

# Two Successful Decades of Empowering Farmers Towards Sustainable Agriculture and Beyond...



Agricultural Development Trust's  
**KRISHI VIGYAN KENDRA, BARAMATI**

A/P : Malegaon Kh., Tal. : Baramati,

Dist. : Pune - 413 115



# Glimpses





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## Two Successful Decades of Empowering Farmers Towards Sustainable Agriculture and Beyond...

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प्रणव मुखर्जी  
**Pranab Mukharji**



सत्यमेव जयते

राष्ट्रपति  
भारत गणतंत्र  
President  
REPUBLIC OF INDIA

## MESSAGE

It gives me an immense pleasure to hear that Krishi Vigyan Kendra of the Nation has successfully completed its twenty years of yeomen service to the farming community.

The pioneering efforts and success of this Institution in transfer of technology from lab to land in agriculture and allied sciences has kindled the gateway for 634 KVKs spread across the country.

I am aware that this Institution is instrumental in the increase of agriculture production in this district. In its chronological development over years, this Kendra has crowned a score of milestones including the State-of-Art Bio fertilizers, Bio pesticide, Dry land farming, water & fertilizer use efficiency, dairy, poultry and fodder development. I learnt that the trend setting efforts of this Institution on an eco- friendly approach has driven in reducing the use of chemical fertilizers and pesticides through Integrated Nutrient management and Integrated Pest Management in Pune district, which has brought many laurels to this Institution.

The effort of this Kendra in the remarkable development of horticulture by the implementation of the Precision Farming Technology and its expanded service in fertigation and use of Information and communication technology (ICT) in agriculture is praise worthy.

On this occasion, I congratulate the entire team of Krishi Vigyan Kendra, Baramati for their dedicated service to excel the farm lives.

I am confident that this Kendra will remain as the wheels of Progression in the years to come.



शरद पवार  
SHARAD PAWAR



कृषि एवं खाद्य प्रसंस्करण उद्योग मंत्री  
भारत सरकार  
MINISTER OF AGRICULTURE &  
FOOD PROCESSING INDUSTRIES  
GOVERNMENT OF INDIA

20<sup>th</sup> December 2013

## MESSAGE

Over the years, the Krishi Vigyan Kendras (KVKs) have taken a centre stage through assessment, refinement and demonstration of various technologies in the micro- farming situation of farmers. It is heartening to note that this critical technical support of KVKs to the farming community across the country in convergence with various research organizations and development departments of Central and State Governments is widely appreciated by the stakeholders of agricultural development.

It is a matter of great pride and honor for me that the seeds of agricultural development sown in Baramati area a couple of decades ago have begun to fruit. This is to the credit of the significant role played by KVK, Baramati as a catalyst of change among the agrarian community of this region.

I am happy that at this juncture the KVK has undertaken a retrospective analysis of its salient technical contributions towards the technological empowerment of farmers in the form of this publication.

I hope this publication would be of immense use to scientists and extension personnel for espousing the cause of farming community at large. I compliment the KVK for its concerted efforts to help the farming and farmers through necessary technical guidance and critical inputs during the past 20 years.

I wish the KVK team all success in the years to come.

(SHARAD PAWAR)

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## MESSAGE

I am happy to record that Krishi Vigyan Kendra (KVK) Baramati has contributed immensely to the improvement of livelihoods of small and marginal farmers in the target area. Recent demonstrations on climate resilient agricultural practices on farmers fields under NICRA Project is noteworthy.

This KVK has documented its experiences during the last two decades that would help to set progressive benchmark for further technological empowerment of farmers.

I wish the KVK all success in its future endeavors.

(S. Ayyappan)

Dated the 2nd January, 2014  
New Delhi



डा. कि. द. कोकाटे  
उप महानिदेशक (कृषि विस्तार)  
**Dr. K.D. Kokate**  
DEPUTY DIRECTOR GENERAL  
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KRISHI ANUSANDHAN BHAWAN-I, PUSA, NEW DELHI 110 012



## FOREWORD

Krishi Vigyan Kendra (KVK) is an institutional innovation according the Food and Agriculture Organization (FAO) of the United Nations for technology application in micro eco situation. KVKs have evolved over time and are considered as pillars of frontline extension system which are engaged in fine-tuning technologies to suit local conditions. Thus, KVKs are contributing to reducing the time lag between technology generation and technology adoption saving precious time and resources for the country besides contributing to increasing food production.

KVK Baramati has been serving farmers of the drought-prone region of Pune district for over two decades. Its contributions to application and up scaling of drought management practices are noteworthy. In the course of this period, it has established itself as a credible institution in steering agricultural development of this region. It has accrued many valuable learning experiences along this path. As a result many awards and accolades have been bestowed on this KVK.

I am glad that the KVK team has brought out a publication entitled “Two Successful Decades of Empowering Farmers towards Sustainable Agriculture and Beyond” which is a compilation of the experiences of working with the farming community. It not only helps one to know how the KVK has played the role of a catalyst but also understand the process that helped the institution to achieve its goals. It is a document of salient technical contributions and the relevant technology delivery mechanisms adopted for empowering the farming community.

I complement to Agricultural Development Trust, Baramati for grooming the KVK over the years to be able to deliver to the expectations of farmers. Further, I congratulate the team for a well summarized publication of KVK experiences.

New Delhi

10 January, 2014

  
(K.D. Kokate)





राजेंद्र पवार  
चेअरमन

**Rajendra Pawar**  
Chairman



अॅग्रीकल्चर डेव्हलपमेंट ट्रस्ट,  
कृषी विज्ञान केंद्र, बारामती (पुणे)  
Agriculture Development Trust's,  
Krishi Vigyan Kendra, Baramati (Pune)

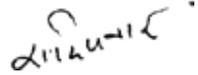
## PREFACE

Krishi Vigyan Kendra, Baramati was established in 1992 under the aegis of Agricultural Development trust, Baramati in affiliation with Indian Council of Agricultural Research, New Delhi. This KVK is completing 21 years of yeoman services to the farming community as on January 2014.

KVK Baramati in Pune District is very well recognized for its persistent efforts in terms of pro-farmer, eco-friendly and broad range of its activities in farming and use of information communication technology for dissemination of information. It is also known among the agriculture fraternity for its innovative approaches of extension, the way it has involved large number of farmers at the level of head, heart & hand for the adoption of useful technologies in farmers fields. The KVK was instrumental in promoting group dynamics of men and women in farming. The KVK has become the most reliable source for farmers to approach for their technology needs, services and inputs.

The KVK is well known at national level for its effectiveness and it is recognized as a role model for the upcoming centres. It is also worth to mention that this Kendra has won the most coveted National KVK Award in 2006-07 and the Zonal Best KVK Award in 2012-13. This is due to the efforts of all KVK team members.

I am really proud of being the team leader & chairperson of this Kendra in the 21st year of its existence and I wish the institution and the staff all success in their future endeavours.

  
(Rajendra Pawar)





डॉ. सैय्यद शाकीर अली  
कार्यक्रम समन्वयक  
**Dr. Syed Shakir Ali**  
Programme Coordinator



अॅग्रीकल्चर डेव्हलपमेंट ट्रस्ट,  
कृषी विज्ञान केंद्र, बारामती (पुणे)  
Agriculture Development Trust's,  
**Krishi Vigyan Kendra,**  
**Baramati (Pune)**

## ACKNOWLEDGMENT

On the occasion of the successful completion of 21 years of establishment of this Kendra, I wish to place on record my deep sense of gratitude to the Indian Council of Agricultural Research, New Delhi, and Agricultural Development Trust, Baramati and all those good heart who rendered willful services for its establishment and remarkable development.

Appreciation is due to the past Programme Coordinator, Zonal Coordinators/Zonal Project Directors (Zone V), Development Commissioners/Secretary (Agriculture)/Chairpersons, who have contributed for the rapid development of this Kendra. My special thanks are due to the members of the General Body, Governing Body and Scientific Advisory Committee for their effective advise in promoting the growth of this Kendra.

My Special appreciation to all the retired staff of this Kendra for their untiring and meticulous efforts in making this Kendra a hous hold name among the farming community.

My Sincere thanks to the press and media personnel for their help in disseminating important farm messages to large number of farmers.

In addition, my sincere thanks to all the scientific staff, technical staff, administrative staff, supporting staff and project staff of this Kendra for their unflinching support in implementing various activities.

I wish to place on record my sincere thanks and appreciation to the Department of Agriculture, ATMA, NHM, NHB, Department of Animal Husbandry, Department of sericulture, Department of Social Welfare, Department of Women & Child Development, Ministry of agriculture, All India Radio, and other line departments and organizations of Government of Maharashtra who contributed for the all-round development of this Kendra.

I also sincerely thank all the collaborating scientific organizations viz., MPKV, Rahuri, TNAU, NRC Grape, Pune, NRC Onion and Garlic, Rajgurunagar, NRC Pomegranate, Solapur, Dry land Research Station Solapur, Sugarcane Research Station, Padegaon, Vasantdada Sugar Institute, Pune, Fruit Research Station, Ganesh Khind, Pune, Horticulture Training Center, Pune, National Bureau of Agriculturally Important Insects, Indian Institute of Horticultural Research, Bangalore, CRIDA, Hyderabad, CIPMC, Nagapur, MANAGE, Hyderabad, NABARD, IIT Mumbai, Maharashtra cooperative milk federation, YCMOU, Nasik and many private and cooperative organizations for their continuous support for our development.

Last, but not the least, my sincere thanks are due to the farming community who has been our motivating forces all along.

(Dr. Syed Shakir Ali)









## 1. INTRODUCTION

The diversified nature of Indian agriculture in context to geological and environmental features adds it to the challenges in improving the productivity and profitability of the agriculture. The climatic challenges and the variant nature of the market of the agriculture commodity are the key barriers for the livelihood security of the marginal farmers. About half of the country's population relies on agriculture as its principal source of income.

The production of food grains increased from 54 million tons in 1950-51 to 67 million tons at the end of the first plan which rose to 80 million tons during the second five year plan, and by the end of third five year plan it was 72 million tons. The production of food grain was 104 million tons at the end of fourth plan. With the introduction and spread of High Yielding Varieties, during the Fifth Plan, the food grains production increased substantially to 126 million tons. There after here an increasing trend was recorded in the production of food grains in our country. The food grains production was 146, 172, 199 and 211 million tons in Sixth, Seventh, Eighth and Ninth Plan Periods respectively and it was 259 million tons in year 2011-12 and 255.36 million tons in 2012-13. (Source: Indian Agriculture under the Five- Year Plans - Agricultural Situation in India: ASIS-J 0)

The ratio of agricultural land to population engaged in agriculture has shrunk to 0.3 ha per person in India as compared to 11.0 ha per person in developed countries. The resources are getting marginalized and there is tremendous pressure on natural resources due to increase in population. Food security continues to be one of the major concerns in agriculture sector. Thus developing entrepreneurial skills in agriculture and allied sectors for empowering farmers need to be done through demand driven extension system in the country.

The Indian Council of Agricultural Research (ICAR) has undertaken number of front line extension programmes over the years to meet the emerging challenges pertaining to food security, sustainability and livelihood security. Krishi Vigyan Kendra an unique efforts of ICAR with a Perspective vision of sustainable development of a district. Krishi Vigyan Kendra is a district level farm science center which can help in speedy transfer of technology to the farmer's field by building bridges between SAUs/ research institutes and the farmers. The first KVK was established at Puducherry on 21st of March 1974 by ICAR has now dispersed countrywide as its number has grown to 634.

## 2. MANDATES OF KVKs

The technology assessment, refinement and demonstration of technology/products is the mandates of KVK and its activities includes the following:

1. To conduct "On Farm Testing" for identifying technologies in terms of locati on specific sustainable land use systems.
2. To organize Front Line Demonstrations on various crops to generate production data and feedback information
3. To organize Training to update the extension personnel with emerging advances in agricultural research on regular basis.
4. To organize short and long term Vocational Trainings courses in agriculture and allied vocations for the farmers rural youth with emphasis on "learning by doing" for higher production on farms and generating self employment.



### 3. FUNCTIONAL OBJECTIVES OF KVK

1. To plan and conduct survey of the operational area through Participatory Rural Appraisal (PRA) methods and characterize physical and human resources with special reference to identifying the technological and training needs of the farming community.
2. To compile all relevant recommendations/packages of practices for the district to be meaningfully utilized in the training programmes and the follow up extension activities.
3. To plan and conduct production oriented and need-based short and long duration training courses both on the campus as well as in the villages for various target groups with priority on the resource poor sections.
4. To Organize Farm Science Clubs in order to inculcate in the younger generations a specific temper and an interest on agriculture and allied sciences and for scientific farming through supervised individual and group projects.
5. To develop and maintain the campus farms and demonstrations units on scientific lines as the facilities for providing work experience to the trainees, dissemination of the latest technologies and also as a means to achieve financial sustainability in due course of time
6. To provide practical training facilities of the Kendra to the teachers and the students of vocational agriculture of the higher secondary schools.
7. To provide added training facilities of the area for home making and nutrition education for rural communities and gradually enlarging the training facilities to encompass other important area such as home/rural crafts and cottage industries with the requirements of the integrated rural development in collaboration with the concerned organizations
8. To implement all such schemes of the ICAR and other related organizations which intend to strengthen the training and technology dissemination programmes as well as follow-up extension activities of the Kendra.
9. To undertake on-farm testing of the technologies developed by the National Agricultural Research Systems (NARS) in agriculture and allied fields for their suitability and identifying constrains.
10. To demonstrate the potentialities of various technologies recommend for adoption in to maximize yield per unit time and area under different resource conditions.

### 4. ABOUT THE DISTRICT

#### 4.1 : Location

Pune district is located between 17.5<sup>o</sup> to 19.2<sup>o</sup> North and 73.2<sup>o</sup> to 75.1<sup>o</sup> East. The district is bounded on North & East by Ahmednagar, by Satara on the South and by Raigad district on the West. It is the second largest district in Maharashtra State with the area of 15.62 lakh ha (approx. 5% of the total area of the state).

#### 4.2 : Population

The total population as per the census in 2011 of the district is 94.26 lakhs with a population density of 603 per square kilometer. It consists of 36.87 lakh of rural population and 57.39 lakh of urban population. The ratio of female population per thousand of male is 910. The average land holding of the district

is 1.56 ha. The district has high literacy level of 87.02 per cent. The number of persons in the workforce in Pune district is 20.51 lakh which indicates that 28.36 per cent of the population is in the labor force. Out of the total workforce, 45.38 percent of the workers are engaged in agriculture as cultivators and agricultural laborers. The agricultural laborers constitute 30 per cent of the workforce in agriculture while 70 percent are cultivators. It can thus be observed that agriculture is the dominant activity in Pune district. However, the share of workforce engaged in agriculture in Pune district is much lower than that for the state as a whole which is 55 per cent. About 1.6 percent of the workforce is engaged in

dairy activities and 1.5 per cent in cottage industries.

#### 4.3 : Agro climatic zones-

Table 1 : District agro climatic zones (Pune)

No.	Zone Name	Tehsils
1	Ghat zone	Part of Mawal
2	Sub Mountain Zone	Velhe, Bhor, Mulshi, Khed and Mawal
3	Plain Zone	Haveli, Junnar and Ambegaon
4	Scarcity Zone	Baramati, Indapur, Purandar, Daund & Shirur

The classification based on five soil types and four rainfall zones further differentiate the district into 6 major eco-units.

Figure 1 : Agro climatic zone of Pune

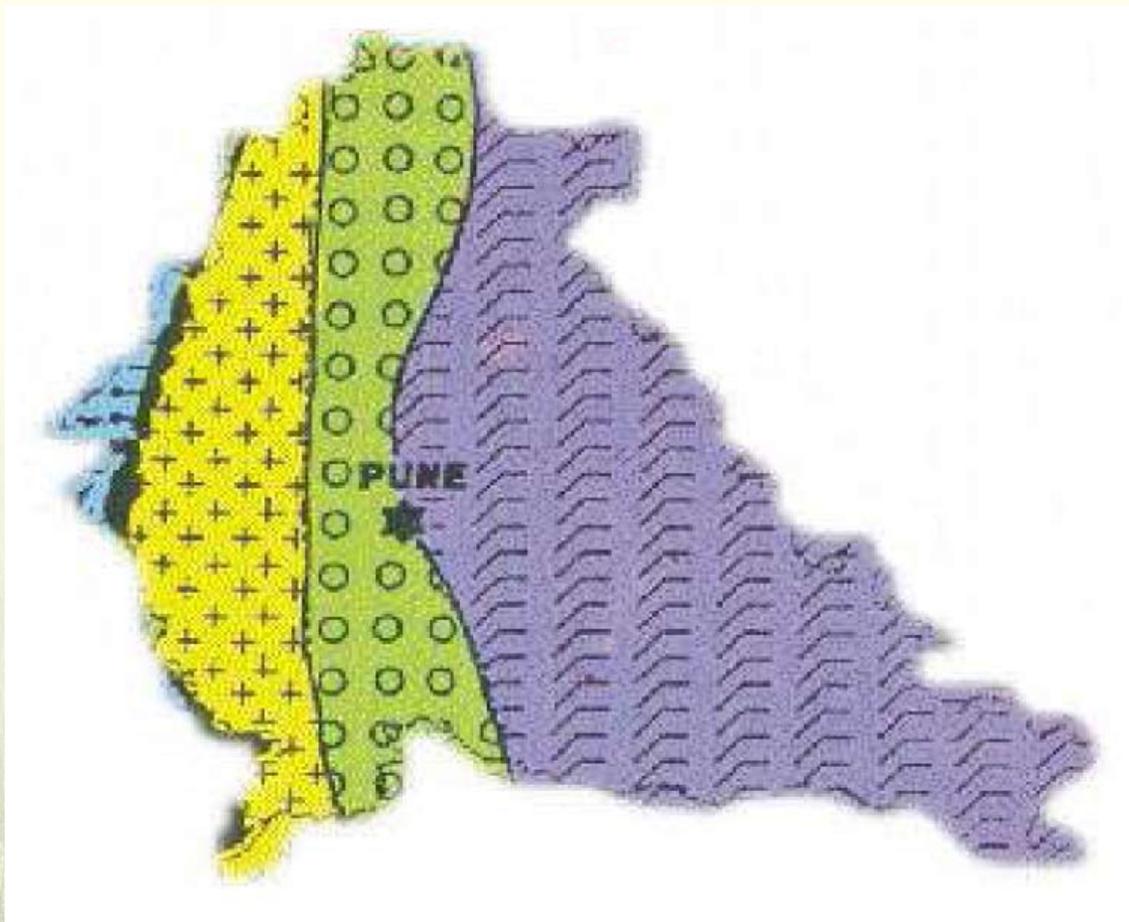


Table 2 : Description of Agro-climatic Zone & major agro ecological situations  
(based on soil and topography) of Pune district

Sr. No	Agro-climatic Zone	Characteristics			
		Climatic conditions	Average annual rainfall	Soil type	Crop and cropping pattern
1.	<b>Ghat zone</b>				
	Part of Mawal	Maximum temperature ranges from 29-39 C. Minimum temp ranges from 13-20 C.	3000 to 6000 mm	Light lateritic & reddish brown. Distinctly acidic, poor fertility, low phosphorous & potash content	25% area is under forest. Principal crops- rice/ ragi & other cereals. Rabi sorghum, Chick pea, groundnut, Niger. Sugarcane is a major crops. Area under spices 353 ha. Fruits & vegetables 2933ha. Well suited conditions for rainfed crops. Fruits- mango, cashew, Jackfruit, Jamun and karwonda
2	<b>Sub Mountain Zone</b>				
	Velhe, Bhor, Mulshi, Khed and Maval	Average maximum temperature is between 28-35 C and minimum 14-19 C	700-2500 mm. Rainfall received mostly from S-W monsoon.	Soils are reddish brown to black tending to lateritic. pH 6-7. Soils rich in nitrogen but low in phosphorous & potash	Mainly dominated by Kharif cereals, groundnut & sugarcane. Rabi crops are taken where there are deep soils with good moisture holding capacity. Vegetables- potato, onion, chillies, tomato & brinjal. Fruits- Mango, Banana, guava, cashew nut & grapes.
3	<b>Plain Zone</b>				
	Haveli, Junnar and Ambegaon	Water availability ranges from 120-150 days. Maximum temperature 40 C & minimum 5 C.	Well distributed rainfall 700 to 1200 mm	Topography is plain. Soils grayish black. Moderately alkaline pH 7.4-8.4, lowest layer is 'Murum' strata. Fair in NPK content. Well drained & good for irrigation.	The zone is predominantly a Kharif tract suitable for single rainfed crop. Principal crops grown -Kharif & Rabi jowar, bajra, groundnut, wheat, sugarcane, udid, tur gram & ragi.

4	Scarcity Zone				
	Baramati, Indapur, Purandar, Daund and Shirur	Very low rainfall with uncertainty & ill distribution. Occurrence of drought is noted once in three years. Dry spell varies from 2-10 weeks. Water availability 60-140 days Which is due to 1) delayed onset of monsoon 2) early cessation of monsoon. Maximum temperature 41 C minimum -14-15 C	Less than 750mm in 45 days. Two peaks of rainfall. 1) June/July	General topography is having slope between 1-2%. Infiltration rate is 6-7 mm/hr. The soils are vertisols. Soils have Montmorillonite clay. Poor in nitrogen, low to medium in phosphate & rich in potash.	Based on bimodal distribution of rainfall two cropping systems are noticed. During Kharif shallow & poor moisture retentive soils are cultivated. Medium deep soils with good moisture holding capacity are diverted to Rabi cropping. Kharif cropping 25-30%. Crops -bajra, jowar, groundnut, safflower, pulses etc. Productivity is rather low in both the seasons.

#### 4.4 : Climate and rainfall

The climate of the district is characterized by dry atmosphere except during monsoon. The western part experiences comparatively cooler climate. The summer is moderately high and the temperature varies from 36 degree Celsius to 40 degree Celsius. The minimum temperature is about 9 degree Celsius. The district presents a varied pattern so far as rainfall is concerned between as high as 5080 mm on the western hill region to 457 mm in eastern plateau thus showing gradual decline from West to East.

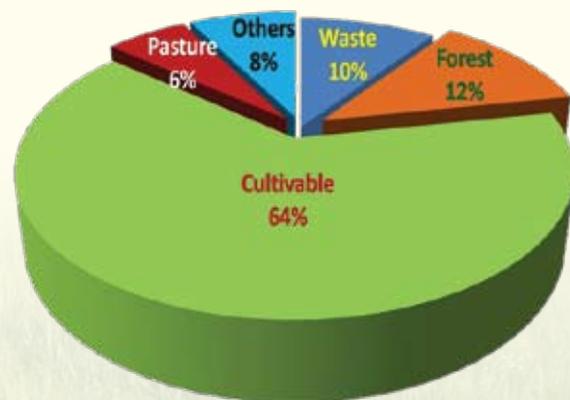
Change in rainfall pattern has divided the district into four macroclimatic zones as mentioned in above table.

#### 4.5 : Land use pattern

Out of the total area of 15.62 lakh ha 12% is under forest. Barren and uncultivable wasteland accounts for another 10%. Major part of land on the eastern side comes under pasture. 6% of the land is under permanent pasture. The cultivable area accounts for 64% of the total area as compared to 59% in the

state. As much as 1,61,300 ha are sown more than once and cropping intensity is 116%.

Figure 2 : The land distribution pattern of Pune District



#### 4.6 : Size of operational land holding

As per 1985 agricultural census statistics 8,64,26,829 land holders hold 11,51,128 ha of land. Of this 29,897 land holders that hold 55,894 ha belong to scheduled cast and 19,321 land holders with 53,157 ha land belong to Scheduled Tribes. The per capita land holding size stood at 2.7 ha. For the Schedule Caste the per capita holding is assessed at 1.86



ha and Schedule Tribes 2.77 ha. Out of the total cultivable land 4.88% is with Schedule Caste, 4.62% with Scheduled Tribes and balance 90.50% is with other farmers. Of the total numbers 57.52% belongs to small and marginal category and they hold 18.85% of the total cultivable land. (Give data as per census 2011)Not available

#### 4.7 : Cropping pattern

Total area under cultivation in the district is 10.05 lakh ha which constituted about 64 % of the total land in the district. The cropping pattern presents a high degree of diversity largely conditioned by variations in rainfall and availability of irrigation water. Out of 11.66 lakh ha gross cropped area 4.2 lakh ha i.e. sown in Rabi and Summer Season.

Pulses and cereals account for 71% of the total area sown in Kharif and 9% of the area in Rabi. 11% area is under oilseeds and the balance 9% is under sugarcane. Bajra is the major Kharif crop occupying 1.88 lakh ha; followed by paddy with 60200 ha besides Kharif Jowar (22300 ha) and Nagli/Ragi ( 13300 ha) which are the other prominent cereals. Red grams, Green gram, Black gram, Matki, Kulthi are the major pulse crops occupying an area of about 4000 ha. Groundnut is major oilseed crop occupying 84% of the total Kharif oilseeds. The eastern tehsils get more of rainfall in August and September and so they are sown in Rabi. As these are also tehsils with developed irrigation command, so Rabi and summer crops are taken with irrigation. 86% of the Rabi area is under cereals. Gram is major Rabi pulses covering 35300 ha i.e. 5.38% and safflower is major oilseed covering about 44000 ha followed by Chillies in 5943 ha and potato in 5030 ha. Cabbage, cauliflower, tomato, ginger, garlic are the amongst other prominent vegetables.

Table 3 : Area, Production and Productivity of major crops cultivated in the district

Crop	Area in "00" ha	Production in "00" metric tones	Productivity (qt /ha)
<b>Cereals, pulses and oilseeds</b>			
Bajara	1168	848	7.26
Kh.sorghum	32	34	10.49
R.sorghum	4281	2278	5.32
Kh.maize	70	136	19.47
R.maize	62	166	26.77
Rice	676	851	12.59
Wheat	525	869	17.08
Sugarcane	282	23619	837
Groundnut	525	522	21.21
Soybean	12	36	29.92
Sunflower	30	16	10.83
Red gram	392	255	6.51
Oilseeds	176	132	39.05
Other cereals	171	124	5.5
Other pulses	85	15	1.74
<b>Fruit</b>			
Mango	736	4100	55.7
Pomegranate	1142	10526	92.2
Sapota	252	1776	70.4
Guava	916	9073	99.0
Grapes	1149	16850	146.7
Banana	2588	126816	490.0
<b>Vegetables</b>			
Tomato	5055	77847	154.00
Brinjal	1853	28647	154.6
Onion	24445	353468	144.6
Chilli	3936	15941	40.5
Leafy vegetables	2206	11446	135.4
Bulb crops	7083	78447	616.3
Guards	115	1079	72.6
Beans	2568	9848	156.1
Other spices	9812	87876	89.5



#### 4.8 : Soils

The land in the entire district is of basaltic origin falling into five soil types. The total geographical area of Pune district is 15.59

lakh ha and cultivable area 12.58 lakh ha.

The soil in the district is deficient in Nitrogen and Phosphorous but rich in Potassium.

Table 4 : Soil types and characteristics of Pune districts

Sr. No	Soil type	Classification of soils of Pune districts depending on Agro climatic zones	Area in ha
1	Shallow soils	Depth 0-30 cm, Low fertility status, Poor water holding capacity, well drained	1004288
2	Coarse shallow land	Depth 30-60 cm, Low fertility status, Poor water holding capacity, well drained	227000
3	Medium black soils	Medium water holding capacity, 30-60 cm depth, Medium black colour, High clay content, High Ca and Mg content Low N & P content, Optimum K,	206000
4	Deep black soils	High water holding capacity, 90-120 cm depth, Deep black colour, High clay content, High Ca and Mg content, Low N content, Optimum K, Low P , Montmorelinitic clay content is high	86000
5	Laterite and lateritic soil	Fe and Al oxides content is high, Low Ca content, Keolinite Mineral content is high	119000
6	Reddish brown soils of hill slopes	Low water holding capacity, 30-60 cm depth, Low clay content, low Ca and Mg content Low N ,P, & K,, content	459000
7	Problematic area	High pH more than 8.5, High sodium, High EC, and SAR, Poor drainage,	29125
8	Calcareous soils	CaCO <sub>3</sub> percent > 15%, Low Fe, Mn, Zn, content	32827

#### 4.9 : Major farming systems/enterprises (based on the analysis made by the KVK)

Table 5 : Farming systems

S. No	Farming system/ enterprise	Characteristic
1	Rain fed Mixed farming system	Low rainfall, Medium to light soils with Plain topography Crops grown Cereals, legumes, fodder crops, livestock, Livestock, backyard Poultry, Goatery
2	Semi arid Rain fed farming system	Very low rainfall, plain topography Coarse cereals, protected irrigated cereals, legumes, Custard apple, Fig, Livestock, backyard Poultry, Goatery
3	Cannel Irrigated sugarcane- horticulture- Livestock based farming system	Low rainfall, Medium to light soils with Plain topography Irrigated cropping, Sugarcane, Cereals, Vegetables, fruits and Livestock

S. No	Farming system/ enterprise	Characteristic
4	River Irrigated sugarcane- horticulture- Livestock based farming system	Low rainfall, Medium to light soils with Plain topography Irrigated cropping, Sugarcane, Cereals, Vegetables, fruits and Livestock
5	Horticulture based Farming system	Low rainfall, Medium to light soils with Plain topography Pomegranate, Grape, vegetables and protected cultivation
6	Rice based farming system	High Rainfall, Lateritic sloppy soils, Main crops-rice/ragi/ & other cereals Rabi Jowar, Spices, Vegetable

## 5. ABOUT THE HOST INSTITUTION

### 5.1 : Agricultural Development Trust, Baramati

Agriculture Development Trust was established on the specific back ground of great famine experienced by the state in the year 1971. The main purpose of establishment of the trust was to create the confidence in the mind of famine affected people for sustaining their economic condition by way of adopting ancillary agricultural activities such as dairy and poultry activities. Subsequent basic concepts were switched on to the water management, high yielding varieties and fertilizer management. Trust was developed integrated farming system with effective input management such as agro forestry, dry land horticulture crops and socio economic aspects of the farming community. The trust was registered under Bombay public trust act 1950.

The christen missionary during above drought period was helping the poor farmers by availing them the necessary life saving food items for charity. Since the food items afforded by the christen missionary was free of cost to the farmers, was thus not yielding any sustainable development to meet the challenges of the drought. Today's agriculture minister Hon. Mr. Sharad Pawar was the

pioneer who started to give the food to the farmers in returns of the work related to the mitigation measures of the drought. He visited to the christen missionary and requested them to give the food in returns of the work, soon the christen missionary agreed to do so. He started to lead the campaign and constructed about 300 earthen bunds on the water channel for harvesting the rain water in Baramati Tehsil. In the later years he established the agricultural development trust for the benefit of the rural community. Since 1971 this organization has been actively working for the socio economic and educational empowerment of the farmers, labor and their families in the Pune district .The Organization is mainly involved in education and extension of agricultural activities.



President, ADT, Shri. Sharadchandra Pawar delivering lecture during Training and Former Chairman, ADT, Late. Aappasaheb Pawar looks on...

## 5.2 : Core Activities Of The Host Organization

1. The organization is working as NGO mainly for the education of the rural woman. In this context the most of the facilities are made available for the fulfillment of the educational needs of the rural woman to become herself sufficient in terms of knowledge, skills and confidence. Organization has facility of secondary, higher secondary and UG programme in most of the faculties and PG in Microbiology. Most of the staff is well qualified in their relevant field. The hostel facility is also available for the girl.
2. The organization has built eminent network of the woman self help group which is enforcing and providing supplemental background to the rural woman to earn. Organization has made significant contribution for strengthening the SHGs movement by providing end to end solution to the problems arising in running the SHGs. Many SHGs under the guidance of the organization are working very well and making good profit. It was observed that the standard of living of the woman SHG members is increased.



Padmashree Late Appasaheb Pawar, Former Chairman, ADT showing crafts made by SHG's women to former Prime Minister of India Shri. Chandrashekhari

3. The Bhimthadi Jatra (Rural Carnival) is organized every year by the organization to promote the woman SHG movement and to give them a big approach and platform for the marketing of the SHG products. The Bhimthadi festival is organized in Pune aiming to give the opportunity to the citizen to know the rural culture and to develop the marketing skill and linkages of the SHGs. More than 350 stalls are needed to exhibit the SHG products in this festival. More than 400 SHGs are participating every year in the festival.



A view of Rural Carnival (Bhimthadi Jatra)

4. Organization has started the free preparatory training course for police for the woman who wants to join the police force.
5. To create awareness about the safeguard of the environment organization has started a separate department which is motivating the peoples and making them aware about importance of natural resources and their conservation, natural flora and fauna, pollution and its management etc.

**The major activities undertaken in agriculture by the organization is as follows-**

1. The host organization has 50 ha of area for the demonstration of agricultural technologies.
2. Trust was demonstrating adoptive research trials on drip irrigation and sprinkler irrigation.

3. Trust was organizing short training courses viz. poultry, dairy, sericulture, Gardner's training, live stock supervisor and small scale industry for women etc
4. Supply of poultry birds, HF and Jersey heifers, facility of artificial insemination, supply of seed material of high yielding varieties of fruit crops, sugarcane, agro forestry commercial plants to the famine affected needy farmers.
5. The trust was organizing farmers rally at district and state level. Trust was also organizing farmer's group discussion, seminars and farmers study tours.
6. Trust had established a Krishi Vigyan Mandal (Farm science club) for organizing farmers related activity. The monthly agriculture reportier Vigyan Varta was published by the institute.
7. Rendering and sharing practical experiences with state government development department and politicians for formulation of state government policies in respect of agriculture production in the state.
8. The trust was having the consultancy services in respect of water management design, erection of poultry and dairy farm, establishment of horticultural and agro forestry farm, storing of honey bee keeping and sericulture works.

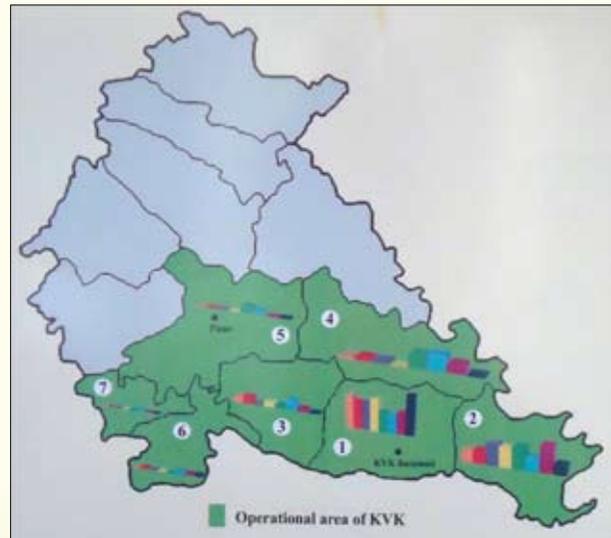
### 5.3 : Krishi Vigyan Kendra Baramati

The KVK Baramati was established on 1st August 1992 under the affiliation of ICAR. Since 1992 to 2008 the operational area of KVK was whole Pune District, but after the establishment of new KVK in the Pune district, now the operational area is reduced to the 7 tehsils of Pune district.

Figure 3 : Map Showing location of KVK



Figure 4 : Map showing operational area of KVK



The aim of Krishi Vigyan Kendra is to reduce the time lag between the technology transfer from research institutions to the farmers' field for increasing production, productivity and income from the agriculture and allied sectors on a sustained basis.

The vision of the KVK is : To be the leading resource & knowledge centre of agricultural technology for the upliftment of the farming community.

And Mission is : To delivers demand driven agricultural products & services by qualified professionals.

This Kendra is situated at 6 kilometer west of the Baramati city. This center has an area of 20 ha of land required for the technology demonstration. The land under demonstration unit is 10.50 ha and under crop is 7 ha the KVK Building has occupied 2.50 ha of land. The demonstration farm is used for the on farm testing of new technology. It is also used for the genesis of the good quality seed and seedlings of various fruit crops like Guava, Mango, Sapota and Pomegranate and seeds of oilseed, pulses and cereal crops and sugarcane.

### 5.3.1 : Staffing Pattern

The KVK has a multidisciplinary technical team from the discipline of Agronomy, Crop Protection, Agricultural Extension, Horticulture, Soil Science and Veterinary Science to cater needs of different sectors of farming community in the district. (Fig. 5)

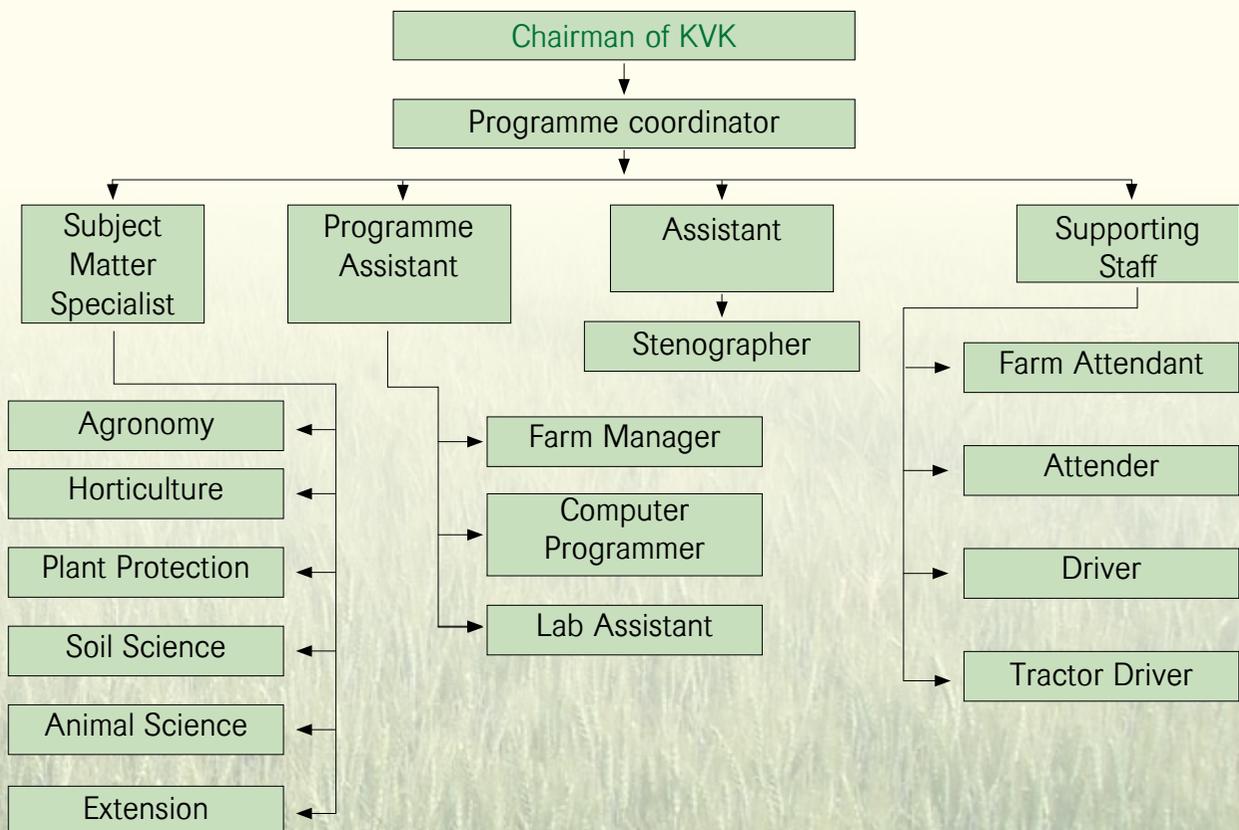
### 5.3.2 : Infrastructure Facilities of KVK Physical and Functional Growth of KVK

This KVK is well equipped with fully developed infrastructure, technically highly qualified multidisciplinary team of Scientists & a well developed demonstration farm over 50 acres. Over the period of 21 years, the KVK has purchased various audio visual aids to make the training activities more effective. It also has a good collection of books in its library. The staff members are residing at the KVK campus in the staff quarters of the KVK or have constructed their houses near to the premises of KVK. The chronologically physical and functional growth of KVK is given below.

#### 1992 :

- This Krishi Vigyan Kendra was established on 1st August 1992 by the Indian Council of Agricultural Research, New Delhi at Baramati having the operational area

Figure 5 : The staffing pattern of KVK is as follows-



of Pune District containing 14 blocks of diversified agro climatic situation.

- The building comprising 9 rooms (711 sqm) was erected.



KVK Old Building

- The bench mark survey of focal and satellite village were conducted for problem identification.
- The center for distance learning in agriculture under Yashwantrao Chavan Maharashtra Open University, Nashik was started.

#### 1993 :

- The agriculture land was acquired and the development work began.
- The plans and estimates of workshop vehicle garage, staff quarter approved and work began.
- Horticultural and cash crops were planted on 4 ha area.
- The administrative building, classroom, farmers hostel with dining hall was completed.
- The farmer's hostel was constructed having 10 rooms.
- A Local Management committee was constituted for assessing and reviving and guiding the activities of the Kendra.
- The Construction of fencing was started and the work was done by self funding.

- The lab to land programme was also initiated for the demonstration of various location specific agriculture technologies.



KVK Old Building

#### 1994 :

- The staff quarter of 22 rooms were constructed.



Staff Quarters

- Tempo Trax (Jeep) was purchased as per the funds received from ICAR
- Introduction of Rhode Island Red birds as improved breed for back yard poultry was done under Lab to Land programme.
- A Farm Godown (78.06 sqm) having 4 rooms were constructed.

#### 1995 :

- A Mahindra tractor was purchased as per the funds received from ICAR.
- The vocational trainings for entrepreneur development were started in collaboration with DRDA and MCED.

- For promoting the sale and use of demand driven agricultural inputs the Farmer's Service Center was established.
- A Museum of agricultural implements was started.



Implements Museum

1996 :

- The Vermicompost production was started on 60 sqm.



Vermicompost Production Units

- An Animal Shade (74.33 sqm) was constructed by the host institute.



Animal Shade

- A motorcycle was purchased for office work as per funds received from ICAR.

1997 :

- Construction of NADEP composting unit on 20Sqm area.



NADEP Units

- Purchased various farm implement for agriculture implement museum.

1998 :

- Programme coordinator was selected by the Indo British partnership to act as consultant for website designing for farmers.

1999 :

- A motorcycle was purchased.

2000 :

- Mechanical sugarcane planter was purchased for demonstration



Sugarcane Planter

2001 :

- A Poly House (560 sqm) was erected by the funds received from ICAR and host institute.



Gerbera Plantation in Poly House

2002 :

- A bio agent production laboratory was established and started producing various bio fertilizers and bio pesticides.
- A Tempo-Trax was purchased.

2003 :

- The unit for production of Neem Seed Kernel extract and Neem Cake was started.
- 14 lakh liters Farm Pond was constructed and lined by polythene sheet for the supply of irrigation water to the demonstration farm.



Farm Pond

- The Computer Lab was established and put in services of the farmer for the easy knowledge empowering.

2004 :

- The expansion of Nursery was done along with plantation of new mother blocks of citrus and pomegranate.



Fruit Crops Nursery

- The Unit of Disease Forecasting was established and put in service for the farmer.
- The joint project between IIT Pawai and KVK Baramati on development of interactive web portal on agriculture knowledge was started and the web portal [www.aAQUA.org](http://www.aAQUA.org) is in working since then.



Web Portal : [www.aAQUA](http://www.aAQUA)

- Use Crop Specific Agro Advisory to the farmers was started by using the Information Technology.

2005 :

- The first Community Radio (Vasundhara Krishi Vahini) in Asia was started in collaboration with Vidya Pratishtan,

Baramati to broadcast agriculture technology dissemination.



Community Radio Station

- The Atomic Absorption Spectro photometer was purchased for testing of micro nutrients in soil, fertilizer and petiole.



Atomic Absorption Spectro photometer

- 85 Farmers Club were established in different villages having 1700 farmers as volunteers.



Member of Parliament inagurating Farmers Club established by KVK

2006 :

- The Nursery was strengthened under the scheme of National Horticulture Mission
- The Bio Control Laboratory was strengthened.



Bio Control Lab

- The additional Vermicompost production unit was strengthened
- The Agriculture Implement Museum were converted into custom hiring center and strengthened by purchasing new need based farm machineries.



Implement Bank

- The ATMA project of the state government invited KVK on district planning committee.
- Second Poly House of 560 sqm established and started using this facility for the training to the farmer.

#### 2007 :

- The expansion of KVK main building was done.



#### Expansion of KVK Building

- The Interactive Voice Response System (IVRS) was established and started giving information on weather, market, agro advisory and various activities to the farming community in the operational area.
- The facility of Short Message Service (SMS) to the farmers on their mobile was started for easy technology dissemination.



SMS Services provided by KVK to the farmers

- The project on Rain Water Harvesting on the KVKs farm was completed.
- A small unit of making urea and DAP briquettes and multi micronutrient solution was started functioning.
- The ACABC 2 months training course for entrepreneurship development was started in collaboration with MANAGE, Hyderabad.
- The New Farmers' Hostel was constructed and put in service of the farmer.
- Crop Diagnostic Center was established and started functioning

#### 2008 :

- The Seed Processing Center was established and started functioning.



#### Seed Processing Center

- The Israel type model dairy farm was erected.



Model Dairy Farm

- The sub project on 'A Tomato Processing Prioritization for Global Competence' under National Agriculture Innovation Project funded by ICAR was started.

2009 :

- The expansion of the building of Seed Processing Godown was done.
- The Fruit Processing Center was established.



Fruit Processing Center

- The Nursery was strengthened by erection of new 0.10 ha shade net house.



Shade Net House

- KVK got VSAT connectivity and 6 computers including server with 2 printers.
- Purchased Generator of 15 KVA capacities for continuous power supply.
- The Farmer's Service Center was modified into sale counter cum reception.

- Purchased Ion Chromatography machine for soil testing.
- Erection of the shed for the unit of making Urea- DAP briquettes and foliar multi micronutrient solution was done.

2010 :

- Establishment of 8 commodity interest group was done for specific trainings to the farmers
- Production of Potassium Mobilizing Bacteria was started for selling it to the farmer. The VAM was also made available.
- Invented Area Specific Mineral Mixture and started providing to the farmers.



Mineral Mixture

2011 :

- Started Mobile Soil Testing Laboratory services under the project of National Soil Health and Fertility Management Programme.



Mobile Soil Testing Van

- The new Community Radio Station (Sharada Krishi Vahini) having 90.8 MHz frequency was started.
- The CRIDA funded project on National Initiative on Climate Resilient agriculture was started.
- Organization of technology week concept was started in which 2752 farmers had participated.
- NABARD's Pilot Project on "Augmenting Productivity of Lead Crops through Adoption of Sustainable Agriculture Practices" was started in 5 villages of KVK jurisdiction.
- NABARD's Pilot Project on "Technology Transfer and Credit Counseling through Farmers Club" was started.

#### 2012 :

- Automatic Fertigation system was established on KVK farm for computer controlled irrigation and fertilizer delivery.



Automatic Fertigation system

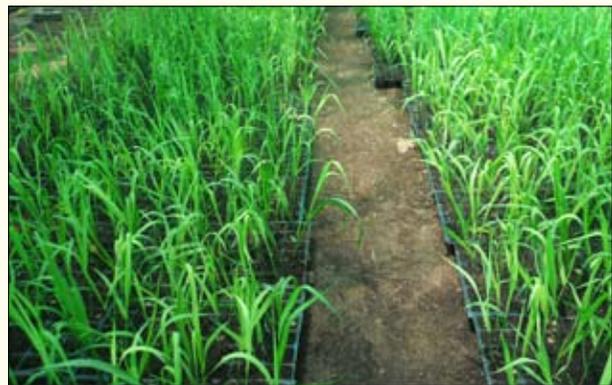
- Ferrous and Sulfur solubilizing Bacterial culture and foliar bacterial culture of Acetobacter made available to the farmers.
- Redesigning of KVK website was done.
- Pilot Project on 'Weather Related Information & Advisory to Farmers in Collaboration with NABARD, IMD & KVK' was started.

- An Apiary unit with 50 Bee hives was established under National Horticulture Mission.



Apiary Unit

- KVK ventured into Sugarcane Sapling production.



Sugarcane Sapling Production

- A suitable sugarcane sapling transplanter was developed.



Sugarcane Sapling Transplanter

- Use of hydroponics as innovative technology for vegetables and fodder production was started.



Spinach cultivation by using Hydroponics

- Laser land leveler was purchased as per funds received from NABARD as custom hiring implement.



Laser land leveler

- The Touch Screen Display of agro info media was started.



Touch Screen Display

2013 :

- Development of New Campus for extending the KVK activities.



Development of New Campus

- Renovation of Demonstration Farm for celebrating Technology Mahotsav.
- Establishment of Soil, Water and Petiole testing Laboratory and Bio Control Laboratory, Plant Health Clinic.



Soil, Water and Petiole testing Laboratory

- Erection of four Poly Houses on 4000 sqm area.
- Construction of Pack house near poly houses for packing flowers and vegetables.



Poly House

- Development of Apiary for honey production and pollination.



Apiary

- Construction of Water Storage Tanks with solar water lifting system.



Water Storage Tanks with solar water lifting system

- Establishment of Traditional Implement Museum around new building.
- Construction of new Administrative building & Training facility.



New Administrative building with Training facilities

- Establishment of Automated fertigation system for whole campus.



Automated Fertigation Unit

- Demonstration unit of various irrigation systems in collaboration with Jain Irrigations Pvt. Ltd.
- Two Canteen and Farmer's hostel having capacity of 150 was constructed for trainees accommodation.
- Main gate and Inside road development has been done.



Main Gate and inside roads of ADT's KVK

- Establishment of Hatchery, Poultry, Azolla and Vermicompost & Silage making unit.



Silage Making Unit

## 6. PROBLEM IDENTIFICATION AND PRIORITIZATION

The problems and need of the farming community in the operational area of KVK were assessed by various extension technique viz. PRA, field visit, farmers' interaction, personal

contacts, group meeting etc. Based on the assessment the following major problems were identified and prioritized.

### 6.1 : Major Problems identified with respect to agro climatic zone

Table 6 : Major problems with respect to agro climatic zone in the operational area

Sr. No.	Name of the Zone	Tehsils	Problems Identified
1	Ghat zone	Part of Mawal	<ul style="list-style-type: none"> <li>• Low family income in rural farming communities</li> <li>• Poor technical knowledge on animal nutrition and reproductive management</li> </ul>
2	Sub Mountain Zone	Velhe, Bhor, Mulshi, Khed and Mawal	<ul style="list-style-type: none"> <li>• Lack of critical input availability</li> <li>• Poor farm mechanization</li> <li>• Poor technical knowledge on animal nutrition and reproductive management</li> <li>• Heavy rainfall</li> <li>• Light soils having heavy leaching of nutrients</li> </ul>
3	Plain Zone	Haveli, Junnar and Ambegaon	<ul style="list-style-type: none"> <li>• Excessive dependence on inorganic fertilizer</li> <li>• Improper cropping sequence and crop management</li> <li>• Lack of knowledge and facilities on proper water management practices</li> <li>• Indiscriminate use of pesticide</li> <li>• Post harvest losses due to improper storage facilities and poor knowledge</li> </ul>
4	Scarcity Zone	Baramati, Indapur, Purandar, Daund and Shirur	<ul style="list-style-type: none"> <li>• Drought and dry spell</li> <li>• Pest and disease attack in major crops</li> <li>• Use of local and poor quality seed material</li> <li>• Lack of knowledge and facilities on proper water management practices</li> <li>• Indiscriminate use of pesticide</li> <li>• Lack of knowledge on the use of various bio pesticides and plant derivatives</li> <li>• Labor shortage</li> <li>• Poor knowledge on rain water harvesting and soil conservation</li> <li>• Reproductive and nutritional management of Livestock</li> </ul>

## 6.2 : Thrust Areas of KVK

Following are the thrust areas identified by PRA or any other methods

Table 7 : Thrust areas identified by KVK

Sr. No.	Name of the Zone	Tehsils	Thrust Areas
1	Ghat zone	Part of Mawal	<ul style="list-style-type: none"> <li>• Farmers club and woman SHGs</li> <li>• Crop diversification</li> <li>• Market lead extension</li> </ul>
2	Sub Mountain Zone	Velhe, Bhor, Mulshi, Khed and Maval	<ul style="list-style-type: none"> <li>• Monitoring and improvement of soil fertility</li> <li>• Empowering woman with appropriate rural technologies</li> <li>• Fertigation and drip irrigation techniques</li> <li>• Nutritional management of livestock</li> </ul>
3	Plain Zone	Haveli, Junnar and Ambegaon	<ul style="list-style-type: none"> <li>• Integrated nutrient and pest management practice</li> <li>• Reduction in cost of production</li> <li>• Biological control of pest and diseases</li> <li>• Farmers club and woman SHGs</li> </ul>
4	Scarcity Zone	Baramati, Indapur, Purandar, Daund and Shirur	<ul style="list-style-type: none"> <li>• Quality seed production</li> <li>• Diversification under water scarce condition</li> <li>• Introduction of new varieties</li> <li>• Water conservation technique</li> <li>• Reduction in cost of production</li> <li>• Disease forecasting in fruit and vegetable crops</li> <li>• Fertigation technique</li> <li>• Livestock management in drought</li> <li>• Promoting non conventional feed resources</li> <li>• Nutritional management of the livestock</li> <li>• Disease and parasite prevention and control in livestock</li> <li>• Cyber extension</li> <li>• Farmers club and woman SHGs</li> <li>• Protected cultivation</li> </ul>

Based on the thrust areas, appropriate technical activities have been planned and conducted which includes technology assessment, refinement, front line demonstration trainings and extension activities and were disseminated by the way of demonstration, field days, Farmers field school, agriculture exhibitions, technology week, farmers study tours, Community radio, by using information technology, popular articles in news paper, TV programmes etc.

Vocational trainings having the duration between 3 to 15 days was conducted on the basis of the thrust area identified for entrepreneurship development. Incomes generating vocational trainings of one month to six months duration were also organized in collaboration with various agencies including District development agency, Maharashtra Center for Entrepreneurship Development, Pune, NHM, ATMA, NABARD etc.

## 7. THE TECHNOLOGICAL INTERVENTIONS THROUGH MANDATED ACTIVITIES

Before implementing various mandatory activities PRA survey have been conducted by KVK in focal and satellite villages so as to identify problems and thrust area in the operational area. Accordingly the mandatory activities were decided and focused. Different interventions were conducted in the thrust areas of working since inception of the KVK. The few technological interventions that have the significant impact on agriculture and live stocks are mentioned here after.

### 7.1 : Technology Assessment and Refinement Through on Farm Testing

This activity is undertaken to identify technologies in terms of location specific sustainable land use system. On the basis of problems and thrust area identified the TAR

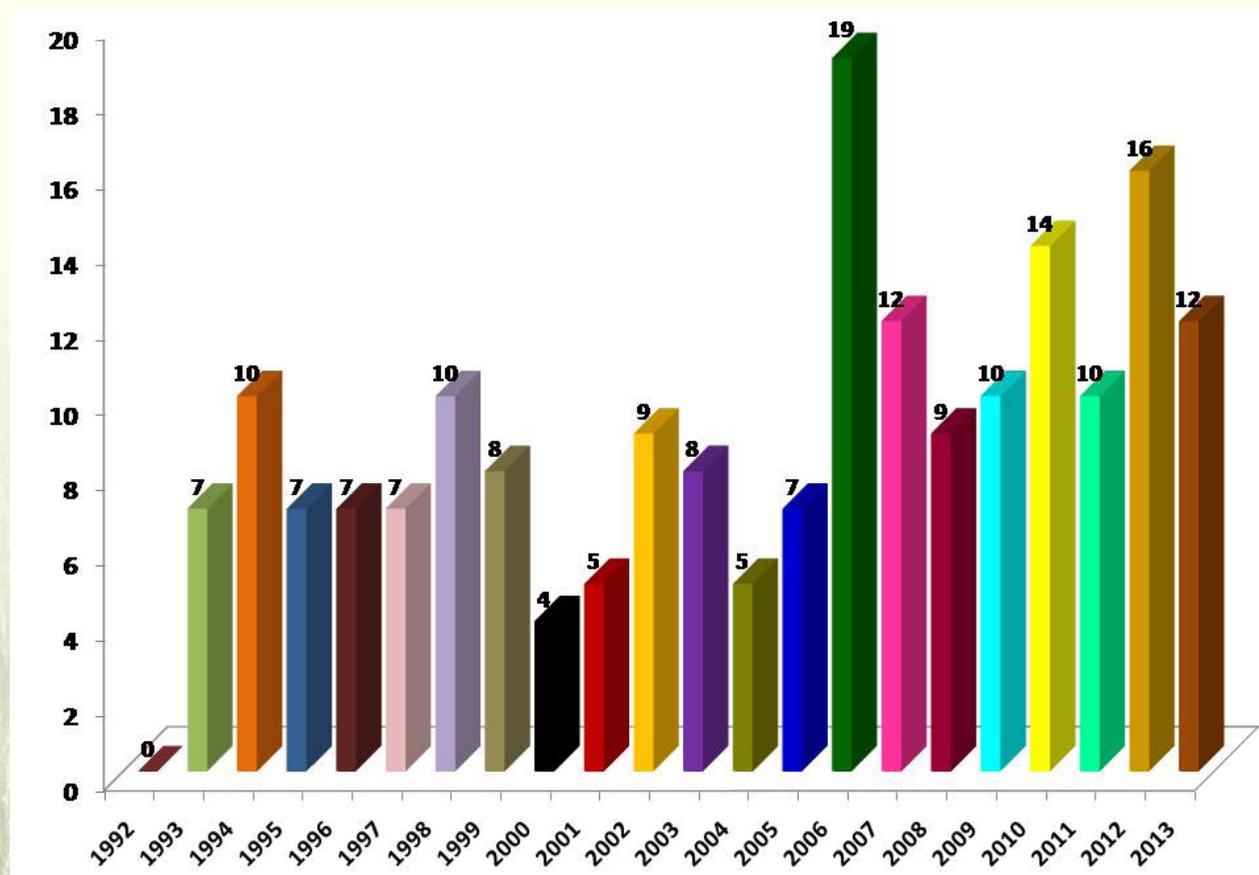
(Technology Assessment & refinement) were undertaken. Since inception 196 OFTs were conducted and some of them are briefed below.

#### 7.1.1 : Assessment of Bengal gram variety: Digvijay

Bengal gram is a main Rabi pulse crop grown in Pune district on 39200 ha area. The productivity of this crop in the district is only 6.51 qt./ha. The major problem identified were use of local variety, wilt disease and attack of *Helicoverpa armigera* which finally causing low yield in Bengal gram under protective irrigated condition.

To tackle this problem KVK has introduced Digvijay variety which is wilt resistant released by MPKV Rahuri. The trial was conducted for 3 years during 2007-10 in comparison with

Figure 6 : Technology Assessment and Refinement (TAR) conducted.





Improved variety of Bengal gram : Dugvijay

existing variety Vijay. The results indicated that variety Dugvijay yielded average 23.18 qt/ha and variety Vijay yielded 18.02 qt/ha. This shows that there is 28.63% increase in yield over local cultivar. Similarly, the wilting percentage was negligible. Data showed that there was 25 to 30 percent more number of pods with double and bolder grain as compared to Vijay. After 3 years the variety was introduced for conducting front line demonstration in major operational area of KVK Baramati.

### 7.1.2 : Introduction of new Wheat variety- NIAW-301 (Trimbak)

Wheat is the major cereal crop of the Pune district. The area under wheat crop during 2002 was 52500 hectare. The average productivity was 17.08 quintal/ha which was very low against the potential yield in the region ranging from 40 to 45 qt/ha. There was very much yield gap due to rust infestation and late sowing.



Improved Wheat variety : NIAW-301 (Trimbak)

During 2002-03 KVK has introduced new rust resistant variety NIAW-301(Trimbak) for irrigated area and timely sowing. The trials on yield assessment were conducted in 2002. The new variety yielded 32.2 qt/ha whereas the local variety (Lok-1) gave 26.63 qt/ha yield. It was observed that there was 20.9% increase in yield over local cultivar (Lok-1). The incidence of rust on NIAW-301 was negligible and the introduced variety is good for chapatti making.

### 7.1.3 : Use of fertigation technique in Sugarcane

Sugarcane is the main cash crop of the district and productivity of the crop is only 84 MT/ ha. Low productivity in sugarcane is due to imbalanced and low up take of nutrients particularly phosphorus and potassium. Most of the progressive farmers are using drip system but not aware about fertigation. Pertaining to this problem, assessment on use of fertigation techniques was conducted as per recommendation of VSI, Pune during 2007 to 2009 in Adsali sugarcane.



Fertigation in Sugarcane

The results of the trial showed that by using fertigation technique of 280:119:119 i.e.70% NPK/ha, application through urea, MOP, H3PO4 in 13 equal splits + 25 tons FYM, there is 13% more increase in yield as compared to recommended practice and having 42750 Rs/ha more net benefit than recommended practice.

#### 7.1.4 : Assessment on Fertigation in Onion

Onion is major crop of Pune district grown in late Kharif and Rabi season. As per PRA survey low yield and poor quality bulbs in onion is due to imbalanced or no use of fertilizer by proper method. Farmers were growing onion on raised beds with drip irrigation system. But the fertilizers application method was not proper and it was directly affecting on yield, quality and net returns from the onion cultivation.

The assessment of use of fertigation in onion was conducted during 2011-13. The trials were conducted with application of 50:50:80 kg NPK/ha as a basal dose and 100 kg Nitrogen through Urea in seven splits up to 75 DAP through drip irrigation.



Fertigation in Onion

The comparisons were made with farmers practice. The fertigation treatment used in this assessment reduced the cost on water soluble fertilizers which was around Rs.3750/ha. It was observed that the yield of onion was increased by 48.76% as compared to farmers practice with the good quality bulb production. The average yield obtained in trial plot was 24.77 ton/ha as compared to 16.65 tons/ha from farmers practice.

#### 7.1.5 : Use of Poly mulch in Muskmelon.

In the operational area of KVK, farmers were growing Muskmelon in medium type of

soil without polythene mulching. Planting of muskmelon without mulching requires more water and labour cost is more for controlling weeds and pest. The use of improper technology by the farmers for growing the muskmelon was resulting into poor quality fruit and low yield, ultimately not getting good returns from this crop.

The trials on assessment on use of polythene mulching in muskmelon was conducted during 2009-11. The silver black colored polythene mulching of 30 micron thickness were used for planting of muskmelon. The farmer's practice i.e. planting of muskmelon without use of polythene mulching was used for the comparison.



Use of Poly mulch in Muskmelon

Due to this technology there is increase in average weight of fruits, reduction in labour cost and increase in net returns as compared to local practice. It was observed that the average yield in trial plot was 22.60 tons/ha as compared to 16.64 tons/ha in farmers practices. This shows that there was increase in 35.81% more yield and increase in net return of Rs.79550/ha as compared to the farmer's practices.

#### 7.1.6 : Efficacy of *Paceilomyces liliacinus* for control of nematodes in pomegranate

There is a heavy incidence of root knot nematode in pomegranate with the intensity of 28-30% in heavy soils. The objective of the

assessment was to test the efficacy of the bio-pesticide *Paceilomyces liliacinus* integrated with Neem cake and Carbofuran against root knot nematode in pomegranate. The farmers use to apply Neem cake, Carbofuran or they drench the Chlorpyrifos near root zone in soil for the management of nematode. The intervention was soil application of Carbofuran along with Neem cake at the time of pruning with application of *Paceilomyces liliacinus* 20 kg/ha with compost. The authentic source of the information is Mahatma Phule Krishi Vidyapeeth, Rahuri (MS).



#### Management of root knot nematode by using *Paceilomyces liliacinus* in Pomegranate

The trial was taken on 10 acres of land with 10 farmers in pomegranate with heavy infestation of nematode and wilt intensity. The root gall formations due to nematode are comparatively lower in recommended practice as compared to farmers practice. The farmers are not much more aware about the use of bio-pesticides as they want quick results. Also, they got the idea for prevention of the nematode infestation in the crop.

The demo plot recorded minimum no. of wilted plants/ year (14.1), no. of root nodule/ 25 gm of root (7.3) and no. of nematodes/ 200 gm of soil (1.6) as compared to the traditional methods (45.3 wilted plants/ year, 20.1 root nodule/ 25 gm of root and 7.5 nematodes/ 200 gm of soil respectively).

#### 7.1.7 : Control of Damping Off in Chilli seedling by using Soil Solarisation and Seed treatment with *Trichoderma*.

Chilli is a major vegetable crop in the area and suffers to the heavy attack of damping off of seedlings. The no. of seedlings per meter germinated is reduced, that directly affects the yield.

The technology assessed were soil solarization for 21 days by using of 200 gauge polythene sheets and seed treatment with *Trichoderma* at the rate of 4 gm/ kg of seed, soil sterilization with application of Formalin 39% before 3 days of sowing seed. It was observed that in Refinement, the no. of seedlings wilted per sq. m. were very low i.e. 4.5 as compared to 7.8 in Recommended practice and 10.3 in Farmers practice. The refinement plots recorded maximum plant height at transplanting (17.6 cm) as compared to technology (13.9) and farmers practice (11.3) and gave 145.4 qt/ha yield with the net profit of Rs. 1,20,930.



#### Damping Off in Chilli seedling can be manage by using Soil Solarisation and *Trichoderma* seed treatment.

#### 7.1.8 : Fertigation in Banana

Banana is second largest fruit crop in Pune district, in recent years farmers have diverted from growing sugarcane to Banana. Banana is getting more popularity among the growers due to the good profit from it and less time

as compared to sugarcane for its growing. It is revealed from the PRA survey that most of the banana growers facing the problem of low uptake of nutrients and thereby low yield. The technologies like plantation of tissue culture banana along with fertigation are helping to improve yield up to 30% as compared to traditional method.

During 2007- 2011 KVK had conducted trials on use of fertigation technique in Banana. Application of Phosphorus in the form of phosphoric acid, Nitrogen in the form of Urea and Potassium in the form sulfate of potash found more useful. The recommended fertilizer dose of 200:40:200 gm of NPK/plant is given through the drip irrigation system.



**Fertigation in Banana can increase yield upto 24%**

Due to intervention of fertigation in Banana 24% yield was increased as compared to the farmer's method and they got additional income of Rs.63000 per ha over the farmers practice.

#### **7.1.9 : Foliar application of nutrients in sugarcane in problematic soils of Pune district**

The canal and river irrigated area is accounting about 30 percent to the total area of the Baramati tehsil of Pune district. Sugarcane is the main cash crop grown intensively in this area. It is observed from the PRA survey that the soils mainly irrigated by canal and river water are becoming saline and sodic in nature

due to over irrigation and salt accumulation. Farmers are facing the problem of low yield due to poor uptake of nutrients like P, Mg, S, Fe, Mn and Zn. In this area the average productivity of sugarcane is only 62 ton/ha. To optimize the yield in this particular area KVK had started trail on foliar application through spraying of Multi nutrient (9:9:5:2:2:2% of N, P, K, Fe, Zn, Mn,) from 60 to 120 days after planting to 120 day after planting at the rate of 7lit /ha in 500lits of water.



**Foliar application of multi nutrients in sugarcane can increase yield by 15 to 20%**

These trial were helped to increase the yield of Adsali sugarcane in selected area by 15 to 20% over control and there was reduction in chlorosis up to 3% which was 23% observed in control plot.

#### **7.1.10 : Use of SAF Kit to reduce incidence of mastitis in crossbred cows**

The main allied agricultural activity in the operational area of KVK is rearing the milk animal. The major problem identified in milking animal is high incidence of clinical Mastitis. To overcome this problem Indian Immunological Ltd, Hyderabad (NDDDB, Anand) has developed preventive technique of use of SAAF kit for spray on teats and udder after milking of Crossbred HF cows. SAAF kit contains concentrated 0.71% w/v iodine + Glycerine and Sorbital. SAAF kit solution is diluted 1:9 proportion with sterile water before its use.

Use of SAAF kit for prevention of mastitis is used for 3 years in cross bred HF cows and results of this technology is summarized as follows.

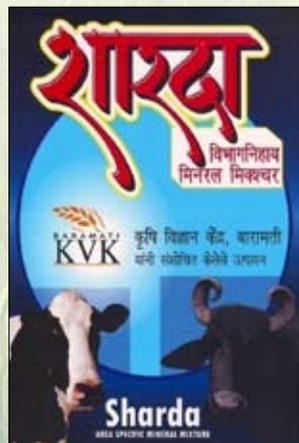


Use of SAF Kit

Reduction of incidence of clinical mastitis from 38% to 07%, Reduction of sub clinical mastitis from 36% to 14%, Reduction of septic pustules on teats from 35% to 05% was found and losses due to clinical mastitis is reduced from Rs.950/-to Rs.65 per cow per lactation.

#### 7.1.11 : Use of Area Specific Mineral Mixtures in cross bred cows

Repeat breeding and low milk yield in cross bred HF cows due to mineral deficiency in sugarcane based dairy farming in medium soil of Pune district was the common problem in dairy enterprise. Testing of minerals in fodder, soil & blood of animals based formulation of area specific mineral mixture for cross bred HF cows as per technology recommended by IVRI was taken into consideration to overcome this problem. Considering the feeding system calcium,phosphorus& Zinc is more deficient as compared to other micro minerals in feed, fodder and soil. Feeding of area



specific mineral mixture 100gm per day/ crossbred HF milking cows is found useful. Ratio of calcium to phosphorus as 1:1 in mineral mixture found more useful. Dairy farmers reported that Increase in milk yield by 1.5 lit. Day/cow as compared to use of regular mineral mixture, increase in fat content by 0.3 points as compared to use of regular mineral mixture. The feed and water intake is increased considerably. Farmers are now purchasing the area specific mineral mixture prepared by KVK. Presently 82 farmers are regularly using area specific mineral mixture for their cows.

#### 7.2 : Front Line Demonstration

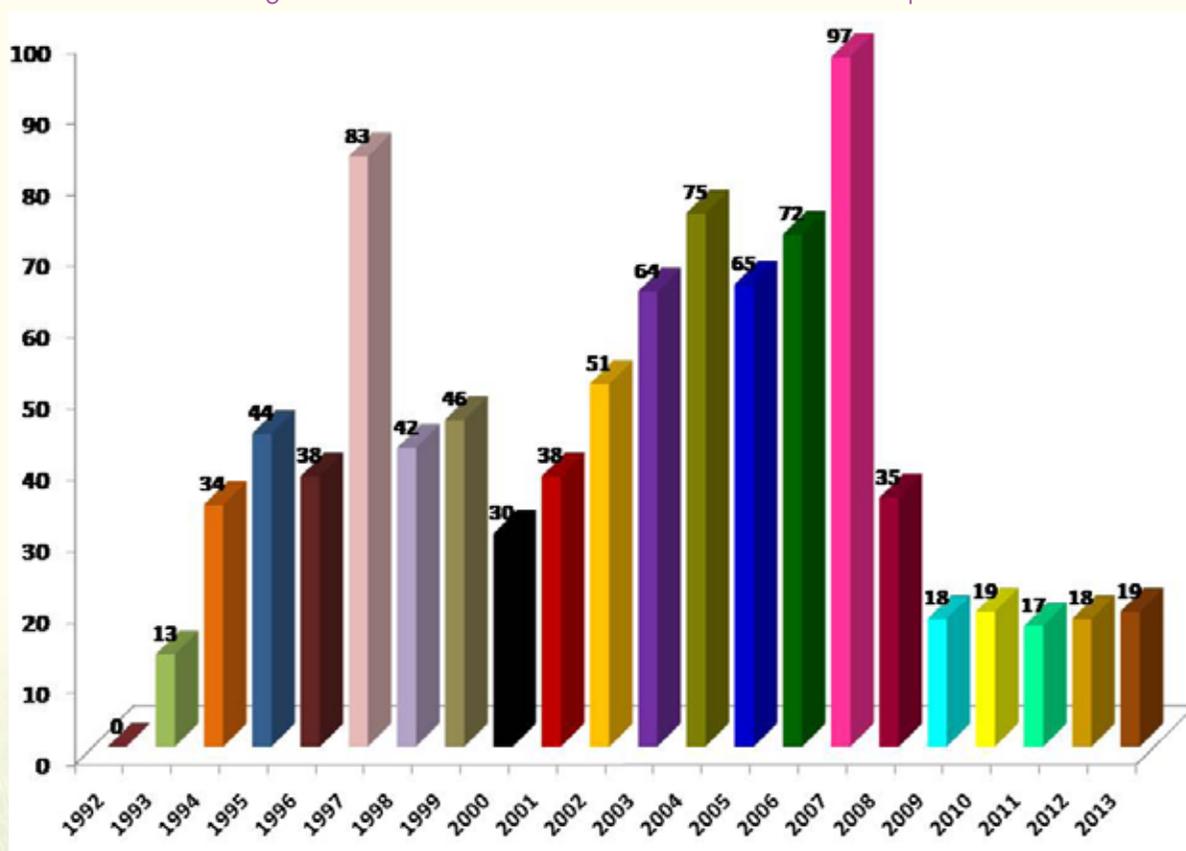
Working on the principle of “Seeing is believing” the KVK has undertaken several demonstrations on low cost agricultural technologies. The data over control was scientifically collected, analyzed and in the common interest of other farmers was given wide publicity, through literature, radio talks, popular articles, field days etc. based on the experiences necessary feedback was given to respective department.

From 1993-94 onward demonstrations were conducted on oilseed crops like Groundnut, sunflower, soybean, safflower, and pulses like Red gram, Bengal gram and Green gram. Total area covered during three seasons (Kharif, Rabi and summer) under oilseeds and pulses from 1993 to 1998 was 152.2 hectares and from 1999-2005 it was 119.2 ha, covering about 866 farm families. The average increase in productivity of the demonstrated plots over control in 2005 was in Groundnut (44.8%), Sunflower (38.69%), and Soybean (51.58%), Safflower (28.77%), in case of pulses Red gram (52.4%), Bengal gram (53.3%) and Green gram (14.92-21.4%) over the traditional practices. Because of these there has been large adoption of new varieties, such as soybean (DS 228, MACS 450, JS 335, PK 1029, MACS 124 etc.) Groundnut (TPG 41,

TG 37, ICGS-44, TG 26, TAG 24) Bengal gram (Vijay, Digvijay) bio- fertilizers, integrated pest management and micronutrients along with other agronomical practices such as ridge & furrow method of cultivation by the farmers. All demonstrations were supported by pre and post season training and other extension activities. The main objectives in laying out any demonstration, was not only increasing the productivity but also reducing the cost of production, making the practices

more eco friendly by promoting INM & IPM, improving the quality of the produce etc. The KVK has also tried covering all the major crops of the district under its demonstrations. Various demonstrations on organic farming, cultivation under green houses, introduction of substitute crops like cassava, mechanized farming such as zero till seed drill, sub-soiler, hand operated hoes etc were also conducted. The information on the total number of FLDs conducted by KVK is as under.

Figure 7 : The number of FLDs conducted since inception



Some of the salient FLDs with specific impact unit popularization are detailed below.

### 7.2.1 : In situ moisture conservation in Rabi Sorghum to reduce water stress at critical growth stage

Rabi Sorghum is the most important cereal crop of the Pune district covering 428100 hectare area. Most of the dry land farmers in the district are growing this crop. From 2011 rainfall in Baramati region is very low and

number of rainy days and average rainfall is reducing. In Pune district Baramati, Indapur, Purandhar and Daund are drought prone tehsil and average rainfall in these tehsils is only 450 mm but from last three years average rainfall is around 200 to 250mm, Some region got only 60 to 70 mm rainfall and it is quite uneven. For solving this problem KVK have demonstrated

the in situ moisture conservation technique in Rabi 2011-12 on large scale.

This technique is developed by All India Coordinated Sorghum Improvement Project (ICAR) and Mahatma Phule Agriculture University, Rahuri. The practice helped to conserve moisture uniformly in the small flat beds in the field. It reduces runoff losses and soil erosion which is very relevant for dryland farming. Uniform moisture conservation helped to have even crop growth. The moisture thus conserved reduces the water stress during critical growth period and ultimately gives assured yield of rainfed crops like Sorghum & Pearl millet. Ground water table also increases by adopting this technique.



#### Demonstration of In situ moisture conservation

Due to this activity, about 256 ha area was brought under this technique in rainfed area. The results are encouraging. Farmers could see by themselves the advantages of this technique. With just 60 to 70 mm rainfall in 2012 before sowing of Rabi Jowar, farmers could get 14.81 qt/ha yields as compared to farmers practice (4.75 qt/ha) which is 211 % more than the control and farmers have harvested more dry fodder also.

#### 7.2.2 : Intercropping of Soybean and Red gram (3:1)

Soybean and Red gram are the main oilseed and pulse crops in Kharif season of Pune district. Due to uneven and delayed

rainfall during Kharif season results in low yield or failure of sole crop. So as to reduce the risk of failure of sole crop intercropping of Soybean and Red gram (3:1) was demonstrated during 2007-09 which shows tremendous increased yield and economic outputs. The results shows that average yield of Soybean and Red gram is 31.47 qt/ha as compared to 23.57 qt/ha in sole Soybean. The net benefit obtained by the farmer using intercropping technique was Rs.38887/- as compared to only Rs.15761/- in sole Soybean per ha.



#### Intercropping of Soybean and Red gram (3:1)

#### 7.2.3 : Introduction of new Rabi Sorghum high yielding variety- RSV-1006 (Phule Revati) under Irrigated condition.

Rabi Sorghum is a main crop grown in Pune district and most common variety used by farmers is M-35-1 (Maldandi) which was cultivated from 1986 with poor quality seed. The average productivity of district is 5.32 qtl/ha and low yield in Rabi sorghum was observed due to local cultivar. Pertaining to this KVK Baramati had introduced new Rabi sorghum high yielding variety RSV-1006 (Phule Ravati) under protective irrigated condition which was released by MPKV Rahuri as per soil type.

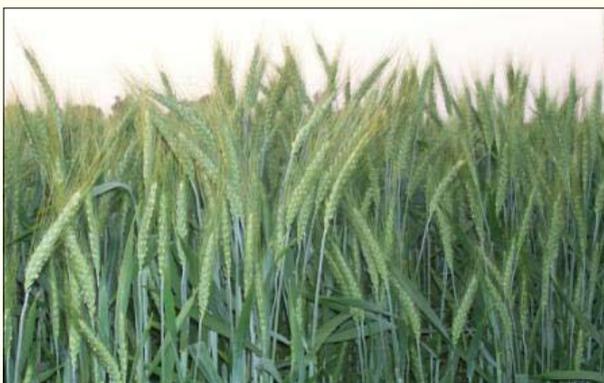
During 2010-13 demonstrations by introducing the variety RSV-1006 was implemented and compared with local cultivars. The results of this demonstration show that there was 74.27% as compared to



M-35-1. KVK has produced the foundation seed of variety RSV-1006 during 2011 and 2012 which covers 344.8 ha area also Department of agriculture taking initiative for production of seed of this new variety.

#### 7.2.4 : Large scale adoption of Wheat variety NIAW-301 (Trimbak)

Wheat is a major irrigated cereal crop grown in Rabi season after sugarcane. Low yield in wheat was due to use of local cultivar and incidence of Rust disease. Farmers are growing wheat mainly for chapatti making for their household use. As per the major problem and thrust area identified KVK had introduced new variety of wheat NIAW-301 (Trimbak) during 2002-05 since then this variety has become very popular among the farming community.



Varietal demonstration of Wheat : NIAW 301

The demonstrations were conducted in 10 villages of four talukas of Pune district. From these villages information was collected from 100 farmers those who have taken this variety after KVK intervention.

As per the data collected the adoption of this variety was due to the increase in yield and quality of grains with negligible incidence of Rust disease. After adopting (96.66 percent) farmers stated that their yield wheat crop was increased from 5 quintal to 17 quintal/ ha and (90 percent) farmers reported that there is no rust incidence on this variety



#### 7.2.5 : Use of skirting bags in banana to the improve quality of fruits

Banana is a crop being cultivated throughout the year in Pune district. As per PRA survey low yield in Banana was due to thrips attack, sun scorching, rust and fungal disease resulting in low market price.



Use of Skirting Bags in Banana

Front line demonstration on use of skirting bags in Banana was conducted on 86 farmers field on 32 ha area for improving quality of fruits during 2008-11. The technique includes covering of bunches with polythene skirting bags having 40 mm thickness and ventilation holes at the time of full emergence of bunches. The results showed that the banana bunches were protected from dust at roadside and bagas from sugar factory. The fingers with attractive yellowish green color were obtained. The losses due to soiling of bunch with mud after falling down were minimized. The losses at western side of orchard were minimized. Reduction in various spots by 11.3% & Color of fingers was attractive light green instead of dark green .The spotless bananas were obtained which fetched better price in the market. This is an easy technology to operate.

#### 7.2.6 : Use of polythene mulch in tomato to improve yield and quality

Tomato is an important vegetable crop which fetches more revenue to the tomato

growers of Baramati. The incidence of weed, imbalanced use of fertilizer, pest and disease are the major problems which finally results in low yield of Tomato.

Realizing the fact KVK have demonstrated use of poly mulch in Tomato for improving the yield and quality of fruit during 2010-12 on 15 ha area. The technology options include planting of Tomato on 30 microns silver color polythene mulch. The results shows that Polythene mulch saved the crop from sudden rains, reduced pests like leaf miner and number of sprays by 7, quality of fruits get increased so better price obtained, saved water, saved labour for weeding. Increase number of pickings by 5. Saved cost on weeding by.12555 Rs/ha. The average yield was increased by 24.02% as compare to farmer practice.



Demonstration on use of polythene mulch in tomato

### 7.2.7 : INM in Cucumber

In Baramati area most of Farmers are growing Cucumber as a major cash crop Vegetables but they do not get maximum yield and net profit because of imbalanced use of Chemical Fertilizers.

During the year 2010-2012 by this Front Line Demonstration i.e. Application of recommended dose of Chemical fertilizers i.e.100:50:50 kg NPK/ha and also use of micronutrients as per soil test base increased number of Pickings (6 Picking), early maturity of fruits as compared to farmers practice

(5 days) and results in increase in yield of cucumber per hectare (6.32 ton/ha).



INM in Cucumber

### 7.2.8 : Integrated approaches for the management of white grub in sugarcane

Sugarcane is a major cash crop grown in the district. Low yield in sugarcane was due to various reasons and one of these reasons is white grub infestation. Demonstrations on management of white grub in sugarcane was conducted by using integrated approaches which includes deep ploughing of soil so as to expose cocoon to natural enemies, application of Carbaryl 10% along with 1 cartload of compost during inter cultivation i.e. 45 DAP, collection and destruction of larvae (90-150 DAP) 2-3 time in kerosene, timely irrigation at critical stages of growth, spray border plants of Neem, Ber, Acasia, etc with Carbaryl 50% 1 kg/ 500 lit of water and apply Beauveria brogniartii at the rate 2.5 kg with compost 1:40. The source of information was MPKV, Rahuri.

The use of Beauveria for the control of white grub in sugarcane is found effective as number of grubs per hill were reduced by 13.5%. Number of the infested hills and number of grubs/sqm area one month of the treatment were found reduced by 62%. Yield obtained in demo plots was 112.5 tons as compared to control i.e. 87.5 tons.

### 7.2.9 : IPM in Bengal gram

Bengal gram is a major pulse crop grown in rabi season with an average productivity of about 6.5 qtl/ha. The major problem identified were incidence of wilt disease and *Helicoverpa armigera* which finally resulting in low yield in this crop. Pertaining to this problem the demonstration of IPM in Bengal gram was conducted by using various IPM components such as HaNPV, Neemark 5%, pest monitoring devices and use of resistant variety.



Demonstration on IPM in Bengal gram

The result of this FLD shows that there was 90% reduction in *Helicoverpa* population when all the component were used as per ETLs. There is 65.81% increase in yield over control plot and reduction in 2-3 sprays of chemical pesticide.

### 7.2.10 : IPM in red gram

Red gram is a major pulse crop and suffers with incidence of wilt disease and *Helicoverpa armigera* which finally resulting in low yield in this crop. Pertaining to this problem the demonstration of IPM in Red gram was conducted by using various IPM components such as HaNPV, Neemark 5%, pest monitoring devices and use of resistant variety and biological control with *Trichocards*.

By using IPM techniques pest population is reduced to 10-15% & due to which yield is increased by 50.83%. Also, the net benefit ratio increased due to low cost of protection.



Demonstration on IPM in Red gram

### 7.2.11 : Use of light traps in Brinjal

Brinjal is a major vegetable crop grown by the farmers. The crop faces the infestation of shoot and fruit borer and the yield losses go up to 70-80%. The plant protection cost increases the cost of production, thus decreasing the net profit. The pest is more difficult to be controlled if goes severe. It is easy to manage the pest in initial infestation by IPM methods like use of light traps, pheromone traps, biological control, use of botanicals, etc.



Use of light traps in Brinjal

The demonstration was initiated with use of 2 lamps per acre area. The light traps attracted the moths and got failed in the pesticide mixed with water. The cost of plant protection in demo plots was reduced by 25%. The demo plots required only 6 sprays (9,000/-) as compared to 8 sprays in control (12,000/-). The percentage of shoot and fruit infestation by borer was 20% in demo plots whereas it was 45% in control plots.

### 7.2.12 : Management of Ratoon Sugarcane

Sugarcane is the main cash crop grown in Pune district having average productivity of 84 tons/ha. It was observed that the ratoon crop of sugarcane taken by the farmers was yielding significantly less as compared to its main crop. KVK found various constraints in the cultivation practices of ratoon sugarcane. To increase the production of ratoon sugarcane KVK introduced management practices of ratoon sugarcane i.e. in situ trash decomposing, Stubble shaving, spot application of fertilizer through crobar in two equal split first at 15 days after harvesting of first crop and second after 135 days after harvesting at opposite site. It was observed that in demonstration plot the average yield of the crop was increased to the tune of 152 tons/ha with the B:C ratio of 2.4.



Demonstration on Management of Ratoon Sugarcane

### 7.2.13 : Demonstration of Technology for sustainable milk production

Green fodder is an important component of animal ration which is directly dependant on water availability. District extends across four of the seven agro climatic zones and major part experiences a tropical wet and dry climate. Dairy cattle rearing are main activity in the rainfed area of Pune district. In irrigated area dairy farming is subsidiary to Agriculture. Out of total cultivable area only 5% area is under Fodder crops. An effort to increase the milk productivity has been constrained by limited green fodder resources. The shortages

tend to be even more alarming during drought periods.

The scope of increasing area under green fodder crops is very low owing to the importance given by farmers to grain and cash crop, Hence there is little scope to increase the area under fodder cultivation. It is therefore necessary to increase the productivity of available land under fodder cultivation through introduction of high yielding varieties of fodder crops and conservation of green fodder to enhance the efficiency of green fodder utilization. Hence demonstrations on use of high yielding variety of fodder crops in rainfed and irrigated area were conducted which are detailed here after.

### 7.2.14 : Demonstration of high yielding fodder variety RBN-13 (Phule Jaywant)

In Pune district most of the dairy farmers are cultivating sorghum, maize as the seasonal fodder crop and old variety of hybrid Napier (Gujraj, NB-21), hence the cost of production of green fodder is higher (Rs.1000 per tons) as compared to perennial fodder crops (Rs. 800 per tons). Hybrid Napier Var. RBN-13 is a high yielding perennial fodder variety having green fodder production potential of 350 MT/ha/year & having low oxalate content (1.91 %) which is lower as compare to old varieties of hybrid Napier (2.3-3%). In demonstration plot there was increase in yield of green fodder and dry matter by 77% against control.



Demonstration on high yielding fodder variety RBN-13

### 7.2.15 : Demonstration of *Stylosanthes seabrana* in rainfed area

Under sorghum based dairy farming system in the rainfed area of Pune district farmers are not growing any leguminous fodder crop due to shortage of water during Kharif, Rabi and summer season hence there is shortage of leguminous fodder throughout the year which leads to imbalanced nutrition (Deficiency of protein, calcium and phosphorus) it leads to repeat breeding. Farmer has to purchase



Demonstration of *Stylosanthes seabrana* in rainfed area

costly concentrate to fulfill protein requirement of animals. Hence KVK has demonstrated cultivation of *Stylosanthes seabrana* (Var. RS-95) to fulfill the leguminous fodder needs of crossbred animal. The variety is superior over *Stylosanthes hamata* for establishment, ether extract, crude fiber and total ash and it is recommended by MPKV, Rahuri for cultivation in Western Maharashtra during kharif season. Increase in Dry Matter (DM) yield, the demonstration on *Stylosanthes seabrana* (Var. RS-95) has increased the green fodder yield and crude protein yield by 17% and 176% respectively over the variety *Stylosanthes hamata*.

### 7.2.16 : Demonstration of high yielding variety of Lucerne-RL-88

Out of total area under fodder crops only 10-12% area is under Lucerne crop. Mostly

Lucerne is grown in irrigated area of Pune district. Dairy farmers are using local variety of Lucerne. Seed is not easily available and cost of seed is also high. Yield and protein content of local variety of Lucerne is low which is 1300 qt./ha and 16-17% respectively.



Demonstration of high yielding variety of Lucerne : RL-88

Hence KVK has demonstrated improved variety of Lucerne having high yield potential (1700qt./ha) and high protein content (19-22%). This variety recorded highest yield of 1630 qtl/ha with 22% protein content. Due to demonstration of improved variety of Lucerne (RL-88) it was observed that there is Increase in green fodder yield and total crude protein yield by 25.42%, 67% respectively.

### 7.2.17 : Demonstration of Area Specific Mineral Mixture

Low milk production & repeat breeding due to mineral deficiency is most common in cross bred cows. Testing of minerals in fodder, soil & blood of animals and formulation of area specific mineral mixture technology recommended by IVRI was undertaken by KVK to overcome the problem. Feeding of 50gm regular available mineral mixture in market was not sufficient to maintain high milk production in crossbred HF cows. Considering feeding system in sugarcane based dairy farming system in medium soil calcium, phosphorus is deficient & Zinc, Mn are more deficient as

compared to other micro minerals in feed, fodder and soil.



#### Demonstration of Area Specific Mineral Mixture

Accordingly KVK formulated the Area Specific Mineral Mixture and demonstrated on large scale in the Pune district for cattle and buffaloes. Feeding of Area specific mineral mixture 100gm per day/cow to crossbred HF cows found useful. It helped to reduce repeat breeding by 90% as compared to the farmers practice and there was increase in milk yield by 16% as compared to the farmers practice.

#### 7.2.18 : Effect of silage making on milk production

Sugarcane tops & maize fodder is available in the irrigated area of Pune District from November to February. There is shortage of green fodder in the summer season due to shortage of water. Hence KVK had organized demonstration on silage making in 5 rainfed villages of Pune districts. The trench silo method was demonstrated to the farmer. Silage was prepared by using sugarcane tops and maize. Fresh silage culture at the rate 100ml per ton was used during the filling of silo pit. This silage was used during summer season when there was shortage of green fodder in the area (March to June).

The silage was given at the rate 20kg/ animal/day for 100 days in summer season in 2012. It was observed that in farmers practice the milk yield was decreased by 1.3 lit per day/



#### Silage Making

animal due to non availability of green fodder where as in demonstration the milk yield was increased by 0.5 liter per animal per day. Milk production was maintained in summer season by feeding of silage in the absence of green fodder and the B:C ratio was 1.47.

#### 7.2.19 : Demonstration of Vanaraja breed for backyard poultry farming in rainfed area

In the rainfed area of Pune district there is no other source of secondary house hold income to the small and marginal farmers rather than rearing of local poultry bird. The local poultry birds are not so productive due to various reasons and therefore farmers were not getting good profit from them. KVK found that Vanaraja is the suitable bird for backyard farming in rainfed areas. The breed Vanaraja for backyard poultry was developed by the Project Directorate on Poultry (ICAR), Hyderabad. The demonstrations on rearing of Vanaraja for backyard poultry were conducted during 2004-2007.

This breed is multi colored, dual purpose, with attractive plumage and has better immune status against common poultry diseases and easily adaptable to the free range rearing system. Vanaraja males attain moderate body weight of 1.5 Kg at 8 weeks of age with feeding of broilers starter feed. The hen lays 160-180 eggs in one year. Due to their relatively light weight and long shanks, these birds are



Vanaraja Breed of Back Yard Poultry

capable to protect themselves from predators which are otherwise a major problem observed in birds reared in back yards. Adult weight of male was observed 3.5-4 kg and Female 2.75 kg. Presently this breed reached in 35 villages of Pune districts and more than 300 women are maintaining the Vanaraja poultry breeds for back yard.

### 7.3 : Trainings

As per the mandate KVK were conducting various training programme for farmers, Farm women, rural youth and extension functionaries which was based on the principle of “Learning by doing” & “Teaching by doing”. On an average 50-60 training programmes were conducted per year till 1997, 70-90 training till 2002, 100 to 120 training till 2006 and 200 training till 2013 per year. The trainings are need based & location specific in nature. The trainings are on campus as well as off campus. More emphasis has been given on long duration self employment oriented training for school dropouts & unemployed rural youth. These include Poultry Keeping, Goat Keeping, Dairy Farming, Nursery management, Sericulture, Bakery and Tailoring etc Many participants on completion of the training have been Successfully self employed by way of establishing their own poultry, Goatery Nursery. Few of them have been working in government, Non government organizations & some working privately by offering services

of budding, grafting in orchards & artificial insemination Vaccination in dairy, poultry etc. Initially efforts had also been concentrated to empower the women component technically as they play a very vital role in agricultural operations. They were also trained in newer areas such as Vaccinating the backyard poultry, Establishing Nutritional garden at the door-step, Artificial inseminations in dairy and intensive fodder production etc. Those women, whose profession was tailoring, were trained in advanced tailoring to increase their earnings by improving their skills so as match the changing fashions which are in high demand even in rural areas.

This KVK is known for its quality trainings. Many participants enroll their names with the KVK to participate in its trainings. The topics included were crop production technology for cereals, pulses & oilseeds mainly on INM & IPM techniques, Technologies for cash crop, Sugarcane, Nursery plantation, INM in Sugarcane, Targeted yield approach (Soil Test Crop Response) Irrigation & fertigation Management, Biological control of diseases & pests, Salinity management & reclamation of problematic soils, Organic farming & various ways of compost making, Dairy management & prevention of mastitis, Poultry management etc Trainings for specific commodity groups, group dynamics, marketing of agriculture produce, trainings for NGOs on the topics of their choice are also arranged by this KVK for their beneficiaries.

#### Important features of the trainings are

1. Collection of Audio visual aids at the KVK is very good & is a major component of the training
2. Farmer as trainer concept is utilized many times where exposure to farmers' field is a part of the training.
3. Many of them are long duration residential

trainings, Concepts like farmers field school is also operated

4. Good use of demonstration units of the KVK make the training more practical
5. Teaching by doing & learning by doing are the main principles of the training

### Significant achievements of these trainings are

- Large scale adoption of improved varieties of sugarcane, wheat Soybean Bengal gram, Onion & Groundnut,
- Large adoption of soil test fertilizer application
- In situ decomposing of sugarcane trash
- Use of wheat straw as animal feed
- Use of bio fertilizers & bio control agents & foliar nutrients
- Vermicomposting

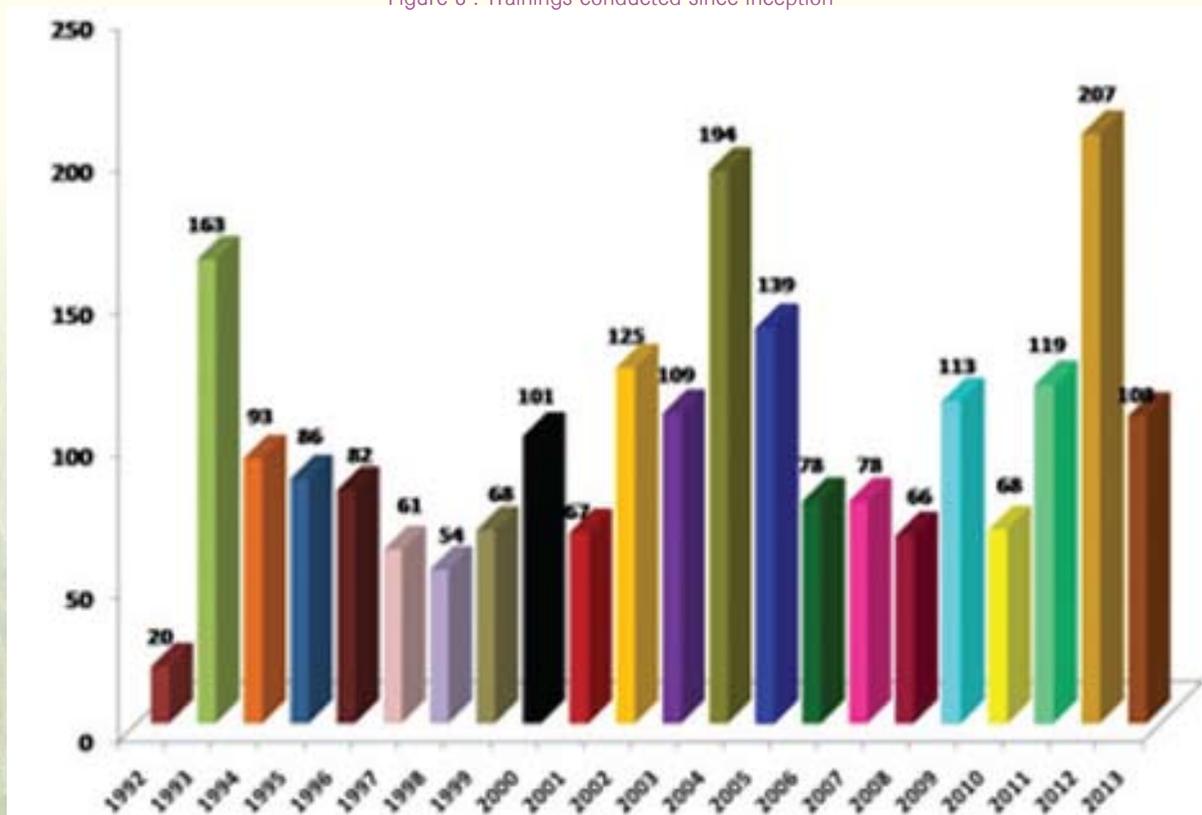
- Employment through Poultry, Nursery, sericulture & as Para-veterinarian

- Large scale adoption of drip irrigation

In order to reach large group of farmers, this KVK also conducts trainings for the extension functionaries of Government & non government organizations. Impact of the trainings conducted by this KVK can be seen in following fields.

- Adoption of high yielding, disease resistant, short duration varieties of soybean Bengal gram, Groundnut, Sugarcane, wheat, Pomegranate, by the farmers around the KVK
- Biological control of pests & diseases such as wilt, Mealy bugs, fruit borers, top shoot borers etc.
- Use of locally available resources to improve the yields & soil fertility such as sugarcane trash, wheat straw etc.

Figure 8 : Trainings conducted since inception



- Use of bacterial cultures, weedicides & improved implements to increase yields & reduce drudgery & labour requirement.
- Self employment through establishment of units of Nursery, Goat keeping, dairy poultry, Mushrooms, bakery
- Adoption of improved multi cut fodder varieties to reduce the cost of production such as hybrid Napier.

The information on some of the important trainings conducted by KVK is given below

### 7.3.1 : Seed production training for rural youths

KVK has been regularly conducting seed production training for rural youth and farmers club since 2004. This training includes the procedures of seed certification and guidelines of seed production. KVK has also provided the quality seed material (breeder seed and foundation seed) from Agriculture University or other research stations to the trainees. This training helped to the trainees for record keeping which is required to submit to the seed certification agency. Also help rural youths for seed certification and train the how to make a record to submit it to seed certification agency.



Seed Produced by the Farmers

From 2004 onward rural youths had produced seed of Groundnut variety TPG-41, TG-26, TAG-24, Soybean variety MACS-450,

DS-228, JS-335, JS-9305, Rabi Sorghum variety Phule Vasudha, Phule Chitra, Phule Anuradha, Phule Revati, Parbhani Moti, Redgarm variety BSMR-736, Vipula, ICPL-87, Wheat variety NIAW-301 Trimbak, MACS3125, NIDW-295 Godavari, NIAW-917 Tapovan, MACS-6222, NIAW-1415 Netravati, Green gram variety Vaibhav, Black gram variety TPU-4, TAU-1, Bengal gram variety Digvijay, Vijay. Due to seed production activity rural youth can get 50% more income as compare to sale their grains in the market. Some youths are benefited by subsidy of “Gram Bejotpadan Yojan” of Government of India.

### 7.3.2 : Vocational Training-Polyhouse Management

In India traditional farming is prevalent but now new farming technology like polyhouse farming provides better income in a short period of time with less labours. Polyhouse farming is an alternative new technique in agriculture gaining foothold in rural India. It reduces dependency on rainfall & makes the optimum use of land and water resources. Polyhouse farming can help the farmer generate income around the year growing multiple Crops.



Vocational Training - Polyhouse Management

Training in practical management of Polyhouse helps to provide technical skills to establish small commercial polyhouse unit, planting of seedlings, preparation of bed, soil sterilization, pest and disease management

in polyhouse. It also helps to impart basic techniques in production of different flower crops in polyhouse like Gerbera, Carnation, Orchid, Rose etc.

**Table 8 : Details of Polyhouse trainings conducted**

Number of trainings	Total Participant	Participants from	No. of Unit established
25	563	Maharashtra, Andhra Pradesh, Madhya Pradesh, West Bengal	106

### 7.3.4 : Training on Fruit and vegetable processing

Due to the various sponsoring schemes of the Central and State government like NHM, NHB the area under fruit crop has increased significantly and along with it, the need of fruit processing came forward. In the operational area of KVK, the major fruit crops grown those can be processed are Mango, Aonla, Tamrind, Banana, Guava and vegetables are Tomato, Bitter guard etc. There are many farmers group either from farmers clubs or woman SHG was demanding to have the processing unit in their periphery.



**Training on Fruit processing**

Many of them had started fruit and vegetable processing on little scale but they couldn't able to sustain in the business

because of the low quality of their products. Looking the need of the fruit and vegetable processing, KVK started the community fruit and vegetable processing center. This center mainly acts as the good resource for the training on this subject. It aims to give practical trainings to the farmers, their clubs, women and self-help groups for value addition of their horticultural produce, to generate employment opportunities and to develop entrepreneurship among the rural youth, to give practical trainings to the extension functionaries, officers from agricultural department, Krishi Vigyan Kendra's and Non Government Organizations and to promote the value addition in horticultural produce. Till date 13 training programmes have been conducted benefitting 317 trainees.

### 7.3.5 : Training on Apiculture

From June 2012, Krishi Vigyan Kendra, Baramati has started an Apiculture unit with 50 hives. *Apis mellifera*, *Apis cerena* and *Apis Indica* are the species kept in the hives. The hives are also given to farmers on rental basis. Most of the farmers of sunflower, pomegranate, drumstick, water melon has got maximum yields due to good pollination.



**Skill oriented Training on Apiculture**

Also, KVK is organizing training on Apiculture in every 2 months. Till today, 4 trainings have been conducted in which 72 farmers had benefitted.

### 7.3.6 : Agri Clinic and Agri Business Management

This Vocational Training Center was started in KVK in 2006 in collaboration with MANAGE, Hyderabad. The agricultural and allied graduates and Agri Diploma holders are eligible for this two months residential training. The students are charged only Rs.500 as fees of training including food and accommodation for two months. The objective of this training is to motivate and train the students for starting business related to agriculture and develop themselves as entrepreneur & also extension of new technologies and information to the farmers.



An entrepreneur started their own business after completion of training

After the training, students have to submit project report up to 20 lakhs to the respective banks for availing loan and they will get 36% subsidy from NABARD. Up to the year 2013, KVK has organized 16 training programmes in which 448 students are trained from which 178 students started their own business.

### 7.3.7 : Nursery management training for school dropouts

The training on nursery management and gardening is regularly conducted by the KVK since 2003. The duration of this training is 6 months. The training is organized under a scheme of National Horticulture Mission. Till date, 234 trainees have got trained and many

of them have started their own business or have got a good job.



Training on Nursery Management

### 7.3.8 : Interstate training programme on Modern Dairy Farm Management

Since 2010, KVK is organizing interstate training program for candidates from other state on Modern Dairy Farm Management Practices. The candidates attending to this training are from various fields and looking for the practical information to start their dairy business. KVK is attempting to teach them practically by using all the resources available at KVK like modern loose housing type dairy farm, cultivation of various fodder crops, milking machine, milk processing, homogenization and pasteurization unit etc. It is therefore, most of the candidates has started their own dairy farm after having training from KVK. It can be revealed from following data-



A Model Dairy Farm

**Table 9 : Details of the interstate training programmes on dairy farm management**

Year	No. of programmes	No. of states	No. of participants	No. of dairy units started
2010	6	09	177	18
2011	6	11	203	22
2012	4	14	116	14
2013	5	13	208	13
Total	21	47	704	67

It can be said from the above data that in 4 years 704 participant took part in training and out of them 67 (10%) participants had started their dairy farm. This is a cost intensive activity and therefore even when only 10% participants have started the enterprise of dairy farming, it is already a good achievement.

### 7.3.9 : Training on Commercial broiler poultry farming

Training on Commercial Broiler Production is regularly conducted in KVK since 1995. The poultry sector is mostly organized in this area, many companies make contracts with farmers and gives support to them regarding production and buy back assurance. Farmers were new to the concept of rearing of broiler birds in this area. Looking the need of skilled manpower in this sector, KVK started this training of 3 days duration.



**Trainees taking information during training on Commercial Broiler Poultry Farming**

This training aims to develop the basic skill in commercial broiler rearing, which helps them in maximization of the profit. Till date, many unemployed youths have been trained under this training & have started own poultry business in a contract with different companies.

### 7.4 EXTENSION ACTIVITIES

Extension activities are basic and proven methods, for attracting attention, around interest, leading farmers to have successful experiences with new ways and of doing things that are an improvement over the old practices. KVK has organized different extension activities to popularize the various new and latest technologies to the farming community, which includes field days, exhibitions, Kisan melas, dissemination of technologies through



**Exposure Visit**

radio, TV and news papers, published new technologies in the form of pamphlets, folders, books etc, organized exposure visits to different agricultural institutes, research stations, progressive farmers fields etc. to update their knowledge.

KVK has obtained good coverage in news paper. Many extension materials like leaflet, pamphlet and folders containing agricultural information have published and disseminated. Many study trips, kisan mela have arranged by KVK and has taken part in agricultural exhibitions.

Figure 9 : Field days conducted since inception

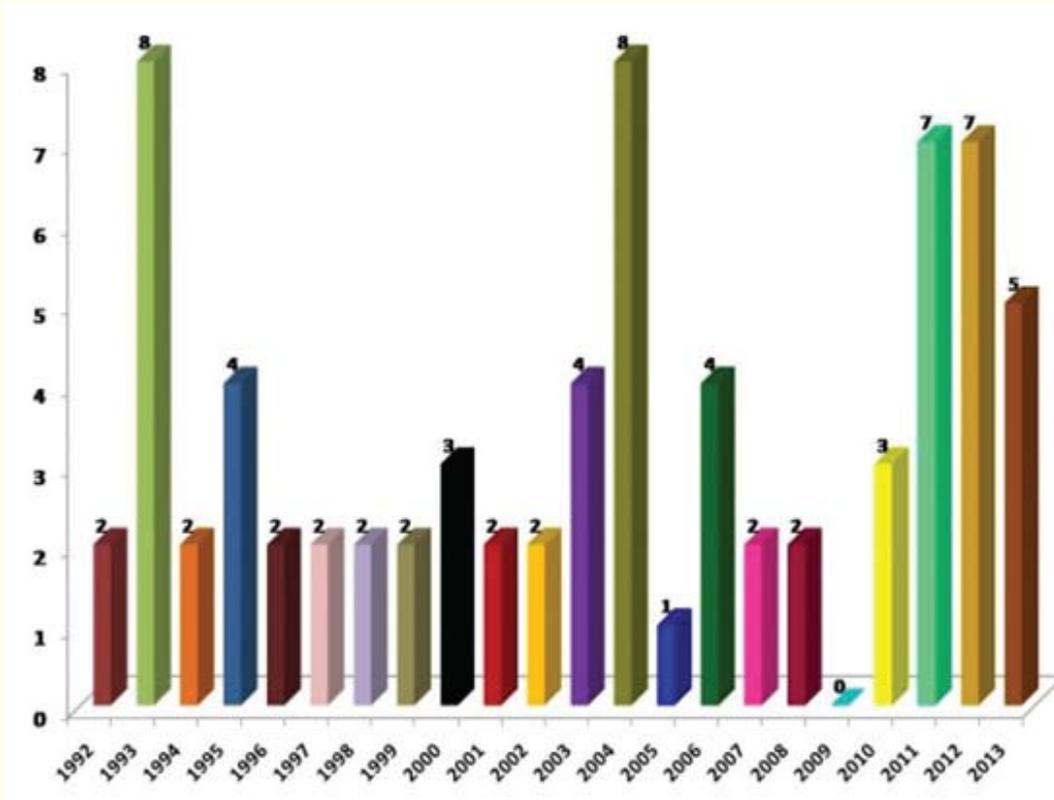


Figure 10 : Kisan Melas Conducted since inception

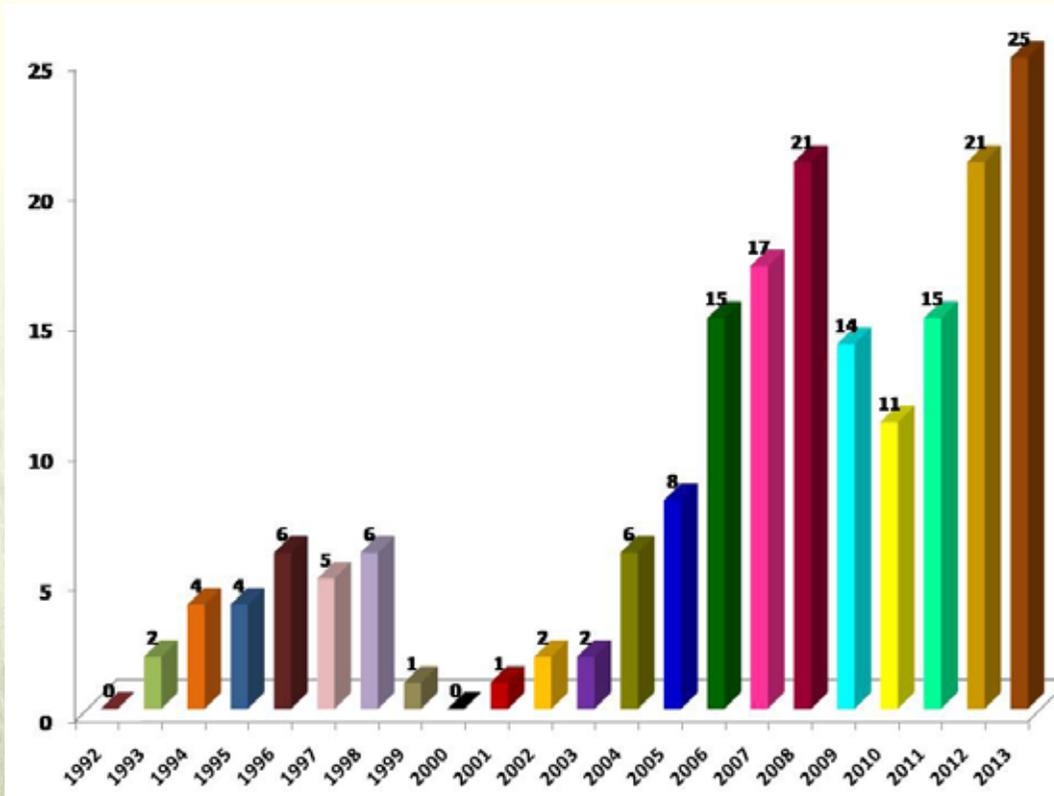
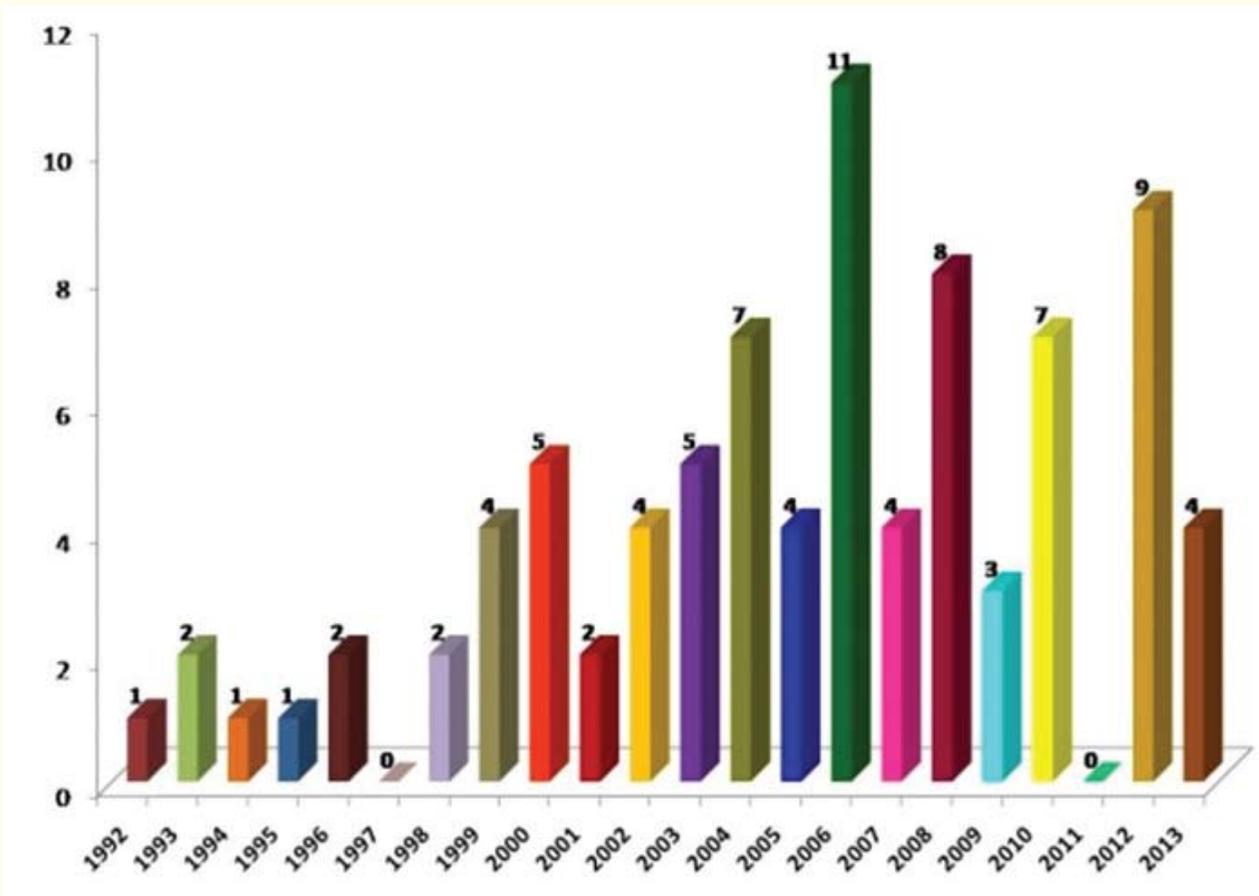


Figure 11 : Study trips conducted since inception



#### 7.4.1 : Organizing study trips for farmers

Hundreds of farmers participate in the trips organized by the KVK by paying the nominal charges to the KVK. This KVK has not only conducted trips within the state but also has taken farmers outside the state. Specific objectives are laid before conducting a trip, such as water storage/saving techniques, mechanized dairy farming, organic farming, cultivation under green houses, modern irrigation and fertigation technique. Show casing Innovative efforts of farmers is the main purpose of conducting the trips. Farmers that have achieved record yields have gone for different agronomical practices, new crops, contract farming is chosen & trips are conducted in most professional way. KVK

organizes 4-5 trips every year. Construction of water storage tanks in large numbers, cultivation under green houses, use of rootstocks in grapes, cassava cultivation are the impact of our study trips on farmers



Study Trips for Farmers

### 7.4.2 : Diagnostic Visits/on farm consultancy

The greatest achievement of the KVK is the implicit faith of the farmers & social realisation. Farmers around the KVK have started consulting the KVK Scientist in their day to day agricultural problems. The KVK offers free & prompt diagnostic visit to the problematic field & guides accordingly.



Diagnostic Visit for Fig Crop

Farmers also visited various demonstration plots like cultivation of rice in sugarcane as an intercrop, cultivation of rice on mulching paper & without mulching paper, turmeric and cotton cultivation. Farmers also visited Model Israel Loose Housing Dairy farm, Nursery and Poly house etc. More than 2700 farmers, from Pune and other districts of Maharashtra visited to Krishi Vigyan Kendra during this week.



Plot Visit

Table 10 : Diagnostic visits offered by KVK

Year	Number of diagnostic visit	Year	Number of diagnostic visit
1996	15	2006	67
1997	37	2007	59
1998	41	2008	52
1999	43	2009	48
2000	36	2010	50
2001	35	2011	67
2002	71	2012	72
2003	56	2013	75
2004	57		



Method Demonstration

### 7.4.3 : Technology Week/Mohatsav

Krishi Vigyan Kendra Baramati had organized four days Technology Week in 2011. It includes field visits to innovative farming technologies, stall of different KVK products, different agricultural machineries like Vegetable transplanter, Lesser land Leveler, Turmeric harvester, Turmeric boiler etc.



Farmers Interaction through Seminar

## 8. TECHNOLOGICAL INTERVENTIONS THROUGH PRODUCTION AND SUPPLY OF TECHNOLOGICAL PRODUCTS

The KVK is not only giving technical information to the needy farmers but also providing several services & inputs that are needed for adopting the technology KVK is dealing with problems faced by farmers and youth thus making them able to achieve livelihood security, employability and sustainability by increasing their productivity and profitability. This KVK not only deals with technology transfer but also provides basic services such as seed processing, fruit processing, soil testing, diagnostic services, telephonic information, mobile SMS etc. Inputs like bio-fertilizers and bio-pesticides, seed, inputs for animal management, grafts/saplings etc are also provided to the farmers.

Some of the important basic services provided by KVK are as under.

### 8.1 : Production of bio-fertilizer and bio-pesticides

The bio-control lab was established by KVK in the year 2002 and the funding for its establishment was received from NHM. It was strengthened in 2006 with new machineries. Various type of bio-fertilizers and bio-pesticides are produced in this lab and supplied to the farmers on no profit no loss basis.

Regarding bio-fertilizers, *Rhizobium*, *Acetobacter*, *Azotobacter*, phosphate solubilizing and potash mobilizing bacteria are produced in the lab. Pertaining to bio-pesticide lab, KVK was producing *Trichoderma*, *Paeceiomyces*, *Verticillium*, *Beauveria*, *Metarrhizium*, *Noumeria* and *Pseudomonas* on demand basis.

Following newer initiative in bio-fertilizers and bio-pesticide have started-

- A combination product including

*Azotobacter*, phosphate solubilizing bacteria and potash mobilizing bacteria is made available to the farmers.



Products of the bio-control laboratory

- Another combination product including *Rhizobium*, phosphate solubilizing bacteria and potash mobilizing bacteria is made available to the farmers.
- The bacterial culture of Ferrous and Sulfur Solubilizing bacteria is made available to the farmers.
- The newer bio-pesticide *Bacillus subtilis* is made available to the farmers which is effective against bacterial blight of pomegranate and Downey mildew of Grapes.

### 8.2 : Supply of Plant Protection Material

Some of the plant protection materials are not available at grass root level. These materials are of cheap cost and farmers are often told to use these techniques to control the pest in an integrated pest management approach. Hence, KVK started to provide the plant protection materials like *HaNPV*, *SINPV*, pheromone traps, sticky traps, neem oil, neem cake and neem powder at the cheaper rate to the farmers.

### 8.3 : Supply of quality planting material

The horticulture nursery was started in the year 1997 with a view to produce quality grafts for the diversification of the cropping pattern and for dry land horticulture in the operational area. The nursery was renovated and expanded time to time. To strengthen the

nursery, the funds were received from NHM. This nursery is recognized by government & also received four star rating in 2012 from National Horticulture Board. Grafts produced at KVK farm with number of farmers benefited & area covered in past 15 years are given below -

Table 11 : Grafted seedling production at KVK nursery

Sr. No.	Crops	Grafts produced	Area covered in ha.	No. Farmers benefited
1.	Sapota	299945	2999.40	7983
2.	Guava	76537	493.78	1371
3.	Mango	239424	2394.24	6019
4.	Pomegranate	42678	58.86	158
5.	Kagzi lime	3900	7.91	25
6.	Aonla	52560	262.8	320
7.	Coconut	41141	274	468
8.	Tamarind	52878	528.4	568
9.	Custard Apple	326109	815.2	1568
10.	Jamun	26845	268.4	389
11.	Sweet Orange	9786	35.6	58
12.	Nagpur Santra	3477	13.6	22
13.	Jack Fruit	1822	11.2	18
14.	Fig	34115	46	83
	<b>Total</b>	<b>1211217</b>	<b>8209.39</b>	<b>19050</b>



KVK Nursery

Baramati is mostly recognized for intense sugarcane cultivation and sugar factories. The plating of sugarcane is mostly done by using sugarcane sets. This method is laborious and germination percentage could be low. Therefore, this method increases cost of cultivation. To overcome this situation and to have alternate method for easy planting and reduce both mortality and cost of cultivation, KVK introduced single bud sapling method. In this method, saplings of sugarcane are raised from single bud of cane by using coco peat

as a media. KVK has conducted trainings and demonstrations to motivate farmers to adopt this method of planting sugarcane. In last three years, farmers adopted this technique over about 414.4 ha. of area by 923 farmers by using 44.60 lakh sugarcane saplings. KVK started to supply the quality saplings from genuine seed material by using coco peat and pro tray method. Farmers liked this technique and adopted on large scale; the evidence can be seen from the sale of the saplings-



Sugarcane saplings

Table 12 : Total number of sugarcane saplings produced and farmers benefited

Year	No. of saplings produced (lakh)	No. of farmers benefited	Area covered (ha)
2011	2.60	42	24
2012	10 .00	206	92.8
2013	32 .00	675	297.6
Total	44.60	923	414.4

#### 8.4 : Soil, water and petiole testing laboratory

KVK has established Soil and water testing laboratory in 2002. Initially, only the soil and water samples were tested but in recent years, the lab was equipped with new equipments like Atomic Absorption Spectrophotometer, Ion Chromatography, Kjaldals distillation and digestion for nitrogen detection, Ultraviolet Double Beam Spectrophotometer etc which are used for computerized micronutrient,

fertilizer and petiole testing. The soil and water testing facility was only available at district level in 1992. So the farmers couldn't able to test their soil easily and were not getting the recommendations on fertilizer use and soil management. The farmers from 6 districts and 25 Tehsils were benefited by the services of this laboratory. The following data of the laboratory elaborates the increasing trend of the awareness among the farmers about soil and water testing-

Table 13 : Year wise soil & water samples tested from 2002 to 2013

Year	No. of soil sample tested	No. of water sample tested	Soil micronutrient testing	Total samples tested
2002	573	131	-	704
2003	581	158	-	766
2004	598	207	-	805
2005	1275	341	30	1646
2006	2103	431	342	2876
2007	6183	1387	778	8348
2008	4991	3338	2932	11261
2009	5231	3318	1107	9656
2010	5684	4668	1490	11842
2011	1949	2225	5295	9469
2012	7776	2551	5328	15655
2013	5310	3295	5044	13649



Soil testing laboratory

Figure 12 : Year wise soil samples tested from 2002 to 2013

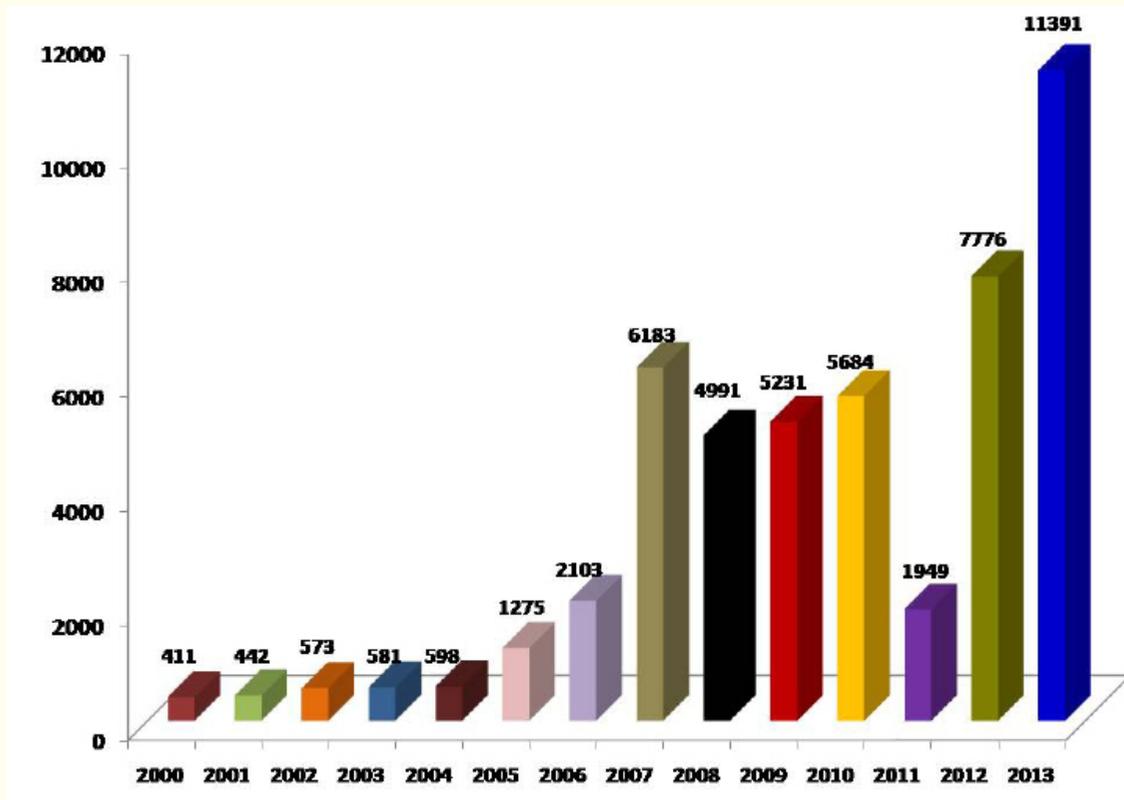
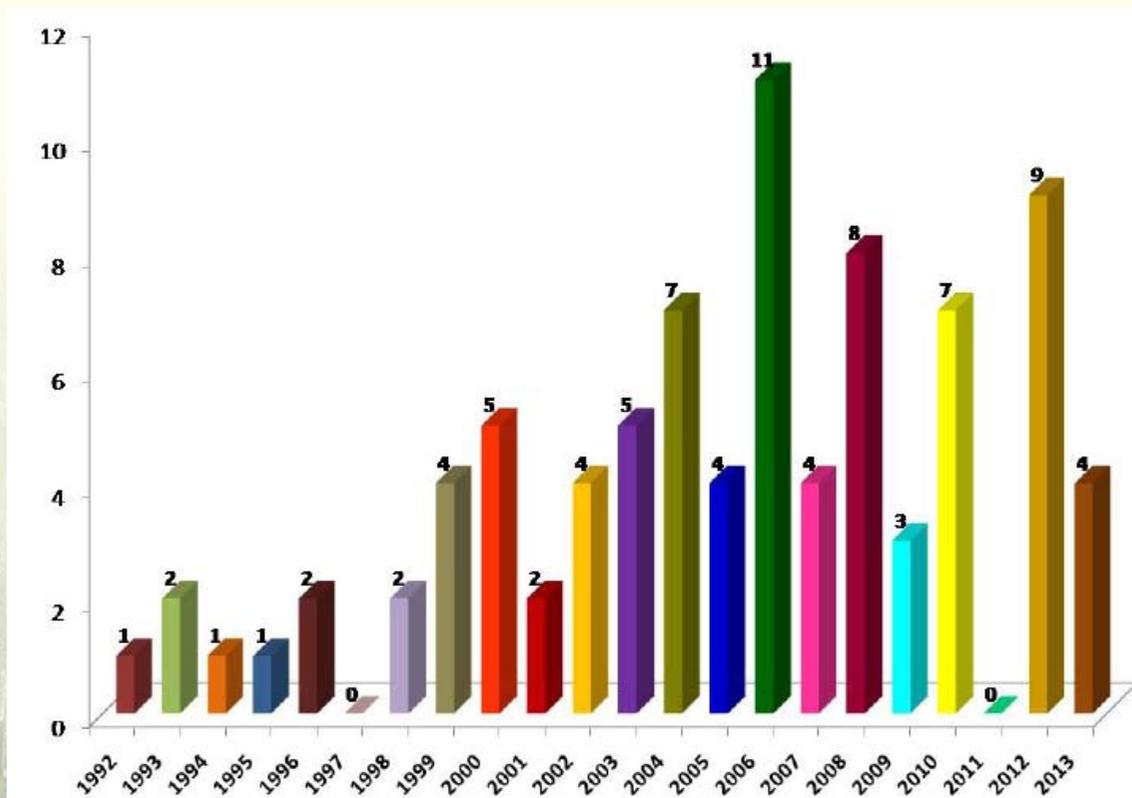


Figure 13 : Year wise water samples tested from 2002 to 2013



## 8.5 : Custom Hiring Center of Agricultural Implements

In 1995, KVK has started establishing a Museum of agricultural implements. Later on, in 2006 the idea of custom hiring center came forward and the museum was changed into it. New agricultural machineries were purchased and put into farmers' service. KVK has more than 52 different improved and modern agricultural implements like automatic vegetable transplanter, seed cum fertilizer drill, rotavators, disc harrows, power tillers, groundnut decorticator etc. These all implements are provided to the farmers on minimum rent basis. Yearly, 60 to 70 farmers were taking the benefit of this center.



Implement Bank for custom hiring

### 8.5.1 : Laser land leveler

Water run-off in monsoon due to slope of lands was resulting in soil erosion in dry land areas. At the background of scarce rainfall, the area needed a technology that can cater to the above problem. Land leveling and bunding will not only improve in situ water conservation but also reduce the soil erosion. The leveled land itself increases irrigation efficiency by 30 percent. There are other benefits of leveling like proper drainage, possibility of irrigating a land evenly and in situ soil moisture conservation. The traditional methods used for leveling are much time

consuming and are labor intensive.



Tractor drawn laser land leveler

Commonly the tractors are used for this purpose. The laser land leveler is an automatic leveling tractor drawn machine which helps to give a proper slope to the land with leveling. This machine requires less time and energy for leveling as compared to traditional methods. The utilization of laser beam, controller and hydraulic lifting technique in this machine is key factors for easy, saving energy and time. This machine is kept in the custom hiring center of the KVK. 9 farmers in 2012 have used this machine for their land leveling over 8.4 ha of area.

### 8.5.2 : The Sugarcane sapling planter

In 2010, KVK imported a vegetable seedling transplanter from Italy. The machine was indeed very good for the transplanting of vegetable seedlings but due to the small land holding and traditional method of planting system of vegetable in the operational area this machine was not used on enough large scale. Mean time, KVK started to produce the saplings of the sugarcane from single eye bud method. As this technology is becoming very popular in a very short course of time, the need of machine for transplanting of the sugarcane saplings came forward. The KVK then took interest in the vegetable transplanting machine and modified it for the furrow transplanting of the sugarcane saplings.



Tractor drawn sugarcane sapling transplanter

Now, this machine can be used for transplanting of sugarcane saplings over 4 to 6 feet distance between row to row and 1 to 2.5 feet distance between plant to plant. This machine is tractor drawn and can be suitably handled by the farmers with short training. It is also kept in custom hiring center and many farmers in the vicinity of KVK are using this machine.

## 8.6 : Live Stock Material

The live stock material regarding animal care like saf kit, animal nutrition like mineral mixture, milk replacer, urea molasses blocks and the seed material of fodder crop like RBN-13, Lucerne, DHN-6, BHN-10, Mullato, poultry birds of Vanaraja breed etc are kept for the benefit of the farmers as a technology intervention.

### 8.6.1 : Supply of stumps of Hybrid Napier (RBN-13)

KVK have demonstrated improved variety of Hybrid Napier RBN-13 which resulted in to the demand of its stump as a planting material from the farmers. KVK started supplying the stumps of the variety and many farmers responded to it. Initially, farmers purchased stumps from KVK but in later years after good stand of their fodder crop and realizing the benefits of RBN-13, they also started to supply the stumps to other farmers in their locality. Thus, there was a vertical as well as horizontal spread of the RBN-13.

### 8.6.2 : Back yard poultry birds

The demonstrations of the back yard poultry bird Vanaraja were successful in changing the mind of the farm woman because they started to buy the birds from KVK for rearing. Looking the need of genuine quality bird, KVK also took interest and provided the facility to the farmers and woman in getting the good quality vaccinated birds at reasonable rate. Initially, KVK was purchasing the day old chicks from the government hatchery and chicks were reared one month at KVK and vaccinated, after this the birds were sold to the farmers. The farmers were booking the birds and making its payment in advance to the KVK. Till date, KVK has supplied 40745 birds of Vanaraja to 883 women in 95 villages.



Vanaraja birds

Now looking to the increased response of the farmers, KVK has started a small hatchery in order to provide the chicks to the farmers at low cost.

### 8.7 : Crop diagnostic center

In 2007, the crop diagnostic center was established with the help of NHM funding. The aim of this center is to give the services to the farmers on crop diseases, insect pests and disorders diagnosis with the help of visual examination and laboratory technique. The farmers get the recommendations on diagnosed problems.

**Table 14 : Plant samples analyzed for disease/nematode**

Sr. No.	Year	No. of samples
1	2008-09	2763
2	2009-10	84
3	2010-11	26
4	2011-12	12
5	2012-13	3
6	2013-14	7
	Total	2895

The plant samples mostly come for the analysis of bacterial blight disease of pomegranate, nematode infestation in vegetables and other diseases. Till today, 2895 samples has been analyzed.

### 8.8 : Seed processing unit

In recent past, the area under seed production in the Maharashtra has increased significantly. The Government of Maharashtra is promoting the farmers to produce more & more seeds of various crops under “Gram Beejotpadan” (Seed Village). But the main difficulty at village level seed production is non-availability of seed processing infrastructure. There is only one seed processing infrastructure in Pune district making it expensive & tedious

for farmers from our area to take the seed up to 100 kms for processing.



**Seed Processing Unit**

Keeping above problems in mind, KVK had established a Seed Processing Unit in the year 2008-09 under the financial support from NHM.



**Seed processed by KVK**

**Table 15 : Performance of seed processing unit from 2008 to 2013**

Crop	No. Of Blocks Under seed production	No. of farmers	Quantity of Seed in Quintal	Area Covered Under Seed in ha.	Types of seed
Soybean	Baramati, Phaltan, Daund	76	1386.89	1872.4	Foundation- 178.28 qts Certified- 1057.84 qts Truthful- 39 qts Breeder seed-111.77 qts
Maize	Baramati, Phaltan	3	226.42	905.2	Foundation- 225.63 qts
Bengal Gram	Baramati, Phaltan, Daund, Indapur, Khatav, Khandala	38	489.754	6530	Foundation- 152.66 qts Certified- 326.414 qts Truthful- 33.10 qts
Tur	Daund	5	65.77	438	Foundation- 57.65 qts Truthful- 8.12 qts

Crop	No. Of Blocks Under seed production	No. of farmers	Quantity of Seed in Quintal	Area Covered Under Seed in ha.	Types of seed
Jowar	Indapur, Phaltan, Baramati	3	172.28	1527.6	Foundation- 70.53 qts Certified- 79.28 qts Truthful- 22.47 qts
Wheat	Baramati, Phaltan, Daund, Man, Khatav, Indapur	73	3294.26	3293.2	Foundation- 986.35 qts Certified- 1684.93 qts Breeder - 397.20 qts Truthful- 225.78 qts
Total		198	5635.374	1456.64	

### 8.9 : The community Fruit & Vegetables processing unit

This unit was started in 2009 with the financial support of NHM. The objective of this activity is to avail the services of fruit processing on minimal rent basis to the nearby farmers for processing of their small scale fruit products. This unit also acts as training infrastructure to the trainees those are coming from woman SHGs, farmers club, rural youth etc. Till date 13 training programmes were arranged and 317 trainees have got the benefit.



Training on fruit & vegetables processing

### 8.10 : Green house/Poly house

Four green houses, measuring total area 4224 Sq.m were constructed each greenhouse having area 1056 Sq.m. and started functioning by December 2013. Out of these four poly houses, one is fan & pad type (Fully controlled) poly house in which Gerbera is planted on cocopeat media in soil

pots. Another three poly houses are naturally ventilated in which plantation of Carnation, Colour capsicum & Rose was done in soil. These poly houses were prepared for various demonstrations and trainings.



Plantation of Carnation in poly house

### 8.12 : Mobile soil and water testing lab

Mobile soil and water testing laboratory was started under the project of National Soil Health and Fertility Management in 2011.



Mobile Soil and Water testing lab



Mandates of this mobile soil testing lab are-

- Collection of soil samples through farmers participation
- Analysis of samples for major, secondary and micronutrients
- To provide Soil testing report with recommendations of fertilizers for particular crop
- Conducting farmers trainings related to soil health in the villages

- Pune district is the working area for this lab
- This lab is also working on demand of farmers and farmer's clubs of neighboring tehsils viz Phaltan, Karmala, Malshiras of Satara and Solapur districts.

Table 16 : Performance of mobile soil laboratory

No. of villages covered	No. of soil samples tested	No. of water samples tested	Farmers benefited
81	8258	113	7268

## 9. SPONSORED PROJECTS

### 9.1 : Introduction

Sponsored projects play important role in the development of KVKs and transfer of technology among the farming community more efficiently. Sponsored projects help in creation of more facilities at the KVKs which increases the overall efficiency and brings more number of farmers for additional knowledge along with the inputs can be provided to the farming community from the financial aid provided by the sponsoring agency.

Different agencies like Department of Biotechnology, CAPART, Department of Science and Technology, Department of Agriculture and Co-operation, DRDA, NABARD, NHM, NHB, RKVY, State Government line department, private companies, co operatives etc are providing the funds to the projects of different organization for rural and agriculture development. Most of the times the target groups of these funding agencies and KVKs are similar. KVKs are getting the project based funding for the implementation of the programmes of the funding agencies. Most of the projects sponsored by the ICAR and non ICAR institutes are supporting the regular activities of the KVKs as most of the projects are related to agriculture development and are helping the KVKs for creation of the additional

infrastructure like laboratories and for transfer of the technologies through demonstrations, FLDs and building the scientific temperament in the farming communities through training and demonstrations.

The infrastructural development and growth of the KVK including the development of quality personals is the key feature for the attraction of the external funding agencies to run the problem solving developmental project. Since 2008, KVK got various externally funded/sponsored projects including state and central government. Below are the key projects that are being implemented or completed by KVK-

### 9.2 :Agricultural Research Information System (ARIS)

Realizing the vital role of KVK's in the transfer of agricultural technology, Indian Council of Agricultural Research, New Delhi in 1993 has selected 108 out of 261 KVK's in the country for establishing Agricultural Research Information System (ARIS). This system enables prompt dissemination of scientific information from research institutes to the KVK's. This is helping in reducing the gap between the research institutes & the farmers. With this unit, the KVK's are strengthened by

having computers, internet & E-Mail facilities. This KVK has been selected in the first 108 KVK's from the country.

### 9.3 : ATMA -

Under National Agricultural Technology Management Agency, most of the KVK's are conducting various projects like technology assessment and refinement and demonstrations on various aspects.

The state agriculture department has Agriculture Technology Management Agency (ATMA). KVK is getting the funds from this agency since 2006 for the implementation of the demonstrations of various technologies, farmer's field school, field day, training

programme, study tour and publication of extension literature etc. The extension work done under ATMA scheme by KVK is tabulated in the following table.



Farmers training under ATMA

Table 17 : Activities conducted under ATMA

Year	Trainings	FFS	Study tour	Field days	Demonstrations
2006-2007	2 (89 Farmers)	-	1 (52 Farmers)	2	4 (90 Farmers)
2007-2008	4 (110 Farmers)	3	1 (50 Farmers)	3	8 (90 Farmers)
2008-2009	11 (330 Farmers)	4 (104 Farmers)	1 (50 Farmers)	5	10 (170 Farmers)
2009-2010	7 (244 Farmers)	2 (58 Farmers)	1 (15 Farmers)	2	8 (157 Farmers)
2010-2011	8 (287 Farmers)	2 (53 Farmers)	1 (84 Farmers)	2	3 (56 Farmers)
2011-2012	6 (190 Farmers)	-	1 (50 Farmers)	3	6 (180 Farmers)
2012-2013	6 (512 Farmers)	6 (159 Farmers)	1 (40 Farmers)	4	8 (303 Farmers)
2013-2014	6 (253 Farmers)	6 (180 Farmers)	3 (430 Farmers)	4	3 (150 Farmers)



SMS delivering lecture under FFS on pomegranate

### 9.4 : The cyber extension through query redress website :

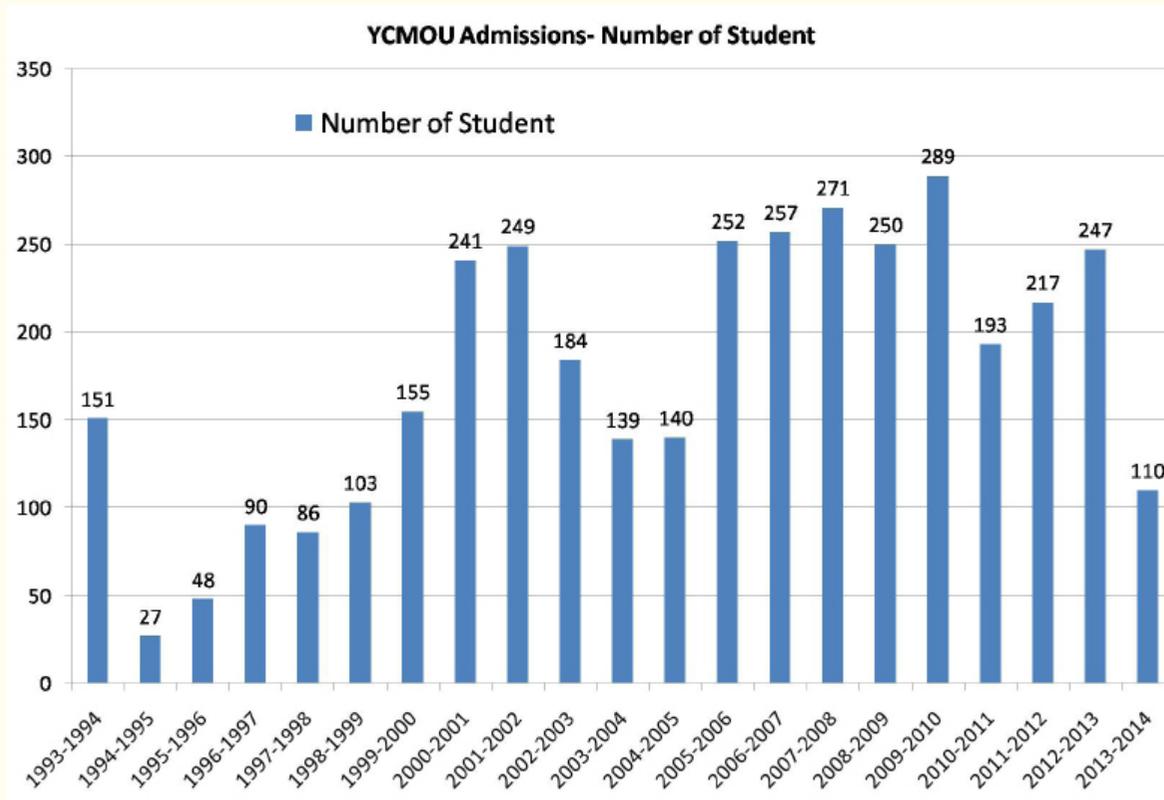
KVK and the IIT Pawai jointly running the most popular farmers query redress web portal i.e. [www.aaqa.org](http://www.aaqa.org). This web portal

is maintained by IIT Pawai and the technical answers to the queries of the farmers are given from KVK. The project is funded by Central government and was started in 2004.

### 9.5 : Yashwantrao Chavan Maharashtra Open University, Nashik (YCMOU)

To impart the skill based training and education to the rural youth is a very effective and important activity run through Distance Mode of Education of Yashwantrao Chavan Maharashtra Open University, Nashik. Learning by doing is an effective tool to educate the unemployed youth to start their entrepreneurship. The centre was started during 1993-94 & since last 20 years, 3589 students passed out from this center successfully.

Figure 14 : Number of students enrolled under YCMOU



### 9.6 : National Agricultural Innovation Project (NAIP)

The National Agricultural Innovation Project (NAIP) was launched in 2008 by ICAR. The sub project from the NAIP entitled 'A Tomato Processing Prioritization for Global Competence' was implemented in Collaboration with MPKV, Rahuri as a research partner, KVK Baramati as an extension organization and Chordia Food Product Pvt. Ltd. Shirval as a processing industry for value addition. This project started in September 2008 and completed on 31 June 2012. Pune and Satara districts of Maharashtra are producing tomatoes round the year but when there is glut in market farmers did not get good price. Small and marginal farmers are mainly engaged in the production of tomato. Technological gaps in cultivation of tomatoes were found responsible for low yield. Strong linkages between research and technology and production to consumption system are

rarely observed in vegetable processing. Small holdings, tiny scale harvest and non uniformity in vegetable quality do not attract commercial research in this area. So there was a need to develop a cluster based approach for tomato growing villages with modern infrastructure backup like agricultural extension services, improved cultural activities, collection centers and buyback assurance in turns



Demonstration plot of Tomato

to improve the living standards of farmers of this area. The objectives of the projects

were to standardize cultivation practices of tomatoes, to apply electronics & IT based systems in value chain, to design the model for collaborative farming linked with holistic extension approach, services based on cluster development between farmers and processors with buyback system, to improve demand of tomato products through development of novel products and processes.

### 9.7 : National Agricultural Innovation Project- NICRA

Looking to the climatic challenges and to fetch with them by empowering the farmers in the area affected by the climatic vulnerability, The Central Research Institute for Dry Land Agriculture (CRIDA), Hyderabad initiated a national project on 'National Initiative on Climate Resilient Agriculture'. In Maharashtra, 7 KVKs were selected for this project by the CRIDA and KVK Baramati is one of them. The project was started in 2011.



De silting of water harvesting structure

Village Jalgaon K.P. from drought prone area was selected from Baramati tehsil for implementation of the project. Various activities to cope with climatic vulnerability were conducted in the village. The activities include de silting of the 6 water harvesting structure in order to increase the rain water harvesting capacity, the excavated silt was about 42 cum which is transported by the farmers of this village with their own contribution.



Rain water harvesting

The silt excavated from these water harvesting structures were utilized on 25 ha of barren and uncultivable land, which helped to increase the productivity. The improved varieties of the crops were introduced in the village which have short duration growing period and are drought tolerant along with it, technologies and methodologies regarding coping with drought like contingency crop planning, intercropping, soil health management etc. The custom hiring center of modern need based agricultural implements established in the village is providing vital services to the needy small and marginal farmers.



Animal health camp

The activities regarding the animal health and reproduction management like silage making, de worming, vaccination, introduction of improved fodder varieties etc. are the facilities provided to the farmers for improving the productivity of the milking animals. The improved variety for back yard poultry namely Vanaraja was introduced in the village. The

salient achievements and impact of the project are summarized below.

- Increased water harvesting capacity by 40% than before de silting
- Increase in water table by 7 to 10 feet due to de silting.
- Increase in area under protective irrigation in rabi by 172 ha (2012).
- Increase in area under protective irrigation in summer by 10 ha (2013).
- Farmers are adopting contingency crop planning (sunflower-10 ha and onion-16 ha during 2013).
- 75% farmers adopted improved varieties of Rabi sorghum as per the soil type and availability of irrigation facility.
- Increase in total milk collection by 22.72% as compared to 2010.
- About 10 ha of uncultivated land is brought under cultivation which was uncultivable due to frequent drought.
- 3 farmers started to sale Vanaraja birds as an entrepreneur in the village after demonstration of Vanaraja birds for back yard poultry farming.
- No animal were sent to government animal camp in 2012-2013, but in peripheral villages the animals were sent in the government animal camp.
- Farmers started to contribute in public work.

### 9.8 : Woman in Agriculture

This project was aimed to train the



Training programme for women SHG members

woman engaged in agriculture for their skill development, drudgery reduction and development of resources for their secondary household income generation. Many farm women have trained in various household business, back yard poultry, dairy cattle management, goat keeping etc.

### 9.9 : NABARD's Pilot Project on "Augmenting Productivity of Lead Crops through Adoption of Sustainable Agriculture Practices"

This project was started in a view to boost the productivity of the major crops grown in the selected villages by adopting appropriate crop production technologies. The project is funded by NABARD and was initiated in 2011. Initially the base line survey of five project villages was completed in October 2011. According to the base line survey the project implementation strategy were designed. The yield of lead crop (Sugarcane, Wheat & Rabi sorghum) was assessed for designing the project implementation strategy.



Demonstration on lead crop : Wheat

For the capacity building of farmers, many farmers training programmes, study tour, distribution of extension material etc were conducted. Formation of Farmers group on the basis of common crops was completed for the easy translocation of the appropriate technologies in a group of the farmers. 45% farmers of the villages had already registered their farmers club with NABARD five to seven years ago.



Seed Production plot of lead crop : Rabi Sorghum

The major technological interventions undertaken in the 5 villages are the introduction of the new need based varieties of lead crop, use of advanced irrigation and fertigation strategy, timely agricultural operations by use of modern agricultural machineries from village custom hiring base. By the use of new varieties and technologies recommended by KVK, the crop yield of rabi sorghum, wheat and sugarcane was increased by 35%, 26% and 21% respectively. In addition to this socio economic status of farmers was increased.

#### 9.10 : Rashtriya Krishi Vikas Yojana (RKVY)-

The project on enhancing the productivity of cereals under Rashtriya Krishi Vikas Yojana was started in 2011. The Processing machineries and the farm implements have been given for the training to the farmers. Farmers take benefit of farm implements like disc harrow, Rotavater etc. Training on sorghum processing is given to the farmers and farm woman.

#### 9.11 : NABARD's Pilot Project on Technology Transfer, Credit Counseling and Market Advocacy through Farmers Club for Wheat, Sorghum, Sugarcane, Turmeric and Dairy commodity

The project was initiated under the financial support of the NABARD in 2011 which was implemented in 20 villages with the help of established farmers club. The project aims to guide the farmers with the help of farmers club

by advocating them about crop production, milk production, credit and market literacy.

The pilot project training involved 20 master farmers. The master farmers were capacitated to conduct training sessions for the other 20 farmers in the villages, on dairy management, soil fertility, cropping systems, fruit production, and marketing of agricultural products, processing & credit linkage.

Project beneficiaries are 400 farmers from 20 farmers clubs', in these villages major crops grown are sugarcane, wheat, Jowar, pomegranate and dairy commodity. Benefits to the farmers through improved crop and management techniques for improving the farmers capacity & develop sustainable farming system.

The farmers' training, learning, marketing and credit activities have greatly improved economic status of farmers.

#### 9.12 : NABARD's project to deliver weather based agro advisory to farmer

This project is about the sending short messages on the registered mobile numbers to the farmers of 50 farmers club from 50 villages. Information of 5000 farmers for this project was collected for sending SMS. The analysis of survey conducted is enabling to find out the topics for sending the appropriate mobile short messages to the needy farmers. This project is supported by NABARD. Till date KVK has sent 444565 short messages on registered farmers mobile.

Mobile SMS
लोह व गंधक विरघळविणारे / उपलब्ध करून देणारे जीवाणू संवर्धन वापरून पिकांना लोह व गंधक कमतरतेपासून वाचवा.प्रमाण २ ली. एकरी-केट्टीके वारामती
असिटोवॅक्टर कॉम्प्लेक्सची फवारणी करून ऊसाला त्व उपलब्ध करून देऊन भरघोस उत्पन्न मिळवा.प्रमाण १० मिली / लि. (फवारणी शक्यतो स. १० पर्यंत करावी.-केट्टीके वारामती
नावाई पकल्यांतर्गत केट्टीके वारामतीतर्फे कोईमत्तूर, वेंगलोर,म्हैसूर या ठिकाणी ऊस,आंबा व भाजीपाला पिकांच्या लागवडी संदर्भात सहलीचे आयोजन केले आहे.संपर्क ९४२२३०२७५४, ९४२०४९८५११. प्रथम देणा-यास प्राधान्य.
पावसाचा अंदाज-वारामती येथे दि १९ सप्टे. १०-१५ मि.मी.दि २० सप्टे. १०-१५ मि.मी.दि २१ सप्टे. ८-१० मि.मी पाऊस पडण्याची शक्यता आहे-केट्टीके वारामती

## 10 . THE KEY TECHNOLOGICAL INNOVATIONS INTRODUCED BY KVK

### 10.1 : The ICT Innovations in Technology Transfer

The mandate of KVK is disseminating agricultural information on modern agricultural technologies to the grass root level for uplifting the farming community economically and socially. Training, field days, television, radio and print media are common ways of disseminating agricultural information. Present day farmers need to know current information on weather forecast and market prices for planning his agricultural operations. The dissemination of agricultural information to the farmers plays a vital role in taking decisions like sowing, spraying, harvesting etc. There are many organizations like agricultural universities, research stations and agriculture department which provides technical information to the farmers but the updated information about weather, market rates, new technology etc. is not reaching to the farmers. As such information changes hourly basis and farmers need updated information for making correct decisions. Therefore, KVK has developed ICT services which includes SMS facility, Community Radio Station, interactive query redress web portal, touch screen info media and Interactive Voice Response (IVR) system for dissemination of agricultural information to the farmers for their decision support.

#### 10.1.1 : Mobile Short Message Sending Facility

- Through mobile SMS service, SMS are sent to approximately 10,000 registered farmers including 13 commodity groups across Maharashtra at free of cost.
- Farmer registers his name and mobile number with crop information at KVK.

- Weather forecasting, disease forecasting, agro advisory, good agricultural practices, farmer's trips & study tours, scientist lecture & other innovative activities are some of the topics on which messages are sent regularly, 2-3 times a week.



SMS alert regarding rainfall

- Weather related messages include information alert about seasonal as well as off season rainfall at farmers' location. This helps farmers to manage their agricultural operations like sowing, weeding, fertilizers, spraying & harvesting etc.
  - Information regarding weather forecast is taken up from different open source internet portals such as Accuweather, Fallingrain, Skymet weather etc.
  - Messages of agro advisory, disease forecasting and good agricultural practices are taken from the services of agricultural universities and KVK experts.
  - Messages are sent in regional language (Marathi) for easy understanding and communication to the farmers.
- #### 10.1.2 : Community Radio Station
- The radio station Sharda Krishi Vahini is a community radio station for benefit of farming community.

- This is one of the useful extension method as agricultural information is disseminated to large number of peoples.
- The broadcasting of radio station is in a range of 25 km from KVK including 68 villages with a total population of more than 2 lakhs. Time of broadcasting is 7.00 a.m. to 7.00 p.m. Frequency of broadcasting is 90.8 MHz.

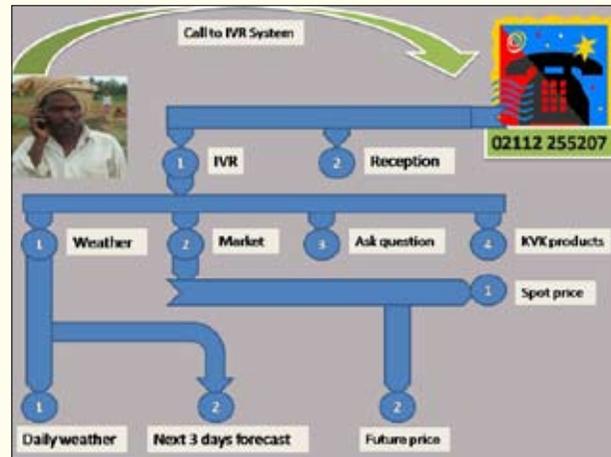


Community Radio Station

- The programmes include agricultural & allied technologies, interviews of experts on different topics, entrepreneurs, results of different demonstrations taken on KVK farm etc. The farmers can share their new experiences in farming through interviews on radio. This information helps farmers to adopt new technologies in their farms.

### 10.1.3 : Interactive Voice Response System

- The working of this system is based on telephonic call. The IVR system placed at KVK answers the call by providing particular information to the client in an interactive way.
- Information regarding daily weather including rainfall, minimum & maximum temperature, relative humidity and 3 days weather forecast, agro advisory based on forecast, market related information including spot and future prices can be accessed in this system.



IVR working system

- Farmers can also seek information on availability of various agricultural inputs at KVK. These include seeds, grafts, bio-fertilizers and bio-pesticides, agricultural implements, books on agriculture and services like soil and water testing, trainings etc.

### 10.1.4 : aAQUA eAgri-Service- An interactive web portal for information retrieval

- aAQUA (Almost All Questions Answered) is a multilingual expert advisory service that has been designed jointly by IIT Mumbai & KVK Baramati, providing answers to agriculture related questions asked over the internet.
- The portal can be viewed on [www.aaqua.org](http://www.aaqua.org). The aAQUA e-Agri Service is a problem-solving system dedicated to find solutions to problems posted by Indian farmers.
- Answers to agriculture related queries are sent in 48 hours.
- aAQUA currently has over 28491 registered members and a large number of guest users. Total topics covered so far 15906 with total number of posts exceeding 41720.



aAQUA portal

- Almost all of the questions are answered in the local language (Marathi) with English answers given to people posting from outside the state. The farmers trust the aAQUA service and are sensitive to the time it takes for the answers to arrive (current average is 1-2 days).
- Farmers can view all the interactions & share their experiences on the problem raised for the benefit of other farmers.
- Compilation of top 8 commodities or commonly asked questions has been done on the portal so as to avoid repetition of the questions



Crop Doctor

- Decision support system of crop doctor has been designed which comprises of 76 photographs of disease infested plants

that are supported with the data such as name of the pest or disease, causative agent, predisposing factors, preventive measures, chemical control & biological control etc.

- Commodity wise Compilation of crop recommendations of all the state agricultural universities in Maharashtra has been done under this so as to make it easier for the farmers to view all recommendations for a given crop under one head.

### 10.1.5 : Krishi Vigyan Kendra's Website – kvkbaramati.com

- It provides information on Weather, Agro advisory, Monthly agricultural activities, Market rates, Products available. It also provides information on different trainings like dairy, poultry, goat, poly house, bee keeping.



KVK Website

- Apart from that it also gives information on Seed Processing Unit, Fruit Processing unit, publications, photo gallery other programs are also available on website.
- Every month almost 2000 visitors visit Web site from different countries.
- Training & KVK products links have large number of hits on the website.

### 10.1.6 : Touch Screen agro info media

- The information on agriculture in a very catchy way was started to display by using the touch screen computer from 2012.
- This agro info media contains the information about good agricultural practices of all the crops including agronomy, horticulture, forestry, dairy management practices etc. The information on the other topics like soil health, pest and disease and their management strategy, agriculture engineering, energy sources for and farmers family, the government scheme and small scale business is given.



Touch Screen agro info media

- The farmers visiting to the KVK can access the information in a hassle free way as his desire and leave this computer when he wants.
- If he doesn't get the sufficient information till his satisfaction he can visit to the experts in the KVK for more details. It is also denoted in each chapter at its end that to whom should have to visit for getting more details about that topic.
- All the information is supported by necessary photographs, charts and tables.
- The information is written in local language i.e. in Marathi in a very simple manner so

that farmers can easily understand the topic.

### 10.1.7 : Use of Information and Communication Technology (ICT) in rural sector

The updated information about weather, market plays very vital role for farmers to take timely decisions. There are many organizations like agriculture universities, research stations; agricultural department which provides technical information to the farmers but the updated information about weather, market rates, new technology etc. is not reaching to the farmers. So the ICT technology used by KVK is playing important role in dissemination of agricultural information to the farmers for decision support. The ICT service helps the farmers to improve agricultural practices resulting in increase in production which leads to increase in income of the farmers.

### 10.2 : Polythene Lined Low Cost Water Storage Tank

Initially grape and fruit crops growers used to hire water tankers at the rate Rs 500/- per tanker in the summer season & they were spending Rs. 30,000 to 40,000/- per acre for irrigating Vineyards & fruit crops. But after participating in the study trip organized by KVK in the year 2003, they were convinced of the utility of the water storage tank's technology & they adopted the same by executing more than 30 tanks in the area.

With the success of this water storage tank and article published in the Sakal news paper the same technology is subsidies in National Horticulture mission. Thus 163 water storage tanks came up in the area up to 2013 under National Horticulture mission and many more will come up in future.

The KVK not only conducted study trip but also constructed a tank storing 76 lakh liters of water to demonstrate this technology.

Farmers were also given consultancy regarding the design, estimate etc. Some details of instructional water storage tank constructed by KVK are given-

**Table 18 : Details of water storage tanks available at KVK Farm**

S.N.	Particulars	Details
1	Water storage capacity of tank	76 Lac liters
2	Catchment area	35 ha
3	Soil type	Medium
4	Expected runoff	10 %
5	Average rainfall of Baramati	530 mm
6	Runoff networking water ways length	1250 m
7	Excavation of farm pound with formation of bund	62X62 m
8	Width of side bund	6.5 m



**Water storage tank**

The amount that they used to spend every year is thus saved & due to timely irrigation the crop yields & quality has also become assured & the risk of failure of crop due to non availability of water is no more. Thus achieved better profitability, productivity & sustained production. Many other farmers from all over the country visited the tanks constructed by these farmers & thus further diffusion of technology has taken place on a great extent. The assured availability of water not only increased the production per acre but farmers could plant more acreage under grapes.

### 10.3 : Loose Housing Dairy Farm Management

Dairy farmers in Pune districts conventionally tied up their animal for 24 hours on concrete flooring. There is increased incidence of mastitis, leg injuries, indigestion, ticks and Acidosis in crossbred cows.



**Loose housing dairy farm**

To overcome these problems arising from the conventional method of animal rearing KVK introduced the loose housing system. The system has various benefits. Cow urine and moisture from manure is absorbed by the sugarcane trash or wheat straw so there is no wastage of urine and production of FYM is increased by 36%. Incidence of mastitis, indigestion, and acidosis is reduced. Expenditure on treatment is reduced by 75% and Increase in fat content in milk by 12% and milk yield is increased by 16%.

110 dairy farmers adopted this technology in the area for cross bred HF cows. 4500 farmers from different parts of country visited these dairy farms.

### 10.4 : Cultivation Of Turmeric- A Crop Diversification

It is noted that in recent few years farmers becoming more curious about cultivation of new and high value crop instead of traditional one. Recently KVK introduced turmeric in this region and started to motivate farmers for cultivation. Currently, 132 farmers, from 7

blocks are in the cultivation of Selam variety of turmeric. KVK has demonstrated cultivation of turmeric on own farm and thereafter on the farmers field. Now farmers are realized that turmeric has a good potential to generate more profit than many other crops. KVK established a commodity interest group of 132 farmers dedicated to turmeric cultivation; more details of this activity are as follow -



Turmeric field

Table 19 : The impact of KVKs interventions about turmeric

No of farmers	Area under turmeric in ha	Average yield qtl per ha	No of blocks involved	Field days organized	Diagnostic visit	Study tours	Farmers training
132	51	75	7	6	4	2	4

### 10.5 : Reclamation of Problematic Soils By Using Subsurface Drainage and Mole Plough

Having irrigation facility for more than a century (since 1880) the soils in irrigated region of Baramati Tehsil have turned into soils with high pH & high electric conductivity. Out of the total cultivable land of 74,000 ha, 5224 ha is problematically salt affected. This has resulted in reduced microbial activity of the soil. Deficiencies of micro elements like Fe, Zn, Mn, etc resulting in reduced yield of crops is observed. Some lands are turning into saline, alkaline & totally unproductive where nothing could be grown economically.

It was therefore essential for the KVK to train farmers on various ways of reclamation of soil choosing proper treatment to soil based on

soil parameters Crop rotation & incorporation of crop residues in soil to improve organic carbon%. Choosing suitable crop that can tolerate high pH & EC of soil was needed. Sub surface drainage system for leaching out excessive harmful salts from the soil. Using foliar nutrients on crops grown on problematic soils to correct the deficiencies is proven helpful. Use of implements like sub soiler/ mole plough help to improve the drainage of the problematic soil is demonstrated over large area by KVK.

Farmers are now well aware of all the above aspects. They have realized the importance of the soil analysis to keep a track of the soil health. They are hiring sub soiler from KVK, and taking crops like sesbania for increasing the soil organic carbon%. Sub surface drainage system was also demonstrated by KVK.



Reclamation of Problematic Soils By Using Subsurface Drainage and Mole Plough

## 11. NEWER INITIATIVES TAKEN BY KVK

### 11.1 : Embryo transfer technique

Many times, farmers could not get the pure breed of the dairy cattle at the reasonable rate. Hence, KVK started to demonstrate and to offer the services of the embryo transfer technology to the farmers. This technological intervention was started in 2012 by the own interest of the KVK.

### 11.2 : Tissue culture laboratory

In the year 2012, KVK started establishment of tissue culture laboratory with the financial support of NHM. The production of tissue culture seedlings of strawberry, citrus and pomegranate has been planed and the adoptive trials are going on. There are very few suppliers of tissue culture seedlings of strawberry in Maharashtra. KVK is focusing to provide seedlings at reasonable price and quality, so that the farmer would have good quality seedling and in an affordable price.



Tissue culture laboratory

### 11.3 Bee keeping

KVK has started apiculture project from June 2012 with the financial support of NHM. The basic purpose of project is to motivate farmers regarding honey bees. The main role of Apiculture is pollination. Apart from this, it increases yield of crops up to 30-40% due

to good pollination. It is beneficial in citrus species, coconut, pomegranate, sunflower,



Bee hives kept in sunflower



Exposure visit of training participants

mustard, banana etc. KVK have 52 colonies of *Apis mellifera* & *Apis cerena* at KVK farm. KVK is playing vital role for extension of this project. The aim of this project is training & demonstration to the farmers. KVK started to provide the bee hives on hiring basis to the farmers. Many farmers have benefited since the inception of this project.

### 11.4 : Hydroponics

In the year 2012, KVK started on farm trials on hydroponics technology. Due to some abiotic unfavorable environmental conditions like drought, alkaline and saline soils and saline water, it is almost impossible to cultivate crops

in soil by traditional method. At present 18.2% land in Maharashtra is waste, problematic soil & uncultivable land and to bring this all land under cultivation, there is a need of soil less cultivation i.e. Hydroponics technology.



Hydroponics technology

Therefore, to overcome such situations and to have cheap method to grow crops particularly leafy vegetables, KVK introduced hydroponics technique. This technology requires aqueous nutrient solution, support system and shade house. Leafy vegetables like spinach, fenugreek and coriander can be grown in hydroponic. To supply vegetables in large quantity in future to metropolitans, hydroponics would be a good technology.

### 11.5 : Low cost hydroponic fodder matting for dairy cattle

The dairy business is consistently increasing in the operational area since the inception of the KVK programme. It is also recorded that the cost of production of milk is hampering the dairy business in terms of profitability. The cost of the input required for dairy is increasing very fast and the milk rates are comparatively low. To overcome the situation and to sustain the dairy business, KVK initiated the trials on low cost hydroponic fodder matting technology. The technology

includes the structure made from bamboo required to keep the tray filled with maize seed or wheat seed. The seeds of maize or wheat grows very fast within 8 days and then it can be utilized to the cattle for their requirement of green fodder. Recently, KVK have started to demonstrate this technique on farmer's field.



Low cost hydroponic fodder matting

### 11.6 : Automated fertigation technology

This unit started in 2012. The basic objective is to give demonstration and training to the farmer on computerized modern technology in automatic irrigation and fertigation. The unit automatically irrigates the entire farm and fertigates automatically as per the programmes and procedure entered in the software. Till date, more than 500 farmers have visited this center and interested in such high tech agricultural practices.



Automated fertigation technology

## 12. OTHER PROMINENT ACTIVITIES OF KVK OTHER THAN MANDATED ACTIVITIES

### 12.1 : Innovation for extension communication, Information Boards

During the year 1997 it was realized that with the limited staff members, many times it is not possible to reach a number of villages in a month which were also in need of technology or scientific information. KVK Baramati Dist. Pune thought as to how number of villages could be contacted within existing system, without affecting the ongoing work. Places were identified where number of farmers visits every day for different activities e.g. bus stations, Agro shops, milk collection Centers, veterinary dispensaries, Village panchayats, co-operative sugar factories etc. Black boards were fixed at such suitable places. Every month/fortnight (depending on the need) Agricultural messages most relevant to that month were written. These boards were receiving a good response & KVK were operating 15-20 such boards.

### 12.2 : Reach to unreached

The trainings, demonstration and on farm testing were mainly concentrated in the focal & satellite villages of KVK. Unfortunately the rest of the villages remain deprived of the scientific information & technical knowhow. In order to take these technologies at their door-step this KVK had organized a programme “KVK at your village “ where the entire team of KVK scientist reaches the selected village on a given day & arranges exhibition of all the demonstrated inputs & displays various informative boards, charts. Arrangement of slides & video show in the village so that the villages would not only get information on agricultural technologies but also know how a KVK could help them.

### 12.3 : Seasonal approach

Crops like sugarcane, wheat get harvested on large scale in a very short span of time.

At this time huge quantity of trash & straw was available which was burnt by the farmers. Pertaining to this, KVK took up a seasonal activity in this period & contacted number of farmers personally & convinced them to use it in one way or the other. This activity received a good response & farmers started using the trash/straw for mulching or in situ decomposing.

### 12.4 : Disease forecasting station

The KVK has a digital fully automated weather recording station at its farm that has 7 sensors recording parameters like Min & Max temp, Relative Humidity, Wind velocity, Wind direction, Leaf wetness, Rainfall, Sunshine hrs, etc at hourly interval. The data can be downloaded to computer software that interprets diseases like anthracnose, late & early blight in tomato, Rust in wheat, Downey & powdery mildew in grapes for next 3 days. The forecast information is then broadcasted through radio, mobile SMS to farmers and also displayed on KVK notice board.



Automated Disease Forecasting Station

## 12.5 : Farmers Service Centre

On analyzing the reasons for very low adoption of Agricultural technologies the main reason was found to be non-availability of Agricultural inputs in time at grass root level. Realizing this, the KVK decided to work on no profit no loss basis, to serve the farming community without investing any additional amount and started farmers service centre where inputs like bio fertilizers, Bio control agents, micronutrients, seed of improved varieties of Soybean, groundnut, chemical traps, grape rootstocks, chicks of RIR breed, vermi compost, seeds/stumps of fodder etc. were sold.

The table given below indicates how this service centre is helpful to the farmers for sale of inputs other than farm produce.

Table 20 : Performance of the farmers' service center

Year	Amount of inputs purchased by farmers from KVK ( Rs.)	No. of farmers benefited
1995-1996	3940	350
1996-1997	4290	375
1997-1998	5800	390
1998-1999	26275	410
1999-2000	26134	425
2000-2001	37160	490
2001-2002	41640	511
2002-2003	285820	560
2003-04	335500	1439
2004-05	393782	1523
2005-06	249242	894
2006-07	611741	1850
2007-08	3921168	2935
2008-09	6454895	3750
2009-10	4577921	3532
2010-11	13459683	4570
2011-12	6977317	3660
2012-13	11259884	4937

## 12.6 : Farmer's Field School

The KVK from 2007 is undertaking Farmers field school on various crops like Bengal gram, wheat, pomegranate, fig, paddy, Soybean, sorghum & back yard poultry in selected villages. Every week a day is fixed in consultation with the farmers growing that crop. On that day all the farmers growing the crop in & around the selected village assemble on a field to discuss the present stage of growth, to observe the changes, pest & diseases if any & to discuss the future management to be done in the crop. This continues till the plots are harvested. The results of these interaction have been very fruitful as farmers get the guidance at right time. The response of the farmers to this activity is increasing



Farmer's Field School on pomegranate

## 12.7 : Farmers Clubs & Self Help Groups

KVK has established 157 Farmers' clubs in 3 districts i.e. Pune, Solapur & Satara out of which 13 are women's farmers clubs. The clubs prepare their action plan for the year in consultation with the KVK & on the basis of this the arrangements were made to deliver the information or to invite the scientists from various research organizations. The farmers come together to discuss issues pertaining to agriculture & share remedies. They get enriched by the interaction with the experts that takes place every month. Farmers have started taking lead in contract farming, Seed

village concepts, Cooperative farming in green houses.

KVK has also established 150 farmers self help groups out of that 50 SHGs are women's. KVK is encouraging the illiterate women from rainfed areas to do more productive farming that can reduce their drudgery too. The women from these self help groups have taken loans from the group for agro related self employment such as Cow or buffalo keeping, goat keeping, vermi composting, group dynamics in marketing etc.



A view of Inauguration of farmers club

Adopting newer market opportunities such as contract farming could also increase the profitability. Therefore KVK introduced some farmer's clubs with few private firms doing contract farming in crops like wheat, sweet corn, soybean, yellow maize, cassava etc. They were explained the benefits of the contract farming. KVK also conducted two study trips to Rajgurunagar & Kolhapur where contract farming in potato & cassava is done respectively. This resulted in many clubs coming ahead & making contracts with various seed or other companies & earned more net profit (ranging from Rs 3000-10,000) per acre from same piece of land, water, & other inputs like manpower, fertilizers pesticides etc. initially only one club came forward but eventually was followed by 10 more clubs. Till date 209 acres has come under contract

farming in wheat, 75 acres under maize, and 35 acres under cassava in & around Baramati. Now the farmers are confident to deal with private companies for contract farming.

In similar ways many farmers adopted the use of Neem seed kernel extract, *Helicoverpa* nuclear poly hydrosis virus (HNPV) for control of *Helicoverpa*, Use of traps for control of fruit borer in guava, pheromone traps for control of borer in vegetable crop. All these technologies are low cost, eco friendly, increase the yield & Cost benefit ratio of the crop. It can be quoted as KVK's greatest achievement to convince the farmers to reduce the use of pesticides & make a shift from chemical to biological pest management.

Table 21 : Rates obtained due to seed diversification

Crop	Local Market rate / Q .	Seed price/qt
Wheat	1900 /-	2500/-
Bengal gram	3500/-	7200 /-
Jowar	2200 /-	6500/-
Paddy	1900/-	7000/-

Table 22 : Process products for direct marketing

Sr. No.	Name of club	Product
1	Adarsh Farmers Club, Murti	Turmeric powder, ginger powder, turmeric pickle.
2	Sharad Farmers Club, Sangvi	Turmeric powder
3	Nisarga Farmers Club, Katewadi	Ice cream, choc-bar, khova & Raw milk
4	Shivshakti Farmers Club, Natambi	Turmeric & Rice

Table 23 : Farmers clubs seed production 2011-2013

Sr. No.	Name of farmers club	Crop for seed production	Quantity	Area covered
1	Gayatri farmers club, Malegaon	Wheat, soybean, Bengal gram, G.Nut	250 Q.	625 acre
2	Prajasattak farmers club Phadtarwadi	Wheat, soybean, Bengal gram, G.Nut	140 Q.	350 acre
3	Pdm.Dr. Appasaheb Pawar farmers club Lonibhapkar.	Jowar	9.50 Q.	250 acre
4	Pandare Panchkroshi farmers club Manajinagar	Wheat	33.50 Q.	83 acre
5	Shri. Sant Tukaram farmers club Bhawaninagar	Wheat, Jowar, Sugarcane	52 Q. 2 acre	230 acre
6	Sharad farmers club Sangvi	Wheat, soybean, Bengal gram.	90.30 Q.	250 acre
7	Jay Hanuman farmers club Madanwadi	Wheat, Jowar, Sugarcane.	70.00 Q. 2 acre Sugarcane	275 acre
8	Shri. Kaleshwar farmers club Aasu	Wheat, soybean , Bengal Gram	90.40 Q.	225 acre
9	Bhagirathi farmers club Malegaon	G. Nut, Bengal gram, sugarcane	31.30 Q. 3 acre	109 acre
10	Krishi Vikas farmers club Jalgaon k.p.	Wheat, Jowar	19 Q.	197 acre
11	Shivshakti farmers club Natambi	Paddy	33 Q.	110 acre
		Total	819 Q.	2704 acres

### 12.8 : Commodity Interest Groups (CIGs)

Commodity interest groups are established by KVK during 2008-09. There are eight different commodities which are grown on large scale in the districts are selected like pomegranate, Banana, Fig, Custard apple, milk, Citrus, Tomato, seed production and newly added Turmeric is included in these group. These groups are trained for improved technologies through demonstrations, trainings, and exposure visits and by different methods of transfer of technologies. Each group meets on particular day of the month and shares their experiences with other farmers. This is one of the interactive

forum through which knowledge is passed to majority. There is no limit for the membership and no any charge so any one can join and get knowledge from the group.



A view of practical training to CIG on Fig

Table 24 : Training organized for CIGs during 2012

S. N.	Name of the group	No. of programs	No. of farmers participating in the trainings	Members in the commodity group
1	Sweet oranges	8	157	23
2	Custard apple	9	297	84
3	pomegranate	5	211	377
4	Figs	6	224	150
5	Tomato	16	549	350
6	Banana	9	513	125
7	Dairy	6	167	45
8	Seed	4	131	47
9	Turmeric	12	132	132

### 12.9 : Campaign on management of livestock in drought situation

During the year 2012 there is low rainfall in Pune than average, hence a mass campaign on dairy cattle management was organised by KVK by conducting various trainings in different villages. In these programmes, campaigning for drought related technologies has undertaken like treatment on low quality roughages, use of silage making, use of mineral mixtures in dairy cows, adoption of loose housing system for dairy cows & method of tick control to reduce tick borne diseases in crossbred cows. In these programmes, 6 villages in Baramati block, 2 villages in Indapur block, 2 villages in Purander block & 2 villages in Phaltan block of Satara district were covered.



Campaign on management of livestock in drought situation

Focusing on animal rehabilitation camps, 4 camps were visited for mass campaigning against drought management as farmers of surrounding villages were participated in these camps. About 556 farmers & 2780 animals covered under this programme.

After these programs many farmers came to KVK asking their problems regarding nutritional management and use of unconventional fodder like wheat straw to their cattle in the drought condition which have been solved.

### 12.10 : In situ water conservation campaign for drought management in drought prone area

In the year 2011 and 2012 there is a low rainfall which was 418 mm and 348 mm respectively as compared to average rainfall which is 530 mm. Pertaining to this KVK had organized mass campaign on drought management and conducted training programmes in 91 villages which were attended by 4055 farmers. The demonstrations on in situ soil moisture conservation was also conducted and was found very helpful to the farmers for enhancing their yield in drought



In situ water conservation practice



Campaign for drought management

condition. In both seasons of 2012 i.e. kharif and rabi, it was observed that this technique is adopted over more than 600 acres of area in the drought prone zone.

### 12.11 : Agro eco tourism

KVK have started the agro tourism center in the demonstration farm from the year 2004. The center was established in the coconut garden having 6 tents for the living of the guest those are mainly coming from the urban area. All the facility regarding the daily livelihood is provided to the guest as per his requirement. The beverages are not allowed in the campus. The guest has allowed having the practical experience about the farming practices as per their will. Mainly the guest and the school/ collage students from urban areas are regularly

coming to the agro eco tourism center. This facility is also utilized for the training of the farmers who wants to establish the agro tourism center on their farm. 4 trainings on this concept were conducted and more than 200 farmers have participated in the training. Till date more than 8000 guest and more than 14000 school student have visited this center.

### 12.13 : Grain Festival

KVK have organized grain festival in 2012 in Baramati in which more than 200 farmers put their agriculture produce for sale and more than 3000 consumers participated in the festival. The festival was arranged for three days duration in which farmers could sale their produce worth Rs.1.5 crorer.



Grain Festival



### 13. SUCCESS STORIES DOCUMENTED

#### 13.1 : Use of bio fertilizers for increasing productivity of crops

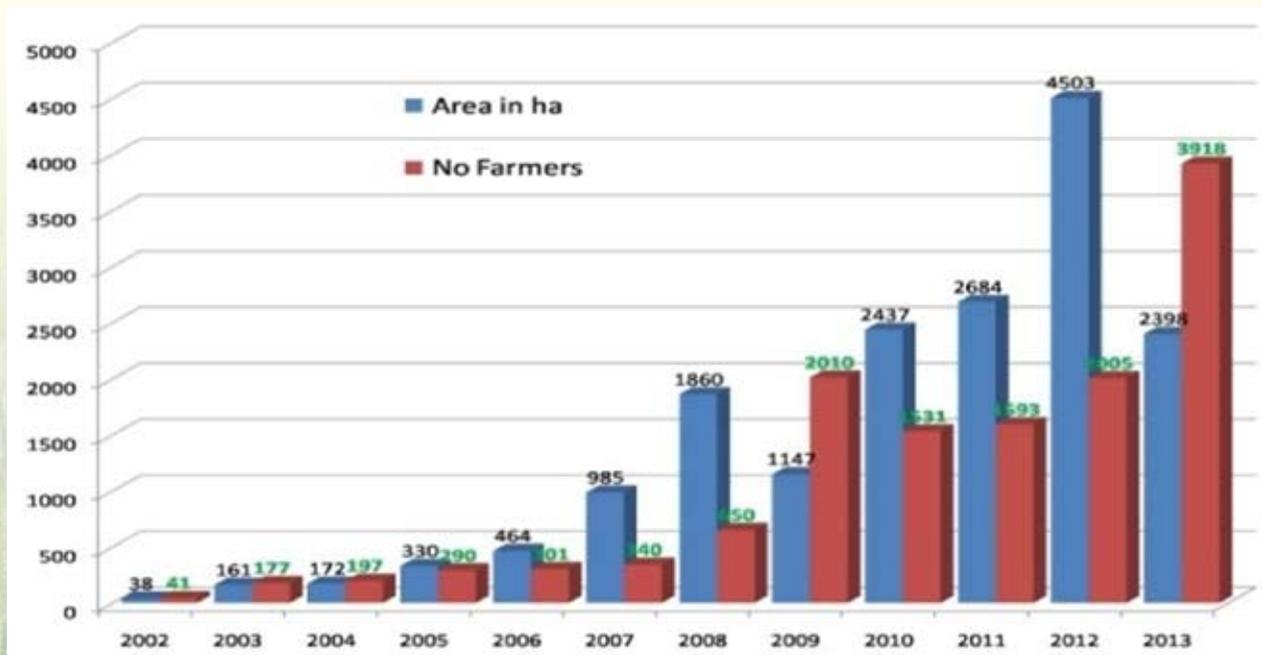
Bio fertilizers viz. Nitrogen fixing bacteria, phosphate solubilizing bacteria, potash mobilizing bacteria are effectively used for enhancement of productivity of different crops. Due to use of bio fertilizers the productivity of crops is increased by 15%. By Keeping this in mind KVK demonstrated this technology in various crops and shown results to the farmers. From the data available with KVK from 2001 to 2013 shows that every year there is increase in users of bio fertilizers. In 2002, only 230 kg of bio fertilizers were used while in 2013 it reaches to 19140 Kg this shows that there is gradual increase in awareness of the farmers about the bio fertilizers. The number of farmers was also increased from 41 in 2002 to 1916 in 2013. The acreage under bio fertilizers were also increased from 23 ha to 1914 ha.

The bio pesticides were found useful with minimum cost of plant protection and residue free production. The initial supply was 50 Kg in 2002 which was increased up to 4840 Kg in 2013. The number of farmers was increased from 31 in 2002 to 604 in 2013 whereas the area was increased from 10 ha to 484 ha with the increasing trend of organic farming.



Use of bio-fertilizers in Tomato

Figure 5 : Total area and no of farmers using bio-fertilizers and bio-pesticide during 2001-13



### 13.2 : Use of Pheromone Traps for control of insect pests

Vegetable crops like Brinjal, Tomato are grown in the area. Among major insect pests attack on these crops is Brinjal shoot & fruit borer, tomato fruit borer etc. Due to which nearly 70-80% losses have been recorded. In case of Sugarcane Shoot borer is major pest which causes about 20 to 40 % losses. The applications of chemical insecticide through spray are not effective. In case of Gram, Red gram, Tomato Helicoverpa is causing considerable losses; In Soybean Spodoptera is causing losses about 30%. In order to overcome the problem KVK demonstrated the Pheromone Trap Technology in 1998 to 2013. For the purpose of surveying 5 traps per hectare are used while for mass trapping 25 traps are used.



Use of pheromone trap in Tomato

Use of Pheromone trap starting from flowering time @ 25 per ha and replacement of lures at 21 days interval reduce incidence of insect and increase in yield of sugarcane by 3.93t /ha(14.07%) over control. the cost of traps is about Rs. 1225/- per hectare.

25 such traps/ha are found effective & economic, This helped in reducing the number of chemical sprays required in 6 months for tomato crop from 18 to 12 thus saving Rs 4350/- per ha & reducing the number of fruits affected with fruit borer from 20% to mere 3% In addition to its less cost intensiveness,

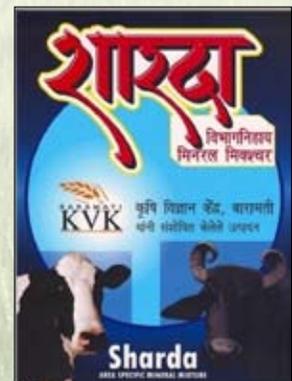
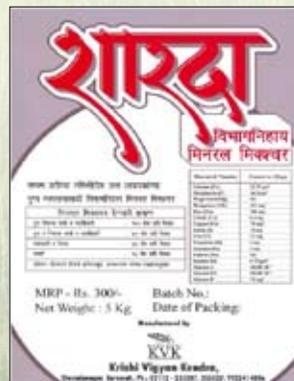
farmers were impressed by its utility & cost benefit pattern & adopted the technology on large area



Farmers training on IPM

### 13.3 : Use of Area Specific Mineral Mixture in cross bred HF cows

KVK Baramati has developed the Area Specific Mineral Mixture for Pune districts by analyzing the mineral content in fodder, concentrate, medium soil and blood serum of crossbred HF animals. KVK found that there is need of 100gm mineral mixture required for the average production of 12-13 liter of milk per day per cow. There is severe deficiency of minerals like Ca, P, Zn and Mn followed by selenium; so there is a need of special formulation of mineral mixture for crossbred cows in Pune district. KVK has formulated and tested it in 600 crossbred cows. The product Sharada Area Specific Mineral Mixture was launched in 2010. KVK have conducted survey of 100 dairy farmers who were using



Area Specific Mineral Mixture developed by KVK

area specific mineral mixture and it was found that 75 % repeat breeding was reduced &

milk yield was increased by 15% (1-1.5 lit/ day /cow).

Table 25 : Details of use of area specific mineral mixture

Year	Area specific mineral mixture (ASM) sold to farmers (Kg)	No. of farmers using ASM	No. of animals fed with ASM	No. of village covered
2009-10	1693	111	666	35
2010-11	2006	134	730	22
2011-12	2936	184	1053	31
2012-13	3410	227	1720	42
Total	10045	656	4169	130

### 13.4 : Foliar application of nutrients and use of Urea DAP briquette

In Sugarcane based farming system and commercial production of vegetables and export quality fruit production foliar application of nutrient bridges the gap between availability and sufficiency of nutrients. Use of granular chemical fertilizers have not only affected the chemical composition of the soil but also have resulted in degraded soil microbial activity. Since hybrids & high yielding crops need nutrients in larger quantities KVK decided to promote foliar application of nutrients and use of urea-DAP briquettes that would not only sustain production but also reduce that much chemicals getting in soil. Above all they are low cost to farmers to adopt on a large scale. These foliar soluble fertilizers and briquettes increased the net additional income by Rs. 2000-4000 per acre in a season in wheat and Sugarcane became soon very popular amongst the farmers. The farmers are now regularly using this multi nutrient solution and briquettes in various crops such as sugarcane, vegetable crops, floriculture, wheat and paddy etc. They are also very popular in areas where soils are problematic & thus do not release some nutrients when applied through soil. KVK have sold 15.4 tons of Urea-DAP briquettes and more than 300 farmers have benefited.

Looking the response and demand from farmers KVK started to produce multi nutrient

solution and urea-DAP briquettes since 2007 and this is then supplied to the farmers on no profit no loss basis. The annual sale of such solution at KVK is an indicator of its utility & impact.

Table 26 : Contents of multi micro nutrient solution in %

Fe	Mn	Zn	Cu	Mo	B
2.5	1	3	1	0.1	0.5



A Sharada Micro+

Table 27 : Details of sale of multi micro nutrient solution (Sharada micro+)

Year	Micro+ production in liters	No. of farmers benefited
2008	100	50
2009	2700	1650
2010	5500	3300
2011	2500	1500
2012	3500	2100
2013	2718	5027
Total	17018	13627

### 13.5 : Group dynamics in marketing

Krishi Vigyan Kendra Baramati has started establishment of farmers clubs from 2003. Farmers come together and discuss on farming issues, problems and future planning of agriculture. The major problem of agriculture

is market and for solving this problem KVK conduct buyers sellers meet in a village. After participating in this programme many buyers start buying of agricultural products from farmers group and there are both side benefits

Table 28 : List of farmers who have adopted contract farming

Sr. No.	Name of club	Crop contracted	Total acreage	Yield / acre	Rate of contract	Local rate at that time	Agency/ company	Additional Benefit/ acre Due to contract
1	Shri. Hanuman farmers club Rajuri Tal Phaltan	Wheat seed Trimbak	50	18 to 20qt.	3000/- / qt.	1200 -1400	Agri. Dept.	20000/-
2	Gaytri Farmers club, Malegaon	Soybean	17	10 to 11 qt.	3500/- / qt.	2100 -2200	Malegaon Sugar factory	14000/-
		Wheat	12	18 to 20qt.	3000/- / qt.	1200 -1400	Agri. Dept.	20000/-
3	Krishiraj farmers club Jadhavwadi	Gawar haritrani	10	18 to 20 qt.	50 / kg	30	Bombay Traders	40,000
4	Appasaheb Farmers club Lonibhapkar.	Poultry	30 sheds	3000 birds	5 / kg.	-	Baramati Agro	Average 20000 to 25000/-
5	Shrinath Farmers club Bhondvewadi.	Poultry	30 sheds	3000 birds	5 / kg.	-	Baramati Agro	Average 20000 to 25000/-
6	Nilkanteshwar Farmers club Lasurne	Banana	100	30 to 32 ton.	7.50/ kg.	5.50 / kg.	Desai export	60000/-
7	Shri Ganesh farmers club Bajrangwadi	Banana	150	30 to 32 ton.	7.50/ kg.	5.50 / kg.	Desai export, Mother dairy	60000/-
8	Jai kisan Farmers club Bori.	Grapes	125	10 ton	110/ kg.	70/ kg.	Bombay D.G. Group	40000/-
9	Krushi Doot Farmers club Jankshan	Grapes	75	10 ton	110/ kg.	70/ kg.	Bombay D.G. Group	40000/-
10	Pragati Farmers club Yashwantnagar	Colour capsicum Greenhouse	27 units	5	100	60	Mehta & company	110000/-

## 14. LINKAGES WITH STAKE HOLDERS

Many institutions have contributed in cash or kind for implementation of various activities as a joint venture during last 20 years. This

clearly indicates the credibility of the KVK in the eyes of outsiders.

Table 29 : List of stake holders and nature of work

S.N.	Stake holder	Name of the Institute	Nature/activity of linkage
1	Agriculture Research Institutes	CRIDA	National Initiative on Climate Resilient Agriculture (NICRA)
		National Center for organic farming	Organic farming
		Vasantdada Sugar Institute, Pune.	Field day & technical support.
2	ICAR	NAIP	Tomato processing prioritization for global competence
		CIPMC, Nagpur	Farmers Field school
		MANAGE	Agri Clinic & Agri Business center
3	Government of India,	National Horticulture Mission	Leaf tissue analysis Laboratory
			Bio control Production Laboratory
			Nursery for Mango & pomegranate
			Gardener's Training
			Technology transfer center
			Seed Processing center
			Plant health Clinic
		NHB & NABARD	Awareness creation by exposure visits
		Ministry of agriculture	Clean milk production trainings
		All India Radio, Akashwani, Pune.	Radio talks & participation in advisory board meetings.
		ATMA	Demonstration, study tour, farmers training
IIT Mumbai	aAqua.org web portal		
Ministry of Women & child welfare	Trainings of women Para-veterinarians		
4	NABARD	NABARD	Rural Agri. entrepreneurship Development
			Pilot project on "augmenting productivity of Lead Crops / Activities through adoption of Sustainable Agricultural practices" in five villages
			Technology transfer ,market advocacy and credit counseling for dairy and wheat through farmers club
			Farmers club
			Mobile SMS project
			Indo-German Watershade Development project



S.N.	Stake holder	Name of the Institute	Nature/activity of linkage
5	State government	Department of agriculture state government	Mobile soil testing laboratory
			Self employment Development in agriculture
			Establishment of bio control laboratory
			Establishment of Soil testing laboratory
			Establishment of agri. information center
			Establishment of Green house/shade house
			Support of information in extension scheme
			Project based extension
			Trial of use of Effective microorganism
			Women in Agriculture
6	Cooperative institute	IFFCO	Farmers training and exposure visits organization
		Maharashtra Co-operative milk federation.	Joint implementation of training of Women
7	Open university	YCMOU	Center for distance education In agriculture
8	Private companies	Deepak Fertilizers & Petrochemicals Ltd.	Farmers training and exposure visits organization
		Zuari Agro Industries	Farmers training and exposure visits organization

#### 14.1 : Nature of Collaborative Linkages with Different Stake Holders

KVK is working in collaboration with different stake holders which are locally and globally situated. They may be research institutes, various Ministries of central or state government, Agricultural institutes, State government, Private companies, Cooperatives, Print and electronic media etc. Some of them are our funding agencies. The nature and quality of interaction with different stake holders can be stated as below

##### 14.1.1 : Policy advocacy

KVK is a member on the Advisory Board for different central and state government schemes and institute like CROPSAP, ATMA, All India Radio Pune, Doordarshan Pune, etc. KVK also participates in the Monthly district work shop of state government etc. Thus jointly policies & guidelines are developed at state level.

##### 14.1.2 : Consultative action planning

KVK is regularly taking part in consultative action planning meetings like Zonal Agricultural Research Advisory Committee (ZARAC) of state agricultural universities. Several stakeholders also help KVK in action planning through scientific advisory committee (SAC).

##### 14.1.3 : Collaborative programs with external funding

Since last many years many programs are being implemented in KVK with external (other than ICAR) funding such as NABARD, NHM, ATMA, Department of Agriculture etc. Moreover, KVK ensures result oriented innovative work, timely utilization of funds, and provides good feedback to the funding agency.

##### 14.1.4 : Joint implementation of program

Many projects in the KVK are being jointly implemented with stake holders such as farmers' club, agro info media, private

companies, cooperative sugar factories etc. These projects may include jointly organization of farmers training program, study tour, demonstrations, transfer of technology through print and electronic media etc.

#### 14.1.5 : Input and technological services to farmer

KVK is not only dealing with information and services but also provides quality input on no profit no loss basis to the farmer. These

inputs are provided to the farmer on the basis of their farming need.

#### 14.1.6 : Collaborative projects

The project like NICRA, Organic Farming, Indo German Water Shade Development Project, Sugarcane Development Project etc. with research institute, Central and State Government organization, private companies and cooperatives are being conducted in the KVK.

### 15. AWARDS & RECOGNITIONS RECEIVED BY THE KVK

#### 15.1 : Awards received by KVK

##### 15.1.1 : Zonal Award for Best KVK in Zone V – 2013

This Krishi Vigyan Kendra won the ICAR's most coveted Zonal Award for Best KVK in Zone –V for the year 2012-13 for outstanding contribution in the field of extension education.



Zonal Award for Best KVK - 2013



Krishi Sahyog Samman - 2012

##### 15.1.2 : Krishi Sahyog Samman by Mahindra Agri Awards -2012

This award is given by Mahindra and Mahindra in partnership with Zee news. KVK Baramati was awarded by this award for the innovative technology transfer in agriculture and contribution in the field of Agriculture.

##### 15.1.3 : NABARD's National level first Award for the best performance of farmers club (2010-2011)

KVK Baramati has established 150 farmers' clubs in 150 villages in three districts of Maharashtra viz. Pune, Satara and Solapur. KVK was awarded as the best facilitation organization for the farmers' clubs.



National Award for best performance of farmers club - 2011

### 15.1.4 : NABARD's State level First Award for best performance of farmer's club-2009-2010

KVK received this award for the best work done in establishing and running the farmers club.



State Award for best performance of farmers club - 2010



National level Best KVK Award - 2006-07

### 15.1.5 : National level best Krishi Vigyan Kendra Award (2006-07)

Based on the significant contribution made in extension education and for outstanding contributions in extension outputs viz. Vocational training, on-farm trials, front line demonstrations, training to extension workers, innovative methods in extension, linkages developed with line departments and impact created in terms of improvement in livelihood of farming community, this centre is awarded with National Level BEST KVK AWARD for the year 2006 to 2007.

### 15.1.6 : Manthan Award (2004-2005) from digital empowerment foundation New Delhi for best e-content development

This award was received for the best e-content development in cyber extension. The KVKs website [www.aaqa.org](http://www.aaqa.org) received this award for query redress website for farmers for most innovative cyber extension.

### 15.1.7 : Certificate of Accrediationand Rating of Horticulture Nursery

Nursery of KVK Baramati is rated as IV star nursery by National Horticulture Board, Ministry of Agriculture, Govt. of India for producing 2.25 lacs grafts of Mango, Guava and Pomegranate during to 2013.



Rating of IV star nursery

## 15.2 Capacity Building of KVK staff through International Trainings & exposure

Table 30 : International exposure to the staff of KVK

Sr No.	Name	Country/Venue	Training / Exposure	Year
1	Dr. Syed Shakir Ali	Van Hall Larenstein University of Applied Sciences Netherlands	Innovative practices in Vegetables Chains, Learning from Dutch experiences	2013
2	Dr. Tarannum Kadarbhai	Netherlands	To Deliver Lecture on Value Chain in Marketing of Vegetables	2013
		China	Hybrid corn breeding and cultivation technique in the China	2012
		Netherlands	Senior Professional	2010
		Bangkok, Thailand	Model scientist award FAO for Asia Pacific Region	2005
		California, USA, France	Group Study Exchange	2002
		United Kingdom	Indo-British Sponsored Programme on Agricultural Networking	2000
		Israel, Costo Rica	Senior Professional for Regional Research and Development in Agricultural	1998
		Canada	Animal Breeding	1997
2	Dr. Ratan Jadhav	Netherlands	International Training Programme on Modern Dairy Farm Management, PTC+	2011
		Israel	International Course on Dairy Cattle Production	2005
3	Mr. Manik Lakhe	Israel	Fertigation and water management technology in Israel	2011
4	Mr. Vivek Bhoite	Israel	Fertigation and water management technology	2011
5	Mr. Santosh Karanje	China	Hybrid corn breeding and cultivation technique in the China	2012
		Israel	Fertigation and water management technology in Israel	2011
		Netherlands	Practical Managemnet course on plant protection in the Netherlands	2009
6	Mr. Santosh Godse	Netherlands	Innovative practices in Vegetable Chains, Learning from Dutch experiences at Van Hall Larenstein University of Applied Sciences	2013
		Netherlands	From competence profile to competence based training programme	2010

7	Mr. Yashwant Jagdale	Van Hall Larenstein University of Applied Sciences Netherlands	Innovative practices in Vegetables Chains, Learning from Dutch experiences	2013
8	Dr. Milind Joshi	Van Hall Larenstein University of Applied Sciences Netherlands	Innovative practices in Vegetables Chains, Learning from Dutch experiences	2013
9	Mr. Haribhau Jarad	Israel	Modern irrigation and fertigation technology in Israel	2011
10	Mr. Kallyan Ghadage	Israel	Modern irrigation and fertigation technology in Israel	2011
11	Mr. Kalane N.W.	Thailand	Kyusei Nature Farming and EM technology at the Kyusei Nature farming ceter, Saraburi, Thailand	2008
12	Mr. Yogesh Patil	Van Hall Larenstein University of Applied Sciences Netherlands	Innovative practices in Vegetables Chains, Learning from Dutch experiences	2013
13	Mr. K. L. Ghadage	Israel	Fertigation and water management technology in Israel	2011



Training on Value Chains at Netherlands



Training at Israel



Training on Dairy Farming at Israel



Staff from KVK, SAU, Agri Dept. and Farmer Representative during training at Netherlands

### 15.3 : KVK contact farmers and staff form other deputed for international training

In addition to capacity building of staff, KVK has also deputed farmers representative, officials from State Agril. Department, M.S, SAUs for various trainings and Exposure visit. During 2013 Mr. Nathrao Karad, Mr Chandrakant Bhor and Dr. Jagtap were deputed for the training on Innovative practices in Vegetable Chains, Learning from Dutch experiences” at Van Hall Larenstein University of Applied Sciences, Netherlands, Mr. Santosh Raut for training in Malaysia and Exposure visit of group of farmers to Egypt and Israel.



Exposure visit of farmers along with chairman, ADT, Baramati to Egypt.



Exposure visit of farmers to Israel

The exposure visit of KVK contact farmers were also organized in other states of India viz. Karnataka, TamilNadu etc so as to have technical knowledge from different institutes in these states.

### 15.4 : Awards and Recognitions to KVK Contact Farmers or Farmers’ Clubs

#### 15.4.1 : NABARD’S National level first award to farmers’ club established by KVK

For the year 2010-11 NABARD awarded KVK supported farmers’ club called Gayatri Farmers’ club at Malegaon Tal. Baramati Dist Pune with best performance national level first award.



Best Farmers Club Award to Gayatri Farmers Club

#### 15.4.2 : NABARD’S state level first award for best performance of farmers club (2009-10)

The NABARD awarded Gayatri Farmers club supported by KVK for its best work.



State level First Award to Gayatri Farmers Club

#### 15.4.3 : Adarsha farmers’ club awarded by NABARD at State level as third best farmers’ club

For the year 2010-11 NABARD awarded KVK supported farmers’ club called Adarsha Farmers’ Club at Murti, Tal. Baramati, Dist

Pune with best performance state level third award.



Adarsha farmers' club Award

15.4.4 : Innovative farmer award to KVK contact farmer by ICAR in the KVKs National Conference at MPUAT, Udaipur in 2010

Mr. Nandakumar Jadhav, a contact farmer of KVK Baramati, was awarded by National Farm Innovator Award at the auspicious hands of Hon. President of India Mrs. Pratibha Devising Patil at Udaipur, Rajasthan in December 2010. This award was given for his innovation in motor cycle operated power sprayer.



Innovative Farmer Award to KVK contact farmer : Mr. Nandakumar Jadhav

15.4.5 : A KVK contact farmer Mr. Bhimrao Gavade was awarded in KVK National Conference held at JNKKV, Jabalpur in 2011

Mr. Bhimrao Gavade is a contact farmer of

KVK. With guidance received from KVK, he has motivated to use loose housing system for his dairy farm. He has presented his experience of loose housing system in national level dairy exhibition at Jabalpur. He has experienced many advantages of loose housing system. Cow urine and moisture from manure is absorbed by the sugarcane trash or wheat straw so there is no wastage of urine and production of FMY is increased by 36%. Incidence of mastitis, indigestion, and acidosis is reduced. Expenditure on treatment is reduced by 75% and increase in fat content in milk by 12% and milk yield is increased by 16%.

15.4.6 : Presentation of innovative farmer in KVKs national conference held at PAU, Ludhiana 2012

A KVK contact farmer Mr. Kishore Tulshiram Kate, A/p- Kaewadi. Tal- Baramai. Dist- Pune has entered into supply chain of milk production to processing. He has developed his own brand called 'Shriram'. He has his own dairy farm of 12 buffaloes and a milk processing centre producing products like pasteurized milk, Ice cream, Choco bar etc. He gives employment to around 5400 man days per year. He is supplying milk products to the dealers and he is earning Rs.81,885/- per month. KVK has guided him for the entire production to supply chain. He has presented his inspiring work in national conference in 2012 at Ludhiana.

15.4.7 : A KVK contact farmer Mr. Pandurang Vabale was felicitated in the National conference on NICRA project held at ICAR New Delhi in 2013

The KVK is implementing the project sponsored by CRIDA on National Initiative on Climate Resilient Agriculture in the village Jalgaon K.P., where KVK established a Village Climate Risk Management Committee. The committee helps to KVK for decision making and implementation of the project

work. The ICAR has identified the chairman of this committee i.e. Mr. Pandurang Maruti Vabale for his best contribution in the project implementation and rewarded him for his work in the said national conference.

#### 15.4.8 : Presentation of innovative farmer Mr. Rajendra Gopal Jathar in the KVKs innovative farmers meet held at IIHR, Bangalore in 2013

Mr. Jathar has taken round the year production of melons by using innovative production methodologies like broad bed furrows with polythene mulching and drip irrigation technique. He has mechanized his farm with various farm machineries. He is regularly taking intercrops in the fruit crops

and in cereals. He has used drip irrigation and fertigation technology for his entire farm. He has presented his experiences in the KVKs innovative farmers meet held at Bangalore in 2013.



Innovative farmer Award to Mr. Jathar

## 16. SOCIO ECONOMIC IMPACT OF THE VARIOUS ACTIVITIES OF THE KVK

### 16.1 : Impact on Profitability, and Productivity enhancement of demonstrating farmers

With various activities of the KVK in the thrust area, there was considerable improvement in the profitability, productivity & sustainability of the production systems. With the enclosed examples this fact can be very well understood. The profitability enhancement was achieved by Reduction in cost of production by adoption of low cost technologies increasing in per acre production by adoption of latest technologies in agriculture making the farming more sustainable by managing the natural resources effectively & scientifically while attempting higher agricultural production. By efficient marketing systems or adopting more profitable production systems such as contract farming or seed production etc. The KVK left no stone unturned to help farmers earn more profit per unit area. Here are some examples to quote

#### 16.1.1 : In situ de composting of sugarcane trash

In sugarcane growing region out of total area; near about 30-40 % area is under ratoon crop. Up to 2005-06 farmers were burning sugarcane trash due to which 100% nutrients in the trash were burnt, nutrients from soil also lost. There were different reasons for burning trash i.e. it takes long time to decompose as its C : N ratio is so wide, not easy for inter cultivation practices in ratoon crop. By considering this issue, KVK intervened for management of sugarcane trash in 2005-06. There is 8-10 tons of trash is available for making use. From this trash 3-4 tons of good quality compost is obtained. In situ decomposition of trash technology was shown to farmers by KVK. First to narrow down the CN ration 80 kg urea and 100 kg Single super phosphate were used. After 15 to 20 days 10 kg decomposing culture were used. This enhanced the process of decomposition and

good quality compost was obtained within 3-4 months. Not only this but also the yield of ratoon crop also increased from 40 tons per acre to 45 tons per acre. By observing these results now farmers stopped burning trash and they are using it for decomposting in situ. As a result number of farmers started using decomposting culture.



Trash Management in Sugarcane

The data available with KVK shows 1.4 to 5.6 tons per year decomposting culture was used on 5000 hectares from 2007 to 2013. In the year 2012-13, the sale of decomposting culture is about 6198 kg which is utilized over 619.8 ha of area by 136 farmers. Please see annexure-I, table-5 for more information.

#### 16.1.2 :Use of wheat straw as animal feed

Wheat is one of the major crop grown in Pune district on 72,900 ha area. Much of the wheat straw was wasted by burning in the field or throwing away. KVK conducted training programs in number of villages in Baramati and adjoining tehsils about using wheat straw as animal feed. The programs resulted in increasing use of wheat straw as animal feed, because of which the wheat straw has now got recognition as animal feed.

Farmers' were previously burning it, now started feeding it to their animals or selling to cattle owners. Previously, the sorghum fodder was the only source of dry fodder for the animals because of which in condition of



Preperation of Animal feed  
by using Wheat straw

draught the price of fodder became two to three times the usual price. In such situation farmers had no other way than buying the higher priced fodder or selling their valuable animals at very low price. Use of wheat straw has changed this situation to some extent. Now Most of the farmers are using wheat straw for feeding their animals in summer season when there is shortage of green fodder and prices of conventionally used sorghum fodder are very high while some farmers are using it throughout year. By this way they are saving expenditure on fodder approximate Rs. 3400/- per animal when treated wheat straw is fed to animals for 04 months in a year.



Use of Wheat straw and  
Sorghum fodder for animal feed

In addition to saving in expenditure on fodder, farmers get additional income from increase in milk production and improvement in fat and SNF content of the milk produced by

the animal. Wheat straw after treatment with Urea, Jaggery, Mineral Mixture and Common salt. Now many farmers in the districts are using treated wheat straw to their animals. Please see annexure-I, table-6 for more information.

### 16.1.3 : Wide spread of RBN-13 hybrid Napier due to KVK demonstrations

With increasing number of cross breed milking animals there was a need to increase per acre fodder yield, therefore in 2006 to 2008 KVK demonstrated multi-cut perennial fodder variety RBN-13 released by MPKV, Rahuri. It contains low oxalate percent (1.9%) compared to RBN-9 & NB-21; RBN-9 & NB-21 is completely replaced by RBN-13 in Baramati & neighboring tehsils. RBN-13 is more succulent & gives higher yield per year when compared to all the major fodder crops. It gives good yield in saline soil & gives good response to nitrogenous fertilizers. Tillering is more. It gives 6-7 cuts per year & it is easy to multiply by sets.

Conventionally grown NB-21 & RBN-9 variety of hybrid Napier has been now completely replaced by RBN-13 variety in



Hybrid Napier : RBN - 13

this area. This is the impact of demonstration conducted by this KVK. Many cattle owners are cultivating RBN-13 on their field ranging from 0.10 ha to 0.40 ha. Annual fodder yield ranges from 200 to 250 tons per ha which is much higher than other fodder crops like Maize, Sorghum etc. As hybrid Napier is perennial crop the expenditure on seed and preparatory tillage are not necessary at least for three years from the planting. As no other fodder variety is yielding higher than this variety and also not having toxic effects on the animal body this variety is sustained in the area.

Table 31 : Adoption of RBN-13 by farmers

Year	No. Farmers Adopted the Cultivation of RBN-13	No. of set supplied from KVK	Area in acre
2006-07	45	22035	2.25
2007-08	34	47950	4.75
2008-09	66	113297	11.25
2009-2010	99	367475	36.7
2010-2011	99	491930	54.2
2011-2012	59	83200	8.3
2012-2013	60	98300	9.83
Total	462	1224187	127.28

Figure 16 : Area under RBN-13

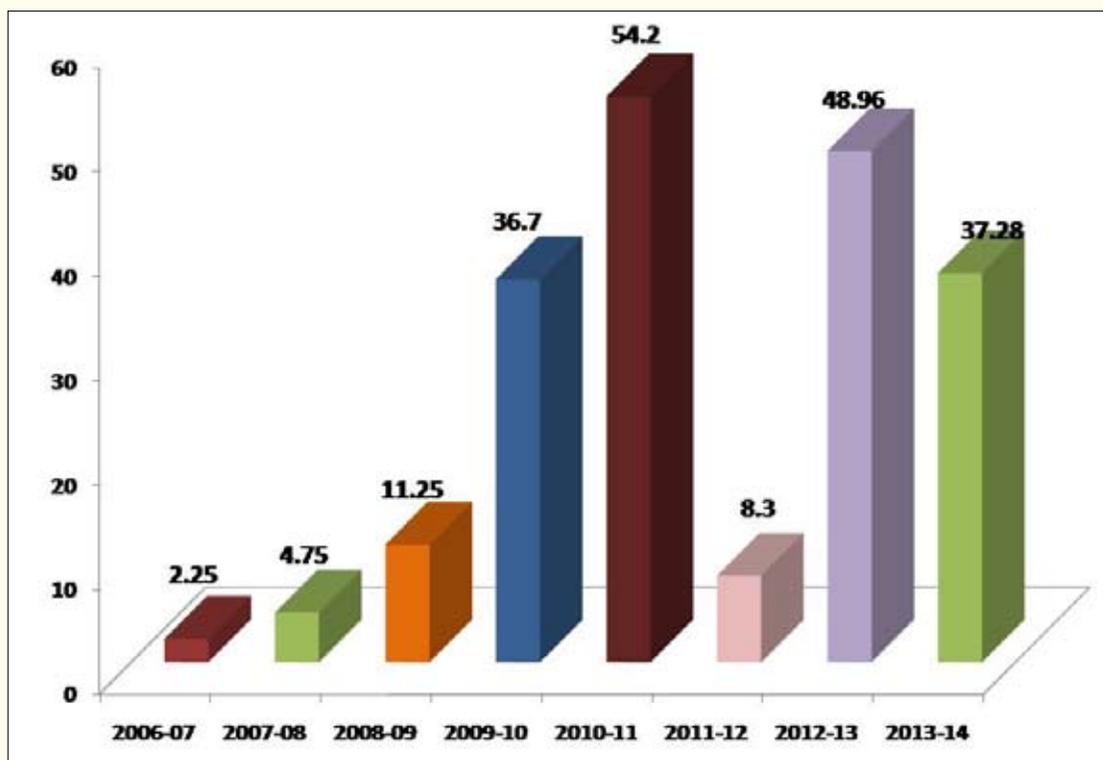
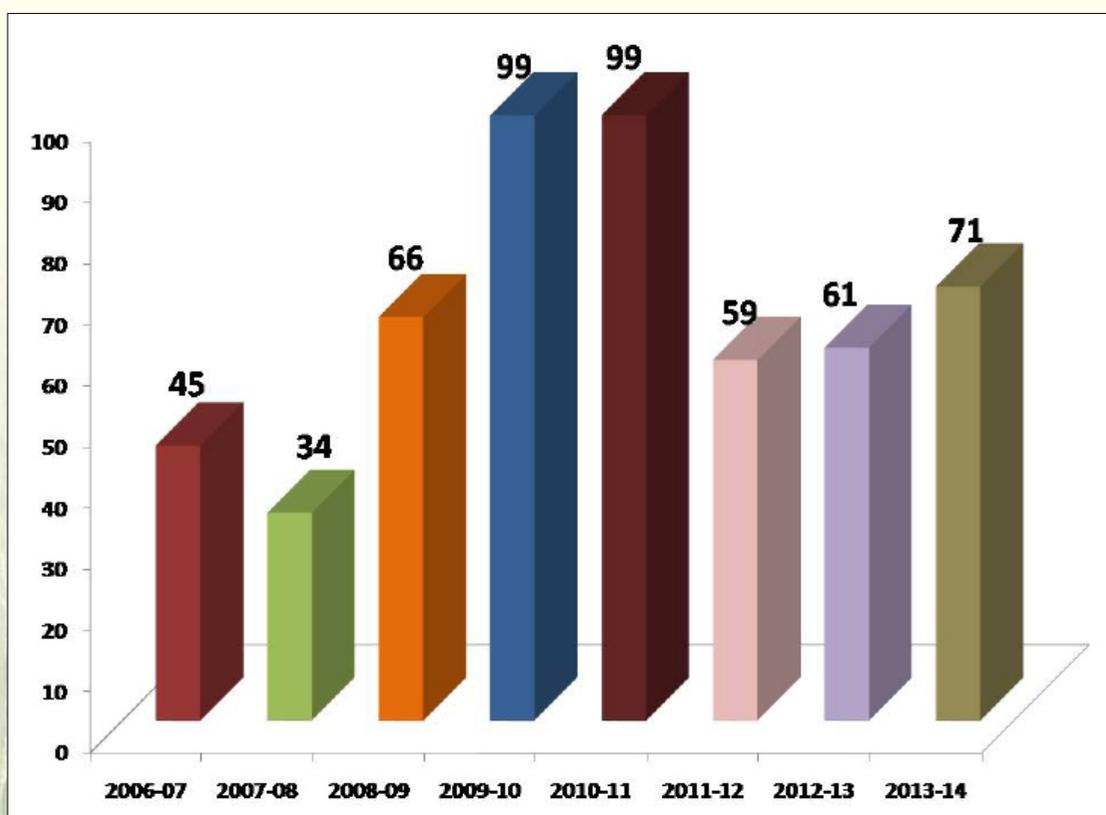


Figure 17 : Adoption of RBN-13 by farmers



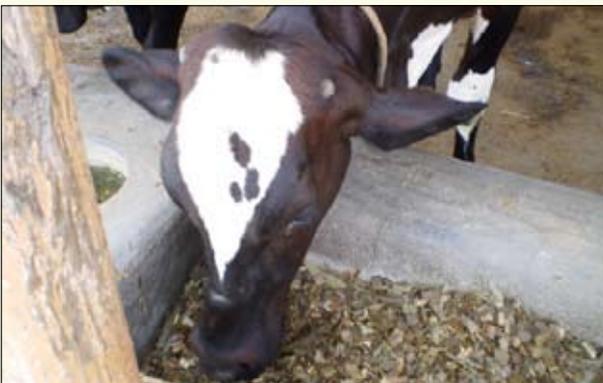
### 16.1.4 : Silage making

In rainy seasons many times in irrigated area different kind of fodder is available in considerably large quantity, for example sugarcane tops, maize etc. But in summer reverse situation occurs. Therefore to overcome this problem KVK demonstrated silage making technology from last few years.



Silage making

Due to efforts of KVK viz. demonstrations, trainings and study tours, now there are 26 silage units established by farmer in Pune. The silage can be given @ 20kg /animal / day for 100 days in summer season from February to May when availability of green fodder is scarce. Following are the results of demonstration conducted on silage making.



Silage feeding to animals

In control milk yield decreased by 1.3 liter per day per cow due to non availability of green fodder.

It is observed in the cow, to whom silage

was given that there is increase in milk by 0.5 liter per day per cow.

### 16.2 : Impact on diversification of agriculture

Diversification of agriculture was achieved in many ways in terms of crops grown, methods of cultivation (from open field cultivation to protected cultivation), from own root plantation to root stock grafting in case of Grapes, from rhizome plantation to tissue culture plantation in banana, from chemical pest management to Integrated Pest Management, from commercial grain production to seed production, from individual farming to contract/ cooperative farming & so on. Keeping in view the farmers needs, changing agricultural scenario, profitable, eco-friendly technologies were tested, refined, demonstrated & promoted. Here are some examples of how the diversification took place effectively due to KVK Intervention.

#### 16.2.1 : Cultivation of vegetables or flowers in green houses instead of open field cultivation

KVK conducted a number of trainings, exposure visits on this aspect to promote cultivation of flowers & vegetables in protected environment. Farmers were also made aware of various schemes by which they can avail the subsidies of National Horticulture Board, & Department of Agriculture etc.



Cultivation of Carnation in Green House

More than 48 farmers have started production under green houses & earn more than 70,000/- per crop per month in four tehsils of Pune districts i.e Baramati, Indapur, Daund, Purandhar. Farmers were also exposed to various marketing systems for crops grown in green houses. Initially, farmers constructed only 1 green house each over an area of 0.05 ha & after its success many of them have gone for second green house of their own. They are mainly growing gerbera, colored capsicum, roses & carnations in them. They are marketing the same in Mumbai, Delhi & other metro cities market. The KVK, through its own green house gave demonstrations to many farmers who visited KVK. In addition KVK arranged regular trainings of 5 days on green house management. Recently, NABARD has identified this KVK as center for training under green house for the beneficiaries of loans from various banks for green house. Till date, 12 farmers have constructed their own poly houses with availing the loan from various banks. They have cultivated vegetables like colored capsicum and flowers like gerbera in their poly houses and are making good profit from it.

### 16.2.2 :Use of polythene mulching in tomato

- Yield revolution by polythene mulching : After identification of the problems in tomato cultivation, Krishi Vigyan Kendra Baramati decided to demonstrate polythene mulching technology on farmer's field. 30 innovative farmers were selected for this demonstration
- Following results are obtained from these demonstrations- The first picking of the fruits was started after 66 days in both the plots. Average total duration of harvesting of fruit were 124 days in demonstration whereas 96 days for control. The total duration of crop was 190 days for demonstration and that of 164 days for

control. The average number of pickings was 21 in demonstration plot whereas it was 16 in control plot.



Cultivation of Tomato on Polymulch

- The per acre average yield of demonstration plot was 356.10 quintal and that of control plot was 287.70 quintal. The average yield was increased in the demonstration plot by 68.40 (24.02%) quintal per acre over the control plot.
- Average yield of A grade tomatoes is increased by 22.65 percent over control. The average yield of B and C grade fruits in demonstration plots was decreased by 15.76 percent and 6.88 percent respectively over the control.
- The gross income obtained from demonstration plot is Rs. 3,09,834 per acre whereas in control plot it is Rs. 2,04,593. Thus, from above experiment it was observed that there is increase in net profit of Rs. 1,03,029 per acre over control due to application of polythene mulch technology in tomato. C:B ratio in demonstration plot is 1:2.50 whereas in control plot it was 1:1.68.
- Due to this intervention now a day many farmers from this area are adopting this technology not only in tomato but also in other vegetables like Capsicum, Brinjal, and Cucurbits etc. Presently, this technology is adopted on more than 300

acres of area.

- Before KVK intervention, farmers do not get easily polythene mulch film but now days there are more than 5 dealers who supply polythene mulch film at tehsil level.

### 16.3 : Impact on livelihood security of the farmers

#### 16.3.1 Livelihood security for rural poor women by back yard poultry

Under the Women Empowerment Programme of KVK, trainings and demonstrations of Vanaraja breed of poultry birds were conducted for the backyard poultry farming. Impact of these trainings and demonstrations is that now 883 women farmers in 95 villages in Pune district started backyard poultry units with Vanaraja poultry breed. Sale of eggs laid by the birds and sale of male birds for Meat purpose is the main source of income.



Back yard Poultry for Livelihood security

These birds lay 170 to 180 eggs in a year while desi birds lay 60 to 70 eggs only. Growth rate of these birds is also quiet higher than desi birds. Average annual income of a woman was approximately Rs. 240/- per year per local birds, which has increased to Rs. 680/- by rearing these Vanaraja birds. Net additional annual income is Rs. 440/- per year per bird as compared to local bird, which is at negligible additional cost. Looking at the performance of the birds under demonstration many women are now purchasing these birds from KVK.

Since 2011 KVK started to sale the pedigree month old chicks of Vanaraja to the farmers. In 2013 KVK started a small scale hatchery unit for the production of chick and its availability to the farmers at low cost.



Small Scale Hatchery Unit for Back yard Poultry at KVK

Table 32 : Sale of Vanaraja back yard poultry birds and impact

Sr. no.	Year	No of Blocks covered	No. of villages covered	No. of birds supplied by KVK	No. of Women Benefited
1	2010-2011	4	16	2904	117
2	2011-2012	4	21	4596	153
3	2012-2013	5	26	13737	242
4	2013-2014	6	32	19508	371
Total			95	40745	883

### 16.3.2 : Impact on livelihood security by KVK's work with regards to dairy development

KVK identified 6 rainfed villages in Baramati where PRA revealed that the farmers had very low income from agriculture, as the land holding was small, water was scarce; there were no employment avenues to rural youth in agriculture & other areas. But at the same time due to local milk processing plant guaranteed market was available to milk. There were many landless laborers for whom the only source of income was wages from working on farms other than their own. The seasonality of availability of work revealed that they did not get adequate work in summer due to drought.



Dairy Development for livelihood security

It was thus thought that dairy farming could be the main source of income generation for the poor farmers for whom the resources were extremely meager. KVK made collaborative efforts with the Local cooperative Milk union & the Local processing unit so as to train the farmers & the women. Important topics were identified based on the problems faced by the farmers & their needs, Weekly trainings were arranged. The women were promoted to establish their own dairy society under the central governments scheme. Also, Demonstration on fodder production, identification of diseases like mastitis, etc, Exposure visits, etc were planned and executed for women who were eager to do dairy business. The local credit society & nationalized banks were requested to lend the women loan for purchase of cows. The women members of the society were trained on maintenance & importance of Self Help Groups. They formed SHG in villages & forwarded loans to many more women. Impact assessment reveals positive changes in the milk yield & reproductive parameters as well as many socio economic parameters as given below.

Table 33 : Impact of women dairy society in six villages of Baramati on reproductive parameters of dairy animals

Sr. no.	Parameters studied	Before establishment of dairy society	After establishment of dairy society	Impact	
				Increased	Decreased
1	Age at first heat	19 months	17 months	-	2 month
2	Lactation yield	2756 lits.	2929 lits.	173 lits.	-
3	Time taken to reach the peak yield	21 days	24 days	3 days	-
4	Total lactation period	332 days	317 days	-	15 days
5	Dry period	75 days	66 days	-	9 days
6	Inter-calving period	408 days	372 days	-	36 days
7	Birth weight of the calf	24.5 Kg	28 Kg	3.5 kg	-
8	Repeat breeding %	11%	6.5%	4.5 %	-

Table 34 : Impact of women dairy societies on parameters related to dairy farming

Changes due to establishment of women dairy society in parameters related to dairy farming	Total change in 6 selected villages	Average change in 6 selected villages
Increase in total milk yield in the villages/year (in liters)	6,10,048	1,01,674
Increase in total village cross bred milk animals (in no.)	261	43.50
Increase in cows population/family (in no.)	-	0.78
Increase in total families in dairy business (in no.)	89	14.83
Increase in no. of landless dependent on dairy (in no.)	74	12.33
Increase in number of rural youth in dairy (in no.)	63	10.5
Increase in area under fodder crops (ha)	154.5	25.75
Reduction in mortality in animals due to diseases. (%)	-	0.52%
Reduction in disease incidences FMD, HS,BQ (%)	-	7.6%
Loan amount provided by dairy society to members (in Rs)	11,70,000	1,95,000

Table 35 : Changes in income and expenditure pattern of women before and after establishment of women cooperative dairy society

Variables	Before formation of dairy ( 1995)	After formation of dairy 2003
Family size	M 3+F3+ C4	M 1+F2+ C2
Land holding	8ha	3ha
House type	Tin/wood roof with soil block walls	Tin/ slab with cement walls
Income from agriculture	Rs .25000	Rs.40000
Income from livestock	Rs. 20000	Rs. 55000
Expenditure pattern	-	-
Agriculture	Rs.6000	Rs.10000
Food	Rs.25000	Rs.27000
clothing	Rs.3000	Rs.5000
Education	Rs.300	Rs. 1200
Medicine	Rs.4000	Rs.5000
Electricity	Rs.1500	Rs.2400

Variables	Before formation of dairy ( 1995)	After formation of dairy 2003
Telephone	-	Rs.2000
Travel/petrol/ miscellaneous	Rs.9000	Rs.18000
House	Rs.25000	Rs.85000
TV/phone	-	Rs.12000
Car/ motorcycle/ Bicycle	Rs.1500	Rs.40000
Freeze	-	Rs.10000
LIC/Fix deposits/ Account	Rs.5000	Rs.20000
Jewelry	Rs.20000	Rs.30000
Debts	-	Rs.25000
Crises Management	Rs.5000	Rs.5000
Total	Rs.1,50,300	Rs.3,92,600

## 16.4 : Impact on creation of job opportunities

The vocational training conducted by the KVK has been very instrumental in creation of job opportunities in the area, mainly in case of nursery, Para veterinarians. The nursery trained boys on completion of the programme get lucrative job opportunities very easily as there has been great shortage of trained skilled manpower in the field of landscaping, house management, drip irrigation and maintenance, grafting etc.

### 16.4.1 : Job opportunities by self employment to Para veterinary trainees

Looking at the potential of development of dairy sector and employment generation, KVK started a course to train the unemployed youths as Artificial Inseminators and Para-veterinarians, so that they could provide the door to door services for the cattle owners in and around their native villages. Thus cattle owners would get the services at their door, which may lessen their losses in respect of money as well as time, and unemployed youths could be employed in their own villages. The impact of this course is very promising. Many youths are self employed and others are in government or private jobs. Some of them were contacted randomly to obtain following information.



Training to Para veterinarians

Most of the youths, which have completed this training course from this KVK, are self employed or employed within two to four month of completing the training. Their average monthly income is approximately Rs. 6000-15000/-.



Job opportunities by self employment to Para veterinary trainees

Most of them were from economically poor families, now living standard of the family is improved. Most of them having landline as well as mobile phones, television, motorcycle etc. in their home. Most of them are having savings as life insurance or bank deposits. These youths are providing Artificial Insemination and Para veterinary services at doorstep to the farmers in and around their own villages.

### 16.4.2 : Job opportunities to rural youth under nursery activity

KVK has been regularly conducting nursery management trainings for school dropout boys. The trainings always receive good response. This is mainly because land scapers private nurseries immediately hire the trained boys, as skilled manpower in this area is rare. Many companies approach our KVK for their recruitment requirements of such manpower. The boys immediately start earning Rs 4000- Rs 10,000/- per month. Due to this the demand for the training from the school dropouts increased so much that KVK

thereafter started charging around Rs.2500/- for a period of 6 months from the trainees.



### Practical Training on Nursery Management

Now trainees not only within the district but also outside district participate in our trainings. Few of them initially worked in private companies & after getting enough experience left the job & entered into their own business of nursery. They now have hired few more labour to work for them as grafts makers. They serve various nurseries on contractual basis & earn around Rs.10,000-25,000/- per month in season. The KVK provides placement guidance to trainees on completion of the training. Keeping the KVK's performance in view the national horticulture mission has sanctioned 8 programmes under human resource development to KVK for gardener's training.

Table 36 : Impact of Nursery management trainings for dropout boys

Particulars	Number of students
No. of students trained (2003-12)	234
Nursery business	6
Landscaping business	8
Job in private companies	77
Students opted for higher education	183
Total no of students employed	274

## 16.5 : Impact on skill development of farmers

Taking the benefits of the KVK activities farmers could upgrade their knowledge & skill in terms of fertigation, implement's use & maintenance, pest management, reclamation of soil, vermi composting, vaccination & first aid in animals, poultry management, sericulture & so on.

### 16.5.1 : Skill development on use of skirting bags in Banana

- Farming practices : Before the intervention the quality of Banana bunches are affected by disease and pest, radiations, dust and rain etc. Due to inferior quality in terms of shinning of the fruits they were getting low price in market.
- KVK intervention : KVK have demonstrated use of skirting bags of 40 and 80 micron thickness in Banana which resulted into production of good quality bunches.



### Use of Skirting Bags in Banana for improving quality

- Economics of skirting bags : If we use skirting bag of thickness 80 micron it cost Rs. 7.30 per bag. The total cost incurred for 80 micron skirting bag for an acre of area is Rs.9000. This bag can be used three times, so the cost for first year will be Rs.3000.If we use skirting bag of 40 micron it will cost Rs. 3.60 per bag. The total cost incurred for 40 micron skirting bag for an

acre of area is Rs.4300. This bag can be used two times, so the cost for first year will be Rs.2150. The average additional income obtained in demonstration plot is Rs.19,358.64 per It is recorded that the C:B ratio of control plot is 1: 1.76 whereas in demonstration plot it is 1: 1.88 and 1: 1.89; for 80 micron and 40 micron bags respectively.

- Impact : we conducted impact analysis study of randomly selected 75 Banana growers, we have found following results.-
- Regarding advantages of using skirting bags in banana most of farmers ( above 80%) reported that before use of skirting bags they get banana containing black spot & dust which decreases its market value. Also attack of pest & diseases is high. But after use of skirting bags they get spotless, dustless banana of yellowish green color so they get additional market price (i.e. Rs.0.6130/- per Kg) as compared to control. Also attack of pest & disease is low & bunches were protected from sun radiation.
- It is observed that use of skirting bags does not increase yield rather it increases its quality which is a key factor to obtain good price in market. This technology is being used over more than 350 acres of area.

## 16.6 : Impact on entrepreneurship development

KVK through its vocational long duration trainings motivated rural youth for starting of their own enterprise there by making them self-reliant.

### 16.6.1 : Entrepreneurship by poultry farming

Training on Commercial Broiler Production

is regularly conducted in KVK keeping in view enterprise development and employment potential. Till date many unemployed youths have been trained under this training & have started their own poultry business .These youths are rearing 2000 to 6000 broilers in a batch and 5 to 6 batches in a year. Many of them have entered in contract farming with one or other poultry farming company for assured marketing of the birds while others are doing their own marketing. Feed conversion ratio in their poultry farm at the time of sale is maintained between 1.75 to 02.00 and mortality in birds is maintained between 02.00 to 07.00% which are indicative of good management practices followed, which has become possible because of training at this KVK. Annual income of these youths from their poultry unit ranges from Rs. 90,000/- to Rs. 1,74,000/- which has increased living standard of their family.

### 16.6.2 : Entrepreneurship in the field of modern dairy farm management

Since last few years we are organizing Interstate training program for candidates from other state. The candidates attending to this training are from various fields and looking for the practical information to start their dairy farm. KVK is attempting to teach them practically by using all the resources available at KVK like modern loose housing type dairy farm, cultivation of various fodder



Modern Loose Housing type Dairy Farm



crops, milking machine, milk processing, homogenization and pasteurization unit etc. It is therefore most of the candidates start their own dairy farm after having training from KVK. It can be revealed from following data-

It can be said from above data that in 4 years 606 participant took part in training and out of them 65 (10 %) participants started their dairy farm. This is a cost intensive activity and therefore even when only 10% participants have started the enterprise of dairy farming, it is already a good achievement.

Table-37 : Details of the interstate training programmes on dairy farm management

Year	No. of programmes	No. of states	No. of participants	No. of dairy units started
2010	6	09	177	18
2011	6	11	203	22
2012	4	14	116	14
2013	5	13	110	11
Total	21	47	606	65

### 17 : DIGNITARIES VISIT TO KVK

Dignitaries at National & International level have visited Krishi Vigyan Kendra & appreciated activities of the KVK which are given in the table below.

Table 38 : List of dignitaries visit to KVK

Sr. No.	Date	Name of visitors
1	10/03/1998	Dr. L. P. Kamble, Director of Extension Education, MPKV Rahuri
2	15/05/1999	Dr. B. S. Hansra, Assistant Director General (Agril. Extension) ICAR ,New Delhi
3	12/12/2000	Dr. S. D. Shikhamani, Director ,National Research Centre for Grape, Pune
4	26/12/2001	Dr. Kirti Singh, Secretary National Academy of Agricultural Sciences, New Delhi
5	01/01/2003	Dr. Sudhir Kumar Goel, Commissioner Agriculture, M.S.
6	01/09/2004	Neerja Rajkumar, Jr. Scientist, DAHD, Min. of Agriculture, GOI, New Delhi
7	10/11/2004	Mangala Rai, Director General, ICAR, New Delhi
8	06/05/2005	Mr. Balasaheb Thorat, Min. of Agriculture ,Govt. of Maharashtra
9	07/05/2005	Dr. Iresh Swami, Vice-Chancellor Solapur University Solapur.
10	11/09/2005	Dr. A. P. Singh, M.O.S. (Agri. Food) Govt Of India
11	10/03/2006	Mr. Montek Singh, Ahluwalia, Deputy Chairman, Planning Commission of India
12	02/06/2006	Mr. Narendra Singh, Agril. Minister, Bihar
13	24/08/2006	Dr. Gurbachan Singh, Director, CSSRI, Karnal
14	31/12/2006	Mr. Prakash Amate & Mrs. Mandakini Amate, (Social Worker) Hemalkasa
15	25/03/2007	Dr. R. Parsgad, ADG (Ag. Extn.) ICAR
16	01/08/2007	Prof. M. R. Sharma, Chief Consultant NHM. Govt.of India ,Krishi Bhavan, New Delhi
17	19/12/2007	Prof. R. K. Pathak, Chief Consultant NHM. Govt.of India, Krishi Bhavan, New Delhi

Sr. No.	Date	Name of visitors
18	02/07/2008	Dr. J. S. Samra, CEO, NRAA, NASC, Pusa, New Delhi
19	17/11/2008	Dr. A. Alam, VC, SKUABT-K Shalimar, Srinagar (J&K)
20	27/12/2008	Dr. B. P. Bandgar, Vice Chancellor, Solapur University, Solapur
21	30/08/2009	Dr. K. D. Kokate, DDG (Agri. Extn.) ICAR, New Delhi
22	24/09/2010	Dr. D. G. Bakwad, Director of Horticulture, Govt. of Maharashtra
23	08/05/2011	Mr. Eknath Dhavale, Commissioner Animal Husbandry, Govt. of Maharashtra
24	22/09/2011	Dr. V. S. Korikanthimath, Former Director, Dharwad, Karnataka
25	23/09/2011	Dr. S. Ayyapan, DG, ICAR, New Delhi
26	18/02/2012	Ms. Sudha Kshatraya, High Commission Canada
27	03/04/2012	Dr. Rani Sinh, Ex. Minister Technical Education Govt. UP
28	31/12/2012	Mr. Chandra Shekhar Sahu, Min. of Agriculture, Govt. Of Chhattisgarh
29	11/02/2013	Mr. M. V. Ashok, CGM, NABARD, Pune
30	12/10/2013	Dr. H. Rahman, Director, PD-ADMAS Bangalore
31	27/11/2013	Mr. Telly Cain, Progressive farmer of USA

## *Glimpses*





## 18. OUTPUT & OUTCOME AGAINST EACH OF THE MANDATED ACTIVITIES OF THE KVK

- a. Assessment & refinement of technologies to address the location specificity, Front line demonstrations to harvest the fullest production potential of a crop, vocational trainings for farmers & rural youth and trainings on advances in agriculture and allied sectors for extension personnel of line department and other institutes are the mandates of the KVK. Since inception, for past 20 years the KVK has been taking up various activities in pursuit of these mandates.
- b. Due to the persistent efforts of the KVK various positive changes have been visible in the area's farming systems, cropping patterns, cultivation practices, productivity and profitability, livelihood security, employment generation, skill up-gradation etc. These changes can be listed looking at the bigger picture to mention the output & outcome of the mandated activities.

### 17.1 : Output of the Kvk's Activities

- a. Large scale awareness and adoption of use of high yielding varieties mainly in Sugarcane, wheat, soybean, Red gram, Bengal gram, Groundnut, Jowar, fruit crops and several other fodder varieties. This resulted in higher productivity per unit area, reduced the cost of production and increased the net profits per acre for the farmers.
- b. Having realized the production potentials of various new varieties farmers got into production of seed of these varieties at farmer's fields to cater to the local need and to solve the problem of non-availability of seed. This raised the profitability of the seed producing farmers. For other farmers, the seed was available at their village level.
- c. The seed replacement ratio increased considerably due to the above activity.
- d. To endorse the above three points please find below the quantitative data for seed production and sale in last few years that justifies the large scale adoption of improved high yielding varieties and also the village level seed production and seed replacement
- e. Farmers became more prone to acceptance of technology even when it was cost intensive due to persisting activities of KVKs. Therefore in the area of operation of this KVK large scale adoption of Drip irrigation, use of poly-houses and shade houses, Tissue culture plantation in banana, skirting bag technology in banana, farm pond techniques, Polythene mulching meadow orchard techniques etc got quite popular & used by many farmers.
- f. Large scale acceptance of soil testing and use of balanced fertilizers based on soil test reports, targeted yield approach is taken by many farmers in the area for various crops such as sugarcane, Banana, pomegranate, grapes etc.
- g. Awareness about deteriorating soil health and measures to improve the soil health have been widely accepted and adopted. Many farmers instead of burning of the sugarcane trash & wheat straw, now use it as biomass, take green manuring crops, use sub soiler, use other organic manures as cow dung is not available in adequate quantities, use acidic fertilizers, adopt fertigation techniques and keep track of the soil pH.



- h. Awareness & adoption of integrated nutrient management has also increased substantially.
- i. The above point no 4 to 7 can be justified by the data available on soil and water testing service of KVK in last 5 years-
- j. Many farmers have reduced the use of chemical insecticides and pesticides. They have started using the bio-pesticides such as Trichoderma or other non-chemical way of pest management such as use of pheromone traps. In the area of operation of this KVK such techniques are used more in Brinjal, Red gram, Bengal gram, vegetable crops, pomegranate etc.
- k. Use of bio-fertilizers has increased substantially over a large area due to awareness creation done by KVK. Farmers use bio-fertilizers in all crops and also to decompose farm waste.
- l. The data available on sale of bio fertilizers, bio pesticides and pheromone traps shows that the impact of awareness creation activities of KVK
- m. Diversification to various enterprises and non-traditional crops and cultivation practices was promoted by KVK and well adopted by farmers. Many farmers in the area are now engaged in Sericulture and broiler farming which were never the traditional enterprises of the area. Non-traditional crops that were very well accepted by farmers were Cassava, Turmeric,
- n. Traditional enterprises such as Dairy farming and goat keeping became more scientifically operated. Farmers now use mineral mixture, dip cup for prevention of mastitis, milk high yielding cows three times a day, adopt loose housing systems,

have gone for milk processing & marketing, use wheat straw as animal feed, chaff the fodder, use de worming etc.

## 17.2 Outcome of the KVK Activities

As outcome of the KVK activities we can say, changes in attitude, skills and knowledge of farmers have brought in sustainability, employability and livelihood security.

- a. Farmers' attitude and skills changed, they learnt to work as a group to solve problems many farmers' groups became very active in production and marketing,
- b. Farmers became ready to contribute financially for good learning activities. They now pay even thousands of rupees to participate in activities and do not wait for government subsidies.
- c. The eagerness to learn and experiment with new technologies, participate in learning activities increased considerably.
- d. The farmers do not follow a suggestion blindly anymore, and want to know why they are using a technology in their fields and how it is beneficial to them.
- e. More jobs and self-employment created in the area due to newer enterprises
- f. Livelihood security raised due to better production and lowering the costs in farming
- g. Sustainability of the farming raised & no suicide incidences happened in the area.
- h. Farmers became more innovative to find solutions to their problems and are ready to share them with each other
- i. Women Empowerment through household enterprises such as dairy and backyard poultry

## 19. SOME IMPORTANT PUBLICATIONS OF KVK BARAMATI

S.N.	Name of Publication	Type
1	Infrastructure and administrative information broacher of KVK, Baramati.	Folder
2	Information on various activities of KVK, Baramati.	Leaflet
3	Improved cultivation practices for Custard apple	Leaflet
4	Improved cultivation practices for Kagzi Lime	Leaflet
5	Improved cultivation practices for Tomato	Folder
6	Management of flower and fruit drop in Mango	Leaflet
7	National Initiative on Climate Resilience Agriculture	Leaflet
8	Urea treatment on wheat straw	Leaflet
9	Improved technology of fodder production	Leaflet
10	Silage production technology	Leaflet
11	Project on Hygienic milk production	Leaflet

S.N.	Name of Publication	Type
12	Integrated pest and disease management in Citrus	Leaflet
13	Integrated pest and disease management in Fig	Leaflet
14	Management of bacterial blight in Pomegranate	Leaflet
15	Biological agent for pest and disease management	Leaflet
16	Sugarcane production technology	Leaflet
17	Control of Oily spot in Pomegranate	Poster
18	Support and Services available with KVK Baramati	Poster
19	Planting of Sugarcane by seedling	Leaflet
20	Onion production technology	Leaflet
21	Modern wheat cultivation technology	Leaflet

## 20. VISION 2025

The present era is of globalization and farmers will have different needs in respect to agriculture technologies, market and credit. The cropping pattern and farming methods will change according to the consumers need and changing climate. The support from KVK to the famers in respect to the technologies and knowledge may be modified to a higher level. To be ready to the coming globalization in respect to agriculture KVK has decided to work and strengthen itself in the following areas.

- To have the international collaborations for sharing the ideas and technologies and opt them for the Indian farmers for easy implementation. Presently KVK has started to collaborate with the various companies from The Netherlands and Israel.
- To establish international agricultural excellence center for the technology transfer through training and exposure to the farmers to the international level.
- To be the leading agricultural information data hub
- To provide genuine services of input and consultancy in dairy, poultry, horticulture, farm mechanization etc. to the farmers in a professional manner.
- The introduction of the technologies according to the farmers need may include satellite guided fertilization, newer bio pesticides, farm automation through various agricultural machineries etc.
- To provide the services regarding post harvest management, marketing and export.

# Glimpses





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