 years (2016-2019).
- Chairman, Institute Management Committee of ICAR-ATARI, Zone-VIII Pune, constituted for 3 years (2017-2020).
- Reviewer for Indian Journal of Agricultural Sciences, ICAR, New Delhi.
- Reviewer for Indian Journal of Soil Conservation.
- HRD Nodal Officer for preparing Annual Training Plan 2019-2020 for capacity development of ATARI staff and ICAR KVKs.
- Member Advisory Committee for International Conference on 'Doubling the Farmers Income



through Innovative Approaches' held at KVK, Baramati on 9-11 April, 2018.

- Vice Chairman, Zonal Monitoring Committee, NICRA.

### Farmers Awarded in the Zone

At different platforms, the farmers got recognition and awards through different agencies. ICAR institutes

(29), SAUs/State Govt. (207), Social Media (21) and NGOs/Banks (68) gave awards/certificate of appreciation for their innovative works in agriculture and allied aspects.

Name of KVK	ICAR/ Institute	State Govt./ SAU	Media	NGO/ Bank	Name of KVK	ICAR/ Institute	State Govt./ SAU	Media	NGO/ Bank
Ahmednagar I		1			Thane		2	1	2
Ahmednagar-II		3			Washim	1	1		
Akola		1	1	1	Yavatmal-I			1	
Amravati II	1	1	2	3	Yavatmal-II		1		
Aurangabad-I	2		1	5	Wardha				1
Aurangabad-II		1			Ahmedabad		15		
Beed-I			1	1	Anand		16		
Beed-II					Banaskantha I		1		1
Bhandara		3	2		Banaskantha-II		1		
Buldhana-I	2	2			Bharuch	2			
Buldhana-II	1				Bhavnagar		4		
Chandrapur		4			Gandhinagar		4		
Dhule		2		1	Jamnagar		2		
Dahod		1			Junagadh		2		
Gadchiroli	2				Kheda		5		
Jalgaon II	2	17		3	Kutch-I		12		
Jalgaon-I		14			Mehsana	1	2		3

Name of KVK	ICAR/ Institute	State Govt./ SAU	Media	NGO/ Bank	Name of KVK	ICAR/ Institute	State Govt./ SAU	Media	NGO/ Bank
Jalna	1	5	1	2	Morbi		1		
Latur			1	1	Narmada		16		
Nagpur		1			Patan		5		
Nanded II		7	1	1	Panchmahal		1		
Nanded-1		8			Rajkot-I		1		1
Nandurbar	5	1	2	32	Rajkot-II				2
Nashik -II		19			Sabarkantha		1		1
Nashik-I		4		1	Surat	1			
Osmanabad	1		1	1	Surendranagar		1		
Parbhani			1		Tapi	1		1	
Pune I		1		1	Vadodara		1		
Pune-II		1			Valsad		2		
Ratnagiri		5		2	North Goa	1			
Solapur-I		7	3	1	South Goa	2			
Solapur-II		1	1	1					

# Status of Budget and Staff

## Status of Budget

During the financial year 2018-19, an amount of Rs. 9355.33 lakh was utilized /released against the

allotted budget of Rs. 9358.46 lakh. Head-wise details of budget and expenditure are furnished in Table 11.1.

Table 11.1 Head-wise budget and expenditure of Zone VIII for 2018-19

(Rs. in Lakh)

Heads	RE 2018-19				Expenditure			
	ATARI	KVKs	Support to DEE	Total	ATARI	KVKs	Support to DEE	Total
Pay & Allowance	41.00	7689.00	0.00	7730.00	40.80	7689.00	0.00	7729.80
T.A	6.40	98.53	0.00	104.93	6.38	98.53	0.00	104.91
Contingencies	30.35	904.98	4.00	939.33	29.64	904.98	4.00	938.62
HRD	1.25	0.00	0.00	1.25	1.21	0.00	0.00	1.21
<b>Total</b>	<b>79.00</b>	<b>8692.51</b>	<b>4.00</b>	<b>8775.51</b>	<b>78.03</b>	<b>8692.51</b>	<b>4.00</b>	<b>8774.54</b>
<b>(B) Non-Recurring</b>								
Works	207.00	162.25	0.00	369.25	207.00	162.25	0.00	369.25
Furniture, IT & Equipment	11.65	146.95	0.00	158.60	9.51	146.95	0.00	156.46
Vehicle	7.10	48.00	0.00	55.10	7.08	48.00	0.00	55.08
<b>Total</b>	<b>225.75</b>	<b>357.20</b>	<b>0.00</b>	<b>582.95</b>	<b>223.59</b>	<b>357.20</b>	<b>0.00</b>	<b>580.79</b>
<b>Grand Total (A+B)</b>	<b>304.75</b>	<b>9049.71</b>	<b>4.00</b>	<b>9358.46</b>	<b>301.62</b>	<b>9049.71</b>	<b>4.00</b>	<b>9355.33</b>

## ICAR-ATARI Staff

### Research Management Position

- 1 Dr. Lakhan Singh, Director

### Scientific Staff

- 1 Dr. D.V. Kolekar, Scientist (Agril Extension) on additional duty from ICAR-ATARI, Bengaluru.

### Administrative Staff

- 1 Shri J. Mathew, Assistant Administrative Officer on additional duty from ICAR-ATARI, Bengaluru.
- 2 Shri R.S. Bhatt, Assistant Finance & Accounts Officer on additional duty from ICAR-DFR, Pune (upto 31 January, 2019).
- 3 Smt Vijaya A. Bhumkar, Assistant Finance & Accounts Officer on additional duty from ICAR-DOGR, Pune.





भाकृअनुप  
ICAR

भाकृअनुप-कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान  
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