वार्षिक प्रतिवेदन
Annual Report
2020

भाकृअनुप
ICAR

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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Contents

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Dr. Lakhan Singh
Director

Preface

Indian agriculture contributed 20 percent to Gross Domestic Product of India in the year 2020-21, highest among the recent years. Covid-19 calamity has affected many industries and sectors in India, however agriculture was the bright spot despite the difficulties. Agriculture and allied sector provide employment to 42% of workforce in India. Indian agriculture also nourishes 1.3 billion population of India and the surplus food is exported to other countries. India meet some of its demand of pulses and oilseeds through import from other countries.

Various government policies and programmes focus on increasing productivity of Indian agriculture, enhancing farmers' income, entrepreneurial opportunities to rural youths in agriculture and allied sectors. Indian Council of Agricultural Research (ICAR) through the network of research institutes, National Agricultural Research System (NARS) comprising of ICAR, State Agricultural Universities conducts research to provide new technologies in agriculture, horticulture, animal husbandry and allied sectors. The research outputs of these systems are then taken to the farming community via frontline extension systems of ICAR. Agriculture being the state subject the major responsibility of extension lies with state agriculture and allied departments.

KVKs (731) are managed by ICAR through 11 Agricultural Technology Application Research Institutes (ATARIs) in the country. ICAR-ATARI Pune looks after 81 KVKs in three states of Maharashtra (49), Gujarat (30) and Goa (2). In the current year 2020 KVKs activities are focussed majorly on the areas of micro-irrigation management, climate resilient technologies through NICRA project, CFLDs on Oilseeds and Pulses crop to showcase the potential and reduce the dependence on import. Other areas of focus have been enhancing farmers' income, promoting entrepreneurship among youths in agriculture, skill development, nutrition security among farm families through nutri-sensitive agriculture, poshan vatika, group approach through FPOs/FPCs, etc. KVKs also worked relentlessly in the Covid pandemic through use of communication platforms like google meet, zoom, facebook live, youtube channels, use of social media like twitter to reach the farmers virtually as physical interaction was restricted due to pandemic. I salute KVKs efforts and their zeal to serve the farming community in this challenging time. Some of our colleagues in the KVKs have lost their lives due to Covid, I offer my condolences to their family members and pray to god to give them courage for facing this toug situation.

ICAR-ATARI, Pune has brought out its fourth 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.

All the Heads of KVKs in the Zone provided full support and prompt response in reporting, deserve special thanks. Special appreciation is extended to Scientists (Shri Tushar Athare and Dr. Rajesh T); Shri R.B. Rai, AAO, ICAR-NRCP, Solapur; Mrs Priyanka, AAO, ICAR-ATARI, Pune; Shri Munish Ganti, AF&AO (NRCG, Pune) for all round support to the ATARI. I would like to appreciate the service rendered by contractual staff especially Anita Deshmukh, Sainath Kharat, Supriya Patil, Aarti Patole, Ganesh Chaware, Mahesh Jadhav and Sumaiyya Bano during compilation of the report. I also acknowledge the help of Shri Vinod Jadhav (KVK Pune-II) for finalizing format and designing graphs.

Date: May 16, 2022
Place: Pune

(Lakhan Singh)

कार्यकारी सारांश

कार्यकारी सारांश

कृषि प्रौद्योगिकी अनुप्रयोग अनुसंधान संस्थान, पुणे की मुख्य गतिविधियों एवं कार्यक्रमों का संक्षिप्त विवरण इस अध्याय में दर्शाया गया है। इसके अलावा 81 कृषि विज्ञान केन्द्रों द्वारा संचालित कार्यक्रमों को भी प्रतिवेदित किया है।

प्रशिक्षण कार्यक्रम

सभी कृषि विज्ञान केन्द्रों ने कुल 6813 प्रशिक्षण आयोजित किये, जिसमें 236562 कृषक, ग्रामीण युवक एवं प्रसार कार्यकर्ताओं ने भागीदारी की। महाराष्ट्र गुजरात व गोवा राज्यों में कुल 24098 ग्रामीण युवकों, 17215 प्रसार कार्यकर्ताओं तथा 195249 कृषकों/ग्रामीण महिलाओं ने प्रशिक्षणों में भाग लेकर लाभ उठाया।

प्रथम पंक्ति प्रदर्शन

जोन –8 के अन्तर्गत कुल 21250 प्रथम पंक्ति प्रदर्शन आयोजित कराये गये जिसमें से फसल (12436), मछली व पशुपालन (3278), अन्य व्यवसाय (3114), प्रक्षेत्र उपकरण (24512), आदि पर प्रदर्शन कराये गये। सभी कृषि विज्ञान केन्द्रों द्वारा कृषकों की आय वृद्धि हेतु, पोषण वाटिका व कृषि जलवायु समुचित तकनीकी प्रदर्शनों पर विशेष बल दिया गया।

तकनीकी मूल्यांकन

कृषि विज्ञान केन्द्रों द्वारा कुल 546 विभिन्न तकनीकीयों पर प्रक्षेत्र परीक्षण कराये गये। महाराष्ट्र, गुजरात व गोवा में 327 स्थानों पर 4838 कृषक प्रक्षेत्र परीक्षण आयोजित हुये। फसलों में लगभग 83% तकनीकीयों पर तथा 17% पशुपालन व मछली पालन पर मूल्यांकन किया गया। फसलों में विभिन्न प्रजाति मूल्यांकन (112), एकीकृत रोग प्रबंधन (88), आदि पर परीक्षण कराये गये। कृषकों की कृषि आधारित समस्याओं को हल करने हेतु मुख्य रुप से धान, चना, अरहर, सोयाबीन, मूँगफली, मिर्च, प्याज, टमाटर, आम इत्यादि फसलों पर कार्य किया गया। पशुपालन में नस्ल मूल्यांकन, पशु खाद्य प्रबंधन तथा रोग प्रबंधन पर किसानों की सहभागिता से परीक्षण किये गये। जोन के अंतर्गत कुल 546 तकनीकीयों पर 4838 कृषकों की भागीदारी के साथ प्रक्षेत्र परीक्षण आयोजित किये गये। महाराष्ट्र में 376 तकनीकी (3901 कृषक), गुजरात में 160 तकनीकी (878 कृषक) तथा गोवा में 10 तकनीकीयों पर 59 कृषकों की भागीदारी से तकनीकी मूल्यांकन किया गया।

प्रसार कार्यक्रम

जोन के अन्तर्गत सभी कृषि विज्ञान केन्द्रों द्वारा बृहद स्तर पर अनेक प्रसार कार्यक्रमों का आयोजन किया गया। मुख्य कार्यक्रम जैसे सलाह सेवाएं (24900), रोग – कीट पहचान भ्रमण (4204), प्रक्षेत्र दिवस (713), समूह परिचर्चा (2252), किसान गोष्ठी (593), फिल्म शो (1116), स्वयं सहायता समूह (215), किसान मेला (179), प्रदर्शनी (109), वैज्ञानिक भ्रमण (6105), पशु स्वास्थ्य शिविर (154), फार्म साइंस क्लब (81), पूर्व – प्रशिक्षणार्थी सम्मेलन (35), कृषक सेमीनार (527), विधि प्रदर्शन (1033), महत्वपूर्ण दिवस आयोजन (1041), एक्सपोजर विजिट (179) तथा अन्य गतिविधियों में 1747559 कृषकों एवं 33820 प्रसार कार्यकताओं ने भाग लिया। इसके अलावा 14194 प्रसार गतिविधियों में जैसे इलेक्ट्रोनिक मीडिया, प्रसार साहित्य, समाचार प्रकाशन लेख, रेडियो व दूरदर्शन वार्ता तथा मोबाईल द्वारा कृषक सलाह सम्मिलित किये गये।

बीज व रोपण सामग्री उत्पादन

तीनों राज्यों के कृषि विज्ञान केन्द्रों द्वारा 6138.29 कुन्तल बीज 538.12 कुन्तल जैव उत्पाद, 22.38 लाख पौध, 31.86 लाख संकर प्रजातियों की पौध सामग्री तथा 22.09 लाख फिंगरलिंगस, गाय, भैंस व बकरियों के बच्चे उपलब्ध कराने में प्रयास किया।

राष्ट्रीय जलवायु समुत्थान कृषि में परिवर्तन (NICRA)

कृषि जलवायु अनुकूल व प्राकृतिक संसाधन प्रबंधन हेतु महाराष्ट्र में 8 तथा गुजरात में 5 कृषि विज्ञान केंन्द्रों द्वारा 3060.05 हे. क्षेत्र पर 2704 कृषक प्रक्षेत्रों पर 40 गाँवों में कार्यक्रम चलाये गये। इसके अतिरिक्त 27 गाँव भी शामिल किये गये। गाँव कस्टम हाइरिंग सेन्टर के द्वारा 1427 कृषकों के द्वारा 97 कृषि उपकरण व मशीनों को 983.60 हे. क्षेत्र में उन्नत खेती करने हेतु उपयोग में लाया गया। इसके छोटे व मझोले किसानों को लाभ पहुंचा और सेन्टर ने 1.71 लाख रूपये के रुप में प्राप्त किये।

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

आर्या कार्यक्रम के तहत 12 कृषि विज्ञान केन्द्रों (महाराष्ट्र में नागपुर – I, नाशिक – I, उस्मानाबाद, पुणे – II, वाशिम व सोलापुर तथा गुजरात में राजकोट – I, भावनगर, खेडा, नवसारी, आनन्द व अमरेली) को चुना गया। कुल 730 ग्रामीण युवकों को

स्वयं का व्यवसाय आरम्भ करने हेतु प्रशिक्षण दिये गये। कुल 192 युवकों ने अपना व्यवसाय केन्द्रों की सहायता से शुरू किया है।

फार्मर फर्स्ट परियोजना (Farmer FIRST)

इस परियोजना के तहत कृषकों की वास्तविक प्रक्षेत्र व पारिवारिक परिस्थितियों को ध्यान में रखकर कृषि तकनीकी उपयोग, कृषक व वैज्ञानिकों के बीच सम्बंध एवं तालमेल, विभिन्न विभागों से समन्वयन तथा जीविकोपार्जन हेतु गतिविधियों का आयोजन किया गया। जोन –8 में जूनागढ कृषि विश्वविद्यालय, नवसारी कृषि विश्वविद्यालय तथा महात्मा फुले कृषि विद्यापीठ, राहुरी द्वारा यह कार्यक्रम संचालित किया जा रहा है। जूनागढ में 650 कृषक परिवार, राहुरी में 750 परिवार तथा नवसारी में 602 कृषक परिवारों को भागीदार बनाकर कृषक समस्या समाधान हेतु कार्यक्रम चलाये जा रहें हैं।

दलहनी व तिलहनी फसलों पर क्लस्टर प्रथम पंक्ति प्रदर्शन (CFLDs)

दलहनी व तिलहनी फसलों के उत्पादन व उत्पादकता बढ़ाने हेतु क्लस्टर रणनीति अपनाकर महाराष्ट्र व गुजरात के कृषि विज्ञान केन्द्रों द्वारा प्रथम पंक्ति प्रदर्शन आयोजित किये गये। दलहनी फसलों पर 6457 प्रदर्शन 2431 हे. क्षेत्र में आयोजित किये गये। तिलहनी फसलों में 5085 प्रदर्शन 1096 हे. क्षेत्रफल में कराये गये। मुख्य रूप से अरहर, चना, उर्द, मूँग, मूँगफली, सोयाबीन, तिल, अरंडी, अलसी, कुसुम आदि फसलों पर वैज्ञानिक तकनीकी अपनाने को कृषकों को प्रेरित भी किया गया।

पल्सेस सीड हब परियोजना (Pulses Seed Hub)

यह कार्यक्रम महाराष्ट्र में 8 कृषि विज्ञान केन्द्रों (जालना, धुले, सोलापुर–II, बीड–II, अकोला, बुलढाणा–II, जलगाँव–II व अमरावती–II) तथा गुजरात में 6 केन्द्रों (तापी, नवसारी, खेडा, राजकोट–II, पचमहल व दाहोद) पर गुणवत्तायुक्त दलहनी फसलों के उन्नतशील बीजों का उत्पादन करने हेतु आरम्भ किया गया। खरीफ में 1145.84 कुन्तल तथा रबी सीजन में 3795.77 कुन्तल बीज पैदाकर कृषकों में वितरित किया गया।

ट्राइबल सब – प्लान (Tribal Sub Plan)

भारत सरकार द्वारा जन जीतीय क्षेत्रों के कृषकों के विकास हेतु कृषि, पशुपालन, मुर्गीपालन, बकरी पालन तथा अन्य कृषि से जुड़े व्यवसायों से सम्बंधित कार्यक्रम ग्यारह कृषि विज्ञान केन्द्रों द्वारा चलाये गये। इन केन्द्रों पर प्रशिक्षण, प्रदर्शन, प्रक्षेत्र परीक्षण, बीज उत्पादन तथा आय बढ़ाने हेतु कार्यक्रमों पर विशेष बल दिया गया।

मानव संसाधन विकास गतिविधियाँ (HRD Activities)

अटारी पुणे द्वारा 22 कार्यशालाएं/ प्रशिक्षण आयोजित किये गये। इसके अलावा 69 वार्षिक / मिड–टर्म समीक्षा तथा बैठकों में भाग लिया। अन्य विभागों, अनुसंधान संस्थानों व विश्वविद्यालयों से तालमेल स्थापित किया गया। पोषण वाटिका, कृषक अन्वेषण, एफ. पी. ओ. गठित करने हेतु तथा महिला कृषक सम्बंधी गतिविधियों पर विशेष बल दिया गया। कृषि विश्वविद्यालयों द्वारा कुल 26 प्रशिक्षण आयोजित किये जिनमें 32 कृषि विज्ञान केन्द्रों से 104 वैज्ञानिकों/विषय वस्तु विशेषज्ञों ने भाग लिया। इसके अलावा 53 कार्यशालाएं व समीक्षा बैठकें आयोजित की गई जिसमें 546 प्रतिभागीयों ने प्रतिभागी की।

विशेष कार्यक्रम

कृषकों के विकास व कल्याण हेतु कृषि विज्ञान केन्द्रों के माध्यम से अनेक पहल की गई। 81 केन्द्रों द्वारा विश्व मृदा दिवस मनाया जिसमें 9098 कृषकों ने मृदा स्वास्थ्य के बारे में जानकारी प्राप्त की। मेरा गाँव मेरा गौरव (एम.जी.एम.जी.) कार्यक्रम के अन्तर्गत 633 गाँवों को अपनाया गया। 74 कृषि विज्ञान केन्द्रों द्वारा राष्ट्रीय महिला किसान दिवस मनाया जिसमें 590 महिलाओं ने भाग लिया। किसान विज्ञान दिवस 53 केविके ने मनाया जिसमें 6305 किसानो ने भाग लिया।

प्रकाशन

अटारी, पुणे द्वारा 5 बुक चैप्टर्स/बुलेटिन, कृषि विज्ञान केन्द्रों द्वारा 126 शोध पत्र, 15 तकनीकी बुलेटिन, 401 पॉपुलर आर्टीकल्स, 292 प्रसार साहित्य, 1858 अखबारों मे लेख, 06 किताबों, 58 सी.डी. /डी.वी.डी. तथा 31 न्यूजलेटर्स विभिन्न तकनिकी विषयों पर विकसित किये गये।

पुरस्कार/सम्मान

भारतीय कृषि अनुसंधान परिषद, नई दिल्ली द्वारा कृषि विज्ञान केन्द्रों व प्रगतिशील कृषकों को पुरस्कार प्रदान करने का प्रावधान है। कृषि विज्ञान केन्द्र, बीड–I (महाराष्ट्र) को जोनल बेस्ट एवार्ड पंडित दीन दयाल उपाध्याय राष्ट्रीय कृषि विज्ञान प्रोत्साहन पुरस्कार दिया गया। श्री पोपटराव पवार और श्रीमती. राहीबाई पोपेरे को पदम श्री पुरस्कार से सम्मानीत किया गया। इसके अतिरिक्त विभिन्न कृषि क्षेत्रों में सराहनीय कार्य हेतु कृषकों को सम्मानित किया गया।

Executive Summary

The Agricultural Technology Application Research Institute, Pune is 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. In this section, brief of activities has been reported.

Training Programmes

In Zone, VIII, 6813 courses were organized involving 236562 farmers, farm women, rural youth and extension functionaries. In all, 24098 rural youth, 17215 extension functionaries and 195249 farmers/ farm women participated in training programs conducted by KVKs of Maharashtra, Gujarat and Goa.

Frontline Demonstrations

A total of 21250 frontline demonstrations were organized related to crops (12436), fishery and livestock (3278), other enterprises (3114), farm implements (2451) etc. Special focus on enhancing farmers' income, nutri-sensitive agriculture, climate resilient interventions was given.

Technology Assessment

In total, 546 technologies were assessed by KVKs through 4838 on-farm trials conducted at 327 locations. About 83% technologies were experimented under crops, 17% under livestock, poultry and fishery enterprises. Under crops, technologies were assessed mainly in integrated nutrient management (85), integrated pest management (88), varietal evaluation (112), drudgery reduction (34) 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, 546 technologies were tested involving 4838 farmers. In Maharashtra, 376 technologies were assessed with active participation of 3901 farmers. In Gujarat, 160 technologies were experimented with involvement of 878 farmers. While in Goa, 10 technologies were tested involving 59 farmers. In Zone VIII, KVKs assessed 112 technologies on 4 thematic areas related to livestock and fishery components including disease management (10); evaluation of breeds (22); nutrition management (62) and production & management (18) through 1345 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 (24900), diagnostic visits (4204), field days (713), group discussions (2252), kisan gosthies (593), film shows (1116), self-help groups (215), kisan melas (179), exhibitions (109), scientist visit to farmers fields (6105), plant/animal health camps (154), farm science clubs (81), ex-trainees sammelan (35), farmers' seminars (527), method demonstrations (1033), celebrations of special days (1041), exposure visits (179) etc. with the participation of 1747559 farmers and 33820 extension personnel were performed. 14194 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 6138.029 q seeds of crop varieties, 63429 lit liquid and 53812.3 Kg solid bio-products, 22.38 lakh number of planting materials of varieties, 31.86 lakh number of planting materials of hybrids and 22.09 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 3060.05 ha area has been treated with NRM related interventions covering 2704 farmers' fields in order to build climate resilience in 40 villages benefitting 12649 farm families. In addition, 27 nearby

villages were included. In respect of custom hiring centres, 1427 farmers of NICRA villages have used 97 various implements to cultivate 983.60 ha area for timely sowing and other cultural operations. The revenue generated by these custom hiring centres was about Rs 1.71 lakh.

Attracting and Retaining Youth in Agriculture (ARYA) Project

Under ARYA project 12 Centres (In Maharashtra Nagpur-I, Nashik-I, Osmanabad, Pune-II, Washim and Solapur-I whereas in Gujarat, Rajkot-I, Bhavnagar, Kheda, Navsari, Anand and Amreli) took up initiative to empower youth in rural areas to take up agriculture and allied and service sector enterprises for gainful employment in selected districts. Total of 730 rural youths were involved in enterprise based modules. Agriculture and allied products based enterprises were started by 192 youth under ARYA project implemented by KVKs 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) were 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, 8617 demonstrations were laid out in cluster mode on 3232.60 ha area.

Cluster Frontline Demonstrations on Oilseeds were implemented to enhance productivity of oilseeds. Groundnut, sesame, soybean, niger, castor, linseed, safflower and rapeseed and mustard crops were covered by the KVKs in selected districts of Maharashtra and Gujarat. A total of 4641 cluster frontline demonstrations were conducted in an area of 1702.40 ha.

Pulses Seed Hub Project

Pulses Seed Hub Project is being implemented at 8 centres in Maharashtra (Jalna-I, Dhule, Solapur-II, Beed-II, Amravati-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 1145.84 q was achieved against target of 2607 q. In case of rabi season, seed production of 3795.77 q was attained against fixed target of 5537.8 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 transformation.

HRD Activities

Twenty-two workshops/trainings, participation in 69 annual/mid-term review workshops, trainings, meetings and interactions were organized and attended. 19 Linkage and coordination with different line departments, research institutions and SAUs was strengthened. Special focus on farm innovations, processing & value addition, organic farming, organizing farmers was given.

Special Programs

Kisan Vigyan Diwas (53 KVKs) benefitted 6305 farmers; World Soil Day (81 KVKs) attended by 9098 farmers; MGMG adopted 633 villages and Rashtriya Mahila Kisan Diwas Celebration (74 KVKs) benefitted 590 participants.

Publications

Four book chapters/bulletins, 3 research papers and 5 seminar papers were published at ATARI level. KVK staff published 120 research papers, 15 technical bulletins and 401 popular articles; KVKs have documented 292 extension literature, 185 newspaper coverage, 6 books, 58 CD/DVD, 48 video clip and 31 newsletters on various technological aspects of agriculture and its allied enterprise.

Chapter 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 722/727 same no in pneback & introduction 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. Besides monitoring of KVKs, ATARI is mandated for research in extension. 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.

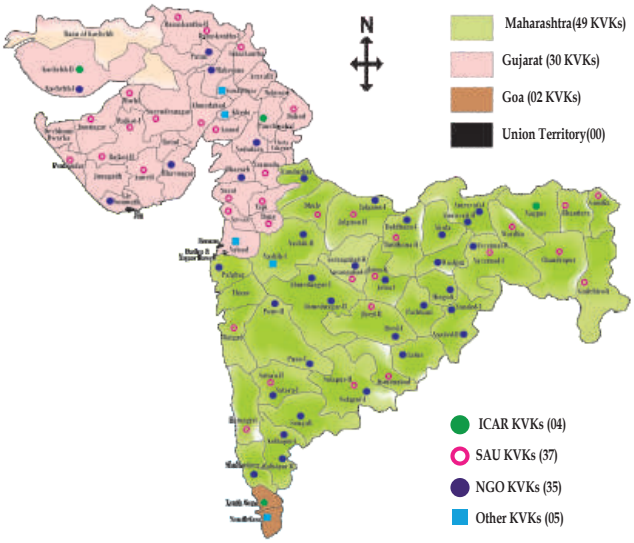
KVKs in Zone VIII, ATARI, Pune

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. The state-wise distribution of KVKs is given in Table 1.2.

Table 1.2 State and host organization wise KVKs

States	Host Organizations						
	SAUs	NGOs	ICAR	DUs	OUs	SDA	Total
Maharashtra	19	28	01	-	01	-	49
Gujarat	18	07	02	03	-	-	30
Goa	-	-	01	-	-	01	02
Total	**37**	**35**	**04**	**03**	**01**	**01**	**81**

Network of KVKs in ICAR-ATARI, Pune



Krishi Vigyan Kendra (KVK)

Krishi Vigyan Kendra is a frontline extension model at district level, designed and nurtured by ICAR to disseminate frontier technologies, capacity building of different stakeholders and to provide feedback to different research, extension and policy framework organizations. Expectation from KVK has been raised from each corner. The confidence of the farmers has also 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 management. The KVKs used to work in pandemic and difficult situations.

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.

Activities of KVK

- 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.

Special Attainments

Zonal Review and Action Plan Workshops

Online Annual Zonal Workshop of 81 KVKs of Maharashtra, Gujarat and Goa organized

The ICAR-Agricultural Technology Application Research Institute, Pune, Maharashtra organized three-days *"Online Annual Zonal Workshop of 81 KVKs of Maharashtra, Gujarat and Goa"* from 10th to 12th July, 2020. Applauding the KVKs' efforts, the Chief Guest, Shri Kailash Choudhary, Union Minister of State for Agriculture & Farmers' Welfare stressed on the crucial role of the entire NARS and KVKs system for doubling the farmers' income by 2022. The Minister iterated on the need for transforming the agriculture sector into business mode. He also urged for popularizing the Farmers' Producers' Organizations (FPOs) for becoming self-dependent and harnessing the strength of working together. Shri Choudhary stressed on revolutionizing the agricultural sector through value-addition, post-harvest technologies, value-chain management, producing, exporting quality products for achieving the targets of "Atmanirbhar Bharat Abhiyan". For this, he urged the KVKs to undertake need-based enterprises for empowering the farming communities across the nation.

Dr. Trilochan Mohapatra, Secretary (DARE) & Director General (ICAR) applauded the advisories issued by the Krishi Vigyan Kendras during the COVID-19 crisis. Highlighting about the increase in demand of the KVKs due to their more visibility in the districts, Dr. Mohapatra emphasized on doing proper analysis of the identified villages towards doubling the farmers' income based on their benchmark surveys. He also urged the State Government to follow the doubling the farmers' income strategy. The Director General stressed on micro irrigation, onion, garlic, castor, seed spices, horticultural crops, post-harvest processing, multi-layering cropping and value-addition that can help in enhancing the farmers' income.

Dr. Ashok Kumar Singh, Deputy Director General (Agricultural Extension), ICAR highlighted the need of speciality agriculture, local marketing mechanism of fruits and vegetables, AMUL based cooperatives, IFS models in scarce condition, etc. He also appreciated the culture of organizing the farmers in Maharashtra through commodity-based FPOs/FPCs. Dr. Singh urged the KVKs to give thrust on developing nutritional gardens at KVKs and villages, involving Anganwadi workers for making Kuposhan Mukta Villages. Dr. K.P. Viswanatha, Vice-Chancellor, Mahatma Phule Krishi Vidyapeeth, Rahuri stressed on undertaking the futuristic challenges along with infrastructure at the KVKs. He suggested the utilization of the Strategic Research and Extension Plan

for understanding the priorities and implementing farm diversification including livestock components for enhancing the farmers' income.

In the Plenary Session, Dr. V.M. Bhale, Vice-Chancellor, PDKV, Akola stressed on crop planning at the District level, facilitating FPOs, bio-agents production units and marketing. Dr. V.P. Chahal, ADG (Agricultural Extension), ICAR highlighted the need to strengthen convergence with other agencies to get financial support, constitute a team of excellence at Directorate of Extension Education level and production of organic inputs. Shri Atul Jain, Member, NITI Aayog Standing Committee on CSOs stressed on documenting the farmers' wisdom, folk songs, proverbs and beliefs.

Earlier, Dr. Lakhan Singh, Director, ICAR-ATARI, Pune, Maharashtra briefed about the Zone's achievements and highlighted the protected cultivation, crop diversification through sericulture, bee keeping, bamboo cultivation, successful cases of agri-entrepreneurs, innovative extension approaches followed by the farmers.

Annual Action Plan Workshop of 51 KVKs of Maharashtra and Goa

State Level Online Annual Action Plan Workshop of 51 KVKs was organized during 27-28 May, 2020. Dr. A.K. Singh, DDG (Agril Extension), ICAR, New Delhi urged the KVKs to change the way of working and maintaining the tempo and zeal to do work. Focus on secondary agriculture, floriculture, IFS model, marketing system and supply chain management was given. Each KVK expert should be multi-tasker and master of their own situation. He suggested building storage system like onion/garlic at household level. Each KVK should develop ideal model village for doubling farmers' income. Climate resilient technologies should be up-scaled in other areas. Convergence is the key for getting mutual benefits. Economic activities may be planned along with skill based trainings for migrant workforce.

Dr. K.P. Viswanatha, Vice Chancellor, MPKV, Rahuri (Maharashtra) stated that planning should be done meticulously considering area specific problems. Weekly planning, end to end planning, marketing intelligence, reduction in cost of cultivation should be focused at KVK level. Crop diversification will help in enhancing the farmers' income. He gave thrust on encouraging Farmers Producers Organizations (FPOs) for input sharing, direct marketing, supply chain management and exporting agro-products. Dr. S.K. Singh, Director, ATARI, Jodhpur emphasized on adopting problem solving approach, providing alternative solution and technology integration. Dr. Atar Singh, Director, ATARI, Kanpur advocated the KVKs to focus on nutri-rich minor millets, simple IPM modules for pulses/oilseed crops and developing functional demonstration units.

Dr. Lakhan Singh, Director, ATARI, Pune critically reviewed the work plan of the KVKs and urged to make contingency planning for combating distress situation. Precision farming, real time agro-advisory, advance input management, making KVK farm as profitable model to convince others, and developing mechanism to reach to unreached was focused.

State Level Action Plan Workshop for 30 KVKs of Gujarat

The ICAR-Agricultural Technology Application Research Institute (ATARI), Pune organized the ***State Level Action Plan-2020 Workshop for 30 KVKs of Gujarat*** at Gujarat Vidyapith, Ahmedabad during 13-14 February, 2020. The Chief Guest, Dr. Anamik Shah, Vice Chancellor, Gujarat Vidyapith, Ahmedabad exhorted the KVK experts to give focus on doubling farmers' income especially small and marginal

farmers through skill oriented trainings and affordable technologies such as use of eco-friendly bio-pesticides, composting of farm waste for promoting organic farming, small millet production, efficient use of available water for irrigation. KVK are the backbone of frontline extension system of country, doing farmer centric, demand driven research to make the farmers fall into step with modern agricultural development. He also urged scientists of KVK to explore the possibility of rural marketing channels for the farmers producing on small piece of land in remote areas.

Dr. Lakhan Singh, Director, ATARI, Pune urged the Heads of KVKs to develop work plan addressing major problems of the farmers in their operational areas. Interventions for minimizing risk of frequent droughts, long dry spell, floods, severe insect/pest incidence on major crops should be designed. Activities may be planned on nutritional security, micro-irrigation, crop diversification, floriculture, vertical farming, water recycling, developing intergraded farming system models, agro-based enterprises, post harvest processing and value addition. Capacity building of farmers is needed on producing quality farm products for assured market and export. Suitable mechanism for reaching to unreached farmers may be developed at district level. Horizontal convergence needs special attention.

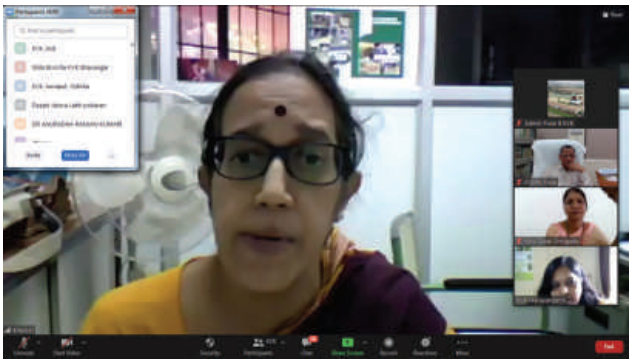
Director General, ICAR Inaugurated Webinar on Mahila Kisan Diwas

ICAR-Agricultural Technology Application Research Institute, Pune, organized a one-day Webinar on "*Women Farmers: Engineered a New Age Farming Transformations*" on the occasion of Mahila Kisan Diwas on 15.10.2020. In total, 590 farm women and Subject Matter Specialists (Home Science) attended the programme across the country.

In his inaugural address, Dr. Trilochan Mohapatra, Director General (ICAR) highlighted the impeccable works of farm women in India. He urged the KVKs to develop the database of women in farming and service sector of agriculture. He suggested organizing more awareness programmes about balanced food and different components of malnutrition. Getting right information on balanced food for farm women, children, adolescent boys and girls is essential. A strategy plan should be developed for reaching at household level towards implementing food and nutritional security programmes including poshan thali and nutrition garden etc. His major concern was on gender mainstreaming and drudgery reduction among farm women. Dr. Mohapatra emphasized on empowering rural women and creating various income generating options. He expressed that international conference with deliberations with experts should be planned in virtual mode

Dr. Ashok Kumar Singh, Deputy Director General (Agril Extension), ICAR applauded the role of KVKs for empowering farm women. His major focus was on identifying malnutrition problem in women and children, food consumption pattern, bio-fortified crops/varieties. Dr. Singh urged the KVKs to work on nutrition garden models, poshan thali, orienting anganwadi workers, taking it in campaign mode for producing quality food, round the year producing vegetables and nutritional security. He said that 703 KVKs organized training/awareness programmes for nutri-thali/poshan thali concept on 17 September 2020. Dr. Singh also emphasized on working for sustainability of different farming systems, combating malnutrition at household especially in rural areas, understanding climate change and its impact should be addressed at large scale linking with nutrition and at ground level. It should be into action with the efforts of KVKs and other institutions/ Ministries.

Dr. (Mrs.) R.V. Bhavani, Director (Agriculture-Nutrition-Health), MS Swaminathan Research Foundation, Chennai urged to address the problem of malnutrition in rural areas. She cited a case study of



Wardha highlighting dietary pattern, nutrition deficiency, under nourishment problem in children and women. She emphasized on growing bio-fortified crops for eating the balanced quality foods. Her major concern was to address the on-site nutrition dimensions, dietary diversity, developing farming system for nutrition model and organizing farm women for Kuposhanmukt Bharat.

Dr. Lakhan Singh, Director, ICAR-ATARI, Pune highlighted the various initiatives of women entrepreneurs in every sector of agriculture especially in marketing and establishing Farmer Producer Organizations (FPOs). He also urged the KVKs to develop more number of women entrepreneurs and helping to build the Aatmnirbhar Bharat. His emphasis was on capacity building and regular orientation towards new social initiatives for women farmers. Mrs. Swati A. Shingade, a woman entrepreneur urged the women farmers to put their efforts for group based farming. She emphasized on developing Farmer Producer Organizations (FPOs) for better market linkage for organic as well as other farm produce. She urged the women to utilize their inner strength.

e-Talk on Digital Platforms for Effective Outreach

A one-day e-Talk on "*Digital Platforms for Effective Outreach*" was organized on 29.8.2020. Dr. A.K. Singh, DDG (Agricultural Extension), ICAR urged the participants for following the pull method and synergize different digital platforms. Dr. Lakhan Singh, emphasized on using the social media to reach the last mile of the villages by using the different digital platforms, such as developing the different Mobile Apps, Facebook, WhatsApp, YouTube and messaging facilities for the need-based advisories. Various invited resource persons Dr. Saravanan Raj, Director, Agricultural Extension, MANAGE, Hyderabad, Dr. Sudeep Marwah, Head, Computer Applications, ICAR-IASRI, New Delhi, Dr. Rajarshi Roy Burman, Principal Scientist (Agricultural Extension), ICAR-IARI, New Delhi, Shri Shivaji Fulsunder, Ex-DDG, Sahyadri, Mumbai and Shri S.K. Joshi, Business Manager, ICAR-Directorate of Knowledge Management in Agriculture, New Delhi delivered their lectures on different topics. Around 160 participants virtually participated in the programme.

Virtual Sensitization Workshop on 'Transforming Animal Husbandry Sector'

The ICAR-Agricultural Technology Application Research Institute, Pune, Maharashtra and Krishi Vigyan Kendra, Kolhapur - II, Maharashtra jointly organized the "*Virtual Sensitization Workshop on Transforming Animal Husbandry Sector*" on 28.11.2020.

The Chief Guest, Dr. Vallabhbhai Kathiria, Chairman, Rashtriya Kamdhenu Aayog, Department of Animal Husbandry and Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, New Delhi urged the KVKs for establishing the holistic indigenous cow demonstration unit at the Centre. Emphasizing on the scope for entrepreneurship and employment generation in animal husbandry, Dr. Kathiria emphasized on sensitizing the farmers about the use of biopesticides / biofertilizers prepared from cow dung and urine. He accentuated on developing the various economic and sustainable models on desi cows in various dimensions, such as, milk production, bio-fertilizers production, etc. He also released an e-publication "Developmental Schemes of Animal Husbandry Sector" by ICAR-ATARI, Pune, Maharashtra during the occasion.

Dr. Ashok Kumar Singh, Deputy Director General (Agricultural Extension), ICAR stressed on establishing the extension network to strengthen the animal husbandry sector by integrating various stakeholders, such as entrepreneurs, incubators, different ICAR Institutes for developing an alarm system for any type of epidemics throughout the country. He emphasized on linking a group of animal husbandry experts in the KVKs with the Research Institutes and State Agricultural Universities at national level.

Dr. Bhupendra Nath Tripathi, Deputy Director General (Animal Science), ICAR stressed on the need for developing the different economy model for the animal husbandry sector and demonstrating the

various proven and location-specific technologies to the farmers. He emphasized on following the different veterinary practices, such as proper vaccination, deworming and providing area specific mineral mixture.

Shri S.P. Singh, I.A.S., Commissioner, Animal Husbandry, Government of Maharashtra highlighted the various government schemes for the farmers' welfare. He stressed on holistic development of the animal husbandry sector leading to produce more income generating options for the farmers. Dr. V.P. Chahal, ADG (Agricultural Extension), ICAR advised the KVKs for showcasing the best practices in animal husbandry and using social platforms for quick knowledge sharing.

Shri P.P. Adrushya Kadsiddheshwar Swami Ji, Chairman, Krishi Vigyan Kendra, Kolhapur-II, Maharashtra urged the KVK for demonstrating the best technologies of organic farming. He highlighted the role of different bio-formulations, such as, Jeevamrut, Gir Gokrupa Amrutam for farmers and their effectiveness in organic farming. Dr. N.H. Kelawala, Vice-Chancellor, Kamdhenu University, Gujarat emphasized on genetic improvement of indigenous breeds with the help of sex-sorted semen of highest quality and artificial insemination. He highlighted the need for managing the stray animals, increasing the number of female cattle in the herd, using the area specific mineral mixture, proper vaccination and deworming practices.

Dr. Lakhan Singh, Director, ICAR-ATARI, Pune, Maharashtra highlighted the animal husbandry sector's role in sustainable agriculture, developing livestock-based integrated farming system models and a regular source of income to the landless and small farmers. More than 450 Heads, Subject Matter Specialists, Programme Assistants of KVKs and Field Functionaries across India along with Directors/ Principal Scientists of 11 ICAR-ATARIs and Principal Scientists from the ICAR Headquarters also virtually participated in the workshop

Innovative Farmers Meet on "Farmers' Innovations for Prosperous Agriculture"

The ICAR-Agricultural Technology Application Research Institute, Pune organized the three-day *"Innovative Farmers' Meet - 2020" with theme of "Farmers' Innovations for Prosperous Agriculture"* at the Krishi Vigyan Kendra, Kolhapur-II, Maharashtra from 30th January to 1st February, 2020.

In his inaugural address, Dr. A.K. Singh, Deputy Director General (Agricultural Extension), ICAR expressed his concerns on the safe use of certified inputs for the crops, maintaining the natural resource and cow-based rural economy. Dr. Singh emphasized on using the quality microbial strains and formulation for farming by maintaining the number of beneficial insects. He urged for attracting and retaining the rural Youths in agriculture by developing different enterprise based models for regular income in the villages. The Deputy Director General opined for promoting the integrated farming systems, protected cultivation, high-tech horticulture, processing & value-addition and agro-based enterprises for the higher profit. He stressed on the need to develop the replicable and sustainable models of farming for doubling the farmers' income. He accentuated on the development of aggregation models for the farmers on commodity and community-based group farming linked with the FPOs that can help the farmers to prosper.

Dr. M.B. Chetti, Vice-Chancellor, University of Agricultural Sciences, Dharwad urged the Krishi Vigyan Kendras for converting more number of farmers into the organic farming and producing quality produce and promotion through market-led innovations. Dr. K.P. Vishwanatha, Vice-Chancellor, Mahatma Phule Krishi Vidyapeeth, Rahuri regarded the rural youths as the key drivers of Indian agriculture with their increased participation and future prospects in term of business. He emphasized on doubling the farmers' income with assured market prices of farmers' produces.

Dr. Lakhan Singh, Director, ICAR-ATARI, Pune highlighted the need of different innovations for commercialization and their proper utilization by the other farmers. He termed the innovative farmers as the link between formal and informal education. Dr.

Singh emphasized on documenting the various innovations for traditional wisdom. He urged the KVKs and farmers for developing more of farming models in respect of the visionary Prime Minister, Shri Narendra Modi for doubling the farmers' income.

Shri Adrushya Kadsiddheshwar Swami Ji, Chairman, Shri Siddhagiri-Krishi Vigyan Kendra, Kaneri, Kolhapur briefed about the programme of Innovative Farmers' Meet - 2020 and its fruitfulness for other farmers. Around 1,000 farmers and other extension officials participated in the meeting.

KRUSHIK-2020: Live Demonstrations and Agri-Expo at KVK, Baramati

The KVK, Baramati organized the *"5th Edition of KRUSHIK - 2020 - Live Demo & Agri Expo"* from 16th to 19th January, 2020. The Chief Guest, Shri Uddhav Thackeray, Chief Minister, Government of Maharashtra applauded the Agricultural Development Trust and Krishi Vigyan Kendra's efforts for such developments on the barren land. He mentioned about the vertical farming and aeroponic techniques in the urban area, etc. He also highlighted about the development of HMT variety of rice by a farmer from Chandrapur district.

Shri Sharad Pawar, Member of Parliament, Rajya Sabha highlighted about the new innovations in KRUSHIK exhibition. He urged for making the innovative techniques available for the farmers. He urged the young farmers to adopt the drip irrigation. Shri Ajit Pawar, Deputy Chief Minster, Government of Maharashtra; Shri Dada Bhuse, Agriculture Minister, Maharashtra; Shri Sunil Kedar, Minister of Dairy and Animal Husbandry, Sports and Youth Welfare Maharashtra along with other senior officials of Government of Maharashtra and ICAR Institutes were also present during the occasion.

The dignitaries visited the 110 acre farm of Live Demonstration of various crops, stalls of the exhibitors, Appasaheb Pawar Horse Competition at animal show. Dr. C.D. Mayee and Shri Suhas Joshi from Drought Action Network (DAN) guided the farmers regarding the next step of Drought Action Network.

The occasion also marked the launching ceremony of the DAN Website. More than 25,000 farmers participated in the event.

Zonal Review Workshop of NICRA KVKs of Maharashtra and Gujarat

The ICAR-ATARI, Pune organized the *"Zonal Review Workshop of National Innovations on Climate Resilient Agriculture (NICRA) KVKs of Maharashtra and Gujarat"* at the Krishi Vigyan Kendra, Ahmednagar - I during 2-3 January, 2020.

Director, ATARI, Pune emphasized on the need to scale-up the proven resilient practices and document the NICRA Villages' farmers' success stories. He urged to make the NICRA villages as the models for the climate resilience, doubling farm incomes, small farm mechanization, and low cost agriculture and integrated farming systems. Dr. J.V.N.S. Prasad, Coordinator, Technology Demonstration Component, ICAR-CRIDA, Hyderabad emphasized on the need for identifying the proven resilient practices based on the performance of the practices during the project period, the need for critical review of the performance of the village Institutions and also the agro advisories to improve them in the next phase of the programme.

The review of 3 Farmer FIRST centres (MPKV, Rahuri; JAU, Junagadh and NAU, Navsari) was also carried out during the occasion. The participants were also

provided with the exposure about the silage making, rain water harvesting, drip irrigation, low cost measure to know water stress in grapes, broad bed furrow, mulching in different crops, etc., in Rainfed area during the field visit to the NICRA village – Pimpri Lokai. A total of 40 participants representing Heads, Co-PIs and SRFs of 13 KVKs (8 KVKs from Maharashtra and 5 from Gujarat) participated in the workshop.

Global Farmers - Live Demos, Agricultural Exhibition and Crop Conference

KVK, Narayangaon organized the three-day "*Global Farmers - Live Demos, Agricultural Exhibition and Crop Conference*" at the Krishi Vigyan Kendra, Narayangaon, Pune from 9th to 12th January, 2020. In his inaugural address, Shri Dilipraoji Valse Patil, Minister of State for Excise & Labor, Government of Maharashtra emphasized on the latest knowledge and technology sharing. He urged for establishment of the Community Radio Station at the Centre in order to reach the farmers at the grassroots level. The Minister accentuated on making the efforts for combating the adverse effects of the climate change on the crop and animal husbandry. Shri Atul Benke, MLA, Junnar emphasized on the promotion of direct marketing to get good price for the produces. Smt. Ashatai Buchke, Member, Zila Parishad, Pune accentuated on the diagnostic services at the field level. While addressing the farmers on the present status and future prospects of sugar industries, Shri Shaikhar Gaikwad, Commissioner of Sugar, Maharashtra highlighted about the benefits that the sugarcane growers will get due to the cancellation of gate cane terms. Dr. DhananjayParkale, Additional Commissioner, Dairy & Veterinary, Government of Maharashtra outlined the opportunities present in the dairy industry.

During the Grapes Crop Conference, Dr. S.D. Sawant, Vice-Chancellor, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Ratnagiri accentuated on the adoption of the export oriented varieties of grapes for competing with the international market. He urged the farmers for adopting the technologies of grapes production under the polythene cover. Dr. R.G. Somkuwar, Director, ICAR-National Research Centre on Grapes, Pune underlined about the export qualities of grapes and bunch management technology during the winter season.

In his valedictory address, Dr. A.K. Singh, Deputy Director General (Agricultural Extension), ICAR expressed his concern on extending the diagnostics, quality input and advisory services to the farmers. Dr. Singh emphasized on the replication of the different models of integrated farming systems, protected cultivation, precision farming, horticulture nursery, processing & value-addition and agro-based enterprises among the farmers to enhance their income. The Deputy Director General urged the farmers for adopting the cluster farming with proper planning. He accentuated on the promotion of the technology of low cost wire rope net house among the farming community. Dr. Singh appreciated the effort of converting about 300 tribal women to Bee Keeping Entrepreneurs.

Dr. Lakhan Singh, Director, ICAR-ATARI, Pune highlighted the need to attract and retain the rural youth in agriculture, develop entrepreneurship, farming system nutrition, tap un-noticed farmers' innovations, showcase the latest crop varieties and models at the Krishi Vigyan Kendra. Dr. Singh urged the farmers to be vigilant about the incidences of insect-pest on crops, soil health and market avenues. Krishi Ratna, Shri Anil Meher, Chairman, Gramonnati

Mandal, Narayangaon, Pune outlined about the different demonstration units created at the Centre like technology cafeteria, backyard poultry, production & supply of urea briquette, bio-fertilizers, silage making, hydroponics, azolla, protected cultivation, etc.

Around 90,000 farmers and other extension officials visited 180 exhibition stalls on different aspects put up by the Krishi Vigyan Kendras, Department of Agriculture, ATMA, NHB, NABARD, RCF Ltd. FPOs and ICAR Institutes, etc.

Shri Parshottam Rupala inaugurates Dial-Out Conference on Kharif Crop Planning

Shri Parshottam Rupala, Union Minister of State for Agriculture & Farmers' Welfare inaugurated the Dial-Out Conference on "*Planning for Kharif Crops of South Gujarat*" organized by the Krishi Vigyan Kendra, Navsari on 16.5.2020.

Stressing on the promotion of doorstep marketing, the Minister urged the farmers to design the market model at the district level and form the Farmers' Producers' Organizations (FPOs) that can revolutionize the agriculture sector of the country. Shri Rupala applauded the farm women's participation in agricultural practices to make them self-reliant. He emphasized more on the herbal plants, bee keeping, packaging, branding, value-addition, organic products marketing and farmers' welfare schemes. The Minister also urged the farmers for following the agro-advisories issued by the ICAR during the Covid-19 pandemic situation.

Dr. Amitaben Patel, President, District Panchayat, Navsari, Gujarat stressed on the need for the technological empowerment of the farm women as they are actively involved in farming, livestock management and household based enterprises. Smt Prafulaben Desai, Board Member, Management, Navsari Agricultural University, Navsari accentuated to focus on the inclusion of the herbal crops in inter cropping system.

Dr. Lakhan Singh, Director, ATARI, Pune urged the farmers to be vigilant in crop husbandry. He stressed on developing the skills as per the need of identified enterprises. He urged the KVK for linking the rural youth with banks or relevant institutions for their business planning and financial support. Dr. Singh emphasized on training the rural youth for the on-site input management that will create employment opportunity in the villages. He accentuated on the promotion of the use of digital platforms / ICT tools in the area for effective knowledge sharing among the farmers and field level functionaries. The conference registered a total participation by 400 farmers including 300 farm women through telephonic calls.

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 and ATARI.

ICAR Network Research Projects

- Impact of ARYA on promotion of agri-preneurship and attractive livelihoods
- Impact of technological interventions of KVKs on socio-economic empowerment and sustainable livelihood security of tribal farmers
- Income enhancement through KVKs interventions under Doubling Farmers' Income programme
- Impact assessment of popular pulses varieties and technologies disseminated through Cluster Frontline Demonstrations of Pulses (CFLD-P) in India

- Impact of climate resilient technologies in different agro-climatic zones in India- A study in National Innovations in Climate Resilient Agriculture (NICRA) Project areas
- Assessing impact of nutri-small villages on dietary pattern, consumption level and food availability in India
- Analysis of agriculture and micro Irrigation programmes in aspirational districts in India
- New Extension Methodologies and Approaches (NEMA)

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)

Focussed Areas: Doubling farmers income, Nutrition garden, Promoting FPOs, Millets based interventions, Indigenous cow based demo units, Natural farming, Beekeeping, Protected cultivation, Drone technologies, Precision farming, Solar energy, Promoting climate resilient technologies, Quality seed & planting materials, Custom hiring centres, Climate smart villages, Digital platforms etc.

Chapter 2

Technology Assessment Through on Farm Trials

Technology Assessment

Technologies developed 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) are conducted in participatory mode involving farming community. During the reporting year, 546 technologies were assessed by KVKs through 4838 OFTs conducted at 327 locations. About 83% technologies were experimented in crops, 17% under livestock, poultry and fishery enterprises. Under crops, technologies were assessed mainly in varietal evaluation (112), integrated nutrient management (85), integrated pest management (88), drudgery reduction (34) 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 (22), nutrition management (62), production & management (18) and disease management (62) components.

Technology Assessment in Crops

In Zone, KVKs of Maharashtra, Gujarat and Goa organized on farm trials under 14 major thematic areas. Overall 546 technologies were tested involving 4838 farmers (Table 2.1). In Maharashtra, 376 technologies were assessed with active participation of 3901 farmers. In Gujarat, 160 technologies were experimented with involvement of 878 farmers. While in Goa, 10 technologies were tested involving 59 farmers (Table 2.2). Technologies under thematic areas of 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 taken up for assessment. Cereals, pulses, oilseeds, vegetables, fruits, cash crops etc. were covered under different thematic areas. State wise technologies tested under different components are given in Table 2.2.

Table 2.1 Thematic area wise technology assessment in crops

Sr. No.	Thematic Areas	No. of KVKs	No. of Technologies	No. of Trials
1	Cropping Systems	9	11	94
2	Drudgery Reduction	17	34	299
3	Farm Machineries	19	38	404
4	Integrated Crop Management	29	54	452
5	Integrated Disease Management	25	32	237
6	Integrated Nutrient Management	46	85	791
7	Integrated Pest and Disease Management	9	13	97
8	Integrated Pest Management	50	88	807
9	Nutritional Security	11	15	207
10	Processing and Value Addition	15	20	198
11	Resource Conservation Technology	18	19	116
12	Storage Technique	9	10	134
13	Varietal Evaluation	56	112	880
14	Weed Management	14	15	122
	Total	327	546	4838

Table 2.2 State wise technology assessment in crops

Sr. No	Thematic Area	Maharashtra			Gujarat			Goa		
		KVK (No.)	Techno. (No.)	Trials (No.)	KVK (No.)	Techno. (No.)	Trials (No.)	KVK (No.)	Techno. (No.)	Trials (No.)
1	Cropping Systems	6	8	77	3	3	17	0	0	0
2	Drudgery Reduction	17	34	299	0	0	0	0	0	0
3	Farm Machineries	18	36	394	1	2	10	0	0	0
4	Integrated Crop Management	20	38	370	9	16	82	0	0	0
5	Integrated Disease Management	12	17	162	13	15	75	0	0	0
6	Integrated Nutrient Management	26	48	545	20	37	246	0	0	0
7	Integrated Pest and Disease Management	6	7	76	3	6	21	0	0	0
8	Integrated Pest Management	33	66	679	17	22	128	0	0	0
9	Nutritional Security	11	15	207	0	0	0	0	0	0
10	Processing and Value Addition	12	15	158	2	2	15	1	3	25
11	Resource Conservation Technology	12	12	91	6	7	25	0	0	0
12	Storage Technique	6	7	118	3	3	16	0	0	0
13	Varietal Evaluation	33	63	624	21	42	222	2	7	34
14	Weed Management	9	10	101	5	5	21	0	0	0
	Total	221	376	3901	103	160	878	3	10	59

Assessment of Livestock Technologies

In Zone VIII, KVKs assessed 112 technologies on 4 thematic areas related to livestock and fishery components specifically disease management (10); evaluation of breeds (22); nutrition management (62) and production & management (18) through 1345 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	10	135
2	Evaluation of Breeds	16	22	275
3	Nutrition Management	40	62	745
4	Production and Management	15	18	190
	Total	79	112	1345

From Table 2.4, it could be observed that 91 technologies in livestock, poultry and fishery sectors were assessed through 1060 trials in Maharashtra. 19 Technologies through 275 trials were assessed in Gujarat, whereas Goa assessed 2 technologies through 10 trials.

Table 2.4 Livestock and fishery technologies assessment: State-wise

Sr. No	Thematic Area	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	8	95	2	2	40	0	0	0
2	Evaluation of Breeds	14	19	245	1	1	20	1	2	10
3	Nutrition Management	30	48	537	10	14	208	0	0	0
4	Production and Management	13	16	183	2	2	7	0	0	0
	Total	63	91	1060	15	19	275	1	2	10

Results of Selected On Farm Trials: Maharashtra

I. Varietal On-Farm Experiments

1. Performance of Garlic variety Phule Nilima in medium black soil: KVK-Ahmednagar-II

KVK Ahmednagar-II conducted a trial on varietal evaluation of Garlic in medium black soil of Newasa tehsil of Ahmednagar district. The local variety grown by the farmers has less fragrance, low yield and longer in duration. Hence KVK designed on farm trial on newly released variety Phule Nilima. The technology which was tested on farmers field gave 15.73% higher yield, besides that due to presence of good fragrance it fetches high market rate. The variety Phule Nilima could be harvested 18 days earlier in comparison of locally grown variety i.e. Jamnagar which matures in 154 days.

Technology Options	Days to maturity	Yield (q/ha)	Net Return (Rs./ha)	B:C Ratio	Fragrance
Farmers Practice: T1- Use of Local varietiy (Jamnagar)	154	71.2	101100.00	1.90	Good fragrance
Technological Option: T2 Improved High Yielding Variety -Phule Nilima	136	82.4	173930.00	2.52	Poor fragrance

2. Crop diversification to Castor crop under rainfed condition: KVK Pune-I

Castor oil is increasingly becoming an important bio-based raw material for industrial applications. Castor crop is cultivated in low rainfall areas where soil is not fertile. Currently Bajra crop is grown on large scale in district as rainfed crop in kharif season. Net benefit obtained from bajra cultivation is very low. After bajra, most of farmers are moving to eastern part of Pune in search of employment. Orientation training was conducted on castor cultivation. On farm trial was conducted at farmers' fields in participatory mode. The result of the on farm trial is given below.

Technology Assessed	Yield (q/ha)	No of irrigations	Days required for first Irrigation after sowing	Net Return (Rs./ ha)	BC Ratio
Farmers Practice T1 - Bajra sowing June 15, 2020 with spacing 45x10cm. Variety- ICTP-8203	20.4	1	25	22100	2.18
Technology option 2- T2 - Castor sowing August 15-30, 2020, Spacing 150 x 75 cm Variety DCH-519	26.3	1	45	59650	2.84

3. Assessment of improved Soybean variety Phule Sangam (KDS-726) and MAUS-612 in medium to deep black soils: KVK-Solapur-I

KVK, Solapur-I conducted on farm experiment to assess the suitable improved high yielding variety of Soybean KDS-726 (Phule Sangam) and MAUS-612. Variety Phule Sangam gave significantly higher yield of 26.50 q/ha as compared to 13.75 q/ha in variety JS-335. Higher net profit of Rs. 79,450/ha was obtained

due to use of Phule Sangam variety over other improved variety MAUS-612 (Rs. 72650/ha) and JS-335 (Rs. 30250/ha). Number of pods per plant were also recorded more in improved variety Phule Sangam (185-195) and MAUS-612 (165-175) as compared to farmers' practice cultivar JS-335 (65-78). Phule Sangam found tolerent to shattering after maturity and gave higher yield under high rainfall situation. It may be promoted in the area to increase profitability of the farmers.

Technology Option	No. of Trials	Yield (q/ha)	Net Returns (Rs./ha)	B:C Ratio	No. of pods /plant	Germination (%)
Farmers Practice T1- JS-335	15	13.75	30,250	2.22	65-78	76
Assessment T2-Phule Sangam (KDS-726)		26.50	79,450	3.99	185-195	84
Assessment T3-MAUS-612		24.75	72,650	3.75	165-175	86

4. Assessment on wheat varieties under late sown condition: KVK- Buldhana-I

Cultivation of LOK-1 variety under late sown condition (after 15 Nov) is a major reason for low wheat productivity in the district. To address this issue the old variety LOK-I was assessed with improved, high yielding and fortified variety PDKV-Sardar (suitable for late sown condition) and variety MACS-3949. PDKV-Sardar Variety (T2) had more no. of grains per Spikes (46.2) as compared to MACS-3949 (46.0) and LOK-1(42.0). The highest grain yield of 35.72 q/ha was recorded for PDKV-Sardar followed by 35.02 q/ha for MACS-3949 which was 17.42% and

15.21% higher than LOK-1 cultivar respectively. Higher net profit of Rs. 18471/ha was obtained with PDKV-Sardar variety.

Technology assessed	Plant height (cm)	Grains/Spike (No)	Yield (q/ha)	Net Return (Rs/ha)	B:C Ratio
T1-Farmer Practice variety LOK-1	60	42	30.42	13986	2.41
T2-Improved variety PDKV Sardar	57.2	46	35.72	18471	2.83
T3-Improved variety MACS-3949	57.4	46	35.02	17929	2.78

5. Assessment of different varieties of wheat (Triticum aestivum L.): KVK- Jalna-II

KVK, Jalna-II conducted on farm experiment to assess the suitable improved high yielding variety of wheat NIAW-1415 (Netravati) for timely and late sown condition. It was revealed that, the variety Phule Samadhan recorded significantly higher yield (42.65 q/ha) than variety Trimbak (39.59 q/ha) and NIAW-1415 (Netravati) (39.21 qt/ha). It is suitable for mechanical harvesting and late sowing. It may be promoted in the area to increase the profitability of the farmers in rainfed as well as irrigated situation.

6. Assessment of new variety of Turmeric (IISR – Pragati & PTS 10 Vs Salem): KVK Nanded-I

KVK, Nanded-I conducted on farm experiment to assess the high yielding variety of turmeric PTS-10. Variety PTS-10 gave higher yield of 40 t/ha as compared to variety ACS-48 (38 t/ha) and Salem (25 t/ha). Higher net profit of Rs. 365675/ha was obtained in PTS-10 variety over local cultivar Salem (Rs. 178175/ha). Curcumin % content was also higher by 7.26% as compared to farmers' practice. IISR-Pragati is short duration (180 days) and highly suitable for the areas where irrigation is serious problem.

Technology Assessed	Duration of crop (days)	Curcumin content (%)	Yield (tons/ha) Fresh rhizome	Net Return (Rs. / ha)
T1-Farmer practice- salem variety	270	4.75	25	178175
T2- New variety of turmeric 1 IISR Pragati (ACS-48)	180	5.02	38	238945
T3- New variety of turmeric- PTS-10	225	7.26	40	365675

7. Assessment of improved rice variety: KVK Sindhudurg

For direct seeding of rice under rainfed uplands, selection of variety is the most important factor responsible for optimal productivity. With the use of improved early and drought tolerant variety, the productivity of the crop can be enhanced. Keeping this in view, KVK conducted on farm trial to assess the performance of the improved drought tolerant rice variety Phule Samruddhi. The results showed that the yield of the assessed variety Phule Samruddhi was 41.09 q/ha which is 4.10 per cent higher over the farmers' practice (T_1). Whereas, Ratnagiri 6 varieties gave yiels of 43.6 q/ha.

Technology Assessed	Yield (q/ha)	Net Return (Rs/ ha)	BC Ratio
T1 – Farmer's practice : Cultivation of "Local var. Shubhangi"	39.47	3415	1.06
T2 – New improved var. Ratnagiri 6	43.6	32175	1.53
T3 – Improved variety "Phule Samruddhi"	41.09	26655	1.44

8. Assessment of High yielding hybrids of Chilli for improvement of yield: KVK Akola

Chilli is a one of the important spice crop of Akola district having an area of 270 ha with annual production 116 MT. The farmers planting improved, local and some hybrid varieties available in the market. The varieties available in the market gave low yield due to sucking pests and improper nutrient management by farmers. KVK assessed high yielding hybrids of chilli for yield improvement. Arka Shweta hybrid gives highest yield of 259.14 q/ha with more number of pickings followed by Arka Meghana (251.29 q/ha), Kashi Ratna (215.57 q/ha). Arka Shweta is having light green colour while Arka Meghana is dark green in colour showing better consumer acceptability in the market. These hybrids shown better field tolerance to leaf curl virus and sucking pests. In the first harvest farmer could harvest 1 to 1.5 kg per plant. Arka Swetha also gave highest net return among all varieties.

Technology Option	Spread (cm)	Pickings (No)	Height (cm)	Yield (q/ha)	Net Returns (Rs/ha)	BC Ratio
Farmer's Practice T1 – 1041 (Syngenta)	64.03	10	92.20	204.43	284357	3.28
T2 - Arka Meghana (IIHR, Bengaluru)	72.29	12	82.17	251.29	371571	3.83
T3 - Arka Swetha (IIHR, Bengaluru)	74.43	14	87.29	259.14	385500	3.90
T4- Kashi Ratna(IIVR, Varanasi)	72.57	11	83.03	215.57	303142	3.36

9. Assessment of Phule Sangam variety of soybean: KVK Satara-I

KVK conducted on farm trials to ascertain the improved cultivar Phule Sangam of soybean crop at farmers' fields. Phule Sangam performed well and gave 14.10 q/ha yield, 38.78% higher over existing variety JS-335 and 16.96% more than JS-9305 cultivar. Net return of Rs 21529/ha was obtained by the farmers which was almost double as compared to local check.

Technology Assessed	Pods/ plant (no.)	Weight of 100 grains (gram)	Yield (q/ha)	BC Ratio
T1 Existing variety JS 335	97	13.34	21.7	1.21
T2 JS - 9305	103	14.80	22.4	1.26
T3 Technology assessed- New variety Phule Sangam (KDS-726)	156	17.32	26.2	1.37

10. Assessment of performance of Phule Samadhan variety of wheat under irrigated condition: KVK Satara I

KVK, Satara-I conducted on farm experiment to assess the high yielding variety of wheat NIAW-1994 (Phule Samadhan) for timely and late sown condition. Variety Phule Samadhan gave higher yield of 47.34 q/ha as compared to variety HD-2189 (21.15 q/ha). Higher net profit of Rs. 45250/ha was obtained due to use of Phule Samadhan variety over local cultivar HD-2189 (Rs. 30125/ha). Panicle length was also recorded longer by 4.30 cm as compared to farmers' practice. Variety was found tolerant to shattering after maturity and chapati making quality is superior to local cultivar. Phule Samadhan variety has recorded 8% more yield over existing variety. It may be promoted in the area to increase profitability of the farmers under timely/late sown conditions.

Technology Interventions	Grains/ Ear head (no.)	Tillers per plant (no.)	Yield (q/ha)	B:C ratio
T1- Existing variety HD-2189	58	14	41.90	1.53
T2 -MACS-6222	76	19	44.70	1.68
T3 - Phule Samadhan (NIAW-1994)	87	22	47.34	1.75

II- Integrated Crop Management

11. Assessment of training & Pruning techniques on yield & quality of Capsicum under protected Cultivation: KVK-Pune-I

Major problems of low yield, poor fruit quality and higher pest and disease attack were affecting yield and quality of capsicum under protected cultivation due to improper training and pruning. To address this issue, KVK Baramati (Pune-I) conducted OFT in Kharif 2020-2021 on proper training and pruning techniques in capsicum. Farmers planted capsicum on raised beds, drip irrigation, fertigation with improper training and pruning techniques and maintaining 4-6 branches on main stem from ground level in Naturally Ventilated Polyhouse. The intervention resulted in higher net return of Rs. 3, 20,000/ha to the farmers. It also reduced disease, pest incidence by 29.3%, and higher weight of capsicum fruits by 30 gram along with 29.10% increase in the yield.

Technology Option	No. of Trials	Yield (q/ha)	Average Wt. of Fruit (g)	% Incidence of Pest & Disease	Net Return (Rs/ha)	B:C ratio
Farmers Practice (T-1) Improper Pruning Techniques with maintaining 4-6 branches on main stem at ground level. Raised beds, Drip irrigation and Fertigation with Naturally Ventilated Polyhouse	10 Trials (Area-10 R per trial)	505.2	160	29.14	8,00,000	1.5
Assessment of Technology Intervention (T-2) Proper Pruning techniques with Maintaining 2 branches on main stem from ground level. Raised beds, Drip irrigation and fertigation with Naturally ventilated Polyhouse.		652.4	190	10.2	11,20,000	1.7

12. Effect of seed treatment & soil test based fertilizer application, micronutrient application with and foliar feeding on growth and yield of soybean: KVK-Beed-I

KVK Beed-I conducted on farm trial to assess the effect of seed treatment with *Pseudomonas striate* to increase Zn efficiency. Soil test based fertilizer application reduces the cost of cultivation as well as foliar feeding mitigates the biotic & abiotic stress in soybean. Result showed that by the use of *Pseudomonas striate* in seed treatment along with biofertilizers & soil test based fertilizers application with use of 25 kg ZnSo4, spraying of 2% 19:19:19 and Potassium nitrate in moisture stress increased yield by 16.18% (29.48 q/ha) over local check (24.71 q/ha). Number of branches, number of pods/plant and seed weight were higher in trial plot as compared to local check.

Technology option	No. of trial	Yield (q/ha)	No. of branches	No. of pods/plant	Seed weight (gm/plant)	Net return (Rs/ha)
T1- Sowing of soybean + available fertilizer without seed treatment	10	24.71	15-17	153-159	11.40	73695
T2- Seed treatment with Psudomonas striata with bio fertilizers + STBF (30:60:60) + application of 25kg ZnSo4 + foliar feeding of 2% (19:19:19) & (13:00:45) in moisture stress condition & pod filling stage	10	29.48	19-20	218-225	14.60	91160

13. Effect of polythene mulching in chilli: KVK Beed-I

Chilli is a major crop cultivated in kharif and summer season. High temperature and heavy occurrences of sucking pest affects the yield. To overcome this problem, KVK Beed-I conducted trial to assess the effect of polythene mulching for growth and yield of chilli. At the time of flowering crop cover was removed for pollination. Result showed that by using polythene mulching yield was increased by 28.65% (238 q/ha) as against 185 q/ha in farmer's practice.

Technology Option	Height of plant(cm)	No. of branches/Plant	Av. yield kg/ Plant	Yield (q/ha)	Net Income (Rs/ha)	B:C Ratio
T1-Planting on bed with mulching	77.6	7.4	1.69	185	187000	2.0
T1 + Crop cover	115.2	11.2	2.2	238	300000	2.38

14. Assessment of the performance of direct seeded rice: KVK Gadchiroli

Paddy is a major food crop of Gadchiroli district. The farmers are facing labour scarcity problem in paddy sowing. To solve this problem KVK Gadchiroli conducted this OFT on 15 farmers' fields. The result of trials revealed that direct paddy sowing recorded better performance as compared to local check. Average yield (28.50 q/ha) obtained was higher as compared to farmer practices. Net economic gain of Rs. 68864/ha was realized under direct paddy sowing which was again found more than other alternative solutions.

Technology Assessed	Effective field capacity (ha/hr)	Field Efficiency (%)	Cost of transplanting (Rs/ha)	Yield (q/ha)	Net Return (Rs/ha)	B:C Ratio
T_1 - Manual Transplanting	0.015	98	5000	26.40	54240	2.70
T_2 - Direct paddy Sowing	0.25	71.26	1100	28.50	68864	3.65

15. Effect of polypropylene non-woven fabric row covers for improving fruit yield & reducing pest and disease risk in watermelon: KVK Nanded-I

KVK, Nanded-I laid out assessment on effect of polypropylene non-woven fabric row covers for improving fruit yield & reducing pest and disease risk in watermelon. On farm trials were conducted on 10 farmers' fields. Before trial, farmers were planting watermelon on mulching paper but they were not using poly propylene-non woven crop cover. Due to that, more attack of pest and disease on crops was observed increasing cost for control of sucking pest.

To address this problem, KVK conducted this trial. The yield of watermelon was increased by 38.89% over the farmer's practice with the good quality fruit production. The average yield obtained in trial plot was 25.00 ton/ha which was quite higher as compared to local check (18.00 ton/ha). The net return of Rs.190000/ha was recorded under treatment plots which was higher over local check (Rs.50000/ha).

16. Assessment of urea-DAP briquette technique and pair row planting of Finger Millet: KVK Nashik-I

Finger millet is a main food crop for tribal farmers of Nashik district and also emerged as an important nutritive cereal crop due to its high nutrient content. Thus, KVK conducted trial on assessment of urea-DAP briquette techniques and pair row planting in finger millet crop. It was observed that the yield of finger millet was increased by 58.12% over the farmer's. The average yield of 14.31 q/ha in trial plot was higher as compared to 9.05 q/ha yields in local check. The net return of Rs. 19152/ha was recorded under treatment plots which was higher over local check (Rs.8411/ha). The pair row plantation helps in aeration between the rows which helps in more shoot development. The yield has increased due to use of urea DAP briquettes due to slow release of fertilizer nutrient in sloppy and high fall areas.

Parameters	No of Tillers per plant	No of fingers per ear head	Length of finger in cm	Yield (q/ha)	Net Return (Rs/ha)	B:C ratio
T1- Farmers Practice: Traditional planting technique without use of fertilizer	1.5	6.1	7	9.05	19152	1.56
T2- Improved pair row planting technique with use of Urea-DAP briquettes	2	7.1	8	14.31	8411	2.06

17. Assessment of new RDF in the form of Fertigation in Turmeric: Kolhapur-I

Area under turmeric crop is increasing in Kolhapur district. In turmeric, farmers are using imbalanced fertilizers and observing low rhizome yield. Farmer's practice of soil application of fertilizers with broadcasting method is not giving good yields. Low fertilizer use efficiency due to improper fertilizer application leads to nutrient deficiency & resulted in low yield in Turmeric.

So KVK Kolhapur-I has started on farm trials in turmeric to increase the fertilizer use efficiency by applying 75% of RDF 150:75:75 NPK kg/ha dose in the form of fertigation through drip which is helpful to increase fertilizer use efficiency and reduce dose of fertilizer by 25% and increase in yield. 75% of RDF is given in 30 split application at weekly interval.

It was observed that application of 75 % RDF 150:75:75 NPK kg/ha in the form of fertigation through drip increases turmeric yield by 29.36%. Due to fertigation fertilizer use efficiency is increased which resulted in good crop growth and increase fresh rhizome yield and dry rhizome yield per plant of Turmeric.

Technology Assessed	No. of trials	Dry Rhizome yield (q/ha)	Fresh Rhizome yield (q/ha)	Dry Rhizome yield per plant in gm	Net Return (Rs. / ha)
Application of NPK 75% RDF 150:75:75 NPK kg/ha in the form of fertigation through drip through 30 splits at weekly interval	13	61.20	672.14	111.45	5,04,620
Soil application of 100% RDF 200:100:100 NPK kg/ha		47.54	524.32	87.60	3,71,700

18. Assessment of planting spacing in pre seasonal sugarcane settling planting on medium soils for improving the productivity and profitability of sugarcane: KVK, Ahmednagar-II

Ahmednagar is known as sugarcane bowl of Maharashtra and it was found during conducting participatory rural appraisal that dense planting with huge quantity seed material is the major problem of low productivity. 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 harnessing solar light, nutrient and water absorption which resulted in higher tillering as compare to 4 x 2 feet planting spacing which the farmers generally followed. And hence assessed technology resulted in higher yield of 116.60 t/ha as compared to 4 x 2 feet planting spacing (98.18 t/ha) in farmers practice. Net return of Rs.174137 / ha was obtained with 5 x 2 feet planting spacing as compare to local practice. This technology helped in minimizing seed requirement besides fast multiplication of newly released variety i.e. MS-10001.

Technology Option	No. of trials	No. of internodes/cane	No. of milliable canes/ha	Yield (t/ha)	Net return (Rs/ha)	B:C Ratio
Technological Option: 1 (150 cm row to row x 60 cm settling to settling spacing (4450 settlings per acre).)	13	32.20	88355.00	116.60	174137.00	2.57
Farmers Practice-120 cm row to row x 60 cm settling to settling spacing (5445 settlings)		27.30	77920.00	98.18	135304.00	2.29

III- Intergraded Nutrient Management

19. Use of Plant Growth Regulators to improve yield and quality of Kagzi Lime in hast bahar: KVK, Ahmednagar-II

Ahmednagar district has sizable area under citrus crop, in view of that KVK planned an on farm trial on citrus. Bahar management is very serious and technical issue in citrus and hence for hast bahar management a trial on plant growth regulator was laid out. In assessed technology Gibbrellic Acid @ 50 ppm was applied in the month of June afterward plant growth regulator cycocel @1000 ppm was sprayed in the month of September and finally in the month October KNO_3 @ 1% was sprayed. This results in increase in fruit weight, number of fruits/ tree and yield of citrus. The detailed results are given in the following table.

Technology Options	No. of fruits/plant	Fruits weight (gm)	Productivity (q/ha)	Net Return (Rs./ha)	B:C Ratio
Technological Option: 1 Spraying of GA_3@ 50 ppm in June, CCC @ 1000 ppm in September, and KNO_3@ 1% in October on kagzi lime.	1348	56.0	187.20	257170.00	3.38
Farmers Practice:- Imbalance use of Fertilizers (400:100:100 gms N:P:K/ plant), No bahar management, No use of Plant Growth Regulators	1158	47.0	163.40	215660.00	3.09

20. Effect of polythene mulching with soil test based INM method on growth and yield of Bt cotton: KVK Beed- I

KVK Beed-I conducted trial to assess the effect of polythene mulching with soil test based INM methods on growth and yield of Bt cotton. The trial was conducted on 10 farmers' fields for third year. Result showed that by using polythene mulching yield was increased by 32.83% (20.15 q/ha) as against 15.17 q/ha in farmer's practice. Spraying was reduced due to heat of polythene mulching which affect sucking pest. Weed infestation was reduced due to mulch. Number of branches, number of bolls and weights of bolls was higher. Water evaporation loss was also reduced.

Technology option	No. of trials	Yield (q/ha)	No. of branches	No. of pods/plant	Boll weight gm/plant	Net return (R/ha)
T1- RDF (100:50:50) kg/NPK/ha with planting of cotton on 4x1 or 5x1 feet spacing without polythene mulch	10	15.17	12-14	98-103	15.86	41375
T2- RDF (150:75:75) kg NPK/ha on soil test based fertilizer application with polythene mulching on 5x1 feet.	10	20.15	16-17	128-134	20.30	58250

21. Assessment of foliar application of multi macro and micro nutrients for higher productivity in sugarcane: KVK Sangli-I

KVK, Sangli-I conducted assessment on foliar application of multi macro and micro nutrient @ 5 lit/ha at 60 days and 7.5 lit/ha at 90 days each in ratoon sugarcane for increasing the yield and economic gain. The multi macro and micro nutrient foliar application gave higher yield of 157.5 t/ha as compared to farmer's practice (124.83 t/ha). The number of tillers and length of internodes were increased by 10.84% and 5.73% over the farmer's practice. In assessed practice, farmers got average net income of Rs. 2,07,833 per ha where as in farmer's practice it was Rs. 1,39,484 per ha. Foliar application of multi macro nutrient and multi micro nutrient may be promoted in the ratoon sugarcane for increasing yield and profitability in the area.

22. Assessment of feasibility of STCR equation on yield of Wheat: KVK Satara II

KVK, Satara-II conducted trial on feasibility of STCR equation in wheat crop with integrated nutrient management and application of recommended STCR in addition to RDF of N: P: K 120:60:40 kg/ha. Under this intervention, average yield of 23.06 q/ha was achieved which was higher over farmer's practice and also increased net return of Rs. 34850/ha was realized by the farmers under recommended dose of fertilizers.

IV-Integrated Pest Management

23. Assessment for the performance of different pheromone traps for monitoring and control of Pink bollworm in Cotton: KVK Ahmednagar-II

An on farm trial was conducted on rainfed medium soils of Shevgaon tehsil in Ahmednagar district. Cotton is major crop of the district and grown on 132400 ha area. The intensity of problem is 35-40% and yield losses is up to 55-60%. The technologies selected for assessment is installation of Pheromone traps of different producers for mass trapping as well as monitoring of pink bollworm moths i.e. Pest Control of India (PCI) @12 traps /ha and Innovative Bio Sciences (IBS) also @ 12 traps /ha. Farmers generally spray pesticides like Chloropyriphos @ 15 ml/ 10 lit of water. While taking the observation it was recorded that Pink bollworm adult catches / trap/day in PCI Traps were 5, and IBS 6 adults catched/day/trap. Use of different pheromone traps was found effective for monitoring and control of pink bollworm in cotton but traps of Innovative Bio Sciences are comparatively more effective than Pest Control of India traps and the yield was increased by 24.88% as compared to farmers practice Farmers feedback was that traps are highly effective for mass trapping of pink bollworm adults and also environmental friendly.

Technology Assessed	No. of trials	Number of Catches /trap/day	Number of boll infected /Plant	Yield (q/ha)	Net Return (Rs. / ha)
(Farmer's practice): No Traps	18	-	12.20	21.78	67290.00
Technological Option: 1 (Use of Pheromone Traps developed by Pest control India (PCI) Limited to 12 traps per hectare)		5	6.30	26.4	79150.00
Technological Option 2 : (Use of Pheromone Traps developed by Innovative Bioscience 12 traps per hectare)		6	4.12	27.2	96750.00

24. Assessment of multi resistant varieties for management of early blight, leaf curl and bacterial wilt in tomato: KVK, Ahmednagar-II

Tomato is grown as an important vegetable crop in the district. Low yield of tomato is due to occurrence of early and late blight, leaf curl and bacterial wilt. The intensity of these diseases is about 36, 25 and 8% respectively and economic yield losses are about 35-38%. OFT was conducted on improved multi resistant varieties released by ICAR-IIHR i.e. Arka Rakshak and Arka Samrat with local variety Rajesh of private seed company. This OFT was conducted in rainfed medium soils of Pathardi tehsil, the infestation of late blight was 62.50% in Rajesh, in Arka Rakshak 47.50%, and Arka Samrat is 58.75%, respectively. No early blight and leaf curl was observed till 55 days in any variety, the highest yield was observed in Arka Samrat of 140 q/ha, in Arka Rakshak 138.5 q/ha and 135 q/ha in Rajesh, respectively.

Technology Assessed	No. of trials	% Disease occurrence	Yield (q/ha)	Net Return Rs. / ha	B:C Ratio
Farmers Practice T1: Rajesh	09	Early Blight: 0 Late blight: 62.50	135	2012	1.01
Technological Option: T2 (Arka Rakshak)		Early Blight: 0 Late blight: 47.50	138.5	4150	1.02
Technological Option: T3 (Arka Samrat)		Early Blight: 0 Late blight: 58.75	140	7150	1.03

25. Management of mite in Citrus: KVK-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 lit of water by spraying after occurrence of pests, but not getting effective control of pest resulting in poor yield. The systematic use of the new generation miticide i.e Propergiate 57 EC @ 250 ml/200 liter of water, Neemark 5% and Sulphur 250 gm/200 liter of water at 15 days interval found to be effective for control of mites and increased yield. This OFT was conducted in rainfed medium soils of Pathardi tehsil. The application of Propagate, Neemark and sulphur achieved control of mites up to 82.5% whereas only 43.5% control of mites were seen in farmers plot. Management of citrus mite by using

Propergiate 57 EC along with sulphur and Neemark increased yield by 52 q/ha. Integrated use of Sulphur, Propergiate and Neemark found very effective in management of citrus mite during rabi season and yield was increased by 22.08%.

Technology Assessed	% incidence of Mite	Mite control efficiency (%)	Average Yield (q/ha)	Net Return Rs. /ha	B:C Ratio
Farmers Practice: Use of Sulphur 20 gm/ 10 Liter of water)	75	43.50	235.5	98875	1.27
Technological Option: 1 (Application of Propergiate 57 EC @ 250 ml/200 liter of water Neemark 5% and Sulphur 250 gm/200 liter of water)	73	82.50	287.5	156875	1.14

26. Wilt Management in chickpea by seed treatment with bio capsule based on nano technology: KVK Hingoli

Chickpea is the major crop of Hingoli district in rainfed/irrigated condition. Incidence of wilt disease in chickpea was prevalent in the area causing crop losses up to 15-20%. To solve this problem, the KVK conducted on farm trial at farmers' fields. Under intervention, seed treatment with Tricho and Rhizo Capsule @ 1 capsule for 30 kg seed performed better and wilt incidence was reduced 50% higher yield than farmer's practice. Net economic gain of Rs 65125/ha was also achieved. Under treatment 2 with seed treatment by Trichoderma 5 gm followed by Rhizobium 25 gm and PSB 25 gm per kg seed exhibited good result and lessened wilt attack and provided higher yield (14.25 q/ha). Bio capsules are very effective for wilt management and easy to apply in water stress condition.

Technology Option	No. of trials	Yield (q/ha)	Net Returns (Rs./ha)	Other performance indicators*
T1 –Farmer's practice -No seed treatment	10	12.00	35600	Wilting-15% Sterility-0% Germination-75%
T2- Trichoderma 5 gm followed by Rhizobium 25 gm and PSB 25 gm per Kg seed treatment		14.25	44900	Wilting-08% Sterility-0% Germination-82%
T3-Seed treatment- Tricho capsule (1 nos-1 gm) Rhizo Capsule (1nos-1 gm) for 30 kg seed(Variety- JAKI-9218)		18.00	65125	Wilting-02% Sterility-0% Germination-85%

27. Assessment for management of white grubs in sugarcane: Pune-II

Sugarcane is being cultivated on large area in Pune district. KVK Pune-II conducted on farm trial on reducing infestation of white grubs in sugarcane with collection of beetles, soil application of Metarhizium anisopliae, Entomopathogenic nematode *Heterorhabditis indica* are used for management of white grubs. The adults feed on foliage of host tree like neem. The best way to control white grubs is when the adult comes above ground and congregate in neem trees. KVK under took trial on use of light trap to collect the beetles on the very day of the receipt of summer showers and continue the collection for a week in month of May- June. It resulted in effective management of the pest and then the soil application of Metarhizium anisopliae 20 kg/ha in the month of June-July and need based application of

Entomopathogenic nematode, *Heterorhabditis indica* 10 kg/ha in the month of August-September. It was observed that the pest infestation was only 6.89% in treatment plots as against 16.66% in control plots. The yield obtained in demo plot of sugarcane crop was 105 t/ha. It was found that there was 16.67% increase in yield over the farmers practice.

Technology Assessed	Pest Infestation (%)	Yield (q/ha)	Cost of Cultivation (Rs/ha)	Net Return (Rs. / ha)
T1-Farmers Practice- Drenching of Chloropyrifos 20 EC 5 lit/ha. or Fipronil 0.3% GR 33 kg/ha	16.66	900	87600	146400
T2- Collection of Beetles in the month of May-June with the help of Solar Traps/ light traps.Soil application of Metarhizium anisopliae 20 kg/ha or Entomopathogenic nematodes (Heterorhabditis indica) 10 kg/ha	6.89	1050	90200	182800

28. Management of fall armyworm in Maize: KVK Sangli-I

Fall armyworm is one of the difficult insect pests to control in field corn. Low yield in maize was observed due the heavy attack of fall army worm. The intensity of pest was > 50%. The farmers are using chemical insecticides viz: Chloropyriphos @ 2ml per lit, Quinalphos @ 1.5 ml per lit and Cypermithrin 1 ml per lit water alternatively after occurrence of pests but not getting the effective control of pest which resulted in low yield. On Farm Trial was conducted on management of fall army worm *(Spodoptera frugipareda)* by judicious use of insecticides with Pheromone traps on 13 farmers' fields. For the control of fall army worm two spray of spinetoram 11.7% sc @ 0.5 gm/lit of water and larvae at 5% damage reduce hatchability of fresh laid egg spray 5% NSKE/ Azadiractine1500 ppm @ 5 ml/ lit of water and then to manage 2nd & 3rd instar larvae at 10 -20% damage two

spray of Spinetoram 11.7% sc @ 0.5 gm/lit of water for control of FAW on maize. The less infested plant/mt of Spodoptera frugipareda was observed under technology assessment (2) and in farmer's practice the more infestation of pests was recorded (7), respectively. Yield was increased by 57.14% and net return was recorded Rs.12660 per ha was achieved under this intervention.

29. Management of Fall Army worm (Spodoptera frugipareda) by judicious use of insecticides in Maize: Solapur-I

Low yield in maize was observed due to heavy attack (0.1-80%) of fall army worm. The intensity of pest is approximately >50%. The farmers are using chemical insecticides viz: Dichlorovas @ 2 ml and Quinalphos @ 1.5 ml per lit water alternatively after occurrence of pests but not getting the effective control of pest which results in low yield. KVK Solapur-I conducted on farm trial on management of fall armyworm (*Spodoptera frugipareda*) by judicious use of insecticides with Pheromone traps on 13 farmers' field on 5.2 ha area at Dhorale village in Barshi taluka. The use of Azadirectin 1500 PPM @ 5 ml/lit,

Thiamethxam 12.6% + Lymbda -cyhalothrin 9.5% @0.5 ml/lit, Emamectin benzoate@ 0.5gm/lit at 10-15 days interval found to be effective for management of *Spodoptera frugipareda.* The two spray of Spinetoram

11.7SC @5 ml /10 lit water at 15 days interval was found more effective for the control of *Spodoptera frugiparedain* maize. The less infestation of *Spodoptera frugiparedawas* observed in technology assessment T2 (9.52%) and in T3 (13.64). The more infestation of *Spodoptera frugipareda* was recorded (29.26%) in farmers practice. Therefore it was concluded that the technology assessment (T2) was superior among the all. Yield was increased by 25.80% over farmers practice.

Technology Option	No. of trials	% Infestation of *Spodoptera frugiperda* at seven Leaf stage to Flowering	Net Return (Rs/ha)	Yield (q/ha)	B:C Ratio
T1: Farmers Practice: Spraying of Dichlorovas 76% and Quinalphos 25EC	13	29.26	33151.0	31.82	2.39
T-2: Technology Assessed: i) Use of Pheromone traps @ 5/0.20 Ha ii) Two Spray of Spinetoram 11.7SC @5 ml /10 lit water at an 15 days interval		9.52	46107.0	39.65	3.07
T3: Technology Assessed: i) Use of Pheromone traps @ 5/0.20ha ii) Azadirectin 1500PPM @ 5 ml/lit iii) Thiamethxam 12.6% + Lymbda-cyhalothrin 9.5% @0.5 ml/lit vi) Emamectinbenzoate@0.5gm/lit		13.64	42217.0	36.71	2.80

30. Assessment of Arka Microbial Consortia & Micro nutrient foliar spray on Cluster bean in irrigated medium black soils: KVK- Solapur-I

KVK, Solapur-I laid out experiments at farmer's fields to assess the Arka Microbial Consortia & Micronutrient foliar sprays on cluster bean. Use of 10:26:26 @ 2 bag for 0.20 ha was the local check and use of AMC @ 4 lit for 0.20 ha was taken as assessed practice. The improved practice with use of AMC 4 lit + Micronutrient spray Zn, Fe @ 0.5% & Bo @ 0.2% for Cluster bean planted in kharif season at Sakat village of Barshi tehsil gave 58.06% higher yield than local check. Cluster bean being a short duration drought sensitive vegetable crop can give regular income to a small family. When we use the NPK consortia along with INM practices it reduces the cost of cultivation up to Rs. 15,000/ ha. When NPK consortia used as critical input, yield of Pods also increased by 58.06% over traditional practices. Pod showing early maturity having long length pods with attractive shining color and having more weight as compared to local check. More market demand was experienced to such pods compare to local check. The pods under T3 treatment were longer hence require less labours for plucking.

Technology Option	No. of Trials	Yield (q/ha)	Net Return (Rs/ha)	B:C Ratio	Av. No. of Plucking	Average yield per plant/season(gm)
Assessment- Use of AMC 4 lit + micronutrient spray Zn, Fe @ 0.5% & Bo @ 0.2% for Cluster bean	15	98.40	175190	3.35	27	116
Farmers Practice- Use of 10:26:26 @ 2 bag for 0.20 ha		62.15	96000	2.47	18	86

31. Management of Pink bollworm (*Pectinophora gossypiella*) in Bt cotton: KVK Buldana-I

Cotton is an important commercial crop in Vidharbha region of Maharashtra. Pink boll worm (PBW) infestation is major issue from last 2 to 3 years and near about 40-60% of PBW incidence occurred throughout season which reduces the cotton yield and quality. To overcome this problem, KVK Buldana-1 conducted on farm trial to provide effective management option for farmers. Results showed that Green boll damage was reduced from 22.45% to 8.75% and cost of plant protection reduced from Rs.7500/ha to Rs. 6250/ha under intervention (T2 and T3). Average yield of cotton 23.50 q/ha in T2 and 21.45 q/ha in T3, which was higher by 25.34% in T2 and 20.45% in T3 respectively over farmer's practice. Pheromone trap, plucking of rosette flowers and use of Azadiractin (300 ppm) was found effective for management pink boll worm in Bt cotton.

Treatment	Green boll damage (%)	Yield (q/ha)	Net income (Rs/ha)	Increase in yield (%)
T1 – 1 or 2 chemical pesticide sprays comprising of Chlorpyriphos 20 EC 30 ml, Triazophos 40 EC 30 ml and prophenophos 40 ml per 10 lit of water	22.45	18.35	37770/-	--
T2 – Installation of Pheromone Traps @2/acre for monitoring at square formation, Spray Azadirachtin 300 ppm @ 50ml/10 lit at flower initiation, 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 (Dr. PDKV, Akola)	8.75	23.50	66455/-	25.34
T3-1st spray propenophos 50EC @ 20ml at 60 DAS 2nd spray emamectin benzoate 5SG @ 4.4gm at 80 DAS and 3rd spray of Lambda cyhalothrin @ 10ml per 10 lit water at 100 DAS (VNMKV, Parbhani)	10.25	21.45	55935/-	20.45

VI- Integrated Weed Management

32. Assessment of effect of herbicides on weeds control in BT cotton. KVK, Ahmednagar-II

KVK, Ahmednagar-II laid out farm experiment to assess the performance of herbicides Pyrithiobac sodium 10% EC @ 0.075kg /ha + quizalofop ethyl 5% EC @ 0.05 kg/ha at 30 DAS 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 sole hand weeding (21.66 q/ha) which was followed in farmers practice. Net return of Rs. 58531 / ha was obtained with timely appropriate herbicide application. In assessed technology 5.40 gm/sqm weed dry weight was recorded 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)
Technological Option: 1 (Spray Herbicide- Pyrithiobac sodium 10% EC @ 0.075kg /ha + quizalofop ethyl 5% EC @ 0.05 kg/ha at 30 DAS)	13	5.40	73.57	6700.00	22.92	58531.00
Farmers Practice- Hand weeding and 1 Intercultural operation.		11.60	67.86	9500.00	21.66	52549.00

33. Weed Management in Maize KVK, Ahmednagar-II

KVK, Ahmednagar-II conducted an on farm experiment to assess the performance of herbicide Tembotrione 34.4% S.C @ 120gm/ha. In the assessed technology weed population of grassy and broad leaved weeds could be controlled by 70-80%. In assessed technology weeds controlled effectively with higher yield of 58.30 q/ha as compared to farmers practice in which 55.40 q/ha yield was observed. Net return of Rs.32031 / ha was obtained with timely herbicide application at proper stage in maize in tested technology.

Technology Option	No. of trials	Weeds dry weight at harvest (gm/sqm)	Cost on weed management (Rs/ha)	Yield (q/ha)	Net return (Rs/ha)	B:C Ratio
Technological Option: 1 (Spray of Herbicide- Tembotrione 34.4% S.C. at 3-4 leaf stage of weeds)	13	6.45	4625.00	58.30	32031	1.61
Farmers Practice- Hand weeding and 1 Interculturing operation.		10.24	7000.00	55.40	28738	1.55

34. Assessment of BSKKV Banana Ripening chamber for ripening of Banana Fruits: KVK Kolhapur-I

Area under banana crop is increasing in Kolhapur district. In Banana cultivation farmers face problem of ripening of banana in natural way and sale of raw banana fetches lowest cost. Farmers use traditional practice for banana ripening chamber which has reduced quality and shelf life of banana. So KVK Kolhapur-I has conducted on farm trials in banana

ripening for good quality as well as increased shelf-life of banana by use of BSKKV Banana Ripening technology with 100 PPM ethylene gas and treatment of biosafe 4ml/lit for 05 min, followed by ethylene gas spray 100 PPM for 8 hrs in ripening chamber. It was observed that use of BSKKV banana ripening technology and MPKV Rahuri treatment of 4 ml/lt biosafe resulted in increase in net profit, reduction in ripening time and uniform color which helps in fetching good economies return over the traditional practice. It was also observed that natural sweetness in banana was intact and after ripening 3 to 4 days banana remained in good condition.

Technology assessed	No of trials	Time required for banana ripening (hr)	Expenditure on ripening process (Rs)	Net returns Unit
Farmers Practice	20	70	5347	8374
Use of low cost BSKKV Ripening chamber for ripening of banana fruits.		25.4	704	16472

VII- Resource conservation technology

35. Management of water stress in soybean during dry spell: KVK, Nanded-I

Uncertainty of rainfall is major problem in Nanded district. To solve this problem KVK conducted on farm trial to manage water stress in soybean during dry spell at farmers' fields. The result showed that the spraying of potassium nitrate 1% @35 DAS and 2%@55 DAS gave higher plant height 81.12, 84.12, number of branches 12.25 & 12.46, number of pods/plant 60.2, 63.3 test weight 55.2, 57.5, yield 20.87, 22.2 respectively.

Technology Assessed	Plant height (cm)	Number of branches	Number of pod/plant	Test weight (gram)	Yield (q/ha)	Net Return (Rs./ha)
T1- Farmer Practice-Application of RDF (30:60:30 NPK/ha)	79.4	11.60	43.6	52.2	18.75	46800
T2-Technology Assessed- Spraying of potassium nitrate (13:0:45) 1%@35DAS	81.12	12.25	60.2	55.2	20.87	54390
T3- Technology assessed- Spraying of potassium nitrate (13:0:45) 2%@55DAS with RDF	84.12	12.46	63.3	57.5	22.2	59060

36. Performance evaluation of seed cum fertilizer drill machine (Rice grain Planter) for direct seeded rice: KVK Chandrapur

Mechanization facilities timely operations which is one of the major factors for attaining higher crop yields. Small and marginal farmers, accounting for a major chunk of the Indian farming fraternity, are still dependent on older method of crop cultivation like broadcasting of seed and fertilizers. KVK Chandrapur conducted on farm trials on performance of seed cum fertilizer drill machines to avoid the labour problem and results of the trials was

encouraging. The incremental increase in yield, net return and B: C ratio over traditional method of transplanting were 30qt/ha, 0.45 ha/hr, 80%and 15000/- with rice grain planter and 28qt/ha, 0.16 ha/hr, 60% and 20000/- with paddy drum seeder respectively. Thus the use of seed cum fertilizer drill increased the crop yield and net return as compared to the traditional method.

Treatments	Yield (q/ha)	field capacity (ha/hr)	Labour saving (%)	Cost of Cultivation	B:C Ratio
T1-Farmer practice- Traditional Method of Transplanting	23.75	0.22	-	25000	1.19
T2-- Technology assessed- Direct seeded rice with seed cum fertilizer drill machine (Rice Grain Planter)	30	0.45	80	15000	1.42
T-3-Technology assessed-Direct sowing with Paddy Drum Seeder	28	0.16	60	20000	1. 20

37. Performance of tractor drawn direct Seeder in onion for reducing the cost, drudgery and crop period: Nashik-I

Onion being a major crop of the district and especially small and marginal farmers are engaged in onion cultivation. Onion cultivation involves high labour, seedling transplanting & crops adversely affected due to water scarcity during maturity. To solve this problem KVK Nashik-I conducted this on farm trials for reducing the cultivation cost on 15 famers field. The result of the trial was large saving in the labour requirement by 95%, increased output by 83% and cost saving by 84% compared to the manual seedling raising and transplanting. Cost saving of 50% in seeds, 100% cost saving in seedling preparation and Transplanting as the seed are sown directly, Crop period saving of 25 days with saving in late irrigation during water scarcity was recorded. With the farmer's practice of manual onion seedling raising and transplanting the normal seed rate is 4 Kg/acre with

net return Rs.92625/ha. Whereas in the trial with commercially available direct onion seeder recommended by AICRP, FIM MPKV direct seeder, the normal seed Rate 2 Kg/acre with net return was Rs.115900/ha were obtained. However, depth and uniformity in seed placement varies with the skill of the driver and type of soil. Hence depth control mechanism is needed. For use of direct seeder cum basin former bed preparation need to be fine, skilled driver needed for depth control.

38. Assessment of tractor operated pruned Grape Twine mulcher for in-situ mulching: KVK Nashik-I

Grape is a commercial crop of the district and occupies prominent position in its shares in the district economy. Almost all the pruned twine removal in Grapes is done manually. These twines are normally decomposed for next season or burnt. With the use of Side Discharge Flail mover, large saving in the labour requirement by 92% was observed, machine has increased output by 84% and cost saving by 85% compared to the manual method of removal of pruned Twines. Moreover organic matter gets more time for decomposing and saves in extra cost for addition of external organic fertilizer, trash mulch done manually. The farmers are very much satisfied

with its present performance and it's up scaling in the district. Tractor Operated Side discharge Fail mulcher is suitable to replace major operation of pruned twine removal in grapes with up scaling potential through custom hiring.

Results of Selected On Farm Trials in Gujarat

I. Varietal on Farm Experiments

1. Assessment of Pigeon pea varieties for Kharif season: KVK Valsad

Wilt is a major problem in pigeon pea which reduces the yield from 30-80% depending on rainfall and other climatic factors. On farm trial was conducted to assess the short duration and wilt resistant pigeon pea varieties BDN-711 and GNP-2 as against farmers' practice cultivating local variety. The result shows that wilt resistant variety BDN-711 performed with highest yield of 8.47 q/ha followed by 7.95 q/ha in GNP-2 as compared to existing local variety 6.11 q/ha. Net return of Rs. 23278 / ha was obtained in BDN-711 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. The results are given below:

Treatment	Grain Yield (q/ha)	Gross Cost (Rs/ha)	Gross Income (Rs/ha)	Net Returns (Rs/ha)	B:C Ratio
T_1 - Use of local variety with local practices	6.11	21180	33605	12425	1.59
T_2 - Use of GNP-2 Var. with improved practices	7.95	23307	43725	20418	1.88
T_3 - Use of BDN - 711 Variety with improved practices	8.47	23307	46585	23278	2.00

2. Assessment of Rice varieties in rainfed condition: KVK Tapi

For direct seeding of rice under rainfed uplands, selection of variety is the most important factor responsible for optimal productivity. With the use of improved early and drought tolerant variety, the productivity of the crop can be enhanced. Keeping this in view, KVK Tapi conducted 5 OFTs to assess the performance of the improved drought tolerant rice variety. The results showed that the yield of the assessed variety Mahisagar was 5595 kg/ha and 7.80% per cent higher over the farmer practices GNR-7. Similarly the assessed variety under GAR-13 produced 1.90% higher yield over farmers practice. The incremental net return and BC ratio in T2 and T3 were found to be Rs. 65066 and 62539 per ha. and 2.24 and 2.20, respectively. The assessed varieties gave very good performance in rainfed condition.

Technology Assessed	Yield (q/ha)	Cost of Cultivation (Rs./ha)	Gross Income (Rs./ha)	Net Return (Rs. / ha)	B:C Ratio
T1 Farmers Practice : GNR-7	51.90	51620	109572	57952	2.12
T2 : GAR-13	52.50	51921	114460	62539	2.20
T3 : Mahisagar	55.95	52120	117186	65066	2.24

3. Assessment of hybrid variety in castor-GCH-8: KVK- Patan

KVK, Patan conducted on farm trial to assess hybrid variety in castor GCH-8 and GCH-9 to increase production and productivity. GCH-8 hybrid variety of castor gave higher yield of 32 q/ha while GCH-9 provided 28.50 q/ha as compared to GCH-7 (30.20 q/ha). Net return of Rs. 98200/- per ha was realized with GCH-8 while Rs. 84273/- attained under GCH-9 variety. It may be promoted in the area to increase the profitability of the farmers. GCH-9 has not suitable for agro climatic condition of Patan district of Gujarat state.

Technology Assessed	Yield (q/ha)	Net Return (Rs./ha)	B:C Ratio
Farmers Practice: variety GCH-7	30.2	91460	3.96
Technology assessed- T_1 : Variety GCH-8	32.0	98200	4.13
Technology assessed- T_2 : Variety GCH-9	28.5	84273	3.72

4. Assessment of high yielding variety of Ajawain: KVK- Patan

KVK, Patan conducted on farm trial to assess the high yielding variety of Ajawain in Patan district. Yield potential of ajawain is very low due to use of local variety. Local variety Gujarat was tested with improved variety of GA-2 and AA-93 in sandy loam soil in rabi season. GA-2 variety had 49.20% umbel per plant as compared to 47.40 and 37.60 in AA-93 and local variety, respectively and 36.79% more effective tillers in T_2 and 31.75% in T_3 as compared to T_1. Highest yield of 14.13 q/ha was recorded in GA-2 variety. It was observed that GA-2 variety is performing better in terms of yield due to short duration and suitability in prevailing agro-ecology. Higher net profit of Rs. 53325 was obtained with GA-2 variety with BCR of 2.70.

Technology Assessed	% of umbel / Plant	Yield (q/ha)	Net Return (Rs/ha)	B:C Ratio
Farmers Practice	37.6	10.33	30670	1.98
T_1 GA-2	49.20	14.13	53325	2.70
T_2-AA-93	47.40	13.61	49963	2.58

II-Resource Conservation Technologies

5. Irrigation management in wheat crop through Soil Moisture Indicator KVK-Bhavnagar

Wheat is a major rabi crop of north saurashtra agro climatic zone of Bhavnagar district. Irrigation management plays an important role in wheat production. Over irrigation wastes water, energy and labour, leaches expensive nutrients below the root zone of plants and reduce soil aeration, whereas under irrigation stresses the plant and causes yield reduction. Farmers don't have a proper knowledge regarding when to irrigate their crop. Hence, the On-Farm Trial was conducted on Irrigation management in wheat crop. It is observed that the yield and B:C ratio was recorded higher in treatment 1 (Farmers' Practice) as compared to treatment 2 and 3 as shown in

table below. However, treatment 3 (Irrigation based on Soil Moisture Indicator) saved 4 number of irrigation with the average yield of 3761.21 kg/ha as compared to farmers' practice which was nearly 2000 cubic meter. It is concluded that treatment 3 (Irrigation based on Soil Moisture Indicator) is very useful to the area where water scarcity is a major problem.

Parameter	No. of Irrigation	Fodder Yield (q/ha)	Plant Height (cm)	Grain Yield (q/ha)	Net Return (Rs./ha)	B:C Ratio
T_1 Farmer practice	9	65.42	76.31	44.34	69765.4	3.13
T2 Irrigation at critical stages of wheat	7	64.54	74.61	42.04	65214.7	3.03
T3Irrigation based on soil moisture indicator	5.2	60.53	75.32	37.61	55919.6	2.74

III. Integrated Crop Management

6. Assessment of application method of herbicide (Pendimethalin) in Groundnut: KVK Kutch-I

KVK, Kutch-I conducted on farm trial to provide an alternative solution to the farmer's about weed control in groundnut. Use of Pendimethalin @ 1.0 kg a.i./ha with 600 lit water (3.0 lit product / ha) was found effective in weed control. This method had recorded the highest yield (18.20 q/ha) and provided 8.33% higher yield over local check with higher net return of Rs 48760/ha which was superior over other interventions. It gave more control of monocot and dicot weeds in the fields. Additionally crop can be free from weeds for longer time.

Technology Assessed	No. of Dicot weeds/sqmt. 30DAS	No. of Monocot weeds/ sqmt 30DAS	Weeding Cost (Rs. /ha)	Yield (q/ha)	Gross Cost (Rs. /ha)	Gross Return (Rs./ha)	Net Return (Rs./ ha)	B:C Ratio
T1 (Farmers Practice): Pre-emergence application of Pendimethalin @ 0.330 kg a.i./ha with flood irrigation (1.0 Lit product / ha)	9.20	12.40	3810	16.80	43100	84000	40900	1.95
T2 : Pre-emergence application of Pendimethalin @ 1.0 kg a.i./ha with 600 lit water (3.0 Lit product / ha) by spraying method	3.20	6.20	2950	18.20	42240	91000	48760	2.15

7. Effect of thinning practices on fruit quality and yield of Date palm: KVK Kutch-I

In Datepalm problem of small fruit size was experienced in the district. To solve this problem KVK Kutch-I conducted on farm trials on effect of thinning practices on fruit quality and yield of date palm. The technology resulted in increased yield of 21.14% as compared to T1 with the good quality fruits. The yield obtained in trial plot was 186.25 q/ha which was higher as compared to local check (153.75 q/ha). The net return of Rs. 426875/ha was recorded under treatment plots which was higher over local check (Rs. 270375/ha).

Technology Assessed	Average Fruit Size (Kg)	Yield (q/ha)	Net Return (Rs. /ha)	BC Ratio
T1: Farmers practice : Without thinning	0.008	153.75	270375	2.31
T2: Intervention : Removal of 1/3 number of fruits in a bunch (Hubbouk : Pea size fruit stage)	0.012	186.25	426875	2.89

8. Effect of Ridge and Furrow method of sowing on yield of finger millet: KVK Dangs

Finger millet is a main staple food for tribal farmers of Dang district and also is emerging as an important nutritive cereal crop due to its high nutrient content. Decreasing productivity of finger millet was observed in the area due to broadcasting method. Heavy mortality, difficulties in intercultural operations due to lodging was faced by the farmers due broadcasting method. A trial was conducted to study effect of sowing finger millet crop on specific spacing 22.50 X 7.5 cm. Farmers noticed that in growing finger millet on specific spacing germination rate is higher as compared to broadcasting method. Higher yield was also observed in finger millet cultivation under ridge and furrow method. Higher yield 13.65 q/ha was recorded under recommended practices T_3 (22.5 X 7.5 cm) as compared to farmer practices (9.76 q/ha).

Year	No. of trial	Area (ha)	Yield(q/ha)		
			T_1 Farmer practices (Random throwing)	T_2 30 x10 cm (Recommended)	T_3 22.5 X 7.5 cm (Recommended)
2019-20	10	1.0	10.06	12.18	14.10
2020-21	10	1.0	9.45	11.94	13.20
Average			9.76	12.06	13.65

9. Effect of Micron silver black plastic mulch row covers for improving fruit yield and reducing pest and disease risk in watermelon: KVK Mehsana

KVK, Mehsana laid out assessment of Micron silver black plastic mulch row covers for improving fruit yield and reducing pest and disease risk in watermelon. On farm trials were conducted on 06 farmers' fields. Before trials, farmers were planting watermelon on mulching paper but they were not using 20 micron silver black plastic mulch crop cover. Due to that, more attack of pest and disease on crops was observed and required more cost for control of sucking pest. To avoid this problem, KVK conducted this trial. It was observed that the yield of watermelon was increased by 26.67% and 8.59% as compared to farmer's practice with the good quality fruit production. The average yield obtained in trial plot was 47.5 q/ha which was higher as compared to local check (37.5 q/ha). The net return of Rs. 208516/ha was recorded under treatment plots which was higher over local check (Rs. 61684/ha).

Technology Assessed	Source of Technology	Drip Irrigation (Hr.) (Flow rate 2 lit/hour)	Yield (q/ha)	Net Return (Rs. /ha)
T1 :Without mulch	Farmer practices	235	37.50	61684
T2 : Organic mulch @ 2.5 ton/ha	SDAU (2009)	195	43.74	122283
T3 : 20 microns silver black plastic mulch 5550 meter/ha	JAU (2015)	183	47.50	208516

IV. Integrated Nutrient Management

10. Assessment of foliar application of micronutrient in mango: KVK Bharuch

In order to get the optimum production of mango, nutrient management is the most important factor. Keeping this in perspective, KVK Bharuch conducted 5 trials to assess the application of micronutrient in mango. The results showed that the fruit yield under T3 (76.40 q/ha) was 31.95% higher than T1 (57.90 q/ha) followed by T2 (72.80 q/ha). Net profit earned was the highest in IIHR special micronutrient

application treatment (Rs 1, 53,700 with B:C ratio 5.12) as compared to farmer practice T1 (Rs 1, 09,350 with B: C ratio 4.08) and T2 (Rs 1, 42,500 with B:C ratio 4.60). The flower dropping lower and yield increase was observed in IIHR special micronutrient and banana sap spray application. On the basis of the above findings it may be concluded that the technology assessed in T_3 was more effective (followed by T_2) as it increases the fruit yield and maintains the soil fertility.

11. Assessment of effect of potassium nitrate in chickpea: KVK, Bhavnagar

Chickpea is gaining importance as a rabi crop in the farming community of North Saurashtra agro-climatic zone of Bhavnagar district which is characterized as semi-arid region. However, the economical production is hampered due to water scarcity in the region. Potassium Nitrate is known to reduce evapo-transpiration rate of crops. Hence, an on farm trial was laid out to assess the effect of Potassium Nitrate on yield of the crop. The fields sprayed with 2% Potassium Nitrate were found

superior and observed higher pod yield (14.83 q/ha) as compared to the control treatment (no spray of Potassium

Details of technologies	Wt. of 100 Seeds (g)	Yield (q/ha)	Cost of Cultivation (Rs./ha)	Gross Return (Rs./ha)	Net Return (Rs./ha)
T1- Farmer practice -No Spray	52	21.40	25346.43	70262.50	44916.07
T_2- 20-40-00 NPK kg/ha (RDF)	59	22.80	28382.69	101570.76	73188.07
T_3-20-40-00 NPK kg/ha (RDF) + Spray of 2% Potassium Nitrate at Flowering and Pod development stage	62	23.40	35102.69	105094.26	69991.57

12. Assessment of ferrous sulphate application in groundnut: KVK Gandhinagar

Groundnut is emerging as major oilseed crop in the district. Farmers' not applying recommended dose of fertilizers including micronutrients leads in reduction of crop yield. In this context, KVK Gandhinagar conducted assessment of ferrous sulphate application of 12.5:25:20 NPS along with two consecutive foliar sprays of ferrous sulphate at 15 days interval for improving the yield and net economic gain. The ferrous sulphate application gave higher yield of 17.60 q/ha as compared to farmers practice (13.60 q/ha). In assessed practice, farmers got average net income of Rs. 57390/- per ha where as in farmer's practice it was Rs. 35440/- per ha. Ferrous sulphate application increase pod yield shelling percentage, protein and oil percentage in groundnut crop.

Treatments	Incidence of iron chlorosis (%)	Yield (q/ha)	Gross cost (Rs./ha)	Gross return (Rs./ha)	Net Profit (Rs./ha)
T_1- Farmers Practice (20:50:00 NPS kg/ha)	48	13.6	36300	71740	35440
T_2- RDF 12.5:25:20 NPS kg/ha	40	16	35150	84400	49250
T_3- 12.5:25:20 NPS kg/ha + Ferrous sulphate (spray)	9	17.6	35450	9284	57390

13. Assessment of nutrient management in transplanted hybrid paddy: KVK Valsad

Farmer cultivated hybrid paddy in kharif season in the district. They were not applying recommended dose of fertilizers. The KVK Valsad conducted on farm experiment to assess the nutrient management in transplanted hybrid paddy. The result of trials revealed under application of 100-30-00 NPK kg/ha with 2.5 litre potash culture/ha, more number of productive tillers/hill (9.9) and length of panicle (23.7

cm) were recorded as compared to local check (8.59 number of productive tillers/hill and 19.1 cm length of panicle). Average yield (39.17 q/ha) was also obtained which was higher as compared to other interventions. Net economic gain of Rs. 36968/ha was realized under treatment 3 which was again found more than other alternative solutions.

Treatment	Productive tillers/hill	Days of 50% flowering	Grain Yield (q/ha)	Straw Yield (kg/ha)	Cost of (Rs/ha)	Gross Income (Rs/ha)	Net Profit (Rs/ha)
T_1 - Farmer's practices (100-30-30 NPK kg/ha)	8.69	92	34.55	3675	37030	61013	23983
T_2 - NAU Rec. 100-30-00 NPK kg/ha	9.58	81.50	36.60	3958	33000	64795	31795
T_3 - 100-30-00 NPK kg/ha + 2.5 li potash culture/ha.	10.3	80.70	39.17	4744	33640	70608	36968

14. Assessment of Nutrient management in Pigeon pea: KVK Valsad

Pigeon pea is the major pulse crop grown across the zone during kharif season. Integrated use of organic manures and inorganic fertilizers help in sustaining the productivity and ensures availability of all the essential nutrients to the crop. KVK Valsad conducted five OFTs to assess the application of 25-50-20 NPS kg/ha (T2) and 25-50-20 NPS kg/ha + one spray of 2% urea at pod filling stage (T3) at farmers' fields. The results showed that the seed yield was 36.42 per cent

and 44.70 per cent higher in T_2 and T3 respectively over farmers' practice.

Treatment	Grain Yield (q/ha)	Cost (Rs/ha)	Gross Income (Rs/ha)	Net Profit (Rs/ha)	B:C Ratio
T_1 - Farmer practices (No use of "S")	6.04	21200	33220	12020	1.57
T_2 - Recommendation (25-50-20 NPS kg/ha)	8.24	23550	45320	21770	1.92
T_3 - 25-50-20 NPS kg/ha + one spray of 2% urea at pod filling stage	8.74	23600	48070	24470	2.04

15. Assessment of efficiency Nauroji LBF and AAU developed Liquid manure in paddy: KVK Valsad

Paddy is a major crop of valsad district. Navsari Agricultural University developed NAUROJI liquid bio fertilizers (LBF) to reduce the consumption of costly chemical fertilizers. Anand Agriculture University recommended liquid natural manure like consortia of Azotobactor, PSB, KMB and many other beneficial microbes, which can be easily prepared by farmers at home with little cost from locally available natural materials i.e. Cowdung, cow urine, buttermilk etc. So, the KVK conducted experiment at Paradi block of Valsad district. Result showed that, higher average yield (38.12 q/ha) was obtained as compared

to other interventions. Net economic gain of Rs. 34517/ha was realized under treatment 3 which was again found more than other alternative solutions.

Treatments	No. of Tillers/ hill	Seed yield (q/ha)	Straw yield (qg/ha)	Gross Income (Rs./ha)	Net Return (Rs./ha)	Increase in net profit (%)	Increase in seed yield (%)
T_1- Farmer practice (177:86:00 kg NPK/ha)	8.54	35.16	38.68	64342.8	27191.9	0.0	0.00
T_2-Recommended Dose of Fertiliser (RDF) (100:30:00 kg NPK/ha)	8.87	36.15	39.77	66154.5	32605.9	19.9	2.82
T_3 – RDF + Nauroji LBF i.e Azoto. and PSB @ 1.25 lit/ha as seedling treatment and soil application	9.12	36.52	37.40	66000.0	32251.4	18.6	3.87
T_4 - RDF + AAU developed Liquid manure @ 500 lit/ha as soil application at 30 & 45 DAP	9.27	38.12	42.12	69816.0	34517.4	26.9	8.42

16. To assess effect of spraying KNO_3 and Novel OLN on yield of Cotton: KVK-Surat

On Farm Trial was conducted in rainfed and medium soils of Kadvali village of Umarpada block, Surat district during Kharif-2020. KVK conducted trial to assess the effect of spraying KNO_3 and Novel OLN on cotton for higher yield and better quality of cotton. The trial was conducted on 10 farmers' fields. Result showed that by using KNO_3 yield was increased by 15.40% (24.35 q/ha) and Novel OLN spraying was increased by 18.70% (25.05 q/ha) against 21.10 q/ha in farmer's practice. Utilizing foliar potassium nitrate has shown to enhance the uptake of potassium into the plant. Potassium promotes the photosynthesis and the transport of sugars from the leaf to the boll. These provide the energy for boll development and growth. Water evaporation loss was also reduced.

Crop	Variety	No. of farmers	Area (ha)	Yield(q/ha)			% increase			B:C Ratio		
				KNO_3	Novel OLN	Check	KNO_3	Novel OLN	Check	KNO_3	Novel OLN	Check
Cotton	G.Cot.Hy-12(Bt)	10	3	24.35	25.05	21.10	15.40	18.70	--	2.9	3.2	2.8

17. Effect of potassium and sulphur in wheat crop: KVK Junagadh

KVK, Junagadh conducted trial on effect of potassium and sulphur in wheat crop with integrated nutrient management and application of recommended doses of fertilizer 60 kg potash with 40 kg sulphur (in form of Phospho gypsum) /ha in addition to RDF N: P: K 120:60:00 kg/ha. Under this intervention, average yield 40.83 q/ha and 39.00q/ was achieved which was higher over farmer's practice. The intervention increased the test weight of seed up to 3.83 and net return of Rs. 49771/ha was realized by the farmers under recommended dose of fertilizers.

Technology Option	No. of trials	Yield (q./ha)	100 grain weight (gm.)	Net Return	B:C Ratio
T_1 - Farmer practices Use of 150 kg DAP, 250 kg Urea and 25 kg Zinc sulphate /ha (Control)	05	35.25	3.63	43625	2.86
T_2-Application of 60 kg potash with 40 kg sulphur (in form of Phospho gypsum)/ha in addition to RDF N: P: K 120:60:00 kg/ha.		40.83	3.83	53135	3.18
T_3- Application of 40 kg potash with 30 kg sulphur (in form of SSP) in addition to RDF N:P:K; 120:60:00 kg/ha		39.00	3.83	49771	3.04

18. Use of organic inputs in okra : KVK Tapi

Foliar application of chemical fertilizers has increased the cost as well as incidence of pest but application of organic fertilizer reduces the cost and increase the production of okra. So KVK Tapi conducted on farm trials with active participation of 10 farmers to solve this problem for higher income. Result showed that, use of novel organic liquid nutrient 1% (T1) provided highest yield 108.80 q/ha with net income Rs. 1905263/ha followed by novel organic liquid nutrient plus 1% (T2) provided 100.14 q/ha yiled with net return Rs. 168826 /ha as compared to farmers practices (100.97 q/ha).

Technology Assessed	Source of Technology	Production (q kg/ha)	Cost of Cultivation (Rs./ha)	Gross Income (Rs.)	Net Return (Profit) in Rs. / ha	B:C Ratio
T_1 -Novel Organic Liquid Nutrient 1%	NAU, Navsari	108.82	81523.47	272050	190526.54	3.34
T_2 - Novel Organic Liquid Nutrient plus 1%	NAU, Navsari	100.14	81523.47	250350	168826.54	3.07
T_3 - Waste decomposer	Gaziabad	100.97	77223.47	252425	175201.54	3.27

19. Effect of supplementation of concentrates on milk production of *Gir* cow: KVK-Porbandar

Gir breed of cattle is very famous indigenous breed in Gujarat and particularly belongs to Saurashtra region. Due to inadequate nutrition in daily ration, the fat percentage in milk and productivity of the animal decreased; ultimately causes financial losses to owners. KVK-Porbandar took trials on feeding of supplementary concentrates to animals. First treatment was farmer's practice; second was feeding of concentrated mixture @ 4 kg/animal/day and the third intervention was feeding of concentrated mixture @ 4 kg/animal/day + mineral mixture @ 50 g/animal/day. The intervention in T_2 gave average 3000 liter milk per annum with net profit of Rs. 55,000/-, which was Rs. 25,000/- higher than the farmer's practice.

Treatment	Milk Yield (lit/annum)	Cost	Net Profit	B:C Ratio
Farmer's practice	2400	80000	30000	1.37
T_1 -Feeding of concentrated mixture	2700	90000	40000	1.44
T_2 -Intervention (Feeding of concentrated mixture + Mineral mixture)	3000	110000	55000	1.50

20. Integrated Nutrient Management in summer chilli: KVK Porbandar

Chilli growers use high dose of nitrogenous fertilizers for production and skip on potash fertilizer. Deficiency of micronutrients was also occurring in chilli. So, an on farm trial on integrated nutrient

management was conducted by KVK Porbandar. There were 3 practices; first farmers practice (150-50-00 kg NPK/ha); Second recommended dose of fertilizer (100-50-50 kg NPK/ha) & third one intervention (RDF + spraying of banana pseudostem sap @ 1% thrice. First spray at starting of flowering and another at 15 days intervals). Highest yield was obtained in T_3 intervention (22.09 t/ha) with net return of Rs. 387390/- ha. In terms of gain in net income, it was Rs. 34610/- ha higher than farmers practice.

Treatment	Yield (q/ha)	Net Return	B:C Ratio
T1-Farmers Practice (150-50-00 kg NPK/ha)	205.1	352780	5.52
T2-Recommendation (100-50-50 kg NPK/ha)	214.5	374950	5.97
T3- Intervention (RDF + spraying of banana pseudostem sap @ 1% thrice. First spray at starting of flowering and another at 15 days intervals)	220.9	387390	6.06

21. Assessment of Response of Bio fertilizers to wheat yield: KVK Rajkot-II

Wheat is a major rabi crop of north saurashtra agro climatic zone of Rajkot district. Due to canal facilities in this area the production and productivity is higher but the continuous use of chemical fertilizer has decreased the productivity and increased the cost of cultivation. Soil fertility is reduced due to higher use of chemical fertilizers. Hence, the On-Farm Trial was conducted on assessment of response of Bio fertilizers to wheat yield. It is observed that the yield and B:C ratio was recorded higher in treatment 3 (Application of Azatobacter & PSB culture (250g/10kg) + 75% of RDF) and 2 (120-60-0 NPK kg/ha) as compared to Farmers' Practice. However, in treatment 3 yield was increased by 13.72 % as compared to farmers' practice with the net income of Rs. 24030 /ha.

Details	Yield (q/ha)	Average Cost of cultivation (Rs./ha)	Average Gross Return (Rs./ha)	Net profit (Rs./ha)
T_1-Farmer's practices	42.50	56812	75438	12251
T_2- 120-60-0 NPK kg/ha	46.25	54512	82094	19694
T_3-Application of Azatobacter & PSB culture (250g/10kg) + 75% of RDF	48.33	55462	85792	24030

22. Management of shoot and fruit borer in Okra: KVK Anand

Due to heavy infestation of shoot and fruit borer in Okra remarkable reduction in yield was observed. To solve this problem KVK conducted on farm trial to assess the management of shoot and fruit borer in Okra for increasing the production of the district. Treatments as-T_1 (Frequent sprays of Pesticides-Farmers' Practice); T_2 (Seed treatment Imidaclopride 9 ml/kg + Removal and destruction damage shoots and

fruits + Pheromone Trap 60/ha, Change 21 days interval + Clontraniliprol 0.006% spray+ NSKE 5% spray 35 days after sowing + Emamectin 0.0025% + BT Powder 5wp (10g/10 lit water) +NSKE 5% spray 65 days after sowing) at 5 farmer's fields. Results revealed that IPM module showed 25% increase in the yield and found less infestation of shoot and fruit borer over farmers' practices. Further, net return from T_2 was also highest (Rs. 200500/- and B:C ratio 4.37) as compared to T_1 (Rs. 154000/- and B:C ratio 3.85).

23. Assessment of management practices of collar rot & stem rot of Kharif Groundnut: KVK Kutch-I

Heavy infestation of collar rot and stem rot of kharif in groundnut was experienced in the district that affected on yield. Trial was laid out to assess the different interventions for management of collar rot and stem rot in groundnut. Collar rot and stem rot infestation was reduced up to 3.2% with average yield of 18.20 q/ha. Net profit of Rs 39925/ha was achieved by the farmers which was higher by Rs 14150/- over local check.

Technology Assessed	Disease Incidence (%)	Yield (q/ha	Gross Cost Rs. /unit	Gross Return Rs/unit)	Net Return (Rs./ ha)	B:C Ratio
T_1: ST with Carbendazin 12% + Mancozeb 63% @ 3 gm/kg followed by spraying of Carbendazin 12% + Mancozeb 63% @ 25 gm / 10 lit. water at 45 & 60 DAS	8.5	15.40	49300	75075	25775	1.52
T_2: ST with Tebuconazole 2% DS @ 1.5 gm/kg followed by spraying of Tebuconazole 250 EC @ 10 ml / 10 lit. water at 45 & 60 DAS	5.3	18.20	48800	88725	39925	1.82

24. Assessment of Savaj MDP Technology for the Management of pink bollworm in Cotton: KVK Mehsana

On Farm Trial was conducted in rainfed and medium soils of Mehsana district. Cotton is major crop of the district. The intensity of problem is 35-40% and yield losses are up to 55-60%. The technologies selected for assessment of savaj MDP technology for the management of pink bollworm in cotton i.e. 1000 drops of savaj MDP paste between two twigs at flowering initiation stage. Farmers generally spray profenophos 50% EC or quinalphos 25% EC 30 ml / 10 lit water. While taking the observation, it was recorded that the performance of savaj MDP for the management of pink

bollworm saw boll damage of 25% as compared to the farmers' practices (32%) and the yield was increased by 13.62% as compared to farmer's practice.

Technology Assessed	Yield (q/ha)	Boll damage (%)	Net Return (Rs. / ha)	B:C Ratio
T_1 : Spray of profenophos 50% EC or quinalphos 25% EC 30 ml / 10 lit water	19.45	32	52287	2.07
T_2 :Five spray of Beauveria bassiana 80 gm / 10 lit water at 5% half opening of flowers and remaining four spray after 10 day interval	20.40	28	59279	2.27
T_3 :1000 drops of savaj MDP paste at place of between two twigs at flowering initiation stage and remaining two treatment after 30 days interval	22.10	25	63809	2.25

25. Management of white grub in groundnut crop: KVK Morbi

Heavy infestation of white grub in groundnut was experienced in the district causing yield loss of 12-20%. Trial was laid out to assess the different interventions for management of white grub in groundnut. White grub infestation was reduced up to 5.3% with average yield of 26.33 q/ha. Observation recorded that 2.9% plant infested in farmer practice without seed treatment of chlorphyriphos where as 1.5% and 1.38% plant infestation observed in seed treatment with chlorphyriphos and soil application of metarhizium respectively.

Effect of chlorphyriphos in control of white grub in groundnut

Technology Option	No. of Trials	Incidence of infested plant (%)	Yield (q/ha)	B:C ratio
T_1-Sowing of groundnut without seed treatment. Farmers adopt drenching of chlorphyriphos or quinalphos @ 6 lit/ha with irrigation at initiation of pest incidence. (farmers practice)	5	2.9%	24.93	2.20
T_2-Seed treatment with chlorpyriphos 20ec @ 25 ml/kg seed		1.5%	26.27	2.33
T_3-Application of *metarhizium anisoplii* @ 5 kg/ha with 300 kg/ha castor cake at the time of sowing		1.38%	26.33	2.34

26. Use of Trichoderma for wilt disease management in cumin: KVK Morbi

Cumin is an important commercial spice crop of Northern Saurashtra. There is high incidence of wilt disease in cumin reducing 5 to 25% yield and monetary loss of Rs.15000/- to 20000/ ha. KVK Morbi conducted on farm trial to assess application of Trichoderma. The OFT trial was conducted for three

Effect of trichoderma for management of wilt in cumin

Technology Option	Wilt (%)		Yield (q/ha)	B:C Ratio
	60 Day	75 Days		
T_1: Sowing without use of Trichodarma. But they use fungicides viz., Carbendazim, Hexaconazole, Difenconazole, Tebuconazole, Propiiconazole etc after initiation of diseases. (Farmers practices.)	6.7%	8.6%	9.76	2.4
T_2: Application of Trichoderma @ 5 kg /ha with organic manure @1000 kg / ha at the time of sowing. (Recommended practices.)	10%	2.79%	10.87	2.65
T_3: Application of Trichoderma @ 5 kg /ha along with organic manure @1000 kg / ha at the time of sowing and second application of Trichoderma @ 5 kg /ha along with organic manure by broadcasting method at 15 days after germination. (Intervention).	1.7%	2.05%	11.17	2.65

years on cumin for management of wilt. The trial pooled results of three years revealed that, treatment T_3 recovered 1172 kg/ha which was 16.5 and 4.1% higher seed yield than the treatments T_1 and T_2, respectively. The highest wilt disease infestation of 11.36% was observed in treatment T_1 as compared to 4.53 and 3.05% in T_2 and T_3 respectively.

27. Management of wilt in Gram: KVK Junagadh

Chickpea is the major crop of Junagadh district in rainfed /irrigated condition. Incidence of wilt disease in chickpea was prevalent in the area causing crop losses of 15-20%. To solve this problem, the KVK conducted on farm trial at farmers' fields. Under intervention, seed treatment with Carbendazim 50 WP @ 3 gm/ kg seed, soil application of *Trichoderma harzianum* @ 2.5 kg/ha with castor cake 300 kg seed performed better and wilt incidence was reduced from 7% with higher yield of chickpea (23.15 q/ha). Net economic gain of Rs 95265/ha was also achieved. Treatment 3 exhibited good result and lessened wilt attack (9%) and provided yield (21.44 q/ha) with Rs.87044/- net income.

Technology Options	Wilt incidence (%)	Yield (qt./ha)	Cost (Rs/ha)	Net Return Rs. / ha	B:C Ratio
T_1 : Farmer practices : No use of seed treatment and *Trichoderma harzianum*	12	18.82	24050	71932	3.99
T_2: Recommended Practices: Seed treatment of Carbendazim 50 WP @ 3 gm/ kg seed, Soil application of *Trichoderma harzianum* @ 2.5 kg/ha with castor cake 300 kg	07	23.15	22800	95265	5.17
T3: Application of *Trichoderma harzianum* 10 Kg/ton FYM/ha & soaking of seeds for 10 hrs in suspension of talc based formulation *Trichoderma harzianum* @ 50 g / 250 ml of water/ kg of seed @ 3 Kg/ha	09	21.44	22300	87044	4.90

28. Management of *Leucinodes orbonalis* in Brinjal : KVK Surat

Low yield in brinjal was observed due to heavy infestation of *Leucinodes orbonalis*. The intensity of pest was > 60%. The farmers are using chemical insecticides to control the fruit and shoot borer alternatively after occurrence of pests but not getting the effective control. To solve this problem KVK Surat conducted On Farm Trial on management of fruit and shoot borer (*Leucinodes orbonalis)* in brinjal with judicious use of insecticides, pheromone traps on 5 farmers' fields. The use of pheromone traps was found to be effective for control of *Leucinodes orbonalis*. Low infestation of *Leucinodes orbonalis* was observed under technology assessment.The percent of infestation was 3% and 4.5% in T3 and T2, respectively as compared to farmer's practice (8.0%). Yield was increased by 18.66% and net return of Rs.291100/- per ha was achieved under this intervention.

Technology option	% Infestation	Average yield (q/ha)	Net Return
T_1: Farmers practices as injudicious and indiscriminate use of chemical pesticides	8.0	165.30	237540
T_2: Installation of pheromone traps @ 40 traps/ha (AAU, Anand)	4.5	185.10	274680
T_3: Remove the infected shoot and fruit + install pheromone traps @ 12/ha (TNAU, TN)	3.0	194.50	291100

Chapter 3

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, pulses, oilseeds, fruits, vegetables, etc. to enhance the production and productivity of the crops and profitability of the farmers.

In total, 21250 frontline demonstrations were conducted on different commodities and enterprises in the Zone covering an area of 3845.23 ha in the states of Maharashtra, Gujarat and Goa (Table 3.1). These included cereals and millets (3175), pulses (1737), oilseeds (1007), commercial crops (528), fodder crops (518), fruit crops (1183), vegetable crops (1656), tuber crops (88), flower crops (90), plantation crops (40), spice crops (787) and hybrids of various crops (1627). KVKs also conducted demonstrations on farm implements (2451), livestock and fisheries (3278) and enterprises (3114).

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 & Millets	1133	360.95	2024	692.25	18	01	3175	1054.2
Commercial crops	305	114.50	201	73.80	22	05	528	193.3
Flower crops	61	11.90	29	6.8			90	18.7
Fodder crops	176	19.78	342	56.20			518	75.98
Fruit crops	536	150.65	617	162	30	0.70	1183	313.35
Oilseeds	581	217.80	426	160.40			1007	378.2
Plantation crops	40	16.00					40	16
Pulses	1000	374.60	717	248.30	20	2	1737	624.9
Spices	271	42.60	506	193.50	10	1	787	237.1
Tuber crops	43	4.90	45	14.08			88	18.98
Vegetables	726	187.40	915	192.98	15	1.03	1656	381.41
Hybrids	567	162.71	1060	377.20			1627	539.91
Farm implements	1693		758				2451	0
Enterprises	1970		1116		28		3114	0
Livestock & Fisheries	1170	15224 (No)	2070	3662 (No)	38	5083 (No)	3278	
Total	**10272**	**1663.79**	**10797**	**2170.71**	**181**	**10.73**	**21250**	**3845.23**

Maharashtra

FLDs on Pulses and Oilseeds

Technology demonstrations on pulses were organized on an area of 374.60 ha involving 1000 farmers on oilseeds covering an area of 217.80 ha involving 581 farmers. The crop and thematic area wise information is exhibited in tables.

FLDs on Pulses

In total 635 demonstrations were laid out on chickpea, 13 on black gram, 15 on cow pea, 30 on field bean, 20 on horse gram, 47 on green gram and 240 on pigeon pea covering an area of 374.60 ha at farmers' fields (Table 3.2). In chick pea, on an average 16.42 q/ha yield was obtained with adoption of full package of practices which was 22.18% higher over local check (13.57 q/ha). Among above technologies, integrated nutrient management gave highest yield of 19.19 q/ha under demonstrations. In Cow Pea, IDM & varietal component gave yield of 14.95 q/ha which found superior over local check (12.55 q/ha). In green

gram, technologies such as integrated crop management and cropping system components gave yield of 8.42 q/ha which was 43.05% more as compared to local check (6.13 q/ha). In horse gram, average yield of 7.84 q/ha was attained which was 34.04% higher over farmer's practice (5.87 q/ha). Under pigeon pea, mean yield of 15.48 q/ha was attained under demonstrations with net economic gain of Rs. 68358/ha.

Table 3.2 Thematic area wise physical achievements of FLDs on pulses in Maharashtra

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
Black Gram	ICM	1	13	5.2	13.06	10.13	28.92	37268	22126
Chickpea	ICM	6	176	67.5	12.25	10.15	20.64	36379	28354
	IDM	1	13	5	5.10	3.90	30.77	17870	11530
	INM	10	132	50	19.19	15.33	27.91	43500	30611
	IPDM	4	62	24.8	16.02	13.76	17.07	56876	45955
	IPM	15	189	67.6	17.64	14.83	19.81	53034	38753
	Varietal	2	63	25	12.39	10.14	21.93	41520	31245
	Sub Total		**635**	**239.9**	**16.42**	**13.57**	**22.18**	**46769**	**34615**
Cowpea	Varietal	1	5	1	13.4	12.5	7.2	30000	15800
	IDM	1	10	1	16.5	12.6	30.95	36115	4590
	Sub Total		**15**	**2**	**14.95**	**12.55**	**19.08**	**33058**	**10195**
Field Bean	Varietal	1	30	11	13.25	11.9	11.34	43400	25700
Green Gram	Cropping system	1	12	4.8	12.21	9.88	23.58	26315	15015
	ICM	2	35	14	6.53	4.25	52.78	29929	16651
	Sub Total		**47**	**18.8**	**8.42**	**6.13**	**43.05**	**28724**	**16126**
Horse Gram	ICM	1	10	1	7.57	5.41	39.93	18540	3420
	INM	1	10	1	8.10	6.32	28.16	14810	10250
	Sub Total		**20**	**2**	**7.84**	**5.87**	**34.04**	**16675**	**6835**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
Pigeon Pea	ICM	5	88	38.8	20.31	16.63	23.97	96808	73524
	IDM	2	50	20	11.14	9.31	19.27	51134	38627
	IPDM	2	37	14.8	13.70	11.48	19.87	64865	51145
	IPM	4	45	18	14.69	12.47	17.26	56676	44106
	Varietal	2	20	4.1	11.1	9.3	18.31	41314	32041
	Sub Total		**240**	**95.7**	**15.48**	**12.88**	**20.25**	**68358**	**52511**
	Grand Total		**1000**	**374.6**					

Performance of Chickpea Demonstrations in Maharashtra

In Maharashtra, 635 chickpea demonstrations were organized with special focus on improved cultivars and full package of practices on 239.90 ha area with net gain of Rs. 46769/ha. On an average 16.42 q/ha yield was achieved by the farmers with adoption of different improved cultivars. Digvijay cultivar performed well and provided 18.88 q/ha yield with net profit of Rs. 51058/ha. Under BDBG-797 cultivar, yield of 15.20 q/ha was attained with economic gain of Rs. 52150/ha (Table 3.3). In Maharashtra, chickpea yield was higher by 53.03% over national and 49.82% at state level (Fig. 3.1).

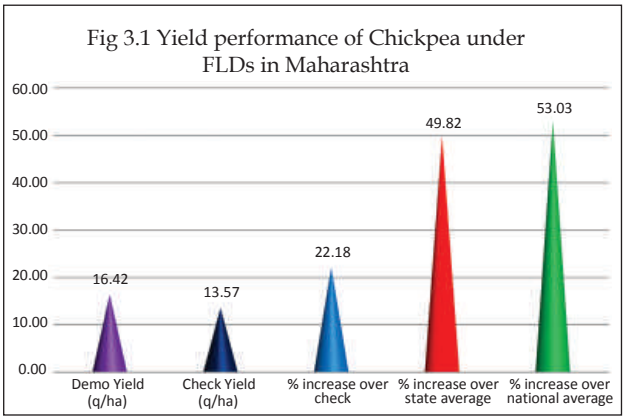


Table 3.3 Variety wise performance of chickpea in Maharashtra

Variety	KVK	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net Return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
BDBG-797	Aurangabad-I, Jalna-II	16	40	15.2	12.65	20.16	52150	40943	27.37
Digvijay	Aurangabad-II, Nagpur-I, Nasik-II, Pune-II, Sangli-I, Satara-I, Solapur-I, Satara-II	41.6	131	18.88	15.84	21.68	51068	38951	31.11
JAKI-9218	Aurangabad-II, Beed-I, Bhandara, Chandrapur, Gadchiroli, Hingoli, Kolhapur-II,Latur, Nanded-I, Osmanabad, Wardha, Yavatmal-II	129.2	331	15.16	12.73	18.51	43847	32559	34.67
Phule Vikram	Dhule, Jalgaon-I, Nandurbar, Solapur-II	33.5	84	14.14	10.68	37	43564	28630	52.16
Rajvijay	Yavatmal-II	5.2	13	19.2	16.7	14.97	64315	48690	32.09
RVG 202	Akola	5.2	13	24.69	18.29	34.99	35297	20612	71.24
Vijay	Amravati-II, Jalna-I	9.2	23	16.21	13.59	18.03	49692	39017	27.36
	Total	**239.9**	**635**	**16.42**	**13.57**	**22.18**	**46769**	**34615**	**35.11**

Performance of Pigeon pea Cultivars in Maharashtra

Under technology demonstrations on pigeon pea, Seven cultivars BDN-716, BDN-711, BSMR-716, ICPL-87119, PKV TARA, Phule Rajeshwari and Richa were demonstrated on 95.70 ha area at farmers' fields. On an average 15.48 q/ha productivity was attained under demonstrations which was higher (20.25%) over local cultivars. Highest yield of 22.43 q/ha was achieved under BDN-711 in Nanded, Beed, Jalna and Aurangabad districts with net profit of Rs. 108471/ha (Table 3.4). In Maharashtra, pigeon pea yield was higher by 106.13% over national and 70.67% at state level (Fig. 3.2).

Fig 3.2 Yield performance of Pigeon pea under FLDs in Maharashtra

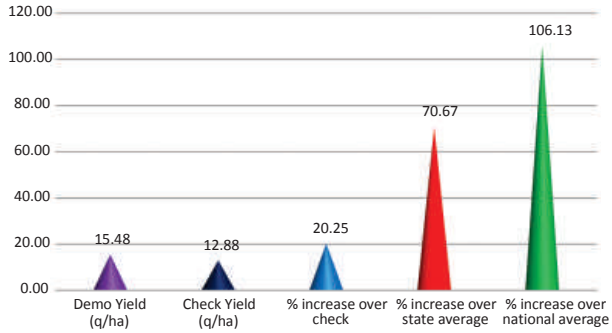


Table 3.4 Variety wise performance of pigeon pea in Maharashtra

Variety	KVK	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net Return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
BDN 716	Latur, Washim	12.8	32	15.65	13.00	20.40	65869	49521	33.01
BDN 711	Aurangabad-I, Beed-I, Jalna-II, Nanded-I,	28	70	22.43	18.70	20.29	108471	85527	26.83
BSMR 716	Latur	10	25	15.40	13.20	16.67	62980	49040	28.43
ICPL-87119	Buldhana-I	10	25	12.33	9.89	24.67	53855	38290	40.65
Phule Rajeshwari	Solapur-II	8.8	13	12.54	9.24	35.71	41489	20740	100.04
PKV TARA	Amravati-I, Bhandara, Wardha, Yavatmal-II	21.3	63	9.12	7.91	15.34	31551	24919	26.61
Richa	Aurangabad-I	4.8	12	12	9.75	23.08	66750	53250	25.35
	Grand Total	**95.7**	**240**	**15.48**	**12.88**	**20.25**	**68358**	**52511**	**30.18**

Oilseed Crops

In Maharashtra, frontline demonstrations were conducted on soybean (473), groundnut (65), niger (43) covering an area of 217.80 ha at farmers' fields (Table 3.5). In soybean, 18.85 q/ha mean yield was achieved under demonstrations which was 18.36% higher over local practice (15.96 q/ha) and net profit of Rs. 45364/ha was obtained by the farmers. Under groundnut, 28.59 q/ha yield was achieved with net profit of Rs. 36340/ha. In niger, productivity of 4.24 q/ha was realised by the farmers under

demonstrations which was 18.69% more as compared to local check.

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	33.36	24.65	35.33	50010	26378
	INM	1	12	5	22.20	17.50	26.86	35150	25850
	Varietal	1	40	10	29.4	21	39.72	30100	15820
	Sub Total		**65**	**20**	**28.59**	**21.04**	**35.41**	**36340**	**20967**
Niger	ICM	2	43	15	4.24	3.65	18.69	15393	9598
Soybean	Farm Mechanization	1	10	4	18.57	15.84	17.23	43605	33316
	ICM	2	50	20	20.05	16.78	19.02	62392	50142
	IDM	1	13	5.2	15.2	12.5	21.6	23600	15452
	INM	4	65	26	22.08	18.28	20.60	58116	43644
	IPDM	2	25	7	18.95	17.48	8.30	47070	40285
	IPM	15	262	101.8	17.02	14.51	18.15	39471	29039
	IWM	2	23	9.2	20.46	17.05	19.80	40130	28464
	Varietal	2	25	9.6	24.60	20.16	22.07	53810	37038
	Sub Total		**473**	**182.8**	**18.85**	**15.96**	**18.36**	**45364**	**34031**
	Grand Total		**581**	**217.8**					

Performance of Soybean Cultivars in Maharashtra

Under soybean, average yield of 18.85 q/ha was attained with adoption of improved varieties and Rs. 45364/ha net return earned by the farmers. Highest yield was obtained under MAUS 71 cultivar in Hingoli and Nanded districts followed by MAUS-158 in Akola, Aurangabad, Beed, Latur, Nagpur & Wardha districts (Table 3.6). In Maharashtra, soybean yield was higher by 54.89% over national and 61.11% at state level (Fig. 3.3).

Fig 3.3 Yield performance of Soybean under FLDs in Maharashtra

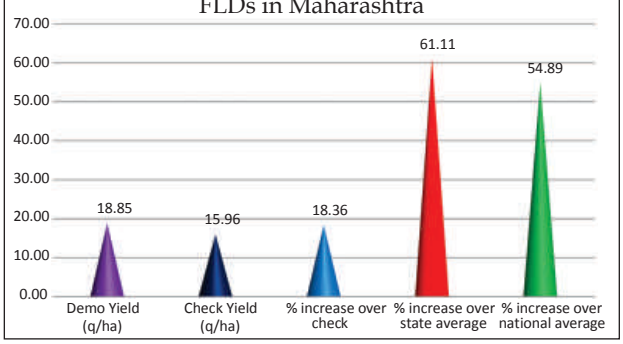


Table 3.6 Variety wise performance of soybean in Maharashtra

Variety	KVK	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net Return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
JS 335	Amravati-II, Buldhana-I, Jalna-I, Kolhapur-II, Nanded-I, Washim, Yavatmal-I, Satara-II	61.2	168	17.96	15.65	15.62	40054	31222	28.29
JS 9305	Akola, Amravati-I	15.6	39	11.27	10.18	11.89	17862	12854	38.96
Phule Sangam	Amravati-II, Dhule, Kolhapur-II, Sangli-I, Satara-II	32.8	83	19.92	16.76	20.66	46051	34438	33.72

Variety	KVK	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net Return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
MAUS 158	Akola, Aurangabad, Beed-I, Latur, Nagpur-I, Wardha	48.4	121	20.01	16.78	18.86	49346	37271	32.40
MAUS 162	Beed-I, Beed-II, Parbhani	16	40	17.77	14.88	19.30	48353	37293	29.66
MAUS 71	Hingoli, Nanded-I	8.8	22	25.34	20	26.7	74785	48760	53.37
	Total	**182.8**	**473**	**18.85**	**15.96**	**18.36**	**45364**	**34031**	**33.30**

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 (476), wheat (187), jowar (211), bajra (78), maize (43) and finger millet (138) covering an area of 360.95 ha in field situations (Table 3.7). In bajra average yield obtained in demonstrations was 19.92 q/ha which was 24.92% more as compared to check (16.03 q/ha). In finger millet demonstrations, average yield of 21.46 q/ha was obtained with economic gain of Rs. 37512/ha which was superior by 31.54% over local practice. Under Jowar, mean yield of 18.53 q/ha was realised by the farmers by following full package of practices which was higher (26.16%) as compared to farmer's practice and net profit of Rs. 41195/ha was obtained. In paddy, 38.95 q/ha yield was attained which was more by 21.90% over local check. Under wheat, 31.17 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

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
Bajra	Varietal	4	58	23.2	15.61	12.08	26.39	24704	11719
	INM	1	10	4	20.58	15.84	29.92	12176	6048
	ICM	1	10	4	36.5	32	14.06	39830	31618
	Sub Total		**78**	**31.2**	**19.92**	**16.03**	**24.92**	**25137**	**14091**
Finger Millet	ICM	2	51	10	17.33	14.44	22.75	25598	16489
	INM	4	69	19	24.77	20.30	41.69	49048	36907
	Varietal+INM	1	18	10	16.5	15.2	8.55	15200	4620
	Sub Total		**138**	**39**	**21.46**	**17.89**	**31.54**	**37512**	**26461**
Jowar	ICM	3	65	26	14.62	12.04	21.96	31423	22135
	IPM	1	13	5	16.26	13.75	18.25	28832	22650
	Varietal	9	133	47.8	20.09	15.69	28.44	45825	25263
	Sub Total		**211**	**78.8**	**18.53**	**14.70**	**26.16**	**41195**	**24340**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
Maize	IWM	1	13	5.2	50.12	48.33	3.70	26166	20789
	Varietal	1	15	0.5	130	90	44.44	160000	100000
	IPM	1	15	3	55.26	51.64	7.01	65418	56743
	Sub Total		**43**	**8.7**	**78.46**	**63.32**	**18.39**	**83861**	**59177**
Paddy	ICM	1	29	11.5	40.75	33.85	20.48	23127	7930
	IDM	2	26	5.6	38.57	33.73	17.04	71479	51705
	INM	6	133	31.20	40.28	30.80	32.94	36140	17514
	IPDM	1	20	8	38.2	32	19.38	17690	6880
	IPM	5	79	28.4	33.28	28.37	17.15	36089	25173
	Varietal	5	189	53	41.56	35.74	17.99	31738	20491
	Sub Total		**476**	**137.7**	**38.95**	**32.35**	**21.90**	**35928**	**21762**
Wheat	ICM	1	13	5	42.14	39.56	6.52	20943	15106
	IDM	1	10	4	27.00	24.00	12.50	57200	50400
	INM	2	23	6.6	32.41	29.73	8.98	33450	27890
	IPM	1	15	6.15	42.00	34.00	23.53	50590	35690
	IWM	1	13	5.2	29.66	22.54	31.59	36130	19316
	Varietal	6	113	38.6	28.08	23.31	20.63	34474	24527
	Sub Total		**187**	**65.55**	**31.17**	**26.62**	**17.99**	**36550**	**26955**
	Grand Total		**1133**	**360.95**					

Varietal Performance of Paddy in Maharashtra

Jordar cultivar of paddy provided highest yield of 48.83 q/ha in Nashik area which was 26.31% higher over local check. Phule Samruddhi cultivar performed well in Dhule, Kolhapur, Pune & Satara districts with average yield of 45.54 q/ha (Table 3.8). In Maharashtra, paddy yield was higher by 46.48% over national and 113.07% at state level (Fig. 3.4).

Fig 3.4 Yield performance of Paddy in Maharashtra

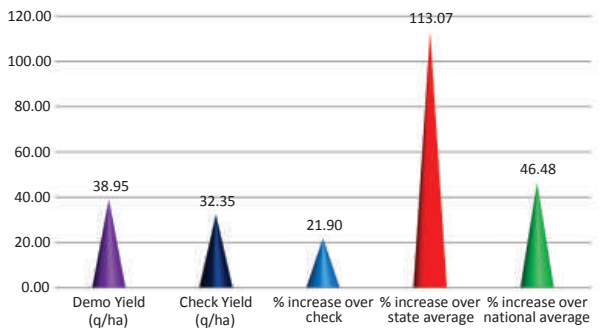


Table 3.8 Variety wise performance of paddy in Maharashtra

Variety	District/ KVK	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net Return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
Indryani	Ahmadnagar-I, Nashik-I	14	60	33.205	24.60	40.11	31248	13456	132.23
Jordar	Nashik-I	6	30	48.83	38.66	26.31	69886	42709	63.63
Karjat-3	Thane	13	40	38.2	32.00	19.38	16690	6380	161.60

Variety	District/ KVK	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net Return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
Karjat-9	Raigad, Sindhudurg, Thane	17.5	59	41.43	34.47	25.69	18935	7626	148.28
Karjat-5	Raigad	5	12	40.3	30.20	33.44	7675	5400	42.13
Karjat-7	Raigad	5	10	45.2	42.75	5.73	6435	2190	193.84
PDKV Tilak	Bhandara	5.2	13	33.15	29.65	11.80	40515	30145	34.40
PDKV Khamang	Gadchiroli	6	13	39.5	35.60	10.96	54900	42920	27.91
Phule Samruddhi	Dhule, Kolhapur-II, Pune-II, Satara-II	13.8	53	45.54	37.34	23.33	68051	42655	59.54
PKV Ganesh	Gadchiroli	5	13	27.65	25.6	8.01	27952	19952	40.10
PKV HMT	Gondia	5.2	13	32	26	23.08	49676	31168	59.38
Ratnagiri-6	Ratnagiri	10	80	33.2	23.4	41.88	31400	16800	86.90
Shriram	Chandrapur	12	30	34.8	30.2	15.23	44200	34300	28.86
SKL-RR-1	Bhandara	20	50	29.11	27.05	7.61	30953	26529	16.68
	Total	**137.7**	**476**	**38.95**	**32.35**	**21.90**	**35928**	**21762**	**65.09**

Commercial Crops

Under Cotton crop 85 frontline demonstrations conducted on 36 ha area in Maharashtra. Average yield obtained in demonstrations was 14.44 q/ha which was 23.13% higher over local check. In total, 220 frontline demonstrations on sugarcane were conducted covering an area of 78.50 ha at farmers' fields. Average yield of 1158.38 q/ha was achieved which was 15.76% higher over local check. Net profit of Rs. 191065 per ha was earned by the farmers. Yield obtained under different components is reported in Table 3.9. In Maharashtra, sugarcane yield was higher by 48.04% over national and 37.58% at state level (Fig. 3.5).

Fig 3.5 Yield performance of Sugarcane in Maharashtra

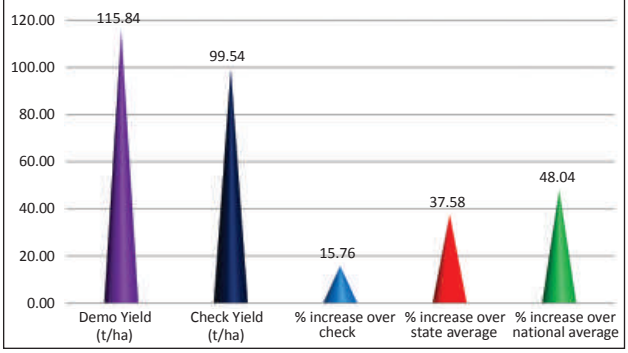


Table 3.9 Thematic area wise physical achievements of FLDs on commercial crops in Maharashtra

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
Cotton	IPM	4	85	36	14.44	11.74	23.13	43790	29867
Sugarcane	ICM	1	13	5	1011	922	9.65	145785	121520
	INM	5	80	30.4	1316.40	1109.38	18.57	218945	160524
	IPM	3	73	21.7	1005.63	851.00	17.27	171228	129113

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
	IWM	1	13	5.2	803.3	742.6	8.17	103367	90184
	Problematic soil management	2	15	6	1450	1210	19.83	204140	148890
	RCT	2	26	10.2	942.5	853.5	10.63	187211	162372
	Sub Total		**220**	**78.5**	**1158.38**	**995.38**	**15.76**	**191065**	**146670**
	Grand Total		**305**	**114.5**					

Flower Crops

A total of 10 demonstrations in Chrysanthemum, 15 in Galardia, 23 in Marigold and 13 demonstrations in Tuberose were conducted covering area of 11.90 ha at farmers' fields (Table 3.10). In Chrysanthemum, technologies such as varietal introduction gave yield of 101.20 q/ha which was quite higher (29.58%) as compared to 78.10 q/ha in local check. In Galardia, Integrated crop management gave yield of 82 q/ha which was also superior over local check. In Marigold, technologies such as varietal introduction, INM gave yield of 124.03 q/ha which was more by 47.84%. In Tuberose, varietal introduction gave yield of 88.20 q/ha with the net profit of Rs. 288950.

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
Chrysanthemum	Varietal	1	10	2	101.20	78.10	29.58	63700	38497
Galardia	ICM	1	15	4	82.00	63.80	28.53	112880	82390
Marigold	INM	1	13	2.6	95.00	68.00	39.71	282500	179700
	Varietal	1	10	2	153.06	98.13	55.98	52868	25505
	Sub Total		**23**	**4.6**	**124.03**	**83.07**	**47.84**	**167684**	**102603**
Tuberose	Varietal	1	13	1.3	88.20	79.40	11.08	288950	235800
	Grand Total		**61**	**11.9**					

Fodder Crops

Frontline demonstrations on berseem (15), guinea grass (20), jowar (88) and napier (53) were organized covering an area of 19.78 ha in field situations (Table 3.11). In berseem, technologies such as varietal introduction gave yield of 780 q/ha which was higher as compared to local check (600 q/ha.). In guinea grass, technologies such as varietal introduction shown yield of 370 q/ha whereas in local check 180 q/ha was attained by the farmers. In jowar, interventions such as fodder demonstrations gave higher yield of 834.40 q/ha as compared to local check (765.60 q/ha). In napier, varietal demonstrations provided yield of 1523.33 q/ha which was superior over local check (1013.33 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	15	3	780	600	30	4000	3500
Guinea Grass	Varietal	1	20	0.4	370	180	105.56	9250	4500
Jowar	Fodder Prod.	5	88	11.18	838.4	765.60	20.78	137335	80527
Napier	Varietal	4	53	5.2	1523.33	1013.33	119.52	211133	128532
	Total		**176**	**19.78**					

Fruit Crops

In fruit crops, banana (189), cashew (5), guava (05), lime (35), mango (54), orange (116), pomegranate (87), sapota (20) and sweet orange (25) frontline demonstrations were conducted covering area of 150.65 ha at farmers' fields (Table 3.12). In banana, technologies such as ICM, IDM and INM gave yield of 670.67 q/ha which was higher (18.93%) than local check (570.15 q/ha). Among above technologies, IDM provided highest yield of 735.67 q/ha in demonstration plot. In Cashew, IPM component gave yield of 10.20 q/ha which showed superiority. In Guava, INM technology gave 175q/ha yield which was 59.09% more than local. In lime, ICM, INM component reported yield of 152.27 q/ha which was more as compared to local check (127.83 q/ha). In Mango, technologies such as ICM, INM, IPDM and IPM provided yield of 73.48 q/ha. Among above technologies, ICM gave highest yield of 100.12 q/ha under demonstrations. In orange, ICM, IPM and INM related interventions reported productivity of 192.83 q/ha which was 21.24% higher over local check (160.05 q/ha). Among above technologies, INM exhibited highest yield of 211.78 q/ha in demonstration plots. In pomegranate, ICM, IDM, INM, IPM and varietal components shown good result and furnished yield of 119.27 q/ha which was quite higher (15.94%) than local practice (103.06 q/ha). Among above interventions, ICM resulted yield of 145.53 q/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	4	104	15.6	602.42	507.37	22.14	279275	142743
	IDM	3	35	14	735.67	626.67	16.42	428100	263367
	INM	2	50	20	696.67	597.33	17.16	206000	127533
	Sub Total		**189**	**49.6**	**670.67**	**570.15**	**18.93**	**301940**	**174367**
Cashew	IPM	1	5	1	10.2	6.50	56.92	48000	19800
Guava	INM	1	5	0.1	175	110	59.09	100000	35000
Lime	ICM	2	20	8	174.65	147.95	18.63	300556	236591
	INM	1	15	6	107.50	87.60	22.72	199050	141010
	Sub Total		**35**	**14**	**152.27**	**127.83**	**19.99**	**266721**	**204731**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
Mango	ICM	2	34	10.5	100.12	67.14	48.53	254584	167124
	INM	1	5	0.5	36.9	24.5	50.6	29600	15560
	IPDM	1	10	4.15	98.4	75.2	23.57	80500	45800
	IPM	1	5	1	31.86	22.20	43.50	23550	12200
	Sub Total		**54**	**16.15**	**73.48**	**51.24**	**42.94**	**128563**	**81562**
Orange	ICM	2	25	6	183.46	150.81	22.45	221171	142319
	INM	5	61	16.8	211.78	173.76	23.43	289897	206050
	IPM	2	30	8	154.81	135.01	14.56	173791	129325
	Sub Total		**116**	**30.8**	**192.83**	**160.05**	**21.24**	**248823**	**174838**
Pomegranate	ICM	2	20	4	145.53	128.94	12.76	482680	331156
	IDM	1	8	3.2	66.70	54.10	23.29	173050	123700
	INM	1	13	2.6	94.43	85.46	10.50	250947	212790
	IPM	2	23	4.6	119.00	99.00	20.37	254947	175798
	Varietal	2	23	6.6	132.00	114.50	13.73	646288	430400
	Sub Total		**87**	**21**	**119.27**	**103.06**	**15.94**	**398978**	**276400**
Sapota	IPDM	1	20	8	162	138	17.39	115580	76360
Sweet Orange	IPDM	1	20	8	163.75	128.00	27.93	391050	283000
	ICM	1	5	2	52	44	18.18	160000	145000
	Sub Total		**25**	**10**	**107.88**	**86.00**	**23.06**	**275525**	**214000**
	Grand Total		**536**	**150.65**					

Plantation Crops

Demonstrations on mulberry (20) and coconut (20) were organized covering area of 16.0 ha in field conditions (Table 3.13). In mulberry, technologies such as INM gave yield of 4.1 q/ha which was higher (33.55%) as compared to local practice (3.07 q/ha). In coconut, technologies such as IPM reported yield of 10060 nut/ha which showed superiority over check (9230 nut/ha) with 8.99% 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
Mulberry	INM	1	20	8	4.1	3.07	33.55	141000	97710
Coconut	IPM	1	20	8	10060 Nut/ha	9230 Nut/ha	8.99	36015	23900
	Total		**40**	**16**					

Spices Crops

Under spices, 271 frontline demonstrations were organized on 42.6 ha. area (Table 3.14). In ajwain, under varietal demonstrations reported average yield of 9.22 q/ha which was 24.43% higher with net gain of Rs. 95580/ha. In ginger, technologies such as IPDM gave yield of 200.25 q/ha which was higher (14.76%) as compared to local practice (174.50 q/ha). In turmeric, ICM, INM, IPM and varietal component reported yield of 248.58 q/ha which was more as compared to local check (206.64 q/ha).

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	1	10	4	9.22	7.41	24.43	95580	73920
Ginger	IPDM	1	12	4.8	200.25	174.5	14.76	130750	120150
Turmeric	ICM	2	215	23	162.1	124.88	24.86	260954	230266
	INM	1	10	4	61.14	54.2	12.80	206840	168200
	IPM	1	10	4	382.00	325.00	17.54	505450	400625
	Varietal	1	14	2.8	475.57	404.27	17.64	335484	268500
	Sub Total		**249**	**33.8**	**248.58**	**206.64**	**19.54**	**313936**	**259571**
	Grand Total		**271**	**42.6**					

Tuber Crops

Under tuber crops, demonstrations on potato (13) and sweet potato (30) were conducted at farmers' fields covering 4.90 ha area (Table 3.15). In potato, technologies such as intercropping in sugarcane gave yield 18.5 q/ha of potato and realised with Rs. 37000/ha additional net profit as compared to check. Component of ICM & IPDM in sweet potato yielded 133 q/ha under demonstrations with economic gain of Rs. 123500/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	ICM	1	13	2.4	Potato -18.5 (Sugarcane-249)	Sugarcane-205	-	108500	71500
Sweet Potato	IPDM	1	20	2	124	104	19.23	94000	64000
	ICM	1	10	0.5	142	130	9.23	153000	96000
	Sub Total		**30**	**2.5**	**133**	**117**	**14.23**	**123500**	**80000**
	Grand Total		**43**	**4.9**					

Vegetable Crops

Under vegetables, demonstrations on amaranthus (10), bitter gourd (35), brinjal (63), dry chilli (13), green chilli (32), coriander (30), dolichus bean (20), drumstick (39), garlic (20), okra (53), onion (357), tomato (49) and watermelon (05) were organized covering area of 187.40 ha in the farmers' fields (Table 3.16). In bitter gourd, technologies such as varietal demonstrations, INM and IDM shown yield of 47.67 q/ha with net profit of Rs. 167692/ha. In brinjal, technologies such as INM, IPM, IPDM and Varietal introduction components gave yield of 271.01 q/ha. In green chilli, technologies such as ICM, INM and Organic farming provided yield of 165.40 q/ha with net profit of Rs. 233980/ha. In drumstick, technologies such as ICM and varietal demonstrations gave yield of 375 q/ha which was higher by 35.09%. In garlic, varietal demonstration exhibited yield of 155.55 q/ha, which was 11.95% more than check (136.75 q/ha.)

In okra, technologies such as INM, IPM and varietal demonstration gave yield of 113.37 q/ha which was higher (21.56%) over farmer's practice. In dolichus bean, varietal component provided yield of 92.80 q/ha with profit of Rs. 131130/ha. In onion, technologies such as varietal component reported highest yield of 278.97 q/ha with net profit of Rs. 248194/ha. In tomato, INM, IPDM and varietal component provided yield of 433.75 q/ha which was higher (21.32%) over check (352.51 q/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	0.5	10.5	9.5	10.52	65000	40000
Bittergourd	Varietal	1	20	2	49.8	38.6	29.02	118214	59595
	INM	1	10	1	79.22	67.75	16.93	240860	185339
	IDM	1	5	0.1	14	12.2	14.75	144000	100000
	Sub Total		**35**	**3.1**	**47.67**	**39.52**	**20.23**	**167692**	**114978**
Brinjal	INM	1	13	2.6	260	210	23.81	162700	62300
	IPDM	1	13	5	205	171	19.88	128050	94510
	IPM	2	22	2.2	283.77	241.62	16.44	268755	206780
	Varietal	1	15	6	322.5	252.44	27.75	143500	81220
	Sub Total		**63**	**15.8**	**271.01**	**223.34**	**20.87**	**194352**	**130318**
Chilli (Dry)	IDM	1	13	2.6	158.62	133.77	18.58	266988	202948
Chilli (Green)	INM	1	10	1	185	150	23.33	190000	95000
	Organic Farming	1	10	4	131.2	88	32	265740	165940
	ICM	1	12	4.8	180	130	38.46	246200	110000
	Sub Total		**32**	**9.8**	**165.40**	**122.67**	**31.26**	**233980**	**123647**
Coriander Leaf	Varietal	1	30	6	116.5	93.66	24.39	124750	66392
Dolichus Bean	Varietal	1	20	2	92.8	86.6	7.16	131130	107030
Drumstick	ICM	2	26	10.4	300	242.5	27.64	171225	121870
	Varietal	1	13	2.6	525	350	50	620000	280000
	Sub Total		**39**	**13**	**375**	**278.33**	**35.09**	**320817**	**174580**
Garlic	Varietal	2	20	0.5	155.55	136.75	11.95	96777	72415
Okra	INM	1	15	3	95.33	78.73	21.08	94847	54956
	IPM	1	13	2.6	139	113	23.01	217389	84126
	Varietal	2	25	7	109.57	90.22	21.08	149530	114650
	Sub Total		**53**	**12.6**	**113.37**	**93.04**	**21.56**	**152824**	**92095.5**
Onion	ICM	5	60	18	257.01	227.87	13.68	166335	132745
	INM	7	128	43.2	234.77	198.81	18.22	177433	138875
	IPDM	2	25	10	226	168	28.11	192924	111590
	IPM	1	10	2	165	152	8.55	173154	126972
	Varietal	10	134	33.6	278.97	236.08	19.24	248194	172119
	Sub Total		**357**	**106.8**	**253.41**	**215.19**	**18.13**	**204586**	**148288**
Tomato	INM	1	5	2	540	510	5.88	168000	148947
	IPDM	1	12	4.8	502.5	409.1	22.83	442250	355700
	Varietal	3	32	6.9	375.41	281.15	25.97	141660	98575
	Sub Total		**49**	**13.7**	**433.75**	**352.51**	**21.32**	**207046**	**160074**
Watermelon	ICM	1	5	1	216	174	24.14	25700	4390
	Grand Total		**726**	**187.4**					

Hybrids

Under hybrids, demonstrations on bajra (05), brinjal (44), cabbage (10), chilli green (42), cotton (170), fodder (28), maize (10), napier (94), okra (59), onion (20), paddy (22), tomato (53) and watermelon (10) were conducted covering area of 162.71 ha at farmers'

fields (Table 3.17). In cotton, average yield of 17.28 q/ha was obtained under demonstrations with net economic gain of Rs. 49754/ha. In okra, mean yield of 151.17 q/ha was attained which was higher (17.30%) over local check. In onion, INM and IPDM components reported average yield of 154.53 q/ha which was higher (10.73%) as compared to local check (140 q/ha). In tomato, mean yield of 501.96 q/ha was achieved with net profit of Rs. 278527/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	ICM	1	5	1	72.5	45	61.11	70250	49500
Brinjal	IPM	4	44	14.6	212.81	186.93	15.65	438892	367253
Cabbage	ICM	1	10	2	584.90	537.48	8.82	238069	204071
Chilli Green	ICM	3	32	6.40	199.75	149.75	35.97	143963	79167
	IPM	1	10	1	128	116	10.34	59800	42240
	Sub Total		**42**	**7.4**	**181.81**	**141.32**	**29.56**	**122923**	**69935**
Cotton	ICM	2	50	20	23.22	20.28	15.09	76105	61110
	INM	2	20	8	14.41	11.88	20.86	23206	14498
	IPDM	1	10	4	18.95	14.2	33.45	59120	27520
	IPM	5	90	36	14.53	12.48	17.14	42689	29498
	Sub Total		**170**	**68**	**17.28**	**14.66**	**18.74**	**49754**	**35212**
Fodder Crop	Varietal	1	28	3.5	694.25	615.5	12.63	36411	26123
Maize	INM	1	10	4	68.37	52.75	29.61	38412	29122
Napier	Hybrid	7	94	13.11	1658.41	1366.96	21.56	152815	112201
Okra	ICM	2	34	12	159.25	132	20.62	251150	116350
	IPM	1	25	10	135	122	10.66	108600	90600
	Sub Total		**59**	**22**	**151.17**	**128.67**	**17.30**	**203633**	**107767**
Onion	INM	1	10	1	231.05	210	10.02	122775	103425
	IPDM	1	10	4	78	70	11.43	131100	113000
	Sub Total		**20**	**5**	**154.53**	**140**	**10.73**	**126938**	**108213**
Paddy	INM	1	12	5	59.1	50.6	16.80	44410	31800
	Varietal	1	10	4	64.1	59.35	8	38650	32081
	Sub Total		**22**	**9**	**61.6**	**54.98**	**12.40**	**41530**	**31941**
Tomato	IDM	1	13	2.6	450	412	9.22	182500	137500
	INM	2	25	5	592.96	502.04	18.29	335825	220683
	Varietal	2	15	1.5	436.95	355.3	22.32	269242	177148
	Sub Total		**53**	**9.1**	**501.96**	**425.34**	**18.09**	**278527**	**186632**
Watermelon	ICM	1	10	4	490	390	25.64	243688	119800
	Grand Total		**567**	**162.71**					

Livestock and Fisheries

Livestock and fisheries are major components for livelihood security. Under these sectors, 1170 demonstrations (198 on dairy buffaloes; 446 on dairy cow; 228 on goats; 278 on poultry and 20 on fisheries) were conducted covering 15224 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 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	4.25	4.05	4.94
	Nutrition Management	1	20	40	kg/animal	630	570	10.53
	Nutrition Management	12	155	302	Milk yield L/anim./day	8.26	7.05	19.84
	Breed introduction	1	13	13	Milk yield L/anim./day	8.6	4.9	75.51
	Sub Total		**198**	**365**				
Cow	Disease management	5	63	149	Milk yield L/anim./day	9.17	7.14	26.87
	Disease management	1	12	12	Morbidity rate%	2	5	
	Disease management	1	13	13	No. of ectoparasites/sq inch	2	11	
	Nutrition Management	20	292	470	Milk yield L/anim./day	10.17	8.82	17.36
	Nutrition Management	2	30	75	Weight gain kg/animal	17.78	16	11.13
	Production management	2	23	53	Milk yield L/anim./day	9.15	7.9	19.89
	Production management	1	13	13	No. of inseminations for conception/anim.	8	5	60
	Sub Total		**446**	**785**				
Fishery	Production management	2	20	4000	Kg of Fish	726	260	178.81
Goatary	Breed	1	4	16	kg/animal	22.18	11.48	93.21
	Disease management	3	35	235	kg/animal	18.74	15.8	14.96
	Nutrition Management	12	126	419	kg/animal	15.14	12.38	24.06
	Nutrition Management	4	50	260	Weight gain in kg/kid/month	3.85	2.65	70.79
	Production management	1	13	13	Conception rate %	100	76	31.57
	Sub Total		**228**	**943**				

Livestock	Thematic Areas	KVK	Demos (No.)	Livestock (No.)	Unit of Yield	Demo Yield	Check Yield	% Increase
Poultry	Breed introduction	10	123	2531	Kg/bird	1.82	1.19	58.17
	Breed introduction	8	102	1170	No. of eggs /bird/year	165.83	84	99.83
	Breed introduction	1	30	300	Mortality %	6	7	
	Disease management	1	10	5000	Kg/bird	2.02	1.99	1.91
	Nutrition Management	1	13	130	Kg/bird	2.2	1.99	29.41
	Sub Total		**278**	**9131**				
	Grand Total		**1170**	**15224**				

Gujarat

FLDs on Pulses

Pulses demonstrations are important for nutritional security in India. In this context, 253 demonstrations on chick pea, 273 green gram, 51 field bean, 11 black gram and 129 on pigeon pea were organized at farmers' fields covering 248.30 ha area (Table 3.19). In chick pea, technologies such as ICM, IDM, INM, IPDM, IPM and varietal demonstrations gave mean yield of 17.62 q/ha which was 13.89% higher over farmer's practice with average net return of Rs. 54470/ha. Under varietal demonstrations, yield of 25.93 q/ha was attained with net profit of Rs. 86052/ha. In green gram, ICM component gave yield of 8.51 q/ha which found higher over local check (6.54 q/ha). In pigeon pea, ICM, IPDM, IPM and varietal components provided average yield of 13.94 q/ha with economic gain of Rs. 44143/ha. Under ICM, pigeon pea performed well (15.13 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
Black gram	Varietal	1	10	4.00	10.74	8.71	23.31	16406	7571
	ICM	1	1	0.40	10.20	8.70	17.24	43740	35940
	Sub-Total		**11**	**4.40**	**10.47**	**8.71**	**20.27**	**30073**	**21756**
Chickpea	ICM	1	18	11.00	18.40	17.00	8.24	47380	43000
	IDM	3	45	16.50	14.07	11.92	17.82	28142	21345
	INM	1	10	4.00	12.10	10.10	19.80	40250	31000
	IPDM	1	25	6.25	27.60	25.30	9.09	83308	73449
	IPM	5	80	27.00	13.60	12.03	13.68	35089	27940
	Varietal	7	75	26.25	25.93	21.74	19.86	86052	66146
	Sub-Total		**253**	**91.00**	**17.62**	**15.48**	**13.89**	**54470**	**43714**
Pigeonpea	ICM	2	66	13.00	15.13	12.64	22.27	48882	38597
	IPDM	1	5	20.00	10.71	8.94	19.80	34528	25018
	IPM	1	10	2.50	10.70	8.45	26.63	24300	17800
	Varietal	2	48	24.00	11.95	9.40	27.06	36657	24887
	Sub-Total	**6**	**129**	**59.50**	**13.94**	**11.57**	**22.58**	**44143**	**34320**
Greengram	ICM	3	208	57.40	8.51	6.54	33.98	36800	25969
	IPM	1	25	10.00	7.56	7.13	6.03	12366	10983
	Varietal	3	40	16.00	9.50	8.11	16.96	44373	33734
	Sub-Total		**273**	**83.40**	**8.81**	**7.19**	**25.01**	**37187**	**27015**
Fieldbean	ICM	1	51	10.00	10.88	8.08	34.65	36853	25100
	Grand Total		**717**	**248.3**					

Varietal Performance of Pigeon Pea in Gujarat

Different improved varieties of pigeon pea were demonstrated and highest yield of 18.40 q/ha was attained with GT-105 cultivar in Surat followed by GT-104 (14.02 q/ha) in Valsad and Surat districts (Table 3.20). In Gujarat, pigeon pea yield obtained was 85.62% more than national and 40.67% at state level (Fig. 3.6).

Fig 3.6 Yield performance of Pigeon pea in Gujarat

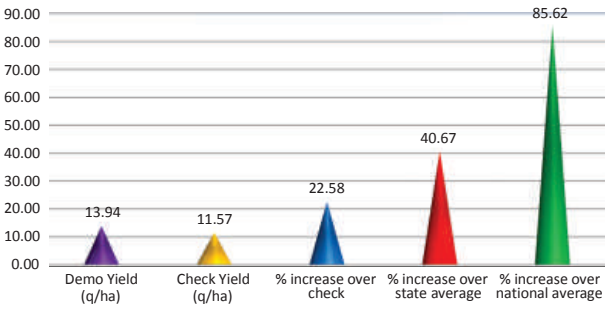


Table 3.20 Variety wise performance of pigeon pea in Gujarat

Variety	District/KVK	Area (ha)	No. of Demos	Demo Yield (q/ha)	Check yield (q/ha)	% increase	Net return (Rs./ha)		% increase
							Demo	Check	
AGT 2	Dahod, Panchmahal	12.5	35	10.6	8.38	26.57	32416	23486	38.02
GNP-2	Navsari, Surat, Bharuch	37	34	12.74	10.45	21.97	36629	26512	38.16
GT-104	Surat, Valsad	7.5	55	14.02	11.18	28.78	45418	33187	36.85
GT-105	Surat	2.5	5	18.40	16.28	13.02	62110	54094	14.81
	Sub-total	**59.5**	**129**	**13.94**	**11.57**	**22.58**	**44143**	**34320**	**31.96**

Performance of Chickpea Varieties in Gujarat

Technology demonstrations of chickpea with GG-1, GJG-3, GG-2, GJG-5 and GG-5 were conducted on 91.00 ha area benefitting 253 farmers. Higher yield of 26.28 q/ha was achieved under GG-5 cultivar in KVKs Ahmedabad, Junagadh, Morbi and Rajkot-II followed by GJG-5 (25.09 q/ha) in Bharuch and Rajkot-I districts (Table 3.21). In Gujarat, chickpea yield was increased by 64.21% over national and 12.37% at state level (Fig. 3.7).

Fig 3.7 Yield performance of chickpea in Gujarat

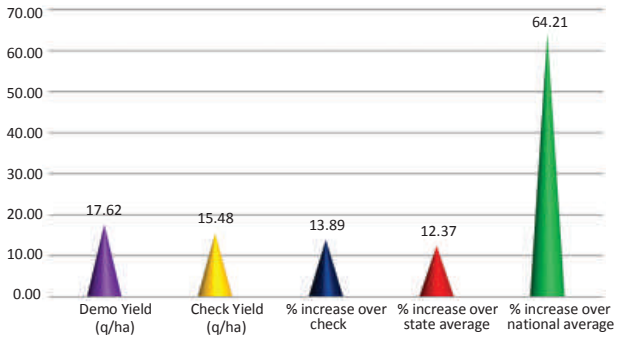


Table 3.21 Yield wise performance of chickpea in Gujarat

Variety	District/KVK	Area (ha)	No. of Demos	Demo Yield (q/ha)	Check yield (q/ha)	% increase	Net return (Rs./ha)		% increase
							Demo	Check	
GG-2	Anand, Kheda	9	35	13.27	11.44	16.37	30631	20192	51.70
GG-1	Porbandar	4	10	15.10	14.69	2.79	56560	53048	6.62
GG-5	Ahmedabad, Junagadh, Morbi, Rajkot-II	18.25	55	26.28	22.154	19.51	90984	69754	30.44
GJG-3	Dahod, Panchmahal, Surendranagar, Amreli, Ahmedabad	44.75	125	15.82	13.63	16.89	39703	31863	24.61
GJG-5	Bharuch, Rajkot-I	15	28	25.09	21.575	14.88	71400	58550	21.95
	Total	**91**	**253**	**17.62**	**15.48**	**13.89**	**54470**	**43714**	**28**

FLDs on Oilseeds

Different technology demonstrations on oilseed crops were conducted especially on groundnut (176), mustard (40), sesame (106) and soybean (87) on 160.40 ha area at farmers' fields (Table 3.22). In groundnut, IDM, INM, IPM and varietal components provided yield of 19.63 q/ha which was more as compared to farmer's practice (16.80 q/ha). Among above technologies, varietal performance gave highest yield of 21.34 q/ha in demonstration plots. In mustard, INM and varietal related interventions contributed yield of 20.06 q/ha which was greater than local check (17.42 q/ha). In sesame, ICM and varietal component gave yield of 6.47 q/ha which was bit higher over local practice (5.31 q/ha). In soybean, average yield of 13.87 q/ha was obtained with adoption of different package of practices like ICM, IPM and improved varieties.

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

Variety	District/KVK	Area (ha)	No. of Demos	Demo Yield (q/ha)	Check yield (q/ha)	% increase	Net return (Rs./ha)		% increase
							Demo	Check	
Castor	IDM	10	10	4	24.30	19.50	24.62	106420	75800
	Variety	7	7	5	41.56	30.26	37.34	159087	95290
	Sub-Total		**17**	**9**	**32.93**	**24.88**	**30.98**	**132753**	**85545**
Groundnut	IDM	2	15	6	18.38	15.59	17.81	49573	35157
	INM	2	22	9	18.43	15.43	15.14	52355	44371
	IPM	3	62	22	20.39	17.75	13.85	56757	44195
	Variety	6	77	24	21.34	18.43	14.77	63080	47039
	Sub-Total		**176**	**61**	**19.63**	**16.80**	**15.39**	**55441**	**42690**
Mustard	INM	1	15	6	23.12	19.03	21.49	53651	39147
	Variety	1	25	10	17.00	15.80	7.59	73358	47500
	Sub-Total		**40**	**16**	**20.06**	**17.42**	**14.54**	**63504**	**43323**
Sesamum	ICM	1	20	8	5.10	3.80	34.21	32870	21966
	Variety	6	86	34.4	7.84	6.82	14.87	35885	25865
	Sub-Total		**106**	**42.4**	**6.47**	**5.31**	**24.54**	**34377**	**23915**
Soybean	IPM	1	25	10	14.60	13.10	11.45	26540	21020
	ICM	1	13	5	10.10	8.50	18.82	14840	9040.
	Variety	2	49	17	16.90	14.70	15.15	43972	35170
	Sub-Total		**87**	**32**	**13.87**	**12.10**	**15.14**	**28450**	**21743**
	Grand Total		**426**	**160.4**					

Varietal Performance of Groundnut in Gujarat

Groundnut cultivars were demonstrated at farmers' fields and higher yield (33.45 q/ha) was obtained under GJG-32 in Morbi district followed by GJG-22 (21.83 q/ha) in Amreli, Bharuch, Porbandar and Rajkot districts. Net profit of Rs. 65812/ha was earned by the farmers under demonstrations.

Table 3.23 Variety wise performance of groundnut in Gujarat

Variety	District/KVK	Area (ha)	No. of Demos	Demo Yield (q/ha)	Check yield (q/ha)	% increase	Net return (Rs./ha)		% increase
							Demo	Check	
GG-22	Junagadh	12	29	15.72	14.15	10.12	46763	36082	29.60
GJG-22	Amreli, Bharuch, Porbandar, Rajkot-I, Rajkot-II	39	122	21.83	18.79	15.50	58596	45668	28.31
GJG-31	Surendranagar	6	15	13.26	11.67	13.74	40586	33228	22.14
GJG-32	Morbi	4	10	33.45	26.46	26.42	117304	76562	53.21
	Total	**61**	**176**	21.06	17.77	16.45	65812	47885	33.32

Performance of Soybean Cultivars in Gujarat

Frontline demonstrations on soybean were conducted with two improved varieties MACS-1188 and NRC-37 in Bharuch, Surat, Vadodara and Dahod. MACS-1188 variety performed well and provided higher yield of 17.90 q/ha followed by NRC-37 with productivity of 13.53 q/ha. On an average, net gain of Rs. 35195/ha was realised by the farmers (Table 3.24). In Gujarat, soybean yield was increased by 29.17% over national and 19.27% at state level (Fig. 3.8).

Fig 3.8 Yield performance of Soybean in Gujarat

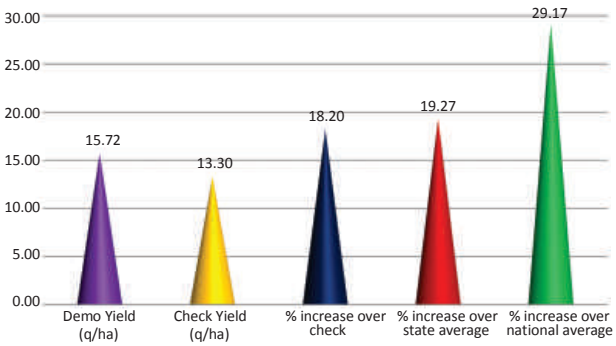


Table 3.24 Variety wise performance of soybean in Gujarat

Variety	District/KVK	Area (ha)	No. of Demos	Demo Yield (q/ha)	Check yield (q/ha)	% increase	Net return (Rs./ha)		% increase
							Demo	Check	
MACS-1188	Bharuch	12	25	17.90	14.40	24.31	40925	28500	43.60
NRC-37	Dahod, Vadodara, Surat	20	62	13.53	12.20	12.09	29467	23967	22.95
	Total	**32**	**87**	**15.72**	**13.30**	**18.20**	**35195**	**26233**	**33.27**

Cereals and Millets

Different technology demonstrations were laid out at farmers' fields mainly on paddy (1536), wheat (443), finger millet (190), maize (45), Pearl Millet (37), jowar (54) and little millet (35) on 770.75 ha area (Table 3.25). In finger millet, ICM, IDM gave yield of 10.83 q/ha which was more (26.11%) than local check (8.54 q/ha). Among above technologies, ICM gave highest yield of 11.53 q/ha under demonstration plots. In jowar, INM and varietal component gave yield of 17.74 q/ha which was more than 16.50% as compared to check (15.08 q/ha). In little millet, INM and ICM component provided yield of 10.51 q/ha as compared to 7.57 q/ha in local check with 38.75 % increase. In paddy, technologies such as ICM, IPDM, IPM, varietal gave yield of 42.61 q/ha as compared to 37.21 q/ha in local check with 15.50% increase followed by IPM gave highest yield of 43.32 q/ha in demo plot. In wheat, technologies such as ICM, INM, improved variety gave yield of 39.51 q/ha as compared to 35.19 q/ha in local check with 12.46% increase. Among above technologies, improved variety gave highest yield of 41.84 q/ha in demo plot as compared to local check (35.58 q/ha).

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	3	165	31.00	11.53	8.74	31.01	20135	14153
	IDM	1	25	2.50	10.12	8.35	21.20	19360	14854
	Sub-Total		**190**	**33.50**	**10.83**	**8.54**	**26.11**	**19748**	**14503**
Jowar	ICM	1	15	6.00	21.80	18.05	20.78	37000	28025
	INM	1	25	10.00	14.22	13.91	2.23	32798	31864
	Varietal	1	14	5.00	21.25	16.25	30.77	21975	14375
	Sub-Total		**39**	**15.00**	**17.74**	**15.08**	**16.50**	**27387**	**23120**
Little millet	ICM	1	25	5.00	10.22	7.49	36.45	12484	8500
	INM	1	10	4.00	10.79	7.65	41.05	13738	8830
	Sub-Total		**35**	**9.00**	**10.51**	**7.57**	**38.75**	**13111**	**8665**
Pearl Millet	IWM	1	12	5.00	22.05	18.88	16.79	15784	7647
	ICM	1	10	4.00	30.20	24.50	23.27	41780	31850
	varietal	2	15	6.00	21.43	21.31	5.15	27071	23620
	Sub-Total		**37**	**15.00**	**24.56**	**21.56**	**15.07**	**28212**	**21039**
Maize	IDM	1	10	2.50	31.50	25.00	26.00	30600	21400
	IPM	2	35	12.50	23.85	18.90	22.73	18260	11950
	Sub-Total		**45**	**15.00**	**27.68**	**21.95**	**24.36**	**24430**	**16675**
Paddy	ICM	8	1128	369.50	42.05	36.14	17.68	37443	33956
	IPDM	2	15	29.00	39.87	34.94	14.38	40403	30779
	IPM	6	136	50.00	43.32	39.31	10.61	40172	31547
	Nursery Management	1	25	2.00	36.65	32.34	13.33	33959	21877
	Varietal	5	232	65.50	39.74	36.29	12.00	38936	29340
	Sub-Total		**1536**	**516.00**	**42.61**	**37.21**	**15.50**	**44031**	**32635**
Wheat	ICM	2	62	25.00	40.28	35.18	14.95	51416	38089
	INM	7	162	63.00	36.78	33.69	9.24	38920	32781
	IPM	1	25	5.00	39.12	36.29	7.80	45410	38595
	Varietal	9	194	68.25	41.84	35.58	17.84	53998	41013
	Sub-Total		**443**	**167.25**	**39.51**	**35.19**	**12.46**	**47436**	**37619**
	Grand Total		**2340**	**770.75**					

Commercial Crops

Technology demonstrations under sugarcane were taken up covering 33 farmers on q/ha area at farmers' fields (Table 3.26). Under different components of ICM, INM and IPM mean yield of 563.02 q/ha was obtained which was higher over local check (490.24 q/ha) with net profit of Rs. 164968/ha. Under IPM component, highest yield of 1046 q/ha was attained. In cotton, INM, IPM and varietal introduction provided yield of 16.57q/ha which was higher as compared to local check (14.98 q/ha) with net profit of Rs. 50077/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	16	3	522.00	440.50	17.84	220007	177480
	INM	1	5	1	121.05	115.23	5.05	139407	126585
	IPM	1	12	5	1046.00	915.00	14.32	135490	111825
	Sub-Total		**33**	**9**	**563.02**	**490.24**	**12.40**	**164968**	**138630**
Cotton	INM	2	35	14	17.78	15.90	11.68	62676	48575
	IPM	6	117	46.8	19.15	17.37	10.46	60217	48232
	Variety	1	16	4	12.78	11.67	9.51	27338	20177
	Sub-Total		**168**	**64.8**	**16.57**	**14.98**	**10.55**	**50077**	**38994**
	Grand Total		**201**	**73.8**					

Fodder Crops

Fodder crops played an important role towards livestock management and gave higher milk yield. Different frontline demonstrations on jowar (205), oat (80), lucerne (30), and napier (27) were conducted covering an area of 56.20 ha at farmers' fields (Table 3.27). In sorghum average yield of 611 q/ha was obtained under varietal component which proved superior to local check (530 q/ha). In napier, varietal component reported highest yield of 2470 q/ha which was greater as compared to local check (2140 q/ha). In lucerne, varietal component gave yield of 535 q/ha which was higher (44.87%) over farmer's practice (367.50 q/ha). In oat, improved variety gave yield of 351.50 q/ha with net profit of Rs. 32448 /ha.

Table 3.27 Thematic area wise physical achievements 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
Jowar	Variety	6	205	29.5	582.91	493.77	39.90	73892	52819
Lucerne	Variety	2	30	9	535.00	367.50	44.87	88816	54159
Oat	Variety	4	80	15	351.50	308.65	14.15	32448	17793
Napier	Variety	1	27	2.7	2470.00	2140.00	15.42	131500	111600
			342	**56.2**					

Fruit Crops

In horticultural crops, demonstrations on banana (40), lime (35) mango (398) dragon fruit (96), sapota (33) and watermelon (15) were conducted on 162 ha area at farmers' fields (Table 3.28). In banana, INM and IPDM gave yield of 858.90 q/ha which was greater than local check (781.61 q/ha). In mango, technologies such as ICM, INM, IPDM and IPM gave yield of 67.73 q/ha and found good over check. In watermelon, technologies such as INM, gave yield of 450 q/ha.

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	30	9	942.58	882.58	6.81	609928	566628
	IPDM	1	10	4	775.22	680.65	13.89	233849	188293
	Sub-total		**40**	**13**	**858.90**	**781.61**	**10.35**	**421888**	**377460**

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
Lime	IDM	1	10	1	124.50	108.70	14.54	195688	165823
	INM	2	25	4	105.45	96.90	10.96	186887	168926
	Sub-total		**35**	**5**	**114.98**	**102.80**	**12.75**	**191287**	**167374**
Mango	ICM	1	10	2	51.14	19.36	164.15	185307	150719
	INM	1	96	38	87.00	80.00	8.75	143000	122000
	IPM	4	282	81	65.96	56.31	21.01	157798	145745
	IPDM	1	10	4	66.80	65.45	2.06	103460	94645
	Sub-total		**398**	**125**	**67.73**	**55.28**	**48.99**	**147391**	**128277**
Sapota	INM	1	33	12	120.00	109.00	10.09	370000	345000
Watermelon	INM	1	15	6	450.00	395.00	13.92	185000	168000
Dragon fruit	Variety	1	96	1	16	12	33.33	228000	198000
	Grand Total		**617**	**162**					

Spices Crops

Under spices, ajwain (35), coriander (145), cumin (246) and fennel (75), were demonstrated covering an area of 192.60 ha in the farmers' fields (Table 3.29). In coriander, ICM gave yield of 23.00 q/ha with net profit of Rs. 73622/ha. In cumin, ICM, IDM, INM, IPM and varietal introduction provided yield of 9.97 q/ha which was higher over local check (8.11 q/ha) with net economic gain of Rs. 79067/ha. Among above technologies, ICM gave highest yield of 10.98 q/ha in demonstration plots. In fennel, INM, IPM and varietal introduction gave yield of 19.91 q/ha which was greater than local check (16.96 q/ha). Among above technologies, improved variety gave highest yield of 21.10 q/ha in demonstration plots.

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
Cumin	ICM	3	85	34.00	10.98	9.43	17.50	86600	67777
	IDM	5	67	27.00	7.47	6.31	17.25	62546	49416
	IPDM	1	59	23.60	10.80	7.20	50.00	119086	68686
	IPM	1	5	2.00	10.57	8.99	17.58	78025	63417
	Variety	2	30	12.00	10.04	8.60	16.20	49076	38205
	Sub Total		**246**	**98.60**	**9.97**	**8.11**	**23.70**	**79067**	**57500**
Fennel	INM	1	10	4.00	18.61	16.50	12.78	88564	78750
	IPM	2	35	14.00	20.03	17.13	16.65	89772	70927
	Variety	2	30	9.00	21.10	17.25	22.16	59150	40938
	Sub Total		**75**	**27.00**	19.91	16.96	17.20	79162	63538
			501	**192.6**					
Ajwain	ICM	1	10	4.00	11.19	9.81	14.07	90056	73344
	INM	1	10	4.00	10.00	8.00	25.00	92400	55100

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
	Variety	2	15	6.00	9.48	8.30	14.81	48735	40000
	Sub Total		**35**	**14**	10.22	8.70	17.96	77064	56148
Coriander seed	ICM	2	70	23.00	14.04	11.77	20.67	73622	55117
	IDM	1	50	20.00	14.00	11.75	20.18	71993	56600
	Variety	1	25	10.00	15.97	13.96	14.40	75764	62732
	Sub Total		**145**	**53**	**14.67**	**12.49**	**18.42**	**73793**	**58150**

Tuber Crops

In tuber crops, demonstrations on Elephant footyam (15), potato (20), chicory (5) and sweet potato (5) were conducted covering an area of 45 ha in the farmers' field (Table 3.30). In potato, INM component gave yield of 314.50 q/ha which showed superiority over existing practice (280.50 q/ha). Sweet potato gave average yield of 219.56 /ha with net profit of Rs. 351208 /ha in Surat 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
Elephant footyam	ICM	2	12	1.03	229.76	214.82	7.06	420100	379225
	Variety	1	3	0.05	185.00	170.00	8.82	225000	195000
	Sub-Total		**15**	**1.08**	**207.38**	**192.41**	**7.94**	**322550**	**287112**
Potato	INM	1	20	10.00	314.50	280.50	12.12	198225	147252
Chicory	IPM	1	5	2.00	137.50	120.00	14.58	244500	201500
Sweet potato	ICM	1	5	1.00	219.56	216.96	1.20	351208	341564
	Grand Total		**45**	**18.08**					

Vegetable Crops

A total of 915 frontline demonstrations in which 186 brinjal, 25 cabbage, 54 green chilli, 80 okra, 128 tomato, 13 cluster bean, 64 onion, 26 pointed gourd and 36 demonstrations on little guard were conducted covering 225.12 ha area at farmers' fields (Table 3.31). In brinjal, ICM, IDM, INM, IPDM, IPM, nursery management and varietal component gave yield of 297.71 q/ha which was greater than existing practice (250.44 q/ha). Among above technologies, nursery management gave highest yield of 545.63 q/ha under demonstration plots. In cabbage, IPM component provided yield of 332 q/ha. In green chilli, IDM, IPM, nursery management and varietal components gave yield of 359.58 q/ha. In cluster bean, varietal introduction gave yield of 7.74 q/ha which was more than local check with 11.69% increase. In okra, INM, IPDM and varietal introduction provided yield of 120.23 q/ha which was higher as compared to local check (106.19 q/ha). In onion, INM, IPM and varietal introduction gave yield of 296.23 q/ha which was

more than local check (264.83 q/ha). Among above technologies, varietal introduction gave highest yield of 348.6 q/ha in demonstration plots. In tomato, technologies such as ICM, INM, IPM, nursery management and improved varieties harvested yield of 557.94 q/ha which showed better performance as compared to existing practice (459.22 q/ha). Nursery management in tomato attained highest yield of 984 q/ha over the local check (679.00 q/ha).

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
Bitter Gourd	ICM	1	10	2	59.25	46.48	27.47	97733	69803
Cabbage	IPM	1	25	5	332.00	329.00	0.91	203937	199135
Cauliflower	Nursery Management	1	20	0.02	973.00	708.00	37.43	828	292
Brinjal	ICM	2	40	7	311.16	280.27	13.19	203981	160907
	IDM	1	16	6	156.00	127.30	22.55	19164	14376
	INM	2	20	8	270.63	240.88	13.01	111057	91422
	IPDM	1	10	4	195.35	165.45	18.07	138750	109750
	IPM	3	45	13	292.87	257.17	16.48	185500	136217
	Nursery Management	2	35	6.02	545.63	421.00	21.37	68119	57842
	Variety	1	20	4	312.32	261.00	19.66	228495	178680
	Sub-Total		**186**	**48.02**	**297.71**	**250.44**	**17.76**	**136438**	**107028**
Chilli green	IDM	1	16	6	25.50	23.30	9.44	14701	13651
	IPM	1	12	5	195.80	169.56	15.48	492187	379918
	Nursery Management	1	20	0.02	979.00	738.00	32.66	588	170
	Variety	1	6	2	238.00	228.00	4.39	476700	442400
	Sub-Total		**54**	**13.02**	**359.58**	**289.72**	**15.49**	**246044**	**209035**
Cluster bean	Variety	1	**13**	5.2	7.74	6.93	11.69	31250	26475
Dolichos bean	Variety	1	74	32	36.55	27.90	31.00	104950	75850
Drumstick	Variety	1	28	0.14	40.00	30.00	33.33	124000	111000
Fenugreek	Variety	1	**5**	2	22.70	20.60	10.19	57100	48700
Indian bean	ICM	3	156	28	32.89	26.14	25.60	75986	61965
Lemon grass	ICM	1	10	0.5	201.10	174.15	15.48	141300	79300
Little Gourd	Variety	1	36	1	168.00	148.00	13.51	163000	145000
Okra	INM	1	10	4	170.25	152.12	11.92	179149	145250
	IPDM	1	10	4	95.00	83.00	14.46	171700	145400
	Variety	2	60	12	95.44	83.45	14.34	149037	125247
	Sub-Total		**80**	**20**	**120.23**	**106.19**	**13.57**	**166629**	**138632**
Onion	INM	1	10	4	246.63	238.88	3.24	78966	64969
	IPM	1	5	2	294.00	276.00	6.52	209470	192310
	Variety	2	49	22	348.06	279.60	24.60	77053	59307
	Sub-Total		**64**	**28**	**296.23**	**264.83**	**11.46**	**121830**	**105529**
Pointed Gourd	INM	1	10	4	172.45	160.15	7.68	311125	283375
	IPDM	1	10	4	171.25	145.35	17.82	283500	227340
	Variety	1	6	0.2	94.00	82.00	14.63	129000	110000
	Sub-Total		**26**	**8.2**	**145.90**	**129.17**	**13.38**	**241208**	**206905**
Tomato	ICM	1	20	5	405.00	377.50	7.28	82250	71250
	INM	1	20	8	178.90	163.15	15.26	142798	121562
	IPM	1	12	5	890.00	778.00	14.40	499174	372398

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
	Nursery Management	1	20	0.02	984.00	679.00	44.92	836	303
	Variety	4	56	14	331.82	298.47	12.37	211047	177097
	Sub-Total		**128**	**32.02**	**557.94**	**459.22**	**18.85**	**187221**	**148522**
	Grand Total		**915**	**225.12**					

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 (40), cotton (323), castor (109), bitter gourd (86), brinjal (36), okra (78), tomato (50), bajra (10), cowpea (40) and maize (60) were conducted covering an area of 377.20 ha at farmers' fields (Table 3.32). In paddy, technological interventions such as ICM, IPDM and hybrid gave yield of 39.69 q/ha which was higher (16.85%) over check (34.01 q/ha). Among above technologies, ICM gave highest yield of 50.41 q/ha in demonstration plots. In okra, technologies such as IPDM, IPM and hybrid provided mean yield of 132.43 q/ha which was more than check (115.60 q/ha). In tomato, interventions like ICM, INM and hybrid reported yield of 372.71 q/ha which was greater than existing practice (322.22 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
Brinjal	IPM	1	10	3	74.40	71.50	4.05	164033	154268
	Organic Farming	1	16	6	156.00	127.30	22.55	15802	12552
	Variety	1	10	4	346.50	281.50	23.09	148375	114025
	Sub-Total		**36**	**13**	**192.30**	**160.10**	**16.56**	**109403**	**93615**
Castor	ICM	2	79	36	30.97	25.65	20.55	98985	75714
	Variety	2	30	18	26.11	23.58	10.85	88644	44813
	Sub-Total		**109**	**54**	**28.54**	**24.62**	**15.70**	**93814**	**60263**
	ICM	2	63	22.5	66.18	54.25	18.00	121092	88979
	Organic Farming	1	16	6	25.50	23.30	9.44	20064	13474
	Variety	2	30	8	135.15	107.52	23.99	135695	102355
	Sub-Total		**109**	**36.5**	**75.61**	**61.69**	**17.14**	**92284**	**68269**
Cotton	INM	3	55	19	21.00	18.10	18.69	34399	23478
	IPM	6	86	31	23.26	19.89	21.94	51646	43525
	ICM	4	182	67.75	19.68	17.70	11.40	57824	47366
	Sub-Total		**323**	**117.75**	**21.31**	**18.56**	**17.34**	**47956**	**38123**
Maize	Hybrid	1	50	20	17.50	14.50	20.69	19458	7965
	INM	1	10	25	29.90	20.40	46.57	27135	13620
	Sub-Total		**60**	**45**	**23.70**	**17.45**	**33.63**	**23297**	**10793**
Okra	IPDM	2	26	8	139.28	126.80	10.25	190754	159065
	IPM	1	12	5	115.00	102.00	12.75	79755	67100
	Variety		40	5	143.00	118.00	21.19	158830	127170
	Sub-Total		**78**	**18**	**132.43**	**115.60**	**14.73**	**143113**	**117778**
Paddy	IPDM	1	10	4	39.10	34.40	13.66	20180	14700
	ICM	1	13	5	50.41	42.82	17.73	50247	41140

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
	Variety	1	17	7	29.55	24.80	19.15	33690	22240
	Sub-Total		**40**	**16**	**39.69**	**34.01**	**16.85**	**34706**	**26027**
Tomato	INM	1	20	5	541.50	505.60	7.10	253200	232470
	ICM	1	20	2	223.12	195.26	14.27	146317	125895
	Variety	1	10	4	353.50	265.80	32.99	182475	129570
	Sub-Total		**50**	**11**	**372.71**	**322.22**	**18.12**	**193997**	**162645**
Bajra	INM	1	10	25	13.10	10.20	28.43	11870	8340
Bittergourd	ICM	2	86	8.5	212.80	178.30	19.35	67280	52693
Ajwain	ICM	1	10	3	6.43	5.90	8.98	39901	42262
Coriander seed	IDM	2	26	10.4	15.03	12.71	19.20	86919	65349
Cowpea	INM	1	40	10	105.80	93.50	13.16	171000	128750
fennel	Variety	1	5	2	14.75	10.85	35.94	58625	39175
Oat	ICM	1	60	6	485.00	420.00	15.48	45838	34719
Napier	ICM	1	11	1	1945.00	1640.00	18.60	137950	109900
Greater Yan	ICM	1	7	0.0514	115.21	99.37	15.94	551645	435905
	Grand Total		**1060**	**377.20**					

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 2070 demonstrations (705-dairy buffalo; 1121-dairy cow; 50 in goat; 40 in poultry and 154 in fisheries) were conducted covering 4593 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 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 CheckK
Dairy Buffalo	Nutrition management	2	55	55	Body weight Gain (gm)	254.53	154.15	59.49
		1	30	30	Conception rate %	84.00	57.14	47.01
		1	20	20	kg/animal	1680.00	1490.00	12.75
		11	330	380	Milk yield L/anim./day	111.48	99.79	14.22
		1	30	30	q/ha	770.00	570.00	35.01

Livestock	Thematic Area	KVK	Demos (No.)	Livestock (No.)	Unit of Yield	Intervention	check	% Increase over CheckK
	Disease management	1	20	20	Fertility rate %	65.00	49.00	32.65
		6	220	240	Milk yield L/anim./day	8.39	7.57	11.63
	Sub-total		**705**	**775**				
Dairy Cow	Disease management	3	384	618	Milk yield L/anim./day	8.21	7.17	13.25
	Nutrition management	1	20	20	Conception rate %	40.00	5.00	700.00
		1	20	20	Fertility rate %	60.00	20.00	200.00
		1	20	20	kg/animal	9.84	8.07	21.93
		14	677	885	Milk yield L/anim./day	213.28	189.92	15.01
	Sub-total		**1121**	**1563**				
Fishery	Breeding Management	1	134	1115	kg of fish	1589.25	1157.25	60.07
		1	20	20	q/ha	5.69	4.85	19.99
	Sub-total		**154**	**1135**				
Goat	Nutrition management	1	30	60	kg/animal	17.8	14.2	25.35
	Disease management	1	20	80	kg/animal	16.8	14.2	18.31
	Sub- Total		**50**	**140**				
Poultry Dual	Breeding Management	2	40	980	kg/bird	1.415	1.015	36.02
	Grand Total		**2070**	**4593**				

Goa

Crops

Different technology demonstrations were laid out at farmers' fields especially on paddy (8) on 0.5 ha area. In paddy, technologies such as improved variety gave yield of 21.40 q/ha as compared to 12.20 q/ha in local check with 75.40 % increase. In plantation crops like cashew 32 demonstrations were laid out at farmers' fields and covered 4.20 ha area. In cashew, technologies such as IPM, IWM, organic farming and Varietal component gave yield of 9.57 q/ha as compared to 4.07 q/ha in local check with 135.22% increase with net profit of Rs. 28450/ha (Table 3.34). In vegetable crops like dry chilli (10), demonstrations were laid out with average yield of 8 q/ha as compared to check (6 q/ha). In cow pea varietal and ICM component provided 9.4 q/ha yield against 5.55 q/ha of local yield.

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
Black pepper	IDM	1	10	1	4.1	3.4	20.59	58000	30000
Cashew	Varietal, IPM, IWM, Organic farming	4	32	4.2	9.57	4.07	135.22	28450	8327

Crop	Thematic Area	KVK	Farmers	Area (ha)	Demo Yield (q/ha)	Check Yield (q/ha)	% Increase	Net Return (Rs./ha)	
								Demo	Check
Dry Chilli	IDM	1	10	1	8	6	3.33	147000	79000
Chilli Green	IPDM	1	10	1	24	19	26.32	60350	40350
Cowpea	Varietal, ICM	2	20	2	9.4	5.55	69.37	23699	12287
Maize	Varietal	1	10	0.5	158	117	35.04	215683	139850
Okra	Organic Farming	1	5	0.025	20	16	25	52000	23500
Paddy	Varietal	1	8	0.5	21.4	12.2	75.40	43380	15660
Watermelon	Vaietal	1	10	0.5	218	184	18.48	307550	243500
	Total		**115**	**10.7**					

Livestock and Fisheries

A total of 20 demonstrations in dairy cow covering 40 animals, 3 demonstrations in goat covering 18 animals, 5 demonstrations in poultry covering 25 chicks and 10 demonstrations in fishery covering 5000 seeds 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	Nutrition Management	1	10	20	Milk yield L/anim./day	12.46	11.14	11.85
	Disease Management	1	10	20	Milk yield L/anim./day	11.63	10.87	6.99
	Sub Total		**20**	**40**				
Fishery	Production and Management	1	10	5000	Kg of Fish	350	250	40
Goat	Breed Evaluation	1	3	18	Kg/Animal	28.25	18.5	52.7
Poultry	Breed Evaluation	1	5	25	No. of eggs /bird/year	135	51	164.71
	Total		**38**	**5083**				

Farm Implements

A total of 2451 demonstrations (1693 in Maharashtra and 758 in Gujarat) were organized on farm implements. In chickpea, major implements demonstrated were BBF Planter, three row CRIDA planter, and tractor drawn multi crop planter. In cotton, major implements demonstrated were B/D/ traction sprayer, bullock drawn ridger, bullock drawn stubble collector, cotton slasher, CRIDA bullock drawn planter, drip lateral coiler, roatary tiller, shreder, sub soiler, and mobile shreder. In paddy, major implements demonstrated were 4 rows paddy harvestor, cono weeder, mini rice mill, paddy power weeder, paddy thresher, power operated paddy winnower, drum seeder, modified plastic raincoat,

vertical conveyor reaper, power cum pedal operated air screen cleaner. 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
Maharashtra			
Brinjal	Mittens	1	10
Chcikpea	BBF Planter, Three row CRIDA planter, Tractor drawn multi crop planter,	6	96
Cotton	B/D/ traction sprayer, Bullock drawn ridger, Bullock drawn stubble collector, Cotton slasher, CRIDA bullock drawn planter, Drip lateral coiler, Roatary tiller, Shreder, Sub soiler, Mobile Shreder	11	259
Drumstick	Drumstick Harvestor	3	48
Finger Millet	Millet Thresher, Mini millet thresher	2	35
Green Gram	Zero Till drill	1	15
Groundnut	BBF planter, Fertilizer carrier bag, Decorticator	3	75
Jowar	Bullock operated three Tyne weeder, Twin wheel hoe	2	52
Lime	Lemon Harvestor	1	10
Linseed	Seed Cum Fertilizer Drill	1	15
Maize	Hand operated Rotary maize sheller	1	15
Mulberry	CSRTI-Cocoon Harvester	3	48
Onion	Cycle Boom Sprayer	1	13
Paddy	4 rows paddy harvestor, Cono weeder, Mini Rice mill, Paddy power weeder, Paddy thresher, Power operated paddy Winnower, Drum seeder, modified plastic raincoat, Vertical conveyor reaper, power cum pedal operated air screen cleaner	8	280
Pigeon pea	Animal drawn stubble collector , Spiral Seperator, PKV mini dal mill	3	93
Soybean	BBF planter, spiral separator, mittens, grain cleaner cum grader, save grain bags, twin wheel hoe, bullock drawn 3 tyne ferti hoe, three row CRIDA planter	16	359
Sugarcane	Drip lateral winder, Use of Mulcher for bio mass utilization	2	20
Tomato	Seedling transplantor, Zero energy cool chamber,	3	50
Wheat	Zerp till drill, Super grain bag, Laxmi sickles, Sulbha bags, Insect Probe trap	5	200
	Total		**1693**
Gujarat			
Castor	Dibbler ,secutter, seed dibbler	5	90
Cotton	Cotton Shredder,Dibbler,Seed Dibbler ,Cotton Picking Appron	4	35
Fodder Sorghum	Serrated Sickle,Chaff cutter	2	70
Greengram	Twin wheel hoe, Hand weede	1	25
Groundnut	Wheel hoe,Groundnut Decorticator	2	35
Mango	Power Sprayer	1	5
Okra	Bhindi Plucker,Twin wheel hoe weeder, Vegetable Mittens	3	55
Paddy	Paddy thresher,Winnowing fan,Twin wheel hoe,Twin wheel hoe	6	312
Pigeonpea	Stalk puller	1	50
Soybean	Spiral seed separator	1	10
Wheat	Power Reaper,Improved sickle, Seed cum fertilizer drill,Wheelhoe	2	71
	Total		**758**
	Grand Total		**2451**

Other Enterprises

A total of 3114 demonstrations (1970 in Maharashtra, 1116 in Gujarat and Goa 28) 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
Maharashtra		
Drudgery reduction	5	95
Mushroom production	3	65
Nutrition Garden	22	1339
Nutrition security	2	30
Processing and Value addition	16	282
Storage loss minimization techniques	10	139
Vermicomposting	1	20
Total		**1970**
Gujarat		
Drudgery Reduction	2	15
Mushroom Production	3	99
Nursery Management	3	130
Nutrition Garden	15	845
Vermicompost	3	27
Total		**1116**
Goa		
Processing and value addition	2	15
Nutrition Garden	2	13
Total		**28**
Grand Total		**3114**

Cluster Frontline Demonstrations

Cluster Frontline Demonstrations of Pulses under NFSM

Cluster Frontline Demonstrations of Pulses under NFSM 2020 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. pigeon pea, chickpea, black gram, horse gram, cowpea and green gram in selected districts through respective KVKs in the states of Maharashtra and Gujarat during year 2020. Details of cluster frontline demonstrations are presented as under:

Target and Achievements

Target

A target of 5427 cluster frontline demonstrations was fixed with coverage of 2242 ha of area in the states of Maharashtra and Gujarat, which was approved for kharif, rabi and summer seasons during 2020. Out of which 1982 demonstrations with coverage of area 826 ha for crops viz., green gram, black gram and pigeon pea in kharif season, 2868 demonstrations in an area of 1176 ha for crops viz., chickpea, horse gram & cowpea during rabi season, and 576 cluster frontline demonstrations with area of 240 ha on green gram during summer were proposed.

Achievements

In total, 6457 demonstrations were laid out in cluster mode on 2431 ha area out of targeted 5427 CFLDs (2242) ha.

(i) **Kharif Season**: A total of 2199 technology demonstrations were conducted on three pulse crops viz., green gram, black gram and pigeon pea in an area of 871 ha covering two states Maharashtra and Gujarat.

(a) **Green gram:** Cluster FLDs were implemented in an area of 140 ha with the involvement of 350 farmers in Maharashtra.

(b) **Black gram:** Cluster FLDs were implemented in an area of 140 ha with the involvement of 350 farmers of which 90 ha with 225 farmers in Maharashtra and 50 ha with 125 farmers in Gujarat.

(c) **Pigeon pea:** Cluster FLDs were laid out in an area of 591 ha with participation of 1499 farmers of which 441 ha with 1090 farmers in Maharashtra and 150 ha with 409 farmers in Gujarat.

(ii) **Rabi Season**: For making larger impact in the area, 3339 demonstrations were conducted in cluster mode on three pulse crops viz., chickpea, horse gram and cowpea in an area of 1290 ha covering two states Maharashtra and Gujarat.

(a) **Chickpea:** Cluster FLDs were implemented in an area of 1260 ha with the involvement of 3132 farmers, out of which 870 ha with 2029 farmers in Maharashtra and 390 ha with 1103 farmers in Gujarat.

(b) **Horse gram:** Cluster FLDs were laid out in area of 20 ha with the involvement of 137 farmers in Maharashtra.

(c) **Cowpea:** Cluster FLDs were conducted in area of 10 ha with the involvement of 70 farmers in Maharashtra.

(Iii) **Summer Season**: A total of 919 technology demonstrations were conducted on green gram in an area of 270 ha covering two states Maharashtra and Gujarat.

(a) **Green gram:** The allocation of area is as follow 20 ha with 249 farmers in Maharashtra and 250 ha with 670 farmers in Gujarat.

Abstract of approved CFLDs on pulses under NFSM and their achievements during 2020 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
Kharif- 2020						
1	Green gram	Maharashtra	140	336	140	350
	Total		**140**	**336**	**140**	**350**

Sl. No.	Crops	State	Approved CFLDs		Achievements of CFLDs	
			Area (ha)	No. of Demos	Area (ha)	No. of Demos
2	Black gram	Maharashtra	90	216	90	225
		Gujarat	50	120	50	125
	Total		**140**	**336**	**140**	**350**
3	Pigeon pea	Maharashtra	426	1053	441	1090
		Gujarat	120	360	150	409
	Total		**546**	**1413**	**591**	**1499**
	Grand Total (Kharif)		**826**	**1982**	**871**	**2199**
Rabi- 2019-20						
1	Chickpea	Maharashtra	786	1886	870	2029
		Gujarat	340	816	390	1103
	Total		**1126**	**2702**	**1260**	**3132**
2	Cow pea	Maharashtra	10	70	10	70
3	Horse gram	Maharashtra	40	96	20	137
	Grand Total (Rabi)		**1176**	**2868**	**1290**	**3339**
Summer- 2020						
1	Green gram	Maharashtra	20	48	20	249
		Gujarat	220	528	250	670
	Grand Total (Summer)		**240**	**576**	**270**	**919**
	Total (Kharif+Rabi+Summer)		**2242**	**5427**	**2431**	**6457**

Technologies Demonstrated

Under CFLD on Pulses, improved and latest varieties along with full package of practices for each pulse crop were demonstrated 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 2020

Region	KVKs	Name of Crop Varieties						
		Pigeon pea	Blackgram	Greengram	Chickpea	Horse gram	Cowpea	Moth Bean
Maharashtra								
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,	AKU-10-1	BM-2003-2	RVG-202 / PDKV Kanchan, RVG 203, JAKI-9218, 9278. Raj Vijay-203			
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	AKU-15, TAU-1 AKU-10-1	Utkarsha, BM-2003-2	BDNG-797, JAKI-9218, Rajvijay-202 RVG-202 & 203			

Region	KVKs	Name of Crop Varieties						
		Pigeon pea	Blackgram	Greengram	Chickpea	Horse gram	Cowpea	Moth Bean
Khandesh	Dhule, Jalgaon-I, Jalgaon-II, Nundurbar, Nashik-I, Nashik-II	BDN-711	AKU-15, Vishwas, AKU-10-1	BM 2003-2, Utkarsha	Phule Vikram, Digvijay Rajvijay-203			
Western Maharashtra	Ahmednagar-I, Ahmednagar-II, Kolhapur-I, Pune-I, Pune-II, Sangli, Satara-I, Satara-II, Solapur-I, Solapur-II	BDN-711			Digvijay, Phule Vikram, RVG-203, RVG-202			
Konkan	Raigadh, Ratnagiri, Sindhudurg, Thane	BDN-711		Dapoli Moong No.-1		Dapoli-I	Konkan Sadabahar	
Gujarat								
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, GJP-1, GNP-2, GT-104	PU-1, GJU-2					
South Gujarat	Dang, Navsari, Surat, Tapi, Valsad	GT-104, BSMR- 853						
Saurashtra	Amreli, Bhavnagar, Jamnagar, Junagadh, Morbi, Porbandar, Rajkot-I, Surendranagar	GJJP-1		GM-4	GJG-3, GG-5,			

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 cowpea under NFSM during 2019-20 in an area of 2431 ha by involving 6457 farmers covering from two states namely Maharashtra and Gujarat. Season-wise and crop-wise results are presented here under:

Performance of CFLDs in *kharif* pulses: Cluster FLDs on three pulse crops viz., green gram, black gram and pigeon pea were implemented during *kharif* 2020. The demonstrations on green gram were laid out by 11 KVKs and average yield of 6.23 q/ha obtained which was higher (31.5%) over local check (4.73 q/ha). In black gram, 13 KVKs laid out demonstrations and got mean yield of 6.68 q/ha which was more than local practice (5.49 q/ha). Under pigeon pea, 40 KVKs conducted cluster FLDs and obtained average yield of 15.9 q/ha which showed superiority (22.55%) over check (12.97 q/ha). State-wise and centre wise data is presented in Table 3.40.

Performance of CFLDs in *Rabi* pulses: Technology demonstrations on three pulse crops viz., chick pea, horse gram and cowpea were implemented during *rabi* season. Chickpea was demonstrated by 60 KVKs and average yield obtained was 17.26 q/ha which was greater (19.32%) than existing practice, while horse gram was demonstrated by 1 KVK that resulted average yield of 6.5 q/ha which was more (25.0%) than farmer's practice (5.2 q/ha). Cowpea was demonstrated by 1 KVK that resulted average yield of 13.5 q/ha which was more (48.35%) than farmer's practice (9.10 q/ha). State-wise and KVK wise data is presented in Table 3.40.

Performance of CFLDs in *Summer* pulses: Green gram demonstrations (919) were conducted on 270 ha area in summer season. Average yield of 8.99 q/ha was attained under demonstrations which was more by 31.60 % over local check (6.82 q/ha). Net profit of Rs. 29350/ha was gained which was more by 65.24% over existing practice. 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	9	Kharif	Black gram	90	225	5.26	4.18	25.62	16670	10924	52.6
Gujarat	4	Kharif	Black gram	50	125	8.1	6.79	19.21	31705	24267	30.65
Total	13			140	350	**6.68**	**5.49**	**21.79**	**24188**	**17596**	**37.46**
Maharashtra	11	Kharif	Greeen gram	140	350	6.23	4.73	31.59	19915	11102	79.38
Maharashtra	30	Kharif	Pigeon pea	441	1090	16.27	12.86	26.5	65206	47144	38.32
Gujarat	10	Kharif	Pigeonpea	150	409	15.52	13.08	18.64	54705	41423	32.06
Total	40			591	1499	**15.90**	**12.97**	**22.55**	**59956**	**44284**	**35.39**
Maharashtra	40	Rabi	Chick pea	870.4	2029	17.06	13.52	26.15	45555	31039	46.77
Gujarat	20	Rabi	Chickpea	390	1103	17.59	15.52	14.05	51676	37072	39.62
Total	**60**			**1260**	**3132**	**17.26**	**14.52**	**19.32**	**48616**	**34056**	**42.75**
Maharashtra	1	Rabi	Horsegram	20	137	6.5	5.2	25	30000	18400	63.04
Maharashtra	1	Rabi	Cow pea	10	70	13.5	9.1	48.35	39500	20500	92.62
Maharashtra	1	Summer	Green gram	20	249	7.9	5.6	41.07	16340	5400	202.59
Gujarat	12	Summer	Green gram	250	670	10.05	8.04	24.9	42359	30123	40.6
Total	**13**			**270**	**919**	**8.99**	**6.82**	**31.60**	**29350**	**17762**	**65.24**

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, 427 training courses were organized with the participation of 14555 farmers (11961 male and 2594 female) that consists of 178 on campus with 6570 participants (5465 male and 1105 female) and 249 off-campus with 7985 participants (6496 male and 1489 female). Details are given in Table 3.41.

Table 3.41 Training programs conducted on pulses production technologies

State	No. of KVKs	Area (ha)	Demo (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
Kharif: Black gram															
Maharashtra	9	90	225	8	198	6	204	13	277	12	289	21	475	18	493
Gujarat	4	50	125	3	81	0	81	5	158	7	165	8	239	7	246
Total	13	140	350	11	279	6	285	18	435	19	454	29	714	25	739

State	No. of KVKs	Area (ha)	Demo (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
Kharif: Green gram															
Maharashtra	11	140	350	10	282	38	320	16	391	108	499	26	673	146	819
Kharif: Pigeon pea															
Maharashtra	30	441	1090	38	1140	147	1287	46	1316	162	1478	84	2456	309	2765
Gujarat	10	150	409	13	349	118	467	24	537	332	869	37	886	450	1336
Total	40	591	1499	51	1489	265	1754	70	1853	494	2347	121	3342	759	4101
Rabi: Chick pea															
Maharashtra	40	870	2029	48	1743	230	1973	84	2144	362	2506	132	3887	592	4479
Gujarat	20	390	1103	33	1130	329	1459	40	1089	209	1298	73	2219	538	2757
Total	60	1260	3132	81	2873	559	3432	124	3233	571	3804	205	6106	1130	7236
Rabi: Horse gram															
Maharashtra	1	20	137	1	20	10	30	2	40	20	60	3	60	30	90
Rabi: Cow pea															
Maharashtra	1	10	70	1	15	15	30	2	35	36	71	3	50	51	101
Summer: Green gram															
Maharashtra	1	20	249	0	0	0	0	5	130	37	167	5	130	37	167
Gujarat	12	250	670	23	507	212	719	12	379	204	583	35	886	416	1302
Total	13	270	919	23	507	212	719	17	509	241	750	**40**	1016	453	1469
Grand Total	**139**	**2431**	**6457**	**178**	**5465**	**1105**	**6570**	**249**	**6496**	**1489**	**7985**	**427**	**11961**	**2594**	**14555**

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 17892 participants (16075 farmers and 1817 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 cow pea 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
Kharif: Black gram															
Maharashtra	9	90	225	17	491	68	559	13	51	2	53	30	542	70	612
Gujarat	4	50	125	16	279	14	293	5	43	0	43	21	322	14	336
Total	13	140	350	33	770	82	852	18	94	2	96	51	864	84	948
Kharif: Green gram															
Maharashtra	11	140	350	28	666	129	795	18	130	86	216	46	796	215	1011
Kharif: Pigeon pea															
Maharashtra	30	441	1090	94	2169	259	2428	43	338	78	416	137	2507	337	2844
Gujarat	10	150	409	63	1534	656	2190	48	114	39	153	111	1648	695	2343
Total	40	591	1499	157	3703	915	4618	91	452	117	569	248	4155	1032	5187

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
Rabi: Chick pea															
Maharashtra	40	870.4	2029	95	5787	861	6648	57	490	95	585	152	6277	956	7233
Gujarat	20	390	1103	97	1928	502	2430	70	185	41	226	167	2113	543	2656
Total	60	1260	3132	192	7715	1363	9078	127	675	136	811	319	8390	1499	9889
Rabi: Horse gram															
Maharashtra	1	20	137	3	52	61	113	3	6	7	13	6	58	68	126
Rabi: cow pea															
Maharashtra	1	10	70	3	48	52	100	3	6	7	13	6	54	59	113
Summer: Green gram															
Maharashtra	1	20	249	5	130	37	167	5	4	2	6	10	134	39	173
Gujarat	12	250	670	59	319	33	352	20	62	31	93	79	381	64	445
Total	13	270	919	64	449	70	519	25	66	33	99	89	515	103	618
Grand Total	**139**	**2431**	**6457**	**480**	**13403**	**2672**	**16075**	**285**	**1429**	**388**	**1817**	**765**	**14832**	**3060**	**17892**

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 18.42 q/ha was obtained under Variety BDN-711 in Aurangabad, Beed, Jalgaon, Jalna, Nanded, Nandurbar, Osmanabad, Ahmednagar, Raigarh, Solapur and Pune districts with net profit of Rs. 71341/ha. BDN-716 also performed well in Amravati, Buldhana, Hingoli, Latur, Nanded, Parbhani, Wardha, Washim & Yavatmal district where 16.14 q/ha yield was attained with net gain of Rs. 68410/ha (Table 3.43). Overall in Maharashtra, 16.27 q/ha mean yield was attained under demonstrations which was about

26.5% higher over local check (12.86 q/ha) and also reflected 79.38% higher over at state average and 116.64% at national average yield (Fig. 3.10).

Fig 3.9 Yield performance of Pigeon pea in Maharashtra

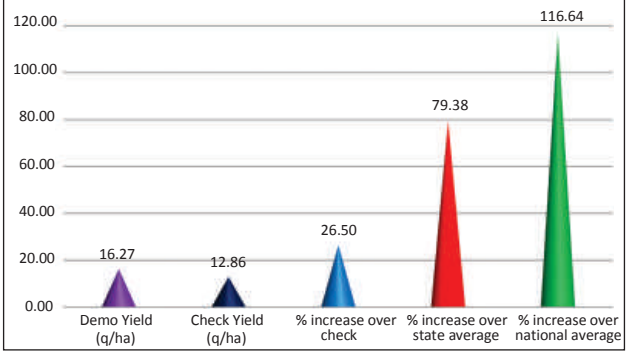


Fig 3.10 Yield performance of Var. BDN-711 (Pigeon pea) in Maharashtra

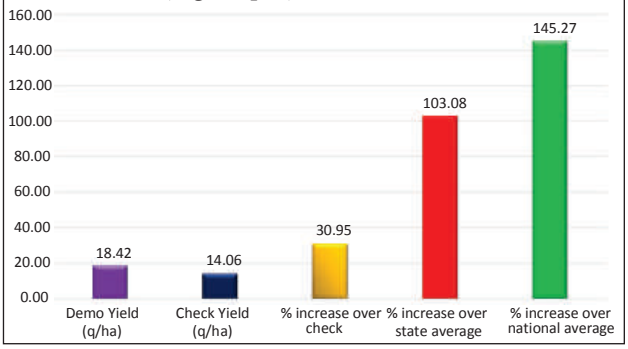


Table 3.43 Yield performance of pigeonpea cultivars

Variety	District/KVK	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net Return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
BDN-711	Ahmednagar-II, Aurangabad -I, Aurangabad -II, Beed-I, Beed-II, Hingoli, Jalgaon-I, Jalna-I, Jalna-II, Nanded-II Nundurbar, Osmanabad, Pune-I, Solapur-I, Raigadh	186	465	18.42	14.06	30.95	71341	49146	45.16
BDN-716	Amravati-I, Amravati-II, Buldhana-II, Hingoli, Latur, Nanded-I, Parbhani, Wardha, Washim, Yavatmal-I	155	350	16.14	13.47	19.80	68410	53785	27.19
PKV-TARA	Bhandara, Chandrapur, Gondia, Gadchiroli, Nagpur	100	275	10.11	8.03	25.97	40395	27855	45.02

Performance of chickpea cultivars in Maharashtra

On an average 17.06 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 that mean yield was 55.66% higher over state average and 58.99% higher over national average yield (Fig. 3.11). Region wise and variety wise performance of chickpea cultivar RGV-202 is given in Fig. 3.12.

Fig 3.11 Yield performance of Chickpea under CFLDs in Maharashtra

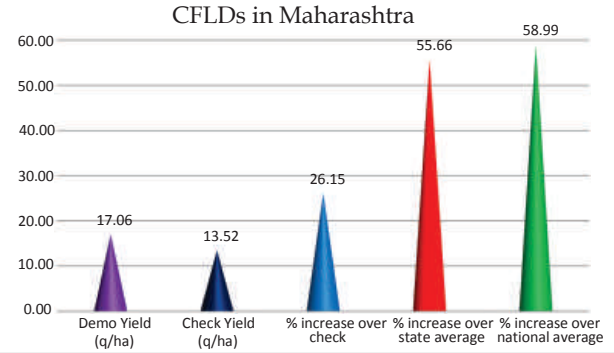


Fig 3.12 Yield performance of Var. RVG-202 (Chickpea) in Maharashtra

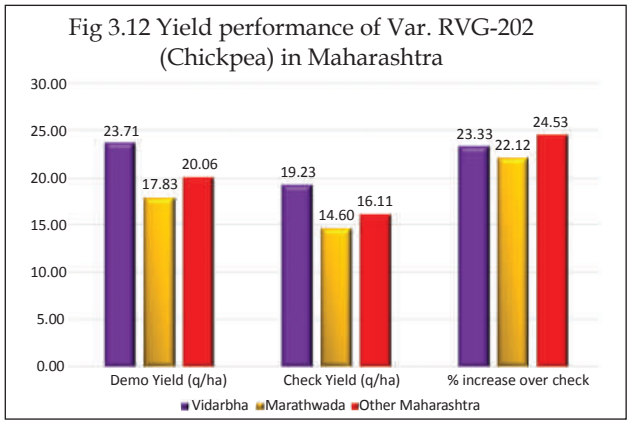


Table 3.44 Performance of chickpea cultivars in Maharashtra

Varieties	District/KVK	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, Latur	100	250	10.64	8.22	29.41	25216	17833	41.40
Digvijay	Nashik-II, Satara-I, Thane	100	171	18.63	14.76	26.19	44909	27337	64.28
JAKI-9218	Beed-I, Bhandara, Chandrapur, Gadchiroli, Gondia, Parbhani, Washim	160.4	310	13.66	11.12	22.77	35369	26006	36.00

Varieties	District/KVK	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net Return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
PDKV Kanchan	Buldhana	20	50	18.13	15.23	19.04	66884	52267	27.97
Phule Vikram	Ahmednagar-I, Dhule, Jalgaon-I, Jalgaon-II, Pune-I, Solapur-I, Solapur-II	180	450	19.05	14.16	34.54	51369	30230	69.93
(Rajvijay) RVG-202	Ahmednagar-II, Akola, Amaravati-I, Amaravati-II, Buldhana-I, Hingoli, Kolhapur-I, Nanded-I, Nanded-II,	180	473	21.59	17.51	23.35	55034	40127	37.15
(Rajvijay) RVG-203	Nagpur, Nyndurbar, Osmanabad, Wardha, Yavatmal-I, Yavatmal-II	120	300	16.77	13.79	21.58	50612	35149	43.99
Kokkan Wal no. 2	Raigadh	10	25	12	8.7	37.93	37000	22200	66.67

Yield performance of Chickpea in Gujarat

In Gujarat, 1103 cluster demonstrations on GJG-3 & GG-5 cultivar were conducted on 390 ha. Mean yield of 17.59 q/ha was attained under demonstrations which was 14.04% higher over existing practice (15.42 q/ha), 12.18% higher over state and 63.93% over national average yield (Fig. 3.14). Net economic gain of Rs. 51676/ha was realised by the farmers which was 39.60% more than local check (Table 3.45).

Fig 3.13 Yield performance of Var. GG-5 (Chickpea) in Gujarat

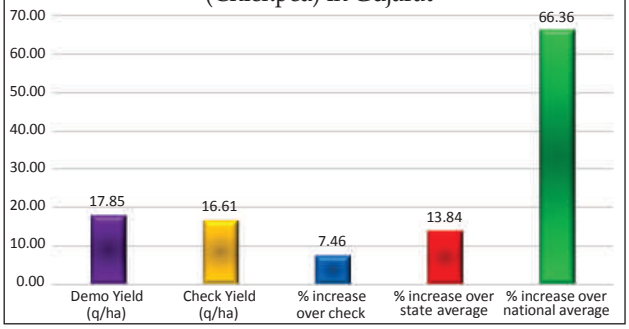


Table 3.45 Yield and economic performance of chickpea in Gujarat

Varieties	District/KVK	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
GJG-3	Dahod, Mehsana, Panchmahal, Porbandar, Surendranagar, Valsad	170	410	17.26	13.96	23.61	52096	37899	37.46
GG-5	Bharuch, Bhavnagar, Dang, Jamnagar, Kheda, Narmada, Navsari, Patan, Rajkot-I, Surat, Tapi	220	693	17.85	16.61	7.46	51332	36295	41.43

Yield Performance of Pigeon pea Cultivars in Gujarat

Under cluster frontline demonstrations, average yield of 16.04 q/ha was attained which was 19.58% over local check. GJP-1 cultivar provided 18.78 q/ha which was superior over local check (16.02 q/ha) (Fig. 3.14). BDN-711 cultivars performed well exhibited 61.15% increase in yield over state average yield (Fig. 3.15).

Fig 3.14 Yield performance of Var. GJP-1 (Pigeon pea) in Gujarat

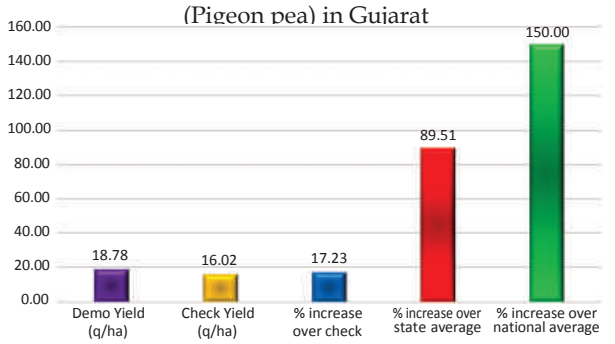


Fig 3.15 Yield performance of Var. BDN-711 (Pigeon pea) in Gujarat

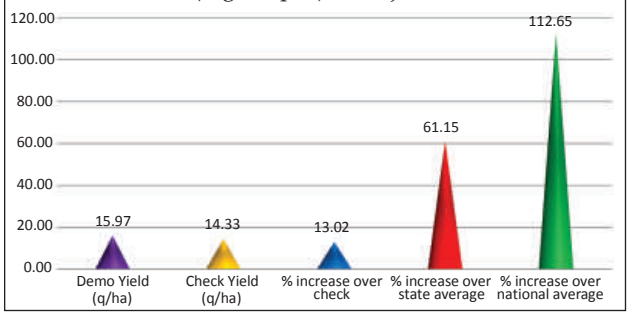


Table 3.46 Yield level and economic performance of pigeon pea cultivars in Gujarat

Varieties	District/KVK	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ ha)		% Increase
				Demo	Check		Demo	Check	
AGT-2	Panchmahal	20	50	14.52	11.50	26.26	59976	44050	36.15
BDN-711	Narmada	10	25	15.97	14.33	13.02	39774	32856	21.06
GJP-1	Amreli, Vadodra	30	75	18.78	16.02	17.23	85040	63887	33.07
GNP-2	Narmada	05	12	13.84	12.74	8.64	30107	26087	15.41
GP-104	Bharuch, Narmada, Navsari, Tapi	65	197	15.41	12.70	21.30	49661	36568	35.81

Cluster Frontline Demonstrations of Oilseeds under NFSM

Cluster Frontline Demonstrations of Oilseeds under NFSM 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. Details are presented here under:

Target and Achievements

Target

In total, 6830 demonstrations on oilseed crops in cluster mode were targeted covering 2846 ha area in Maharashtra and Gujarat during kharif, rabi and summer seasons. Out of which 3998 demonstrations in area of 1666 ha for crops viz., groundnut, sesame, soybean, castor and niger was target during kharif season. A total of 888 demonstrations on 370 ha area for crops rapeseed and mustard, linseed and safflower during rabi season and 1944 CFLDs in an area of 810 ha for crop groundnut and sesame during summer was targeted.

Achievements

A total of 5085 cluster frontline demonstrations were implemented in an area of 2096 ha, out of targeted

6830 CFLDs (2846 ha.) in Maharashtra and Gujarat during 2020.

(i) *Kharif* Season: A total of 3189 CFLDs were conducted on five oilseeds crops viz., groundnut, sesame, soybean, castor and niger in an area of 1329 ha covering two states Maharashtra and Gujarat.

(a) **Groundnut:** Cluster FLDs were organized in an area of 301 ha with 715 participating farmers of which 40 ha with 100 farmers in Maharashtra and 261 ha with 615 farmers in Gujarat.

(b) **Sesame:** Cluster FLDs were organized in an area of 104 ha with 260 participating farmers of which 30 ha with 75 farmers in Maharashtra and 74 ha with 185 farmers in Gujarat.

(c) **Soybean:** Cluster FLDs were laid out on area of 754 ha benefitting 1809 farmers of which 655 ha with 1561 farmers in Maharashtra and 99.0 ha with 248 farmers in Gujarat.

(d) **Castor:** Castor demonstrations were carried on 160 ha area with involvement of 380 farmers in Gujarat.

(e) **Niger:** Demonstrations on niger were conducted in cluster mode on 10 ha area at 25 farmers' fields in Maharashtra.

(Ii) *Rabi* Season: A total of 531 CFLDs were conducted on five oilseed crops viz rapeseed and mustard, linseed and safflower in an area of 260 ha covering two states Maharashtra and Gujarat.

(a) **Rapeseed and Mustard:** In total, 241 demonstrations were conducted on rapeseed and mustard covering an area of 100 ha in two states Maharashtra and Gujarat.

(b) **Linseed:** 140 farmers demonstrated linseed technologies on an area of 85 ha in Maharashtra.

(c) **Safflower:** 150 farmers laid out demonstrations on safflower with coverage of 75 ha area in Maharashtra.

(iii) *Summer* Season: A total of 1365 CFLDs were conducted on two oilseed crops viz., groundnut and sesame in an area of 507 ha covering two states Maharashtra and Gujarat.

(a) **Groundnut:** Cluster FLDs were implemented in an area of 342 ha with the involvement of 952 farmers of which 302 ha with 852 farmers in Maharashtra and 40 ha with 100 farmers in Gujarat.

(B) **Sesame:** Cluster FLDs were implemented in an area of 165 ha with the involvement of 413 farmers of which 50 ha with 125 farmers in Maharashtra and 115 ha with 288 farmers in Gujarat.

Crop-wise data for three seasons of 2020 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
Kharif Season-2020						
1	Groundnut	Maharashtra	40	96	40	100
		Gujarat	296	710	261	615
	Total		**336**	**806**	**301**	**715**
2	Sesame	Maharashtra	80	192	30	75
		Gujarat	70	168	74	185
	Total		**150**	**360**	**104**	**260**
3	Soybean	Maharashtra	800	1920	655	1561
		Gujarat	120	288	99	248
	Total		**920**	**2208**	**754**	**1809**
4	Castor	Gujarat	240	576	160	380
5	Niger	Maharashtra	20	48	10	25
	Grand Total (kharif)		**1666**	**3998**	**1329**	**3189**

Sl. No.	Crops	State	Approved CFLDs		Achievements of CFLDs	
			Area (ha)	No. of Demos	Area (ha)	No. of Demos
Rabi Season- 2019-20						
1	Rapeseed & Mustard	Maharashtra	0	0	30	75
		Gujarat	100	240	70	166
	Total		**100**	**240**	**100**	**241**
2	Linseed	Maharashtra	160	384	85	140
3	Safflower	Maharashtra	110	264	75	150
	Grand Total (Rabi)		**370**	**888**	**260**	**531**
Summer Season- 2020						
1	Groundnut	Maharashtra	440	1056	302	852
		Gujarat	130	312	40	100
	Total		**570**	**1368**	**342**	**952**
2	Sesame	Maharashtra	70	168	50	125
		Gujarat	170	408	115	288
	Total		**240**	**576**	**165**	**413**
	Grand Total (Summer)		**810**	**1944**	**507**	**1365**
	Total (Kharif+Rabi+Summer)		**2846**	**6830**	**2096**	**5085**

Technologies Demonstrated

Improved varieties and latest technologies were included under cluster frontline demonstrations on oilseed crops are given in Table 3.48.

Table 3.48 Crop-wise and season-wise varieties demonstrated under NFSM during 2019-20.

Crop	Varieties		
	Kharif	Rabi	Summer
Groundnut	JL776, Konkan Gaurav, GG-2, GG-5, GG-20, GG-22, GJG-31 and TG- 37A.	-	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, GT-5, KDS-344	-	PKV NT – 11, G.Til-3, GT – 3
Soybean	JLT-408, JS-2029, MACS-1188, MAUS-158, MAUS-162, Phule Agrani, Phule Sangam, NRC-37, GJS-3, JS-9560, AKT-64, PKV NL-260, MAUS-162,JS-9305, JS-3, RVS-2001-04	-	-
Castor	GCH 7, GAC-311, GCH-8	-	-
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 moister after cereals
- Relay cropping etc.

Results

Demonstrations on eight oilseed crops viz., groundnut, sesame, soybean, castor, niger, rapeseed and mustard, linseed and safflower under NFSM during 2020 in an area of 2096 ha by involving 5085 farmers covering two states namely Maharashtra and Gujarat. Season-wise and crop-wise results are presented here under:

Performance of *Kharif* Oilseeds: Cluster FLDs on 5 oilseed crops viz., groundnut, sesame, soybean, castor and niger were implemented during *kharif* 2020. Demonstrations on groundnut were executed by 18 KVKs and provided mean yield of 18.72 q/ha which was greater (22.27%) than farmer's practice (15.31 q/ha). In sesame, 6 KVKs laid out demonstrations and obtained average yield of 3.92 q/ha which showed superiority (28.15%) over existing practice (3.05 q/ha). In soybean, 40 KVKs demonstrated latest technologies which provided average yield of 17.99 q/ha which was higher over check (14.54 q/ha). Niger was demonstrated at one KVK got mean yield of 3.50 q/ha which was more than local check (2.86 q/ha). In case of castor, 9 KVKs demonstrated the latest technologies, resulted average yield of 30.69 q/ha which was better against local practice (24.35 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 2019-20. Linseed technology was demonstrated at 5 KVKs and resulted 5.06 q/ha yield which was more (26.45%) than farmer's practice (3.99 q/ha). In safflower, 4 KVKs demonstrated latest technologies that provided yield of 13.74 q/ha which was greater (32.83%) than existing practice (10.34 q/ha). In rapeseed and mustard, 6 KVKs organized demonstrations in field situations which gave average yield of 12.24 q/ha which was superior over check (9.99 q/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 2020. A total of 952 demonstrations were laid out on summer groundnut.

On an average of 21.08 q/ha yield was achieved under summer groundnut which was about 25.44% higher over local practice. Average net gain was of Rs. 58025/ha was obtained by the farmers. Similarly, under sesame average yield of 5.94 q/ ha was recorded which was almost 24.29% more over local check with net profit of Rs. 26270/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	
Maharashtra	3	Kharif	Groundnut	40	100	18.87	15.0	25.85	52483	31971	64.16
Gujarat	15	Kharif	Groundnut	261	615	18.57	15.62	18.83	61033	44931	35.84
Total	**18**			**301**	**715**	**18.72**	**15.31**	**22.27**	**56758**	**38451**	**47.61**
Maharashtra	2	Kharif	Sesame	30	75	3.09	2.58	19.81	16353	11463	42.66
Gujarat	4	Kharif	Sesame	74	185	4.74	3.53	33.87	20265	12650	60.64
Total	**6**			**104**	**260**	**3.92**	**3.05**	**28.15**	**18309**	**12039**	**52.08**
Maharashtra	34	Kharif	Soybean	655	1561	18.72	14.92	25.51	40432	27243	48.41
Gujarat	6	Kharif	Soybean	99	248	17.26	14.16	22.11	39130	28744	36.30
Total	**40**			**754**	**1809**	**17.99**	**14.54**	**23.73**	**39781**	**27994**	**42.11**
Maharashtra	1	Kharif	Niger	10	25	3.5	2.86	22.38	11850	5520	114.67
Gujarat	9	Kharif	Castor	160	380	30.69	24.35	25.73	89307	66681	33.97
Maharashtra	5	Rabi	Linseed	85	140	5.06	3.99	26.45	18683	13711	38.81
Maharashtra	4	Rabi	Safflower	75	150	13.74	10.34	32.83	44433	29891	48.65
Maharashtra	1	Rabi	Rapeseed & Mustard	30	75	6.20	4.50	37.68	22500	14000	60.71
Gujrat	5	Rabi	Rapeseed & Mustard	70	166	18.27	15.47	18.13	44328	33436	32.45
Total	**6**			**100**	**241**	**12.24**	**9.99**	**22.53**	**33414**	**23718**	**40.88**

State	KVK	Season	Crop	Area (ha)	Demo (No.)	Average Yield (q/ha)		Increase (%)	Net Return (Rs./ha)		Increase (%)
						Demo	Check		Demo	Check	
Maharashtra	16	Summer	Groundnut	302	852	22.69	17.71	28.52	51365	29912	71.72
Gujarat	4	Summer	Groundnut	40	100	19.47	15.9	22.4	64685	45584	41.9
Total	**20**			**342**	**952**	**21.08**	**16.81**	**25.44**	**58025**	**37748**	**53.72**
Maharashtra	3	Summer	Sesame	50	125	4.61	3.56	29.99	22800	14933	52.68
Gujarat	9	Summer	Sesame	115	288	7.26	5.99	21.38	29740	20767	43.25
Total	**12**			**145**	**363**	**5.94**	**4.78**	**24.29**	**26270**	**17850**	**47.17**

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 324 training courses were structured with the participation of 9729 farmers (8282 male and 1447 female) that consists of 125 on-campus with 3935 participants (3363 male and 572 female) and 199 off-campus with 5794 participants (4919 male and 875 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 programmes for CFLD farmers				Off campus training programmes for CFLD farmers				Total training programmes for CFLD farmers			
				C	M	F	T	C	M	F	T	C	M	F	T
Kharif: Groundnut															
Maharashtra	3	40	100	4	118	22	140	18	157	32	189	22	275	54	329
Gujarat	15	261	615	18	387	108	495	23	545	85	630	41	932	193	1125
Total	18	301	715	22	505	130	635	41	702	117	819	63	1207	247	1454
Kharif: Sesame															
Maharashtra	2	30	75	3	45	8	53	6	118	48	166	9	163	56	219
Gujarat	4	74	185	2	50	0	50	8	181	0	181	10	231	0	231
Total	6	104	260	5	95	8	103	14	299	48	347	19	394	56	450
Kharif: Soybean															
Maharashtra	34	655	1561	39	1198	122	1320	52	1372	154	1526	91	2570	276	2846
Gujarat	6	99	248	7	192	105	297	12	331	176	507	19	523	281	804
Total	40	754	1809	46	1390	227	1617	64	1703	330	2033	110	3093	557	3650
Kharif: Niger															
Maharashtra	1	10	25	1	22	16	38	1	32	14	46	2	54	30	84
Kharif: Castor															
Gujarat	9	160	380	9	243	20	263	18	482	42	524	27	725	62	787
Rabi: Linseed															
Maharashtra	5	85	140	8	235	60	295	7	191	48	239	15	426	108	534
Rabi: Safflower															
Maharashtra	4	75	150	3	100	7	107	4	141	7	148	7	241	14	255
Rabi: Rapeseed & Mustard															
Maharashtra	1	30	75	1	67	3	70	2	45	5	50	3	112	8	120
Gujarat	5	70	166	5	126	0	126	7	129	10	139	12	255	10	265
Total	6	100	241	6	193	3	196	9	174	15	189	15	367	18	385

State	KVK	Area (ha)	Demo (No.)	On campus training programmes for CFLD farmers				Off campus training programmes for CFLD farmers				Total training programmes for CFLD farmers			
				C	M	F	T	C	M	F	T	C	M	F	T
Summer: Groundnut															
Maharashtra	16	302	852	10	250	43	293	24	675	119	794	34	925	162	1087
Gujarat	4	40	100	4	82	20	102	5	159	22	181	9	241	42	283
Total	20	342	952	14	332	63	395	29	834	141	975	43	1166	204	1370
Summer: Sesame															
Maharashtra	3	50	125	2	41	2	43	3	77	6	83	5	118	8	126
Gujarat	9	115	288	9	207	36	243	9	284	107	391	18	491	143	634
Total	12	165	363	11	248	38	286	12	361	113	474	23	609	151	760
Grand total	**121**	**2096**	**5085**	**125**	**3363**	**572**	**3935**	**199**	**4919**	**875**	**5794**	**324**	**8282**	**1447**	**9729**

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 12145 personnel (9966 farmers and 2179 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
Kharif: Groundnut															
Maharashtra	3	40	100	12	216	62	278	8	24	4	28	20	240	66	306
Gujarat	15	261	615	55	718	157	875	16	288	137	425	71	1006	294	1300
Total	18	301	715	67	934	219	1153	24	312	141	453	91	1246	360	1606
Kharif: Sesame															
Maharashtra	2	30	75	5	95	21	116	5	20	4	24	10	115	25	140
Gujarat	4	74	185	10	189	12	201	1	25	5	30	11	214	17	231
Total	6	104	260	15	284	33	317	6	45	6	54	21	329	42	371
Kharif: Soybean															
Maharashtra	34	655	1561	122	3145	233	3378	40	533	23	556	162	3678	256	3934
Gujarat	6	99	248	79	1044	322	1366	10	229	260	489	89	1273	582	1855
Total	40	754	1809	201	4189	555	4744	50	762	283	1045	251	4951	838	5789
Kharif: Niger															
Maharashtra	1	10	25	7	153	49	202	5	18	3	21	12	171	52	223
Kharif: Castor															
Gujarat	9	160	380	24	488	25	513	12	145	21	166	36	633	46	679
Rabi: Linseed															
Maharashtra	5	85	140	6	226	50	276	7	10	1	11	13	236	51	287

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
Rabi: Safflower															
Maharashtra	4	75	150	5	139	5	144	3	5	0	5	8	144	5	149
Rabi: Rapeseed & Mustard															
Maharashtra	1	30	75	1	51	2	53	1	2	1	3	2	53	3	56
Gujarat	5	70	166	27	225	26	251	1	32	0	32	28	257	26	283
Total	6	100	241	28	276	28	304	2	34	1	35	30	310	29	339
Summer: Groundnut															
Maharashtra	16	302	852	62	1410	425	1835	27	132	23	155	89	1542	448	1990
Gujarat	4	40	100	1	2	1	3	6	48	26	74	7	50	27	77
Total	20	342	952	63	1412	426	1838	33	180	49	229	96	1592	475	2067
Summer: Sesame															
Maharashtra	3	50	125	3	85	7	92	2	21	3	24	5	106	10	116
Gujarat	9	115	288	15	286	97	383	9	97	39	136	24	383	136	519
Total	12	165	363	18	371	104	475	11	118	42	160	29	489	146	635
Grand Total	**121**	**2096**	**5085**	**434**	**8472**	**1494**	**9966**	**153**	**1629**	**547**	**2179**	**587**	**10101**	**2044**	**12145**

Yield Performance of Soybean Cultivars in Maharashtra

Soybean is one of the major oilseed crop in Maharashtra. Different varieties of soybean with improved package of practices were demonstrated in clusters. On an average yield of 18.72 q/ha was obtained which was 25.51% higher over local check (Table 3.52 and Fig. 3.16). MACS-1281 cultivar provided 20.47 q/ha. which was higher in Maharashtra region (Fig. 3.17).

Fig 3.16 Yield performance of Soybean under CFLD in Maharashtra

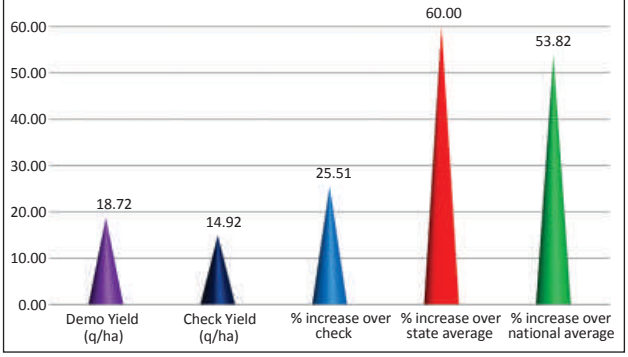


Fig 3.17 Yield performance of Var. MAUS-162 (Soybean) in Maharashtra

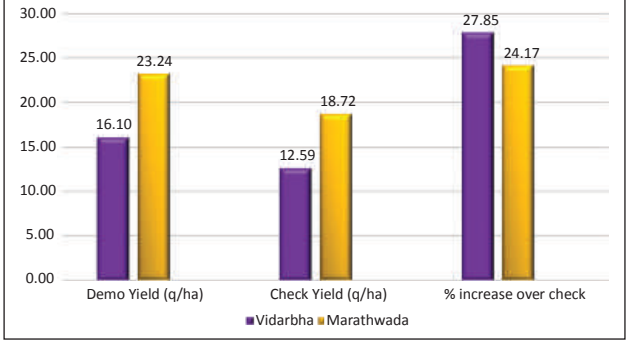


Table 3.52 Yield obtained under soybean demonstrations in Maharashtra

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
Phule Sangam (KDS-726)	Amaravati-II, Buldhana-II, Yavatmal-II,	70	171	16.66	14.47	15.18	36626	29286	25.06
MACS 1188	Nandurbar, Buldhana-I, Kolhapur-I, Pune-I, Pune-II, Nasik-I, Nasik-II	110	275	18.95	14.74	28.57	43177	28894	49.43
MAUS-162	Aurangabad-II, Jalana-I, Parbhani, Sholapur-I, Wardha	95	200	18.99	15.06	26.15	43994	30617	43.69
MAUS-158	Akola, Amravati-I, Beed-I, Chandrapur, Hingoli, Jalana-II, Latur, Nagpur-I, Nanded-I, Washim, Yavatmal-II	250	585	18.05	14.26	26.53	38898	25716	51.26
MACS-1281	Nanded-II	10	25	20.47	14.25	43.65	43771	15575	181.03

Groundnut Yield under CFLDs in Gujarat

Under cluster frontline demonstrations of groundnut, TG-37A cultivar performed well and provided 19.70 q/ha which was about 25.50% higher over farmer's practice. Net income of Rs. 71693/ha was realised by participating farmers which was 39.58% more over check. (Table 3.53). On an average yield of 18.80 q/ha was obtained which was 19.50% higher over local check (Fig. 3.18)

Fig 3.18 Yield performance of Kharif Groundnut in Gujarat

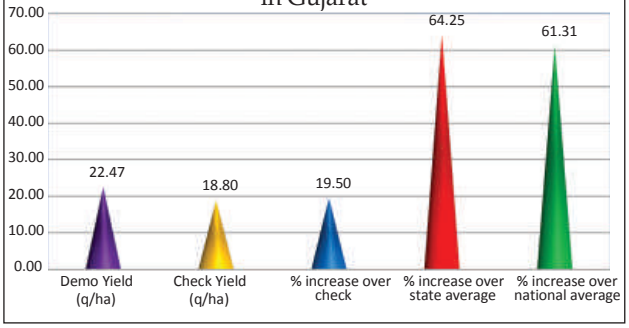


Table 3.53 Yield obtained under groundnut demonstrations

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
GG-2, GG-5	Kutch-II	10	25	17.24	15.63	10.30	49700	43850	13.34
GG-20	Junagadh	40	100	11.96	10.44	14.56	49661	37869	31.14
GJG-22	Amreli, Bhavnagar, Jamnagar, Kutch-I, Mehsana, Rakjot-II, Sabarkantha Kheda	120	300	19.15	16.35	17.11	58424	42923	36.11
GJG-31	Surendranagar	20	50	17.29	14.68	17.78	61969	43408	42.76
TG37A	Banaskantha-I, Banaskantha-II, Narmada, Tapi	71	140	19.70	15.70	25.50	71693	51362	39.58

Performance of Castor in Gujarat

Castor technologies were demonstrated in cluster mode in Panchmahal, Gandhi nagar, Ahmedabad, , Banaskantha-I. Banaskantha-II, Kutch-II, Bharuch,

Mehsana and Patan at farmers' fields. Yield of 30.69 q/ha was attained which was about 25.73% higher over check (Fig. 3.19) and gave net profit of Rs. 89307/ha (Table 3.49). GCH-8 cultivar performed well and provided 31.53 q/ha which was about 31.87% higher over farmer's practice. Net income of Rs. 84557/ha was realised by participating farmers which was 54.07% more over check. (Table 3.54).

Fig 3.19 Yield performance of Castor under CFLD in Gujarat

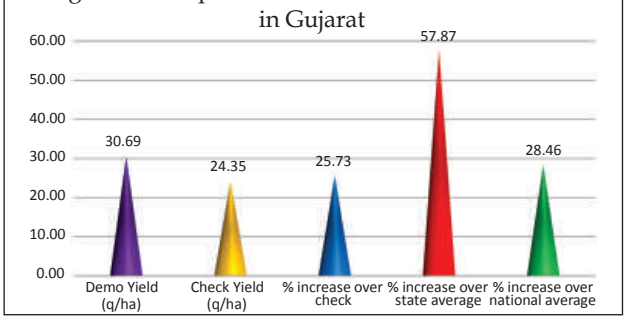


Table 3.54 Yield performance under castor demonstrations

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
GAC-11	Ahmedabad	10	25	21	25.86	19	73358	61900	18.51
GCH-7	Gandhinagar, Kutch-II, Patan	70	155	26.80	26.69	18.26	94466	76224	23.93
GCH-8	Banaskantha-I, Banaskantha-II Mehsana, Panchmahal	60	150	31.53	23.91	31.87	84557	54883	54.07
GNCH-I	Bharuch	20	50	29	24.5	18.37	108775	90025	20.83

Performance of Soybean in Gujarat

Soybean cultivars JS-335, KDS-344, KDS-335 and NRC-37 and were demonstrated at 248 farmers' fields in Dahod, Tapi, Sabarkantha, Surat and Narmada districts. Average yield of 17.26 q/ha under demonstrations plots was obtained which was about 22.11% higher over local practice (Fig. 3.20). JS-335 cultivar recorded 21.18 q/ha average yield which was about 17.54% higher over local check (Table 3.55 and Fig. 3.21)

Fig 3.20 Yield performance of Soybean under CFLD in Gujarat

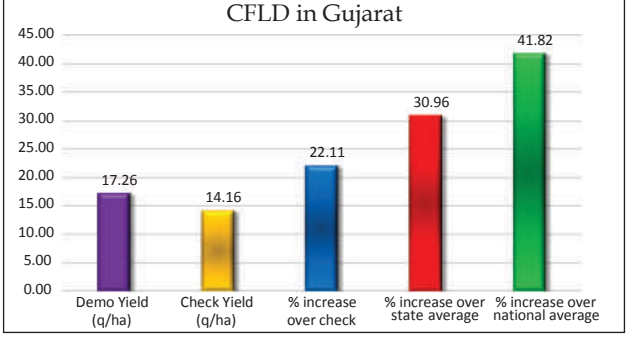


Fig 3.21 Yield performance of Var. JS-335 (Soybean) under CFLD in Gujarat

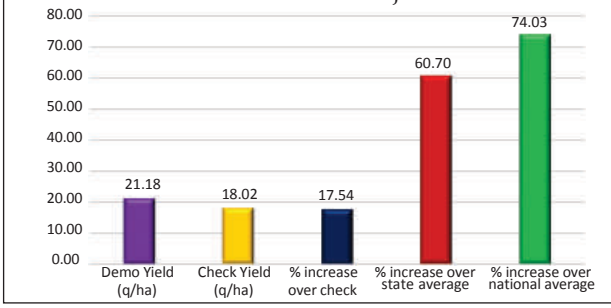


Table 3.55 Yield level and economics under soybean demonstrations

Variety	District	Area (ha)	No. of Demos	Yield (q/ha)		% Increase	Net return (Rs./ha)		% Increase
				Demo	Check		Demo	Check	
JS-335	Sabarkanth	20	50	21.18	18.02	17.54	65972	57307	15.12
KDS-335	Narmada	15	40	19.6	15.6	25.64	37100	24772	49.77
KDS-344	Surat	20	50	11.26	8.9	26.52	24680	16450	50.03
NRC-37	Dahod, Narmada, Tapi	44	108	17.17	14.10	21.83	35675	24645	44.76

Chapter 4

Training of Farmers and Extension Personnel

Technological empowerment of farmers and extension functionaries is required at KVK level. In the Zone, 81 KVKs organized 6813 training courses with the participation of 236562 farmers, farm women, rural youth, extension functionaries, sponsored and vocational trainings involving Maharashtra, Gujarat and Goa states. Out of these, 62501 participants represented SC/ST category with 37922 male and 24598 female. The farmers and farm women were represented in a proportion of 73% and 27%, respectively. In all 195249 farmers and farm women and 24098 rural youth were trained on different skills in different enterprises. Similarly, 17215 extension workers were also trained in different areas. In addition, 391 sponsored courses were organized for

benefiting 22915 officials. In all, 108 vocational trainings were conducted by the KVKs with 3613 rural youth for developing their entrepreneurial capability and skills (Table 4.1 and Table 4.2).

Table 4.1 Physical achievement of training programmes

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	3394	99930	28577	127878	1968	41233	22401	63624	134	1721	1387	3108	5496	142884	52365	195249
Rural Youth	693	14669	5163	19836	111	1669	1244	2913	57	727	626	1353	861	17065	7033	24098
Extension Functionaries	353	8815	4948	13849	94	1592	1635	3227	9	146	79	225	456	10553	6662	17215
Total	**4440**	**123414**	**38688**	**161563**	**2173**	**44494**	**25280**	**69764**	**200**	**2594**	**2092**	**4686**	**6813**	**170502**	**66060**	**236562**

C: Courses, M: Male, F: Female

Table 4.2 Physical achievement of training programmes

Clientele	Maharashtra				Gujarat				Goa				Grand Total			
	C	M	F	Total	C	M	F	Total	C	M	F	Total	C	M	F	Total
Regular	3941	112801	35944	148206	1914	36834	20468	57292	173	2215	1772	3987	6028	151850	58184	210034
Sponsored	391	8655	2153	10808	215	7142	4266	11408	27	379	320	699	633	16176	6739	22915
Vocational	108	1958	591	2549	44	518	546	1064	0	0	0	0	152	2476	1137	3613
Total	**4440**	**123414**	**38688**	**161563**	**2173**	**44494**	**25280**	**69764**	**200**	**2594**	**2092**	**4686**	**6813**	**170502**	**66060**	**236562**

Farmers and Farm Women

In all 5496 training courses were conducted by the KVKs in the Zone with 195249 participants including 142884 male and 52365 female. About 27% participants represented female category. The state wise data related to capacity building of farmers and farm women are given below:

Maharashtra

In Maharashtra, 127878 farmers and farm women were trained through 3394 training courses. More than 22% female represented the trainees group. In total 27072 farmers and farm women belonged to SC/ST category represented 21.17% of the total participants. Majority of courses were conducted on different components such as crop production (601) with 27597 participants, plant protection (663) involving 22404 participants, livestock production and management (378) benefiting 14967 participants, soil health and fertility management (308) with 10790 farmers and women empowerment (176) with 6336 farm women etc. Area-wise and category-wise details of training programmes are furnished in Table 4.3.

Table 4.3 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
Agricultural Engineering	168	3272	638	3910	1429	363	1792	4701	1001	5702
Agricultural Extension	97	4891	571	5546	764	240	1004	5739	811	6550
Capacity Building and Group Dynamics	94	1782	351	2133	728	363	1091	2510	714	3224
Crop Diversification	25	529	109	635	115	30	145	644	139	783
Crop Production	601	20699	2482	23181	3580	836	4416	24279	3318	27597
Entrepreneurship Development	72	632	301	933	220	103	323	852	404	1256
Fisheries	32	498	265	763	70	54	125	568	319	887
Fruits	157	4332	429	4761	742	125	867	5074	554	5628
Income generating activity	3	10	77	87	23	35	58	33	112	145
Livestock Production and Management	378	10315	1960	12275	1950	742	2692	12265	2702	14967
Medicinal and Aromatic Plants	9	202	17	219	60	4	64	262	21	283
Natural Resource Management	71	1820	242	1443	835	174	999	2655	416	2442
Nutritional security	163	1016	2641	3657	271	1157	1429	1287	3799	5086
Ornamental Plants	15	350	30	380	37	12	49	387	42	429
Other	2	80	3	83	11	0	11	91	3	94
Plant Protection	663	16071	2138	18185	3554	705	4259	19561	2843	22404
Plantation crops	7	144	21	165	46	11	57	190	32	222
Post-Harvest Technology	1	36	1	37	5	2	7	41	3	44
Production of Inputs at site	28	700	134	834	300	210	510	1000	344	1344
Soil Health and Fertility Management	308	6378	1772	8150	2055	585	2641	8435	2355	10790
Spices	41	1317	69	1386	192	25	217	1509	94	1603

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
Storage techniques	3	56	5	61	14	0	14	70	5	75
Tuber crops	5	120	2	122	24	6	30	144	8	152
Value Addition	126	2163	1368	3531	549	612	1161	2712	1980	4692
Vegetable Crops	149	3451	577	4028	709	333	1048	4210	933	5143
Women Empowerment	176	499	3774	4273	229	1852	2063	711	5625	6336
Total	**3394**	**81363**	**19977**	**100778**	**18512**	**8579**	**27072**	**99930**	**28577**	**127878**

Gujarat

Capacity building of 63624 farmers and farm women was done by the KVKs by organizing 1968 training courses in Gujarat. More than 35.20% of the participants were from female group. In all, 24348 participants belonged to SC/ST category representing 38.26% of total trainees. The major thrust was given on crop production technologies (466 courses with 15319 trainees), plant protection (348 courses with 11135 participants) and livestock management (251 courses with 7341 beneficiaries). Similarly, women empowerment, soil health and fertility management, agriculture engineering and capacity building with group dynamics were covered under different farmers' empowerment programmes. The details of training courses with male/ female participants are reported in Table 4.4.

Table 4.4 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
Agricultural Extension	58	768	555	1323	793	632	1425	1561	1187	2748
Agricultural Engineering	59	783	476	1259	197	437	634	980	913	1893
Agro-forestry	4	240	24	264	164	108	272	404	132	536
Capacity Building and Group Dynamics	33	520	87	607	231	315	546	751	402	1153
Crop Diversification	6	84	8	92	51	26	77	135	34	169
Crop Production	466	8357	1025	9382	4262	1675	5937	12629	2700	15319
Entrepreneurship Development	30	594	199	793	274	146	420	868	345	1213
Fisheries	28	485	97	582	188	157	345	673	254	927
Fruits	78	1676	182	1858	299	197	496	1975	379	2354

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	251	2390	2297	4687	1435	1219	2654	3825	3516	7341
Medicinal and Aromatic Plants	6	87	21	108	1	0	1	88	21	109
Natural Resource Management	21	196	69	265	172	69	241	368	138	506
Nutritional security	89	216	1031	1247	306	1945	2251	522	2976	3498
Ornamental Plants	4	32	0	32	16	57	73	48	57	105
Plant Protection	348	6609	1066	7675	2197	1263	3460	8806	2329	11135
Plantation crops	3	25	4	29	8	15	23	33	19	52
Problematic Soil Management	4	0	54	54	28	16	44	28	70	98
Value Addition	24	72	280	352	2	175	177	74	455	529
Production of Inputs at site	10	150	39	189	50	48	98	200	87	287
Soil Health and Fertility Management	87	1970	142	2112	611	331	942	2581	473	3054
Spices	33	834	223	1057	96	7	103	930	230	1160
Tuber crops	7	89	0	89	61	48	109	150	48	198
Vegetable Crops	172	1772	861	2633	1236	944	2180	3008	1805	4813
Women Empowerment	147	256	2331	2587	340	1500	1840	596	3831	4427
Total	**1968**	**28205**	**11071**	**39276**	**13018**	**11330**	**24348**	**41233**	**22401**	**63624**

Goa

In Goa, KVKs of both North Goa and South Goa organized 134 training courses with participation of 3108 farmers and farm women. In total participants, SC/ST category farmers/farm women represented about 35.97% and more than 44% of the participants were females. Major attention was given on livestock management (32 courses with 623 trainees), in addition, crop production, plant protection, value addition, and soil health and fertility management components were also emphasized. The details of trainings with participants are given in Table 4.5.

Table 4.5 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	21	198	162	360	100	43	143	298	205	503
Capacity Building and Group Dynamics	6	36	12	48	46	26	72	82	38	120
Entrepreneurship Development	1	0	25	25	0	0	0	0	25	25
Fisheries	1	12	6	18	6	0	6	18	6	24
Fruits	8	112	89	201	56	23	79	168	112	280
Livestock Production and Management	32	225	98	323	185	115	300	410	213	623

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	23	90	113	5	24	29	28	114	142
Plant Protection	23	192	117	309	133	106	239	325	223	548
Plantation crops	3	42	18	60	21	12	33	63	30	93
Value Addition	14	32	157	189	24	121	145	56	278	334
Soil Health and Fertility Management	16	178	84	262	32	14	46	210	98	308
Tuber crops	2	32	16	48	11	0	11	43	16	59
Vegetable Crops	2	14	20	34	6	9	15	20	29	49
Total	**134**	**1096**	**894**	**1990**	**625**	**493**	**1118**	**1721**	**1387**	**3108**

Training of Rural Youth

Major focus was given on skill development for beginning their enterprises/agri-business to become self-dependent. In total including Maharashtra, Gujarat and Goa, 861 training courses were organized where 24102 rural youth got benefited on different areas of enterprises based on agriculture, horticulture, bio-fertilizer/ bio-pesticides and value addition etc. In total participants, 24.52% represented SC/ST categories of rural youths out of which 35.07% belonged to female group. In Maharashtra, 693 training courses were organized with involvement of 19836 rural youth with ratio of male-female participation of 2.84:1.

In capacity building of SC/ST category, 22.89% rural youth were trained. About 26.07% of rural youth were female participants. Main focus was given on livestock management, entrepreneurship development, crop production, plant protection and value addition towards developing skill among rural youth. In case of Gujarat, 111 training courses were arranged with participation of 2913 rural youth. In total participants, 42.70% female trainees attended the programmes and showed keen interest on agri-business/enterprises. About 36% SC/ST category people were represented in the course. In Goa, 57 training programmes were organized with 1353 participants involving 727 male and 626 female. Major training areas considered for capacity building of rural youth were fisheries, value addition, entrepreneurship development, plant protection techniques and production of input at site. About 25.35% participants were represented SC/ST category of rural youth. Details of state wise rural youth training courses are given in Table 4.6 to 4.8.

Table 4.6 Training courses for rural youth 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
Agricultural Extension	43	860	310	1170	134	40	174	994	350	1344
Agricultural Engineering	13	224	92	316	75	22	97	299	114	413

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	19	399	97	496	60	33	93	460	130	589
Crop Diversification	4	263	49	312	1	0	1	264	49	313
Crop Production	41	861	156	1017	124	42	166	989	198	1183
Entrepreneurship Development	112	1442	459	1901	310	136	446	1753	595	2348
Fisheries	17	376	111	487	50	13	63	426	124	550
Horticulture	54	1007	260	1267	292	92	384	1299	352	1651
Livestock Production and Management	139	2511	562	3092	907	298	1205	3414	883	4302
Natural Resource Management	9	165	30	195	46	6	52	211	36	247
Nutritional security	3	144	122	266	19	0	19	163	122	285
Plant Protection	109	1556	444	2000	544	279	823	2100	723	2823
Production of Inputs at site	20	307	65	372	51	20	71	354	85	443
Soil Health and Fertility Management	31	593	270	863	118	25	143	711	295	1006
Spices	2	36	0	36	1	0	1	37	0	37
Tuber crops	1	18	0	18	0	0	0	18	0	18
Value Addition	66	759	591	1350	244	285	529	1003	876	1879
Women Empowerment	10	35	113	148	139	118	257	174	231	405
Total	**693**	**11556**	**3731**	**15306**	**3115**	**1409**	**4524**	**14669**	**5163**	**19836**

Table 4.7 Training courses for rural youth 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
Agricultural Extension	10	143	68	211	22	26	48	165	94	259
Agricultural Engineering	6	121	2	123	22	0	22	143	2	145
Capacity Building and Group Dynamics	1	0	14	14	0	6	6	0	20	20
Crop Production	23	313	142	455	186	64	250	499	206	705
Entrepreneurship Development	4	132	1	133	0	0	0	132	1	133
Fisheries	1	3	0	3	26	15	41	29	15	44
Fruits	4	69	22	91	32	1	33	101	23	124
Livestock Production and Management	8	96	29	125	7	39	46	103	68	171
Nutrition security	1	0	55	55	0	3	3	0	58	58
Plant Protection	21	148	43	191	161	200	361	309	243	552
Value addition	5	34	103	137	0	0	0	34	103	137
Production of Inputs at site	7	20	10	30	39	51	90	59	61	120
Soil Health and Fertility Management	3	7	0	7	11	2	13	18	2	20
Vegetable Crops	6	58	58	116	12	62	74	70	120	190
Women empowerment	11	4	174	178	3	54	57	7	228	235
Total	**111**	**1148**	**721**	**1869**	**521**	**523**	**1044**	**1669**	**1244**	**2913**

Table 4.8 Training courses for rural youth 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
Agro-forestry	3	42	20	62	22	14	36	64	34	98
Capacity Building and Group Dynamics	1	8	27	35	0	6	6	8	33	41
Crop Production	3	23	10	33	26	9	35	49	19	68
Entrepreneurship Development	6	88	31	119	36	19	55	124	50	174
Fisheries	15	191	92	283	48	21	69	239	113	352
Nutritional security	4	24	46	70	8	34	42	32	80	112
Ornamental Plants	2	31	12	43	13	0	13	44	12	56
Plant Protection	5	62	22	84	31	9	40	93	31	124
Value Addition	9	7	181	188	0	2	2	7	183	190
Production of Inputs at site	5	27	16	43	18	14	32	45	30	75
Vegetable Crops	4	22	28	50	0	13	13	22	41	63
Total	**57**	**525**	**485**	**1010**	**202**	**141**	**343**	**727**	**626**	**1353**

Training of Extension Personnel

In total 456 training courses were organized for developing capacity of 17301 extension functionaries in the Zone. About one fourth of extension workers were represented the SC/ST category. The participation of female extension workers was 27.39%. The state-wise information is furnished in Table 4.9 to 4.11.

Maharashtra

In Maharashtra, 353 training programmes were organized with participation of 13849 extension functionaries on crop production (53 courses), plant protection (76 courses), livestock production and management (32 courses), women empowerment (26 courses) etc. Major focus was given on areas of training specially protected cultivation, micro irrigation, 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 4.9.

Table 4.9 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
Agricultural Extension	35	887	226	1113	96	37	133	983	263	1246
Agricultural Engineering	10	291	48	339	59	26	85	350	74	424
Agro-forestry	2	120	7	127	13	1	14	133	8	141
Capacity Building and Group Dynamics	12	492	231	724	29	92	121	521	323	844

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 Diversification	6	82	81	163	20	18	38	102	99	201
Crop Production	53	1403	193	1596	268	56	324	1671	249	1920
Entrepreneurship Development	6	51	91	142	8	23	31	59	114	173
Fruits	11	235	21	256	20	7	27	255	28	283
Livestock Production and Management	32	626	45	671	164	17	181	790	62	852
Natural Resource Management	7	134	50	184	15	17	32	149	67	216
Nutritional security	34	87	997	1082	29	311	340	116	1306	1422
Ornamental Plants	2	65	9	74	5	5	10	70	14	84
Plant Protection	76	2079	518	2592	394	200	594	2473	718	3329
Value Addition	12	193	156	349	13	44	57	206	200	406
Production of Inputs at site	1	29	0	29	1	0	1	30	0	30
Soil Health and Fertility Management	18	389	73	462	87	29	116	478	106	532
Vegetable Crops	10	226	29	255	18	6	24	244	35	279
Women Empowerment	26	84	852	936	101	430	531	185	1282	1467
Total	**353**	**7473**	**3627**	**11094**	**1340**	**1319**	**2659**	**8815**	**4948**	**13849**

Gujarat

Technology backstopping of 3227 extension functionaries was done through organizing 94 training courses. Majority of courses were organized in areas such as women empowerment (16 courses) with 728 participants, plant protection (15 courses) with 557 participants, agricultural extension (13 courses) with 421 participants, livestock production and management (11 courses) with 298 participants etc. Information about trainings is given in Table 4.10.

Table 4.10 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
Agricultural Extension	13	262	14	276	109	36	145	371	50	421
Capacity Building and Group Dynamics	3	59	0	59	35	18	53	94	18	112
Crop Production	9	191	5	196	70	21	91	261	26	287
Entrepreneurship Development	1	0	0	0	21	9	30	21	9	30
Fruits	5	58	3	61	41	5	46	99	8	107
Livestock Production and Management	11	92	18	110	79	109	188	171	127	298
Natural Resource Management	1	17	9	26	0	0	0	17	9	26
Nutrition security	9	0	414	414	10	57	67	10	471	481
Plant Protection	15	320	93	413	123	21	144	443	114	557
Value Addition	1	0	0	0	0	21	21	0	21	21
Production of Inputs at site	1	0	14	14	0	5	5	0	19	19
Soil Health and Fertility Management	6	40	6	46	32	5	37	72	11	83

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
Vegetable Crops	3	0	0	0	16	41	57	16	41	57
Women Empowerment	16	10	279	289	7	432	439	17	711	728
Total	**94**	**1049**	**855**	**1904**	**543**	**780**	**1323**	**1592**	**1635**	**3227**

Goa

In Goa, 2 KVKs (North Goa and South Goa) organized 9 training courses for 225 extension workers (Table 4.11). Efforts for developing capacity of extension workers are needed in the state.

Table 4.11 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
Agricultural Extension	8	88	51	139	40	24	64	128	75	203
Fisheries	1	12	4	16	6	0	6	18	4	22
Total	**9**	**100**	**55**	**155**	**46**	**24**	**70**	**146**	**79**	**225**

Sponsored Trainings

In Maharashtra, Gujarat and Goa, 22915 participants were trained through 633 training courses, which were sponsored by different agencies/organizations. About 27.14% of the participants were represented SC/ST category in training courses. State-wise training details are given below:

Maharashtra

In Maharashtra, 391 sponsored training programs were conducted with participation of 10808 trainees. Majority of courses represented training areas like Plant Protection (88 courses) with 2954 participants, Soil Health and Fertility Management (43 courses) with 1088 participants, Crop Production (40 courses) with 1297 trainees etc. Component wise and category-wise training details are reported in Table 4.12.

Table 4.12 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
Agricultural Extension	8	188	41	229	19	3	22	207	44	251
Agricultural Engineering	7	89	18	107	37	14	51	126	32	158
Capacity Building and Group Dynamics	12	157	34	191	40	17	57	197	51	248
Crop Diversification	5	113	50	163	24	5	29	137	55	192
Crop Production	40	796	115	911	328	58	386	1124	173	1297
Entrepreneurship Development	75	451	148	599	59	27	86	510	175	685
Fisheries	13	272	116	388	21	13	34	293	129	422

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
Fruits	19	540	21	561	135	12	147	675	33	708
Livestock Production and Management	29	480	136	635	142	59	201	622	214	836
Medicinal and Aromatic Plants	1	10	1	11	0	0	0	10	1	11
Natural Resource Management	8	160	29	189	20	17	37	180	46	226
Nutritional security	12	63	283	346	57	79	136	120	362	482
Plant Protection	88	2202	281	2483	392	79	471	2594	360	2954
Value Addition	10	97	110	207	23	67	90	120	177	297
Production of Inputs at site	2	351	35	386	10	5	15	361	40	401
Soil Health and Fertility Management	43	656	62	718	340	24	364	1001	87	1088
Spices	1	12	1	13	0	0	0	12	1	13
Vegetable Crops	12	262	67	329	24	19	43	286	86	372
Women Empowerment	6	49	55	104	31	32	63	80	87	167
Total	**391**	**6948**	**1603**	**8570**	**1702**	**530**	**2232**	**8655**	**2153**	**10808**

Gujarat

In case of Gujarat, 215 training courses were conducted with active participation of 11408 trainees. Major attention was given on crop production (45 courses with 2234 participants), plant protection (30 courses with 2039 participants), livestock production and management (26 courses with 1724 participants) etc. Training area-wise and category-wise details are given in Table 4.13.

Table 4.13 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
Agricultural Extension	17	317	249	566	5	14	19	322	263	585
Agricultural Engineering	9	127	185	312	53	50	103	180	235	415
Agro-forestry	3	190	24	214	164	108	272	354	132	486
Capacity Building and Group Dynamics	11	197	56	253	120	146	266	317	202	519
Crop Diversification	1	0	0	0	30	15	45	30	15	45
Crop Production	45	1541	159	1700	385	149	534	1926	308	2234
Entrepreneurship Development	2	190	68	258	0	0	0	190	68	258
Fisheries	3	20	0	20	117	134	251	137	134	271
Fruits	8	149	23	172	28	14	42	177	37	214

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	26	412	822	1234	221	269	490	633	1091	1724
Natural Resource Management	1	1	30	31	0	0	0	1	30	31
Nutritional security	10	0	137	137	48	314	362	48	451	499
Plant Protection	30	1280	191	1471	309	259	568	1589	450	2039
Plantation crops	1	0	0	0	6	14	20	6	14	20
Value Addition	2	0	77	77	0	11	11	0	88	88
Production of Inputs at site	2	0	30	30	0	33	33	0	63	63
Soil Health and Fertility Management	17	475	5	480	146	75	221	621	80	701
Spices	3	105	26	131	37	2	39	142	28	170
Vegetable Crops	18	252	168	420	217	187	404	469	355	824
Women Empowerment	6	0	129	129	0	93	93	0	222	222
Total	**215**	**5256**	**2379**	**7635**	**1886**	**1887**	**3773**	**7142**	**4266**	**11408**

Goa

In Goa, 27 training programmes were organized with 699 participants involving 379 male and 320 female. Major attention was given on entrepreneurship development and agricultural extension. About 30.90% participants were represented SC/ST category. Details of training courses are given in Table 4.14.

Table No. 4.14 Training courses for sponsored trainings 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
Agricultural Extension	6	60	36	96	32	22	54	92	58	150
Capacity Building and Group Dynamics	1	8	27	35	0	6	6	8	33	41
Entrepreneurship Development	7	88	56	144	36	19	55	124	75	199
Fisheries	4	44	25	69	18	6	24	62	31	93
Plant Protection	5	62	22	84	31	9	40	93	31	124
Value addition	4	0	55	55	0	37	37	0	92	92
Total	**27**	**262**	**221**	**483**	**117**	**99**	**216**	**379**	**320**	**699**

Vocational Trainings

In Maharashtra and Gujarat, 3613 participants were trained through 152 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 youth to start their agri-business or enterprise. In Maharashtra, 2549 participants were trained through 108 courses. Major emphasis was given on areas like livestock production and management (29 courses with 708 participants), entrepreneurship development (27 courses with 554 participants), value addition (15 courses with 458 participants) etc. Area-wise and category-wise training details are given in Table 4.15.

Table 4.15 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
Agricultural Extension	4	66	1	67	14	0	14	80	1	81
Agricultural Engineering	1	9	0	9	6	0	6	15	0	15
Capacity Building and Group Dynamics	1	20	0	20	0	0	0	20	0	20
Crop Production	5	59	3	62	34	18	52	93	21	114
Entrepreneurship Development	27	315	96	411	108	35	143	423	131	554
Fisheries	2	48	9	57	3	0	3	51	9	60
Fruits	4	67	10	77	10	1	11	77	11	88
Livestock Production and Management	29	472	61	533	124	51	175	592	116	708
Ornamental Plants	1	24	0	24	1	1	2	25	1	26
Plant Protection	6	57	23	80	25	1	26	82	24	106
Plantation crops	1	18	0	18	2	0	2	20	0	20
Value Addition	15	192	199	391	32	35	67	224	234	458
Production of Inputs at site	1	7	4	11	1	3	4	8	7	15
Soil Health and Fertility Management	8	142	21	163	43	7	50	185	28	213
Vegetable Crops	3	60	4	64	3	4	7	63	8	71
Total	**108**	**1556**	**431**	**1987**	**406**	**156**	**562**	**1958**	**591**	**2549**

Gujarat

To develop entrepreneurship among rural youth 44 vocational trainings were organized for benefitting the 1064 participants. Main focus was given on training areas such as women empowerment (11 courses with 244 participants), livestock production and management (7 courses with 161 participants), crop production (7 courses with 199 participants) etc. Area-wise and category-wise training details are given in Table 4.16.

Table 4.16 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
Agricultural Engineering	3	79	2	81	0	0	0	79	2	81
Capacity Building and Group Dynamics	1	0	14	14	0	6	6	0	20	20
Crop Production	7	155	17	172	16	11	27	171	28	199
Entrepreneurship Development	3	102	1	103	0	0	0	102	1	103
Livestock Production and Management	7	49	36	85	32	44	76	81	80	161
Ornamental Plants	1	15	0	15	0	0	0	15	0	15
Plant Protection	3	0	0	0	20	63	83	20	63	83
Value Addition	3	0	78	78	0	0	0	0	78	78
Production of Inputs at site	5	20	10	30	18	32	50	38	42	80
Women Empowerment	11	0	83	83	12	149	161	12	232	244
Total	**44**	**420**	**241**	**661**	**98**	**305**	**403**	**518**	**546**	**1064**

Chapter 5

Extension Activities

Focus on virtual extension is being given to reach the unreached in short time. In this context, a combination of extension methods and ICT techniques will play a greater role in technology transfer. 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 service (24900), scientists visit to farmers fields (6105), diagnostic visits (4204), field days (713), group discussions (2252), kisan gosthies (593), film shows (833), self-help groups (215), kisan mela (179), exhibitions (109), plant/animal health camps (154), farm science clubs (81), ex-trainees sammelan (35), farmers' seminars (527), method demonstrations (1033), celebrations of important days (1041), exposure visits (179) etc. with the participation of 1747559 farmers and 33820 extension personnel were performed. Out of total participants, about 20.19% farmers represented the SC/ST category. Similarly, about 14.72% farmers belonged to female group under different extension activities (Table 5.1). In addition, 14194 number of other extension activities viz. use of electronic media, extension literature, newspaper coverage, popular articles, animal health camp, radio and TV talks were taken up by the KVKs to reach the unreached people. Mobile based agro-advisory was also given by the KVKs to the farmers.

Table 5.1 Number of extension activities and participants

Extension Activities	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	21043	852133	101666	953469	122967	28969	151896	974035	131853	1107339	20612	5676	26289
Gujarat	29384	359446	68389	426714	148651	51534	200185	508035	119923	627958	5268	1642	6910
Goa	1328	6331	5211	11542	364	474	838	6643	5619	12262	347	274	621
Total	51755	1217910	175266	1391725	271982	80977	352919	1488713	257395	1747559	26227	7592	33820

Extension Activities in Maharashtra

In popularization of farm and livestock related technologies, extension activities played a major role in distant places. In Maharashtra, 21043 extension programmes were organized where 1107339 farmers and 26289 extension personnel benefited. Major extension activities were covered such as advisory services (7607 programmes) with participation of 728206 farmers and 6025 extension officials; scientists' visit to farmers' fields (3529) with 21898 farmers and 1533 extension workers' participation; diagnostic visits (2953) with beneficiaries of 12176 farmers and 1564 extension official; etc. Activity-wise details of extension programmes are reported in Table 5.2.

Table 5.2 Extension activities organized by KVKs in Maharashtra

Extension Activities	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
Advisory Services	7607	581713	47256	628969	86250	14119	100369	666788	61418	728206	5160	863	6025
Awareness Programme	211	8585	1765	10350	1122	426	1548	9707	2191	12117	309	98	407
Celebration of important days	740	17637	7376	25085	3882	2923	6805	21587	10313	31904	1949	1418	3367
Diagnostic visits	2953	8281	1180	9444	2063	639	2702	10355	1821	12176	1304	261	1564
Exhibition	67	98422	18980	117112	7753	2293	10046	106175	21273	127448	1362	599	1961
Exposure visits	93	1837	514	2351	349	156	505	2186	670	2856	156	55	211
Ex-trainees Sammelan	15	336	65	365	66	31	97	402	96	498	32	10	42
Farm Science Club	68	1146	471	1617	330	84	414	1432	599	2031	215	48	263
Farmers' seminar /workshop	170	8113	1374	9487	1337	320	1657	9450	1694	11144	1150	179	1329
Farmers visit to KVK	1759	1712	230	1942	92	34	126	1773	264	3225	50	13	63
Field Days	326	7937	1368	9259	1841	602	2423	9623	2002	11625	921	122	1043
Film Show	171	39112	3288	42400	612	349	961	39724	3637	43389	262	56	318
Group Discussions	655	9553	2274	11827	3131	709	3820	12820	3010	15815	1360	191	1551
Kisan Ghosthis	394	13989	2228	16250	2181	589	2770	16148	2840	18988	726	237	963
Kisan Melas	166	9805	4068	13873	2073	1235	3308	11860	6149	18009	683	233	916
Lecture Delivered as Resource Person	110	2890	415	3305	243	154	397	3133	569	3702	809	163	972
Method Demonstrations	545	10005	1543	11548	2633	1293	3926	12776	3020	15808	479	121	600
Plant/Animal health camps	100	3063	369	3432	764	127	891	3827	496	4323	230	46	276
Scientists' visit to farmers field	3529	14233	3126	17359	3379	1115	4494	17639	4244	21898	1187	346	1533
SHGs	170	1209	1097	2306	361	599	960	1570	1696	3266	54	59	113
Webinar	147	2926	566	3492	354	184	538	3280	750	4030	1470	204	1674
Others	1047	9629	2113	11696	2151	988	3139	11780	3101	14881	744	354	1098
Total	**21043**	**852133**	**101666**	**953469**	**122967**	**28969**	**151896**	**974035**	**131853**	**1107339**	**20612**	**5676**	**26289**

Extension Activities Organized in Gujarat

In Gujarat, 29384 extension programmes were organized by the KVKs where 627958 farmers and 6910 extension officials participated. Main extension activities such as advisory services (16629) with participation of 319354 farmers and 647 extension personnel; farmers visits to KVK (2834) benefited 12100 farmers and 142 extension workers; scientists' visit to farmers' fields (2370) benefited 13107 farmers and 617 extension personnel 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 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
Advisory Services	16629	240809	15307	256116	59246	3992	63238	300055	19299	319354	580	67	647
Awareness programme	196	1695	1375	2995	1090	1522	2612	2785	2897	5682	72	24	96
Celebration of important days	283	9917	8295	18212	7347	7332	14679	17264	15627	32891	554	336	890
Diagnostic visits	1023	2600	497	3097	1384	420	1804	3984	917	4901	112	17	129
Exhibition	40	9885	8719	18604	5187	5067	10254	15072	13786	28858	198	59	257
Exposure visits	79	862	299	1161	579	489	1068	1441	788	2229	21	7	28
Ex-trainees Sammelan	19	458	94	552	74	42	116	532	136	668	4	1	5
Farmers' seminar /workshop	355	14712	2413	17125	2874	1735	4609	17586	4148	21734	406	50	456
Farm Science Club	13	200	0	200	107	0	107	307	0	307	0	0	0
Farmer visit to KVK	2834	4598	1479	6077	3514	2509	6023	8112	3988	12100	134	8	142
Field Days	378	4618	1396	6014	2631	1180	3811	7187	2576	9763	188	33	221
Film Show	636	5220	3220	8440	28177	3517	31694	33397	6737	40134	212	179	391
Group Discussion	1580	4913	1634	6559	2543	2375	4918	7456	4009	11465	322	131	453
Kisan Ghosthi	187	7594	2334	9928	1826	1297	3123	9420	3631	13051	224	47	271
Kisan Melas	13	6003	4104	10107	3726	3413	7139	9729	7517	17246	178	61	239
Method Demonstration	428	3809	1728	5537	2607	2011	4618	6416	3739	10155	221	27	248
Plant/Animal health camps	50	1261	254	1515	443	164	607	1704	418	2122	45	5	50
Scientists' visit to farmers field	2370	7794	1355	8091	2839	1119	3958	10633	2474	13107	489	128	617

Extension Activities	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
SHGs	20	6	163	169	38	81	119	44	244	288	10	5	15
Other Guest Lectures	1659	9131	3221	12352	1519	526	2045	10650	3747	14397	315	194	509
Lectures delivered as resource persons	589	23234	10502	33736	20900	12743	33643	44134	23245	67379	977	263	1240
Webinars	3	127	0	127	0	0	0	127	0	127	6	0	6
Total	**29384**	**359446**	**68389**	**426714**	**148651**	**51534**	**200185**	**508035**	**119923**	**627958**	**5268**	**1642**	**6910**

Extension Activities in Goa

In Goa, farmers have different mindset towards farming. There is lot of potential to create agriculture related enterprises. In this state, 1328 extension programmes were conducted in which 12262 farmers and 621 extension personnel got benefitted. Major extension activities such as Advisory services (664) benefiting 5888 farmers; Diagnostic visits (228) benefitting 752 farmers; Scientists visits to farmers field (206); Method demonstration (60) etc. were conducted for large scale technology dissemination and application. 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 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
Advisory Services	664	3263	2390	5653	158	77	235	3421	2467	5888	57	47	104
Celebration of important days	18	435	346	781	52	16	68	487	362	849	44	24	68
Diagnostic visits	228	402	315	717	21	14	35	423	329	752	30	25	55
Exhibition	2	104	86	190	0	0	0	104	86	190	2	3	5
Exposure visits	7	22	18	40	0	0	0	22	18	40	0	0	0
Ex-trainees Sammelan	1	25	20	45	0	0	0	25	20	45	1	1	2
Farmers' seminar/ Workshops	2	11	9	20	0	0	0	11	9	20	40	34	74
Field Days	9	85	60	145	13	8	21	98	68	166	18	13	31
Film Shows	26	277	227	504	0	0	0	277	227	504	20	14	34
Group Discussion	17	135	77	212	16	11	27	151	88	239	13	9	22
Kisan Ghosthi	12	82	69	151	18	16	34	100	85	185	22	16	38
Method Demonstration	60	412	340	752	23	29	52	383	303	686	14	13	27
Plant/Animal health camps	4	68	56	124			0	68	56	124	0	0	0
Scientists' visit to farmers field	206	616	697	1313	24	15	39	640	712	1352	39	32	71
SHGs	25	105	265	370	39	288	327	144	553	697	9	13	22
Other Guest Lectures	47	289	236	525	0	0	0	289	236	525	38	30	68
Total	**1328**	**6331**	**5211**	**11542**	**364**	**474**	**838**	**6643**	**5619**	**12262**	**347**	**274**	**621**

Other Extension Activities

KVK experts have a major challenge of reaching to each corner of the village. In this context, mass communication can play a major role to get in touch with people residing at distant places. 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, 14194 activities were organized by KVKs in the zone. State-wise and activity-wise details are reported in Table 5.5.

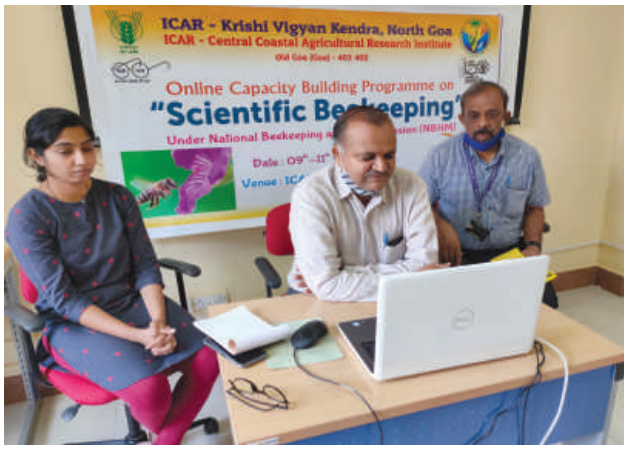


Table 5.5 Other extension activities organized by KVKs across the Zone

Other Extension Activities	Maharashtra (No.)	Gujarat (No.)	Goa (No.)	Total (No.)
Animal health camp (No. of animals treated)	5303	2587	157	8047
Electronic Media	83	59		142
Extension Literature	302	529	21	852
Newspaper Coverage	2034	635	25	2694
Popular Articles	671	266	3	940
Radio Talks	795	87	13	895
TV Talks	573	48	3	624
Total	**9761**	**4211**	**222**	**14194**

Chapter 6

Seed and Planting Material Production

Production of Technological Inputs

Availability of quality seeds, planting materials, livestock breeds and bio-products is the primary requirement of the farmers to attain higher productivity in agriculture and allied sectors. KVKs are actively involved in production of quality seeds, planting materials, livestock, bio-products and providing to the farmers and other stakeholders. During the period under report, KVKs produced 6138.29 q seeds of crop varieties, 63429 litre liquid and 53812.3 kg solid bio-products, 22.38 lakh number of planting materials of varieties, 31.86 lakh number of planting materials of hybrids and 22.09 lakh number of livestock and fingerlings (Table 6.1).

Table 6.1 Production and supply of technological inputs

Category		Quantity	Value (Rs.in lakh)	Farmers (No.)
Seed of crop varieties (q)		6138.29	306.64	18357
Bio-products	Liquid (lit)	63429	32.66	9371
	Solid (kg)	53812.3	83.89	15324
Planting material of crops (No. in lakh)		22.38	154.54	20970
Planting material of crops hybrid (No. in lakh)		31.86	42.44	3399
Livestock and fisheries (No. in lakh)		22.09	77.87	4978
Total			**698.04**	**72399**

Seeds

In the year 2020, the quality seed production by KVKs of Maharashtra, Gujarat and Goa was 3811.29 q, 2279.80 q and 47.20 q, respectively. The crop category-wise information of seed production is reported in Table 6.2.

Table 6.2 Quality seed produced by the KVKs in the Zone

State	Crop Category	Quantity (q)	Total Value (Rs)	Sold to No. of Farmers
Maharashtra	Cereals	1060.66	3099206.85	4830
	Commercial crops	8	96000	222
	Fodder Crops	1.56	32635	156
	Oilseed Crops	824.82	4983352.5	1027
	Pulses	1858.28	11050903.8	7563

State	Crop Category	Quantity (q)	Total Value (Rs)	Sold to No. of Farmers
	Spices	50.63	132575	60
	Vegetable crops	7.33	298128.6	406
	Total	**3811.29**	**19692802**	**14264**
Gujarat	Cereals	1369.24	3890551.62	2974
	Commercial crops	159.07	597565.9	14
	Fodder Crops	20	208000	162
	Oilseed Crops	394.35	3846329.37	400
	Pulses	305.94	1980430.2	317
	Spices	8.02	192480	47
	Vegetable crops	7.5825	46525	20
	Fiber crops	15.6	86350	0
	Total	**2279.80**	**10848232**	**3934**
Goa	Cereals	47.20	122720	159
	Total	**47.20**	**122720**	**159**
	G.Total	**6138.2934**	**30663753.8**	**18357**

Bio-products

The KVKs of Maharashtra have produced 22114 kg (solid) and 49102.3 litre (liquid) quality bio-products, 37686 kg (solid) and 4710 litre (liquid) by KVKs in Gujarat and 3629 kg (solid) by North and South Goa KVKs. Cost of cultivation was reduced by the farmers by using bio-fertilizers and bio-pesticides. In Gujarat, farmers are more eager to adopt bio-fertilizers and bio-pesticides. 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

State	Category	Form	Quantity	Total Value (Rs.)	Sold to No. of Farmers
Maharashtra	**Bio fertilizers**	Solid (Kg)	1880.5	187190	1262
		Liquid (lit)	26231.3	4454058	6624
	Bio fungicides	Solid (Kg)	11510.5	1325778	4034
		Liquid (lit)	19365	3052530	5241
	Bio pesticides	Solid (Kg)	7236	557030	1035
		Liquid (lit)	1306	226200	621
	Micro Nutrients mixture	Solid (Kg)	1487	392740	512
		Liquid (lit)	2200	154000	795
	Total	**Solid (Kg)**	**22114**	**2462738**	**6843**
	Total	**Liquid (lit)**	**49102.3**	**7886788**	**13281**

State	Category	Form	Quantity	Total Value (Rs.)	Sold to No. of Farmers
Gujarat	Bio fertilizers	Solid (Kg)	597	30470	65
		Liquid (lit)	2006	210200	930
	Bio fungicides	Solid (Kg)	7244	450650	1159
	Bio pesticides	Solid (Kg)	2550	89065	584
		Liquid (lit)	714	246490	590
	Other	Solid (Kg)	27295	160240.9	328
		Liquid (lit)	1990	45000	523
	Total	**Solid (Kg)**	**37686**	**730425.9**	**2136**
	Total	**Liquid (lit)**	**4710**	**501690**	**2043**
Goa	Other	Solid (Kg)	3629	72580	392
	G.Total	**Liquid (lit)**	**63429**	**3265743**	**9371**
		Solid (Kg)	**53812.3**	**8388478**	**15324**

Planting Material of Crops

In the year 2020, the quality planting material production of crops by KVKs of Maharashtra, Gujarat and Goa was 18.22 lakh, 40.12 lakh and 0.14 lakh, respectively. In Maharashtra, KVKs have given more focus on developing horticulture nurseries at their centers. The crop category-wise details of planting material production are reported in Table 6.4.

Table 6.4 Planting material produced by the KVKs

State	Crop Category	Quantity (No.)	Total Value (Rs)	Sold to No. of Farmers
Maharashtra	Commercial crops	320276	815473	217
	Flower crops	11627	49722	130
	Fodder crops	315435	338685	268
	Forest species	23018	2660	6
	Fruit crops	221943	10925425	7105
	Ornamental plants	1319	30580	44
	Plantation crops	2309	169470	317
	Spices	3697	58915	2053
	Vegetable crops	922816	1083525	2988
	Total	**1822440**	**13474455**	**13128**
Gujarat	Commercial crops	11500	2300	4
	Flower crops	9952	17877.54	22

State	Crop Category	Quantity (No.)	Total Value (Rs)	Sold to No. of Farmers
	Fodder crops	55000	55000	400
	Forest species	510	10050	201
	Fruit crops	28278	869620	1369
	Medicinal and Aromatic crops	4023	4584	10
	Spices	10000	3000	2
	Vegetable crops	281957.5	206854.9	1829
	Total	**401220.5**	**1169286**	**3837**
Goa	Commercial crops	120	6360	56
	Fruit crops	1060	68320	437
	Ornamental plants	1408	56320	745
	Plantation crops	3457	99160	1546
	Spices	217	8680	167
	Vegetable crops	8531	571820	1054
	Total	**14793**	**810660**	**4005**
	G.Total	**2238454**	**15454402**	**20970**

Planting Material of Crop Hybrids

In the Zone, the quality planting material production of crop hybrids by KVKs of Maharashtra and Gujarat was 28.28 lakh, 3.45 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

State	Crop Category	Quantity (No.)	Total Value (Rs)	Sold to No. of Farmers
Maharashtra	Flower crops	3950	11930	15
	Fodder crops	810654	820250	924
	Fruit crops	2312	126010	214
	Ornamental plants	926	18520	12
	Vegetable crops	2010504	2775086	1100
	Total	**2828346**	**3751796**	**2265**
Gujarat	Flower crops	9400	14100	10
	Vegetable crops	335941.9	465115.9	936
	Total	**345341.9**	**479215.9**	**946**
Goa	Fodder crops	13300	13300	188
	Total	**13300**	**13300**	**188**
	G.Total	**3186988**	**4244312**	**3399**

Livestock and Fisheries

During the reporting period, the quality livestock and fingerlings production by KVKs of Maharashtra and Gujarat was 2206318 and 3039, respectively. KVKs of Maharashtra did admirable work in fingerlings production. The crop category-wise information of livestock and fisheries production is given in Table 6.6.

Table 6.6 Quality livestock and fingerlings production

State	category	Quantity (No.)	Total Value (Rs)	Sold to No. of Farmers
Maharashtra	Dairy cow	12	139000	1
	Fishery	2107972	2153972	795
	Goat	273	1159777	113
	Poultry	98061	3527232	3005
	Total	**2206318**	**6979981**	**3914**
Gujarat	Dairy cow	24	430000	16
	Fishery	2714	271400	1023
	Goat	35	86199.96	12
	Poultry	266	19252	13
	Total	**3039**	**806852**	**1064**
	G.Total	**2209357**	**7786833**	**4978**

Chapter 7

Farmer Centric and Skill Oriented Programmes

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

National Innovations in Climate Resilient Agriculture (NICRA)

Major focus is being given on climate resilient technologies and interventions in changing climatic scenario. 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 components 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-I and Ratnagiri in Maharashtra and Amreli, Banaskantha-I, Rajkot-I, Kutch-I and Valsad in Gujarat state. In Maharashtra, 8 KVKs adopted 25 villages benefitting 7292 farm families. In Gujarat, 5 KVKs adopted 15 villages benefitting 5357 farm families. In addition, 27 nearby villages (20 in Maharashtra and 7 in Gujarat) have been included under NICRA project. 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	Names of Adopted Villages	No. of Families	Population	Major crops grown	Rainfall (mm)	Vulnerability situation
Ahmednagar-I	Pimpari lokai	194	1297	Pearl millet, soybean, cotton, sorghum, fodder crops	463	Drought
Amravati-II	Takali (Bk)	472	1973	Soybean, cotton, pigeonpea, chickpea	890.5	Drought/ Heat wave
	Ajani	169	547	Soybean, cotton, pigeonpea, chickpea	890.5	Drought/ Heat wave
	Morgaon	327	749	Soybean, cotton, pigeonpea, chickpea	890.5	Drought/ Heat wave
Aurangabad-I	Shekta	115	560	Cotton, maize, pearl millet, gram	644	Drought
	Wajnapur	135	600	Cotton, maize, pearl millet, gram	644	Drought
	Buttewadgaon	141	1250	Cotton, maize, pearl millet, gram	644	Drought

Name of KVK	Names of Adopted Villages	No. of Families	Population	Major crops grown	Rainfall (mm)	Vulnerability situation
	Shankerpur	171	1900	Cotton, maize, pearl millet, gram	644	Drought
	Gopalwadi	101	745	Cotton, maize, pearl millet, gram	644	Drought
	Saigaon	95	685	Cotton, maize, pearl millet, gram	644	Drought
Buldhana-II	Chautha	350	1678	Soybean, gram, maize, wheat, sorghum	953.1	Drought
	Girda	244	1115	Soybean, gram, maize, wheat, sorghum	953.1	Drought
	Atkal	214	985	Soybean, gram, maize, wheat, sorghum	953.1	Drought
Jana-I	Kadegaon	355	1690	Cotton, jowar, red gram , bengal gram, wheat, bajra	932.9	Water logged
	Varudi	387	1810	Cotton, jowar, red gram , bengal gram, wheat, bajra	930	Water logged
Nandurbar	Umarani	257	1747	Maize, sorghum, black gram, pigeon pea, chickpea, mango	813.2	Heat stress and drought.
	Surypur	108	502	Maize, sorghum, black gram, pigeon pea	813.2	Heat stress and drought
	Roshmal	875	1688	Sorghum, maize, soybean, pigeon pea, black gram	813.2	Heat stress and drought
	Bhujgaon	133	777	Sorghum, maize, soybean, pigeon pea, black gram	813.2	Heat stress and drought
Pune-I Baramati	Jalgaon kadepathar	398	2578	Sorghum, maize, green gram, red gram, bajara, onion	896.1	Drought
	Jalgaon supe	474	3254	Sorghum, maize, green gram, red gram, bajara, onion	805.3	Drought
	Karhati	738	4597	Sorghum, maize, green gram, red gram, bajara, onion	790.7	Drought
Ratnagiri	Haral	271	950	Rice	3500	Flood prone/heavy Rainfall
	Parule	202	873	Rice	3500	Flood prone/heavy Rainfall
	Satwali	366	1369	Rice	3500	Flood prone/heavy Rainfall
Total	**25**	**7292**				

Table 7.2 Brief profile of identified villages under NICRA in Gujarat

Name of KVK	Names of Adopted Villages	No. of Families	Population	Major crops grown	Rainfall (mm)	Vulnerability situation
Amreli	Karjala	404	3000	Cotton, groundnut, sesame, wheat, chickpea, sugarcane, pigeon pea	880	Drought
	Nesadi	957	7000	Cotton, groundnut, sesame, wheat, chickpea, sugarcane, pigeon pea	880	Drought
Banaskantha-I	Fatepura	96	491	Groundnut, mustard, potato, wheat, pearl millet, castor, amaranths	736.8	Drought

Name of KVK	Names of Adopted Villages	No. of Families	Population	Major crops grown	Rainfall (mm)	Vulnerability situation
	Dhaneri	320	2402	Groundnut, mustard, potato, wheat, pearl millet, castor, amaranths	736.8	Drought
	Velavas	206	1841	Groundnut, mustard, potato, wheat, pearl millet, castor, amaranths	745.6	Drought
	Marvada	110	1104	Groundnut, mustard, potato, wheat, pearl millet, castor, amaranths	755.68	Drought
Kutch-I	Bhalot	177	897	Pomegranate, bt. cotton, castor, cumin, sesame, date palm, green gram	360	Drought
	Lafara	128	677	Pomegranate, bt. cotton, castor, cumin, sesame, date palm, green gram	360	Drought
	Bagada	204	845	Pomegranate, bt. cotton, castor, cumin, sesame, date palm, green gram	360	Drought
Rajkot-I	Magharvada	300	1543	Groundnut, cotton, cumin	1160.4	Drought
	Rafala	692	13613	Groundnut, cotton , cumin, gram	1160.4	Drought
	Targhadia	475	1748	Groundnut, cotton , cumin, gram	1160.4	Drought
Valsad	Amdha	481	2660	Paddy, gram, pigeon pea	2287	Flood
	Khutli	349	1922	Paddy, gram, pigeon pea		Flood
	Panas	458	2354	Paddy, gram, pigeon pea		Flood
Total	**15**	**5357**				

Rainfall in NICRA Villages

The month wise rainfall received, no. of dry spells, intensive rain spells and water logging situation observed during the crop growth period are varied and that resulted in adverse effect on crops/livestock. Dry spells and low rainfall in July-August severely affected kharif crops – green gram, black gram, maize and soybean in Maharashtra. Heavy rains in September-October affected harvesting of kharif crops. Long dry spells were also observed in both Gujarat and Maharashtra states.

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 2020 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/ Composite Fish Culture (CFC)	No. of Trainings	Farmers	No. of Programs	Farmers
Maharashtra (08)										
Ahmednagar-I	55	34	255	102	130	93	7	330	162	212
Amravati-II	1276	1720.95	562	1057.5	536	1586 (CFC: 2000)	21	1366	20	1289
Aurangabad-I	182	135	215	90	70	5020	10	264	65	596
Buldhana-II	15	41	58	21	13	1	25	559	24	531
Jalna-I	363	453	287	115.2	530	1210 (CFC: 30,000)	27	814	28	721

Name of KVK	NRM		Crop		Livestock		Capacity Building		Extension Activities	
	Demo (No.)	Area (ha.)	Demo (No.)	Area (ha.)	Demo (No.)	No. of Animals/ Units/ Composite Fish Culture (CFC)	No. of Trainings	Farmers	No. of Programs	Farmers
Nandurbar	103	94	195	53.85	110	683	32	709	23	509
Pune-I	50	20	555	227.16	205	205	5	117	1	4
Ratnagiri	141	92.7	490	95.7	34	34	4	80	25	636
Sub-Total	2185	2590.65	2617	1762.41	1628	8832 (CFC: 32000)	131	4239	348	4498
Gujarat (05)										
Amreli	72	75.2	60	24	40	40	3	92	66	695
Banaskantha-I	130	71.2	189	28.15	333	365	10	209	57	559
Kutch-I	120	130	110	40.8	204	842	7	235	24	571
Rajkot-I	85	163	60	30	125	158	7	123	9	175
Valsad	112	30	487	88.5	249	223	10	417	6	272
Sub-Total	519	469.4	906	211.45	951	1628	37	1076	162	2272
Grand Total	**2704**	**3060.05**	**3523**	**1973.86**	**2579**	**10460 (CFC: 32000)**	**168**	**5315**	**510**	**6770**

Table 7.4 Details of Custom Hiring Centre (CHC)

State	Name of KVK	Implement (No.)	Area Covered (ha)	No. of Farmers	Revenue generated through CHC (Rs.)
Maharashtra	Ahmednagar I	4	9.4	18	4050
	Amravati-II	5	67.7	92	18500
	Aurangabad-I	16	194	212	15900
	Buldhana-II	2	16.5	40	4000
	Jalna-I	7	64.5	176	21800
	Nandurbar	4	55	46	1200
	Pune-I	29	231	89	8615
	Ratnagiri	7	20.5	114	8800
	Sub Total	**74**	**658.6**	**787**	**82865**
Gujarat	Amreli	6	52	31	12415
	Banaskantha-I	4	60	275	18800
	Kutch-I	5	58	146	25200
	Rajkot-I	7	140	143	10790
	Valsad	1	15	45	21000
	Sub Total	**23**	**325**	**640**	**88205**
Zone VIII	**Grand Total**	**97**	**983.6**	**1427**	**171070**

Table 7.5 Crops/Commodity wise groups and farmers

KVK	Name of Crops/ Commodity Groups	Area Covered (ha)	No. of Farmers
Amravati-II	Fodder Bank: Bajra, Napier Hybrid Grass (DHN- 10), Seed bank: Soybean , Chickpea	14	547
Jalna-I	Fodder Bank: Hybrid Napier Grass (BNH-10 -Muti-cut, Jayvant, Gunvant), Seed Bank: Rabi jowar (Parbhani Super moti), Chick pea (Akash), Wheat (Phule Samadhan)	26	94
Nandurbar	Seed Bank: Maize (GM-6), Chickpea (RVG-203)	1	5
	Farmers facility centre	114	95

KVK	Name of Crops/ Commodity Groups	Area Covered (ha)	No. of Farmers
Pune-I	Seed Bank: Sorghum (Phule Vasudha, Revati, Anuradha	8	20
Ratnagiri	Seed Bank: Rice (Ratnagiri-6)	0.5	15
Amreli	Fodder Bank: Groundnut straw, Seed Bank: Groundnut, Wheat	2	20
Kutch-I	Fodder Bank: Sorghum, Seed Bank: Lucern	53	500
	Total	**218.5**	**1296**

Extension Activities

In all, 510 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 7169 farmers were benefitted through participation in these programmes including 5255 men and 1917 women farmers. About 800 farmers including 169 women farmers were taken on diagnostic visits to various places/ institution by the NICRA-KVKs during the year. The details are given in Table 7.6.

Table 7.6 Extension activities conducted under NICRA

Name of Activity	Number of Programmes	No. of Beneficiaries		
		Men	Women	Total
Agro-advisory services	139	1255	544	1799
Animal health	8	419	132	551
Awareness	11	256	84	340
Celebration of important days	19	481	190	671
Diagnostic visits	212	631	169	800
Exhibitions	1	40	15	55
Farmers meeting	21	325	113	438
Field days	35	763	151	911
Field Visit - NICRA	12	132	8	140
Formation of farmers groups	3	30	53	83
ICT based extension services	1	52	8	60
Integrated farming system	3	36	10	46
Interaction of RAWE students with farmers about NICRA	3	177	142	309
Kisan mela	1	45	16	61
Method Demonstrations	32	482	188	680
Mini kit/Adaptive trials	1	8	4	12
Online Farmers meet	1	15	0	15
Result Demonstrations	1	12	4	16
SHGs activities	1	4	45	49
Survey	2	33	0	33
Up scaling of technology demonstrations by organizing Agricultural technology meet	2	44	41	85
Video Shooting	1	15	0	15
Total	**510**	**5255**	**1917**	**7169**

Farmer 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 programme 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–scientists 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. In the Zone, Farmer FIRST project is implemented in 3 centres MPKV, Rahuri; NAU, Navsari; and JAU, Junagadh. 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

Centre wise and Module based Interventions

Module wise and centre wise progress for the year 2020 is reported in different tables. Under MPKV Rahuri, focus on nutri-rich cultivars of bajra, rabi sorghum, horticulture based interventions on Bhagwa variety of Pomegranate, integrated farming system and suitable micro enterprises for small and marginal farmers was given in Table 7.7. Cluster of villages were covered and their active involvement was ensured.

Table 7.7 MPKV Rahuri Centre: Coverage of different technological interventions in the villages

Modules	Crop/Animal/ Enterprise	Variety	Area covered (ha.)	Quantity produced (q)	No. of farmers
Crop based module	Bajra	Dhanshakti and Adishakti	40	1080	100
	Red Gram	Phule Rajeshwari	20	390	50

Modules	Crop/Animal/ Enterprise	Variety	Area covered (ha.)	Quantity produced (q)	No. of farmers
	Rabi Sorghum	Phule Revati	40	778	100
		Phule Vasudha			
		Phule Suchitra			
		Phule Anuradha			
	Chickpea	Phule Vikram	20	380	50
Horticulture based module	Pomegranate production technology	Bhagwa	20	3790	50
Livestock based module	Goat rearing	Sangamneri	50 families	Rs. 48000/ family	50
	Fodder setts	Phule Gunvant	3	37000	50
	Silage preparation		65 bags	650	65
Entrepreneurship Module	Dal Mill	PKV mini dal mill	Two Women Self Help Group	9.2	15
NRM Based Module	In situ soil moisture conservation	Rabi Sorghum	40	915	100
	Vermicomposting	Eisenia fetida	15 farmers	8.2	15
Integrated Farming System based module	Backyard poultry	Grampriya	100 families	Eggs- 520000 Male birds selling – 2380 nos	100

Table 7.8 NAU Navsari Centre: Coverage of different technological interventions in the villages

Modules	Crop/Animal/ Enterprise	Variety	Area covered (ha.)	Quantity produced (q)	No. of farmers
Crop based module	Rice	GNR-3	40	32.74	100
	Sugarcane	13073	5	910.83	12
Horticulture based module	Mango	Application of micronutrients, PGR and fruit fly traps	40	126.78	100
	Sapota		20	169.82	50
Livestock based module	Scientific Calf Rearing Practices	-	70 crossbreed calf	-	70
	Application of Calf Statar feeding				
	First Aid Kit and Deworming				
Entrepreneurship module	Vermi composting	Providing the earthworms, training will be given to selected young farmers	-	-	24
NRM based module	Improving soil properties through soil amendment	Provide d gypsum	-	-	60
Integrated Farming System based module	IC of Lucerne with young sapota orchard + livestock + Vermicompost	(Anand-2) TF	0.28	258	50
	IC of green gram with young mango orchard + Vermicompost	GM-6	0.11	7.9	42
	Boundary plantation of drum stick	PKM-1	5 plants/ farmer	-	76

Table 7.9 JAU Junagadh: Coverage of different technological interventions in the villages

Modules	Crop/Animal/ Enterprise	Variety	Area covered (ha.)	Quantity produced (q)	No. of farmers
Crop based module	Groundnut	GG-20	20	346	100
	Cotton	GTHH-49	32	662.72	160
	Wheat	GW-496	20	843.4	100
	Gram	GJG-3	10	121.5	50
Livestock based module	Buffalo	Jaffrabadi	50 buffaloes	1,26,300 (lit milk)	50
NRM Based Module	Groundnut+ Pigeon pea	GG-22 + GJP-1	10	139.1	50
Crop Diversification Module	Cotton + Sweet corn	-	8	144.96	40

Enhancement in Yield and Income

Considering the farmers' major needs, different interventions were planned and implemented at farmers' fields with their active participation in whole process of crop planning, field operations and post-harvest processing. Overall increase in yield and income realized by the farmers is given in Table 7.10. In some cases the average income was raised by one and half times.

Table 7.10 Average yield and income of different crops demonstrations at farmers' fields

FFP Centre	Crops	Avg. Yield (q/ha)		Gross Income (Rs/ha)		Net Income (Rs/ha)	
		Before	After	Before	After	Before	After
MPKV, Rahuri	Bajra	24.12	27	61200	64800	35100	39400
	Red gram	14.5	19.5	65250	87750	32850	55750
	Chickpea	14.2	19	67100	85500	33100	52500
	Sorghum	Grain-12.28 Fodder-38.6	Grain-18.3 Fodder-45.9	45790	61600	17790	34600
	Pomegranate	133	189.5	798000	1137000	603000	942000
NAU, Navsari	Rice	27.4	32.73	67676	80532	11816	28014
	Mango	99.65	126.78	249125	316950	205580	267804
	Sapota	125.45	169.82	188175	254730	130175	177025
JAU, Jaunagad	Groundnut	15.21	17.3	68382	78,280	37132	51378
	Cotton	17.43	20.71	95881	113924	23081	48749
	Wheat	38.51	42.17	74141	81177	43408	55444
	Gram	10.23	12.15	40920	48,639	18556	29493

Capacity Building of Farmers

Need based technological empowerment of the farmers was done by organizing training courses. In these courses, experts from different institutions including financial organizations and line department officials were invited. Few successful farmers were also used as resource persons. Centre wise thematic areas and number of programmes are given in Table 7.11.

Table 7.11 Capacity building programmes

Thematic area	Number of programme		
	MPKV, Rahuri	NAU, Navsari	JAU, Junagadh
Capacity Building and Group Dynamics	-	-	11
Crop Production	4	2	28
Entrepreneurship Development	-	2	7
Farm Implements	-	-	1
Livestock Production and Management	1	4	7
Natural Resource Management	1	2	6
Nutritional Security	-	2	-
Plant Protection	-	3	22
Processing and Value Addition	1	2	1
Production of Inputs at site	-	-	-
Soil Health and Fertility Management	1	3	7
Women Empowerment	-	2	1
Total	**8**	**22**	**91**

Extension Activities and Content Mobilization for Larger Technology Application

Under this project, different technology focused extension activities were organized. Diagnostic visits, mobile based advisory services, use of ICT tools, sending text and voice messages, developing well tested contents and onsite input management were emphasized (Table 7.12 and 7.13).

Table 7.12 Extension activities

Programmes	Number of programme		
	MPKV, Rahuri	NAU, Navsari	JAU, Junagadh
Advisory Services	1	-	780
Celebration of important days	-	-	3
Diagnostic visits	5	3	123
Exhibition	4	-	1
Exposure visits	1	2	-
Ex-trainees Sammelan	-	-	2
Farm Science Club	-	-	-
Farmers' seminar/workshop	3	2	3
Field Day	-	5	23
Film Show	-	-	-
Group discussions	5	3	13
Kisan Ghosthi	2	1	7
Kisan Mela	-	-	1
Method Demonstrations	-	3	4
Plant/animal health camps	3	3	-
Any other	-	-	28
Total	**24**	**22**	**988**

Table 7.13 Content mobilization related activities

Module	Content Mobilization					No. of Text messages	No. of villages	No. of farmers
	WhatsApp			No. of voice calls				
	No. of chats	No. of videos	No. of clips	Outgoing	Incoming			
Crop based modules								
MPKV, Rahuri	150	7	0	600	300	0	2	300
NAU, Navasri	95	15	4	221	183	11	3	112
JAU, Junagadh	122	4	4	660	577	713	4	577
Total	**367**	**26**	**8**	**1481**	**1060**	**724**	**9**	**989**
Horticulture based modules								
MPKV, Rahuri	340	5	0	100	50	0	2	50
NAU, Navasri	85	9	3	202	186	0	3	150
JAU, Junagadh	0	0	0	0	0	0	0	0
Total	**425**	**14**	**3**	**302**	**236**	**0**	**5**	**200**
Enterprise based modules								
MPKV, Rahuri	60	2	0	50	35	0	2	20
NAU, Navasri	31	6	0	139	128	0	3	24
JAU, Junagadh	33	1	2	318	347	45	4	278
Total	**124**	**9**	**2**	**507**	**510**	**45**	**9**	**322**
Livestock based modules								
MPKV, Rahuri	360	7	0	400	150	0	2	300
NAU, Navasri	49	19	9	220	135	29	3	70
JAU, Junagadh	62	1	2	107	112	203	4	77
Total	**471**	**27**	**11**	**727**	**397**	**232**	**9**	**447**
NRM based modules								
MPKV, Rahuri	50	2	0	0	0	0	2	100
NAU, Navasri	58	9	0	168	110	0	3	60
JAU, Junagadh	47	1	1	98	96	177	4	93
Total	**155**	**12**	**1**	**266**	**206**	**177**	**9**	**253**
IFS/Crop diversification based module								
MPKV, Rahuri	70	5	0	80	40	0	2	200
NAU, Navasri	56	16	10	228	114	28	3	168
JAU, Junagadh	32	1	1	81	86	157	4	78
Total	**158**	**22**	**11**	**389**	**240**	**185**	**9**	**446**
Grand Total	**1700**	**110**	**36**	**3672**	**2649**	**1363**	**50**	**2657**

Attracting and Retaining Youth in Agriculture (ARYA) Project

Earlier, two KVKs (Nagpur-I and Rajkot-I) were identified for implementing ARYA project 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 youth 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/ programmes for sustenance of efforts. In 2019, ten more centres have been identified and started

working (In Maharashtra Nashik-I, Osmanabad, Pune-II, Washim and Solapur-I whereas in Gujarat, Bhavnagar, Kheda, Navsari, Anand and Amreli), so presently 12 ARYA centres are working through KVKs. In 2020, total of 78 trainings were conducted and 730 youth were trained by 12 ARYA centres. In all, 192 rural youth have established their entrepreneurial units (Table 7.14).

Table 7.14 Various activities conducted by 12 ARYA centres for the year 2020

State/ARYA centres	No. of training courses	No. of rural youth trained	No. of youth established units	No. of entrepreneurial units established
Maharashtra				
Nagpur - I	6	225	14	24
Nashik - I	0	0	0	0
Osmanabad	3	30	10	10
Pune - II	11	124	28	33
Washim	24	137	26	29
Solapur - I	1	28	12	12
Total	**45**	**544**	**90**	**108**
Gujarat				
Rajkot I	3	48	2	25
Bhavnagar	7	46	22	25
Kheda	15	38	38	46
Navsari	6	14	34	26
Anand	2	40	6	2
Amreli	0	0	0	0
Total	**33**	**186**	**102**	**124**
Grand Total	**78**	**730**	**192**	**232**

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, Amravati-II, Akola, Buldhana-II, Jalgaon-II) , 6 centres in Gujarat (Tapi, Navsari, Kheda, Rajkot-I, Panchmahal and Dahod) and 1 centre in Goa (South Goa). Major pulse crops namely pigeon pea, chickpea, black gram and green gram were cultivated for producing seed in selected districts through KVKs during the year 2021. In kharif season, 1145.84 q seed was produced. In case of rabi season, seed production of 3795.77 q was done. 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 farmers' fields in other villages. The details are presented in Table 7.15.

Table 7.15 Seed produced under Pulses Seed Hub project in year 2020

State	No. of KVKs	Crop	Area (Ha)	Target of seed production (q)	Achievement in seed production (q)
Kharif					
Maharashtra	1	Black Gram	6.4	32	19.89
Maharashtra	1	Chick pea	25	200	95
Maharashtra	3	Green gram	40	700	185.96
Goa	1	Paddy	1.2	13	15.72
Maharashtra	4	Pigeon pea	93.9	862	674.82
Gujarat	2	Pigeon pea	33	800	154.45
Total	**12**		**199.5**	**2607**	**1145.84**
Rabi					
Maharashtra	7	Chick pea	243.94	4022	3380.52
Gujarat	5	Chick pea	43.29	1475	414.6
Maharashtra	1	Green gram	10.2	40	0
Goa	1	Red Amaranthus	0.2	0.8	0.65
Total	**14**		**297.63**	**5537.8**	**3795.77**
Summer					
Gujarat	3	Green gram	24	775	236.75
Goa	1	Paddy	3.5	55	55.8
Total	**4**	**0**	**27.5**	**830**	**292.55**

Tribal Sub Plan (TSP)

Major attention is being given on tribal people to raise their socio-economic status 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 based enterprises. In Zone, 11 KVKs are involved in organising several activities like capacity building programmes, frontline demonstrations, 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 7.16 and 7.17.

Table 7.16 Achievements under TSP in the zone

Sr.No.	Description	Achievements
1	On-farm trials (Number of farmers)	96
2	Frontline demonstrations (Number of farmers)	262

Sr.No.	Description	Achievements
3	Farmers training (Number of farmers)	1094
4	Training of extension personnel (No.)	94
5	Participants in extension activities (No.)	7547
6	Production of seed (q)	1172.57
7	Production of planting material (No.)	750675
8	Production of livestock strains and fingerlings (No.)	25440
9	Testing of soil, water, plant, manures samples (No.)	8822
10	Mobile agro-advisory to famers (Number of farmers)	1023189

Table 7.17 Centre wise activities conducted under Tribal Sub Plan

KVK	OFT (No. of farmers)	FLD (No. of farmers)	Farmers trained (No.)	Training of extension workers (No)	Participants in extension activities (No)	Seed production (q)	Planting material production (No.)	Livestock strains etc.(No.)	Soil, water, plant, manures samples (No.)	Mobile agro – advisory to farmers (No.)
Amravati-I	6	23	72	14	90	0	1903	1063	569	2921
Nandurbar	18	40	87	18	208	6474	335000	20000	1090	5720
Nashik-I	2	16	58	8	29	0	7690	208	352	12422
Palghar	6	12	204	9	1644	9650	16150	3658	693	17000
Raigad	20	26	52	6	36	9470	1150	500	1222	823
Bharuch	5	25	51	1	74	1300	32325	0	3101	50115
Dahod	8	16	77	9	1315	12550	3500	0	0	8135
Dang	6	24	93	6	1653	8520	19590	0	346	36011
Narmada	5	19	139	3	204	18400	63144	11	361	1430
Tapi	12	41	148	16	2090	10995	182923	0	194	1581
Valsad	8	20	113	4	204	39898	87300	0	894	63286
Total	**96**	**262**	**1094**	**94**	**7547**	**117257**	**750675**	**25440**	**8822**	**199444**

Skill Training

The skill development initiative is a good step towards making youth self-dependant. Micro enterprises should be encouraged along with appropriate skill development. Agriculture Skill Council of India (ASCI) was set up to work towards building capacity in the agriculture industry and bridge diversifying the rural economy and reducing stress on agriculture and related sectors. Agro-based industries will be helpful to bridge 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) is being implemented through ATARIs in KVKs/SAUs/ICAR institutes since 2016-17. Under this project each centre has targeted to organize two skill training programmes with 200 hours duration each as per the cost norms notified by MSDE. In 2020, 41 KVKs, 1 SAUs & 1 ICAR institute under zone conducted 84 skill training programmes benefitting 1534 farmers. The details are given in Table 7.18.

Table 7.18 Number of farmers and farm women trained during 2020 under Skill Development programs

States	Number of skill development programmes	Total number of farmers trained	Number of farm women trained
Maharashtra	54	938	143
Gujarat	28	556	223
Goa	2	40	15
Total	**84**	**1534**	**381**

DAMU under GKMS Scheme

The India Meteorological Department (IMD), Ministry of Earth Sciences and Indian Council of Agricultural Research (ICAR) have signed a Memorandum of Understanding (MoU) for establishing weather observing system and development of Gramin Krishi Mausam Seva (GKMS) in the country through KVKs. Under Gramin Krishi Mausam Seva (GKMS), the IMD has proposed to establish District AgroMet Units (DAMU) in 530 districts. DAMU will receive weather forecast from IMD to prepare and disseminate block level agromet advisory bulletins. IMD is providing technical guidance to install and inspect the Automatic Weather Stations (AWS) at all the KVKs. Capacity building of contractual staff and nodal officers of concerned KVKs is also being made. In first phase, 21 KVKs (Maharashtra-10, Gujarat-9 and Goa-2 KVKs) were identified. As an implementation strategy, orientation

of the Nodal Officers from relevant Krishi Vigyan Kendras was done by the IMD. Contractual staff have been appointed and sensitized towards preparation and dissemination of agromet advisory services at block level at ICAR-NRCP, Solapur. They were also trained about process of developing agromet advisory services bulletin. Site selection to establish AWS has been finalized in consultation with technical team of the IMD. In second phase, 13 KVKs (Maharashtra-11 and Gujarat-2) have been added in the zone.

Table 7.19 Dissemination of AAS (Agromet Advisory Services)

Name of KVK	No. of WhatsApp group created by DAMUs (KVKs)	No. of Farmers covered	No. of villages covered
Maharashtra			
Amravati-II	58	11993	614
Aurangabad-I	106	15800	137
Bhandara	7	725	53
Buldana-II	99	12209	206
Gadchiroli	74	17496	323
Nagpur	139	13689	503
Nandurbar	57	9842	345
Osmanabad	207	30388	344

Name of KVK	No. of WhatsApp group created by DAMUs (KVKs)	No. of Farmers covered	No. of villages covered
Palghar	32	6537	332
Solapur-II	45	10338	0
Washim	62	10509	303
Total	**886**	**139526**	**3160**
Gujrat			
Amreli	17	2265	180
Dahod	15	1303	108
Dang	3	728	60
Jamnagar	16	2117	103
Narmada	11	1008	312
Panchmahal	8	723	99
Surat	18	1339	101
Vadodara	28	2298	232
Valsad	18	1132	239
Total	**134**	**12913**	**1434**
Goa			
North Goa	130	5998	195
Total	**130**	**5998**	**195**

Table 7.20 Status of FAP (Farmers Awareness Programme)

Name of KVK	No. of FAP organized for 2020-2021	No. of farmers attended FAP during 2020-2021	No. of farmers connected through social media
Maharashtra			
Amravati-II	4	155	2625
Aurangabad-I	17	800	487
Bhandara	13	277	183
Buldana-II	16	500	179
Gadchiroli	11	417	152
Nagpur	21	672	18087
Nandurbar	10	396	201
Osmanabad	25	923	43925
Palghar	14	387	6352
Washim	16	602	15456
Total	**147**	**5129**	**87647**
Gujrat			
Amreli	10	255	0
Dahod	19	628	2
Dang	8	258	239
Jamnagar	8	130	85
Narmada	10	287	312
Panchmahal	15	1179	723
Surat	7	125	30

Name of KVK	No. of FAP organized for 2020-2021	No. of farmers attended FAP during 2020-2021	No. of farmers connected through social media
Vadodara	22	568	0
Valsad	26	943	0
Total	**125**	**4373**	**1391**
Goa			
North Goa	8	178	0
Total	**8**	**178**	**0**

Network Project on New Extension Methodologies and Approaches (NEMA)

A Network Project 'New Extension Methodologies and Approaches' was designed with involvement of major ICAR institutions under the guidance of the DDG (Agril. Extension) with ICAR-IARI, New Delhi as the lead centre. The major objective of the project is to assess the performance of identified technologies at field level. For each ATARI, technologies were

identified along with source of ICAR institutes for the study. For ATARI Pune, ICAR-IVRI Crystoscope technology was identified to study its impact in Maharashtra state. This technology helps in estrus detection and hence avoids losses due to delayed conception in cows and buffaloes. Specific objectives of the study are to analyse the determinates of adoption of Crystoscope Technology; to assess the impact of the Crystoscope technology at field level; and to suggest the suitable strategies for its wider application at field level.

Interview schedule was prepared and tested before the data collection. Data were collected from 667 respondents i.e. 335 respondents from controlled villages and 332 respondents from treatment villages. Eleven KVKs (Ahmednagar-I, Ahmednagar-II, Parbhani, Solapur-I, Solapur-II, Aurangabad-I, Aurangabad-II, Jalgaon-I, Jalgaon-II, Beed-I and Jalna-II) from 7 districts were involved in the study. Data coding has been done and data entry into excel sheet was completed.

Farming System Nutrition

Farming System Nutrition (FSN) project is being implemented in Maharashtra through 19 KVKs in collaboration of Maharashtra Council of Agricultural Research and Education (MCAER), Pune and MS Swaminathan Research Foundation (MSSRF), Chennai financially supported by UNICEF. The major focus of the project is on training and awareness of farm women and other stakeholders about nutrition and development of nutrition gardens in the identified villages. Development of nutri-sensitive village is an ultimate objective of FSN project. In all, 54 villages have been adopted for developing farming system nutrition models. In kharif, 2525 farm families and 3055 in rabi season were involved under the project.

Nutri-Sensitive Agricultural Resources and Innovations (NARI)

Focus on nutri-sensitive agriculture has been given by all the KVKs. Awareness camps, trainings and exhibitions were organized for the farmers, farm women and anganwadi workers. Nutrition gardens/ Poshan vatikas have been developed at the KVK and in identified villages. Rashtriya Mahila Diwas was also celebrated on 15 October for creating more awareness among farm women and children.

Chapter 8

Case Studies

Successful case studies written in scientific way have motivational value among different stakeholders. KVKs have documented successful cases/success stories on different enterprises and commodities. In addition, focus on enhancing farmers' income and fighting farm level stress as faced by the farmers is given while documenting cases. KVKs, SAUs, ICAR institutes and other line departments are taking efforts to increase the profit of farmers along with prosperous sustainable agriculture. In this context, successful cases on different aspects especially floriculture, organic farming, intercropping, protected cultivation, poultry farming, resource conservation, hi tech nursery, integrated pest management, sericulture etc. were documented, which are reported in this chapter.

1. Rural Women Became 'Atmanirbhar' through Vermicomposting & Nursery – KVK Ratnagiri

Mrs Harshada Rajendra Palaye, 38 years old woman and a resident of Kondye village in Lanja tehsil a of Ratnagiri district is involved in family farming. She 7th class educated and her spouse got education up to 10th class. She has land holding of 4.0 ha. Her husband was doing the job in a private company in Mumbai. She was cultivating subsistence crops like rice, finger millet, horse gram etc. in the traditional way. Her farm income was very limited due to lack of knowledge and skill about improved agricultural technologies.

Intervention

The leaflet on "vermicompost in enhancing crop productivity" prepared by KVK Ratnagiri made her curious about this technology. She attended five days vocational training on vermicompost production at KVK Ratnagiri. KVK also linked her activity with the Department of Agriculture, Government of Maharashtra for accessing subsidy. She got a subsidy of Rs. 30,000/- for construction of shed (15x10m) in the year 2010. KVK also provided vermiculture of *Eisenia Fetida* sp. for demonstration. The capacity building programme and institutional linkages helped her to build confidence in agribusiness start-up.

Even, considering the opportunities in Nursery management, she has undergone training on Nursery Management at Krishi Vigyan Kendra, Ratnagiri. She started ornamental, fruit and forest crop nursery along with the vermicompost production. The Krishi Vigyan Kendra, Ratnagiri has helped to certify the mother orchards of fruit crops and getting a license. Dr. B.S. Konkan Krishi Vidyapeeth, Dapoli has certified the mother orchards. The Department of Agriculture has registered the nursery and issued the license.

Outcome

At first she prepared vermicompost of 5-6 tons and sold it at nearby villages. Approximately, she earned Rs. 50,000/-. After reaping an economic benefit, she felt that there is a huge demand for vermicompost due to awareness of organic farming in farming community. Therefore, she decided to expand her small-scale activity into a commercial business venture. She joined a Self-Help Group named-*Shri. Samarth Shetkari Swayamsahata Gat* consisting of five male and five female farmers. She sold vermicompost under trade name of Self-Help Group. The vermicompost prepared by group was available in 1 Kg, 5 Kg, 10 Kg and 40 Kg polybags. She used to take part in conferences and exhibitions organized by different agencies at district places and cities like Mumbai and Pune for publicity. Now, Shri Samarth Vermicompost became a brand name among the farming community in the Konkan region. At present, she achived production capacity of more than 100 tons per year. She has a turnover of Rs. 12 lakh per year. She has employed 7-8 people in Kondye village.

After getting a grand success in vermicompost production, Mrs. Harshada moved to the idea of the ornamental nursery. Vermicompost is the main media for growing ornamental plants and the other reason behind starting ornamental nursery was the demand of ornamental plants in Mumbai for terrace gardening. Considering this opportunity, she has started ornamental, fruit and forest crop nursery. Initially she prepared 1000 vegetable seedlings and sold in the weekly market. After getting confidence,

she constructed polytunnel for preparation of grafts. Since last 3-4 years, she is producing about 10,000 grafts of cashew (Var. Vengurle-4), 4000 of Mango (Var. Kesar & Alphonso), 1000 Coconut (Var. Banavali) and 500 Kokum fruits crops. She is preparing about 2000 rose and 5000 Sonchaffa grafts and around 30,000 agroforestry crops saplings viz. teak, Khair, sandalwood, bamboo, *Acacia mangium*, Aonla and Gulmohar (*Delonix regia*). She is selling these grafts and seedlings under the same trade name of Shri Samarth Shetkari Nursery in entire Konkan as well as in western Maharashtra.

Table 1: Economic Status of Agribusiness Startup

Name of Startup	Production capacity	Selling rate	Turnover/ Year Rs.	Production Cost Rs.	Net profit Rs.
Vermicompost production	110 tons	Vermicompost @ 12 Rs/Kg Vermi-culture @ 500 Rs/Kg	13.50 Lakh	7.50 Lakh	6.0 Lakh
Nursery management	Mango-4000	100 Rs/graft	4.0 Lakh	10.05 Lakh	6.70 Lakh
	Cashew-8000	100 Rs/graft	8.0 Lakh		
	Coconut-1000	100 Rs/graft	1.0 Lakh		
	Kokum-500	50 Rs/graft	0.25 Lakh		
	Sonchaffa-5000	50 Rs/graft	2.5 Lakh		
	Rose-2000	50 Rs/graft	1.0 Lakh		
	Sub-Total		16.75 Lakh		
	Agro-forestry-30,000	10 Rs/plant	3.0 Lakh	1.3 Lakh	1.7 Lakh
Grand Total			**33.25 Lakh**	**18.85 lakh**	**14.4 Lakh**

Impact in area

Mrs Harshada Palaye, ensured economic stability to her family. Every year, her financial turnover is Rs. 13.50 lakh from vermicompost units and Rs. 19.75 lakh from the nursery unit. The net profit of vermi-compost is Rs. 6 lakh and Rs. 8.4 lakh from the nursery. She is gaining profit of Rs. 14.04 lakh per year. She has not only made her family a self-reliant but also, provided assured employment for 10-12 persons throughout the year. Every employee is getting salary of around Rs. 7 to 8 thousand per month.

Awards and recognitions

Considering her contribution, Mrs Harshda Palaye and her SHGs has bestowed with 'Sevavrati Shinde Guruji Smruti Purskar (2019-20)' from Kunabi Seva Sangh, Dapoli- a NGO and 'Best Women Farmer Award' from NGO-Late Tatya Deshmukh Shetinsitha Sanstha, Lanja Dist: Ratnagiri.

Contributing and Enabling Factors

She opined that merely subsistence farming is not a solution to the resource poor farmers but promoting secondary agriculture and agribusiness start-ups give the financial stability to rural farming families. The institutional backstopping, direct marketing linkages, quality control and resource management are the

drivers of the success in agribusiness start-up. She felt that her family becomes economically self-reliant through these agribusiness ventures. Ten years before, her husband was employment seeker in Mumbai, now he became an employment provider due to his ambitious spouse.

2. Organic Farming by Agriculture Graduate: KVK Beed-I

An agriculture graduate youth Mauli Jadhav is engaged in farming from 2011. After completion of his graduation, he focused on organic farming along with production of traditional crop varieties of food grain and pulses. His family business is agriculture which was not profitable. Cost of production was high and ultimate agriculture profit was very low. He decided

to change agriculture practices when he realized that organic farming is low cost production technology with sustainability and profitability. Organically produced farm commodities fetch good market price and more demand despite low productivity. His family owns 12 ha of land along with 1 open well and 4 bore wells. They possess tractor and tractor drawn implements. They also have bullock pair and bullock drawn implements. Their cropping pattern was soybean followed by chickpea & rabi sorghum.

Plan, Implement & Support

After completion of agriculture graduation, he came in contact with KVK scientists during Kisan Mela organized by KVK Beed-I. After that he visited KVK frequently and linked with KVK experts.

He realized that organic farming system is always good for human and environment. Organically produced food grains and vegetables have good demand in market, fetching high value in terms of money. He sold out all exotic cows and and started rearing desi cows i.e. Red Kandhari, Gir and Sahiwal. Now he gets 30 trollies of dung compost. He started production of dung slury and application in crop. He maintained trees on bunds and raised trap crops for IPM. He used to cultivate traditional crop varieties on his farm like okra, suran, beans, bottle gourd, pumpkin, leafy vegetables. He also cultivated fruits trees like tamarind, jamun, lime, sweetlime, banana, ramphal, custard apple, papaya, guava.

He produced alternative for chemical inputs like Dashparni Ark, Waste decomposer, Gokrupa Amrut and used burnt cow dung ash for control of aphids in crops.

He is using traditional varieties of crops like sorghum (Dagadi), greengram, yellow sorghum, black gram, bajara, groundnut, sesamum, niger, coriander for cultivation. He is in second phase of organic conversion by NPOP certification of eco cert India.

Output

They got average annual income of Rs. 10 lakh. Cost of production reduced considerably due to recycling of easily available farm materials. Family medical expenditure reduced to nil for last 3 years. He is getting 30% more market price to his farm produce by selling directly to consumers.

Impact

Other farmers prefer to purchase seed from Mauli Jadhav as he follows good agriculture practices. Other farmers have started organic farming system for production of all crops. They have exited from chemical farming ADM company Latur has hired Mauli Jadhav for consulting farmer for organic soybean production and organic farming registrations.

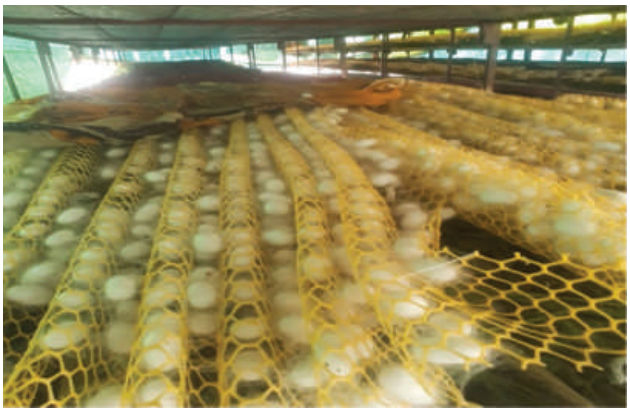
3. Sustainability through Sericulture: A case study of KVK Jalna-I

Shri Ram Devidas Yellikar is a rural youth from village Aalamgaon, Tq. Ambad Dist. Jalana having 10 acre land. He was following traditional farm practices with traditional crops i.e. cotton, soybean, jowar and Bengal gram. He could not get expected crop yield due to uncertainty of rainfall, big gap in two rains, late monsoon and unseasonal heavy rains and storms. It directly affected his income (Rs. 0.2 to 0.35 lakh per acre). This situation made him unsatisfied with agriculture profession.

Plan, Implement and Support

Krishi Vigyan Kendra, Jalna – I provided one month sericulturist training to Shri Ram Devidas Yellikar in the year 2018. After successful completion of training, he started sericulture enterprise. He planted mulberry

V1 variety for one acre area. He constructed silkworm rearing shed of 50 X 22 feet size. He adopted advance rearing technology and got continuous KVK support. He is taking four to five silkworm rearing batches which resulted into regular income every two months. Now through sericulture enterprise he is getting Rs. 1.0 to 2.0 lakh net profit per acre per year which is nearly ten times of previous income per acre.



Output

Sr. No.	Year	DFL/Acre	Cocoon Production Kg/Acre	Total Gross Income Rs./Acre	Expenditure Rs./Acre	Net Profit Rs./Acre
1	2019-20	600	530	180000	65000	115000
2	2020- 21	850	700	190000	70000	120000

Horizontal Spread

Many farmers from his own village visited his sericulture and about 25 farmers came forward and started sericulture.

Impact

He expanded mulberry area to two acre and became master trainer in the village.

4. Farmers to customers direct sale of vegetables and fruits during lockdown period: KVK Aurangabad-I

The availability of vegetables and fruits for people in the urban area has been a challenging task due to the harsh and unpredictable COVID-19 lockdown. The sale of fresh vegetables and fruits was completely stopped in Aurangabad city. All merchants cancelled deals of sale of sweet orange, watermelon and muskmelon during this pandemic period. It was very difficult situation for farmers. Their crops were ready for harvest, but no sale outlets were available in Aurangabad city. On other side people were not getting fresh vegetables and fruits or had to pay high rates.

KVK, Aurangbad-I in collaboration of State Department of Agriculture and ATMA, Aurangabad has come with a very innovative idea to provide vegetables and fruits kit at doorstep of people in the Aurangabad city. KVK, Aurangabad-1; SDAO, Aurangabad and ATMA, Aurangabad jointly started direct selling of vegetables and fruits from farmers to consumers. In this way, KVK Aurangabad-I adopted two villages (Deogaon and Lakhegaon) and three farmers groups participated in this innovative idea (Jay Jawan Jay Kisan Group, Deogaon Tehsil Paithan; Yuva Mauli Farmers Group, Lakhegaon Tehsil Paithan; Krushi Samarpan Farmers Private Ltd. Paithan).

KVK, Aurangabad-1 provided technical and marketing support to farmers groups in the district with the help of State Department of Agriculture and ATMA Aurangabad and asked them to provide vegetables and fruits kit on pre-order of customers. For effective implementation, they formed WhatsApp groups of all staff of SDAO, ATMA, state agriculture marketing officers, city housing society president, few collector office staff, KVK staff, farmers, farmers groups and FPOs of Aurangabad district.

Farmers and farmers groups asked to make their vegetable baskets and fruit baskets as per availabilities for direct selling to customers. All

information regarding availability of this facility and procedure for making order of vegetable and fruit kits was communicated on different WhatsApp group. Orders of all people received on common group "FARMERS TO CUSTOMER DIRECT SALE" and by this way, order of vegetables and fruits received by farmers and information regarding confirmation and delivery status of this order was communicated to customers by sending messages to them by farmers.

In this way, KVK Aurangabad-I adopted two villages and three farmers groups. KVK gave complete guidance and supported them for publicity in Aurangabad city for sale of their commodities. All precautionary and required measures during COVID-19 lockdown were strictly followed by all groups which provided fresh vegetables and fruits to people in the urban area.

In total, more than Rs. One Crore sale of vegetables and fruits was observed within 28 days by all farmers, farmers groups and FPOs. Total 65 participants participated jointly and still continuouing. Among 65 participants, Aurangabad-I KVK farmers performed well with total sale of Rs 28,81,335 in 28 days (out of total Rs. 1,09,67,695) i.e. 26 per cent.

5. Income generation through Processing and marketing of Aonla and Banana Products: KVK Jalna-I

Background

Mrs. Meera Santosh Paul, At Post, Rohina Bk, Tq. Partur Dist. Jalna, is 35 years old farm woman having 2 acres of land 7 members a family and depends only on farm produce. Her husband is involved in farming growing soybean, cotton and sugarcane. The incomes earned from only 2 acres of farm are insufficient to fulfil the family requirements. Hence, both of them decided to do processing to raise the income of family.

Intervention

In 2018, she approached KVK Jalna and discussed with the KVK scientists about her plan. KVK Jalna trained her on value addition of Aonla along with her husband. After training she started to purchase different processed products from KVK and marketed them for one year. KVK Scientist provided her proper guidance, support and demonstration on marketing strategy. This training of value addition and marketing made her confident to start her own processing unit of Aonla, Mango, Rose and Banana at Rohina village.

Output

She started to process the Aonla, Banana, Mango and Rose. Mainly she produced candy, pickles, supari, powder, murabba, moraonla, juice and syrup from aonla while pickles from mango and lemon. Banana wafers, banana powder and rose gulkand are also her value added products. She marketed her products under "Hirkani Brand". The detailed quantity produced and sale of products during last three years is given in table.

Year wise production of processed products (quintal)

S. No.	Particulars	2018	2019	2020
		Quantity (quintal)		
1	Aonla Products	05	12	20
2	Banana Wafers	15	10	--
3	Mango Pickle	0.5	01	01
4	Lime Pickle	0.5	01	0.8
5	Rose Gulkand	0.5	0.5	0.25
6	Moringa Powder	0.25	0.10	0.10

Through processing and value addition of Aonla and Banana, she is earning Rs. 6 to 7 lakh with net profit around Rs. 1.5 lakh/ year.

Horizontal spread

Mrs. Paul is the first woman from her village to start a business. The women from her village as well as other nearby villages visited her processing unit and appreciated her work. She guided women from her villages regarding the processing unit and marketing strategy.

6. Doubling the income through crop diversification: KVK Washim

Mr. Sayyad Salim Sayyad Sattar, small farmer from Warud Tofa village of Risod Block, district Washim is having 1.80 ha land. Seasonal irrigations were done on dug well but the water level used to deplete from December onwards. Total 9 members in his family depend on the agriculture. Both he and his brother are involved in agriculture. Earlier before 2015 he used to grow agronomical crops like soybean & pigeon pea in kharif season while bengal gram and wheat in rabi season. His average income from entire 1.80 ha land was Rs. 1.15 lakh. Mono-cropping pattern, climate change and fluctuating market rates were affecting his income. He and his brother had worked as daily wage labour to fulfill the financial needs of family.

In 2015, Mr. Sayyad Salim came in contact with SMS (Horticulture) of KVK Washim. While discussing and looking the entire resources including soil type, irrigation facility and family labour availability, KVK suggested him to go for horticultural crops. In 2015, KVK has selected Mr. Sayyad Salim for assessment of late kharif Onion production technology and provided seed of Bhima Super variety. He prepared the nursery in the last week of July and transplanted the seedling in the month of September. KVK guided and provided all the technology from land preparation, Nursery raising, BBF system, INM and IPM. Because of his dedication and technical backstopping of KVK, he got the yield of 145 q from one acre irrigated land. The crop was harvested in the month of January, when the supply of onion in the market was limited. The high demand and less supply of onion in the market resulted into the average rate of Rs. 2300 per quintal. As an outcome from one acre land, he earned net profit of Rs. 276500 within a period of 6 months.

In the first year he renewed his well and increased the depth and water storage capacity. In next year, he continued the cultivation of late kharif onion and got the similar type of results. From year 2017-18, he started growing turmeric crop on one acre land & late kharif onion on one acre land. He got yield of 28 quintal dry turmeric and 165 quintal onion and earned net profit of Rs. 280000/- from two acres.

He has converted his total land towards horticultural crops including potato, garlic, turmeric, late kharif onion, rabi onion and ginger and generated net income of Rs. 525000/- from 1.80 ha land.

As an impact he developed his land with well-maintained well, drip irrigation system, sprinkler irrigation system and solar water pump, built his house.

7. Shatayushi Organic FPO During COVID-19 crises: Success story of KVK Pune II

The increased usage of pesticides and chemical fertilizers affects human health as well as the land; hence the demand of organically grown vegetables and fruits in the market is increased. Unavailability of certified organically grown vegetables & fruits in the market evolved the idea of creating a FPO of farmers who can supply organic certified vegetables and fruits consistently.

Hence KVK decided to start FPO of organic farmers. Moto behind creating such a FPO was to grow variety of organic vegetables and fruits round the year on sustainable basis and to supply in the markets of Mumbai and Pune which would be logistically feasible. Maintaining round the year availability and consistency of supply is the major concern. By keeping in view the consistency and round the year availability; Junnar Taluka was selected. The Junnar Taluka is a vegetable belt with assured irrigation and farmers were interested for organic cultivation. This area being adjacent to Mumbai and Pune Cities is a major advantage in logistics front.

KVK Pune II formed Shatayushi Organic Farmers Producer Company under company act for market linkages and other activities. FPO established their Collection Centre at. Shroli Tal. Junnar, District- Pune as ICS office where all documentations and records were kept simultaneously from this collection center. They are collecting farmer's fruits and vegetables and after sorting, grading sent to distant buyers from Mumbai, Pune.

Challenges faced by the farmers before formation of FPO

Majority of vegetable farmers were marginal farmers, with average land holding of 5 acres of land. Vegetable farming is not sustainable business for the marginal farmers, because of small land holding, lack of infrastructure & connectivity to the market. The challenges faced are as follows:

1. Can't optimize production process to get economy of scale due to small land holding.
2. Dependency on local mandis /agents to sell the produce.

3. Lack of knowledge and faulty agronomical practices, mono cropping / indiscriminate use of insecticides resulting in high cost.
4. Lack of infrastructure, finance, cold storage, transportation, packing material etc. caused substantial financial losses.

Shatayushi Organic Farmers Producer Company

Mr. Manish Ramdas More is passionate about production and marketing of organic fresh fruits and vegetable. He is M Sc Agriculture and having 13 years experience in production and marketing of organic fresh fruits and vegetable. They grow organic vegetables and fruits, through an end-to-end eco-friendly process to provide fresh farm produce which are safe to consume. The FPO combine the knowledge of age-old wisdom with a modern technology for soil health, crop health and post-production processes. For the past five years, organic produce has continued to be embraced by more and more consumers while establishing a strong footprint in well-known modern retail chains and ecommerce platforms such as Amazon, Godrej Nature's Basket among others.

The major aim was to create a sustainable vegetable & fruit cultivation business model for the farmers. Key points of the model were,

1. Formed a group of 25-30 farmers having collective land of 80 acres.
2. Completed organic certification process for all the farmers.
3. Developed their own agronomy practices based on ancient Indian Vedic agriculture.
4. Planned crop production to produce a basket of 15-20 varieties of crop/ season.
5. Developed brand for their produce and tied up with modern retail outlets for marketing
6. Encouraged farmers to invest in sorting, grading and packing facility at their farm, to ensure quality control & minimize handling losses of the produce.
7. Invested in infrastructure like cold storage, vehicles, packing material, quality control process, certification etc.
8. Marketing tie-up with modern retail.

Impact

1. Achieved production of 3 tons of vegetables / Day.
2. Established Brand " Shatayushi Organic" with leading retail outlets like, "Godrej Natures Basket", "Amazon", "Food hall"
3. Achieved turnover of Rs. 3 Crore from modern retail.
4. Quality is established with modern retail.
5. More revenue for the group farmers.
6. Created infrastructure like cold storage, transport vehicle, packing, sorting facility etc. at the village level.

Future Plan

The success of this model depends on, creating more number of farmer groups, in different climatic zones. In phase 1, we need to create 20 groups of farmers in Maharashtra, each group consisting of 15-20 farmers, bringing approx. 1000 acres of land. In phase 2, the model will be taken to different states with more groups of farmers.

8. Empowerment of Rural families through backyard poultry farming: KVK Latur

Backyard poultry farming in Latur district is a secondary income generation activity for the rural families. They were rearing desi poultry birds having low egg and meat production potential (60-70 eggs/year and adult bird weight 1.5 kg). They maintained these birds traditionally without any scientific approach, caused high mortality (20-100%) due to incidence of diseases like ranikhet and fowl pox. These were the reasons for reduction in income from backyard poultry farming with desi poultry birds, though there were increasing demand of eggs and meat in rural as well as urban areas.

Latur district is receiving 730 mm of rain with 25 rainy days in a year. Rests of the days in a year are having plenty of sunshine and dry weather. Climatic conditions in district support free range system of rearing. Also the backyards are full of natural feed resources like fallen grains, insects, earthworms, green grass, kitchen waste, left over and damaged

grains and vegetables grown in farm unfit for human consumption. Due to availability of these natural resources, backyard poultry farming with improved birds will becomes highly economical.

Plan, Implement and Support

To overcome the problems in backyard poultry farming with desi birds KVK, Latur identified the improved poultry birds (Vanaraja, Grampriya and Shrinidhi) suitable for backyard farming in rural areas developed by the Directorate on Poultry Research, Hyderabad. These are multi-colored dual purpose birds with attractive plumage, having better immunity against common poultry diseases (Ranikhet, Gumboro and Fowl pox) and better adaptability to free range rearing system.

KVK has assessed these birds and demonstrated in the villages. Each family provided 20 vaccinated one month old birds. Selected farmers were trained for how to manage these birds in backyard. After receiving birds from KVK, farmers housed these birds in cages or house made from local material at low cost during night time. During day time the birds were made loose in the surrounding area for scavenging. The birds utilized the natural feed resources like fallen grains, insects, earthworms, green grass, kitchen waste, etc. At the time of night housing, farmers offers cheap and available grains (Maize, Bajra, and Sorghum, Wheat) and kitchen waste & vegetable grown on their field which is unfit for human consumption to these birds to match up the energy deficiency. Plenty of clean and fresh water was made available at farm site. Farmers were advised to deworm the birds once in every three month period and give Ranikhet disease vaccine (R2B strain) and Fowl pox vaccine at the age of 9th weeks and after 6 month. Technological backstopping is provided by KVK at every step. KVK has maintained regular contact with farmers and required suggestions and advisory were given to solve location specific problems by field visits, mobile advisory.

Output

Backyard poultry farming with improved poultry breeds increased egg production by 173%, net income by 142% and reduced mortality by 50% than the desi birds along with increase in volume of production (Egg production 1314 Vs 480). Also improved poultry birds are having better adaptability to the rural backyard conditions and shown better immunity; hence the good survival rate than the desi birds.

Gain in Knowledge and skill: Participated farmers acquired skill of rearing these birds (feed management, shelter management, medication & vaccination, debeaking etc.) and also acquired skill of marketing of produce. Some of the farmers started incubating these eggs under desi birds to produce chicks. Produced chicks reared for next batch or sold to needy farmers.

Outcome

After attaining desirable market weight (4-5 months) farmers sold extra male birds for meat purpose and hens were kept for egg purpose. Egg laying started at the age of 155 to 170 days of rearing. After egg laying period (72 wks) the hens were sold for meat purpose. The annual egg production of demonstrated improved poultry birds is 146 eggs/hen compared to 60 eggs/hen in the desi birds. This resulted in net return (selling eggs and birds for chicken) of Rs. 10,625 from 20 birds unit of improved poultry birds (Vanaraja, Grampriya, Shrinidhi), which is Rs. 5955 higher than local bird (Rs.4670/20 birds unit).

Horizontal spread

The intervention fetched good income to the farmers through sale of eggs and birds for chicken. Consumers happily buy the eggs and chicken with better price from farmer as, it taste like desi birds. By observing the performance of farmers field, demand from other farmers, rural youth, women farmers and SHGs in the district increased for the one month old birds. KVK has supplied total 24947 one month birds to 678 families from 219 villages in the district, covering all the blocks in Latur district. 37 farmers started rearing one day chicks of improved birds by purchasing it from PDP, Hyderabad and private hatchery with technical support from KVK. Looking to the increasing need for day old chick from farmers in the district KVK has started 1000 chick capacity hatchery at KVK.

Economic Benefit occurred to secondary level participants

Depending upon the birds unit size (20-100 birds) participants farmers getting additional net income of Rs. 10600 to 53000/ year (Rs. 880 to 4400 per month) by selling eggs and birds for chicken. 37 farmers started with chicks rearing in shed getting net income of Rs. 45,000 to 2, 25,000 per year depending upon the birds placed in shed (100-500 birds).

9. Era of geranium crop in Gujarat: Case study of KVK Banaskantha I

Geranium is one of the worldwide popular aromatic crops that receives higher market price. In seasonal crops, cost of cultivation is increasing day by day due to increase of labour cost so farmers are turning towards new cropping systems which give them higher net income with minimal operational cost. Geranium is one of the aromatic plants having geranoil and citronellol oil as the main aromatic principles. It is mainly cultivated in states like Uttar Pradesh, Maharashtra, Andhra Pradesh, Tamilnadu, Punjab, Himachal Pradesh etc. Banaskantha district comes under North Gujarat and has sandy soil with hot and dry climate. Geranium crop was never commercially planted in Gujarat, but under the guidance of KVK the farmer has successfully harvested geranium and also extracted oil.

Geranium crop was introduced in Banaskantha district of Gujarat in 2019-20 on the field of Shri Shrikantbhai Panchal from Bhoyan village of Deesa taluka. The crop was successfully harvested after every 3-4 months and gave an average yield of 20 liters oil per cutting per acre and recovery rate of 1 liter oil from 1000 kg of green biomass.

KVK Interventions

KVK modified package of practices for geranium crop as per the climatic condition. For successful production of geranium, mechanized raised beds were prepared with proper management of major and micro nutrient along with organic manures. The healthy, high yielding and quality planting material were procured from Maharashtra. Inline drip lateral were spread on raised bed and after giving proper moisture the planting of geranium was done with 3.5 ft x 1.25 ft. spacing in November month. INM, IPDM were adopted for successful geranium production viz., water soluble fertilizers along with trichoderma, Pseudomonas, Pochoniya, Metarrizium, waste decomposer, NPK biofertilizer etc. for minimizing cost of cultivation. In short time this crop has emerged as a high returning crop for farmers of Gujarat state. There was less pest and disease incidence that ultimately lead to lower cost on plant protection measures. KVK also guided farmers for nursery raising of geranium through media preparation, selection of cutting and care and management of sapling.

Output

The farmer extracted and sold the geranium oil with a rate of Rs.12500 per litre. KVK trained the farmer for nursery raising and through this technology he has produced planting material of 155000 geranium sapling and he has received additional income of around Rs. 12.00 to 13.00 lakh. Due to introduction of geranium, the farmers are very happy and interested for cultivation of this crop in their field. More than 2440 farmers till now visited the geranium field.

Horizontal Spread

Shri Anandbhai Patel (IAS), Collector of Banaskantha, and more than 2440 farmers visited the geranium field as well as around 5100 farmers through social media appreciated the efforts of farmer. During winter season of 2020-21, farmers of Banaskantha, Valsad, Ahmedabad, Junagadh, Rajkot and Mehsana districts of Gujarat have procured planting material for cultivation of geranium crop and some of them have started planting of geranium.

10. Honey production by adopting scientific and technical methods: KVK Dang

Dalubhai Pecheryabhai Gamit is a 51 year old progressive farmer of village Nishanna, Tal: Shubir, Dist: Dang, Gujarat having 3.95 ha of farmland with one bore well, 4 cattles and other essential farm machineries and equipments. His formal education is 10th standard. He was interested in adopting new technologies and new production methods for the farming system. In his farm he adopted different technologies such as organic farming, use of net house for vegetable production, drip irrigation, honey Bee production. Dalubhai is an ordinary farmer in the district, but what makes him special is his in-depth expertise in honey farming. Through intensive

research for more than five years, he has successfully developed a season cycle that can boost the production of honey with the same number of honey bees.

Output

Bee keeping had increased his annual income by Rs. 25000 over and above Rs. 14500 earned by crop production, Horticulture & Animal husbandry during 2018-19. In per cent terms it was about 172% higher than that of crop production, Horticulture & Animal husbandry. Honey bee keeping activity helped to increase employment by 92 man days (52.79%) for small farmers. The productivity levels achieved during last five years from honey bee is given in table …

Table 10. Productivity Levels achieved in Apiculture (Honey production) during the last five years.

Year	Gross income in lakh	Expenses in lakh	Net profit Income in lakh
2016	0.85	0.25	0.60
2017	0.90	0.25	0.65
2018	0.92	0.20	0.72
2019	1.00	0.30	0.70
2020	1.30	0.35	0.95

Horizontal spread

Presently, Dalubhai trains the local tribal's to cultivate honey and has not only attended seminars in Karnataka, Maharashtra, but also in other states. He was associated with NGOs. He had also established self-employment centre for tribal farmer at his village Nishanna. He trained more than 250 farmers for scientific bee keeping. Giving knowledge about various government schemes and benefited to them.

Innovative interventions

If the bee-hives are kept in different farmer during different season, it can help boost the production of honey by 30-40%. Another important innovation that Dalubhai has come up with is the creation of rani honey bee the only bee that can deliver larva within 16 days. In a bee-hive no female bee other than rani, can deliver larva and if she dies, the entire been-hive gets destroyed.

Out of 8 types of honey bee of dang district he has produced honey from 3 types of honey bee. By the hard work, interest and knowledge, he has established honey bee box and honey pot so easily honey is collected. The box is arranged in crops like maize, mango, cashewnut so the production is increased by 30 to 40 percent. He has trained and shared information among farmers in various training and awareness programmes.

11. A case study on dragon fruit cultivation: KVK Kutch I

Mr. Khushalbhai Surjibhai Savala from Ramaniya village of Mundra Taluka of Kutch district has 5.4 ha (11 acre) land with irrigation facility. Earlier, he was sowing cotton and castor crop as cash crops. During peak season of cotton picking and castor harvesting labour availability was the problem. He was earning Rs. 5 to 7.5 lakh as net income from 5.0 ha of cotton and castor. Cost of cultivation was higher due to higher labour and input cost.

Plan, Implementation & Support

Mr. Khushalbhai is highly progressive farmer and attends all programmes conducted by KVK. He got idea of Dragon fruit cultivation from one of his friends Mr. Vishal Gada, who had prepared nursery of Dragon fruit. He purchased 6000 nursery plants of Pink Red Variety in 2015 and planted on 2 ha land.

He adopted organic farming practices, gave 2 to 3 kg FYM per pole at the time planting in July to September. Rigid poles at distance of 12 x 12 ft were built with RCC ring of 30 inch above the bottom of the pole. He planted 4 plants per pole. He had given cow dung with urine slurry @ 1 lit/pole (4 plants) at the duration of 30 days on regular basis. Moreover, he has given Jivamrut @ 50 lit/acre with drip at 15 to 20 days interval. There was no incidence of pest and disease. Sometimes fungal diseases were observed at base of the plant. To control this diseases farmer had reduced

irrigation intensity. He had sold fruits at Mumbai and Ahmedabad. Marketing was done through traders of the cities.

Income from Dragon fruit nursery

He had sold total 90,000 plants from his dragon fruit nursery @ Rs. 25/plant and earned total Rs. 22.50 lakhs. He has developed mother plant unit and sells Avg. 30,000 plants annually. Cost of nursery maintenance is Rs. 180000 annually.

Thus, he is earning Rs. 6 to 7 lakh per ha. Earlier his income was Rs. 1 to 1.5 lakh/ha from seasonal commercial crops.

Intercrop: Miliya Dubia, Date palm and Drumstick grown as intercrop in Dragon fruit.

Economics

Sr. No.	Year	Expense (Rs./2ha)	Gross income (Rs./2ha)			Net Income (Rs./2ha)
			From Fruit	From Nursery Plants	Total	
1	1st	17,00,000	1,50,000	0	1,50,000	(-) 15,50,000
2	2nd	2,70,000	2,50,000	7,50,000	10,00,000	7,30,000
3	3rd	2,70,000	6,00,000	7,50,000	13,50,000	10,80,000
4	4th	2,70,000	7,60,000	7,50,000	15,10,000	12,40,000

Outcome

Due to the innovation made by Mr. Khushalbhai and due to his nursery plant supply other 24 farmers have started Dragon fruit cultivation. Today, almost 500 acre area is covered under Dragon fruit cultivation in the district. Farmers are making fruit supply in almost all cities like; Ahmedabad, Mumbai, Jaipur, etc. This innovative cultivation of Dragon fruit in the district like Kutch has proved highly beneficial because it requires very less water. It can also be grown in salty water up to 2000 ppm. Annually, 12 to 15 Crore income is earned by farmers in a district and almost all cultivators have made their income more than the double as compared to previous income.

Impact

Dragon fruit cultivation is increasing day by day in Kutch district. Today, Kutch district become hub of nursery of Dragon fruit plants. District farmers supply plants in other district and other state also.

12. Paddy seedling raising Technology - Dapog method: KVK Valsad

Paddy is the main food crop of Valsad district. Farmers of Valsad district raised paddy seedlings with traditional method known as "Aadar". Farmers makes a ½ to 1 feet height layer of leaves, twigs, branches of plant, agricultural waste and cow dung cake on selected 0.12 ha. (13,007 sq. ft.) area and burn all the biomass. After "Aadar" practice they made flat bed and sown seeds @ 35 kg ha-1. Weak and yellow seedlings with undeveloped roots were ready to transplant in 25 to 30 days, which were severely damaged during heavy rain. This method is costly, laborious and deteriorates soil health. Aadar increases the soil temperature more than 100^{0}C in the upper 5 cm, with a concomitant partial reduction of the bacterial population eroding amount of organic matter and loss soil nutrients. Quantity of lost soil nutrients replenished through costly fertilizers increases cost of cultivation.

KVK Intervention

Dapog method was developed in Philippines, in which seedlings are raised on surface, like banana leaves or plastic sheets without disturbance of soil. On plastic sheets 92-100 beds of size 1 m wide and 5 m long, were made on raised surface and boundaries were provided with frames with the help of waste bamboo or bricks or stones. Each frame was filled with a mixture of 70% soil, 20% FYM, 10% ash and 100 gm Urea and SSP. About 36 to 48 hours pre-germinated paddy seed (Jaya variety) at the rate of 20

kg ha^{-1} was uniformly spread. The bed was mulched with paddy straw net to protect from bird damage.

To stop deterioration of soil health and makes a paddy cultivation more profitable, Krishi Vigyan Kendra – Valsad conducted frontline demonstration on dapog method of raising paddy seedlings in Asma and Ozar villages. To aware the tribal farmers about dapog method, KVK expanded the technology by various extension activities like, training, group discussion, method demonstration and field days etc. in Asma, Rabdi, Ozar and Lakhmapore villages of Valsad.

Growth and yield parameters

With the Dapog method, paddy seedlings can be transplanted within 14 to 17 DAS (Days after sowing) however in traditional aadar flatbed nursery, transplanting was delayed. The delay also reduced maximum tiller number, and extended crop duration with delayed maximum tillering, flowering and maturity. Crop lodging during heavy rains were found minimum compared to traditional aadar flatbed nursery raised plot. Grain yield was consistently increased by 7.71 to 9.10% with younger seedlings transplanting.

Table 11. Impact of paddy seedling raising methods on yield and yield attributes of paddy

Yield and yield parameters	Traditional Aadar flatbed nursery		Dapog nursery	
	Kharif 2019	Kharif 2020	Kharif 2019	Kharif 2020
Average number of tillers per plant	9.7	9.4	11.2	11.8
Grain yield (kg ha^{-1})	3364	3247	3645	3572
Straw yield (kg ha-1)	2804	2756	2795	2670
Straw bundle yield (kg ha-1) (1bundle of 200 - 250 gm straw)	8995	8742	9020	8857
Increase in grain yield (%)	Kharif 2019		7.71	
	Kharif 2020		9.10	

Economic gain

The seed requirement and its cost in dapog nursery was reduced up to 70% i.e. 20 kg ha^{-1}as compared with 35 kg ha^{-1}for the traditional Aadar flatbed nursery. The dapog nursery does not require tractor ploughing as it is established near the homestead in a small area of 0.04 per ha as against 0.12 ha^{-1} for a traditional aadar flatbed nursery so inputs and labour cost also reduced. The overall cost for the dapog nursery was 26.13% less for one ha. than transplanted paddy. Transplanting younger healthy seedlings raised in dapog nursery, improves number of tillers, flowering results in 7 to 9% more grain yield of paddy, simultaneously increase net profit by 19.09 to 23.51% against traditional aadar flatbed nursery. Highest BCR of 1.86 (Kharif 2019) and 1.76 (Kharif 2020) were recorded with dapog nursery compared to traditional aadar flatbed nursery BCR of 1.66 (Kharif 2019) and 1.55 (Kharif 2020).

Farmers of Valsad district are pleased with our efforts for motivation and other nearby farmers came forward to adopt dapog method of paddy seedling nursery. About 84 farmers of Asma, Rabdi, Ozar and Lakhmapore villages of Valsad district started to raise paddy seedling with dapog method.

13. Organic Farming of Tuber Crops to improve Economic Status: KVK Tapi

In Tapi district, farmers are mainly cultivating the vegetable crops like okra, brinjal, Chilli, tomato and cucurbits on a commercial basis. In our daily diet, tuber crops play an important role after cereal and pulse crops. However, the farmers of Tapi district were deprived of cultivation of tuber crops for many years. Elephant Foot Yam (EFY) and greater yam is a tuber crop. In general, most of the vegetable crops are perishable in nature, hence spoil quickly & cannot be stored. EFY and greater yam has long shelf life; hence it can be stored for a long time and can sell the produce when market rate is high. The cost of EFY and greater yam cultivation is low. Therefore, the demonstrations of EFY and greater yam were organized in Tapi district with the objectives that the farmers can earn good income by cultivating the tuber crops along with other vegetable crops.

Plan, Implement and Support

The demonstrations of EFY cv. Gajendra and greater yam var. Shri Neelima, Shri Swati, Shri Nidhi were given to 7-7 farmers of Tapi district with the aim that farmers can earn good income by cultivating tuber

crops at low cultivation cost. Training on its scientific cultivation was also given to the farmers. One demonstration was also organized in 2019-20 at Sureshchandra Dinubhai Gamit's farm in Ghata village of Vyara taluka. Sureshbhai had planted EFY and greater yam in 10 guntha area on May, 2019 at a distance of 90 x 90 cm with ridge and furrow method. In which, EFY was planted in an area of 6 guntha and greater yam was planted in an area of 4 guntha. Maize crop was also planted as an intercrop. Demonstration plots were frequently visited by KVK scientists and technical guidance was also given as per need. Field day was also organized at demonstration plot.

Outcome

For the cultivation of EFY and greater yam, Sureshbhai had invested Rs. 3970. The crop wise detail information are given in the below table. After planting, he got the first year EFY corm production 350 kg and greater yam tuber 110 kg on February: 2020. Out of which, Sureshbhai kept 200 kg of EFY corm and 20 kg of greater yam tuber for next/second year planting. He earned Rs. 4000 from selling of 150 kg EFY corm and Rs. 9800 from selling of 90 kg greater yam tubers. Hence, he earned total Rs. 13800 from selling of the produce. He got market price of Rs. 20-40 per kg EFY corm and Rs. 70- 120 per kg greater yam tuber for the selling. After deducting the total expenses, he got net profit of Rs. 9830 and also saved estimated cost of EFY & greater yam planting material Rs. 10400 for the next year planting.

Impact: Sureshbhai earned more income by growing tuber crops organically with other vegetable crops. From this successive result, he has extended EFY cultivation in an area of 25 Guntha and greater yam in an area of 10 Guntha in this year (2020-21) at a dist. of 90 x 90 cm with ridge and furrow method. In which, maize, cowpea, cluster bean and bottle gourd have also been planted as mixed crop. From the inspiration of Sureshbhai's success, Shantilal Naginbhai Gamit of Ghata village has also planted EFY this year. Thus with less care & labor cost, the income of farmer has increased by tuber crop cultivation and around 20-25 farmers has started its cultivation in Tapi district.

Farmers Feedback

1. Less cost of cultivation due to negligible pest & disease infestation.
2. Good market price due to less no. of daughter corm in EFY cv. Gajendra.
3. Can get more income by less effort due to less care & management require compared to other vegetable crops.
4. Due to long storage life, it can be sold at any time of the year or when market price is high.

Cost of cultivation of EFY (6 Guntha)		
Sr. No.	Particulars	Cost (Rs.)
1	Ploughing	300
2	Pit digging & Corm planting	350
3	FYM (1000 kg)	500
4	Irrigation	500
--	--	--
5	Labor charges & other cost	520
A	Expenses incurred by Sureshbhai	2170
B	EFY corm (By KVK)	1200
	Total Cost of Cultivation (A+B)	3370
	Gross Income	12000
	Net Income	8630
	B:C Ratio	3.56

Cost of cultivation of Greater yam (4 Guntha)		
Sr. No.	Particulars	Cost (Rs.)
1	Ploughing	300
2	Pit digging & tuber planting	200
3	FYM (800 kg)	400
4	Irrigation	500
5	Support	200
6	Labor charges & other cost	200
A	Expenses incurred by Sureshbhai	1800
B	Greater yam tuber (By KVK)	1400
	Total Cost of Cultivation (A+B)	3200
	Gross Income	12200
	Net Income	9000
	B:C Ratio	3.81

14. High Value Mushroom Production: KVK Vadodara

Mr. Rathwa Shailesh Somabhai is a tribal small farmer in the Kawant Taluka of Chhotaudepur district earlier they followed traditional farming. Income generation for the family under these conditions/ situations was difficult because of the limited resources of water, soil type and climatic conditions and limited availability of money.After than he was exploration for alternate livelihood was discussed at family level and the need arose Krishi Vigyan Kendra.

Plan, Implement and Support

Mr. Shaileshbhai learnt about the prospects and opportunities in mushroom cultivation and contacted with Krishi Vigyan Kendra, Vadodara. Discussions followed by technical visits to various mushroom units gave him the confidence of integrating mushroom as an added enterprise in his farm. He started, experimenting with Oyster mushroom after completing the 4 days skilled training on mushroom cultivation from Krishi Vigyan Kendra, Vadodara in 2018-19. He required technical backstopping in his place so the techniques were provided by the experts of the KVK. The KVK was encouraged to production of oyster mushroom through skill development programme of the 60 farmers. His active role in mushroom and mushroom production enabled year round production of the Oyster mushroom.

Trainings

The entrepreneur underwent series of trainings in the district. The details are furnished below.

Period	Topic	Training type	Location
2018-19	Oyster mushroom production	Skilled training On campus	KVK, Vadodara
2019-20	Oyster mushroom production	Skilled training On campus	KVK, Vadodara
2020-21	Oyster mushroom marketing	Off Campus	Vijali village in Kawantblock organized by District Dept. of Horticulture with collaboration of KVK Vadodara

Output

From 2019 onwards he is supplying spawn& other materials in collaborations with Pvt. Company to the local producers of Chhotaudepur and nearby areas. He has displayed his products in Krishi Melas conducted during every year at ATMA, Chhotaudepur & Vadodara, KVK, Vadodara, SAUskrishi Mela and State level krishi mela organized by Govt. of Gujarat. The developing story of mushroom in his farm was telecast in state level programme on "Lokmat" and "TNN" news TV channels which attracted youth towards him and in State level news Paper like "Divya Bhaskar". The KVK facilitated his participation in many inhouse empowerment programmes like farmer shibir, innovative farmers meet etc.

Outcome

Mr. Shaileshbhai had an ancestral property of 3.50 acres of land in Vijali, Kawant taluka of Chhotaudepur District. The whole family was engaged in cultivation of paddy, Maize, Pigeon pea and vegetables in this piece of land. This continues to be their first occupation even today. After entering into mushroom enterprise, the number of crops stood at an average of 5 per year from the baseline of 2 crops per year following the intervention of KVK. The mushroom production at inception was 264kg / month during 2019. Currently, it has risen to 600kg / in 60 days with 100% commercial consumption and earns Rs. 2.10 lakh in a year as net profit only from mushroom cultivation. The enterprise is providing employment to three rural persons besides his family. The mushrooms are sold in local and regional trade methods. The entrepreneur as a resource person in programmes organized by different

institutes during 2020-21 and experience share to needy farmers. Mr. Shaileshbhai also received the Best district level farmers award from ATMA during 2017-18 and best state level farmers award in 2018-19. In 2020-21 he started the value addition in Mushroom like as mushroom pickle and mushroom dry powder.

Impact

Chhotaudepur district basically is under the tribal district and the main problem is migration so farmers were migrating in Saurashtra region of Gujarat. In this situation Mr. Shaileshbhai is innovative in Mushroom cultivation. After this Mushroom cultivation, the rural youth interested in Mushroom cultivation and KVK, Vadodara trained the 60 farmers in last year on Mushroom cultivation and all are adopted the Mushroom cultivation. After the success seeing of Shaileshbhai and other farmers in mushroom cultivation Dept. of horticulture & District Panchayat, Chhotaudepur implemented a pilot project of Rs. 40 lakhs for 275 farmers in technical support of KVK Vadodara.

15. Increased Income through Dairy and Vermicompost: Tapi

Mrs. Jasuben Chhakabhai Chaudhari Ramaji Faliyu, of village: Unchamala, Tal: Vyara, Dist: Tapi cultivated crops like sugarcane, paddy and mango, on 2 ha land.

Situation analysis/Problem statement

Like other farmers, animal husbandry along with agriculture is the inherited agribusiness of Jashuben's family. In agriculture, paddy and sugarcane are preferred cash crops. While mango is cultivated in about 1 acres as a horticultural crop. Before adopting the new system, she raised only one cow as a livestock keeper. The main purpose was to use milk and manure as fertilizer in agriculture for home consumption. Thus, before adopting the new system, farming and animal husbandry were disorganized as well as conventional.

Plan, Implement and Support

KVK, Tapi conducts training and extension activities for the tribal farmers of Tapi district to increase their income through farming and animal husbandry. Accordingly, Jashuben also came in contact with Krishi Vigyan Kendra, Tapi through ATMA, Tapi and was inspired to abandon conventional dairy practices and adopt animal husbandry in a scientific manner as per the guidance of scientists. KVK, Tapi scientists frequently visited on the spot and gave guidance according from time to time. During 2018-19, she also joined 200 hrs training programme of 'Organic Grower" at KVK, Tapi sponsored by Agricultural Skill Council of India (ASCI) under RKVY.

Outcomes

Starting animal husbandry with only one cow, Jashuben had around 15 small and large cattle. But due to her ill health, she has kept only 5 animals at present. While through their own experience they have been making vermicompost manure and vermiwash from animal dung for the last three years. It is also used for home farming and retail as organic inputs. In addition, during year 2019-20, she has earned a total income of Rs. 84900 by selling 83 Kg earthworm at the rate of 300 Rs. per Kg. In the same way, she has earned a total income of Rs. 25000 by selling 1000 liter Jivamrut at the rate of 25 Rs. Now Jashuben has also mastered in the art of animal husbandry and organic farming and has become known as an ideal farming woman for the farmers of her village as well as the surrounding villages. During the year 2013-14, she has received the Taluka Level Best Atma Farmer Award in the field of Animal Husbandry. Similarly, during the year 2015-16, she has received the District Level Best Atma Farmer Award in the field of Animal Husbandry. She has been awarded a certificate by Hon'ble Collector-Tapi on the occasion of "Mahila Swavalamban Divas" on 08-08-2018.

Table 1: Details of expenditure and income from dairy

Year	Total no. of Milking Animals	Total no. of Lactating Milking Animals	Gross total income (Rs.)	Total Expenditure (Rs.)	Net income (Rs.)	Net income per Lactating Income (Rs.)
2016-17	12	08	842854	545000	297854	37231
2017-18	11	07	806940	557000	249940	35705
2018-19	07	05	742459	576000	166459	33291
2019-20	05	02	228077	167289	60788	30394

NB :- (1) Animal Feed/ Labour would be include in Total cost (Rs.)

Table 2: Details of expenditure and income from Vermicompost and Vermiwash

Year	No. of vermibed	Vermicompost production (Kg)	Income (Rs.)	Vermiwash Production (Lt.)	Income (Rs.)	Total Income (Rs.)	Total Expenditure (Rs.)	Net Income (Rs.)
2016-17	02	6000	30000	-	-	30000	4500	25500
2017-18	10	30000	150000	-	-	150000	21000	129000
2018-19	16	48000	240000	2000	10000	250000	33600	217400
2019-20	18	54000	270000	-	-	270000	118800	151200

NB :- (1) Vermicompost selling rate Rs. 5/kg
(2) Vermiwash selling rate Rs. 5/kg

Chapter 9

Special Programmes

In this section, special programmes are reported which were organized by the KVKs in the Zone. Several programmes like Poshan Maah, Jal Shakti Abhiyan, Celebration of World Soil Day, Kisan Diwas, Kisan Vigyan Diwas, Rashtriya Mahila Diwas, Constitution Day etc. were organized with involvement of different stakeholders.

Poshan Maah (September 2020)

Poshan Maah celebrated during 01.09.2020 to 30.09.2020 by all KVKs. Total 37124 activities were conducted for 9981 anganwadi workers, 60129 farm women, 2698 adolescent girls, 1019 school children with the total participants of 73827 farmers and others.

Table 9.1 Poshan Maah celebrated during 01.09.2020 to 30.09.2020

Sr. No.	State	Number of KVK	Farm women	Adolescent girls	School children	Anganwadi workers	Total Participants
1.	Maharahstra	41	11704	1645	763	5909	20021
2.	Gujarat	29	47900	925	112	3764	52701
3.	Goa	2	525	128	144	308	1105
	TOTAL	72	60129	2698	1019	9981	73827

Jal Shakti Abhiyan

Jal Shakti Abhiyan (JSA) - A Water Conservation Campaign was launched by the Ministry of Jal Shakti, Government of India across the country from 1 July to 15 September 2019. Main objective of the JSA was for creating awareness among all stakeholders including farmers on water management and rainwater harvesting. There is need to shift focus from land productivity to water productivity. A time bound implementation and monitoring of JSA was ensured in their allotted districts at national level. In this period, several activities were organized by the KVKs with a total of 83 programmes and 26957 participants. Focus on water sharing among farmers – a tradition in dry land villages, innovative practices of rain water management, water budgeting at village level, forming water users associations was given. All were motivated by sharing statement 'we can achieve the power of Jal Shakti with the power of Jan Shakti'.

Celebration of Cleanliness Drive Programme

Concerted efforts for making Clean India are being taken up at national level. 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. All the KVKs across the Zone celebrated Swachhata Pakhwada from 16-30 December 2020. In this period, several activities were organized by the KVKs with active involvement of farmers and 806 VIPs attended the programme. Total number of participants was 24713 and uploaded 1693 images / photographs.

Table 9.2 Swachhta Pakhwada Celebrated from 16-30 December, 2020

State	Activities organized	No. of farmers participated	No. of VIPs attended the programme	Total No. of participants	Number of images/ photographs uploaded (jpg Format)
Maharashtra	Taking Swachhata Pledge, Stock taking & briefing of the activities to be organized during the Pakhwada	14676	513	14477	1012
Gujarat	Oath taking and briefing of Swachhata pakhwada activity to staff and participants	10635	280	9908	630
Goa	Swachhta Pledge & Tree Plantation, KVK campus cleaning.	314	13	328	51
	Total	25625	806	24713	1693

World Soil Day Celebration

Major attention was given for maintaining soil health for sustainable agriculture. Every year, World Soil Day is celebrated on 5th December for creating mass awareness among human beings. This year, the theme of World Soil Day was 'Stop soil erosion, Save our future'. In this context, 81 KVKs across the Zone (49 Maharashtra, 30 Gujarat and 2 KVKs from Goa) celebrated World Soil Day programme on 5th December, 2020. In this programme, 9098 participants were benefitted and got aware about soil conservation and integrated nutrients management. The state-wise details of the events are reported in Table 9.3.

Table 9.3 Details of World Soil Day organized by the KVKs

State	Number of KVKs	No. of Dignitaries attended	No. of farmers participated	Total no. of participants
Maharashtra	49	9	6512	6521
Gujarat	30	1	2463	2464
Goa	2	2	111	113
Total	81	12	9086	9098

Celebration of Constitution Day

Fundamental duties are intended to serve as a constant reminder to every citizen and it also requires citizens to observe certain basic norms of democratic conduct and democratic behavior because rights and duties are co-relative. Keeping this as the main objective, the following programmes on fundamental duties were chalked out during the year till 26 November, 2020. Reading of 'Preamble' by all staff members; talk by eminent learned personalities; quiz programme; audio-visual programme on value and preserve the rich heritage of our composite culture; public programme on Fundamental Duties with celebrities and learned scholars and display of

standees in the institutes' premises etc. In this programme, 3597 participants were oriented in presence of 48 people's representatives. The state wise details are given in Table 9.4.

Table 9.4 Details of Constitution Day Celebrated by the KVKs

State	Name of activity organized	No. of officials attended	No. of VIPs attended	Other Participants	Total Participants
Maharashtra	Talk on Constitution and citizen duties, Land legislations and Reforms, Awareness Campaign, Constitutional day field visit, Constitution oath and importance of Indian constitution, Awareness of Land reform and use of forest land.	292	40	1863	2195
Gujarat	Talk on constitution and citizen duties, land legislations and reforms, Video talk, Kisan Sangosthi.	150	8	1142	1300
Goa	Talk on Constitution and citizen duties, Land legislations and Reforms, Awareness on Dairy and Vermicomposting.	8	0	94	102
	Total	**450**	**48**	**3099**	**3597**

Rashtriya Mahila Kisan Diwas Celebration

Farm women were given more attention for their socio-economic empowerment. In this context, the Ministry of Agriculture and Farmers Welfare had decided to observe 15th October every year to celebrate as Rashtriya Mahila Kisan Diwas by all SAUs, ICAR institutes and KVKs. In the Zone, 74 KVKs celebrated Rashtriya Mahila Kisan Diwas on 15th October, 2020 and 590 farm women/participants attended the programme. Series of activities like special lectures, exhibitions, quiz/drawing competitions, innovative farm women's experience sharing, exposure visits etc. were organized.

Kisan Diwas and Kisan Vigyan Diwas Celebration

On the birth anniversary of former Prime Minister Shri Chaudhary Charan Singh and Shri Atal Bihari Vajpayee, Kisan Diwas (23.12.2020) and Kisan Vigyan Diwas (25.12.2020) were celebrated by the KVKs across the Zone. It was celebrated keeping in view their immense contribution for promoting use of science for the welfare of farmers. Kisan Diwas was celebrated by 51 KVKs on 23rd December 2020. In all

4507 farmers and 508 officials were attended the programme. Kisan Vigyan Diwas was celebrated on 25th December 2020 by the KVKs. In the Zone, 53 KVKs (34 in Maharashtra and 19 from Gujarat) organized different activities for different stakeholders. In all 6305 participants attended the events and they also shared their innovative experiences. The details of both events are given in Table 9.5 and Table 9.6.

Table 9.5 Celebration of Kisan Diwas by KVKs on 23.12.2020

State	No. of KVKs	No. of Officials	Total No. of participants
Maharashtra	46	305	2351
Gujarat	29	182	2067
Goa	2	21	89
Total	**77**	**508**	**4507**

Table 9.6 Kisan Vigyan Diwas Celebration by KVKs on 25.12.2020

State	No. of KVKs	No. of Officials	Total No. of participants
Maharashtra	34	349	2253
Gujarat	19	190	4052
Total	**53**	**539**	**6305**

Mera Gaon Mera Gaurav (MGMG) Scheme

Focus on promoting direct interface of scientists with the farmers is being given under innovative scheme Mera Gaon Mera Gaurav (MGMG). Lab to land process is being accelerated at ground level. 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, ICAR institutes and SAUs 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 159 groups of scientists in the zone (Maharashtra-53 groups, Gujarat-106 groups) were constituted of 591 scientists. In total, 633 villages were adopted. State-wise details are given in Table 9.7.

Table 9.7 Number of teams of scientists formed, villages adopted and farmers oriented

Sr. No.	State	No. of Teams	No. of Scientists	No. of villages
1.	Maharashtra	53	195	143
2.	Gujarat	106	396	490
	Total	**159**	**591**	**633**

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 regarding important agricultural operations, weather, market, events, programmes etc. Accordingly, KVKs advised farmers regularly on crops, livestock, other enterprises, weather, marketing and awareness of latest agricultural technologies, events and programmes through personalized advisory. During the reporting period, 14048 text messages, 4309 voice & text both and 1581 voice messages were sent to 43.09 lakh farmers. Among these advisories, major share was of crops (7598) followed by livestock (4759), weather (3653), awareness (2728), other enterprises (762) and marketing (438). The information on mobile based advisories is presented in Table 9.8.

Table 9.8 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	2654020	Text Only	4359	2815	2198	171	1978	352	11873
Gujarat	1079374	Text Only	810	682	72	15	391	205	2175
Total	**3733394**	**Text Only**	**5169**	**3497**	**2270**	**186**	**2369**	**557**	**14048**
Maharashtra	478902	Voice and Text both	63	19	369	14	31	22	518
Gujarat	1309	Voice and Text both	1460	1012	863	190	163	103	3791
Total	**480211**	**Voice and Text both**	**1523**	**1031**	**1232**	**204**	**194**	**125**	**4309**
Maharashtra	95159	Voice only	756	231	151	48	165	80	1431
Gujarat	35	Voice only	150	0	0	0	0	0	150
Total	**95194**	**Voice only**	**906**	**231**	**151**	**48**	**165**	**80**	**1581**
Grand Total	**4308799**		**7598**	**4759**	**3653**	**438**	**2728**	**762**	**19938**

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 center. 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 and providing advisory services on nutrient based recommendations to the farmers. In 2020, a total of 61851 samples of soils, 5339 samples of water, 660 samples of plants and 8 samples of organic manures were analyzed by the KVKs in the zone. In total, 99662 Cards were distributed among farmers with specific recommendations in local language. State-wise data on various parameters are given in Table 9.9.

Table 9.9 Number of soil, water and plant analysis at KVKs

State	SOIL, WATER, PLANT & MANURE TESTING LAB					
	Samples	No. of Samples	No. of Farmers	No. of Villages	Amount realized (Rs.)	No. of Card issued
Maharashtra	Soil	49530	44940	3374	10391718	86299
Gujarat	Soil	7020	6881	799	751855	6421
Goa	Soil	5301	4673	109	0	5301
Total	**Soil**	**61851**	**56494**	**4282**	**11143573**	**98021**
Maharashtra	Water	4257	3925	711	446775	1491
Gujarat	Water	1033	975	476	42690	96
Goa	Water	49	49	17	4270	0
Total	**Water**	**5339**	**4949**	**1204**	**493735**	**1587**
Maharashtra	Plant	542	250	113	177850	54
Gujarat	Plant	118	86	45	0	0
Total	**Plant**	**660**	**336**	**158**	**177850**	**54**
Maharashtra	Manure	8	8	7	4000	0
Total	Manure	8	8	7	4000	0
Total Testing		**67858**	**61787**	**5651**	**11819158**	**99662**

HRD, Publications and Linkages

Chapter 10

Workshops/Conferences/Trainings Organized

- '*Online Annual Zonal Workshop of 81 KVKs*' from 10-12 July, 2020. Shri Kailash Choudhary, MoS, Govt. of India; DG, ICAR; DDG (Agril Extension); ADGs, VCs, Directors of ICAR Institutes, DEEs of SAUs and Heads of KVKs attended the program.
- e-Talk on '*Digital Platforms for Effective Outreach*' on 29 August, 2020.
- '*Online Annual Action Plan for the year 2020-21 of 51 KVKs of Maharashtra and Gujarat*' during 27-28 May, 2020.
- '*Online Zonal Review cum Action Plan Workshop on Farmer FIRST Project*' on 13 June, 2020.
- '*Online Annual Zonal Workshop of NICRA-KVKs*' on 07 August, 2020.
- '*Online Zonal Review Workshop on Gramin Krishi Mausam Sewa (GKMS) – DAMU-KVKs*' on 3 September, 2020.
- Webinar on '*Women Farmers: Engineered a New Age Farming Transformation*' under Mahila Kisan Diwas Celebration on 15 October, 2020. DG, ICAR was the Chief Guest.
- '*Awareness Program on Farm Acts-2020*' organized in virtual mode on 28 October, 2020 in collaboration with KVK Pune-II and KVK Kolhapur-II.
- '*Sensitization Workshop on Transforming Animal Husbandry Sector*' on 28 November, 2020. Dr Vallabhbhai Kathiria, Chairman, Rashtriya Kamdhenu Aayog was the chief guest.
- Webinar on '*Hi-tech cultivation of vegetables and grafted technology*' jointly organized by KVK, Baramati and ICAR-ATARI, Pune on 24 December, 2020.
- '*Zonal Review Workshop of NICRA KVKs*' at KVK, Ahmednagar-I on 02 January, 2020.
- '*Review Workshop on Farmer FIRST Centres*' at KVK, Ahmednagar-I on 03 January, 2020.
- Orientation Workshop on '*New Extension Methodologies and Approaches (NEMA) Project*' at KVK, Ahmednagar-I on 14 January, 2020.
- '*State Level Action Plan-2020 Workshop for 30 KVKs of Gujarat*' at Gujarat Vidyapith, Ahmedabad during 13-14 February, 2020.
- Review of Vidarbha KVKs through Web Conference on 14 April, 2020.
- Video Conferencing with 9 Comptrollers of SAUs-Maharashtra and Gujarat on 16 April, 2020. Details of fund released to KVKs and other schemes were briefed.
- Webinar with Heads of KVKs and their staff in Maharashtra organized on 18.4.2020 to review the present status of activities and issues.
- Webinar with Heads of NGO-KVKs and Assistants organized on 19.4.2020.
- Review meeting of KVK Nagpur-II and KVK Sangli-II organized by Director Extension, MAFSU, Nagpur on 27 December, 2020.
- Meeting for Reviewing New Project Proposals at ATARI level on 10 September, 2020.
- Online meeting on video production under NICRA-KVKs on 26 September, 2020.
- ICAR-ATARI, Pune and MGM-KVK jointly organized an event on 150th birth anniversary of Mahatma Gandhi on 2 October, 2020.

Organized Meetings

- '*2nd Institute Management Committee (IMC) meeting*' of ICAR-ATARI, Pune at KVK, Narayangaon on 13 March, 2020.
- '*Interaction Meet on Emerging Problems in Cotton*' jointly organized by ICAR-ATARI, Pune and CICR, Nagpur on 2 December, 2020 for Maharashtra KVKs.
- Finalized QRT report and visit to North Goa and South Goa KVKs by the QRT during 03-07 March, 2020.

Attended Workshops/ Conferences

- Online Directors' Conference on 19th March, 2020 with all the Directors of ICAR Institutes.
- Meeting of DG with Directors of ICAR institutes on 10 April, 2020.
- Online training on e-office EMD organized by IASRI on 1 May, 2020.
- Online meeting on ICT in Agricultural Extension under chairmanship of DDG (Agril. Extension), ICAR, New Delhi on 05 May, 2020.
- One day online workshop on Training Management Information System (TMIS), HRD Nodal Officers on May, 2020.
- 'State level online workshop for farmers on advanced pomegranate technologies' organized by KVK, Banaskantha-I from 18-20 May, 2020.
- Online Krishi Samvaad organized by VNMKV, Parbhani on 18 May, 2020.
- Online Celebration of World Honey Bee Day by KVK, Baramati on 20 May, 2020.
- Spoke on role of SMS Extension at KVKs organized by ATARI, Hyderabad on 21 May, 2020.
- Interface meeting with KVKs for technological backstopping of migrant labourers on 30.5.2020.
- Virtually joined Agronomic Training for better cotton cultivation for Connect Cotton PU team on 30.5.2020 organized by KVK Rajkot-I.
- National KVK backstopping on resource conservation and bio-energy self-reliance for sustainable agriculture organized by SDAU Sardarkrushinagar from 28-30 May 2020.
- Online interface with cotton farmers on the occasion of World Environment Day on 5.6.2020 organized by KVK Nagpur.
- Online Annual Review Workshop of Farmer FIRST Project during 17-18 June, 2020.
- Online progress and action plan workshop of CFLDs on pulses and oilseeds on 10 June, 2020.
- Online NEMA review workshop under chairmanship of Dr. A.K. Singh, DDG (Agril Extension) on 29 June, 2020.
- Review meeting about ATARI office building construction on 29 June, 2020. SE, CPWD along with other officials, contractor Sh. D.K. Patil, Director, ATARI with AAO attended through video conferencing.
- Virtually attended inaugural function of Zonal Workshop of KVKs of ATARI, Kolkata on 1 July, 2020.
- Joined plenary session of virtual Zonal Workshop organized by ICAR-ATARI, Bengaluru on 15 July, 2020.
- Online 92th ICAR Foundation Day Celebration and Awards Ceremony on 16 July, 2020.
- Online Inaugural Program of Annual Zonal Workshop of KVKs organized by ICAR-ATARI, Jodhpur on 17 July, 2020.
- Online Inaugural Program of Annual Zonal Workshop of KVKs organized by ICAR-ATARI, Patna on 20 July, 2020.
- Attended Online Inaugural Program of Annual Zonal Workshop of KVKs organized by ICAR-ATARI, Hyderabad on 23 July, 2020.
- Attended Inaugural Program of 6 days training in 'Preparation and Dissemination of Agromet Advisories at Block Level under GKMS Scheme for SMS and Agromet Observes of DAMUs' on 27 July, 2020.
- Attended Online Meeting 'Community Organizations: Role in Extension' on 28 July, 2020 under chairmanship of DG, ICAR.
- Inaugural function of Online Annual Zonal Workshop on KVKs of ICAR-ATARI, Jabalpur on 29 July, 2020.
- Chief Guest in Inaugural Program of Webinar 'Formation and Promotion of FPOs' organized by KVK, Kolhapur-II on 31 July, 2020.
- Valedictory session of 6 days training held on preparation and dissemination of agromet advisories for SMS and observers under DAMU organized by IMD on 1 August, 2020.
- Interface meeting of DG with KVKs of India on 04 August, 2020.
- Online Foundation Stone laying ceremony of administrative building of KVK, Surat on 05 August, 2020.
- Attended 22nd Agriculture Research Council meeting of MPKV, Rahuri as special invitee on 11 August, 2020.
- Webinar on 'Bamboo Schemes of Maharashtra

Bamboo Development Board' organized by KVK, Baramati on 14 August, 2020.

- Chief Guest in 'State Level Online Interface Meeting on Ajwain Cultivation' organized by KVK, Aurangabad-I on 17 August, 2020.
- Online meeting '*Poshan Abhiyan*' organized by DDG (Agril Extension) on 8 September, 2020.
- Online Review Workshop chaired by MOS (Agri), GOI on 9 September, 2020. Presented brief report of ATARI Pune.
- Attended online inaugural program and gave speech on extension strategy for lumpy disease management at KVK level on 9 September, 2020.
- Online meeting for selection of districts for 2nd phase NICRA-TDC on 16 September, 2020.
- Online meeting for finalization of NICRA-KVKs for 2nd Phase and developing video films on 16 September, 2020.
- Online inaugural session of DAMU training on 24 September, 2020. DG, IMD, DDG (Agril Extension) and ADG (Agril Extension), ICAR participated.
- Online inaugural ceremony of administrative building, lab and guest house of IIMR, Hyderabad on 24 September, 2020.
- Interface meeting with Commissioner Agriculture, Director, ATMA, ASCI officials and others on 25 September, 2020.
- Online ACZ meeting on 25 September, 2020. Commissioner Agriculture presented strategic planning based on ACZ.
- Online National Level Consultation on Natural Farming Organized by NITI Aayog, New Delhi during 29-30 September, 2020.
- Online Agricultural Technology Week organized by KVK, Palghar inaugurated on 20 October, 2020.
- Chief Guest in online Rabi Krishi Mela organized by KVK Jalna-II on 20 October, 2020.
- Online Alumni Meet of Agril Extension Division, IARI on 20 October, 2020.
- Attended Online RAC meeting held for ICAR-ATARI Kolkata and Patna in 21 October, 2020.
- Online Rabi Mela organized by KVK Osmanabad on 26 October, 2020.
- Online training on 'Vegetables and Medicinal Plants for Nutritional Gardening' organized by MPKV, Rahuri under Farmer FIRST Program on 26 October, 2020.
- ATARI, Pune staff observed Vigilance Awareness Week from 27 October, 2020 to 2 October, 2020.
- Inaugural program of 48th AGRESCO on 27 October, 2020.
- Online Special Lecture on Vigilance Related Issues delivered by Shri G.P. Sharma, Director Finance, ICAR, New Delhi on 31 October, 2020.
- Joined online rabi crops mela organized by KVK Beed-II on 2 November, 2020.
- Online Agriculture Technology Week Inaugural program organized by KVK Nandurbar on 2 November, 2020.
- Online Interaction about Network Project Gender and Nutrition on 3 November, 2020.
- Online Krishi Vigyan Mandal program attended on 5 November, 2020 organized by KVK Jalna.
- Directors and Vice Chancellors Conference in virtual mode on 5 December, 2020.
- 11th Foundation Day Celebration of ICAR-DFR, Pune was attended virtualty on 10 December, 2020.
- Online meeting with ATARI Directors on forthcoming programmes on 11 December, 2020.
- Online meeting on SARATHI project under chairmanship of ADG, ICT on 15 December, 2020.
- Online meeting 'ARYA Network Project' on 15 December, 2020.
- Online flyers raiser ceremony of India International Science Festival on 16 December, 2020.
- Joined inaugural program on Administrative Building of ICAR-NIASM, Baramati on 16 December, 2020 in virtual mode.
- Online Agricultural Scientists Meet during India International Science Festival from 23-24 December, 2020.
- Online Program in Clean Agriculture - Green Agriculture during Swachhata Pakhwada on 30 December, 2020. It was jointly organized by IARI-RS and other Pune based ICAR institutes.
- Celebrated Hindi Saptah at ICAR-ATARI, Pune and concluded on 23 September, 2020.
- Online QRT meeting for finalization of report organized from 8-9 August, 2020.

- Review meeting about construction work of KVK, Yavatmal-II on 13 July, 2020 along with Chairman, KVK.
- Attended Farmer Science Congress and facilitated display of experiences of innovative farmers and share their experiences at UAS, Bengaluru on 6-7 January, 2020.

Participation in Trainings/Meetings/Visits/Interactions by ATARI Officials

- High Level Public Private Consultation meeting to discuss the idea of the Drought Action Network (DAN) at ICAR-NIASM, Pune on 16 January, 2020.
- Attended meeting with DG, MEDA, Pune and 2 KVK Heads on 20 January, 2020.
- EFC meeting under chairmanship of DDG, Extension at ICAR, New Delhi on 31 January, 2020.
- Preliminary RAC meeting held at ICAR, New Delhi from 31 January to 1 February, 2020.
- Outlook Agriculture Conclave and Swaraj Innovation Awards 2020 at New Delhi on 24 February, 2020.
- 11th National Conference on KVKs at New Delhi on 28 February to 1 March, 2020.
- Online review meeting with CPWD and Contractor of ATARI office building attended on 7 December, 2020.
- Online special RAC meeting attended during 6-7 November, 2020.
- Inaugurated the Rabi Krishi Mela organized by KVK, Washim on 13 October, 2020.
- Online TDC-NICRA meeting on 8 July, 2020.
- NEMA Review Workshop organized by ICAR-IARI, New Delhi on 22 June, 2020.
- e-office online meeting under chairmanship of Secretary, ICAR, New Delhi on 24 June, 2020.
- Participated in Online National Level Review Workshop on ARYA held on 16 June, 2020.
- Attended inaugural function of Global Farmers – Live Demos and Agriculture Exhibitions at KVK, Narayangaon on 9 January, 2020.
- Accompanied DDG, Agri. Extension, ICAR, New Delhi for participating in concluding session of Global Farmers – Live Demos and Agriculture Exhibitions at KVK, Narayangaon on 12 January, 2020.
- Attended inaugural function of Krushik-2020 at KVK, Baramati on 16 January, 2020.
- Institute Foundation Day and Scientist-Farmer Interaction Meet at ICAR-NRCG, Pune on 24 January, 2020.
- Attended inaugural function of **'Innovative Farmers Meet-2020** with theme of **Farmers' Innovations for Prosperous Agriculture'** at KVK, Kolhapur-II on 30 January, 2020.
- Attended inaugural function of Agro-Tech-Fair (Krushived-2020) at KVK Nanded-II on 9 February, 2020.

Chaired the Technical Sessions/Lectures Delivered

- Co-chaired the Technical Session on Social Science during 48th AGRESCO on 29 October, 2020 organized by PDKV, Akola.
- Panelist in National Consultation on 'Fostering Freshwater Aquaculture Technology Dissemination through KVK Network' organized by ICAR-CIFA, Bhubaneswar on 27 August, 2020.
- Chaired online the technical session on review of progress and action plan of KVKs in Zone-III on 26 June, 2020.
- Lecture delivered on Dissemination of Agromet Advisories on 28 September, 2020 during 'Short term training course on preparation and dissemination of agromet advisories at block level under GKMS scheme for SMS (Agromet) of DAMUs' held from 24-30 September, 2020.
- Presented a paper on Status of Oilseed Technology Dissemination and Area Expansion in the Zone during National Oilseeds Brainstorming Meet (Research-Industry-Farmer Interface): Challenges in Technology Dissemination and Adoption on 25 September, 2020.
- Delivered speech for promoting use of Rajbhasha Hindi in official works on the occasion of Hindi

Diwas on 14 September, 2020 virtualty organized by KVK, Pune-II.

- Delivered talk on 'Empowering women SHG members for making self dependance' on 06 July, 2020.
- Addressed the FPO/FPC members in online orientation training organized by KVK, Ahmednagar-II on 30 June, 2020.
- Online interface meeting with farmers and scientists and other stakeholders under Farmer FIRST project on 26 June, 2020.
- Inaugural speech given in virtual FPO meet organized by KVK, Pune-II on 09 June, 2020.

Organized/ Participated in Special Activities by ATARI Officials

- E-office in ATARI, Pune started in June 2020.
- Addressed the farmers on the occasion of celebrating World Environment Day on 5.6.2020 organized by KVK Rajkot-I.
- Addressed the farmers and other stakeholders in the occasion of World Environment Day on 5.6.2020 organized online by KVK Aurangabad-II.

KVK and Field Visits by the Director, ATARI, Pune

- Visited and reviewed the activities of KVK Kolhapur-II, Sangli-I and Sangli-II on 4 December, 2020.
- Visited demonstration units of KVK Satara-II on 9 November, 2020.
- Visited CFLD plots on chickpea organized by KVK Satara-I on 28.12.2020.
- Visited instructional farm of KVK, Narayangaon on 1 January, 2020.
- Reviewed activities of KVK, Aurangabad-II on 5 January, 2020.
- Visited KVK, Kolhapur-II and obtained different information about different models for doubling farmers' income on 20 February, 2020.
- Visit of KVK, Narayangaon instructional farm and demo units by the IMC members.
- Visited KVK, Ahmednagar-I, Aurangabad-I and Aurangabad-II during 14-15 March, 2020 along with Dr Randhir Singh, ADG, ICAR, Pune.

Interviews Conducted

- Conducted interview for the post of SMS (Animal Science) and Farm Manager at KVK, Nanded-II on 8 February, 2020.
- Conducted interview for the post of SMS (Agronomy), SMS (Plant Protection) and Assistant at KVK, Parbhani on 10 February, 2020.
- Conducted interview for the post of driver at KVK, Narayangaon on 15 February, 2020.
- Conducted interview for the post of SMS (Agril Engg) and Driver at KVK, Sindhudurg on 8 March, 2020.

SAC Meetings Attended

- KVK, Kolhapur-I (9.12.2020), KVK, Solapur-I (5.11.2020) KVK, Kolhapur-II (9.11.2020), KVK, Satara-I (28.12.2020), KVK, Pune-II (29.12.2020), KVK, Jalna-I (30.12.2020), KVK Beed-I (14.10.2020), KVK, Gondia (19.06.2020), KVK, Yavatmal-I (20.06.2020), KVK, Buldhana-II (23.06.2020), KVK Navsari (16.12.2020), KVK, Jalgaon-II (04.01.2020), KVK, Ahmednagar-I (05.02.2020), KVK, Baramati (11.02.2020), North Goa (03.03.2020).

Compilation

- State wise Action Plan for rural migrants during COVID 19 developed.
- Reporting on dissemination of state advisory to farmers during lockdown period.

- Prepared and compiled national and state level advisory to farmers during lockdown period for Maharashtra, Gujarat and Goa.
- Compilation and Reporting of Arogya-Setu App
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- Progress of NICRA-KVKs during National Review Workshop
- Progress of ARYA project in the review workshop
- Progress of DAMU-KVKs during review workshops

Chapter 11

Status of Budget and Staff

Status of Budget

During the financial year 2020-21, an amount of Rs. 13447.94 lakh was utilized/released against the allotted budget of Rs. 13460.00 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 2020-21

(Rs. in Lakh)

Heads	RE 2020-21				Expenditure			
	ATARI	KVKs	Support to DEEs	Total	ATARI	KVKs	Support to DEEs	Total
A) Recurring								
Pay & Allowance	69.00	11515.00	0.00	**11584.00**	67.32	11515.00	0.00	**11582.32**
TA	5.00	82.34	2.00	**89.34**	0.00	82.34	2.00	**84.34**
Contingencies	35.75	951.91	4.00	**991.66**	31.37	951.91	4.00	**987.28**
HRD	1.00	0.00	8.00	**9.00**	0.00	0.00	8.00	**8.00**
Total	**110.75**	**12549.25**	**14.00**	**12674.00**	**98.69**	**12549.25**	**14.00**	**12661.94**
B) Non-Recurring								
Works	0.00	786.00	0.00	**786.00**	0.00	786.00	0.00	**786.00**
Furniture, IT & Equipment	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Vehicle	0.00	0.00	0.00	**0.00**	0.00	0.00	0.00	**0.00**
Total	**0.00**	**786.00**	**0.00**	**786.00**	**0.00**	**786.00**	**0.00**	**786.00**
Grand Total (A+B)	**110.75**	**13335.25**	**14.00**	**13460.00**	**98.69**	**13335.25**	**14.00**	**13447.94**

ICAR-ATARI Staff

Research Management Position

1 Dr. Lakhan Singh, Director

Scientific Staff

1 Dr. Ankush Lala Kamble, Scientist (Agril Economics)

2 Dr. Amol Kamalakar Bhalerao, Scientist (Agril Extension)

Administrative Staff

1 Shri J. Mathew, Assistant Administrative Officer on additional duty from ICAR-ATARI, Bengaluru

2 Shri Munish Narayan Ganti, Assistant Finance & Accounts Officer on additional duty from ICAR-NRCG, Pune

भाकृअनुप
ICAR

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