Report of the
Quinquennial Review Team
2011-12 to 2018-19
ATARI Pune & KVKs Zone-VIII

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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ICAR

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जोन–VIII, पुणे–411005, महाराष्ट्र

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

The Director General
ICAR-Krishi Bhavan
New Delhi-110 001

Dated: 09.08.2020

Sub: Report of the Quinquennial Review Team in respect of Zone VIII, ATARI Pune for the year 2011-12 to 2018-19 – reg.

Ref: F.No. A.Extn.9/19/2019 dated 19 June, 2019

Sir,

In accordance with the laid down procedure of review of its institutes / projects in the ICAR system (as per the guidelines of QRT), a Quinquennial Review Team (QRT) was constituted by your good self to review the progress of Zone-VIII, Agricultural Technology Application Research Institute (ATARI), Pune and Krishi Vigyan Kendras under its jurisdiction for the period of 2011-12 to 2018-19 under the above reference.

The Team has completed its assignment, and has a great pleasure in submitting its report herewith.

Yours faithfully,

(K.S. Khokhar)
Chairman, QRT

(A.K. Mehta)
Member

(Sudhir Raizada)
Member

(R.P.S. Ratan)
Member

(Indrajeet Mathur)
Member

(Lakhan Singh)
Member Secretary

भाकृअनुप
ICAR

INDIAN COUNCIL OF AGRICULTURAL RESEARCH
AGRICULTURAL EXTENSION DIVISION
Krishi Anusandhan Bhawan-I, New Delhi - 110 012 INDIA

F.No. A. Extn. 9/19/2019-AE-II **Dated the 19th June, 2019**

OFFICE ORDER

The Secretary (DARE) & DG, ICAR has been pleased to constitute a Quinquennial Review Team (QRT) consisting of the following in respect of Agricultural Technology Applications Research Institute (ATARI) and Krishi Vigyan Kendras (KVKs) of ATARI, Pune for the period from 2011-12 to 2018-19. The composition of QRT is as follows:

Name & Designation	Chair/ Member
Dr. K. S. Khokhar, Former Vice Chancellor, CCSHAU, Hisar	Chairman
Dr. A. K. Mehta, Former ADG (AE), ICAR, New Delhi	Member
Dr. Sudhir Raizada, Former ADG (Fisheries), ICAR, New Delhi	Member
Dr. R.P.S. Ratan, Former Director of Extension, BAU, Ranchi	Member
Dr. Inderjeet Mathur, Former Director of Extension, MPUA&T, Udaipur	Member
Dr. Lakhan Singh, Director, ICAR-ATARI, Pune	Member Secretary

The terms of reference of the QRT are as under:

a) To review the KVK programmes and activities and their relevance, keeping in view the identified and prioritized farmers needs of t h e area.
b) To assess the superiority of the technology/products demonstrated on the farmer's fields through on-farm trials and frontline demonstrations.
c) To access the efforts made in transfer of technology through training of farmers and extension personnel, extension activities, and production of seeds and planting materials and other technology inputs.
d) To evaluate the innovative extension methodology developed and the procedures adopted by the KVKs to prioritize, monitor and assess the Impact of programmes.
e) To suggest a road map for KVKs to work as single window knowledge, resource and capacity development centre in the district.
f) To assess the existing provision for manpower and infrastructure in KVKs and ATARIs in view of their roles and responsibilities; review the monitoring, coordination, overseeing, liasioning, reporting, budgeting, technology flow and backstopping mechanisms; and
g) To suggest measures for organizational and administrative changes for strengthening and overall improving the visibility and efficiency of KYK system.

The mode of operation of the Committee will be mostly based on progress of KVKs. travel workshops including essential field visits, discussions with KVKs. ATARIs and host organizarions and ICAR Hqrs, and draft presentation before the finalization of the report. However, the Director of ATARI, Pune shall provide all the logistics for the visits, meetings, compilation of proceedings and final report of the Team and ADGs in the Agricultural Extension Division will facilitate in the overall coordination of the work of the QRT.

The QRT will submit its report with recommendations within a period of six months. The TA/DA and honorarium to the Chairperson and Members of the QRT will be met as per the exrsting ICAR norms out of the budget of the ATARI. Pune wherever QRT visits during the review period in the zone.

19.6.19

(V.P. Chahal)
Asstt. Director General (AE)

Distribution:
1. Chairman and all Members of the QRT.
2. Director, ATARI, Pune.
3. ADG (PIM), ICAR, Krishi Bhawan.
4. PPS to DDG (AE), ICAR for information of DDG (AE).
5. PA to ADG (AE-VPC) and ADG (AE-RS).
6. Deputy Secretary (AE)/Under Secretary (AE).

Contents

Acknowledgement

A Quinquennial Review Team was constituted by the Director General, ICAR, New Delhi under the Chairmanship of Dr. K.S. Khokhar, former Vice Chancellor, CCSHAU to review the Zone VIII, ATARI and KVKs of Zone VIII. The esteemed Members of the QRT included Dr. A.K. Mehta, former ADG (Agril Eextension); Dr. Sudhir Raizada, former ADG (Inland Fisheries); Dr. R.P.S. Ratan, former Director of Extension, BAU Ranchi; and Dr. Indrajeet Mathur, former Director of Extension, MPUAT, Udaipur. Dr. Lakhan Singh, Director ATARI Pune was entrusted with the responsibility to act as Member Secretary of the team.

The Chairman and Members of the QRT take this opportunity to express their sincere thanks to Dr. T. Mohapatra, Secretary, DARE & Director General, ICAR for reposing faith in this committee to undertake this review. The team also places on record its sincere thanks to Dr. A.K. Singh, DDG (Agril Extention), ICAR for his constant guidance, constructive suggestions and extending all time help. The support and guidance extended by Dr. V.P. Chahal, ADG (AE), ICAR is thankfully acknowledged.

The Team took up the actual work of QRT with effect from September 4, 2019, when a meeting of all QRT Chairman, ADGs (Agril Extension), Director ATARIs and Member Secretaries was held under the chairmanship of DDG (Agril Extension). During this review, the committee interacted with all the stakeholders of ATARI and KVKs and made visits to representative KVKs.

The QRT immensely enjoyed the work entrusted to it and received whole hearted cooperation, courtesy and hospitality from the Vice Chancellors, Directors of Extension Education, other authorities of SAUs, Officers from line departments, Chairmen/ Secretaries of NGOs and Head of all KVKs. The Team thankfully acknowledges the significant contribution of these administrators, scientists and other staff. We acknowledge the support of Shri Munish Ganti and Mrs Vijaya Bhumkar. Ms Pallavi Uttamrao Palve deserves appreciation for her sustained efforts in data compilation and typing of manuscript.

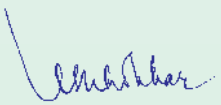
Chairman and QRT Members

Preface

A Quinquennial Review Team (QRT) was constituted under my chairmanship, vide F.No. A.Extn.9/19/2019 dated 19 June, 2019 for reviewing the activities and achievements of Krishi Vigyan Kendras (KVKs) working under Agricultural Technology Application Research Institute Zone-VIII, Pune, Maharashtra. QRT followed an interactive process to obtain views and information from different clientele groups including the higher officials of ICAR, the stakeholders belonging to line departments and the ultimate end users/farmers. The team made selective visits to sets of different KVKs representing varied agro-ecology and socio-economic settings, and organized travel workshops with involvement of different stakeholders. The committee could interact with the Senior Scientist & Heads and the staff of all KVKs, which were more than 5 years old. The strengths and specialities of the KVKs were explored for the period 2011-12 to 2018-19.

The QRT is of the view that KVKs are the main technology providers to the farmers at district level. The credibility of KVKs is very high which are serving the farmers in respect of technology application, knowledge dissemination and agro-advisory. It has been noticed that the performance of the KVK is highly influenced with the commitment and leadership of the Senior Scientist & Heads, Director Extension Education and Head of the Host Organization. For making KVKs more vibrant/effective, enhancing number of staff, contingencies, technological backstopping, close monitoring mechanism, upgrading few KVKs as model KVKs are main suggestions of the Team. The Team also realized that overburdening of KVKs with non-mandated activities should be avoided to maintain their identity/distinctness. A guideline enforcing decentralization of administrative and financial powers at the KVK level will help empowering the Senior Scientist & Heads to implement the mandated activities more efficiently.

I express my gratitude to the Heads of the institutions implementing KVKs, Vice-Chancellors, Director-ATARI, Directors of Extension Education and the Senior Scientist & Heads in facilitating our visits, meetings and travel workshops during the review of KVKs of Maharashtra, Gujarat and Goa. I also extend my thanks to the members of my team Dr. A.K. Mehta, Dr. Sudhir Raizada, Dr. R.P.S. Ratan, Dr. Indrajeet Mathur and Dr. Lakhan Singh (Member-Secretary) for their untiring efforts and deep involvement without which this huge task would not have been accomplished. Mr. J. Mathew, AAO deserves special thanks and acknowledgment who has been deeply involved in making visits very successful without caring for his personal comfort and well being.



(K.S. Khokhar)
Chairman, QRT

August 09, 2020

Executive Summary

A Quinquennial Review Team (QRT) was constituted by the Secretary, DARE and Director General, ICAR for reviewing the activities and achievements of Krishi Vigyan Kendras (KVKs) working under Agricultural Technology Application Research Institute, Zone-VIII, Pune for the period 2011-12 to 2018-19. The QRT comprised of the Chairman Dr. K.S. Khokhar, former Vice Chancellor, CCSHAU, Hisar along with Team members Dr. A.K. Mehta, Ex-ADG (Agril Extension), ICAR; Dr. Sudhir Raizada, Ex-ADG (Inland Fisheries), ICAR; Dr. R.P.S. Ratan, former Director of Extension, BAU, Ranchi; Dr. Indrajeet Mathur, former Director of Extension, MPUAT, Udaipur, and Dr. Lakhan Singh, Director, ATARI, Pune (Member-Secretary).

The Team followed interactive process to obtain views and information from different clientele groups including the higher officials of ICAR, the stakeholders belonging to line departments and the ultimate end users/farmers. The Team made selective visits to sets of different KVKs representing varied agro-ecology and socio-economic settings, and organized travel workshops with the participation of different stakeholders. The committee could interact with the Senior Scientist & Heads and the staff of all KVKs, which were more than 5 years old. The strengths and specialities of the KVKs were explored for the period of review.

In the Zone, 81 KVKs have been established, of which 49 are in Maharashtra, 30 in Gujarat and 2 in Goa. Of 81 KVKs, 74 (> 5 years old) were reviewed and evaluated by the Team. The ATARI got in touch with all Senior Scientist & Heads of KVKs and DEEs to obtain the background information about each KVK required for review. The QRT interacted with Senior Scientist & Heads of KVKs, DEEs and Vice-Chancellors of State Agricultural Universities, Chairpersons of NGOs and line department officials to validate the information supplied by the KVKs. The information provided by KVKs pertained to infrastructure, demonstration units, laboratories, staff position, instructional farms, linkages and convergence. For this purpose, the Team visited 19 KVKs (Maharashtra-9, Gujarat-8 and Goa-2) and six Travel Workshops were organised at different places across the Zone.

All the 74 KVKs eligible for review made their presentation before the QRT during the Travel Workshops in the presence of top functionaries of the Host Organizations. During QRT visits to the instructional farms and demonstration units the KVKs showcased the live material as well as exhibits. The participating farmers/entrepreneurs actively interacted with the participants during these travel workshops. Some of them also brought samples of their elite varieties and quality products for showing to the QRT members. The feedback of Chairmen of NGO-KVKs, Vice Chancellors of SAUs and line departments was very well taken. The comments of Directors of Extension Education/Directors of Research of SAUs were also invited during the interface.

Identification of constraints and problems encountered by the farmers and end users of technologies is an important process to understand the situations and devise a holistic approach for solutions. It was happy to note that the KVKs adopted appropriate methodology to identify problems and to arrive at the decision of interventions. KVKs took into consideration the agro-eco system analysis of representative villages, salient recommendations of Scientific Advisory Committee (SAC) meetings, feedback from end users, line departments, NGOs, other stakeholders, and reports of scientists-farmers interactions to facilitate the process of problem identification. KVKs also referred to the exercises done on training need assessment,

recommendations of the Zonal level workshop, State and National priorities to supplement their list of production constraints and consequent interventions.

The major mandate of KVK is technology assessment and demonstration for its application and capacity development. This mandate is fulfilled by KVK by four activities namely On Farm Testing; Frontline Demonstrations; Vocational Trainings and training of Extension Functionaries. Primarily the KVKs are to disseminate the frontline technologies. The grass root level extension is the responsibility of line departments. In order to accomplish these mandates, the KVKs adopted different techniques and extension methodologies. Throughout the Zone, the prioritised technologies on which KVKs focussed their major attention include: climate resilient technologies to combat/mitigate the ill effects of drought/flood/adverse climatic conditions. Since the rainfed areas form major acreage of the Zone the interventions of KVKs were focussed on *in situ* moisture conservation, rain water harvesting, ground water recharge, soil &water conservation, micro irrigation system etc. In order to supplement the income of the farmers, focus on raising high value crops under protected conditions, diversified crops including horticulture was given. Under rainfed farming system, IFS model is of major importance and in this Zone due importance has been given to the animal husbandry component particularly dairy, goatery, sheep rearing, poultry, piggery etc. The most important field of aquaculture had not received the due attention because of the sentiments of the people particularly in Gujarat. The Team emphasized the importance and scope of this important activity and at least a beginning be made with ornamental fisheries. The dearth of human resource trained in fisheries has to be attended on priority. The replacement of chemical pesticides and minimising the use of chemicals has been a focal area of the KVKs. It was reflected through production and use of several bio-pesticides, bio-agents and other bio-products by the KVKs. They are also promoting organic farming, formation of FPOs, primary and secondary processing & value addition. The fruit cultivation particularly in Maharashtra has made headway through the efforts of KVKs and other extension agencies. The value chain management is a specific Maharashtra model which could be replicated in other fruit growing regions. Some of the KVKs have created excellent infrastructure and their demonstration units are worth seeing. Some of the KVKs also popularised sericulture, medicinal plants, under-utilised fruits and cereals, IFS models, IPM technologies, agri tourism, nutri-sensitive agriculture etc. The availability of labour is becoming a constraint in successful farming operations and farm mechanization offer solution to a great extent. The KVKs are focussing on popularization of tools, implements, equipments and farm machinery to the farmers. The feedback is also given to the agricultural engineering institutes and SAUs for specific requirement of machinery for canopy management, fruit harvesting, drudgery reduction, ergonomically designed, inter cultural operations & seed bed preparation etc. Soil health management is a focal area with almost every KVK which has tested the soil of adopted villages and got the soil health cards issued. KVKs are also playing a major role in the production and supply of quality seed and planting materials.

For preparing draft report the inputs provided by each QRT Member after thorough analysis was considered for its inclusion. Submission of final report was preceded by two meetings. First meeting of QRT members was conducted on 6-7 March 2020 at Goa in which the report was arranged systematically by incorporating useful suggestions emerged during the discussion. Second meeting could not be held for next more than four months due to COVID 19 Pandemic, which was held in virtual mode on 8-9 August 2020. The salient recommendations of the QRT are summarized hereunder:

Technical

1. Since over a period of time the KVKs have evolved as basic centre to empower the end users, the Zone may prioritize the KVKs based on their need for supplementing infrastructural facilities. ICAR may give commensurate support in terms of funds and other requirements to these KVKs.

2. In the Zone, four existing KVKs, one each from SAUs, NGOs, State Government or ICAR should be developed as role model KVK with all appropriately feasible demonstration and other units so

that the remaining KVKs of the Zone may endeavour to raise their level to these model KVKs. These potential model KVKs may also establish one agro-poly clinic. Each KVK in the Zone should be encouraged to develop one niche area as their Centre of Excellence.

3. Development and promotion of IFS models for varied agro-ecologies incorporating horticulture and livestock components.
4. Rejuvenation of old water storing structures, popularization of rainwater harvesting techniques, moisture conservation and water saving technologies.
5. Promotion of organic farming in rainfed areas through the use of bio-pesticides, bio-agents and bio-products.
6. Promotion of primary & secondary processing, value addition of agri produce. Focus on value added products from different fruits, particularly in Maharashtra.
7. Farm mechanization of agricultural farms and meeting the specific requirements of different agricultural operations and gender sensitivity.
8. *In situ* crop residue management; diversified use of crop residues.
9. Harnessing use of ICT in agriculture.
10. Creation of nutri-smart villages through nutri-sensitive agriculture.
11. Strengthening of livestock production and management.
12. Enhancing the strength and capacity building of Fisheries human resource and introduction of new aquaculture technologies.
13. Reforms of market regulations, strengthening of marketing intelligence and decentralization of markets.
14. Strengthening of agricultural and allied activities performed by women farmers.

Administrative

1. KVKs may not be involved in carrying out non mandated activities.
2. Filling up of the vacant posts in KVKs and strengthening of ATARI.
3. Despite administrative and financial sanctions and release of funds by the ICAR in time, the money was not made available to KVKs by the University. Necessary action is required to be taken at the level of Head of the Host Organization.
4. Decentralization of administrative and financial powers to the level of Senior Scientist and Head of KVKs.
5. Once the financial sanction is issued by the Competent Authority there should not be any diversion of funds at the level of Host Organization and Head KVK should be fully authorized to expend as per the sanction.
6. There should be parity in scales and service conditions including CAS of the SMSs/Scientists/Technical under different set of KVKs (SAU/NGO/ICAR/State Government).

Financial

1. Funds from DAC and FW for specialised programmes are received very late. This hampers timely implementation of the programmes and payment to input agencies. The DAC and FW should ensure timely sanctions of programmes and funds.

2. The ICAR should make provision of "Difficult Area Allowance" to KVK staff as per Government of India guidelines.

3. There is urgent need for repair and maintenance of administrative buildings and farmers' hostels, replacement of furniture and motor cycles at KVKs established 15 to 20 years ago. The Council should provide lump sum fund for the same.

4. KVK should make efforts for getting funds from all possible external sources and the information to that effect be provided to ATARI.

5. ICAR may revisit the guidelines of Revolving Fund to incentivise KVK staff on the pattern of ICAR Revolving Fund Scheme applicable to scientist borne on research post.

6. The QRT was made aware by the KVKs under visit that the contingency provided is insufficient to implement the mandate. The Committee is of the opinion that there is a strong case for enhancement of contingency and at least 20 per cent of the total salary component should be provided as contingency to fulfil the mandate of the KVK.

Policy Matters

1. Increasing the staff strength of KVK.

2. The KVKs under Non-Government Organizations, funded on 100 per cent basis by Government of India, engaged in the service of farmers, rural youth, and women should not be subjected to GST and Income Tax on capital gains as the products they are producing are not for commercial use but for the disadvantaged section of the society.

3. There is no provision in Council for supporting International visits for KVK scientists. The QRT recommends that Council should provide opportunity and commensurate funding to highly performing KVK scientists, as an incentive, so that they sustain their morale and efficiency for better performance.

1. Introduction

1.1 Introduction

The Indian Council of Agricultural Research (ICAR) has established 11 Agricultural Technology Application Research Institutes (ATARIs) across the country for monitoring, reviewing and coordinating the KVK system. Deputy Director General (Agricultural Extension), supported by two Assistant Director Generals, monitors and reviews the progress of KVKs (at present numbering 723) through ATARIs. Earlier, there were eight ATARIs (Ludhiana, Kolkata, Barapani, Kanpur, Hyderabad, Jodhpur, Jabalpur and Bengaluru). Considering more number of KVKs and intricate monitoring/coordination mechanism, three additional ATARIs (Pune, Guwahati and Patna) were established in 2015 which became operational in 2017. Historically, what was started as Zonal Coordinating Units in 1979 at 8 locations were upgraded as Zonal Project Directorate and further elevated as ATARI in 2015. Besides monitoring of KVKs, ATARI was mandated for research in extension.

Mandate of ATARI

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

Objectives of ATARI

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

Activities of ATARI

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

Krishi Vigyan Kendras (KVK)

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

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

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.

1.2 Growth and Development of KVKs in Zone

In Maharashtra, the beginning of KVKs was marked in 1976 at Wardha and Thane districts. Simultaneously, in 1976, KVKs were also established in Dahod and Banaskantha districts of Gujarat. Till date, 81 KVKs have been established, of which 49 are in Maharashtra, 30 in Gujarat and 2 in Goa. Status of Krishi Vigyan Kendras under different institutions (Table 1.1) and host organizations is given in Table 1.2.

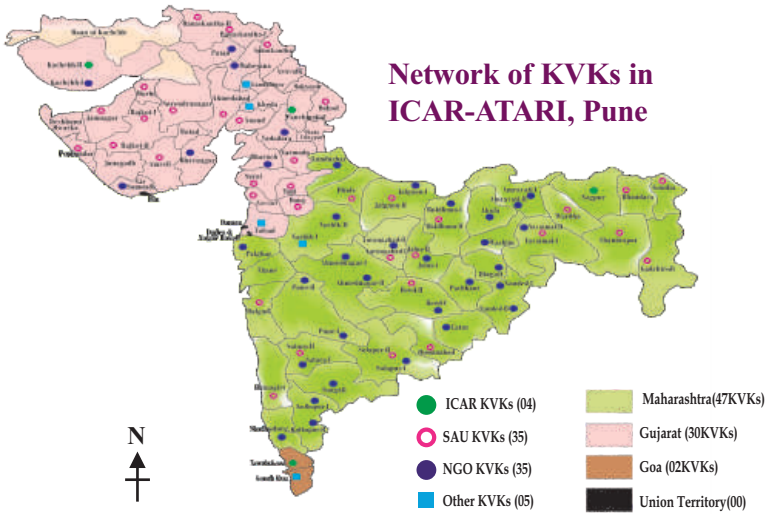


Table 1.1: Status of KVKs under different host organizations in Maharashtra, Gujarat and Goa

States	SAUs	Host Organizations					Total
		NGOs	ICAR	DUs	OUs	SDA	
Maharashtra	19	28	01		01	00	49
Gujarat	18	07	02	03		00	30
Goa	-	-	01			01	02
Total	**37**	**35**	**04**	**03**	**01**	**01**	**81**

SAUs= State Agricultural Universities, NGOs=Non-governmental organizations, ICAR=Indian Council of Agricultureal Research, DUs=Deemed Universities, OUs=Other Universities, SDA=State Developmenal Agency

Table 1.2: Host Organization wise KVKs

S. No.	KVKs	Year of Sanction & Host Organization	S. No.	KVKs	Year of Sanction & Host Organization
Maharashtra					
PDKV, Akola					
1.	Wardha	1976-SAU	2.	Chandrapur	1999-SAU
3.	Bhandara	2002-SAU	4.	Gadchiroli	2004-SAU
5.	Gondia	2004-SAU	6.	Yavatmal-I	2004-SAU
7.	Buldhana-II	2010-SAU			
VNMKV, Parbhani					
8.	Aurangabad-I	1983-SAU	9.	Osmanabad	2004-SAU
10.	Beed-II	2010-SAU	11.	Jalna-II*	2018-SAU
MPKV, Rahuri					
12.	Dhule	1983-SAU	13.	Jalgaon-II	2010-SAU
14.	Satara-II	2010-SAU	15.	Solapur-II	2011-SAU
BSKKV, Dapoli					
16.	Ratnagiri	1983-SAU	17.	Raigad	2004-SAU
Rural Development & Research Foundation, Akola			**Grammonnati Mandal, Pune**		
18.	Akola	2010-NGO	19.	Pune-II	2010-NGO
Manjara Charitable Trust, Latur			**Saint Namdeo Sevabhavi Sanstha, Hingoli**		
20.	Latur	2005-NGO	21.	Hingoli	2002-NGO
Dr. Hedgewar SevaSamiti, Nandurbar			**Sharam Safayalya Foundation, Amaravati**		
22.	Nandurbar	2002-NGO	23.	Amravati-I	1995-NGO
Sharam Sadhana Trust, Amaravati			**Sindhudurg Zila Krishi Pratishthan, Sindhudurg**		
24.	Amaravati-II	1995-NGO	25.	Sindhudurg	1995-NGO
YCMOU, Nashik			**Jeevan Jyoti Charitable Trust, Parbhani**		
26.	Nashik-I	1994-YCMOU	27.	Parbhani	1994-NGO
D.Y. Patil Education Society, Kolhapur			**Satpuda Edn. Society Jalgaon, Jamod, Buldhana**		
28.	Kolhapur-I	1994-NGO	29.	Buldhana-I	1994-NGO
J.N. Instt. of Edn. Sci. & Tech. Research, Pokharni, Nanded			**Shabari Krishipratishtan, Solapur**		
30.	Nanded-I	1994-NGO	31.	Solapur-I	1994-NGO
SUVIDE Foundation, Washim			**DRI, New Delhi**		
32.	Washim	1994-NGO	33.	Beed-I	1992-NGO
Kalyani Gorakshan Trust, Pune			**Agril. Development Trust, Baramati, Pune**		
34.	Satara-I	1992-NGO	35.	Pune-I	1992-NGO
Pravara Instt. of Res. & Edn. in Natural & Soc. Sci., Ahmednagar			**Vasant Prakash Vikas Pratisthan, Sangli**		
36.	Ahmednagar-I	1992-NGO	37.	Sangli-I	1992-NGO

S. No.	KVKs	Year of Sanction & Host Organization	S. No.	KVKs	Year of Sanction & Host Organization
Marathwada Shethi Sahaya Mandal, Jalna			**SatpudaVikas Mandal PO Pal, Jalgaon**		
38.	Jalna-I	1992–NGO	39.	Jalgaon-I	1984-NGO
Gokhle Edn. Society, Nashik			**Rich Field Agro-e-Research & Development Centre, Nashik**		
40.	Thane	1976-NGO	41.	Nashik	2011-NGO
Mahatma Gandhi Mission, Aurangabad			**Sanskriti Samvardhan Mandal, Sagroli, Nanded**		
42.	Aurangabad-II	2011-NGO	43.	Nanded-II	2011-NGO
Shri Marutrao Ghule Patil Shikshan Sanstha, Newasa, Ahmednagar			**Navsanjivan Shikshan Prasarak Mandal, Yavatmal**		
44.	Ahmednagar-II	2011-NGO	45.	*Yavatmal-II	2016-NGO
Shri Sidhagiri Math, Kolhapur			**ICAR-CICR, Nagpur**		
46.	*Kolhapur-II	2018-NGO	47.	Nagpur-I	1994 -ICAR-CICR
48.	Nagpur-II*	2018-MAFSU	49.	*Sangli-II	2018-MAFSU
Gujarat					
NAU, Navsari					
1.	Dang	1985-SAU	2.	Tapi	2004-SAU
3.	Narmada	2006-SAU	4.	Navsari	2006-SAU
5.	Surat	2011-SAU			
JAU, Juanagadh					
6.	Jamnagar	2004-SAU	7.	Amreli	2004-SAU
8.	Rajkot-I	2004-SAU	9.	Surendranagar	2005-SAU
10.	Porbandar	2004-SAU	11.	Rajkot-II	2012-SAU
12.	**Morbi	2016-SAU			
AAU, Anand					
13.	Dahod	1976-SAU	14.	Anand	1985-SAU
15.	Ahmedabad	2004-SAU			
SDAU, SK Nagar					
16.	Banaskantha-I	1976-SAU	17.	Sabarkantha	2004-SAU
18.	**Banaskantha-II	2015-SAU			
DU, Gujarat Vidyapith, Ahmedabad					
19.	Gandhinagar	1977-DU	20.	Valsad	1992-DU
21.	Kheda	2005-DU			
ICAR-CIAH, Bikaner			**ICAR-CAZRI, Jodhpur**		
22.	Panchmahal	2005-ICAR-CIAH	23.	Kutch-II	2010-ICAR-CAZRI
Lokbharati Gramvidyapith Trust, Bhavnagar			**Ambuja Cement Foundation, New Delhi**		
24.	Bhavnagar	2009-NGO	25.	Junagadh	2007-NGO

S. No.	KVKs	Year of Sanction & Host Organization	S. No.	KVKs	Year of Sanction & Host Organization
Mehsana District Education Foundation, Mehsana			**Bhartiya Agro Industries Foundation, Baroda**		
26.	Mehsana	2005-NGO	27.	Bharuch	1994-NGO
Mangal Bharti Bahadurpur, Baroda			**Saraswati Gram Vidyapith Samoda-Garwada, Patan**		
28.	Vadodara	1994-NGO	29.	Patan	1992-NGO
Rural Agro. Research & Development Society, Mumbai					
30.	Kutch-I	1992-NGO			
Goa					
State Government, Goa			**ICAR-CCARI, Goa**		
1.	South Goa	2004 -State Govt.	2.	North Goa	1984-ICAR-CCARI

*Jalna-II, Nagpur-II, Sangli-II, Yavatmal-II, Kolhapur-II of Maharashtra and **Morbi, Banaskantha-II of Gujarat have been established within the period of less than 5 years and they have not been reviewed.

Staff position in Maharashtra, Gujarat and Goa states till 2018-19 is given in Table 1.3.

Table 1.3: Status of staff position of KVKs as on 31 March, 2019

State/ Host Institute	SS & H		SMS		Programme Assistant		Asstt		Steno		Driver		SSS		Total	
	S	V	S	V	S	V	S	V	S	V	S	V	S	V	S	V
Maharashtra																
PDKV, Akola (7)	7	2	42	9	21	8	7	1	7	3	14	2	14	1	112	29
VNMKV, Parbhani (3)	3	2	18	4	9	9	3	1	3	2	6	1	6	2	48	20
MPKV, Rahuri (4)	4	2	24	4	12	2	4	1	4	1	8	2	8	0	64	12
BSKKV, Dapoli (2)	2	0	12	2	6	0	2	0	2	1	4	0	4	0	32	5
NGOs (26)	26	10	156	19	78	8	26	1	26	3	52	7	52	0	416	54
YCMOU (1)	1	0	6	0	3	0	1	1	1	0	2	0	2	0	16	2
ICAR-KVKs (1)	1	1	6	3	3	0	1	0	1	1	2	0	2	2	16	6
Sub Total	**44**	**17**	**264**	**41**	**132**	**27**	**44**	**5**	**44**	**11**	**88**	**12**	**88**	**5**	**704**	**128**
Gujarat																
NAU, Navsari (5)	5	0	30	3	15	5	5	1	5	4	10	7	10	7	80	32
JAU, Junagadh (6)	6	2	36	12	18	0	6	1	6	3	12	11	12	7	96	38
AAU, Anand (3)	3	0	18	4	9	4	3	1	3	2	6	4	6	5	48	23

State/ Host Institute	SS & H		SMS		Programme Assistant		Asstt		Steno		Driver		SSS		Total	
	S	V	S	V	S	V	S	V	S	V	S	V	S	V	S	V
SDAU, SK Nagar (2)	2	0	12	4	6	1	2	0	2	1	4	1	4	1	32	10
NGOs (7)	7	1	42	4	21	4	7	0	7	2	14	3	14	-1	112	18
ICAR-KVKs (2)	2	1	12	4	6	1	2	0	2	1	4	0	4	3	32	10
DUs KVKs (3)	3	0	18	3	9	3	3	0	3	0	6	0	6	0	48	9
Sub Total	**28**	**4**	**168**	**34**	**84**	**18**	**28**	**3**	**28**	**13**	**56**	**26**	**56**	**22**	**448**	**140**
Goa																
ICAR KVKs (1)	1	1	6	2	3	1	1	0	1	0	2	0	2	0	16	3
SDA KVKs (1)	1	1	6	3	3	2	1	1	1	0	2	0	2	2	16	8
Sub Total	**2**	**2**	**12**	**5**	**6**	**3**	**2**	**1**	**2**	**0**	**4**	**0**	**4**	**2**	**32**	**11**
Total	**74**	**23**	**444**	**80**	**222**	**48**	**74**	**9**	**74**	**24**	**148**	**38**	**148**	**29**	**1184**	**279**

Districts with two KVKs: In Maharashtra, 16 districts (Amravati, Ahmednagar, Pune, Nashik, Aurangabad, Buldhana, Nanded, Beed, Yavatmal, Solapur, Jalgaon, Satara, Jalna, Sangli, Nagpur and Kolhapur) and Gujarat, 3 districts (Banaskantha, Kutch and Rajkot) are having two KVKs.

1.3 Genesis of Quinquennial Reviews

The ICAR has an in-built mechanism for monitoring and external evaluation of its establishments after every five years. The review is essential for monitoring the progress of activities and their relevance and providing feedback to the ICAR for taking steps for fulfilment of the mission and achievement of the goals of the institute/project/KVK supported by it. For effective monitoring of KVKs, ICAR has constituted QRT exclusively for ATARI, Zone-VIII (vide F.No. A.Extn.9/19/2019 dated 19 June, 2019 for the period 2011-12 to 2018-19). ATARI, Zone-VIII is situated in Pune and it covers Maharashtra, Gujarat and Goa states.

1.4 Methodology for Reviewing

1.4.1 Initial Meeting with DDG (Agril Extension)

The first meeting of the QRT Chairmen was held on 4th September 2019 at ICAR HQ under the chairmanship of DDG (Agril. Extension), which was also attended by the ADGs, Member Secretaries and ATARI Directors. The

DDG briefed the meeting with the KVK concept and elaborated the guidelines and the terms of reference. Subsequently, the QRT met at Zone VIII, ATARI, Pune on 23 September 2019, wherein Director ATARI made a presentation regarding the background information, brief achievements, and issues & constraints. The visits to KVKs so as to represent different agro ecosystems and host organizations were finalized.

1.5 Brief Achievements of ATARI

Capacity Building/Technological Backstopping: Need based trainings were organized to build the capacity and ensure technological backstopping of experts and staff.

- Orientation of home science experts at KVK Jalna on 27-29 November 2017. A Total of 30 SMSs (Home Science) from 30 KVKs of Maharashtra participated.
- Farming System for Nutrition Approach for 11 KVKs of Maharashtra and 2 of Gujarat organized at KVK Narayangaon on 24 April 2018.
- Sensitization workshop on 'Preparation and Dissemination of Agromet Advisories at Block Level' was organized at KVK Aurangabad during 6-7 July 2018.
- Preparation and Dissemination of Agromet Advisories for SMS (Agromet) and Observers' organized at ICAR-NRCP, Solapur from 19-24 August 2019. A total of 39 KVKs including that of Karnataka and Kerala participated.
- Advances in Horticultural Technologies' for 31 KVKs of Maharashtra and Gujarat organized at IIHR, Bengaluru from 4-6 July 2019.
- Six hands-on trainings on PFMS conducted separately at the Zone.

Monitoring and Review

- Two Annual Zonal Workshops of KVKs were organized (MPKV, Rahuri from 5-7 May, 2018 and ICAR-CCARI, Goa from 14-16, June 2019) for reviewing the progress of KVKs.
- Three State Level Annual Action Plan Workshops of KVKs were organized for Maharashtra and Goa at MPKV, Rahuri from 5-7, May 2018 and KVK Baramati during 15-16, March 2019. For Gujarat at NAU, Navsari during 1-2, March 2019 and Gujarat Vidyapith, Ahmedabad during 13-14, February 2020.
- Review Workshops on CFLDs on Oilseeds and Pulses were held at KVK Solapur-I from 16-18, January 2018; BSKKV, Dapoli from 24-25 November 2018; KVK Kolhapur-I during 10-11, December 2019 for the state of Maharashtra. In Gujarat, NAU Navsari from 29-31, January 2018; KVK Bhavnagar, Gujarat Vidyapith, Ahmedabad were the venues for the workshops on different dates.
- Three Annual Action Plan and Review Workshops for NICRA-KVKs at Baramati (3 July 2017); KVK Jalna on 10-11 September 2018 and KVK Ahmednagar-I (02-03, January 2020).
- Five Review Workshops on Farmer FIRST at Navsari, Dapoli, Bengaluru during 29-31, January 2018; BSKKV, Dapoli during 24-25, December 2018; ATARI, Bengaluru, Ahmednagar-I were organized.
- Lastly, Review Workshop on ARYA at NAU, Navsari on 31 January, 2018 and KVK, Kolhapur-I on 12 December, 2019 were organized.

Farm Innovators Meet: Focus has been given to identify and document farm innovations through innovative farmers meets. Three such Farm Innovators Meets were organized and titled as 'Farm Level Stress and Farmers Innovations for prosperous agriculture'. These innovators meets were held at Baramati, Pune and Kolhapur-II in the Zone.

Zonal Monitoring Committee (ZMC) critically reviewed NICRA interventions at KVKs Nandurbar and Ahmednagar during 8-10, January 2019 and KVK Baramati on 9 March, 2019.

First Institute Management Committee (IMC) was organized on 28 January, 2019.

Interface Meeting on Jal Shakti Abhiyan organized at DOGR, Pune on 22 August, 2019 where ICAR Institutes, SAUs, Line Departments, NGOs and KVKs attended the event.

Special Programmes: Sankalp Se Siddhi, Swachhata Hi Sewa, Swachhata Pakhwada, Krishi Kalyan Abhiyan, PM Kisan Samman Nidhi Program, World Soil Day, Jal Shakti Abhiyan, National Animal Disease Control Program for FMD and Brucellosis and Artificial Insemination, Tree Plantation programme, Fertilizer Awareness Program were organized by 81 KVKs across the Zone.

Review of KVKs by Union Minister: 8 Ministers visited 13 KVKs of Maharashtra, Gujarat and Goa and were appreciative of the activities of KVKs.

Awards and Recognition (hand-holding of KVK)

- Zonal Best Award 'Pandit Deendayal Upadhyay Rashtriya Krishi Vigyan Protsahan Puraskar' was conferred to KVK Thane (2016); KVK Tapi (2017) and KVK Nandurbar (2018) by ICAR, New Delhi.
- Jagjivan Ram Abhinav Kisan Puraskar' was received by Smt. Sunandabai Madanrao Shinde, Parbhani (Maharashtra) for 2016; Shri Dhirendra Kumar Bhanubhai Desai, Bharuch (Gujarat) of 2017; and Shri Samir Mohanrao Dombe from Pune (Maharashtra) for the year 2018, conferred by the ICAR, New Delhi.
- Pandit Deen Dayal Upadhyay Antyodaya Krishi Puruskar' was given for the year 2017 to Mrs. N.S. Chaudhari, Surat, Gujarat and Smt Vasav Ushaben Dineshbhai from Narmada (Gujarat) for the year 2018, awarded by the ICAR, New Delhi.
- N.G. Ranga Farmer Award for Diversified Agriculture-2018 was awarded to Shri UdhavAsaram Khedekar from Jalna (Maharashtra).

Publication

- Inaugural Issue of ATARI News - 2019
- ATARI Annual Report 2017-18 and 2018-19
- Book on Managing Farm Level Stress
- Bulletin on Performance of CFLDs on Pulses in Maharashtra and Gujarat
- Bulletin on Cluster Frontline Demonstrations on Oilseeds through KVKs in Maharashtra and Gujarat
- Three book chapters, 6 research papers, 6 lead papers and 7 seminar papers were published at ATARI level
- Website of ATARI Pune with URL- http://ataripune.icar.gov.in was launched by the DDG (Agril. Extn), ICAR

Vacant Posts at KVKs Filled up

- Scrutinized the applications (numbering 5144) for different positions for 74 posts of NGO KVKs.
- Sixty-one posts of 19 NGO-KVKs were filled up.
- Thirteen Heads of KVKs; 34 SMSs; 6 Programme Assistants; Four Drivers; 3 Stenographer; 1 Skill Supporting Staff joined at different KVKs.
- Fifteen SRF, DEOs and YP-II engaged in ATARI.
- Two new KVKs Kolhapur-II and Jalna-II commenced their operations as new establishment.
- Head and SMSs of KVK Kolhapur-II were recruited.

Sponsored Projects

- Farmer FIRST Project

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

Collaborative Programmes

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

Entrepreneurship Development

- Special training on Floriculture Entrepreneurs and SMS (Horticulture) at KVK, Baramati
- Training on Master Trainers in Entrepreneurship for SMS (Agril Extension) at KVK, Pune-II
- Capacity Building of SMS (Home Science) across the zone for empowering and changing role for enterprises development
- Value addition to poor quality silk worm cocoon
- Integrated effort for managing pink bollworm in cotton and fall army worm in maize in convergence mode
- Facilitating FPOs/FPCs and linking them with market
- Focus on doubling farmers' income and farming system nutrition

Overall Assessment

ICAR-ATARI, Zone-VIII, Pune is one of the three newly established ATARIs and started functioning from 3rd April, 2017. As of now this Institute is monitoring 81 KVKs, of which 74 are under review. During the review period 2011-12 to 2018-19, the existence of ATARI is only for two years. So far as manpower of this duration is concerned, only the Director was posted. The strengthening of scientific and technical manpower at ATARI will enhance its capacity to address researchable issues, for which it is mandated. The Administrative and Finance Officers were on-charge. Assistance of contractual staff was utilised. The office of ATARI was temporarily housed in College building. In spite of these constraints this Institute carried out its mandated activities most efficiently, effectively and meticulously. In a short span of time ATARI has done a commendable job in monitoring, hand holding, mentoring of KVKs, and implementing Govt. sponsored schemes, programmes and activities.

1.5.1 Review/Travel Workshops

In all, 19 KVKs were visited by the Team. Travel workshop programme details are given in Annexure-I. The QRT interacted with Senior Scientists & Heads of KVKs, DEEs and Vice-Chancellors of State Agricultural Universities and NGO-KVK Heads (Table 1.4 and Table 1.5). Line department officials were also attended.

Table 1.4: Review of KVKs during travel workshops

S.No.	Date	Venue	State	KVKs Participated
1.	24-25, September 2019	KVK Baramati (Pune-I)	Maharashtra	**12 KVKs:** Pune-I, Solapur-II, Nandurbar, Ahmednagar-I, Satara-II, Nashik-II, Sangli, Kolhapur-I, Solapur-I, Pune-II, Dhule, Satara-I
2.	26-27, September 2019	KVK Aurangabad-I	Maharashtra	**12 KVKs:** Jalna-I, Aurangabad-I, Beed-I, Beed-II, Nashik-I, Ahmednagar-II, Latur, Jalgaon-II, Osmanabad, Aurangabad-II, Jalgaon-I, Parbhani
3.	18, November 2019	PDKV Akola	Maharashtra	**16 KVKs:** Wardha, Gondia, Hingoli, Chandrapur, Amravati-II, Buldhana-I, Buldhana-II, Nagpur, Akola, Nanded-I, Yavatmal-I, Nanded-II, Gadchiroli, Bhandara, Washim, Amravati-I
4.	25, November 2019	AAU Anand	Gujarat and Goa	**20 KVKs:** Dahod, Vadodara, Kheda, Panchmahal, Anand, Ahmedabad, Tapi, Surat, Thane, Navsari, Valsad, Ratnagiri, Raigad, Sindhudurg, Dang, Patan, Gandhinagar, Mehsana, North Goa, South Goa
5.	19, December 2019	JAU Junagadh	Gujarat	**14 KVKs:** Bhavnagar, Rajkot I, Rajkot II, Jamnagar, Porbandar, Amreli, Junagadh, Surendrangar, Banaskantha I, Bharuch, Sabarkantha, Kutch I, Kutch II, Narmada
6.	3-8, March 2020	KVK North Goa	Goa	**02 KVKs**: North Goa, South Goa and Report Writing

Table 1.5: Interaction of QRT with heads of host institutions

S.No.	Date	Venue	State	Institutions/KVKs
1	23, September 2019	KVK Narayangaon (Pune-II)	Maharashtra	Chairman, Gramonnati Mandal, Narayangaon, Pune
2	24, September 2019	KVK Baramati (Pune-I)	Maharashtra	Chairman, Agricultural Development Trust, Baramati
3	25, September 2019	KVK Aurangabad-I	Maharashtra	Vice Chancellor, VNMKV, Parbhani Chairman, Marathwada Sheti Sahayak Mandal (MSSM)-KVK, Jalna-I
4	26, September 2019	KVK Aurangabad-II	Maharashtra	Chairperson, MGM, Aurangabad
5	17, November 2019	KVK Nagpur	Maharashtra	Director, ICAR-CICR, Nagpur
6	17, November 2019	KVK Amravati-II	Maharashtra	Chairman, Sharam Sadhana Trust, Amaravati-II
7	18, November 2019	PDKV Akola	Maharashtra	Vice-Chancellor, PDKV, Akola President, Sharam Safayalya Foundation (KVK, Amaravati-I)

S.No.	Date	Venue	State	Institutions/KVKs
				Secretary, Rural Development and Research Foundation, KVK, Akola Chairman, Satpuda Education Society, Jalgaon, Jamod, Buldhana (KVK, Buldhana-I) Secretary, Navsanjivan Shikshan Prasarak Mandal (KVK, Yavatmal-II)
8	25, November 2019	AAU Anand	Maharashtra, Gujarat and Goa	Vice Chancellor, NAU, Navsari Vice Chancellor, AAU, Anand Chairman, Mangal Bharti Trust, Ahmedabad
9	26, November 2019	KVK Panchmahal	Gujarat	Representative of Director, ICAR-CIAH, Bikaner
10	27, November 2019	KVK Gandhinagar	Gujarat	Vice Chancellor, Gujarat Vidyapeeth, Ahmedabad
11	20, December 2019	KVK Junagadh	Gujarat	Chairman, Ambuja Cement Foundation (KVK, Junagadh)
12	21, December 2019	KVK Porbandar	Gujarat	Vice Chancellor, Junagadh Agricultural University, Junagadh
13	03-05, March 2020	KVK North Goa and KVK South Goa	Goa	Director, ICAR-CCARI, Goa and Director, Agriculture, Goa

1.6 Visit to KVKs

To have first-hand information about infrastructure, demonstration units, laboratories, staff position, instructional farms, linkages and convergence; 19 KVKs (Maharashtra-9, Gujarat-8 and Goa-2) were visited by the Team (Table 1.6). During the visits, interaction with the stakeholders of KVK representing farmers, farm women, youth, entrepreneurs and line department officials was made.

Table 1.6: QRT visits to KVKs

S.No.	Date	Venue	State	KVKs visited
1	23-25, September 2019	KVK Baramati	Maharashtra	Pune-II, Pune-I
2	26-27, September 2019	KVK Aurangabad-I	Maharashtra	Aurangabad-I, Aurangabad-II & Jalna-I

S.No.	Date	Venue	State	KVKs visited
3	17-19, November 2019	PDKV Akola	Maharashtra	Nagpur, Amravati-II, Akola, Wardha
4	25-28, November 2019	AAU Anand	Maharashtra, Gujarat and Goa	Anand, Panchmahal, Ahmedabad & Gandhinagar
5	18-22, December 2019	JAU Junagadh	Gujarat	Rajkot-I, Junagadh, Porbandar & Jamnagar
6	03-05, March 2019	KVK North Goa and KVK South Goa	Goa	ICAR-CCARI, Goa

1.6.1 Finalization and Submission of Report

For preparing draft of report the inputs provided by each QRT Member after thorough analysis was considered for its inclusion. Submission of final report was preceded by two meetings. First meeting of QRT members was conducted on 6-7 March 2020 at Goa in which the report was arranged systematically by incorporating useful suggestions emerged during the discussion. Second meeting could not be held for next more than four months due to COVID 19 Pandemic, which was held in virtual mode on 8-9 August 2020.

2. Identification and Prioritization of Technologies and Interventions by KVKs

2.1 Methodology

To identify and prioritise problems and appropriate interventions, the KVKs took into consideration the following approaches:

- Agro-ecosystem analysis of the representative villages
- Important recommendations of Scientific Advisory Committee (SAC) meetings
- Feedback from end users of technology, line departments, NGOs and other stakeholders, etc.
- Scientist-Farmer interactions
- Exercises on training need assessment
- Specific problems of the particular area
- State and zonal level workshops
- State and national priorities

2.2 Broad Priority Areas Zeroed in on by the KVKs

- Climate resilient technologies in each district for combating the drought/flood/adverse climatic conditions
- *In-situ* moisture conservation, rain water harvesting, ground water recharge and soil & water conservation interventions through integrated watershed management
- Micro irrigation system for enhancing water use efficiency in crop production
- Protected cultivation for raising high value crops
- Agro enterprises for enhancing income of the farmers
- Farm machineries
- Minimizing use of chemicals, pesticides and promotion of bio-pesticides, bio-fertilizers and organic manures for sustainable agriculture
- Introduction of underutilized crops like dragon fruit, custard apple and spirulina crop under dryland condition
- Promotion of appropriate integrated farming system models for small and marginal farmers
- Organic farming in specific pockets/areas and categories of farming in the district
- Encouraging formation of FPOs/FPCs for crop production, processing, value chain management and marketing
- Value addition to specific crop such as sorghum, minor millets, soybean, groundnut, pulses, castor, spices and condiments
- Special focus on the management of fall army worm, pink boll worm and promotion of IPM
- Sericulture for small and marginal farmers for regular income
- Emphasis on peri-urban horticulture
- Inter cropping of short-duration crops to cover the risk
- Soil health management
- Introduction of improved breeds and enhancing productivity through feed, fodder and disease management
- Focus on goatery, piggery and backyard poultry as income generating enterprises
- Focus on primary processing and value addition for horticultural crops/products
- Focus on personalized agro advisory using ICT tools

2.3 Salient Achievements of KVKs

MAHARASHTRA

S.No	KVKs	Significant Achievements
1.	Ahmednagar-I	• Commercialized drumstick PKM-1 variety in dryland and scarcity areas among 1911 farmers and supplied 274.4 kg seed and 0.74 lakh seedlings covering 203 ha area through KVK's nursery. Net average income of Rs. 125800 per ha was realized. • Tested and demonstrated bio-organic slurry application leading to horizontal spread among 3500 farmers in 1200 ha in 35 villages facilitating increase in soil organic carbon status to an extent of 21.1% and saving of Rs 13375 per ha. • Tested, analyzed and extended nutrient diagnostic services by analysing 59662 samples of soil and water. • KVK produced and supplied 82.5 tonnes of biofertilizers among 13921 farmers covering 14791 ha area. • KVK produced 124.9 tonnes of biopesticides for 23912 farmers covering 27773 ha area.
2.	Ahmednagar-II	• Promoted Sustainable Sugarcane Initiative (SSI) in the district. Distribution of > 40 lakh sugarcane seedlings, covering > 1000 farmers covering 1000 acre area resulted in 37% increase in the yield of sugarcane. • Disseminated Broad-Bed and Furrow (BBF) technology for oilseed and pulses covering 1200 farmers covering 4500 acre area in 12 villages in the district. • Demonstration and promotion of silage making in cluster of villages. • ICT application in agriculture was promoted through development of three mobile apps for sugarcane, pomegranate and cotton for large scale technology dissemination.
3.	Amravati-I	• Popularized Chickpea variety JAKI 9218 and Pigeonpea variety PKV-TARA with horizontal expansion on 30000 ha area, benefiting 25000 farmers in the district. • Analysed 72616 soil samples and issued 170795 soil health cards, benefiting 170325 farmers. • Promoted 7 farmers' groups for custom hiring of primary processing machinery in tribal area and encouraged 5 farmers to start pulse processing units (PDKV mini dal mill).
4.	Aurangabad-II	• Sericulture units have been developed by 21 farmers in 5 villages of the district after attending skill-based training at the KVK. • Popularized Pigeonpea (BDN-711 and BSMR-853) through cluster frontline demonstrations covering 234 farmers of 9 villages in the district. • Popularized Chickpea variety Digvijay, JAKI 9218 and BDNG-797 (Aakash) through CFLD with horizontal expansion in 9 villages covering 96 ha area, benefiting 356 farmers in the district.
5.	Aurangabad-I	• Popularized short duration variety of pigeonpea (BDN 711), benefitting 683 villages in the district covering 6839 ha area, as it escape terminal drought and resistant to wilt and sterility mosaic disease and also early maturity. On an average, it increased 25% yield.

S.No	KVKs	Significant Achievements
		• Horizontal expansion of vermi-composting for the production of organic manure through establishment of 60 vermi-composting units among farmers. • Developed 76 agro-based enterprises including 58 under livestock and 18 for agro processing entrepreneurs. • Popularized improved variety of green fodder 'Gunwant' covering 60% of the fodder area in the district.
6.	Beed-I	• Soybean cultivation of variety MAUS-162 was promoted in 20 villages, covering 652 ha area involving 1725 farmers under the jurisdiction of the KVK. About 70% area is covered under this variety, replacing existing JS-335 variety. • Popularized use of soybean mitten during harvesting through 100 demonstrations for drudgery reduction. 163 women labourers have started using soybean mitten. • Popularized wheat variety NIAW-1994 (Samadhan) with adoption of INM including Azotobacter, Trichoderma and PSB + fungicides for seed treatment. It was adopted by > 500 farmers of 7 villages covering 100 ha area.
7.	Buldhana-I	• Promoted custard apple farming by capacity building of 2500 farmers and distribution of 1.75 lakh saplings to the farmers. Area under custard apple has increased up to 1900 ha. • BBF technology was promoted for soybean, chickpea and summer groundnut through need based trainings, frontline demonstrations and other extension activities. Area under BBF technology increased from 12 ha (year 2012) to 15419 ha in 2018-19. • Eleven rural youth have started PKV Mini Dal Mill units in the area. • Of the several SHGs established by the KVK, 4 started processing of Aonla, Mango, Lime, Chili, Wood Apple Pickles and other products and 3 in processing and value addition of Safed Musli and Turmeric. • Distributed 102350 Soil Health Cards to the farmers belonging to 427 villages in the district.
8.	Chandrapur	• Mass-scale use of SRI method of paddy in buffer zone area and distribution of early age paddy seedlings for transplanting. • Enterprises-based skill-oriented trainings were organized for rural youth involving 600 participants. Goat rearing units (10), poultry units (12) and mushroom units (20) were established for earning additional income.
9.	Dhule	• Integrated crop management in cotton was promoted through 300 frontline demonstrations with increase in yield from 20.00 q/ha to 24.19 q/ha. Horizontal spread was taken up to 3000 farmers, covering 1200 ha area in 53 villages. • Management of cotton pink boll worm was done through frontline demonstrations on 280 ha area during 2012-2018. The demonstrations helped for expanding technology on 5809 ha area in 136 villages covering 7165 farmers. Infestation of pink bollworm reduced from 97.25 % (248000 ha) to 2.79 % (6000 ha).
10.	Gadchiroli	• Pearl culture initiated and 6 units were developed. Training courses for its promotion were organized. • Patent on value addition on Jamun mouth freshner has been filed. • Established 24 Custom Hiring Centres for SHGs and FPOs for funding by Human Development Mission, Gadchiroli.

S.No	KVKs	Significant Achievements
		• Promoted Paddy-cum-Fish farming. • Popularized Paddy variety PKV-HMT covering 2250 ha area under SRI paddy cultivation in adopted villages involving 1625 farmers in adopted area.
11.	Gondia	• Promoted Lac Production Technology covering around 4900 farmers in the tribal area for generation of self-employment. • Of the total paddy area of 188800 ha in the district, 66080 ha is covered under the SRI method. • To enhance milk production in Gondia district, KVK demonstrated Azolla production technology and also distributed its culture to farmers. A total of 575 farmers are now producing azolla as a supplementary feed for livestock.
12.	Jalna-I	• Popularised Krishi Vigyan Mandal (KVM) by organizing regular monthly seminars on 5th day of every month. Total 96 seminars were organized without discontinuity during reporting period of QRT, covering about 192 need based topics for the benefit of 20000 farmers across the district. • Introduction and expansion of sericulture as a climate resilient activity covering an area of 1500 acres, benefiting 700 contact farmers. • Adoption of grapes production technology in Kadwanchi watershed village with technical support of KVK on around 500 ha with 400 community farm ponds through convergence for water security. More than 350 families are benefited by getting average income of Rs.3.5 to 4 lakh per year from one acre grapes. • Bamboo farming was popularised on the farmer's fields covering an area of 159 acres of 90 farmers. • Goat and poultry farming was popularised through trainings and demonstrations with small, marginal and landless farmers, women SHGs to have continuous source of earning and ultimately doubling farmers' income. More than 700 families were benefited in the district.
13.	Kolhapur-I	• Conducted sugarcane nursery raising vocational trainings and also supplied > 315438 sugarcane seedling of new varieties. • In total 650 sugarcane nurseries were developed with active support of KVK and line department officials. • Promoted dairy farming in the district with the result 450 farmers have adopted this venture. Minimized infertility problem in milking animals by creating awareness through animal health camps. Provided area specific mineral mixture, for higher milk production and silage production. • Management of white grub in sugarcane by bio-pesticides was promoted in 19 villages, benefiting 6176 farmers covering 2820 ha. • Focus on soil health was given and tested 10230 soil samples and distributed 55942 soil health cards to the farmers.
14.	Latur	• Popularized improved poultry breeds Vanaraja and Grampriya in the district, benefitted 472 farm families covering 197 villages in the district. • Tested, refined and popularised CRIDA 03 row bullock drawn planter and CRIDA 4/5/6 row tractor drawn planter for saving seed cost and increasing crop yield. 700 Farmers adopted the technology and using it successfully in the district. • Popularized improved soybean varieties MAUS-162, MAUS-158, MACS-1188, DS-228 by undertaking seed production programme and supplying 1711 q quality seed to 3200 farmers in the district.

S.No	KVKs	Significant Achievements
		• Promoted Mini Dal Mill technology through training and method demonstration to 240 rural youth and SHGs resulting in establishment of 11 mini dal mills by women and rural youth. • Popularized Liquid Bio-fertilizer technology by supplying 5480 liters of different bio fertilizers and bio pesticides through horizontal expansion covering 85 villages and benefiting 1525 farmers in the district.
15.	Nagpur	• Popularized pigeonpea variety PKV-TARA, chickpea variety JAKI-9218 and Digvijay with horizontal spread, covering 1532 ha area benefiting 3465 farmers. • Promoted Insecticide Resistance Management (IRM) strategies for effective management of Pink Bollworm in cotton through several extension activities covering 80 villages and involvement of 9150 cotton growers. • Popularized cotton picking bags through 8 SHG's covering 978 farmers in the district. • Osmanabadi goat rearing was promoted, resulting in establishment of 9 SHGs and 216 goat units in 139 villages. Popularized Swarnadhara & Giriraja breed of poultry among 96 tribal women in the district. • Perennial Hybrid Napier production technology was popularized in the district through trainings, demonstrations and farmers fairs covering 176 farmers. • Horizontal spread of drudgery reduction by introduction of Gujarat Sickle among farm women, covering 671 farm women in 39 villages in the district.
16.	Nanded-I	• Introduced and popularized variety of Tomato 'Arka Rakshak', triple disease resistant developed by IIHR Bengaluru in 40 ha. • Introduced new variety of turmeric PTS-10, ACS-48 (IISR-Pragati) and Rajendra Sonia and distributed planting material among 250 farmers covering 35 ha area. • Popularized use of neem based pesticides and provided to 5054 farmers of the district. • Analyzed 20693 soil samples and distributed to 38187 farmers.
17.	Nanded-II	• Popularized soybean harvesting mittens among farm women thorough demonstration and training. Two Self Help Groups are preparing and selling the mittens. Till date 3250 mittens have been sold and adopted by 158 farm women members of the SHGs. • Provided 2213729 Napier fodder stumps of Jaywant, Yashwant and DHN-6 to 2767 farmers in the district through convergence with support of animal husbandry department. • In total, 40969 soil and water samples were tested and soil health card issued. • Custom hiring centres for small and marginal farmers at Sagroli and Atkali village were established. Total 1380 farmers were benefited since 2014.
18.	Nandurbar	• Popularized 'Raised bed technology' for Papaya and Chilli farming with convergence of 70% area of Papaya and 60% in Chilli area in Nandurbar district. • Designed and developed 'Mogi-Improved wheel hoe' and popularized among the farming community. A total of 1250 farmers from 31 districts, 67 tehsils and 140 villages of Maharashtra and 4 other states purchased it. • Horizontal expansion of vermi composting and NADEP for composting of organic manure through establishment of 14 vermi composting units by 7 SHGs and 120 farmers and 200 NADEP pits in 20 villages of the district.

S.No	KVKs	Significant Achievements
		• Initiated the concept 'Profitable backyard poultry with 25 days brooded and vaccinated chicks' that mobilized 247 families to start small-scale poultry farming in the district. • Twenty five Self-Help Groups took up quality onion seed production that helped in employment generation.
19.	Nashik-I	• Produced and made available improved varieties of soybean through seed village concept on 109 ha area in village Moh, Taluka Sinner. A total of 959 q of soybean seed was produced through this concept with horizontal spread to 196 farmers covering an area of 1278 ha in the district. • KVK Nashik in its horticulture nursery produced 505281 grafts of various fruit crops viz. mango, guava, sapota, jackfruit, coconut etc. and supplied to 6484 farmers covering approximately 3600 ha area in the district. • Established brooding unit for poultry at KVK for supplying vaccinated chicks to tribal farmers for the promotion of backyard poultry. Supplied 42500 birds of Giriraja breed to 950 farmers, covering 45 villages in the district. • Established bio-control laboratory, produced and supplied 4228 kg bio-agents to 2275 farmers in order to promote IPM concept and organic farming in the district. • Organized 44 vocational trainings in horticulture for 1004 rural youth. Trainees established 10 fruits and vegetables nurseries in the district and supplied vegetable sapling and fruit grafts on a mass scale. • Trained field service grafting contingent for *in-situ* grafting in grapes. Trained 12 groups covering 68 youth, catering to 45 villages covering 550 farmers and 1100 ha area in the district.
20.	Nashik-II	• Popularized chickpea variety Digvijay with horizontal expansion through Cluster Frontline Demonstrations, covering 312 ha area benefiting 738 farmers in the district. • Promoted onion variety Phule Samarth with horizontal expansion, covering 385 ha area benefiting 635 farmers in the district. Promoted storage of onion technology with sulphur for improving storage & bulb yield through demonstrations, covering 320 ha area benefiting 712 farmers in the district. • Horizontal spread of mass trapping of Pheromone Traps for management of Pink boll worm on 27 ha.
21.	Osmanabad	• A special programme was conducted by KVK during 2015-16 i.e. Baliraja Chetana Abhiyan with financial support of Rs. 17.17 lakhs from the District Collector. Main objective of the Abhiyan was to prevent the farmer's suicide in the district. Counseling programmes were conducted in 49 villages of 7 talukas for the benefit of 4107 farmers. A total of 18 skill oriented trainings were conducted in the district covering 450 beneficiaries. • Under the technical guidance of KVK, 120 farmers established poultry units, 12 farmers Goat units, two farm women SHGs Mini Dal Mill units, 40 farmers vermi composting units as a business enterprise for generating additional income for their families. • Popularized low cost fruit-fly traps in guava, ber, sapota and mango. Prepared low cost fruit-fly traps and sold near about 500 traps to the farmers in the district
22.	Parbhani	• Popularised inter-cropping of greengram/soybean in wide row spacing (5'x1') with cotton benefited 2080 participants. Presently more than 40,000 ha area is under this technology.

S.No	KVKs	Significant Achievements
		• Introduced and popularised high yielding variety of drumstick Bhagyya (KDM-1). The farmers provided seed and seedlings by the KVK were able to reap monetary benefit from Rs 2,50,000 to Rs 3,30,000 per ha with average yield 250 q/ha. • Promoted azolla as a supplementary feed to buffaloes, increasee in milk yield by 15 to 20 % (net gain of 1.23 litre/day milk) and helped in replacement of 20 % of the oilcakes from regular feed. • Introduced new high yielding variety of onion, Bhima Shakti which is suitable for late kharif as well as rabi seasons. This intervention has provided higher net income of Rs. 2, 28,000/- per ha to the farmers. • In order to reduce drudgery, soybean mittens were introduced involving 460 farm women in the district which helped 45 to 60% reduction in the drudgery. Presently 1500 women entrepreneurs from 12 villages have started using mittens and 57 entrepreneurs have developed mitten stitching units in the area.
23.	Pune-I	• With the implementation of NICRA project in dry land village of Jalgaon KP, all the check dams have been filled with water and that recharged 86 open wells in the village with a rise in water level by 7 to 10 feet. • NDP-I, Fodder Development Programme was implemented during 2014 to 2017 in 7 tehsils of Pune district. With the successful demonstration of the Silage making technology, more than 500 farmers have now adopted this technology. • With the introduction of *in-situ* moisture conservation by Compartment bunding activity, about 3225 ha area was brought under this technology in rainfed agro-ecosystem. • The farm ponds constructed in collaboration with state agriculture department are utilized for fish farming activities for which carp fingerlings were provided to the farmers. After 8-9 months rearing, the farmers got an additional profit of more than Rs. 1 lakh/ha. • KVK is providing Kisan Mobile Advisory Services to more than to more than 1.5 lakh farmers. • KVK supplied 112.07 lakh sugarcane settlings covering an area of 883.25 ha.
24.	Pune-II	• Introduction of new rice variety Phule Samruddhi along with Urea Briquette application method with horizontal spread in more than 3400 ha area, benefitted more than 5000 farmers. • Organized annual Global Farmers Fair with participation of more than 1.0 lakh farmers. • Popularized MACS-1188 soybean variety in 480 ha covering 1270 farmers in the district. • Provided 24 units of Mobile Rice mills to 24 SHGs with the external financial assistance. • Provided 11742 litre bio-fertilizers (Azotobacter, PSB, KMB) to 2617 farmers. • Conducted the courses on Agriclinics and Agri. Business Management, following which 207 entrepreneurs started their business.
25.	Raigad	• Popularised paddy variety Karjat-3 with horizontal expansion through 28 FCs and SHGs, benefitting 600 farmers in the district. • Tested and popularised application of KNO_3 for improving fruit shelf-life of mango.

S.No	KVKs	Significant Achievements
		• Promotion of Giriraja poultry bird for backyard rearing among the tribal farm women benefitted 250 tribals. • Demonstration on carp seed production. • Popularised Nagali (ragi) HYV variety (a minor millet) and processing techniques among the tribal community.
26.	Ratnagiri	• The KVK also acted as a district hub for the supply of improved poultry breeds such as Kaveri, Giriraja, Vanraja, Kadaknath to smallholders and PRIs. • KVK has supplied technology products such as vermiculture, azolla, seed & grafts of unique varieties of mango (Var. Alphanso & Kesar), cashew (V-4 & V-7) & coconut (Banavali & Pratap) crops.
27.	Sangli-I	• Popularized farming of turmeric varieties Selum & Phule Swarupa (DTS-222) through horizontal expansion and participation of 12 farmers group, covering 75 ha area and benefiting 125 farmers in the district. • Tested & popularized single eye bud method of propagation of sugarcane for cost reduction through 7 SHGs, covering 250 ha area and benefiting 525 farmers in the district. • Popularized High Density Planting (HDP) technology for mango and guava crops. • Popularized high yielding onion variety Phule Samarth and Bhima Super covering 40 ha area in 150 farmers in the district. • Horizontal expansion of vermi-composting and NADEP composting for the production of organic manure was done. Established fourteen vermi-composting Units for 10 SHGs and 100 farmers and 200 NADEP pits, covering 200 farmers in 10 villages in the district. • Establishment of 37 goatery units for self-employment.
28.	Satara-I	• KVK developed Groundnut dibbler marker for easy sowing of groundnut seed by ICRISAT BBF method and it is being used by 872 farmers in 3 talukas. • KVK promoted whole aonla candy technology. The technology generateded a minimum profit of Rs. 2.5 lakh per year involving women SHGs. • Demonstrated low cost technology for white grub control using castor fermented traps. The technology is adopted in 32 villages. • KVK provided 91723 one-day old vaccinated chicks of improved breeds of Giriraja, Black astrolop, RIR to 966 farmers through which farmers are getting assured income of Rs. 2.0 lakh per year per unit. • Under seed village concept, village Janugadewadi has been adopted and produced quality seed of groundnut. • The KVK tested 26817 soil samples and distributed 2.29 lakh soil health cards.
29.	Satara-II	• KVK endured to diversify the sugarcane crop to floriculture (tuberose) on 42 ha. • Produced 1800 qt. seed from 150 acre of rabi jowar (Phule Suchitra). • Conducted cluster FLDs on Gram during 2015 to 2018 involving 197 beneficiary farmers with average increase in yield by 48% in comparison to district average.
30.	Sindhudurg	• Polythene mulching and drip irrigation in 150 ha watermelon area involving 450 farmers. • Capacity building of 510 women and other sections of the society on processing and value addition of food crops.

S.No	KVKs	Significant Achievements
31.	Solapur-I	• Promoted BDN-711 variety of pigeonpea on over 3000 ha in the Solapur district which benefitted 6150 farmers through cluster frontline demonstrations. On an a average 55% yield improvement was observed. • Popularized drumstick variety KDM-01 (Bhagya) which covered 280 ha involving 450 farmers. • Promoted IPM technology for Okra, which spread to 31 villages covering 119 ha covering 3719 farmers. • Popularized Hybrid varieties Napier Phule Jaywant, DHN-6 and Phule Gunvant on over 540 ha area, involving over 7800 farmers. • Promoted Sorghum processing and value addition units, enabling the women to earn up to Rs. 15,000/- per month. • Promoted use of ICT for agro-advisory services sending 1077 messages to 3.6 lakh farmers. The KVK also advocated the innovative approach of using U-Tube for advisory services.
32.	Thane	• Popularized rice variety Karjat-3 through horizontal expansion in 400 ha area benefitting 1250 farmers. • A total of 260 tribal farmers to the cultivation of sapota and mango. • KVK promoted income generating activity like bee keeping and with its efforts 165 farmers have established units. • In order to ensure the livelihood security of tribal farmers, back-yard poultry introduced involving 2160 families. • Promoted value addition of finger millet among 30 women SHGs, covering 320 women farmers. • Sapota rejuvenation technology was promoted among 500 farmers covering 1460 ha. • Popularized foliar application of fertilizer and low-cost drip irrigation system in Jasmine production among 300 farmers. • For developing waste land, wild date palm production technology was adopted by 200 Farmers and they are realizing up to Rs. 10000 per month.
33.	Yavatmal-I	• Promoted pigeonpea variety PKV-TARA, covering 68000 ha area with 52% adoption rate. BDN-711 was also popularized and cultivated by the farmers on 25000 ha area. • Soybean variety MAUS-158 was promoted which has spread to 58000 ha. • Popularized Chickpea (JAKI-9218), resistant to wilt under rainfed situation, covering 61000 ha with over 60% adoption. • Large scale mulberry cultivation and establishment of Sericulture units increased from 80 ha to 360 ha.
34.	Buldhana-II	• Popularized multi-purpose mittens for harvesting of soybean, chickpea and other crops among farm women in 15 villages. Five women trainee farmers started stitching of mittens. • Popularized PKV-Kranti variety of rabi sorghum among farmers through demonstrations in 148 villages leading to spread over on 855 ha in the district. • Popularized soybean variety MAUS–158 and MAUS–162 that has now covered 45% area in the district. • Promoted pigeonpea (PKV-TARA) and chickpea (JAKI-9218) in 2040 ha and 44434 ha, respectively.

S.No	KVKs	Significant Achievements
35.	Hingoli	• Popularised MAUS 71 variety of soybean (non-shattering) for replacing existing JS-335 variety in 24000 ha (12% area of the district). • Popularized improved production technologies (BBF, drip irrigation, fertigation, rhizome treatment, INM, post-harvest management) in 24500 ha area (70% turmeric area) in Hingoli district. Farmers are getting gross monetary return of up to Rs 4.25 lakh/ha. • Promoted "Kayadhu" Farmer Producer Company in 2014, which is first FPC registered in the district and having 500 members. It has started Goat Farming Unit with 200 Goats and Gir Cow Unit with 30 cows. • Rhizome fly is one of the major pests in turmeric. Recommended technology of placing earthen pots of 200 gm castor seed crush in 1.5 lit of water, which has been adopted in 5 villages for mass trapping of rhizome fly. • Eight sericulture production units were setup by the farmers trained by the KVK whose regular income is about Rs 32000/100 dfl.
36.	Wardha	• Technical support to 15 Farmer Producer Companies and Farmers' Clubs was provided. • Soybean processing and value addition was focused and capacity building programs were organized.
37.	Washim	• Sixty five percent are rearing improved dual Giriraja breed for back-yard poultry. • Promoted fish farming to 165 fish farmers in the area. • *In-situ* moisture conservation technologies including BBF system was promoted among > 900 farmers covering 955 ha area.
38.	Amravati-II	• Enhanced yield from 25 to 36 q/ha through drip system demonstration in cotton. • Introduced new varieties PKV TARA/BDN-716 of pigeonpea as best alternate to local variety, Maroti in dry areas and increased yield up to 15%. • Established 379 agri-ventures and created entrepreneurship through well designed training courses. • About 1000 farmers have adopted different Integrated Farming System models under varied agro-ecology.
39	Akola	• KVK intervened to promote domestic production of bio-pesticide (7 rural youth), turmeric (37 members), vegetable nurseries (11 trainees) and onion production (28 numbers). Promoted Hasta bahar treatment in citrus. • Focus on soil health management was given with testing of 20077 soils samples and distribution of 54280 soil health cards.
40.	Jalgaon-II	• Floriculture was focussed to earn higher income. Frontline demonstrations were conducted on tuberose, rose and marigold. • Promoted micro-irrigation to increase water use efficiency. • Value addition using PKV Dal Mills (9 units) was promoted among rural youth. • Horticulture nursery units (24) were established in the district and employment to the rural youth was created.
41.	Solapur-II	• KVK focussed on skill-oriented trainings on "Seed Processing Worker" & "Dairy Entrepreneurship". • Promoted goatery, sericulture and poultry farmingsamong rural youth.

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S.No.	KVKs	Significant Achievements
1.	Ahmedabad	• Paddy varieties GAR-13 and Mahisagar were promoted with GAR-13. • Durum wheat (GW-1), chickpea (GJG-3 and GG-2) and desi cotton (GADC 1 & GADC 2) were promoted on a larger area.
2.	Amreli	• Popularized groundnut variety GJG-22 through NMOOP programme, covering 550 ha area benefiting 1000 farmers. • Popularized GJG-3 chickpea variety, covering 300 ha area benefitting 525 farmers. • Promoted GW-173 and GW- 496 wheat varieties, adopted by 1500 farmer covering 1000 ha of land. • Pheromone traps were popularized to manage pink boll worm covering 3500 ha benefitting 6522 farmers. • Renovated water harvesting structures under NICRA in 48 ha benefitting 200 farmers.
3.	Anand	• Introduced wheat variety (Cv. GW-366), which was adopted by >800 farmers, covering 25 villages. • Introduced Paddy variety (Cv. GAR-13) which was adopted by >4500 farmers through frontline demonstration in approximately 5500 ha area, covering 240 villages. • IDM &IPM in Chickpea, Carbendazim 50% WP + *Trichoderma viride* for wilt disease & pheromone traps for pod borer has been adopted by > 400 farmers of 80 villages.
4.	Banaskantha-I	• Introduction of pomegranate crop in dry taluka's of Banaskantha district and horizontal spread to around 10,000 ha under drip irrigation. • Promoted mechanized cultivation of potato. • More than 2500 farmers were trained on organic farming, 268 farmer's adopted it and 68 farmers did certification of their farm produce during the reporting period . Established organic outlet “Banaskantha Organic Farmers Producer Company” in Deesa, Banaskantha district as a certified organic grower.
5.	Bhavnagar	• Popularized use of biological inputs like *Beuvaria bassiana*, Trichoderma, neem oil, pheromone traps and waste decomposer, with horizontal spread in >100 villages covering over1000 farmers.

S.No.	KVKs	Significant Achievements
		• Popularized the establishment of nursery units for preparing vegetable seedlings as well as grafts in fruit crops. Provided more than 1.5 lakh vegetable seedlings every year. Within 3 years, with the support of KVK, 7 youth established horticulture nursery for quality planting materials. • Demonstrated and popularized soil salinity tolerant wheat variety KRL -19 in more than 10 villages of the coastal belt of the district, covering around 150 ha of area, which helped the farmers to earn on an average Rs.10000/ha additional income. • Production technology of chickpea variety GJG 3 covering 30 villages was promoted in 250 ha.
6.	Dahod	• KVK made effort to diversify the maize with soybean and as a result the area under the former has increased to 42000 ha. • Kadaknath breed of poultry was introduced and has become increasingly popular as a backyard poultry breed. 700 farmers have adopted this breed. • KVK promoted and made available biofertilizers and biopesticides for use in chickpea by the tribal farmers as a result the technology has been adopted in more than 500 ha.
7.	Gandhinagar	• Mass scale trapping of pink bollworm using 20 Pheromone traps/ha with IPM in cotton and promotion of bio-control agent *T. japonicum* against the paddy stem borer and Entomo pathogenic fungus *M. anisopliae* against paddy BPH. • Large scale adoption of JAKI-9218 cultivar of chickpea under rainfed and irrigated situations. • Popularized castor variety GCH-7 covering 170 ha area with participation of >500 farmers of the district.
8.	Jamnagar	• Under micro irrigation, 33473 ha area has been covered and majority of farmers are aware about drip and sprinkler system in the district. • Focus on use of Beauveria was given and 35936 kg *Beauveria bassiana* (Sawaj Beauveria) was made available by the KVK to the farmers. • Groundnut (GG-20) was promoted in 350000 ha. • Popularized the varieties of groundnut GJG-22, GG-20, GJG-9, GJG-31; sesame G.TIl.-2, 3, 4; chickpea GJG-3 & 5; pearl millet GHB-558 & 932; wheat GW-463 & 451. Coriander was introduced for the first time in this area as a regular crop.
9.	Junagadh	• Popularized wheat variety KRL-19 through front line demonstration among 350 farmers; the variety has been adopted in about 60 per cent area in the district adjoining the coastline. • Promoted use of *Trichoderma harzianum* for control of stem rot in groundnut among 3197 farmers through FLD; about 70 per cent groundnut farmers have adopted the technology. • For the enhancement of the Cotton yield and quality, promoted foliar spray of KNO_3 @ 3% in Bt. cotton among 925 farmers through FLD; about 45 per cent of cotton growers adopted the technology. • Popularized the High-Density Plantation of mango orchard among 325 farmers. • Promotion of shrimp farming (*Litopenaeus vannamei*) among 75 farmers.

S.No.	KVKs	Significant Achievements
		• Formation of 43 Self Help Groups (SHGs) in five talukas of the district with involvement of 517 farm women; the activities undertaken by them were Mango pulp processing, Mitti Tava/bottle making, Handicraft making, Pickle making and other items.
10.	Kutch-I	• Awareness created for rainwater harvesting and efficient use of irrigation water by drip irrigation system. In KVK working area, total 197 check dams, 27 community pond renovation, 97 well recharging structures were developed and 532 ha area covered under drip irrigation system. • KVK, Kutch has become a pioneer organization in high-tech cultivation of Date palm with improved varieties and by elite off shoot varieties, which was spread in 8200 ha area with 4230 farmers. • Introduction of drought tolerant/short duration varieties of different crops such as castor (GCH-2), green gram (GM-4), Til (GT-3), cumin (GC-4) and cluster bean (GG-2) in 46800 ha. • Demonstrated use of yellow sticky traps and Pheromone traps for management of sucking pest and pink bollworm in Bt. Cotton, respectively.
11.	Kutch-II	• Drumstick (PKM-1 and Bhagya) with improved package of practice was promoted covering >300 ha area in the district. • Value addition and development of marketing channel for seeds of spices, pomegranate and date palm.
12.	Mehsana	• Introduced castor variety GCH-7 with application of 20 kg Sulphur per ha. The variety has been adopted in 104 ha area, benefiting 265 farmers. • Popularized mustard variety GDM-4, which has been adopted by 298 farmers. • Neem extract was used for effective pest management involving 4900 farmers of 260 villages. • Popularization of vermi compost production involving 1545 farmers in 110 villages. • Introduction of Fennel variety GF-12 in 125 villages (2300 farmers).
13.	Narmada	• Popularized gram GG-2 & GG-3 improved varieties in 208 villages, covering 140 ha area benefiting 735 farmers. • Popularized cereal crops like paddy GNR-2 & Purna improved variety in 200 villages, covering about 400 ha benefiting 674 farmers. • Promoted pigeonpea, Vaishali & BDN-711 improved varieties in 146 villages, covering around 175 ha benefiting 708 farmers. • Popularized Soybean JS-335 & NRC-37 improved varieties in 50 villages, covering around 145 ha area benefiting 400 farmers. • Promotion of oyster mushroom production technology involving 105 farmers in the Narmada district. • Promoted vermi and NADEP composting in 25 villages covering 800 farmers. About 300 composting units were established.
14.	Panchmahal	• Popularization of raised bed technology for growing healthy vegetable seedlings and its adoption by 65% vegetable growers. • Popularization of chilli (Arka Meghna) involving > 300 farmers. • Introduction of low cost pheromone traps (bottle traps) for the management of fruit fly in cucurbits, covering 23 ha area.

S.No.	KVKs	Significant Achievements
15.	Patan	• Varieties of, castor (GCH-7) on 6300 ha, cumin (GC-4) on about 500 ha, chickpea (GJG-3) on 950 ha area and fennel (GF-12) on 900 ha area, were promoted. • Popularized Kagzi lime in surrounding villages on more than 100 ha. • Adopted and developed Madhupura village as a model village with Micro Irrigation System covering of 85% area as the cultivable land. • Area under Pomegranate farming using micro-irrigation system was expanded to 3092 ha.
16.	Porbandar	• Over 800 farmers adopted adopted IPM technology for the control of pink boll worm in cotton. • Popularized the use of Trichoderma for the control of stem rot in groundnut in 2100 ha, involving 4500 farmers. • Promotion of seaweed cultivation among 100 fishermen for regular income generation. • A nursery of Coconut hybrid (DxT) was established, which produced 5000 coconuts seedlings.
17.	Rajkot-I	• Popularized *Trichoderma harzianum* for the management of stem rot in groundnut. KVK provided Trichoderma culture to about 2000 farmers every year. • Seven rural youth groups were formed covering 75 persons through which mini daal mil units were established. • Entrepreneurship development activities were organized for value addition to different crops like groundnut, sugarcane, milk, spices, and pulses. • Popularized groundnut GJG-22, chickpea GJG-3 and cumin GC-4 and Coriander GJC-2 varieties through FLDs in 50 villages, covering 200 ha area and benefiting 500 farmers.
18.	Tapi	• A total of 4609 farmers of 125 villages adopted Plug-tray nursery for the production of quality planting materials of vegetables. • Popularized pigeonpea variety BSMR 853, chickpea variety GJG-3 and paddy variety GAR-13 on 109 ha, 101 ha and 125 ha area respectively, benefiting 358, 235 and 232 farmers of 53, 50 and 67 villages, respectively. • Large scale introduction of mass trapping devices for fruit fly in mango and vegetables covering 705 farmers in 381 ha. • Promotion of Novel organic liquid nutrient (International patent product of NAU, Navsari) in okra, covering 125 ha in 65 villages benefitting 1220 farmers. • Popularized sex pheromone trap technology in brinjal and yellow sticky traps in vegetables covering 155 ha and 140 ha in 40 and 55 villages benefitting 240 and 450 farmers, respectively. • Expansion of Compound Cattle Feed technology for ration balancing for livestock keepers, By-passing fat for increasing milk production among 2522 farmers of 50 villages.
19.	Vadodara	• Greengram variety Meha (IPM-99-125) was promoted in more than 900 ha area and adopted by more than 1500 farmers. • Popularized pigeonpea variety Vaishali (BSMR-853) in 1500 ha area and its adoption by more than 10000 farmers.

S.No.	KVKs	Significant Achievements
		• Introduced paddy variety GAR-13 covering 5000 ha involving 8000 farmers. • Promoted INM technology in tomato & chilli covering 800 ha and 1500 farmers • Popularized drudgery reduction technologies such as serrated sickle, cotton picking bags, soybean harvesting mitten and milking stool & stand.
20.	Valsad	• Popularized napier grass varieties CO-3, CO-4, covering 117 ha benefitting 4122 farmers. • Popularization of mass trapping of fruit fly through sex pheromone (methyl eugenol) traps in mango and Q-lure traps in vegetable crops covering 1100 ha and 340 ha area, respectively. • Promotion of Oyster mushroom technology through 7 women SHGs, covering 110 tribal women farmers. • Popularized high yielding varieties of sweet potato (C-71), covering 251 farmers in 46 ha area in the district. • Popularized water logging resistant and high yielding varieties of paddy (NTU-1010, GAR-13), covering 450 ha area and more than 6500 farmers in the district.
21.	Bharuch	• Promotion of salt tolerance varieties of wheat KRL-19, KRL-210 and G.Cot-25 of cotton in coastal saline soils of Bharuch district. • Use of Pheromone traps for effective control of pink boll worm in cotton was promoted in 2500 ha area and adopted by 7250 farmers in the district. • Banana pseudo stem sap on yield of cotton and vegetables have been adopted by about 60% farmers for using it as an organic growth promoter in cotton.
22.	Dang	• Low cost polyhouse technology for vegetable nursery was popularized. 10 polyhouses for off-season vegetables production were created in the area. • Emphasis on minor millets cultivation was given. Over 500 ha area was covered with active involvement of about 700 farmers. • Mobile based agro-advisory (3709) was sent to 123497 farmers. 186 relevant messages were shared to reach to unreached farmers. • Pigeonpea (Vaishali) was popularized in the district on a large scale. • Promotion of Artificial Insemination for the improvement of local breeds.
23.	Sabarkantha	• Introduction of seed production in cotton among tribal farmers as an lucrative activity. • Populatization of waste-decomposer for *In situ* residue management and production of quality organic manure. • Popularized wheat variety GW-496 & GW-366 in 82 ha, benefiting more than 4500 farmers.
24.	Surat	• Popularized biofertilizers and waste decomposer on mass-scale. • Peri-urban agriculture was promoted and several training courses conducted on terrace garden. • Popularized HYV of paddy (NAUR-1 & GNR-3), chickpea, mungbean (Meha) and soybean in the district. • Popularized SRI technology of paddy transplanting.

S.No.	KVKs	Significant Achievements
25.	Rajkot-II	• Quality seed produced (1251q) at the instructional farm and provided to the farmers. Groundnut (GJG-22, GJG-10, GAUG-31, GAUG-17), castor (GCH-9), pegion pea (Vaishali), Wheat (GW-496), chickpea (GG-3) crops with latest cultivars were included in the seed chain. • Promoted use of biopesticides by providing 21545 kg Trichoderma+Beauveria, biofertilizer (Azotobacter +PSB) -724 litre and Pheromone traps (7104 numbers) among the farmers.
26.	Kheda	• Mungbean (Meha, IPM-2-3) seed production has been started at village level for fulfilling the seed demand. 430 ha area was covered, benefitting 1480 farmers.
27.	Navsari	• Promotion of organic farming activities and Formation of Navsari Organic Farmers Co-operative Society (NOFCO). • Crop diversification through high value sweet corn crop. • Production technology of high yielding varieties of paddy NAUR-1, GNR-2 and GNR-3 was promoted. • A Memorandum of Understanding (MoU) with Navsari Taluka Sangh, facilitated production of 100 q seeds of paddy (GNR-3).
28.	Surendranagar	• Promoted the use of *Beauveria bassiana* for the control of pink bollworm and sucking pest of cotton crop, covering 11280 ha and benefiting12332 farmers. • Quality seed of chickpea (GJG-3) was produced on 200 ha land in Karmad village and 900 q seed was provided to the farmers.

GOA

S.No.	KVKs	Significant Achievements
1.	North Goa	• SRI technology in rice was demonstrated in an area of 20 ha and now adopted in around 150 ha involving 330 farmers. • Turmeric var. Pratibha was demonstrated in an area of 10 ha as an intercrop in coconut-based cropping system and is being practiced in an area of 60 ha involving 85 farmers. • Management of Cashew Stem and Root Borer was demonstrated in an area of 50 ha and is adopted in an area of 250 ha covering 198 farmers. • Hybrid Napier CO-4 and CO-5 has been demonstrated in an area of 5 ha and has spread in an area of 55 ha involving 165 farmers. • Virgin Coconut Oil production technology has been demonstrated at household and commercial levels. Three commercial and two household level units have been established.
2.	South Goa	• Focus on value addition on fish and fishery products for regular income generation was made through organization of several training programmes involving fishing community and entrepreneurs. • Organized coconut/mango/local vegetable exhibitions for larger impact in the district in collaboration with state agriculture department.

2.4 Overall Assessment

The QRT observed the processes and methodologies being followed by the KVKs in identifying and prioritizing the constraints and technologies were appropriate in respect to bio-physical, agro-climatic and varying socio-economic conditions of the area. Team opined that following critical areas have to be addressed by the KVKs of Maharashtra, Gujarat and Goa.

- Land use planning for the districts to avoid production gluts
- Water conservation, recharging of aquifers, rainwater harvesting and increasing water use efficiency by micro-irrigation
- Optimizing nutrient use efficiency through fertigation
- Availability of quality seed and planting material
- Post-harvest management, promoting primary and secondary agriculture processing and value addition
- Promoting farm mechanization
- Diversification to horticultural crops and promotion of income supplementing farm and non-farm activities
- Promotion of bio-fertilizers, bio-pesticides and organic manures
- Increasing farm profitability and reducing cost of production
- Promotion of entrepreneurship development for rural women and youth
- Insulating climatic vulnerability through farm worthy and climatic resilient technologies
- Addressing low productivity of livestock through breed upgradation and quality nutrition and management
- Promotion of modern systems of aquaculture for seed production, grow-outs of high value fish/prawn/shrimp/ornamental species
- Addressing livelihood security through agro-based and enterprises/allied activities
- Addressing household nutritional security through nutri-gardens etc.
- Crop residue and farm waste management
- Linking farmers to market through FPOs, FPCs, FOs etc.

3. Mandated Activities of KVKs

3.1 Technology Assessment

3.1.1 On-farm Trials

On farm trials were conducted for assessing technologies and improving upon the farmers practices and to address the location specific production constraints. During the period under report, 3802 technologies were assessed and 362 were refined for crops. Similarly, 1046 technologies were assessed and 112 were refined for livestock and other enterprises (Table 3.1 and Figure 1). In totality, 5856 trials were conducted under different thematic areas (Table 3.2 and Figure 2).

Table 3.1: Technologies assessed and refined under crops, livestock & other enterprises

Year	Crops		Livestock & Other Enterprises	
	Technologies Assessed	Technologies Refined	Technologies Assessed	Technologies Refined
2011-12	277	45	86	6
2012-13	314	45	76	6
2013-14	410	41	91	13
2014-15	530	70	110	18
2015-16	452	64	162	16
2016-17	540	43	141	8
2017-18	662	27	186	12
2018-19	617	27	194	33
Total	**3802**	**362**	**1046**	**112**

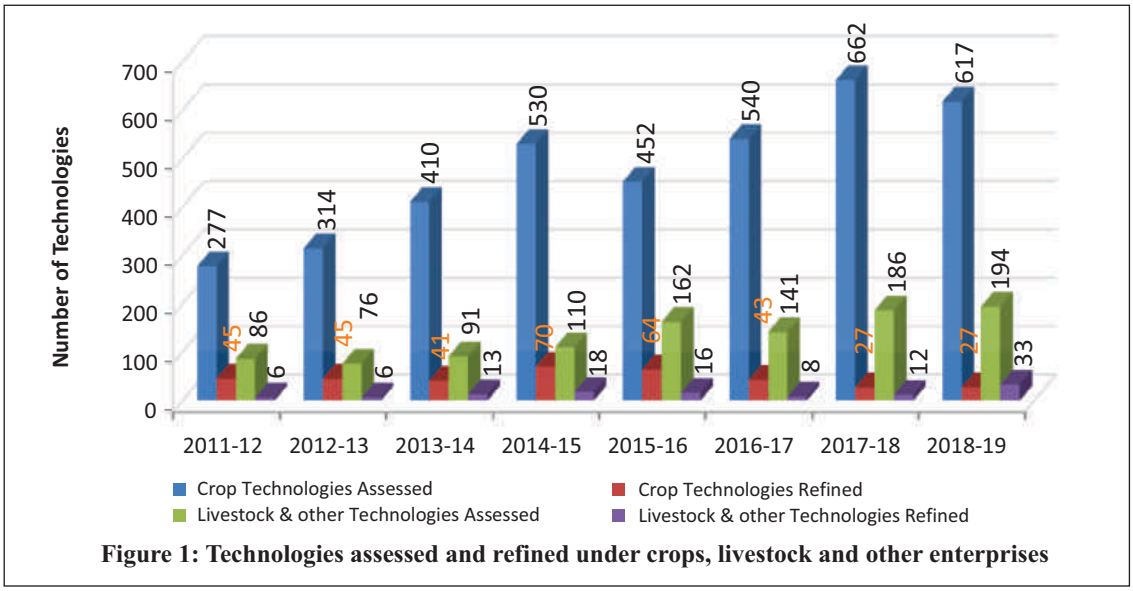


Figure 1: Technologies assessed and refined under crops, livestock and other enterprises

Table 3.2: Thematic area wise trials conducted by KVKs under OFT

Thematic area	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Total
A) Crops									
INM	71	99	111	138	130	102	107	111	869
Varietal evaluation	43	49	54	92	80	84	120	136	658
Integrated Pest Management	65	65	85	88	94	93	107	111	708
Integrated Crop Management	51	67	66	102	68	89	80	59	582
Integrated Disease Management	21	19	27	45	28	68	53	56	317
Weed management	6	12	21	20	10	20	23	27	139
RCT	4	9	25	27	36	34	33	30	198
Farm machines	23	22	26	28	20	17	48	39	223
Post-harvest technology	3	5	4	15	8	20	10	6	71
Value addition	16	14	29	21	18	13	28	37	176
Storage techniques	8	1	1	2	4	7	14	13	50
Integrated farming system	3	2	8	15	13	2	6	1	50
Drudgery reduction	36	42	35	74	51	62	94	94	488
Small scale income enterprises	3	5	5	11	7	9	23	20	83
Total	**353**	**411**	**497**	**678**	**567**	**620**	**746**	**740**	**4612**
B) Livestock									
Disease management	13	14	17	12	332	26	33	15	462
Feed & fodder management	15	12	18	52	33	40	42	45	257
Nutrition management	64	65	79	51	33	39	56	72	459
Mortality of buffalo calf	1	2	0	1	0	0	2	2	8
Mortality of kids (goat)	0	2	0	2	24	4	3	5	40
Increasing female sex-ratio	2	4	0	2	2	3	2	3	18
Total	**95**	**99**	**114**	**120**	**424**	**112**	**138**	**142**	**1244**
Grand Total	**448**	**510**	**611**	**798**	**991**	**732**	**884**	**882**	**5856**

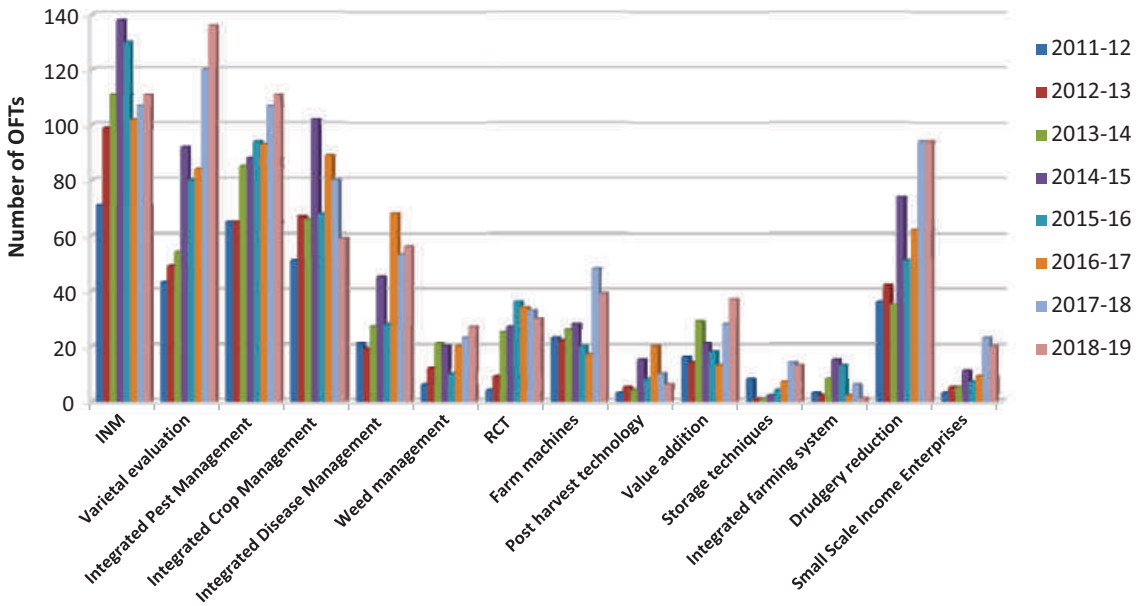


Figure 2: Thematic area wise trials conducted by KVKs during 2011-12 to 2018-19

3.2 Frontline Demonstrations

To demonstrate proven production potential of latest location specific technologies in agriculture and allied areas for generating production data and obtaining feedback after testing, 161777 frontline demonstrations covering 66054 hectare area on major crops of oilseeds, pulses, cereals, fodder crops, spices, fruit crops, commercial crops, vegetables, minor millets were carried out by the KVKs during the period under report (Table 3.3 and Figure 3).

Table 3.3: Frontline Demonstration Conducted by KVKs during 12-2011 to 19-2018

Year	Pulses		Oilseeds		Other*		Total	
	Demon.	Area (ha)	Demon.	Area (ha)	Demon.	Area (ha)	Demon.	Area (ha)
2011-12	2345	1142	1242	578	7924	2692	11511	4413
2012-13	3561	1397	1671	859	23623	9439	28855	11695
2013-14	4430	1598	1480	751	8642	3876	14552	6225
2014-15	3243	1335	1814	784	9850	3593	14907	5712
2015-16	3933	1493	2345	1034	9454	3483	15732	6009
2016-17	7332	3522	4404	2380	10032	3437	21768	9339
2017-18	8905	4026	7243	3645	12359	4597	28507	12268
2018-19	8520	3776	5797	2895	11628	3721	259458	10393
Total	**42269**	**18289**	**25996**	**12927**	**93512**	**34838**	**161777**	**66054**

*It includes FLD of other disciplines





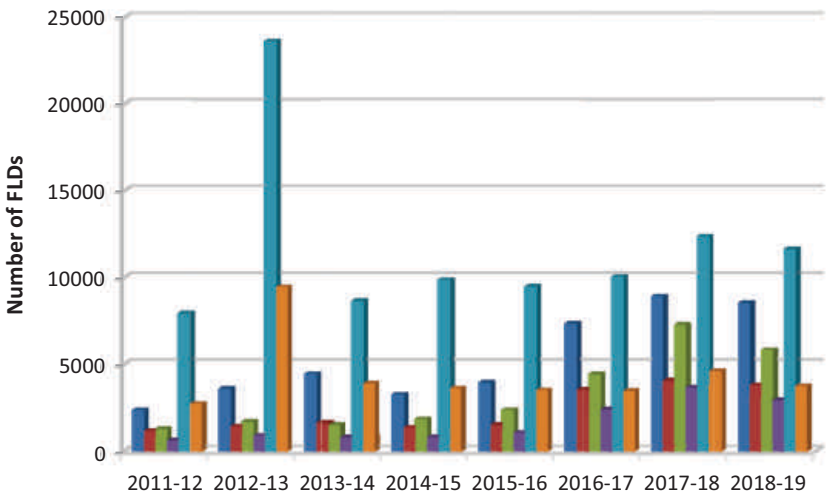



Figure 3: Frontline Demonstrations by KVKs During 2011-12 to 2018-19

FLDs were organized considering the need and potential of the district. The team observed that the FLDs were designed based on the feedback emerged through participatory rural appraisal, surveys, interactions, farmers responses and inputs of specialists/scientists/professors drawn from SAUs/ICAR institutes.

3.3 Speciality and Niche Areas of Excellence of the KVKs

MAHARASHTRA

S.No.	KVKs	Specialty/Uniqueness
1.	Pune-I	• Centre of Excellence in Vegetable Production • Value chain management of different crops • Community Radio Station for regular agro-advisory • Large scale carp fingerlings including Jayanti rohu production • Promotion of silage making • Demonstration on precision farming and agriculture information centre • Bee keeping and large-scale promotion of resource conservation technologies • Development & Utilization of Mobile Apps, KRUSHIK App
2.	Pune-II	• Strong linkage with Farmers Producer Organisations/Companies FPOs/FPCs • Horticulture nursery for providing grafted plants • Minimal processing and value addition in soybean and pulses • Farming System Nutrition Model
3.	Ahmednagar-I	• Production and promotion of biofertlizers/biopesticides and biofood in the district • Dairy based IFS model • Horticulture (guava/ pomegranate/grapes) based IFS models • Promotion of Farmers organization • Community Radio Station for regular agro-advisory
4.	Ahmednagar-II	• Promotion of Sustainable Sugarcane Initiative (SSI) technology • Promotion of pomegranate (Phule Bhagwa and Phule Super Bhagwa) • Demonstration of loose housing system for cattle • Broad Bed & Furrow (BBF) technology for soil-moisture conservation in oilseeds and pulses • Custom hiring services in implements, apiculture and poultry hatchery

S.No.	KVKs	Specialty/Uniqueness
5.	Aurangabad-I	• Women entrepreneurship development (processing fruit & vegetable, drumstick, and sericulture • Promotion of nutrition gardens • Promotion of Azwain cultivation and processing
6.	Aurangabad-II	• Sericulture based enterprise development and value chain management • Horticulture nursery for promotion of mango, citrus, custard apple
7.	Jalna-I	• Bamboo cultivation at farmers fields with buy back arrangement • Crop diversification through sericulture for small and marginal farmers • Organization of Krishi Vigyan Mandal on monthly basis since 1997 • IPM in cotton on large scale
8.	Jalgaon-I	• Promotion of Banana cultivation and its processing • Organic farming and establishment of seed bank • Conservation of medicinal and aromatic plants
9.	Jalgaon-II	• Promotion of flower-based enterprises • Focus on micro-irrigation
10.	Amravati-I	• Promotion of protected cultivation • Bio-agents production lab
11.	Amravati-II	• Food processing and value addition unit • Community Radio Station for regular farm advisory • Fruit & Vegetable Processing Laboratory, Bio fertiliser & Bio pesticide Laboratory • Mushroom Production & Training Unit • Plant Health Clinic
12.	Nandurbar	• Shetkari Suvidha Kendra (Farmers Service Centres) for capacity building and input provision • Brooded and vaccinated chicks for backyard poultry rearing • Onion seed production through SHGs • Entrepreneurship development in tribal villages • Biodiversity conservation
13.	Nashik-I	• Hi-tech model horticultural nursery • Floriculture and high value vegetable production • Model backyard poultry, vermi compost units, nutrition garden, modern irrigation systems, farm mechanization etc. under single roof promoted • Focus on organizing farmers (FPOs) and facilitating them to link with market • Export oriented grape cultivation
14.	Nashik-II	• Protected cultivation in floriculture • Protected cultivation of vegetables in soil less media
15.	Solapur-I	• Crop diversification through drumstick • Spreading of Hybrid Napier fodder • Processing and value addition of Sorghum
16.	Solapur-II	• Quality seed of pulses

S.No.	KVKs	Specialty/Uniqueness
17.	Latur	• Large scale promotion of Sustainable Sugarcane Initiative (SSI) • Promotion of BBF technology in soybean • Dairy based IFS model. • Supply of one-month old improved poultry chicks for backyard poultry
18.	Kolhapur-I	• Sugarcane and horticulture nursery
19.	Satara-I	• Supply of one-day old vaccinated and brooded poultry chicks • Development of groundnut seed village
20.	Satara-II	• Hi-tech horticulture under polyhouses • Promotion of BBF system for pulses • Promotion of drip irrigation system
21.	Nagpur	• Raising and supply of disease free citrus saplings • Women empowerment for agro-based enterprise development
22.	Nanded-I	• Promoted turmeric cultivation and its value addition
23.	Nanded-II	• Production of quality seed, bio-fertilizers, bio-pesticides, fodder stumps, farm tools and equipments • Agro-based enterprises e.g. dairy, poultry, goatery and sericulture
24.	Yavatmal-I	• Promotion of *in-situ* moisture conservation technologies to combat water stress condition
25.	Washim	• Introduction of freshwater aquaculture • Facilitating the FPOs
26.	Parbhani	• Promotion of protected cultivation and export-oriented vegetable production • Large scale adoption of backyard poultry farming and goat rearing • Promotion of group farming approach
27.	Chandrapur	• Entrepreneurship development through Oyster Mushroom • Use of non-chemical components like yellow sticky traps, pheromone traps, use of botanical insecticides
28.	Buldhana-I	• Promotion of varied horticulture • Popularization of cotton slash
29.	Buldhana-II	• Resource conservation technologies under NICRA promoted • Custom hiring service
30.	Bhandara	• Promoted backyard poultry farming • Promotion of farm mechanization
31.	Gadchiroli	• Promotion of custom hiring • Conservation of biodiversity
32.	Akola	• Soil reclamation on large scale • Focus on women empowerment, post-harvest processing and value addition
33.	Wardha	• Promotion of sericulture
34.	Gondia	• Promotion of lac cultivation and entrepreneurship development

S.No.	KVKs	Specialty/Uniqueness
35.	Ratnagiri	• Crop diversification through high value horticultural crops
36.	Raigad	• Promotion of hybrid rice
37.	Sindhudurg	• Cashew processing • Backyard poultry • Horticulture nursery
38.	Thane (Palghar)	• Bee keeping in tribal areas • Backyard poultry for landless and marginal farmers • Jasmine production • Empowering tribal youth for agro-based enterprises
39.	Hingoli	• Horticulture nursery • Promotion of FPOs
40.	Dhule	• Quality seed production of chickpea
41.	Sangli-I	• High density planting guava orchards • Popularization of drudgery reduction technologies for farm women
42.	Osmanabad	• Goat rearing specially Osmanabadi for regular income of small and marginal farmers • Use of liquid biofertilizers in soybean • Promotion of low-cost resource conservation technologies in pulse crops
43.	Beed-I	• Promotion of sericulture • Promotion of IFS under drought conditions
44.	Beed-II	• Entrepreneurship development in sericulture

GUJARAT

S.No.	KVKs	Specialty/Uniqueness
1.	Navsari	• Demonstration of fish/shrimp farming in saline affected areas • Promotion of high value short duration sweet corn crop in tribal area • Women empowerment through income generating activities
2.	Narmada	• Quality seed production of paddy
3.	Tapi	• Promotion of Pro-tray nursery for vegetables • Promotion of banana sap as organic input for fruit crops
4.	Junagadh	• Community Radio Station for agro-advisory services
5.	Gandhinagar	• Promotion and production of Neem based bio-pesticides
6.	Anand	• Training on inland aquaculture
7.	Vadodara	• Tools promoted for drudgery reduction in tribal area
8.	Banaskantha-I	• Horticulture nursery development • Popularization of micro irrigation system

S.No.	KVKs	Specialty/Uniqueness
9.	Bharuch	• Promotion of salt tolerant wheat varieties
10.	Patan	• Promotion of Kagzi lime • Crop diversification with IFS model • Cumin cultivation.
11.	Ahmedabad	• Quality seed production of durum wheat • Value addition in custard apple
12.	Valsad	• Promoted California Mastitis Detection technique • Promotion of micro irrigation
13.	Jamnagar	• Promotion of dual purpose and all season variety of Pearl millet.
14.	Porbandar	• Promotion of seaweed cultivation amont fishermen.
15.	Rajkot-I	• Popularization of *Trichoderma harzianum* for the management of groundnut • Entrepreneurship development for start-up of mini oil mill, herbal *jaggery*, milk products, spices and pulses
16.	Rajkot-II	• Quality seed production of field crops
17.	Kutchh-I	• Promotion of date palm cultivation through offshoot propagation and tissue culture • Rain water harvesting
18.	Kutchh-II	• Salinity management with saline tolerant crops in barley and mustard. • Introduction of safflower during post rainy season using residual moisture.
19.	Surendranagar	• White grub management in groundnut by using bioagents
20.	Surat	• Promotion of bio-pesticides and bio-fertilizers
21.	Dangs	• Promotion of plastic mulch with drip irrigation in watermelon • Focus on biodiversity conservation
22.	Sabarkantha	• Promotion of cotton seed production by tribal farmers • Horizontal expansion of waste-decomposer for *in-situ* residue management. Production of quality organic manure
23.	Panchmahal	• Arid horticulture • Post harvest processing and value addition especially in fruits/vegetables
24.	Dahod	• Popularization of soybean variety NRC-37
25.	Kheda	• Quality seed production through seed village concept
26.	Mehsana	• Jeevamrut production for organic farming • Promotion of Castor GCH-7 and Fennel GF-12 • Promotion of Mehsana buffalo breed
27.	Amreli	• Promotion of biofertilizers and biopesticides
28.	Bhavnagar	• Promotion of dryland technologies. • Use of bio-agents, botanicals, waste decomposer for organic agriculture • Popularized soil salinity tolerant wheat variety KRL – 19

GOA

S.No.	KVK	Specialty/Uniqueness
1.	North Goa	• Virgin coconut oil unit • Cashew production, protection technologies and value addition • Popularization of AI in pigs
2.	South Goa	• Promotion of aquaculture • Promotion of ornamental plants and horticulture crops

3.4 Overall Assessment

For solving farmers' problems, 3802 technologies were assessed and 362 technologies were refined under crop production. Similarly, 1046 technologies were experimented at farmers' fields and 112 technologies were refined under livestock and other enterprises categories.

OFTs and FLDs are the major activities of the KVK. Hence, certain norms need to be developed.

i. One SMS including Senior Scientist and Head should organize at least one OFT and 35 demonstrations in a year.

ii. Cluster approach should be followed for organizing frontline demonstrations for larger impact in the area. Regular monitoring is essentially required at KVK, SAU, and Host organization level.

iii. Technical programme should originate from the district level interface meetings followed by scientific input at the university level workshop and its finalization in zonal workshop at ATARI level. The university/research organization level supports need to be taken up for designing realistic action plan of KVKs.

iv. Emphasis should be given on the problems covering larger area, affecting more number of farmers and major crops/ enterprises of the districts for designing OFTs to solve the location specific problems/issues.

v. The OFTs and demonstration in the areas of post-harvest management, value addition, integrated farming system models, climate resilient technologies and home science related issues need to be emphasized.

vi. The conductance, data collection, interpretation and drawing inferences need to be done more critically for making the whole exercises more authentic.

vii. SMSs should maintain data register and it should be used while making interpretation during reporting.

viii. Farmer should be treated as co-researcher/partner in organizing the on farm trials. The SMS/KVK Expert should be in role of facilitator.

ix. Best technologies from NARS system should be included under different treatments for their assessment and if possible for refinement.

x. Technical feedback emerged during on farm trials and frontline demonstrations should be communicated to the concerned research organizations.

4. Status of Training and other Activities

Capacity building of practicing farmers, farm women, rural youth and extension functionaries, and organization of other extension activities are some of the mandated activities of the KVKs. On-site input production, management and distribution, especially quality seed and planting material are also priority areas of KVKs. These activities have largely impacted the creation of awareness about frontline technologies, developmental programs & their implementation, entrepreneurship development regarding agro-based enterprises in rural areas of these States. Team evaluated these activities critically for the review period.

4.1 Training of Farmers, Farm Youth and Extension Personnel

Major focus was given by the KVKs on organization of income generating activities through vocational trainings. KVKs conducted training programme to facilitate application of technologies and their adoption at faster rate. Training needs were identified by the KVKs through surveys, PRA/RRA exercises, SAC meetings, group discussions and feedback from the farmers and other stakeholders. The extension functionaries were also trained for technological backstopping. The trainings empower the clientele to develop entrepreneurship skill and to start their own enterprises for generating regular income. Details of training programme for different beneficiaries are given in Table 4.1 to 4.3. In all, 53304 courses benefited 1759357 farmers, rural youth and extension personnel during the period of review.

Data shown in (Table 4.1 and Figure 4) indicated a total of 42101 training courses for farmers and farm women were organized by KVKs in Zone-VIII, which were attended by 1415131 participants.

Table 4.1 Training programmes organized by the KVKs for farmers

Discipline	2011-12		2012-13		2013-14		2014-15		2015-16		2016-17		2017-18		2018-19		Total	
	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
Crop Production	869	31004	1125	40020	1135	42981	1118	38658	1023	39780	985	34336	1026	42161	1153	44391	8434	313331
Horticulture	793	24825	815	28014	907	33864	859	25443	762	24145	679	23090	644	22900	689	23831	6148	206112
Soil Health & Fertility Mgt.	221	6999	297	8637	388	12226	439	13169	416	13046	374	13244	338	13615	375	19879	2848	100815
Livestock Production & Management	841	23588	708	21321	629	18448	707	23214	722	21855	678	20777	709	20366	706	24827	5700	174396
Home Sc/ Women empowerment	689	19730	675	18815	742	20659	779	22268	742	22771	666	20591	625	19422	702	24890	5620	169146
Agril. Engineering	362	13123	319	11259	323	9363	316	9975	313	9877	313	10636	307	9215	328	10811	2581	84259
Plant Protection	877	28121	827	24411	763	24443	877	27806	739	23874	764	26685	822	29791	980	36407	6649	221538
Fisheries	101	2328	119	3244	92	2451	92	3555	97	3487	79	2997	62	2098	65	1983	707	22143
Production of on-sight inputs	30	1149	18	1211	62	3137	45	2159	35	2387	28	1329	37	1465	38	1868	293	14705
Capacity Building/Group Dynamics/Agri. Extension	419	15717	377	13130	427	14503	319	11792	331	11835	259	9548	211	8418	262	9687	2605	94630
Agro- forestry	33	1023	27	623	92	2624	32	766	116	4384	131	1747	35	1083	50	1806	516	14056
Total	**5235**	**167607**	**5307**	**170685**	**5560**	**184699**	**5583**	**178805**	**5296**	**177441**	**4956**	**164980**	**4816**	**170534**	**5348**	**200380**	**42101**	**1415131**

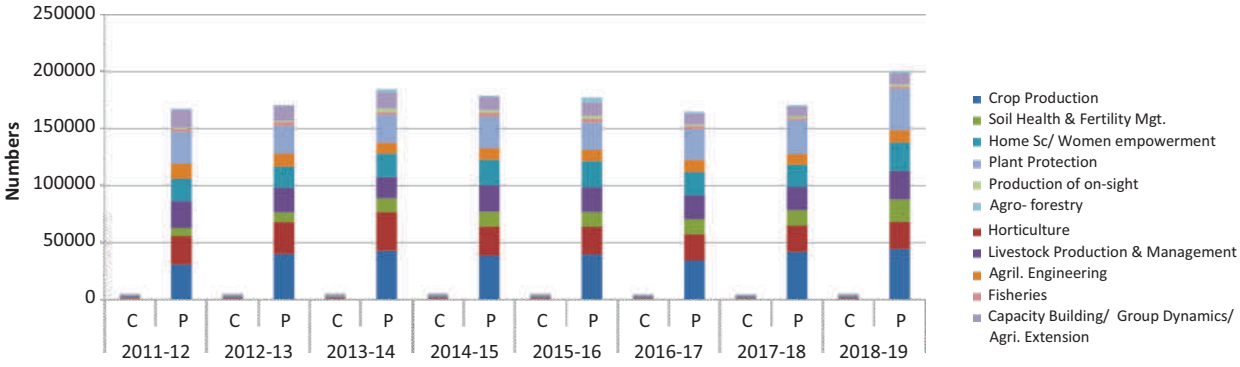


Figure 4: Training programmes organized by KVKs for farmers

A total of 6875 training programmes were organized by the KVKs for rural youth, which were participated by 199340 rural youth during the review period (Table 4.2).

Table 4.2 Training programmes organized by the KVKs for rural youth

Year	No. of courses organized	Number of trainees participated
2011-12	883	23376
2012-13	906	25397
2013-14	900	23336
2014-15	846	25719
2015-16	861	25239
2016-17	784	23810
2017-18	850	24600
2018-19	845	27863
Total	**6875**	**199340**

Data presented in (Table 4.3 and Figure 5) depicted subject-wise courses organized by the KVKs and number of participants benefitted during different years. In all, 4328 training courses under various components/ aspects for 144886 extension personnel were organized during 2011-12 to 2018-19.

Table 4.3 Details of training programmes organized by the KVKs for extension personnel

Area of training	2011-12		2012-13		2013-14		2014-15		2015-16		2016-17		2017-18		2018-19		Total	
	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
Productivity enhancement in field crops	69	2098	118	3158	88	3368	100	3359	97	3451	78	3225	94	2816	99	3627	743	25102
Integrated Pest Management	49	1394	67	2850	72	2718	92	3253	84	2955	94	3888	109	4356	117	6164	684	27578
Integrated Nutrient management	38	1316	27	1068	40	1193	36	1327	39	855	37	1401	64	1903	47	1759	328	10822
Rejuvenation of old orchards	4	71	10	352	13	274	5	97	3	85	4	152	7	212	10	220	56	1463
Protected cultivation technology	18	479	27	748	32	932	30	849	31	810	27	893	30	942	19	806	214	6459
Formation and management of SHGs	20	979	15	504	16	450	15	443	12	414	14	348	22	647	15	445	129	4230
Group dynamics and farmers organization	32	963	41	1231	29	893	37	982	30	1078	25	898	17	654	37	1206	248	7905
Information networking among farmers	21	605	8	225	17	817	8	278	6	156	6	350	14	543	15	410	95	3384
Capacity building for ICT application	24	584	37	985	23	543	20	573	30	720	20	485	16	548	25	902	195	5340
Care and maintenance of farm machinery and implements	25	715	18	545	15	364	25	833	11	371	19	765	22	793	16	515	151	4901
WTO and IPR issues	3	75	2	90	3	64	1	35	1	11	4	128	4	214	6	146	24	763
Management of farm animals	20	569	21	572	18	648	17	533	10	293	9	258	18	533	15	467	128	3873
Livestock feed and fodder production	28	817	46	1310	42	1296	42	1253	36	1159	42	1247	58	2199	57	2135	351	11416
Household food security	10	293	6	174	10	282	12	382	11	487	14	489	6	162	12	421	81	2690
Women and child care	21	581	28	1189	30	802	27	979	23	618	35	1106	33	993	31	909	228	7177
Low cost and nutrient efficient diet designing	9	272	16	446	9	236	23	705	12	332	9	284	13	393	16	787	107	3455
Production and use of organic inputs	15	284	10	246	13	331	8	221	13	423	12	415	15	516	17	540	103	2976
Gender mainstreaming through SHGs	11	436	7	268	17	133	23	132	3	46	3	95	7	272	5	219	76	1601
Others	58	2169	40	1704	33	911	38	1187	34	849	44	1529	71	2584	69	2818	387	13751
Total	**475**	**14700**	**544**	**17665**	**520**	**16255**	**559**	**17421**	**486**	**15113**	**496**	**17956**	**620**	**21280**	**628**	**24496**	**4328**	**144886**

*C = Number of courses, *P = Number of participants

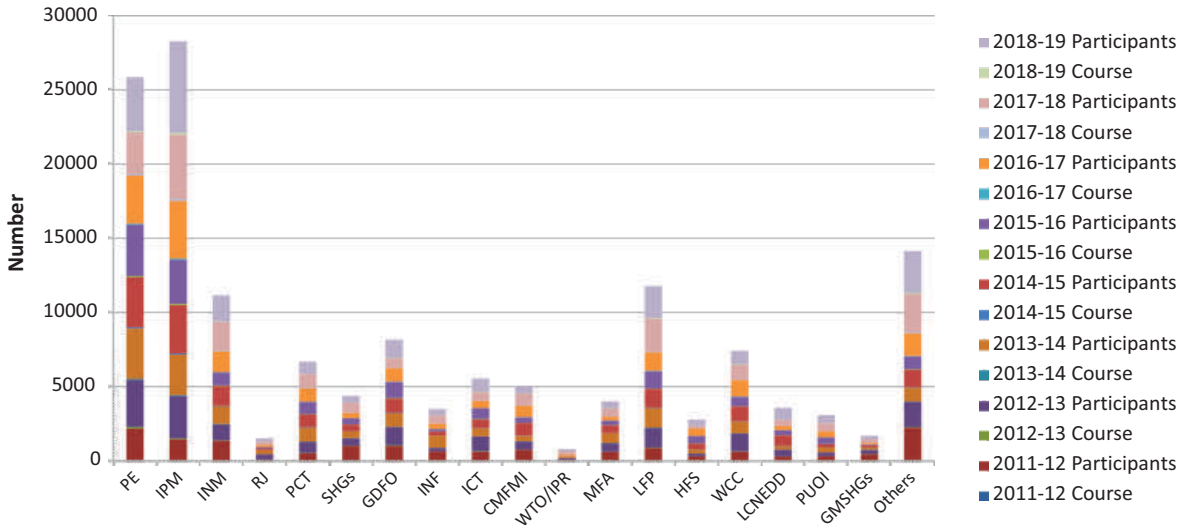


Figure 5: Training programmes organized by the KVKs for extension personnel

PE=Productivity enhancement in field crops, IPM=Integrated Pest Management, INM=Integrated Nutrient Management, RJ=Rejuvenation of old orchards. PCT= Protected cultivation technology, SHGs=Formation and Management of SHGs, GDFO=Group Dynamics and farmers organization, INF= Information networking among farmers, ICT=Capacity building for ICT application, CMFMI=Care and maintenance of farm machinery and implements, WTO/IPR=WTO and IPR issues, MFA=Management of farm animals, LFP=Livestock feed and fodder production, HFS=Household food security, WCC=Women and Child care, LCNEDD=Low cost and nutrient efficient diet designing, PUOI=Production and use of organic inputs, GMSHGs=Gender mainstreaming through SHGs, Others=Others

Altogether 16.14 lakh farmers and farm women including rural youth were trained on different need based aspects/areas during 8 years through 48976 training programmes by the KVKs, which appear to be a satisfactory attainment. In all 74 KVKs were reviewed critically. The average number of trainings per KVK per year for farmers and farm women (including rural youth) was 82, which was found to be quite satisfactory. Also, 144886 extension personnel and 199340 rural youth received trainings through 4328 and 6875 training programmes respectively during the period under review. On an average one KVK trained 2390 farmers and farm women, 245 extension personnel and 337 rural youth per year, which was satisfactory. In respect of on-campus and off-campus trainings, the KVK should concentrate more on on-campus trainings and each SMS should conduct a minimum of 10-12 on-campus vocational/enterprise based trainings in a year.

4.2 Other Extension Activities

In addition to mandated activities, KVKs carried out large number of other extension activities for popularizing latest improved farm technologies and other relevant information. The details of various activities undertaken are provided in Table 4.4.

Table 4.4 Other extension activities organized by KVKs in Zone-VIII

Activity	2011-12		2012-13		2013-14		2014-15		2015-16		2016-17		2017-18		2018-19		Total	
	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
Field days	467	17765	610	21941	650	37785	571	22650	602	26002	714	34499	797	36281	737	33254	5148	230177
Agril. exhibition	173	1165323	211	600679	255	1593469	252	922834	413	968798	298	1305702	301	1099944	300	773090	2203	8429839
Farmers' Fairs	146	289212	147	102057	132	77492	121	79822	223	106263	279	117363	260	133282	219	251302	1527	1156793
Radio talk	530	2961	488	31566	1072	3708	1178	5416	813	21984	587	8483	642	8653	648	21050	5958	103821
TV show	84	390	114	90220	126	2730	170	921	144	477	177	1275	198	4828	195	958	1208	101799
Film show	701	20818	688	29543	956	48208	931	37171	897	40024	975	41389	1263	71130	1289	75545	7700	363828
Training materials produced-Folders/pamphlets	2466	64727	3759	119008	2568	78694	3455	121594	4631	144729	4657	125528	11566	129984	4533	117723	37635	901987
Farm Science Club organized	165	3746	167	3345	170	3575	157	3270	179	6875	143	3910	149	4237	168	4387	1298	33345
MahilaMandals organized	240	5798	109	4362	129	5182	110	3284	98	2296	129	3563	171	5421	168	4693	1154	34599
Extension training meetings organized	445	51345	459	39950	560	42313	483	33920	539	17293	520	19547	522	14889	456	12832	3984	232089
Any other	0	0	0	0	0	0	0	0	0	0	4	963	0	0	0	0	4	963
Advisory services	12306	287648	143215	375060	31839	1785680	26803	1800218	37218	3829052	20408	10937527	91682	11432158	320206	7089941	683677	37537284
Diagnostic visits	2330	17049	2517	19869	3865	42414	4053	18012	3980	20382	4554	20154	3544	19954	3583	26013	28426	183847
Kisan ghosthi	908	21499	892	41504	1045	30820	1140	170719	1072	43801	1207	36068	1314	37455	1130	38521	8708	420387
Scientists' visit to farmers field	5805	24673	6721	29083	6006	50960	6680	29634	8363	35419	7867	30218	9294	41979	7890	41302	58626	283268
Plant/animal health camps	123	14500	126	6364	165	9544	244	14756	196	9127	285	6679	243	9992	195	8687	1577	79649
Ex-trainees sammelan	22	1138	33	1308	22	1031	21	1113	26	2374	30	1556	39	1797	34	1776	227	12093
Farmers' seminar/ workshop	170	12657	211	17634	246	29944	208	18800	294	24942	239	23562	265	25840	339	24325	1972	177704

Activity	2011-12		2012-13		2013-14		2014-15		2015-16		2016-17		2017-18		2018-19		Total	
	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
Method demonstr-ations	481	13239	531	11706	639	11788	1014	17434	823	17790	679	14890	812	19437	941	55472	5920	161756
Celebration of important days	148	20212	200	19228	193	27450	1001	21425	431	46406	319	39903	442	54240	520	70261	3254	299125
Special day celebration	41	3907	62	4135	55	2854	62	5207	232	16013	142	20526	216	20380	161	17633	971	90655
Kisan samman diwas	5	72	3	77	3	124	2	86	4	577	3	931	8	500	15	1108	43	3475
Exposure visits	294	11472	334	14106	387	17911	554	15167	354	12496	425	18048	447	22459	566	17730	3361	129389
Electronic media - CD Preparation	241	7160	316	387	264	325	105393	828	99	525	149	674	294	1107	472	686	107228	11692
News letter	94	3847	168	3590	154	3162	214	16434	172	3448	246	3017	290	3601	275	1659	1613	38758
News paper coverage	1795	23517	1625	36655	1771	42029	1821	28852	1831	15920	2461	41330	2696	23240	2734	36948	16734	248491
Technical articles	366	4435	421	3545	451	5965	5958	6014	510	4554	497	2492	495	5993	671	25533	9369	58531
Technical bulletins	89	5461	95	6800	98	5078	114	5167	635	5333	104	6600	113	5462	129	5491	1377	45392
Technical reports	224	1530	233	1376	249	2009	351	2176	227	3625	364	1382	314	1495	271	1977	2233	15570
Animal health camps (No. of animals treated)	392	14531	540	10632	690	11442	764	17964	781	9946	1964	12734	4149	16806	2348	14328	11628	108383
Self Help Groups	373	3375	319	4002	279	4048	257	4388	290	8586	521	4423	258	7617	252	11702	2549	48141
Total	**31624**	**2114007**	**165314**	**1649732**	**55039**	**3977734**	**164082**	**3425276**	**66077**	**5445057**	**50947**	**12884936**	**132784**	**13260161**	**351445**	**8785927**	**1017312**	**51542830**

4.3 Other Broad-based Extension Activities

Many broad-based extension activities/services as enumerated in Table 4.5 carried out by the KVKs were found highly useful. The achievements attained in this direction by the KVKs are given in Table 4.5.

Table 4.5: Broad-based front-line extension activities carried out by the KVKs

S.No.	Activity	Maharashtra	Gujarat	Goa	Total
1	Artificial insemination cases	7723	2142	0	**9865**
2	Animal health-care provided	101053	32266	1979	**135298**
3	Poultry introduced	490620	101	230	**490951**
4	Piggery / rabbit farming introduced	711	37	32	**780**
5	Planting material produced and distributed	16118590	17254966	503149	**33876705**
6	Fodder and grass varieties(Ha)	176093	2991	7	**179091**
7	Sapling planted (No.)	79757	116744	0	**196501**
8	Consultancy on Soil analysis and topographic survey	640464	18864	47580	**706908**
9	Improved hand tools and implements introduced	5254	836	11	**6101**
10	Fishery demonstrations	5580	396	67	**6043**
11	Any Other	19908	13352	155	**33415**

KVKs organized different advisory services and developmental activities in collaboration with different line departments including other organizations. KVKs treated 135298 animals for various diseases during animal health-check camps.

A total of 490951poultry and 780 piggery/rabbit rearing units were established by the KVKs for regular income generation to the farm families. KVKs produced a total of 33.87 lakh planting materials of fruits, vegetables and trees and distributed to the farmers. Fodder grass and other fodder crops were promoted in 1.79 lakh ha. A total of 1.96 lakh tree saplings were provided to the farmers.

QRT is of the view that the efforts made by the KVKs on some extension activities are praiseworthy. They conducted varied types of training programmes and also acted as motivators, catalyst, facilitators for starting income generating activities by small and marginal farmers.

4.4 Production and Distribution of Seeds, Planting Materials and Farm Products by KVKs

KVKs were found involved in the production and distribution of quality seeds, planting materials and bio-products/bio-agents, animal progeny, chicks and fish fingerlings in addition to their mandated activities. Different products produced and provided to the farmers by the KVKs during reporting period are given in Table 4.6.

KVKs played major role in providing quality seed and planting materials among the farmers in the districts by which accelerated technology spread. KVKs produced a total of 6.67 lakh q seed of cereals, oilseed and pulses. The number of seedlings/ saplings produced and distributed by KVKs for vegetables, fruits, forest trees and other crops numbered 415.83 lakh. KVKs also produced 31.28 lakh kg quality bio-agents. A total of 8.48 lakh improved chicks were provided to the farmers. KVKs produced and supplied 25 lakh fish fingerlings.

Seed village concept should be adopted by the KVKs for fulfilling the need of farmers in their jurisdictional area. Private- public-farmer participation approach may be adopted for the production of seeds by each of the KVK. The KVKs should continue such interventions/initiatives for the benefit of the farmers on a large scale. Some rural youth should be identified and trained for taking quality seed production as an enterprise, fulfilling the need of quality seed production in the villages.

Table 4.6 Products produced and distributed during 2011-12 to 2018-19 by KVKs in Zone VIII (All states)

Enterprise	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Total
I. Seed Production (q)									
Cereals	2317	2121	12686	2373	31321	16150	34620	2762	104348
Oilseeds	3363	1166	1926	1640	5609	7754	20765	7856	50079
Pulses	4912	706	16575	2187	17259	6889	46048	2878	97454
Vegetables	78	636	5577	18884	68	67	22	16	25347
Fodder	1506	253500	16538	7374	1874	32832	4530	4373	322528
Commercial	1317	728	346	945	2352	465	2849	800	9807
Other	15395	29	46	1399	46.15	4705	31844	3963	57427
Sub Total	**28887**	**258886**	**53692**	**34802**	**58530**	**68862**	**140678**	**22647**	**666984**
II. Planting Material Production (in number)									
Fruits	675320	761001	981376	559563	478041	643104	836780	683996	5619181
Vegetables	2015619	2155913	3308262	2893764	3717304.5	3479407	4264891	3956214	25791374.6
Forestry	103050	82900	83515	73800	28261	15255	42085	19027	447893
Fodder/others	396071	398634	1816953	1310385	1388520	1142956	1615020	989215.84	9057754.84
Ornamental	81052	37269	60636	158047	19121	108723	165901	36499	667248
Sub Total	**3271112**	**3435717**	**6250742**	**4995559**	**5631247.5**	**5389445**	**6924677**	**5684951.8**	**41583451.4**
III. Production of Bio-product (kg)									
Bio-fertilizers	151169	254463.92	157510.1	96167.8	145747.2	120744.2	191938.54	294024.09	1411764.82
Bio Agents	167726.3	217547.3	193133.3	235103.1	190438.34	261634.4	193195.46	258020.19	1716798.46
Sub Total	**318895.3**	**472011.22**	**350643.4**	**331270.9**	**336185.54**	**382378.6**	**385134**	**552044.28**	**3128563.28**
IV. Production of livestock materials (Number)									
Cattle	51	64	75	44	67	45	41	9	396
Sheep & Goat	84583	354	50397	62361	61464	55955	38003	114818	467935
Poultry	47116	75790	70765	85103	115043	170566	117902	165915	848200
Total	**131750**	**76208**	**121237**	**147508**	**176574**	**226566**	**155946**	**280742**	**1316531**
V. Fish Fingerlings (No.)	52018	51036	50029	50021	50016	126007	839447	1303950	2522524

5. Innovative Approaches and Extension Methodology Adopted by the KVKs

KVKs are very proactive and eager to follow innovative extension approaches and methodologies for transferring latest farm technologies among different clientele groups. The efficiency and effectiveness of the approaches and methods applied over a period of time by the KVK scientists has been often judged in terms of its consistency for better performance in promotion of identified viable technologies. KVKs had adopted different approaches to solve emerging problems/issues following relevant extension strategies. The approaches for transfer of technologies need to be effective, efficient and feasible so that its results are achieved by the farmers/villagers with minimum time lag.

Innovative extension approaches/methodologies adopted by the KVKs are given as under:

1. **Postal Extension Service:** Four KVKs and Indian Postal Department of Pune, Maharashtra jointly initiated a new concept of collection of soil samples from the farmers' doorsteps and in return supply of its report in the year 2016 -2017. In order to undertake it, the Post Masters of the Village Level Post Offices from Baramati, Indapur and Purandar were trained to serve as the channel/ middlemen between the KVK and farming community. Under the service, the soil samples from the farmer's village are collected and sent to the KVK for analysis and the soil analysis report together with soil health card is procured from the KVK and supplied to the farmers. The farmers have to pay the soil testing and postal charges at the post office only once, which facilitate farmers to get soil testing facility at his doorstep and also encouragement towards soil analysis and a visit to KVK is dispensed with. The service has encouraged and benefitted small and marginal farmers greatly and till date 2727 farmers from 4 districts of Maharashtra have availed this innovative approach.

2. **Soil Testing Services through Mobile Labs:** KVKs are also working on group approach system by constituting farmers clubs, FPOs and SHGs as most of the farmers live more than 50-100 km away from the KVK and it becomes difficult for them to bring soil samples to the KVK. On the basis of demand from these groups, the soil mobile testing service is arranged on affordable charges near the farmers field, provided more than 100 samples are available for testing.

3. **KRUSHIK, Global Farmers Live Demos:** Kisan Aadhar Sammelan was organised for large scale awareness and knowledge sharing. The demonstrations were organized under PPP mode in collaboration with different government and private exhibitors, in which large number of companies/agencies/research institutions participated and showcased their technologies in the form of live demonstrations, machinery/equipment displays, seminars, video shows, animal shows etc. The event was attended by more than two lakh participants.

4. ***Shetkari Suvidha Kendras* (Farmers Service Centres):** These centres have been created for input sharing, knowledge sharing, capacity building and farmer to farmer extension. KVK, Nandurbar has created 12 *Shetkari Suvidha Kendras* which are working satisfactorily. It may be replicated in other areas/districts.

5. **Integrated Efforts for Pink Bollworm Management in Cotton in Convergence Mode:** KVKs took a lead and involved different line department officials, SAUs, ICAR institutes to follow integrated approach for managing pink bollworm infestation in cotton in Vidarbha and Marathwada regions. The integrated efforts were found very effective at field level.

6. **Farming System Nutrition Model at KVKs:** Initiatives have been taken up to develop farming system nutrition model at each KVK for awareness and empowering the farm women/other stakeholders. Nineteen

KVKs have developed such model and also adopted 1-2 villages, where nutri-rich crops/varieties have been incorporated in existing cropping systems. Series of trainings, health campaigns, exposure visits are being organized in adopted villages. Technical support has been taken up from MSSRF, Chennai.

7. **Cluster Approach for Larger Impact in the Villages:** For having larger impact of latest technology, KVKs have followed cluster approach to demonstrate the technology in a contiguous area. It has proved to build trust in technology by seeing its performance in field situation.

8. **Custom Hiring Services for Use of Farm Implements/Farm Machineries:** This approach has been adopted by many KVKs especially in NICRA-KVKs, in which farm implements are provided on hiring basis to the farmers. Benefits accrued through custom hiring services are used for repairing/ maintenance of farm implements/ machineries. This approach has helped in sharing of resources leading to induced savings, group actions and harmony in the villages. Many farmers have seen the improved implements for the first time in their villages.

9. **Participatory Approaches:** Importance of participation of farmers and other stakeholders in KVK activities have been realized by all the KVKs. Problems prioritization, planning and designing of OFTs & conducting FLDs and other programmes of the KVKs have been done by all the KVKs. Sharing of inputs by farmers in conducting trials and demonstrations indicated participation of farmers with their willingness.

10. **Farmer Producer Organizations/Farmer Producer Companies:** Maharashtra and Gujarat have large numbers of FPOs/FPCs on different commodities. Many of them are working at national and state level such as grape growers association, pomegranate growers association, custard apple growers association etc. Farmers get technical advice and opportunities for capacity building, input sharing, linking with markets etc.

11. **Use of Electronic Media Including Social Media for Fast Knowledge Sharing:** In order to provide better communication facilities in rural areas, help line services through telephones/video conferencing, kisan advisory services using SMS feature of cell phone have been created in KVKs. KVKs have also extended kisan advisory services through text and voice messages feature of cell phone. Database has been developed for providing instant services as farm advisory units at these locations. This has, in many respects, revolutionized the concept of extension by reaching to the sizeable range of clients of the Zone. The KVKs of the zone have registered thousands of progressive farmers of their district who are continuously getting text messages from m-kisan portal.

12. **Seed Village Concept:** Technology adoption among farmers is often constrained because of non-availability of essential planting materials or seeds at the right time and at a reasonable cost. To overcome this difficulty, most of KVKs have ventured into promoting multiplication and supply of seeds of new varieties as trusted seed producers. Some KVKs have promoted the concept of seed multiplication at village level through some of the innovative or enterprising farmers by arranging breeders/foundation seed along with requisite technical backstopping. Foundation seeds from SAUs and research stations were arranged by the KVKs and technical support was provided to maintain purity and quality. Seed village concept increased the seed replacement rate due to readily availability of seeds of required variety in their own locality, at cheaper rates and of assured quality. Timely sowing or planting operations have also complemented the increase in yield substantially.

13. **Climate Smart Village:** Under NICRA-KVKs, climate smart villages have been created and all weather related information, climate resilient technologies, contingency plans to combat adverse effect of climate change, farm advisories, educating farmers, display of climate smart technologies at common place in the villages have been promoted.

14. **Farmer Field School (FFS):** Farmer Field Schools have become very popular and effective in promoting knowledge and skill development of the farmers. The approach is in great demand and needs to be taken up by other KVKs. There is good convergence with departments of agriculture in running these FFSs; many such

FFSs developed by department of agriculture are now under the supervision of KVKs. FFSs are being used under PoCRA for promoting climate resilient technologies in Vidarbha and Marathwada region.

15. **Krishi Rath Yatra for Farmers' Service at the Doorsteps:** This is a new initiative of the Gujarat government in which all the agricultural officials of the State Goverment take part including KVKs experts. KVKs along with line departments go to the village panchayats along with essential inputs and literature. KVK experts/scientists/extension workers educate the farmers on farm/animal husbandry related issues. This concept was found very useful for the farmers as they get latest information along with required farm inputs at their doorsteps.

16. **Contingency Plan at Block Level:** Agriculture in Maharashtra and Gujarat is often characterized as risk prone due to occurrence of frequent droughts on account of low and erratic rainfall, heat stress, frost and many other adverse conditions. The KVK experts have formulated contingency plans so that effect of drought could be mitigated at block/village level. Under this plan, various activities such as awareness camps, distribution of input kits including farm advisory, short duration crops/varieties, *in situ* moisture conservation technologies are regularly undertaken as per the need of the situation and the farmers.

17. **Interface with ICAR Institutes/SAUs/Line Departments/KVKs:** For faster technology dissemination and effective convergence, district/state line departments have been pursued to meet at district and state level. Some of the KVKs have devised mechanism to meet on a fixed date of every month for discussing relevant problems/issues and their solutions.

18. **Technology Weeks:** The KVKs of Zone also celebrate technology week in a crop season when the crop is in full bloom so that crop production technology could be demonstrated on-site. It facilitates seeing and believing among the rural farmers. The KVKs arranged activities in different thematic areas which run throughout the week. To make it more interactive and useful to all stakeholders, line departments were invited to demonstrate products and technologies at the KVK premises. The lectures, interactive sessions with experts are arranged to provide information and technological backstopping. Products and materials are arranged for sale in addition to providing information through exhibits, relevant literature and deliberations. The farmers are shown to various demonstration units of the KVK and interactions are facilitated.

19. **Community Radio Station:** Some of the KVKs have Community Radio Stations and running regular programmes as per need of the farmers' problems/ issues with coverage of a radius of 20-30 km area. They also broadcast interactive discussions between farmers and researchers/ experts for solving their farm related problems. Such facility needs to be extended to more KVKs

20. **Monitoring Mechanism for KVKs in Cluster/Ring of KVKs:** A cluster/ring has been formed by the ATARI in consultation with SAUs/host organisations. A group of scientists involving officials of the concerned organisations has been constituted for effective monitoring/reviewing.

21. **IFS Model Developed in Convergence Mode:** KVKs have focused on developing different IFS models for different categories of farmers as per need/locality/potential of the area. Support in terms of credit, technology, inputs, planning, implementation etc. is being taken for effective and workable convergence.

22. **Paravet Workers Group:** The activities in animal husbandry and agriculture have not made headway in most of the villages. Farmers hesitate to take up scientific livestock rearing due to lack of support services, high cost involved and uncertainty of success. To overcome these constraints, some KVKs of the Zone have resorted to training rural youth on the basic and general veterinary services like artificial insemination, vaccination, de-worming, first-aid in emergency situations and recommending improved breeds of cattle, goats and sheep. It has been successful due to working in close proximity of KVKs as well as with development departments of the districts. Rapid adoption of farm technologies is positively correlated to adoption of the practices by innovators in the same social system.

23. **Extension Corner:** Such corners have been established at 38 input dealer shops in Buldhana district. KVK provided latest technology/knowledge to the farmers who use to visit these corners for buying the inputs.

24. **Sarpanch Meet:** Sarpanch is elected as head of a village with responsibilities for looking after the development and welfare of the village. An interaction meeting of several sarpanches is organized to discuss village level problems/issues and their solutions related to farming were provided.

25. **Using Innovative Farmers as Resource Person for Transferring Technologies in other Areas:** In most of the KVKs, innovative farmers have been identified and their expertise is used for knowledge/technology sharing for up-scaling in other areas. The farmers showed more faith in listening and following the farm technologies practiced by these 'technology agents'.

26. **Exposure Visits to Model Farms:** Exposure visits are the routine features of most of the KVKs in the Zone. Some of the KVKs are using these approaches innovatively through concepts like "visit-our-campus" on pre-determined date and time to strengthen the linkages between the KVK and end users. In addition, exploratory visits of groups of interested farmers are being arranged by the KVKs to the places of interest within and outside the States. Such visits not only provide an opportunity to learn new things but also create new level of desire for excellence that is being achieved in other places. Line departments have fund provision of sending progressive farmers on study tours; such opportunities should be utilized for enriching their knowledge.

27. **Honorary Training Associate (HTA):** Honorary Training Associates are the master trainers, who had received skill trainings at the KVK. They are the ambassadors of KVK for disseminating the agricultural technologies to the farming community by their own members. KVK is issuing an identity card to the HTAs and utilizing them as a resource person for various trainings and extension activities to reach the unreached.

In addition to the innovative approaches, the following approaches were also followed by different KVKs.

28. Krishi Vigyan Mandal/Krishi Vigyan Manch on fixed date of every month.
29. Whole village adoption for silage making and loose housing dairy farm.
30. Community based water budgeting for appropriate use of available rain water and crop planning.
31. Contract farming for seedling production and marketing for sweet potato.
32. Mass trapping of insects for controlling pink bollworm etc.
33. Agro ambulance for diagnostic services (Pune-I & Pune-II).
34. Agro advisory through Climate Change Knowledge Network in Indian Agriculture at field level.
35. Pro Soil-NICE platform for agro advisory.
36. Chaitra Palavi- state level farmers' interaction on specific need-based themes.
37. Video conferencing, touch screen kiosk (Baramati).
38. Farming system nutrition model at village level.
39. Involvement of RAWE student for agro ecosystem analysis.
40. Massive campaigns for solving issues and relevant timely advisory.
41. Innovative couples farmers forum (Jalna-I).
42. V-ATIC (Village Level Agriculture Technology Information Centre at Baramati).
43. aAQUAeagri service- an interactive web portal for information retrieval.
44. Key agents/krishidoot at village level for knowledge transfer.
45. Three tier extension system for extended outreach (Nandurbar).

6. Impact of KVK Activities

6.1 Impact of Activities

The KVKs normally conduct impact studies of their activities/technologies in the districts through different ways and means. They assess the percentage of farmers, farm women and rural youth who adopted the technologies with their technical feedback. In depth analysis of different successful cases is being done. Relevant information and data were obtained through group discussion, participatory rural appraisal, informal interaction, survey etc.

6.2 Impact of Training and Other Activities

Capacity building programmes, demonstrations, seed production, nursery raising, vocational training, poultry farming, off season vegetables, protected cultivation, production of organic inputs, cultivation of pulses, bee keeping, mushroom production etc., are some of the technologies/initiatives which have impacted the villagers in terms of socio economic development at the village level. Some of the cases have made larger impact in the area, which are reported as under:

6.3 Case Studies

MAHARASHTRA

1. Mogi- Improved Wheel Hoe for Inter Cultivation Operation: KVK, Nandurbar

Problem identified: Various existing hand tools like spade, khurpi are used by farm women for weeding and that require sitting in a squatic position for a prolonged time that caused drudgery, leading to backache. Besides drudgery, the field efficiency also remains very low that involves more labour and time.

KVK's Intervention: To solve this problem and considering the usefulness of wheel hoes, KVK Nandurbar developed new wheel hoes and named it Mogi. The tool was validated by MPKV, Rahuri and the capacity was found 82.5 %. The Mogi hoe has spread among 1250 farmers in 31 districts of Maharashtra.

2. Doubling Pigeonpea Production with Introduction of BDN-711 Variety: KVK, Solapur-I

Problem Identified: Pigeonpea (local variety Khadka/Gullolli) was a major pulse crop grown in kharif in Akkalkot and Barshi tehsils of Solapur in about 45000 ha area (>75% area and 80% production) with average yield of 5.87 q /ha, which was very poor. The major reason of poor productivity was frequent dry spells during the rainy season which caused moisture stress during flowering and pod filling leading to severe drop down in productivity due to susceptibility with *Helicoverpa armigera,* sterility mosaic and Fusarium wilt.

KVK's Intervention: In order to overcome the problem, the KVK Solapur-I laid down FLD in 117.2 ha (av. plot size 0.40 ha) with BDN-711 cultivar, a short-duration variety, most suitable for dry land conditions, having

synchronized flowering, resistant to wilt disease and highly responsive to drip irrigation. Solapur is a drought prone area, frequented with dry spells during rainy season. Average rainfall of the district is 561.47 mm with erratic and uneven distribution. The moisture stress during flowering and pod filling are the major constraints for low productivity of pigeon pea together with local cultivars susceptible to *Helicoverpa armigera,* sterility mosaic and Fusarium wilt. BDN-711 variety gave an average yield of 15.35 q/ha as compared to local check (7.75 q/ha), which was 98.06% higher and provided an additional income generation of Rs. 38,380/ha. Two farmers and equal number of youth sold 33.16 q of seed of this variety to 393 farmers @ Rs. 100/kg in place of support price of Rs. 50/- of local variety thus helped the farmers in supplementing their income. The variety has now been adopted in 30,000 ha area.

3. Broad Bed Furrow Sowing in Soybean through Cluster Approach: KVK Pune-II

Problem identified: Due to low productivity of groundnut in rainfed area, the soybean was introduced as an alternate crop for higher productivity. However, soybean suffered badly due to erratic rainfall and prolonged dry spells weather conditions.

KVK's Intervention: To mitigate the problem, 50 demonstrations on 20 ha area with active involvement of farmers on cluster basis were carried out with the improved variety MACS-1188, which was sown with Broad-Bed and Furrow Planter (BBF) for maintaining better *in-situ* moisture conservation under rainfed situation. The seed was treated with Trichoderma, Rhizobium, PSB (Phosphate Solubilising Bacteria) and soil with foliar spray of N:P:K (13:00:45) based on soil testing. Sowing with BBF technology yielded 24.1q/ha, which was 22% higher in yield over the local check of 19.6q/ha. This success has lead to increase in soybean area to around 100 ha within a year.

4. Backyard Poultry with Deshi Birds for Higher Income Generation: KVK Pune-I

Problem Identified: Small-scale backyard poultry farming is highly suitable for the area particularly for rural women. In the prevalent system, local (deshi) birds having slow growth and poor egg laying capacity are used which are also not vaccinated leading to higher amount of mortalities. Hence, there is need for replacement of poultry birds with that of disease resistant birds having faster growth and higher egg laying capacity.

KVK's Intervention: In order to increase productivity of both eggs and meat, the vaccinated chicks of Vanaraja produced by KVK Baramati were introduced in the area. Vanaraja birds are highly suitable for backyard poultry farming in rural areas as they are multi-coloured dual-purpose bird with attractive plumage and higher price for both eggs and meat. It has also better immune status against common poultry diseases and is adaptable to free range rearing system. Demonstrations were arranged by providing 5

weeks old 20 vaccinated chicks to each farmer family. They were fed on locally available feed ingredients such as maize, sorghum, pearl millet and kitchen waste. On attaining age of 8-10 weeks, they were given RD vaccine (R2B) and Fowl pox vaccine and a booster dose after 6 months. The birds started egg laying at 6 months age having average weight of 2.5 kg. Average egg production was recorded 156 eggs/yr/hen, which was highly significant than the local check in which egg laying was started at the age of 7-8 months with average weight 1.75 kg and egg laying 66 eggs/yr/bird, respectively. Eggs and meat production was found to increase by 136% and 28%, respectively.

5. Intercropping of Soybean with Pigeonpea for Higher *In-situ* Moisture Conservation in Wardha

Problem Identified: Poor *in-situ* moisture availability is a common problem in Vidarbha region, where crops like cotton, soybean and pigeonpea are grown under rainfed system that result in poor crop production.

Intervention made: To maximize moisture conservation in soil, Shri Dilip Nanaji Pohane of village Daroda, taluka Hingnaghat, district Wardha adopted *in situ* conservation practices like across the slope cultivation and opening of furrows in his farm of 12 acres. He opened the furrow after sowing cotton at 45 days and soybean at 30 days using two tines bullock drawn cultivator. He also sowed pigeonpea on beds at a distance of 2.5 m and three rows of soybean as intercrop. Due to this intervention, the runoff from the field was reduced up to 60-65%. During dry spell, the moisture in the treated field was 25% in comparison to untreated field having 20%, which helped in sustaining the crop during two dry spells and resulted in increasing productivity by 18.64% i.e. increase in production from 5.9 q/acre to 7.0 q/acre. Additionally, he also cultivated pigeonpea as intercrop in cotton and attained supplementary yield of 2 q/acre.

6. *In Situ* Soil Moisture Conservation Practices for Raising Rabi Sorghum: KVK, Baramati

Problem Identified: Poor productivity of rabi sorghum due to low moisture availability in soil at critical growth stages.

KVK's Intervention: KVK, Baramati demonstrated the moisture conservation technology for increasing productivity of rabi sorghum. In this practice even with rainfall of 60-70mm, moisture was conserved uniformly in the field by constructing small (10x10 m) flat beds, which reduces runoff losses of water and soil erosion. This resulted in minimizing the water moisture stress during critical growth period and higher crop yield of an average 14.81 q/ha in the Baramati, Purandhar and Indapur tehsils in comparison to check of 6.25 q/ha, thus showed an increase of 212% yield.

7. Pheromone Traps for Shoot and Fruit Borer Management in Brinjal: KVK, Ahmednagar-I

Problem Identified: Brinjal is a major vegetable crop in Ahmednagar district, cultivated on approximately 3000 ha. The crop is prone to shoot and fruit borer that causes 30-35% loss to the crop every year.

KVK Intervention: The KVK used pheromone traps for the management of shoot and fruit borer of brinjal. The trap attracts the adult male pest which provides advance intimation on pest incidence in the field. Initially, three

traps per acre were placed, which were increased to 16 traps per acre for mass trapping once the pest attack started. With the installation of these traps, the spray interval period was increased by 5-6 days, which helped in 40% reduction in use of chemical pesticides besides 90% reduction in pest infestation. Now around 75% brinjal grower villages covering an area of 1000-1500 ha are using this methodology. The traps are being provided by the KVK Ahmednagar. So far more than 6000 traps have been supplied to 296 farmers.

8. Enhancement in Sugarcane Productivity Using Fertigation: KVK, Baramati

Problem Identified: Sugarcane is a major crop of western Maharashtra region where huge volume of water and fertilizers is used, which costs more to the farmers. Intervention was required to cut down the input cost of sugarcane farming on account of use of more fertilizers.

KVK Intervention: In order to reduce consumption of fertilizers in sugarcane crop, KVK Baramati applied fertigation method through drip irrigation system for enhancement of yield and profit. In this system, 80% of recommended dose of fertilizer was applied through drip with irrigation (Fertigation) on daily or weekly intervals. This application helps in saving of 20% cost towards fertilizer application and also labour cost. The average numbers and weight of millable canes and length of internodes were also found more as compared to control. The fertigation technology is being adopted by 8600 farmers. With this, the average productivity of sugarcane has increased from 97.5 t/ha to 142.5 t/ha.

9. Success of First Women Farmers' Producer Company in Maharashtra: KVK, Solapur-I

Mrs Anita Yogesh Malage established an FPC named M/s Yashswinee Agro Producers Company Ltd in Boramani, taluka South Solapur, district Solapur in 2018. The KVK promoted group approach by establishing farm women's SHGs at Boramani village with the support of ATMA and Maharashtra Agricultural Competitiveness Project (MACP), Solapur. Technical guidance and trainings on value addition, agro-processing, packaging, labelling and FSSAI licensing to the members of FPC were given to the groups. The FPC has been identified by the NABARD as a nodal agency for providing financial support to the joint liability groups (JLG) involving rural youth in Solapur district. Under this scheme, capital of Rs.25 lakh is provided to 50 JLGs comprising 250 farm women. KVK, Solapur promoted fruit production and marketing through group approach. The FPC promoted fruit cultivation on 86 ha area and did direct marketing. FPC saved the money otherwise going to the middlemen. The FPO has also developed 120 small agro processing units (dal mill, grading, primary processing, pickles & masale, soybean and jowar processing) involving farm women. The FPC developed 109 units of women' entrepreneurship through agro-processing and established 120 vermi compost units and 86 ha fruit plantation under MREGS scheme in Boramani. Establishment of agro-processing centre and direct marketing of vegetables has created confidence among the members about functioning of FPO. Technical backstopping by KVK and regular advisory enhanced the productivity of crops and sped-up the value addition and marketing avenues.

10. Enhancing Grape Cultivation through Improved Methods in Jalna: A Model for Attracting Youth in Agriculture

Problem Identified: Can mechanization in grape farming, increase productivity and profitability and attract youth & retaining them in rural area.

KVKs Intervention: In order to improve productivity and profitability in grape farming, KVK Jalna provided technological support on advanced & improved varieties, pruning techniques, micro irrigation management, rain water harvesting through adoption of farm ponds, marketing techniques like early and late pruning on grape farming to Shri

Dattatray Bhanudas Chavan, who has now become an innovative grape farmer of the area. Sonaka, Super Sonaka, Thompson, Tas-E- Ganesh improved varieties of grapes were planted by him and practiced automization for irrigation and fertigation together with electrostatic spray for dipping of grapes. He used drip and sprinkler irrigation for whole crop husbandry and during water scarcity period, water collected in a pond through rainwater harvesting was used. With this, the average productivity of grapes was enhanced from 12 tons/acre to 15 tons/acre together with significant higher profitability. He has also adopted modern packing system for transport of grapes for better shelf-life and acquainted himself for retail and wholesale marketing for maximizing profit. He has now become the facilitator of advanced grape farming in the area and motivating the rural youth to adopt grape farming instead of traditional crops. As a result, about 200 migrated unemployed youth returned to the village. The grape cultivation from a mere 25 acre in the village during 2012-13 is now jumped to 350 acres in 2015-16. About 50 landless families also got self employment in the village in the months of February, March and April by purchasing grapes directly from the orchards and selling it on the road sides in Jalna city.

11. Sericulture for Self-employment and Higher Income Generation: KVK, Beed-I

Problem Identified: Can sericulture provide higher income in drought-hit areas of Beed?

KVK's Intervention: KVK motivated farmer Shri Kishan Jadhav of Warapgaon, Ambajogai (Beed) to plant mulberry crop using drip irrigation at his farm. He used 100 DFL (disease free larvae) per batch for cocoon production and harvested them seven times in a year. The yield of coccon per batch was obtained 80-90 kg, which was sold on an avereage of Rs. 450 to 600 per kg. An income of Rs. 45000/100 DFLs was estimated within a span of 25 days, which is highly lucrative for self-employment.

12. Sericulture as an Alternative Crop for a Sustainability and Profitability in Drought-hit Areas of Jalna, Maharashtra

Problem Identified: Poor productivity and failure of traditional crops due to drought conditions in Jalna, Maharashtra.

KVK's Intervention: KVK provided technical support to Shri Pratapsing Marag of village Kadegaon, taluka Badnapur, district Jalna to overcome poor productivity and failure of traditional crops such as cotton, maize and chickpea due to prevalent drought conditions with that of sericulture on his 4.0 acre cultivable land. Under NICRA project, sericulture group was formed involving 20 farmers. Mulberry was grown on one acre area in the year 2015-16 and cocoon production was taken up under a shed of 22x55 feet with the introduction of 175 DFLs. Four cycles of cocoon were produced each one at an interval of one month. From 175 DFLs, an average of 150 kg cocoons and a total of 600 kg cocoons from 4 cycles were obtained with gross income of Rs 3.0 lakh per acre in a year. More than 1500 farmers have started sericulture and 1300 new farmers have got registered themselves for sericulture. Farmers are now getting assured income due to sustained survival of crop in low rainfall.

13. Krishi Vigyan Mandal: An Innovative Model for Transfer of Technology

Problem Identified: With large jurisdictional area and small team of experts, it becomes difficult for the KVK to reach to large number of farmers particularly those located in remote area. At such places, physical presence of experts from ICAR, SAUs and line departments is also not available.

KVK's Intervention: In order to solve the above problem, KVK Jalna formed a district level informal group of farmers named 'Krishi Vigyan Mandal' (KVM) with specific objective of technology transfer in faster and effective manner through farmers' network. A forum of officials and few innovative farmers was formed during 1997 to serve as mentors. This forum organizes monthly seminar on the topics decided by the farmers in advance for the seminar on every 5th day of the month at KVK in which experts from all the above said departments together with Member Farmers activitely participate. The funding for all the logistics of seminar is met by the KVK Member Farmers. In order to assess the utility of topics and motivate the farmers for regular participation, a quiz contest is also organized based on seminar topics discussed in the previous seminar and the winners are awarded medals. So far 251 monthly seminars have been held without any discontinuity. More than 500 topics have been discussed on broad issues of crop production, horticulture, animal husbandry, post-harvest management, value addition, marketing and awareness of government schemes etc. Farmers are also felicitated for their outstanding contribution in various fields. The Mandal has become very popular in the area and around 250 to 300 farmers actively participate in the seminars on their own cost due to the importance of the topics discussed in the seminars and benefits farmers get. There are > 2000 active members in KVM, who motivate other farmers from this platform to adopt new technologies. In all 968 villages in the district are directly or indirectly covered through this regular event. Few farmers from adjoining districts namely Aurangabad, Beed, Parbhani, Buldhana and Jalgaon are also members of KVM and regularly attend the seminars. With this activity, the Farmers' trust in KVK has increased. KVK is also getting regular feedback and support in several mandatory and extension activities from the farmers in a better way.

14. Tuberose Farming is Short Duration and More Profitable and an Alternative to Sugarcane: KVK, Satara-II

Problem Identified: Sugarcane is long duration crop that provides return after long interval of 12-18 months, with the result farmers have to wait long for their earning. It also requires huge volume of water for irrigation and fertilizers for maintaining productivity.

KVK's Intervention: In order to minimize water and fertilizer consumption and also getting regular income from agricultural produce, the KVK initiated tuberose farming in Satara. Technical support was provided to the farmers about tuberose cultivation through training and exposure visits at the Directorate of Floricultural Research (DFR), Pune. Information on govt funding and subsidies were also provided to them. With the sincere efforts of KVK experts; three farmers namely Shri Alpesh Bapurao Phalke, Shri Bhushan Anil Phalke and Shri Aniket Sanjeevan Phalke from village Padali Tal Koregaon of district Satara, successfully started tuberose cultivation in a scientific mode. With their success, more than 42 farmers have now taken up tuberose cultivation in around 20 ha in Koregaon tehsil. Farmers plant single type of tuberose Arka Prajwal and Phule Rajani bulbs on 4.5 feet raised-bed at spacing of 40 cm x 40 cm. Water soluble fertilizers are applied through drip system @ 2 lph. *Jivamrut* is used as bioagent. Yield of flowers started after 70-82 days of planting and a production of 4 kg/acre/day was achieved on daily basis up to 4 months which subsequently increased to 14-15 kg/day/acre. Farmers in this village produce more than 400 kg of tuberoses every day. The net return of Rs. 66000/acre earned by the farmers is significantly higher by 188% in comparison to sugarcane crop. Thus, crop diversification has brought changes in the income of rural youth and mind set towards tuberose farming.

15. Kadaknath Backyard Poultry- A Better Option for Unfavourable Climatic Conditions and Higher Profitability: KVK, Nandurbar

Problem Identified: The prevalent poultry in the village Umarani, Nandurbar is highly susceptible to viral diseases in extreme hot and cold climatic conditions and to water borne diseases in rainy season and thus a constraint in popularization of poultry in the region.

KVK's Interventions: In order to mitigate the disease problems occurring in the prevalent local poultry in the climatic conditions of Nandurbar, KVK Nandurbar facilitated farming of vaccinated Kadaknath breed, which is tolerant to diseases emerged during extreme cold & heat and during monsoon season. KVK provided 13 chicks of 25 days age and 3 fully grown males to Shri Dhakal Singh of village Umarani in the beginning along with poultry feed and mineral mixture. The Kadaknath poultry established well at his farm and there number has now increased to over 1000. Kadaknath birds are high-valued commodity which become ready for meat sale after four months on attaining body weight of up to 1 kg and sold @ Rs. 800 per kg. It started laying eggs at 6 months age and on average lay 92 eggs in a year, which is sold @ Rs. 30 per egg. Net income of Rs. 3380 per bird is obtained from Kadaknath in comparison to local Giriraja breed with Rs. 1070 per bird.

16. Protected Cultivation of High-Value Vegetables Under Polyhouse: KVK, Pune-II

Problem Identified: Young and educated farmers aspire for higher income from agriculture by adopting high-value vegetables farming.

KVK's Intervention: Mr Vikas Wagh, an educated young farmer from Pimplwandi village from Junnar tehsil of Pune district was carrying out traditional farming over his 5 acre land and was not satisfied with its outcome due to low income return. He underwent courses of Agriclinics and Agribusiness at KVK Narayangaon and started growing colour capsicum, Inspiration and Bachata varieties (red and yellow chilli), the high-value vegetables under the polyhouse on 10 R (1R=100 m^2) area in a scientific mode. Planted nursery in mid of July in the polyhouse and the production was started after 2 months. He obtained about 10 tons of export quality colour capsicum from polyhouse of 10 R areas. He has also started growing red cabbage, an exotic vegetable under the polyhouse at his farm. He started growing colour capsicum (red and yellow chilli) under polyhouse (10 R area) in a scientific mode. The construction cost of polyhouse (Rs 12.0 lakh) was met from a bank loan (Rs. 10.0 lakh) and own money (2.0 lakh) on which a subsidy of Rs. 5.35 lakh was provided by the state govt. A total of 10 tons of export quality capsicum was produced by him in the first year itself from whose sale an earning of Rs. 4.5 lakh was made, which helped in returning the loan amount in the first year itself. The farmer also achieved yield of 10 ton capsicum in the second year and earned net profit of Rs. 8.0 lakh due to rise in selling price of capsicum to Rs. 150 per kg. The farmer is now satisfied with his performance and has started farming of blue cabbage an exotic variety of high value vegetable. He has also taken up production of sticky traps as a side business and now has become role model in the area for promoting farming of high-value vegetables.

17. Vegetable Seedling Production through High-tech Nursery: KVK, Nashik-I

KVK Nashik-I provided one-month training on horticulture nursery management to Shri Madhukar Gavali of village- Ugaon, tehsil Niphad, district Nashik, having landholding of 44 R during July 2008. After his training, he developed shed-net houses for raising vegetable seedlings with an initial production capacity of 10,000-12,000 vegetable seedlings in portrays using modern methods of mechanized high-tech farming in polyhouses during 2009. With success, he gradually expanded production to over 50-55 lakh seedlings annually. He has become a

successful entrepreneur of producing vegetable seedlings in the region. Every year 2000 farmers, students and extension workers used to visit his horticulture nursery. He has also become one of the prominent exporters of fruits and vegetables in Maharashtra.

18. Mass Trapping of Pink Bollworm in Cotton with IPM: KVK, Jalna-I

Problem Identified: Cotton is one of the main cash crops of Jalna district which is grown on almost 65-70% cropped area (2.80 lakh ha). During 2017-18, there was heavy outbreak of pink bollworm in cotton, which caused 30-70% yield loss. Pink bollworm has also developed resistance against Bt cotton hence, it became essential to provide immediate technological support to farmers for its control.

KVK's Intervention: The IPM technology of using pheromone traps recommended by the Anand Agril. University, Anand was promoted on large-scale by conducting seminars, trainings and personal visits by the scientists of KVK Jalna-I in the affected area with the support of ATMA. KVK conducted OFTs on large-scale for demonstration on Mass Trapping of Pink Bollworm with IPM technology, which was greatly successful. As per the technology, 40 traps are to be used per hectare. The traps are to be used 15 days after sowing at 30 cm above the plant height and changed after every 60 days during the period of infestation. Male moths catched in the traps need to be destroyed every day. With this IPM management, about 33.65% yield of cotton was found increased at an additional input cost of 4%. The technology has now reached to almost every village with the help of Department of Agriculture and other agencies and more than 2 lakh traps have been used in 2018-19 by the farmers.

19. Income Generation from Degraded Cocoons: KVK, Jalna-I

Problem Identified: During harvesting of silkworm cocoons, 5-10% of them is procured in degraded forms and get very low market price.

KVK's Intervention: To make use of degraded cocoon for higher profit, KVK Jalna-I provided training in the utilization of degraded cocoons for the production of high-valued decorative items. A total of 50 farm women were trained in last 2 years, who have started preparation of various decorative items such as flowers, garlands, bouquets, necklaces, bracelets, key chains, wall pieces, torans, flower pots, night lamps etc from the degraded cocoons, which are in good market demand with high price. The value added products have given the income of Rs. 1000-2000 per kg of cocoons which otherwise would have sold at Rs. 100-150 per kg.

20. IT Graduate Turned into Agricultural Entrepreneur: KVK, Beed-I

Mr. Vaijanath Nirmal, an IT graduate from village Ambajogai (Beed-I) was inspired with the training on Aonla Processing provided by KVK Ambajogai in 2016. He started his own company with a set of machineries such as aonla breaking and punching machine, container packing machine and also procured license from FSSAI for the production and supply of several processed aonla products such as aonla candy, supari, murabba etc in the year 2017. The company is now producing and supplying aonla products in the market with good return.

21. Sericulture: A High-income Generating Farming System: KVK, Solapur-I

Problem Identified: The productivity and profitability from traditional crops of sorghum and sugarcane is low and provide one-time income after a prolonged period in district Solapur. This has led to migration of rural youth to urban areas.

KVK's Intervention: It was observed that the climate and soil conditions of district Solapur are suitable for the cultivation of mulberry plant and rearing of silkworms, which is a high-vlaue practice. The rural youth of village Kalegaon and adjacent villages from Solapur district, who were carrying out traditional farming of rabi sorghum and sugarcane and interested in moving to high-value enterprises were given skill and vocational trainings in sericulture. Out of 145 rural youth trained, a functional group comprising of 20 youth from village Kalegaon formed a group named Laxmi Narsinha Sericulturists Group Kalegaon. KVK also helped them linking with the Department of District Sericulture Development for erection of sericulture unit under MREGS scheme. Govt of Maharahstra provided a regular grant of Rs. 2.95 lakh (100% subsidy) for three years. Now, a total of 44 youth have started their sericulture units. Each unit is earning Rs. 25000 to 30000 per batch. On an average, 3-4 batches are run in a year. Thus the income generated through sericulture is not only on regular basis but also very high in comparison to traditional crops, where income of Rs. 22000-25000 was obtained after a gap of 14 months. The activity has thus paved way for enhancing the farmers' income and also retaining youth in agriculture.

22. Setting-up of Poultry Hatchery as a Rural Enterprise: KVK, Pune-II

KVK's Intervention: The KVK-Pune II promoted the concept of poultry hatchery to Shri Ravi Jadhav, aged 36 years of Manchar village, taluka Ambegaon, district Pune. On the advice of KVK experts, he started his hatchery named Mayur Hatchery with a production capacity of 1000 chicks in the year 2013 as a subsidiary occupation. Subsequently on the advice of KVK experts, set up his own parental stock farm in order to maintain quality chick production in 2018. Now, more than 100000 chicks are sold by him to various poultry farmers from his unit and has become a popular chick producer in the area.

23. Soybean Cleaning with Spiral Separator for Reducing Drudgery: KVK, Pune-II

Problem Identified: Manual method of cleaning grains (soybean and pigeon pea) with sieves leads to heavy drudgery that cause pain in fingers, hands, shoulders to workers and higher time consumption. Even after threshing, lots of stones and sticks remain present in crop grains that provide poor price to the farmers.

KVK's Intervention: To overcome the above problem, KVK Pune-II distributed spiral separators to SHGs with the financial support of ATMA and demonstrated the cleaning methodology by organizing trainings and distribution of extension literature using spiral separators. One such separator cleans about 200 kg grains/hr with 90-95% cleaning efficiency in contrast to 32-35 kg grains/hr by a labour with comparatively poor cleaning efficiency. Some farmers have started their business of cleaning grains by charging Rs 1 per kg and also doing custom hiring of the implement at Rs 150 per day. By seeing result in 2016, 2017 and 2018, ATMA has announced financial assistance for supplying of spiral separators to 55 SHGs in Junnar, Ambegoan, Khed, Shirur talukas. Some farmers have also started buying from their own resources.

24. Silage a High Quatity feed for Crossbred Cows and Alternative to Green Fodder: KVK, Baramati

Problem Identified: Crossbred HF cows, whose population is around 50% in Pune district, require green fodder throughout the year for optimum milk yield. However, the availability of green fodder is seasonal in the area and also limited as 5% of the cultivable area is utilized for fodder production.

KVK's Intervention: In order to overcome the problem, the KVK Baramati introduced silage as a quality feed for the HF cows, whose acceptability, palatability and milk yield in cows is better than green fodder and can be stored round the year for use. To promote silage making in the area, KVK selected 90 farmers from 90 villages of Pune district and trained them in silage making. A financial support of Rs. 25000 was provided to the farmers under the National Dairy Plan-I of Fodder Development Project (NDDB). The technology of silage making has been adopted by the farmers, which is first of its kind in the area. For making of silage, the chopped fodder is filled in the silo tank and silage culture @ 1litre for 10 ton of fodder is mixed during filling of the tank. The tank in this way is completely filled within 3-5 days and sealed with 300 micron HDPE film. Silage becomes ready for use in 45 days and fed to the cows either alone or mixed with green fodder. The technology has been adopted by about 800 farmers till 2018.

GUJARAT

1. Control of Pink Bollworm in Cotton with *Beauveria bassiana* and IPM: KVK Surendranagar

Problem Identified: Pink bollworm (*Pectinophora gossypiella*) became a menace in cotton crop (including Bt cotton) in Surendranagar district of Gujarat during 2016-17 and 2017-18, where it is cultivated as a major kharif crop.

KVK's Intervention: KVK, Surendranagar under the guidance of Junagadh Agricultural University studied the mode of pink bollworm menace in the area and came out with a new holistic approach for its control using bio-agent *Beauveria bassiana* and IPM module. However, this approach requires knowledge on infestation method and application of treatment to minimize crop damage and operation cost on treatment. Hence, KVK organized mass campaigns to apprised the farmers about it. Mobile and poster display based agro-advisories were also given, which helped in control of the menace. Junagadh Agricultural University took initiative to produce Sawaj brand *Beauveria bassiana* and assured its availability through KVK to farmers.

2. Date Palm Production Technologies in Kutch, Gujarat

Problem Identified: Poor availability of elite planting materials and manual pollination are the tedious problems in Date Palm cultivation in Kutch district.

KVK's Intervention: Date palm is a major fruit crop in Kutch district. However, it has the problems of non-availability of good quality planting material and simple & handy pollination techniques. The KVK Kutch has developed production of quality planting material from the off-shoot suckers of elite local variety and also through tissue culture techniques in place of traditional plantation. As production of planting material from off-shoot sucker has limited scope, the KVK established tissue culture laboratory for the production of planting variety of elite groups. It has so far supplied 1000 planting material from this lab. In order to promote farming of date palm

and techniques of producing planting material through tissue culture, the KVK organized trainings, seminars and exhibitions. More than 90% of the farmers have now planted date palms produced either by off-shoot suckers or tissue culture method. With this success, the farmers have also planted 120000 Barahi variety of imported date palm. KVK Kutch also developed and popularized PVC pollinator in which a PVC pipe and empty glucose bottle are used to blow pollens on female flowers with better pollen spread and help in reducing drudgery of climbing on the tree. The KVK, Kutch has become the hub of date palm planting material as well of date palm fruits.

3. Use of Cotton Stubble as Soil Nutrient Resource: KVK, Amreli

Problem Identified: Farmers of Amreli sow cotton crop in both kharif and rabi seasons. After harvesting of cotton, lots of cotton stalks remained as residue on farmers' fields. These stalks are either largely wasted (burnt) or inefficiently used (firewood) and become the cause of air pollution.

KVK's Intervention: Understanding the situation, KVK, Amreli demonstrated proper use of cotton crop residues by converting it in to valuable compost. For composting, the crop residue is cut into small pieces of 2.0-2.5 cm size with a cotton shredder developed by Junagadh Agricultural University; the shredded pieces of stalks are subsequently incorporated into soil. This serves as organic manure before sowing the next crop. The cotton residue provides nitrogen, phosphorus, potassium and carbon as available nutrients in the field and also reduces the risk of soil erosion. The farmers of Amreli and that of adjoining areas have adopted the technology.

4. High-tech Organic Farming and Value Addition for Higher and Sustainable Income: KVK, Jamnagar

Problem Identified: The production of traditional crops such as groundnut, sorghum, pearl millet and fodder crops has become uneconomical in village Siddhpur of Jam Khambahlia, block Devbhumi, Dwarka due to continuous drought seasons, increase in the cost of fertilizers and pesticides.

KVK's Intervention: In order to overcome the identified problems, KVK Jamnagar persuaded Shri Laljibhai Parmar of village Siddhpur to practice organic farming of high valued vegetables using farm-made organic manures and bio-agents. In order to follow it, he started ***Mandap Paddhati*** for vegetable (viz., bottle gourd, ridge gourd, sponge gourd, bitter gourd) cultivation supported with micro-irrigation. He also practiced mixed cropping of brinjal, chilli, cabbage, beetroot, carrot, coriander and fenugreek; inter cropping of pulses with garlic and onion cultivation. All the crops were grown using farm-made organic products such as compost, cow urine *jivamrut* and *agnihotra* mantra. He applied bio-products *viz*., *Trichoderma*, *Beauveria*, *Azotobacter*, PSB, *Rhizobium*, NPV; MDP Technology, Pheromone trap, Fruit fly trap, Yellow sticky trap, light trap for pest control. Recently, he has introduced cultivation of passion and dragon fruits. He has also started potato growing above the ground for the Jain community, which is giving him higher price. Shri Parmar did marketing of his farm produce himself and maintains contacts with the consumers. Now he is getting very good profit from his farm produce on a sustainable basis.

Besides, he has also started Kamdhenu Gaushala at Gadhka, initially with 15 Gir cows which have now increased to 60 cows. Desi ghee is prepared from the milk of Gir cow, which has a very high demand and gets higher price due to its medicinal properties. He has also started production of organic groundnut and wheat. Organic groundnut is used for the production of oil production for which a mini oil mill has been established by him. The oil is sold @ Rs. 2800 per 15 kg groundnut oil. Similarly organic wheat also gets higher price of Rs. 700 per 20 kg (Rs 35/kg).

GOA

1. Improved Piggery through Artificial Insemination (AI): KVK, North Goa

Problem Identified: Low weight gain by local piggery breed.

KVK's Intervention: Shri William Afanso, a 45-year old agri-entrepreneur of village Agassaim, Tiswadi, Goa used to rear poor quality piggery breed in a traditional manner from which he was getting adult pigs of average weight 30-35 kg, which is very low. Expert of KVK, North Goa advised him to adopt artificial insemination technology for improving the local breed for higher weight gain. Hence, AI was done in 7 local sows using semen

of Large White Yorkshire Boar from Semen lab established by Animal Science Division of ICAR-CCARI, Goa. Shri Afanso was also provided training on AI procedure and technique. Artificial insemination in sows gave good results as piglets born were healthy with good weight and reached around 70-80 kg marketable weight at the age of 8-9 months. With this success, ten nearby piggery owners also practiced artificial insemination in their local pigs. Now the piggery owners are getting much higher returns from their produce.

6.3 Farm Innovations by Farmers

The KVKs under the Zone VIII ATARI Pune provide time to time technical support to farmers in the development of their thoughts into reality in the area of agricultural development through organization of group meets, informal interactions and also visit to their place. With the result, some of the progressive farmers have succeeded in the development of innovative technologies, which are praiseworthy and highly useful for the farming community. The important ones are given as under:

6.3.1 Polyhouse for Rainwater Harvesting and Retardant for Lowing Evapo-Transpiration

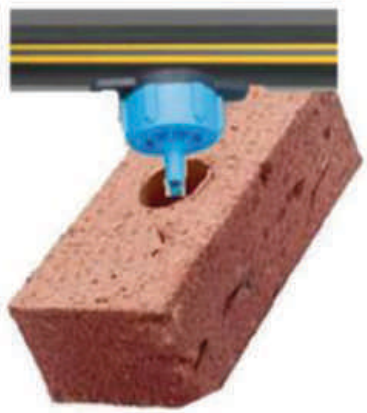
Shri Uttam Mayanji Gadekar, village Pimpri Lokai, Taluka-Rahata, District Ahmednagar developed rainwater harvesting structure by collecting rooftop water of polyhouse in a pond of size 50x10x3 m having water storage capacity of 15 lakh litres for use during drought period. He also used surface water retardant (Evaloc) to minimize evapo-transpiration rate in the pond, which is very high in the area. The retardant reduces 27% water loss from the pond in 3 months. The conserved water is used by him for protective cultivation of high-value colour capsicum in Polyhouse of 0.20 ha area with high rate of return.

6.3.2 Bullock Drawn Fertilizer Applicator

Shri Namdeo Anandrao Vaidya, village Nimbhora Bodkha, taluka Dhamangaon, district Amravati developed a low-cost bullock drawn fertilizer applicator for faster and uniform fertilizer application. The bullock drawn fertilizer applicator is simple and portable weighing 25 kg. The field efficiency of the implement is 2.4-3.2 ha/day and operating cost is Rs. 428/ha, which is comparatively highly economical than the traditional system of hiring labour. The applicator also provides advantage of applying fertilizer near root zone and hence proper mixing with soil, which increases the fertilizer use efficiency. The implement has been adopted by the farmers of the area and more than 25 such applicators have been locally manufactured and are in use.

6.3.3 Use of Bricks for Irrigating Rootzone of Plants, Minimize Water Use in Drip System

Shri Nayum Patel, village Dhawalapuri, tehsil and district Aurangabad initiated orange plantation in severe drought prone area. He developed a simple, cost-effective and unique system of saving water requirements in drip irrigation system. He used bricks to serve as pipeline for providing the water directly at the plant root zone. For this, a hole is made in the centre of bricks. Two such bricks were piled up and inserted 5-6 inch below the soil so as to serve as pipeline and also work as storage of water in that regime. In the top brick-hole, a single dripper (compensating dripper) having discharge of 8 litre/hr was inserted for providing water to plant root zone directly without its wasting in the soil. This way, he irrigated the orchard for half an hour every alternate day or once in two days. The system was found highly successful in saving the water and helped the farmer in taking good produce of orange from his orchard. The system will help in reviving orange cultivation in such areas.



6.3.4 Innovative Farming Practices through Water Budgeting

Shivni village is a drought prone area with 660 mm average rainfall, where mono-cropping is practiced during kharif season with unpredictable results. In order to have a sustainable crop round the year, Shri UddhavAsaram Khedekar of village Shivni, Jalna, Maharashtra started crop planning based on water budgeting technique. He started collecting daily rainfall data in order to get estimate on water availability through water recharge and storage in the area. Based on the estimated water availability, the cropping was planned in respect of type of crop, planting density, inter-cropping, raising of crop beds, bunding, protective farming etc. The farming measures undertaken by him were use of BBF planter in soybean, pigeonpea, mungbean, urdbean for reducing farm level stress; maintaining organic carbon in soil by contour cultivation, bunding, minimum tillage and green manuring; protective irrigation by sprinkler and drip in case of water availability; cultivation of highly remunerative crops for seed production such as onion etc. With such manoeuvrerial measures, the farmer successfully realized higher crop productivity and profitability per unit area. Now this practice has become popular in around 2000 ha in the surrounding area.

6.3.5 Low-Cost Sprinkler Irrigation Set Using Waste Plastic Bottles

In order to reduce high cost of sprinkler set used in micro-irrigation system, Shri Shivaji Keshav Navgire, village Tuljapur, district Osmanabad developed a low cost sprinkler set using disposed off pet plastic bottles to serve as sprinkler. The bottom circumference of the plastic bottle (used pet bottle) is provided with uniform miniature holes and top is fixed in inverted condition with micro-irrigation inlet installed on a tripod stand. On pumping the water, the plastic bottle spray the water just like a metal sprinkler. The system has become very popular due to low price of the sprinkler set and has been adopted by 150 farmers in the area.

6.3.6 Development of New Cultivars for the Promotion of Custard Apple Farming

In custard apple marketing, glut arrival, poor pulp quantity and low shelf-life are the major problems. In order to overcome this problem, Shri Navnath Malhari Kaspate, village Gormale, tehsil Barshi, district Solapur made selections of suitable varieties from his Custard Apple Plant Bank and found out Annona-2 and NMK-1 (Golden) are the suitable varieties. He promoted 10 ft X 15 ft planting distance in medium soils rather than 16 x 16 ft (recommended by SAU) for the development of micro-climate in orchard for enhancing pollination. He did thinning operation for getting quality fruits in good number i.e. keeping 100-125 fruits/ plant at the age of 8-10 years. Fruits grown by him were found very attractive in colour and size. The speciality of these matured fruit is that the harvesting time can be adjusted according to market demand and cargo facilities as it remain in good condition for at least for 20-25 days on plant itself.

The number of seeds per fruit is also less and berry size is quite big. The harvesting of fruits of NMK-1 selection is possible 2-3 times within the period of 20-25 days as per the market demand. Productivity of new selections is about 15-19 tons/ha with 70-80% Grade-1 fruits while existing varieties provide 10-12 tons/ha. Due to good quality fruits, the market rate is higher over the existing cultivar fruits.

6.3.7 Model for Integrated Fruit Orchard

Inter-cropping is not practiced in the existing fruit cropping system. Hence, sunlight harvesting is achieved by one crop at single canopy level. In order to utilize maximum space and sunshine, Shri Rajendra Todkar, village Savargaon, tehsil Junnar, district Pune started intercropping of fruit crops with having two or more different canopy heights. Due to different crop canopy levels, maximum sunlight was harvested and hence maximum per unit area more productivity. For carrying out the practice, he planted the major fruit trees of Jamun in a zig-zag manner in order to provide maximum sunshine on each of the plant leaving some space to receive full sunshine in

between two rows. A total of 48 Jamun plants were sown at a distance of 25x25 feet in zig-zag rows. Intercropping was done in two phases with two types of plants. First intercropping was done with 30 mango trees in an acre, which were planted in the area getting full sunshine i.e. one plant in each row of Jamun trees. Mango trees attained height of 12-16 ft in nine years and yielded 10 dozens of fruits per plant per year and thus a total of 300 dozen mangoes were harvested in a year. After 10 years mango plants were removed and 100 number of custard apple trees were planted at 10x10 feet distance at the same places. Custard apple trees gave yield of 3 dozens fruits per plant per year. Thus a total yield from 100 plants was 300 dozens per year. After 10 years custard apple plants were also removed. Thus within 20 years, the intercropping was stopped as the Jamun plants grow to large size leaving less open space for other trees. Ten year old Jamun plant started giving 40 kg of fruits, which has now increased to 80 kg at thirteen years of age. Thus, Shri Rajendra introduced a new technology of inter-crop farming in fruit plants for the first time in the area and now earning additional profit from inter-cropped fruit plants.

6.3.8 Mass-scale Onion Seed Production with Improved Methods in Drought Hit Region

Shri UddhavAsaram Khedekar, village Shivni, district Jalna initiated seed production of selected varieties of onion crops with drip irrigation in drought hit area of Jalna. Improved varieties of onion includes Bhima Shakti, Bhima Kiran, AFLR, NH Red-3, Fursungi, Bhima Super, AFDR were included for raising quality seed for increasing productivity and profitability through onion farming in the area. He also adopted improved method of planting such as strip planting at 4x1x1 ft, use of optimum size seed bulbs (40-60 g) for assured germination and crop stand, use of honey bees for artificial pollination for increasing seed setting and productivity, use of fertigation techniques for increased efficiency of nutrients. He also developed a lined pond of size 44x44x6m for using water during scarcity period. By raising onion seed with drip irrigation in drought hit area, he got a net return of Rs. 1.20 lakh per ha, which is highly attractive from such areas.

6.3.9 Use of Polythene Mulch for Tomato Cultivation under Drought Condition

Baramati and Indapur blocks of Pune are drought prone area but farmers of the area grow more of vegetable crops. Lot of weeds also grow along with vegetables that consume lots of water and also affect productivity of vegetable crops. In order to remove weeds and conserve water, use of plastic mulching is considered highly beneficial. Shri Nitin Krishnarao Kadam, village Sastewadi, Baramati, district Pune used this technology for tomato crop. He used 30 micron silver black polythene mulch (4 feet width and 100 m length of bundle) for plantation of tomato. Use of polythene mulching was found very helpful in controlling weed growth as it eliminating weeding process, reduced 7 number of chemical sprays of weedicides and on the contrary increased 5 number of tomato pickings. Average yield (356 q/acre) of tomato was found to increase by 24% over the existing practice. The technology has now sspread in 350 acre benefiting 259 farmers of nearby villages.

6.4 Externally Funded Projects

S. No.	Name of Funding Agency	Maharashtra			Gujarat			GOA		
		No. of KVKs	No. of projects	Total Funding (in lakh)	No. of KVKs	No. of projects	Total Funding (in lakh)	No. of KVKs	No. of projects	Total Funding (in lakh)
1	NABARD	11	31	199.50401	1	1	0.55	-	-	-
2	ATMA	17	157	276.95615	2	6	64.13	-	-	-
3	MANAGE	8	12	205.42849	0	0	0	-	-	-
4	NHM	7	15	1229.20277	2	3	34	-	-	-
5	RKVY	6	12	381.692	7	17	1119.81	2	13	425.86
6	ICAR and Central Government	18	56	658.45435	13	62	762.23271	-	-	-
7	State Government	18	92	1195.03691	10	35	342.83087	-	-	-
8	Private Sector	7	27	35.95994	1	2	4.38	-	-	-
9	Other Funding Agency	16	58	1000.82481	12	31	311.98004	-	-	-

6.5 New Initiatives

- Introduction of commercial bamboo cultivation on farmers fields in organized manner
- Processing and value-addition in guava, custard apple, pomegranate etc.
- Introduction of aromatic and medicinal plants under varied/adverse agro ecology
- Centre of excellence on vegetable cultivation
- Involvement of post office as an agency to send soil samples from farmers place to laboratory and in return soil report from laboratory to farmer' places on nominal charges
- Climate Change Knowledge Network in Indian Agriculture
- Pro Soil-NICE platform for agro advisory
- Madhushakti- Empowering women through beekeeping
- Chaitra Palavi- state level farmers interaction on specific need based themes
- KRUSHIK and Global Farmers Live Demos on large scale
- Shetkari Suvidha Kendra (Farmers Service Centres) created
- Saturation of whole villages for silage making and loose housing dairy farm
- Virgin coconut oil unit (North Goa)
- Community based water budgeting for appropriate use of available rain water and crop planning
- Integrated efforts for pink bollworm management in cotton in convergence mode
- Developing farming system nutrition model at the KVK for awareness and empowering the farm women/ other stakeholders
- Introduction of wild date palm for nira production
- Introduction of sugar beet as crop diversification for sugarcane
- Promotion of Shrimp farming, Seaweed farming and Pearl culture
- Contact farming for seedling production and marketing for sweet potato
- Grafting techniques in vegetables (on experimental basis)

6.6 New Initiatives sponsored by ICAR and DAC&FW in the Zone

Many new initiatives were taken up in Zone-VIII through KVKs for improving the productivity and profitability of the farmers. Various new projects implemented and major thrusts given are as under:

6.6.1 National Innovations in Climate Resilient Agriculture (NICRA)

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

- To enhance the resilience of Indian agriculture covering crops, livestock and fisheries to climatic variability and climate change through development and application of improved production and risk management technologies.
- To demonstrate site-specific technology packages on farmers' fields for adapting to current climate risks.
- To enhance the capacity building of scientists and other stakeholders in climate resilient agricultural research and its application.

In Zone-VIII, it is being implemented in 13 most vulnerable districts through KVKs namely Ahmednagar-I, Aurangabad-I, Amravati-II, Buldhana-II, Jalna-I, Nandurbar, Pune-II and Ratnagiri in Maharashtra; Amreli, Banaskantha-I, Rajkot-I, Kutch-I and Valsad in Gujarat state.

6.6.2 Farmers FIRST Project

Farmer FIRST (Farm, Innovation, Resource, Science and Technology) is an ICAR initiative to move beyond the production and productivity and to privilege the complex, diverse & risk prone realities of majority of the farmers through enhancing farmers-scientists contact with multi stakeholders-participation. Farmer FIRST aims at enriching farmers-scientists interface for technology development and application. The aim of program is to achieve with focus on innovations; feedback; multiple stakeholders participation; multiple realities; multi method approaches; vulnerability and livelihood interventions. Under Zone VIII, 3 Farmer FIRST projects (MPKV, Rahuri; NAU, Navsari; and JAU, Junagadh) have been implemented.

6.6.3 Attracting and Retaining Youth in Agriculture (ARYA) Project

Attracting and Retaining Youth in Agriculture (ARYA) was initiated by the ICAR to empower youth in rural areas to take up agriculture and allied service sector enterprises for sustainable income and gainful employment in selected districts. It enables 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/programs for sustenance of efforts.

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

6.6.4 Seed Hub Project

For quality seed production of pulses, Seed Hub Project has been 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). For seed processing of pulses, provision for Seed Processing Plant has been made at identified centres. In addition, quality seed is also being produced at farmer fields in other villages.

6.6.5 Tribal Sub Plan (TSP)

Special focus is being given for socio economic development of tribal people in tribal dominated districts through different agencies. In this context, Tribal Sub Plan (TSP) was initiated through KVKs which meant for developing strategy for tribal welfare through organising different activities related to agriculture, livestock, fisheries and other rural based enterprises. In the zone, 11 KVKs are involved in organising 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 up-liftment.

6.6.6 Skill Training

Agriculture Skill Council of India (ASCI) has been set up to work towards capacity building in the agriculture industry and bridge the gap between laboratories and farms. ASCI envisions to teach/ 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 the Ministry of Skill Development and Entrepreneurship (MSDE) has been implemented through ATARI in KVKs/SAUs/ICAR institutes since 2016-17. Under this project each center has been targeted to organize two skill training programmes of 200 hour duration as per the norms notified by the MSDE.

6.6.7 Mera Gaon Mera Gaurav (MGMG)

MGMG is an innovative scheme, launched to promote direct interface of scientists with the farmers to accelerate the lab to land process. Major objective of the scheme is to make more contacts with farmers and scientists, developing linkages with line departments, providing on-spot advisory on regular basis by adopting villages by the scientists. In all 214 groups of scientists in the zone (Maharashtra- 41 groups, Gujarat-169 groups and Goa-4 groups) have been constituted involving 895 scientists. In total, 949 villages were adopted and 122643 farmers were benefitted through different activities in 2017. In 2018, 813 villages were adopted and 85382 farmers were benefitted.

6.7 Other New Initiatives

Capacity Building of Home Science Experts of KVKs in Maharashtra: Main focus was given to build the capacity of Home Science Experts' in the zone. In all, 30 SMSs (Home Science) from 22 districts of Maharashtra were invited and oriented in their areas. Major emphasis was given to act themselves as Co-trainers; working in collaborative manner to promote nutrition agriculture, develop message capsules, establish nutritional garden at the centre, provide quick technology flow and develop inventory of successful cases & the technology. The home scientists were oriented about changing roles, technological options, identifying personal strength, target setting behaviour and achievement motivation syndrome through simulation games, interaction with successful farm-women innovators.

Farming System for Nutrition through KVKs: Focus on to establish Farming System for Nutrition models in KVKs to address the problem of malnutrition in rural areas was given. A separate workshop of KVK experts was organized in collaboration with MSSRF, Chennai. Major attention was given on identifying the prevalent nutrition deficiencies, designing the farming system, processing and storage, sustainability, investing in nutrition literacy and leveraging agriculture for nutrition and developing a monitoring framework etc. 19 KVKs have started functioning on this model.

IPM for Kharif Crops with Special Focus on Pink Boll Worm in Cotton in Maharashtra: Special program was organized on 'IPM for Kharif Crops with Special Focus on Pink Boll Worm in Cotton in Vidarbha and Marathwada regions and 35 Heads/SMSs of KVKs from 22 KVKs of Vidarbha and Marathwada regions were oriented to deal with the problem.

Developing Entrepreneurship in Floriculture: A total of 25 trainees from Maharashtra and Gujarat attended the program on 'Entrepreneurship development in floriculture', of which 11 were Subject Matter Specialists of KVKs and 14 were floriculture entrepreneurs. In training course, innovative training methods and simulation games were used. Entrepreneurial motivation of trainees was enhanced through experiential learning based group work. Micro lab was used to facilitate sharing thoughts and feelings. Participants were sensitized on entrepreneurial opportunities like ornamental plants, vertical gardening, tissue culture, media, dry flower industry, different options for growing potted-plants etc.

Master Trainers' Programme for Developing Entrepreneurship: A four-day 'Master Trainers' Programme for Developing Entrepreneurship 'was organized at KVK Narayangaon (Pune-II). In total, 25 Subject Matter Specialists (Agril Extension) from different KVKs of Maharashtra and Gujarat attended the programme. Innovative training methods were used by specially trained Entrepreneurial Motivation Experts to make the training lively and interesting. Simulation games, group exercises and experiential interactive lectures were given. KVK SMSs in Agricultural Extension had reinforced their motivation training skills through practice sessions and feedback. All the SMSs have experienced great change in their outlook towards training rural youth with a theme 'helping to help themselves' to become successful entrepreneurs by imbibing entrepreneurial spirit and motivation to enhance their farm income.

Orientation training cum workshop on **'Preparation and Dissemination of Agromet Advisories at Block Level'** was organized for the SMS of 21 KVKs (10 from Maharashtra, 9 from Gujarat and 2 from Goa). The SMSs were oriented about operational Agromet Advisory Service under GKMS, observatory network of IMD, AWS, Agromet observatory, different observation like Doppler Weather Radar (DWR) Satellite Information, their application, access to data, weather forecasting in spatial and temporal scales, use of agromet products, crop information and components of AAS bulletin and its preparation. Advisories for extreme weather situations were also prepared using sample data.

Capacity Building Programme on 'Advances in Horticultural Technologies' was organized for the SMSs of 31 KVKs of Maharashtra and Gujarat in collaboration with IIHR, Bengaluru.

A total of four 'Innovative Farmers Meets' were organized in which a good number of farm innovations were documented for up-scaling and validating.

7. Recommendations

Technical

1. In order to make KVKs more effective, adequate infrastructural facilities including well developed farm, equipment and machinery are essential. Whereas, some of the KVKs have excellent infrastructural facilities, most of them lack it to a greater disadvantage in performing their mandated activities and some KVKs need complete revamping. Since over a period of time the KVKs have evolved as basic centre to empower the end users, the Zone may prioritize the KVKs based on their need for supplementing infrastructural facilities. ICAR may give commensurate support in terms of funds and other requirements to these KVKs.
2. In the Zone, four existing KVKs, one each from SAUs, NGOs, State Government or ICAR be developed as role model KVK with all appropriately feasible demonstration and other units so that the remaining KVKs of the Zone may endeavour to raise their level to these model KVKs. These potential model KVKs may also establish one agro-poly clinic. Each KVK in the Zone should be encouraged to develop one niche area as their Centre of Excellence.
3. Development and promotion of Integrated Farming System (IFS) models of different effective unit areas for varied agro-ecologies incorporating horticulture and livestock including poultry, piggery, dairy and aquaculture. These models should be demonstrated and promoted on wider-scale to provide platform for sustainable farming systems, minimizing input cost and maximizing output for a regular and higher income generation.
4. Crop selection on annual rainfall data basis, creation of check dams, renovation of village ponds & low-cost water harvesting structures for increasing water availability, soil-moisture retention methodologies, water budgeting and water reuse systems, use of non-conventional energy gadgets for water extraction and supply systems, water saving technologies, mulching, BBF system and intercropping of horticulture have to be adopted.
5. Promotion of organic farming in rainfed areas using bio-fertilizers, bio-pesticides and other bio-agents through demonstration and establishment of on-campus and off-campus laboratories/ production units together with application of eco-friendly pest management technologies for the reduction of residual toxicity in soil and non-target organisms.
6. Value-added agriculture enables farmers to align with consumer preferences for agricultural or food products with form, space, time, identity, and quality characteristics that is not present in conventionally-produced raw agricultural commodities. Many policies and programs supporting value added agriculture as a farm entrepreneurship and rural development strategy lack a framework recognizing the importance of consumers' willingness to pay and farmers' competitive advantages. Several value-added products from grapes, pomegranate, date palm, jackfruit, kokum, aonla etc. have emerged as important commodities that need safety standards, packing standards and marketing on a wider scale.
7. Post-harvest management involves handling, storing and transporting agricultural commodities after harvest so as to allow minimum loss, maintain quality and food safety that increase overall production and provide higher return to the beneficiary. It requires knowledge of production practices, packing and transport in order to preserve quality, quantity and safety of the commodities. KVKs are required to encourage the farm level processing so as to increase the profitability of the farmers. Industrial post-harvest management has the potential to become game changer and to be promoted. To meet the changing needs of the value addition of the agriculture commodities through primary, secondary processing & value addition, KVK should establish PHT and Fruit & Vegetable Processing Lab for training and demonstration.

8. Mechanized farming is an indicator of high standard and good management agricultural farming systems for raising standard of living of farmers and agricultural workers. It is an imperative to enhance input use efficiency, reduce human drudgery, increase production and productivity of food-grains, reduce cost of production and to address issues of labour scarcity and timeliness of farm operations. The major issues for consideration for promoting mechanization are affordable cost, multi-use, long life, easy fabrication/ easy availability of implements together with simple operation or otherwise easy availability of skilled personnel. Custom Hiring ensure distribution of mechanical power beyond large holding to small/ marginal land holding. KVKs need to promote farm mechanization particularly in labour scarce areas and intensive farming regions.

9. Promotion of technologies for optimum utilization and in-situ management of crop residue to prevent loss of invaluable soil nutrients, minerals and improvement of general soil health and its diversified use for various purposes such as compost, media for mushroom cultivation, bio-ethanol, packing material, biogas generation, bio-pesticide, animal fodder & feed etc.

10. ICT in agriculture focuses on the enhancement of agricultural and rural development through timely value added information and communication processes for advisories on soil quality assessment, weather forecasting and timely warning to mitigate the effects of natural disasters such as floods & pest management, animal disease management, rural development, women empowerment, market information to the farmers, entrepreneurs and market players. Though some of the KVKs in the Zone have adopted ways for issue of location-specific advisories using mobile SMSs, and short-range radio station facilities, by and large, the facility is limited in respect not only to the farmers but all stakeholders of agriculture production system. More intervention is required such as development of farmers' friendly mobile apps on farming technologies, weather forecasting for water resource management, pest management, livestock management including aquaculture, post-harvest, value-addition, and marketing channels including export potentials.

11. Creation of nutri-smart villages through nutri-sensitive agriculture needs greater attention, enabling nutrition for healthy life, household food security and improved economic growth of rural families and community. Better nutrition and better life cultivate a variety of commodities including cereals & pulses, vegetables, fruits, dairy and small livestock like chicken including egg and fish from raw as well processed products and also through proper cooking methods. Concept of nutri-smart villages emphasizing prevention of all forms of malnutrition particularly in children through school feeding programmes and in case of lactating mothers through Anganwadi centers. Therefore, KVKs have to play greater role to meet out the above social requirements through better education, training, technical support for the supply inputs and developing market channels for sale of cash crops for regular income generation by the farmers.

12. Strengthening of bovine production, goat rearing, sheep rearing and back-yard poultry for sustainable livelihood of farmers, increasing area under climate resilient fodder crops and silage production, increases clean and hygienic milk production, conservation and improvement of indigenous breeds etc. to be stepped up. Promotion of animal feeds from locally available ingredients and supplementation of mineral-mixture for optimizing livestock production and dairy industry. Introduction of Azolla and silage production as better nutritional diets for higher milk yield. KVKs should establish the relevant demonstration units to promote these areas.

13. Water scarcity, porous soil conditions, shortage of quality fish seed, inadequate demonstration units and very few/ untrained Fisheries SMSs are the major factors constraining propagation of aquaculture in the Zone particularly in Gujarat. Satellite centers for seed production & supply and recent technologies of low water input use such as biofloc system, re-circulatory aquaculture, aquaponics; farming of ornamental fishes, farming in inland saline areas, cages & pens, and seaweed & pearl culture needs to be introduced & propagated as per the available water resources for promoting fish farming.

14. Marketing and value chains are important strategies for providing optimum benefit to the farming community. Agricultural marketing in India is highly unorganized with inherent defects compelling distress

sale by the farmers. This is also due to lack of grading & storage facilities, transportation, organization, market intelligence; unfavourable mandis/markets and too much interference by the intermediaries, and negligible institutional support. Farmer Producer Organizations enable the farmers for group or cooperative marketing seem to be the possible solution to overcome these problems. KVK needs to facilitate and promote FPOs on large scale.

15. A good number of agri-technologies are gender sensitive and better handled by women. Farm women provide support at many points during and after crop and livestock production more particularly where lesser labour intensive agri-work is required such as pheromone trap management, weeding, shelling, stripping, seed cleaning & storage, compost preparation, Azolla production, milking etc. Value addition of farm produce and its post-harvest management, rural crafts, tie and dye, tailoring and stitching, making of handicrafts etc. are almost exclusively managed by rural women. A good number of drudgery reduction tools have been promoted by the KVKs in the Zone, which are greatly appreciated in the area and need mass-scale production and further refinement for better applicability.

16. KVK scientists should compile relevant technologies in their district and make them available to all stakeholders.

17. The Committee observed during the Travel Workshops and presentation made by KVKs that the focus on technology assessment through On Farm Trials/Testing was not given due weightage. The Council/ATARI should reiterate the importance of this mandated activity to all KVKs.

Administrative

1 KVKs are involved in a number of non mandated activities. Some relate to non-mandated agri related activities while some other non- mandated non- agri activities. It has been reported that substantial time is being devoted by KVKs in such activities. These non mandated activities hamper/dilute the mandated activities of KVKs as it not only involves manpower but also substantial portion of budget, which is already insufficient for KVKs mandated activities. Council need to examine the issue, its intricacies and fall out. Ideally the KVK should restrict their activities within the mandate.

2 About 30 per cent posts of Senior Scientist and Head, 18 per cent SMSs and overall 24 per cent posts are lying vacant. Host Organizations with active involvement of Director ATARI should make efforts for filling these vacancies. The ATARI also need strengthening in terms of manpower and modern ICT.

3 It has been observed that in case of SAUs, despite administrative and financial sanctions and release of funds by the ICAR in time, the money was not made available to KVKs by the University. Necessary action is required to be taken at the level of Head of the Host Organization.

4 The Team observed that different set of KVKs were exercising differing financial and administrative powers especially at the level of KVK Head. There is a dire need to decentralise administrative and financial powers and to make them uniform throughout the Zone/country. KVK Head should be given powers equivalent to Head of the Department of SAUs.

5 It has been observed that although KVKs have opened separate accounts with Nationalized Banks for financial transactions but still the funds earmarked and released for the KVKs by the ICAR for specific activity are diverted to some other head by the SAU. So committee is of the opinion that complete autonomy has to be provided to the KVK Head for utilizing the funds.

6 The KVKs are implemented by SAUs, NGOs, Voluntary Organizations, State Government and ICAR. The scales of pay and service conditions are different in different organizations. This scheme is 100 per cent funded by ICAR. A mechanism be evolved to maintain pay parity and service conditions in all set of KVKs. In NGO KVKs there is no provision for career advancement. When a scientist from NGO KVK moves to SAU or ICAR, even his pay is not protected. Whereas, vice versa, the salary of the incumbent is protected. In some of the SAUs of Maharashtra, even the statutory deduction of EPF is not remitted. In SAUs, the creation of two

different streams of recruitment i.e., technical cadre (KVK) and teachers (research and teaching) actually hampers the integration of research, teaching and extension which is the primary objective for which the SAUs were established under Land Grant Pattern. The Team also noted that an SMS working in NGO is not eligible to become KVK Head in NGO KVKs/Senior Scientist in ICAR, if he has crossed 47 years of age. On the similar lines, there is also an anomaly with regard to Programme Assistant who inspite of fulfilling all the conditions of qualifications except age are not eligible to apply for the post of SMS. To address these grievances and set these anomalies right, ICAR may constitute a Committee of eminent persons to give recommendations.

Financial

1. Funds from DAC and FW for specialised programmes are received very late. This hampers timely implementation of the programmes and payment to input agencies. The DAC and FW should ensure timely sanctions of programmes and funds.
2. The ICAR should make provision of "Difficult Area Allowance" to KVK staff as per Government of India guidelines.
3. There is urgent need for repair and maintenance of administrative buildings and farmers' hostels, replacement of furniture and motor cycles at KVKs established 15 to 20 years ago. The Council should provide lump sum fund for the same.
4. KVK should make efforts for getting funds from all possible external sources and the information to that effect be provided to ATARI.
5. ICAR may revisit the guidelines of Revolving Fund to incentivise KVK staff on the pattern of ICAR Revolving Fund Scheme applicable to scientist borne on research post.
6. The QRT was made aware by the KVKs under visit that the contingency provided is insufficient to implement the mandate. The Committee is of the opinion that there is a strong case for enhancement of contingency and alteast 20 per cent of the total salary component be provided as contingency to fulfil the mandate of the KVK.

Policy Matters

1. The QRT strongly feel that there is ample justification for increasing the staff strength of KVK. In the current circumstances lots of programmes are being implemented through KVK and the dearth of staff is being felt in every KVK.
2. The NGO KVKs are funded on 100 per cent basis by Government of India through ICAR and are serving the most disadvantaged sections of the society such as farmers, women, tribes, rural youth etc. The produce in terms of bio-agents, bio-pesticides, agricultural processed products are utilized by these sections of the society. The resource so generated is subjected to GST and Income Tax deduction on capital gains, since NGO KVKs are considered commercial organizations but the facts are contrary. These organizations are actually working for the welfare of the farmers and other stakeholders and are not involved in any commercial activity. Levying GST and Income Tax deductions are not appropriate in anyway on these KVKs. The Council should find a way to resolve the issue so that NGO KVKs are exempted from these levies. Actually this is a step in furtherance of the cause to make nation self reliant – Atmanirbhar.
3. There is no provision in Council for supporting International visits for KVK scientists. The QRT recommends that Council should provide opportunity and commensurate funding to highly performing KVK scientists, as an incentive, so that they sustain their morale and efficiency for better performance.
4. The technical backstopping of NGO KVKs need to be strengthened.

Annexure-I

Travel Workshops Schedules
Quinquennial Review Team Visit to KVKs of ICAR-ATARI, Pune
Maharashtra (Phase-1 at KVK, Baramati and Aurangabad-I): 22-27 September, 2019

Date and Time	Programme	Stay Arrangement
22.9.2019	Arrival at Pune	NRCG, Guest House, Pune (22-23 September, 2019)
23.9.2019		
7.30 hrs	Breakfast	
8.00 hrs	Departure to ATARI, Pune	
9.15-10.45 hrs	Meeting of QRT Members Brief presentation by Director, ATARI	
10.50 hrs	Departure to KVK, Naraynagaon (Pune-II)	
12.50 hrs	Visit to Campus of KVK, Narayangaon	
13.45 hrs	Lunch Break	
14.15 hrs	Brief presentation by the Head, KVK	
14.35 hrs	Interaction with Chairman of Host Organization	
14.45 hrs	Soya processing, Vermicompost and other units	
15.15 hrs	Hi-tech horticulture at farmer's field	
16.45 hrs	Departure to NRCG Guest House, Pune	
24.9.2019: 8.00 hrs	Departure to KVK Baramati	Stay at NIASM, Baramati
10.00 hrs	Interaction with Heads of Host Organizations/ Director Extension Education, MPKV/Line Deptt officials Presentation by KVKs (Pune-I, Solapur-II, Nandurbar, Ahmednagar-I, Satara-II, Nashik-II, Sangli) Visit of KVK, Baramati Campus	
25.9.2019: 8.30 hrs	Presentation by KVKs (Kolhapur-I, Solapur-I, Dhule, Satara-I)	Stay at Aurangabad 25-26 September, 2019
14.00 hrs	Departure to Aurangabad via Shirdi	
26.9.2019: 8.00 hrs	Visit of KVK Aurangabad-I Campus	
9.00 hrs	Interaction VC/ NGO Heads/ DEE, VNMKV/ Line Deptt. officials Presentation by KVKs (Jalna-I, Aurangabad-I, Beed-I, Beed-II, Nashik-I, Ahmednagar-II, Jalgaon-II, Latur)	
14.00 hrs	Visit of KVK Aurangabad-II Campus	
27.9.2019: 8.00 hrs	Visit of NICRA village	
11.00 hrs	Presentation by KVKs (Osmanabad, Aurangabad-II, Jalgaon-I, Parbhani)	
15.00 hrs	Departure to Airport, Aurangabad	

Quinquennial Review Team Visit to KVKs of ICAR-ATARI, Pune

Maharashtra (Phase-2 at PDKV, Akola): 17-20 November, 2019

Date and Time	Programme	Stay Arrangement
17.11.2019 9.30-10.30 hrs	Visit to CICR-KVK, Nagpur	
10.30 hrs	Departure from KVK, Nagpur	Stay at PDKV, Akola 17-19 November, 2019
13.00 hrs	Reaching at KVK, Amravati-II and Lunch	
14.00-17.00 hrs	Visit to KVK, Amravati-II Farm and interaction with staff	
17.00-19.00 hrs	Departure from Amravati and Reaching to PDKV, Akola	
18.11.2019		
8.00 hrs	Interaction with Vice Chancellor, PDKV; Chairman, NGO-KVKs, DEE and Line Deptt Officials	
9.00-18.00 hrs	Power Point Presentation by KVKs (Wardha, Gondia, Hingoli, Chandrapur, Amravati-II, Buldhana-I, Buldhana-II, Nagpur, Akola, Nanded-I, Yavatmal-I, Nanded-II, Gadchiroli, Bhandara, Washim, Amravati-I)	
19.11.2019: 8.30 hrs	Departure to KVK, Akola	
9.00-10.30 hrs	Visit to Demonstration Units and Instructional Farm of KVK, Akola	
10.30 hrs	Departure to KVK, Wardha	
13.00 hrs	Reaching to KVK, Wardha and Lunch	
14.00-15.30 hrs	Visit of KVK Wardha Campus	
15.30 hrs	Departure from KVK Wardha	
18.00 hrs	Reaching to Nagpur	Stay at Nagpur on 19.11.2019
20.11.2019: 7.00 hrs	Departure to respective places	

Quinquennial Review Team Visit to KVKs of ICAR-ATARI, Pune

Gujarat (Phase-3 at AAU, Anand): 25-28 November, 2019

Date and Time	Programme	Stay Arrangement
24.11.2019		
19.25 hrs	Arrival at Vadodara Airport	
20.00-21.00 hrs	Travel to AAU, Anand	AAU Guest House, Anand
25.11.2019		
08.30-10.30 hrs	Visit to KVK, Anand and interaction with staff	AAU Guest House Anand
10.45-11.30 hrs	Interaction with VC, AAU, Anand; VC, NAU, Navsari; DEEs (AAU & NAU) and line department officials at AAU, Anand	

Date and Time	Programme	Stay Arrangement
11.30–18.00 hrs	Presentation by KVKs: Dahod, Vadodara, Panchmahal, Kheda, Anand, Ahmedabad, Tapi, Surat, Navsari, Valsad, Thane, Ratnagiri, Raigad, Sindhudurg, North Goa and South Goa	
26.11.2019		
09.00–10.30 hrs	Presentation by KVKs : Dang, Gandhinagar, Patan, Mehsana	
10.30–12.30 hrs	Travel to KVK, Panchmahal and Lunch at KVK.	
13.00–15.00 hrs	Visit to KVK, Panchmahal. Interaction with Director, ICAR- CIAH, Bikaner and interaction with KVK staff.	
15.00–17.00 hrs	Travel to AAU. Dinner at AAU Guest House	AAU Guest House, Anand
27.11.2019		
09.00–11.00 hrs	Travel to KVK, Ahmedabad	
11.00–13.00 hrs	Visit to KVK, Ahmedabad and interaction with staff. Lunch at KVK	
13.30–15.30 hrs	Travel to KVK, Gandhinagar	
15.30–17.00 hrs	Visit to KVK Gandhingar and interaction with staff and officials of Gujarat Vidyapith	Guest House, Gujarat Vidyapith, Ahmedabad
28.11.2019		
07.10 hrs	Departure to respective HQ from Ahmedabad Airport	

Quinquennial Review Team Visit to KVKs of ICAR-ATARI, Pune

Gujarat (Phase-4 at JAU, Junagadh):18-22 December, 2019

Date and Time	Programme	Stay Arrangement
18.12.2019		
14.35 hrs	Arrival at Rajkot Airport	
15.45-17.30 hrs	Visit to KVK Rajkot-I	JAU, Junagadh
17.30-19.00 hrs	Travel to JAU, Junagadh	
19.12.2019		
08.30-09.30 hrs	Interaction with VC, JAU; DEE and line department officials at JAU, Junagadh	JAU, Junagadh
10.00-18.00 hrs	Presentation by KVKs (Bhavnagar, Rajkot-I, Rajkot-II, Jamnagar, Porbandar, Amreli, Surendrangar, Banaskantha-I, Banaskantha-II, Sabarkantha, Kutch-I, Kutch-II, Gir Somnath, Bharuch, Narmada)	Halt at JAU, Junagadh
20.12.2019		
08.00-17.00 hrs	Travel to the Gagnetha village and Interaction with farmers on the way to KVK, Gir Somnath including Demo Units, Farm, CRS, FPO, Cattle feed unit and interaction with KVK's President and staff	Lunch on the way. Halt at KVK, Gir Somnath
21.12.2019		
08.30-11.00 hrs	Travel to KVK, Porbandar	

Date and Time	Programme	Stay Arrangement
11.00-15.00 hrs	Visit to KVK, interaction with farmers and KVK staff	Lunch at KVK, Porbandar
13.00-19.30 hrs	Travel to KVK, Jamnagar and interaction with KVK staff	Halt at Jamnagar
22.12.2019		
09.00-12.00 hrs	Visit to KVK, Rajkot-I	
15.10 hrs	Departure from Rajkot Airport	

Quinquennial Review Team Visit to KVKs of ICAR-ATARI, Pune

Goa (Phase-5 at ICAR-CCARI, Goa): 3-8 March, 2020

Date and Time	Programme	Stay Arrangement
3.3.2020		
15.15 hrs	Arrival at Goa Air port	
14.30 hrs	Arrival at Guest House of CCARI, Goa	Guest House, CCARI, Goa
15.30-16.00 hrs	Interaction with Director, ICAR-CCARI, Goa; KVK staff; Line Deptt Officials and representing farmers, Visit to KVK-CCARI, North Goa	
4.3.2020		
08.30-18.00 hrs	Visit to KVK South Goa, Interaction with KVK staff and progressive farmers&Visit to farmers' fields	
6-7 March, 2020		
08.30-18.00 hrs	Writing QRT Report	
8.3.2020		
09.00-12.00 hrs	Preparation of TA Bills and collecting pending documents of Rajkot visit, Informal Exit Meeting, Departure from Goa	

Virtual Meeting of QRT on 8-9 August, 2020

Date and Time	Programme	Stay Arrangement
8.8.2020		
10.00-18.00 hrs	Finalization of QRT Report	
9.8.2020		
10.00-18.00 hrs	Finalization of QRT Report	

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