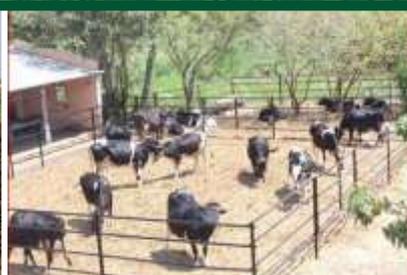


Technological Interventions of KVK, Baramati for Sustainable Production in Agriculture



AGRICULTURAL DEVELOPMENT TRUST'S
KRISHI VIGYAN KENDRA, BARAMATI

At.Po.-Malegaon Khurd, Tal. Baramati,
Dist. Pune- 413 115



Glimpses

Inauguration of New Facilities of KVK, Baramati



Glimpses





Agricultural Development Trust's
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KRISHI VIGYAN KENDRA, BARAMATI

1. INTRODUCTION

Salient Features of Pune District

1.1 Geographical Location & Extent

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

1.2 Population

The total population as per the census in 2011 of the district is 94.26 lakh with a population density of 603 per sq. km. 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. This indicates that 28.36 per cent of the population is in the labor force. Out of the total workforce, 45.38 per cent 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 per cent 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 & 1.5 per cent of the workforce is engaged in dairy & cottage industries, respectively.

1.3 Agro Climatic Zones

Further, fine classification based on five soil types and four rainfall zones; differentiate the district into 6 major eco-units.

Table-1: Agro Climatic Zones of Pune District

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

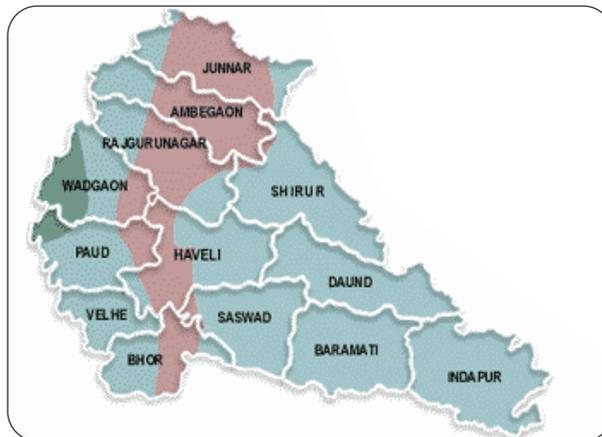


Figure 1 : Agro Climatic Zones of Pune

1.4 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 mentioned in above table.

1.5 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

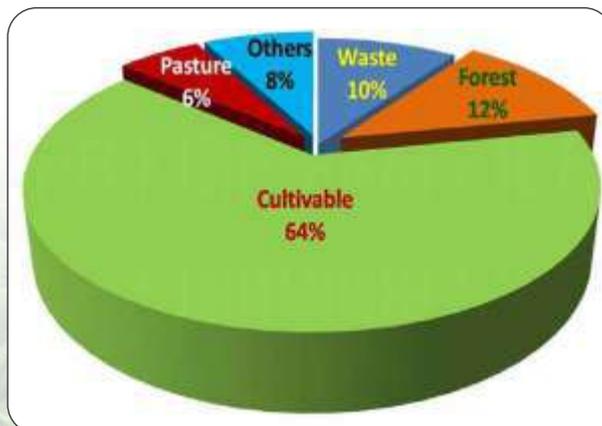


Figure 2 : The land distribution pattern of Pune District

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 is sown more than once and cropping intensity is 116%.

1.6 Size of Operational Land Holding

As per agricultural census statistics, the 8,64,26,829 land holders hold 11,51,128 ha of land. Of this 29,897 land holders hold 55,894 ha belong to Scheduled Cast and 19,321 land holders holding 53,157 ha 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 is 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. They hold 18.85% of the total cultivable land.

1.7 Cropping pattern

Total area under cultivation in the district is 10.05 lakh ha which constituted above 64% of the total land in

Table 2 : Area, Production and Productivity of Major Crops Cultivated in Pune District

Crop	Area in "00" ha	Production in"00" metric tonnes	Productivity (qt /ha)
Cereals, pulses and oilseeds			
Bajara	360	167	4.65
Kharif Sorghum	40	34	8.54
Rabi Sorghum	1,771	870	4.91
Kharif Maize	95	233	24.52
Rabi Maize	152	419	27.65
Summer Maize	5	9	16.83
Rice	776	1,062	13.68
Wheat	530	938	17.70
Sugarcane	1,377	1,38,884	101.00
Groundnut	446	433	23.42
Soybean	42	81	19.35
Sunflower	21	9	4.29
Red Gram	378	270	7.13
Oilseeds	561	536	9.55
Other Cereals	14	5	3.50
Other Pulses	63	25	4.00
Fruit			
Mango	736	4,100	55.70
Pomegranate	1,142	10,526	92.20
Sapota	252	1,776	70.40
Guava	916	9,073	99.00
Grapes	1,149	16,850	146.70
Banana	2,588	1,26,816	490.00
Vegetables			
Tomato	5,055	77,847	154.00
Brinjal	1,853	28,647	154.60
Onion	24,445	3,53,468	144.60
Chilli	3,936	15,941	40.50
Leafy Vegetables	2,206	11,446	135.40
Bulb Crops	7,083	78,447	616.30
Guards	115	1,079	72.60
Beans	2,568	9,848	156.10
Other Spices	9,812	87,876	89.50

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% by oilseeds and the balance 9% is under sugarcane. Paddy is the major *Kharif* crop occupying 77,600 ha followed by bajra with 36,000 ha and *Kharif* Jowar (4,000 ha). Red grams, Green gram, Black gram, Matki, Kulthi are the major pulse crops occupying an area of about 6,300 ha. Groundnut is major oilseed crop occupying 44,600 ha area of the total *Kharif* oilseeds. The eastern tehsils get more of its rainfall in August and September and so they are sown in *Rabi*. 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 37,800 ha.

Mango, pomegranate, sapota, guava, grape and banana are major fruit crops of the district. Tomato, brinjal, onion, chilli, cabbage, cauliflower, ginger, garlic are amongst other prominent vegetables.

1.8 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 3 : Soil Types and Characteristics of Pune Districts

Sr. No.	Soil type	Classification of Soils of Pune district depending on Agro Climatic Zones	Area in ha.
1	Shallow soils	Depth 0-30 cm, low fertility status, poor water holding capacity, well drained	10,04,288
2	Coarse shallow land	Depth 30-60 cm, low fertility status, poor water holding capacity, well drained	2,27,000
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	2,06,000
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, montmorellinite clay content is high	86,000
5	Laterite and lateritic soil	Fe and Al oxides content is high, low Ca content, Keolinite Mineral content is high	1,19,000
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	4,59,000
7	Problematic area	High pH more than 8.5, high sodium, high EC and SAR, poor drainage	29,125
8	Calcareous soils	CaCO ₃ per cent > 15%, low Fe, Mn, Zn content	32,827

1.9 Major farming systems/ enterprises (based on the analysis made by the KVK)

Table 4 : Farming Systems

Sr. 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, back yard poultry, goatary
2	Semi Arid Rain fed farming system	Very low rainfall, plain topography coarse cereals, protected irrigated cereals, legumes, custard apple, fig, livestock, back yard poultry, goatary
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
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 <i>Rabi</i> jowar, spices, vegetables

2. KRISHI VIGYAN KENDRA, BARAMATI

Krishi Vigyan Kendra, Baramati was established on 1st August 1992 under the affiliation to Indian Council of Agricultural Research, New Delhi. From 1992 to 2008, the operational area of KVK was whole Pune district, but after the establishment of another KVK in the Pune district, the operational area is reduced to the 7 tehsils of Pune district.

Krishi Vigyan Kendra, Baramati is Model, Hi-tech & National Award winning KVK of India working for farming community since 22 years for the development of sustainable agriculture.

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.

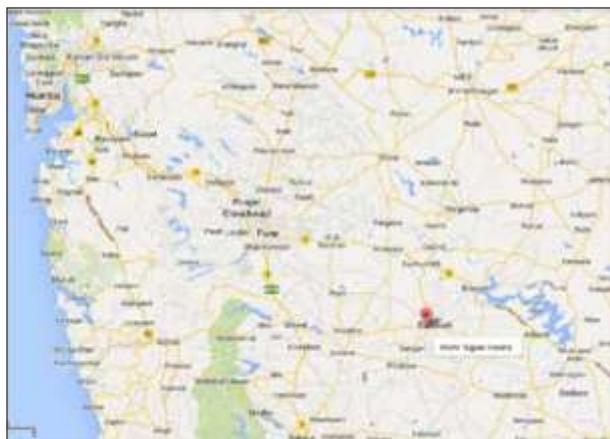


Figure 3 : Map Showing location of KVK

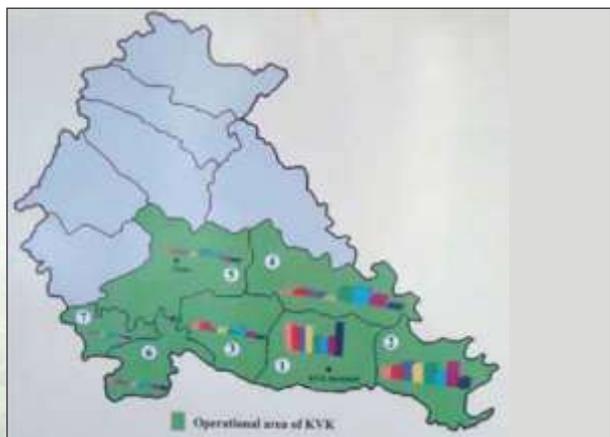


Figure 4 : Map showing operational area of KVK

Vision of KVK:

The vision of the KVK is to be the leading resource and knowledge centre of agricultural technology for the upliftment of the farming community.

Mission of KVK:

The mission is to deliver demand driven agricultural products and services by qualified professionals.

Infrastructure facilities of KVK :

This Kendra & host institute farm is situated at 6 kilometer West to the Baramati. This center has an area of 20 ha of land required for the technology demonstration while 24 ha belong to host institute. From this total 44 ha land, the total land under cultivation & demonstration is 30.03 ha, dairy 1.6 ha, nursery 1.4 ha, poly house 0.40 ha, KVK & host institute buildings has occupied 3.4 ha, well & water storage tanks 2.4 ha & roads 4.77 ha of land. The demonstration farm is used for the on farm testing of new technologies. 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 settlings.

New facilities of Krishi Vigyan Kendra, Baramati was inaugurated by Hon. President of India on 19th January 2014 in the presence of the then Chief Minister of Maharashtra, Union Minister of Agriculture & other dignitaries. The new facilities added are given below.



1. New Administrative Building



2. Agricultural Technology Information Centre (ATIC)



6. Nursery



3. Conference Hall



7. Wind & Solar Hybrid System for Generating Electricity



4. Audio Visual Training Halls & Auditorium



8. Plant Health Clinic & Bio Control Laboratory
(An ISO 9001:2008 Certified Unit)



5. Demonstration Plots



9. Soil, Water, Leaf & Petiole Testing Laboratory



10. Hi-Tech Green house & Poly houses



14. Automated Fertigation Unit



11. Grading & Packing Unit for Fruits & Vegetables



15. Farmers Hostel



12. Apiary Unit



16. Dairy Unit



13. Water Storage Tanks with Solar Pump



17. Poultry & Hatchery Unit



18. Silage Demonstration Unit



19. Goaty & Sheep Unit



20. Integrated Poultry & Fish Farming Unit

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.

The Mandate of the KVK is TECHNO-LOGY ASSESSMENT, REFINEMENT & DEMONSTRATION –

The specific activities carried out by KVK as per mandate are :

- On-farm testing to identify the location specificity of agricultural technologies under various farming systems
- Organizing frontline demonstrations to establish its production potentials of various technologies on the farmers' fields
- Conducting need based training of farmers to update their knowledge and skills in modern agricultural technologies
- Conducting training of extension personnel to orient

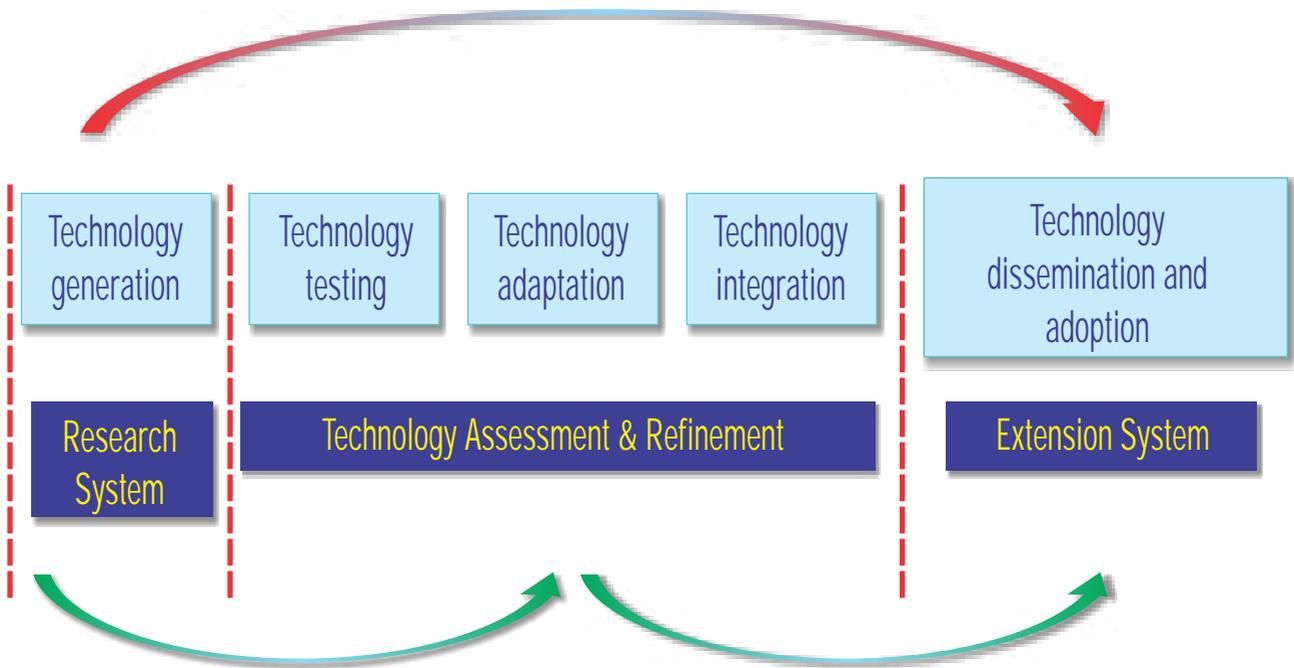
them in the frontier areas of technology development

- Work as knowledge and resource centre of agricultural technology for supporting initiatives of public, private and voluntary sector for improving the agricultural economy of the district
- In addition, to speed up the process of dissemination of technology, a large number of various extension activities and production of seeds and planting materials, livestock, poultry and fisheries breeds and various bio-products are taken up by the KVKs.

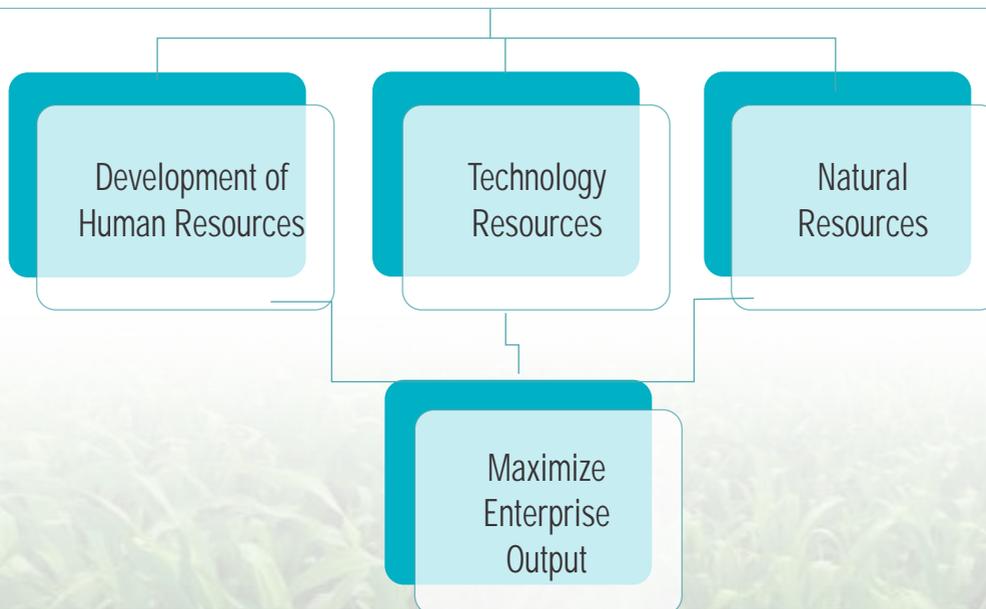
Uniqueness.....

- Creation of valuable resources in terms of manpower and assets
- Tailoring of technologies to meet location specificity
- Demonstrating the frontier technologies
- Capacity building of stakeholders
- Front runner in technological application, information and inputs
- Participatory approaches in planning, executing & evaluation.

UPTAKE PATHWAYS FOR RESEARCH OUTPUT ...



KVK-Knowledge & Resource Centre



Sr. No.	Name of the Zone	Tehsils	Thrust Areas
4	Scarcity Zone	Baramati, Indapur, Purandar, Daund and Shirur	<ul style="list-style-type: none"> • Quality seed & planting material production • Introduction of new varieties • Diversification under water scare condition • In Situ Soil and Moisture Conservation technique • Fertigation technique • Promotion of sugarcane settling transplanting and mechanization • Protected cultivation • Production & use of Bio-fertilizers & Bio-pesticides • Reduction in cost of production • Disease forecasting in fruit and vegetable crops • Livestock management in drought • Promoting non-conventional feed resources • Nutritional management of the livestock • Disease and parasite prevention and control in livestock • Silage making • Backyard Poultry Farming • Loose Housing System for dairy farming • Use of ICT in agriculture • Farmers club and woman SHGs

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. The proven technologies were disseminated through demonstration, field days, farmers field school, agriculture exhibitions, technology week, farmers study tours, Community radio, using information technology, popular articles in news paper, TV programmes etc. Vocational trainings of 3 to 15 days were conducted on the basis of the thrust area identified for entrepreneurship development. Long term vocational trainings for income generation of 1-6 months duration were also organized in collaboration with various agencies including District development agency, Maharashtra Center for Entrepreneurship Development, Pune, NHM, ATMA, NABARD etc.

Major Interventions of KVK, Baramati :

- In-Situ Moisture conservation
- Settling transplanting by machine
- Fertigation in Settling planted sugarcane
- Use of polythene mulching for production enhancement and quality improvement
- Quality production supply of fruit grafts
- Use of bio-fertilizers in pomegranate
- Use of bio-pesticides in pomegranate
- Silage making in rainfed area of Pune district
- Back yard poultry farming in rural area of Pune district
- Loose Housing System
- Dissemination of Crop Advisory and Weather information
- Entrepreneurship Development through Agri Clinic & Agri Business Management

2.2 : Thrust Areas of KVK

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

Table 5 : Thrust Areas identified by KVK, Baramati

Sl. No.	Name of the Zone	Tehsils	Thrust Areas
1	Ghat Zone	Part of Mawal	<ul style="list-style-type: none"> • Farmers club and woman SHGs • Crop diversification • Market lead extension • Production and use of Bio-fertilizers and Bio-pesticides • Nutritional management of the livestock • Disease and parasite prevention and control in livestock • Silage making • Backyard Poultry Farming • Use of ICT in agriculture
2	Sub Mountain Zone	Velhe, Bhor, Mulshi, Khed and Mawal	<ul style="list-style-type: none"> • Monitoring and improvement of soil fertility • Empowering woman with appropriate rural technologies • Fertigation and drip irrigation techniques • Nutritional management of livestock production and use of Bio-fertilizers and Bio-pesticides • Nutritional management of the livestock • Disease and parasite prevention and control in livestock • Silage making • Backyard Poultry Farming • Use of ICT in Agriculture
3	Plain Zone	Haveli, Junnar and Ambegaon	<ul style="list-style-type: none"> • Integrated nutrient and pest management practice • Reduction in cost of production • Biological control of pest and diseases • Farmers club and woman SHGs • Production and use of Bio-fertilizers and Bio-pesticides • Nutritional management of the livestock • Disease and parasite prevention and control in livestock • Silage making • Backyard Poultry Farming • Use of ICT in Agriculture

Table 6 : Interventions done by KVK, Baramati

Sl. No.	Crop/ Enterprise	Technical Interventions of KVK	Average yield of operational area before intervention (Kg/ha)	Average yield of operational area after intervention (Kg/ha)
1	Rabi Sorghum	In-Situ Moisture conservation	625	1,500
2	Sugarcane	Settling transplanting by machine	95,000	1,85,000
3	Adsali Sugarcane	Fertigation technology in Settling planted sugarcane	1,40,000	2,05,000
4	Tomato	Use of polythene mulching for production enhancement and quality improvement	71,925	89,025
5	Nursery	Quality production supply of fruit grafts	As per the fruit crops mentioned in the Research Summary	
6	Pomegranate	Use of bio-fertilizers in pomegranate	11,375	19,337
7	Pomegranate	Use of bio-pesticides in pomegranate	13,750	21,250
8	Dairy cattle	Silage making in rainfed area of Pune district	10.2 litre/crossbred HF cow/day	12 litre/crossbred HF cow/day
9	Poultry	Back yard poultry farming in rural area of Pune district	66 eggs/hen/year	156 eggs/hen/year
10	Dairy Cattle	Loose Housing System	13.20 lit/day/cow	14.90 lit/day/cow
11	Kisan Mobile Advisory Services (K-MAS)	Reaching to unreached through K-MAS (Dissemination of Crop Advisory & Weather information)	As per the crop/ commodity mentioned in the Research Summary	
12	Direct Marketing	Direct Marketing of agril produces through Dhanya Mohotsav (Grain Festival)	Middle man	Direct marketing to consumer
13	Vocational training	Entrepreneurship Development through Agri Clinic & Agri Business Management	As per the enterprise	

3. TECHNOLOGICAL INTERVENTIONS OF KVK, BARAMATI FOR SUSTAINABLE PRODUCTION IN AGRICULTURE

1. In-Situ Moisture Conservation Practice for *Rabi* Sorghum

I. Technology :

In-Situ Moisture Conservation : This technique is developed by Mahatma Phule Agriculture University, Rahuri. Due to this practice, moisture is conserved uniformly in the field in small flat beds. It reduces runoff losses of water and soil erosion.

reducing. In Pune district, drought prone tehsils are Baramati, Indapur, Purandar and Daund with average rainfall of 450 mm. But from last three years, average rainfall received was only 200 to 250 mm. Some regions got only 60 to 70 mm rainfall and which was uneven. Cropping pattern in this block is Bajara,



Before sowing preparation for In-situ moisture conservation



Moisture conserved in flat beds after first rain



Prepare flat beds of 10 X 10 m



Training conducted by KVK before sowing of *Rabi* Jowar

Due to uniform moisture conservation, the crop growth is also uniform. The moisture thus conserved reduces the water stress during critical growth period and ultimately gives assured yield of rainfed crops like *Rabi* Sorghum and *Kharif* Bajara.

Redgram, Onion and Green gram in *Kharif* and the major crop in *Rabi* is Sorghum. If rainfall is around 400 to 600

II. Details of KVK Intervention

From 2011, rainfall in Baramati region is very less and number of rainy days and average rainfall are

Table 7 : Weather data of last three years

Sr. No.	Month	Year 2012		Year 2013		Year 2014	
		Rainfall in mm	Dryspell in Days	Rainfall in mm	Dryspell in Days	Rainfall in mm	Dryspell in Days
1	January	-	-	-	-	-	1 (31 Days)
2	February	-	-	-	-	22.0	1 (25 Days)
3	March	-	-	-	-	30.0	1 (17 Days)
4	April	-	-	-	-	49.2	1 (18 Days)
5	May	-	-	-	-	53.0	1 (24 Days)
6	June	40.0	1 (12 Days)	115.2	Rains were at regular interval	40.2	1 (23 Days)
7	July	35.1	1 (28 Days)	76.8	Rains were at regular interval	59.4	1 (14 Days)
8	August	77.2	1 (19 Days)	39.4	1 (25 Days)	190.6	1 (20 Days)
9	September	100.9	1 (10 Days)	203.4	1 (10 Days)	2.0	1 (26 Days)
10	October	90.6	1 (18 Days)	-	-	12.0	1 (25 Days)
11	November	4.4	1 (28 Days)	-	1 (10 Days)	-	-
12	December	-	1 (31 Days)	-	1 (31 Days)	-	-
	Total	348.2		434.8		458.4	-
	% of normal rainfall (Normal rainfall 550 mm/year)	63.30		79.05		83.34*	

(* Though the rainfall in year 2014 is 83.34% of normal, but rains received during January to May, 304.2 mm was not useful for cropping. There was no rainfall in January to May during 2012, 2013)

III. Output :

For solving this moisture stress problem, Krishi Vigyan Kendra, Baramati have started activity like farmers campaign for In-situ moisture conservation and supply the new variety seeds as per soil type, supply of critical inputs like bio-fertilizer for seed treatment. KVK provided these inputs at farmers doorstep free of cost. This type of campaign has been taken up since 2010-11 initially with demonstration in 10 acres. But, in 2011-12, even though village Jalgaon (Kp.), Tal. Baramati has received only 55 to 70 mm rainfall, the farmers could harvest average 5.5 q/acre grain yield due to adoption of in-situ moisture conservation practice. The then DDG ICAR (Extension), Dr. K. D. Kokate visited this demonstration and appreciated the results of the In-situ soil moisture conservation practice.

Due to efforts and vision of Shri. Rajendra Pawar, Chairman, Agricultural Development Trust, Baramati, during 2012-13, KVK has organized village wise campaign for guiding the farmers on this practice. KVK had covered 38 villages in 2012-13 and during 2013-14 again KVK covered 53 villages and in 2014-15 KVK covered 70 villages.

In *Kharif* 2013, the onset of monsoon was in 2nd fortnight of June and the rainfall was very uneven which resulted in drought conditions in this season. Under this situation, the moisture conservation technology was found useful to the farming community in growing fallow *Kharif* and early *Rabi* crops. The positive impact of this technology was also displayed on ICAR website.

Table 8 : Details of the villages and farmers covered during 2012

Sl. No.	Tehsil	Number of villages covered	Name of villages	Total number of farmers benefited
1	Baramati	15	Murti, Moragaon, Bhondavewadi, Jalgaon KP, Karhawagaj, Loni Bhapakar, Dhakale, Mudhale, Karhathi, Sadobachiwadi, Panasarewadi, Jogawadi, Borakarwadi, Shirsuphal, Undawadi	1,314
2	Indapur	9	Shetaphalgade, Bori, Madanwadi, Khorochi, Wadapuri, Ghorapadwadi, Redani, Lakadi, Parawadi	255
3	Purandhar	13	Mavadi, Chacharmala, Sakurde, Somurdi, Javalarjun, Jadhavawadi, Satalwadi, Parinche, Veer, Samgirwadi, Ambale, Malshiras, Walunj	497
4	Daund	1	Khor	300
Total	4	38		2,366

Table 9 : Details of the villages and farmers covered during 2013 and 2014

Sl. No.	Tehsil	Number of villages covered	Name of villages	Total number of farmers benefited
1	Baramati	42	Jogavdi, Barhanpur, Karhavaghaj, Aanjangaon, Aambi Bk., Ambi Kh, Sonavdi Supe, Karkhel, Gojubavi, Khandu Khairewadi, Mudhale, Pawarwadi (Tardoli), Mudhale, Chaudharwadi	2,403
2	Indapur	38	Lamjewadi, Mhasobawadi, Kalas, Rui, Kauthadi, Tarangwadi, Varkute Khurd, Galandwadi, Vadapuri, Kazad, Shindewadi, Aanthurne, Sarati	1,042
3	Purandhar	32	Pandeshwar, Javalarjun, Nazare Supe, Rakh, Kolvihire, Valha, Gulunche, Malshiras, Guroli, Paragon, Aamble, Rajuri, Pisarve, Naygaon Shivri, Sakurde, Munjavdi, Kumbharvalan, Rise	978
4	Daund	11	Hingnigadha, Roti, Deulgaon Gada, Kauthadi, Pandharewadi, Jiregaon, Vasunde	352
Total	4	123		4,775



In-situ Soil Moisture Conservation Campaign at Loni-Bhapkar, Tal. Baramati, Dist. Pune (2012-13)



In-situ Moisture Conservation Campaign at Jogavadi, Tal. Baramati, Dist. Pune (2013-14)

IV. Outcome & Impact of the KVK Intervention:

Due to this KVK intervention, about 256 ha area was brought under this technique in rain fed area and the results are encouraging. Farmers could see for themselves the technological benefits. Therefore more area was covered under In situ moisture conservation in *Rabi* 2013-14. With just 60 to 70 mm rainfall before sowing of *Rabi Sorghum*, farmers could harvest good yields in Baramati, Purandar & Indapur Tehsils. The

technique has resulted in 60 to 70 % yield increase.

Where this technology was not adopted, farmers could not harvest even *Kadba*. During *Kharif* 2014, farmers adopted this technology for cultivation of Bajara. The Bajra crop grown by many other farmers has failed due to intermittent drought. But, farmers' who adopted this practice have got average yield of 6 to 15 q/ha.

Table 10 : Details of demonstration on In-Situ moisture conservation in *Rabi Sorghum*

Crop / Enterprise	Thematic Area	Technology Demonstrated	Details of Popularization methods suggested to the Extension system	Horizontal spread of technology		
				No. of Villages	No. of Farmers	Area in ha
<i>Rabi Sorghum</i>	Resource conservation techniques	In-situ moisture conservation practices for <i>Rabi Sorghum</i> . For improving yield and reduce moisture stress at Critical Growth Stages (CGS) during low rainfall	Field day and Demonstrations	161	7,141	2,563

Table 11 : Details of FLD's implemented during 2013-14

Crop	Thematic Area	Technology Demonstrated	Season and Year	Area (ha)		No. of farmers / demonstration		
				Proposed	Actual	SC / ST	Others	Total
<i>Rabi Sorghum</i>	Water Management	In-situ moisture conservation practice	<i>Rabi</i> 2013-14	04	04	03	07	10



Rabi Sorghum & Bajara crop during 2013-14

Table 12 : Details of farming situation for field demonstration implemented during 2013-14

Season	Farming situation (RF/Irrigated)	Soil type	Status of soil			Previous crop	Sowing date	Harvest date	Seasonal rainfall (mm)	No. of rainy days
			N	P	K					
Rabi 2013-14	Rain fed	Medium black	medium	low	high	Fallow	Second fortnight of September 2013	First fortnight of Feb 2014	220	12

Table 13 : Performance of Demonstration

Variety	Demonstration yield (q/ha)			Average yield of local check (q/ha)	Increase in yield (%)	Data on parameter in relation to technology demonstrated	
	H	L	A			Demo	Local
Phule Revati	27.75	10.25	14.81	4.75	211.7	Germination-78%, Height of plant at maturity-142.1cm, Av. yield kadaba- 31.5 qt/ha	Germination-61%, Height of plant at maturity-94.8cm, Av. yield kadaba - 16.2 qt/ha

Table 14 : Economic Impact

Average Cost of cultivation (Rs./ha)		Average Gross Return (Rs./ha)		Average Net Return (Profit) (Rs./ha)		Benefit-Cost Ratio (Gross Return / Gross Cost)
Demonstration	Local Check	Demonstration	Local Check	Demonstration	Local Check	
18,750	16,250	40,739	15,505	21,989	-745	1:2.17&1:0.95

Table 15 : Farmers who adopted the In-situ Moisture Conservation Technique and obtained considerable yield without any protective irrigation

Sl. No.	Name of Farmers	Village	Demonstration Yield q./Ha.	Local check Yield q./Ha.
1	Vilas Babasaheb Gaikwad	Mawadi KP	12.27	5.9
2	Chandrakant Dnyanoba Bhame	Mawadi KP	14.22	7.6
3	Hanumant Shivaji Bhosale	Jogwadi	10.25	3.8
4	Bhauso Ramdas Balgude	Murti	16.39	7.4
5	Nazir Rehaman Shaikh	Jogwadi	10.75	4.2
6	Sunil Shashikant Rajebhosale	Jogwadi	16.44	3.7
7	Soma Manik Kapase	Jogwadi	10.46	3.6
8	Dhansing Vinayak Jagtap	Jalgaon KP	14.53	2.8
9	Sharad Raghunath Pawar	Karhati	27.75	3.9
10	Hanumant Chachar	Mawadi	15.12	4.6
Average			14.81	4.7

Table 16 : The results of demonstration on In situ moisture conservation for Rabi Sorghum at NICRA project (National Initiative on Climate Resilient Agriculture) Village are detailed as below-

Name of intervention	Reason of intervention	Farmers Practice yield (q/ha)				Demonstration yield (q/ha)				Remark
		2011	2012	2013	Average	2011	2012	2013	Average	
In situ soil moisture conservation	Conservation of moisture for Rabi sorghum	3.75	8.90	6.40	6.35	11.25	12.3	10.15	11.23	The average increase in yield of last three years over control is 76.85 %



KVK Baramati published this activity in news paper, TV Program and website

KVK Baramati has organized a Field Day to show the results of In-situ moisture conservation for *Rabi Sorghum* during 2013-14



Participation of progressive farmers of village Mavadi KP, Tal. Purandar in Field Day on *Rabi Sorghum* conducted by KVK



ICAR has displayed this result on their website

2. Sugarcane settling transplanting & Use of mechanical transplanter

I. Technology:

Instead of planting sugarcane sets, KVK was conducting trials of sugarcane single eye bud prortray settlings transplanting at 150 x 60 cm spacing and for transplanting of settlings, KVK introduced mechanical transplanter by modifying a vegetable transplanter for sugarcane settling transplanting which was found to be very cost effective and time saving machine for sugarcane planting.

II. Details of KVK Intervention:

Sugarcane is the major cash crop of the Pune district of Maharashtra. Total area under this crop in the district is 1,13,400 ha, out of which total area in Baramati, Inadapur and Daund tehsils is 20,600 ha, 29,000 ha and 22,800 ha respectively. It means, 52% total area of sugarcane is covered by these tehsils. The average productivity of the sugarcane in the district is only 101 tonnes/ha. Major sugarcane growing tehsils comes under KVK Baramati jurisdiction.



Sugarcane settlings produced in the nursery of KVK Baramati

The potential yield of sugarcane is 160 to 200 tonnes/ha. But, there is a wide gap in adoption of improved technologies. Main reason behind low yields is that farmers use the setts planting techniques with flood irrigation which is very time consuming, labor intensive and requires more initial cost for planting. Also, farmers do not maintain proper plant population and follow imbalanced nutrient management. KVK, Baramati promoted technologies like single eye bud (35 days old portray settling) transplanting with spacing of 150cmX60 cm., with drip irrigation and fertigation .

Problem diagnosis:

The farmers are planting sugarcane crop by using setts as per the dates given by sugar factories. However, at the time of planting, there is unavailability of labor and labor are charging double the normal rate for planting, as a result the planting is delayed and not uniform. Further, planting by manual method is not uniform and the spacing of settlings is not maintained uniformly, so that plant population is either reduced or increased.

III. Output-1: Production & supply of sugarcane settlings by the KVK are given below.

Since 2011, area covered under sugarcane settlings supplied by KVK is 481.6 ha and number of settlings supplied to farmers is 52.5 lakh.

Table 17: Supply of sugarcane settlings by KVK Baramati and area covered under settling planting.

Sr. No.	Year	Number of settlings supplied to farmers (lakh)	Area covered under settling planting (ha.)
1	2011-12	1.5	13.76
2	2012-13	8.0	73.3
3	2013-14	32.4	297.2
4	2014-15	10.62	97.43
	Total	52.52	481.69

It is observed that due to transplanting of sugarcane settlings, yield of sugarcane is increased by

40.1% than farmers practice and farmer's net income is increased

Table 18 : Sugarcane yield observed in the demonstration on transplanting of the sugarcane settlings vs. normal sets planting

Sl. No.	Area under demonstration ha.	Average yield (t/ha)		% increase in yield	Cost of production (Rs./ha)		Gross Income (Rs./ha)		Additional income (Rs./ha)
		Demo.	Local check		Demo.	Local check	Demo.	Local check	
1	10	185	132	40.1	79,700	85,700	3,88,500	27,72,200	1,11,300

III. Output-2: Sugarcane settling transplanting machine

KVK Baramati has modified vegetable seedling transplanter for transplanting of sugarcane settlings. During 2013-14, KVK has assessed this technology for transplanting of settlings by manual method. KVK had

given a wide publicity to this technology through method demonstrations to the farmers and given publicity through communication medias like radio, news paper and TV.

Table 19 : Observations on various parameters regarding sugarcane settling transplanting machine

Technology Assessed	Parameters of assessment	Data on the parameter
Normal planting of sugarcane by using sets at spacing 150 cm X 60 cm	Number of labour days required for planting/ha	50
	Cost of planting (Rs./ha)	12,500/-
Manual Planting of 45 days sugarcane seedling at spacing 150 cm X 60 cm	Number of labour days required for planting /ha.	35
	Cost of planting (Rs./ha)	8,750/-
Planting of 45 days sugarcane seedling by using mechanical transplanter at spacing 150 cm X 60 cm	Number of labour days required for planting/ha.	3
	Cost of planting (Rs./ha)	2,750/-



Sugarcane settling transplanting by using mechanical trasplanter



Uniform crop stand and growth of sugarcane due to machine transplanting

IV. Outcome:

The above results show that cost of planting with sugarcane settling transplanter is less by Rs. 6000/- as compared to manual transplanting of settling and Rs. 9,750/- for sett planting. Further, only three labour days are required to machine transplanting of settlings in one hectare and uniform crop stand is observed with proper spacing of 150 cm x 60 cm. With the settling transplanting technique, both sowing time and planting material required are reduced besides reducing the initial operations up to 2 months of growth phase viz. irrigation, weeding, fertilizers application and cutting of setts from mother canes etc.

V. Impact:

After method demonstration of the technology and news paper coverage in Sakal news paper, farmers are contacting to KVK and picking up the machine using their tractors for transplanting of sugarcane settlings.

Area covered under machine transplanting is 46 ha till date and farmers are making advance booking for using the machine. KVK is charging Rs. 1000/- per day rent to the farmers. Farmers can adopt the settling transplanting technique on large scale and more than 20 farmers started their nurseries of settling production. Farmers are booking their requirement of settlings before one month.



Farmer sharing his experience on impact and usefulness of sugarcane transplanter on SAM TV Marathi

3. Fertigation for settling transplanted sugarcane as per soil testing

I. Technology :

Application of fertilizer through fertigation for sugarcane planted as settlings.

II. KVK Intervention:

Sugarcane is the main crop of Pune district. KVK established Soil Testing Laboratory in 2001. Initially, 318 soil samples were tested and recommended for sugarcane. Whereas in 2014 more than 11,000 soil samples were tested and recommendation was made for fertigation in settling transplanted sugarcane. Fertigation technology is very cost effective and labor saving. It also increases nutrient availability and reduce fixation and losses of nutrient through leaching.

Setts plantation is common method of plantation of sugarcane where farmers use flood irrigation and adhoc application of chemical fertilizers in soil. In such cases, availability of nutrients is very low and crop productivity is also low. The average productivity of sugarcane in Pune district before intervention was 39.5 tonnes/acre. Due to this practice in the long run soil health was also affected.

Problems identified :

i. **Use of flood irrigation** – Before intervention, for flood irrigation in sugarcane, farmers used 3.5 corer litres of water for 0.40 ha area, which resulted in increase of soil salinity, alkalinity and bulk density and affected soil micro flora and fauna.

III. Outcome

A. For solving this problem, Krishi Vigyan Kendra, Baramati, has undertake assessment and demonstration of fertigation in large area. After application of this technology, water was saved up to 51%. In flood irrigation, 3.45 crore liters of water was used for one acre. While, only 1.25 crore liters of water was required through drip irrigation for attaining double the yield. The intervention also shows 80% labor saving (for irrigation, fertilizer application and weed management).

B. In Pune district, 2.5 lakh ha area is under Sugarcane. Out of which, 18,000 ha area is now under drip fertigation. Mainly canal and well irrigated sugarcane area was converted to drip irrigation.

Table 20 : Details of fertigation technique in sugarcane

Crop	Technology Demonstrated	Variety	No. of Farmers	Area (ha.)	Demonstration yield (t/ha)			Yield of local check	Increase in yield (%)	Data on parameter in relation to technology demonstrated	
					H	L	A			Demo.	Local check
Adsali Sugarcane	Use of Fertigation for enhancement of sugarcane and sugar productivity in Adsali and two ratoon sugarcane	Co-86032	8	3.2	210	157.5	187.5	165.31	16.91	Avg. No. of milleable cane - 1,06,250/ha, Av. brix at harvest- 14.2%, Yield - 187.5 t/ha, Net return- Rs.3,66,250/-, Cost of production- Rs.1,02,500/-	Avg. No. of milleable cane - 1,02,500/ha, Av. brix at harvest- 13%, Yield - 165.31t/ha, Net return- Rs.3,13,275/-, Cost of production- Rs.1,00,000/-

Table 21 : Impact (continuation of previous table)

Average Cost of cultivation (Rs./ha)		Average Gross Return (Rs./ha)		Average Net Return (Profit) (Rs./ha)		Benefit-Cost Ratio (Gross Return / Gross Cost)
Demonstration	Local Check	Demonstration	Local Check	Demonstration	Local Check	
1,02,500/-	1,00,000/-	4,68,750/-	4,13,275/-	3,66,250/-	3,13,275/-	4.57

IV. Outcome :

Average sugarcane production in demonstration plot was 187.5 t/ha as compared to 165.31 t/ha for control (farmers practice) with 16.91% increase in yield. Average number of milleable cane/ha was 1,06,250, Avg. brix % at harvest-14.2, Net return-3,66,250.



Technology demonstrated at farmers field

V. IMPACT :

By observing the result of fertigation in settling planted sugarcane, thousands of farmers have adopted this technology for adsali, pre-seasonal and suru sugarcane from the farmers of Baramati, Indapur, Dound.



110 Days old sugarcane crop on fertigation .
(Planting distance 5 ft Row to Row and set to set 20 cm.)

4. Use of Polythene Mulching For Production Enhancement and Quality Improvement In Tomato

I. Technology :

Pune district is well known for fruit and vegetable production in the Maharashtra State. The region covering Baramati, Indapur and Purandar tehsils of Pune district comes under dry land zone but these are leading tehsils for vegetable production. Water stress during dry period is the major constraint in this area. Weed growth during continuous rainy period is also a major problem in vegetable growing. So the plastic mulching was considered as beneficial technology to tackle the above problems in this area. Polythene mulching also increases quality of vegetables by minimizing weed growth, pest attack and moisture conservation with efficient use of fertilizers. Therefore the technology of polythene mulching was evaluated in farmers field.

- Solve the problem of weed control and labor unavailability.
- Reduce attack of insect pests and disease on tomato plant and thereby reduction in the pesticide application
- To increase in A grade tomato so that farmers can earn more profit.
- To save the crop when there is excess rainfall.

II. KVK Intervention:

From 2011, rainfall in Baramati region is very less and number of rainy days and average rainfall is reducing. In Pune district, drought prone tehsils are Baramati, Indapur, Purandar and Daund and average rainfall in these tehsils was only 450 mm. But, from last three years average rainfall was only 200 to 250mm. Some regions got only 60 to 70 mm rainfall which is also uneven. Cropping pattern in this block is Bajara, Red gram, onion and tomato during *Kharif* and in *Rabi*, the major crop is sorghum and if rainfall is around 400 to 600 mm, farmers grow *Rabi* onion, tomato, wheat, bengal gram by giving protective irrigation.

To reduce evaporation from soil surface due to excess irrigation and to reduce weed population, KVK introduced the mulching technology.

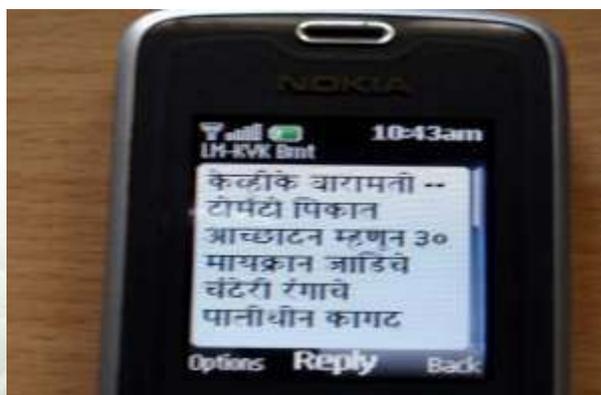
Technology - Use of 30 microns silver black polythene mulch (4 feet width & 100 M length of Bundle) for plantation of tomato.

III. Output :

The KVK organized two field days in which 295 farmers participated. An article on use of polythene mulching in daily news paper Agro won was also published. Training on use of polythene mulch in tomato was given to the beneficiary farmers. A compact disc (CD) containing photos and videos of polythene mulching was prepared and shown to tomato growers who visited the KVK. Mobile messages were also sent regarding activities of KVK on use of polythene mulching, crop advisory, practices to be followed, weather prediction etc. to the tomato growers who registered their mobile numbers at our KVK. The regular visits to problematic plots were also made and the remedial measures were suggested as per the need of



Tomato demonstration plot with polythene mulching



Mobile agro advisory services on polythene mulching

farmers. KVK also conducted the demonstrations on the use of polythene mulch for increasing productivity & quality of tomato on 20 innovative farmers fields by supplying good quality polythene mulch. The results of the demonstrations were also published in daily newspaper Agro won.

Before the above KVK intervention, farmers were not using polythene mulch and they were facing lot of problems with weeds, pest & disease, excess rainfall and evaporation from soil surface.

IV. Outcome of KVK Intervention:

- ❖ The first picking of the fruits was started after 66 days. Average total duration of harvesting of fruits was 124 days in demonstration while it was 96 days for control. The total duration of crop was 190 days for demonstration and 164 days for control. The average number of pickings was 21 in demonstration plot while it was 16 in control plot.
- ❖ The per acre average yield of demonstration plot was 356.10 q and in control plot it was 287.70 q/acre. The average yield was increased in the demonstration plot by 68.40 q/acre (24.02%) over the control plot.
- ❖ Average yield of A grade tomatoes was 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 as compared to control.

- ❖ The gross income obtained from demonstration plot was Rs. 3,09,834/acre, whereas in control plot it was Rs. 2,04,593/acre. There was increase in net profit of Rs.1,03,029/acre over control due to application of polythene mulch technology in tomato. C:B ratio in demonstration plot was 1:2.50 whereas in control plot it was 1: 1.68.
- ❖ Due to this intervention, now a days 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 in more than 350 acres by 259 farmers.
- ❖ It is observed that the incidence of sucking pest is reduced which in turn reduced 7 sprays of pesticides.
- ❖ The soil temperature is maintained at a congenial level which in turns favors uptake of some micronutrients.
- ❖ Polythene mulching prevents volatilization of applied water soluble fertilizers.
- ❖ Use of polythene mulching found to be very helpful to control weed growth. In control plot, farmers have done 3-4 weedings while in demonstration plot no weeding was done. Further, due to labor unavailability, farmers could not adopt timely weeding which resulted in excess weed growth in control plots.



Benefits of KVK Intervention

Table 22 : Details of polythene mulch technology in tomato

Sl. No.	Observations	Control Plot (Planting of Tomato without mulching)	Demonstration Plot (Planting of Tomato with mulching)
1	Labor (man days) for weeding /ha	158.50	4.80
2	No. of weedings	3.4	--
3	Cost of weed control Rs./ ha	12,680/-	2,125/-
4	No of chemical sprays for pest control	27	20
5	Cost of polythene mulch and its application Rs./ha	-	Rs. 41,000/-
6	No of pickings of Tomato	16	21



Weed infestation in drip irrigated tomato plot
Farming Practice before KVK Intervention - Planting of Tomato without use of polythene mulching-



KVK Intervention - Use of 30 microns silver black polythene mulch for Planting of Tomato

V. Impact of KVK Intervention :

Due to this activity, in about 350 acres, 259 farmers adopted this technique in rain fed area. The results are encouraging. Farmers could see by

themselves the advantages of the technology. Therefore, more area will come under planting of tomato on polythene mulch in future. The technique has resulted in 24.02% yield increase.

5. Quality production and supply of fruit grafts through nursery

I. Technology

Rainfall in Baramati region is very less and number of rainy days and average rainfall are reducing. In Pune district, drought, prone tehsils are Baramati, Indapur, Purandar and Daund and average rainfall in these tehsils is only 450 mm but from last three years average rainfall is only 200 to 250 mm and some regions got only 60 to 70 mm of uneven rainfall. Cropping pattern in this block is *Kharif* Bajara, Redgram, onion, green gram and in *Rabi* major crop is sorghum and if rainfall is around 400 to 600 mm, farmers can grow *Rabi* onion, wheat and Bengal gram with protective irrigation. As all these crops required more irrigation and to facilitate crop diversi-

fication, the KVK started quality fruit grafts Nursery.

II. KVK Intervention :

The Horticulture Nursery was started in the year 1997 with a view to produce quality grafts for diversification of the cropping pattern and promote dry land horticulture in the operational area. The Nursery was renovated and expanded time to time. The Nursery was recognized by Government and also received four star rating in 2012 from National Horticulture Board. KVK started the production of saplings of Mango, Pomegranate, Guava, Sapota, Kagzi Lime, Coconut, Tamarind, Custard Apple Jack Fruit and Fig.

Details of Mother trees :

Table 23 : Mother trees

Area in ha.	Crop/ Variety	No. of plants	Source of planting material	Age of plants	
				Year	Month
2.0	Mango - Kesar	403	BSKKV, Dapoli	5	1
	Mango - Alphonso	126			
0.8	Pomegranate - Bhagva	560	MPKV, Rahuri	5	2
0.4	Guava	78	MPKV, Rahuri, CISH, Lucknow	5	2

Table 24 : Structures including tunnels, Shade-house and Poly-House :-

Name of the equipments	Number	Year of erection	Area/ Dimension (sq.m.)
Tunnel	12	2006-2007	40
Shade- House	3	2006-2007	1800
Poly – House	1	2006-2007	560 (30 x 18.66)

The farming practice in operational area before the Technology Intervention :

In the KVK operational area, the major fruit crops are Mango, Pomegranate, Guava, Sapota, Kagzi Lime, Coconut, Tamarind, Custard Apple and Fig. Generally, farmers grow the seedlings by using seeds. By using the seedling produced from seeds they have faced lot of problems like non-uniformity, increase in cost of cultivation etc.



Problems faced by the farmers before the KVK Intervention:

1. Orchard developed with seedling produced from seed required long duration for fruiting as compared to grafted seedlings.
2. There is no uniformity in growth, yield and quality of fruits.
3. Seedlings trees are usually large in size and thus the cost of harvesting, pruning and crop protection is more.
4. Fruits produced from seedlings are inferior in quality.
5. Farmers are facing the problems of seed borne virus in number of fruits plants.

Benefit of Intervention to the farmers:

1. Early fruiting of plants.
2. Uniformity of fruit quality is obtained. Picking or harvesting became easy owing to restricted growth and early maturity.
3. Grafting on resistant rootstock for vigorous growth, freedom from pest and diseases is possible.
4. Yield of fruit plants is increased.
5. Plants are true to type and uniform in growth.

III. Outcome of Technology Intervention:

Table 25 : Difference in the yield before and after the technology intervention of KVK

Sl. No.	Name of crops	Yield of crop before Technology Intervention	Yield of crops after Technology Intervention
1	Pomegranate	5.5- 7 tonnes/ acre	8.5-9.5 tonnes/ acre
2	Mango	6-7 tonnes/ acre	7.5- 8.5 tonnes/ acre
3	Guava	6.5 – 7 tonnes/ acre	8-9 tonnes/ acre
4	Tamarind	150-200 Kg fruits/ plant	250-300 Kg fruits/ plant
5	Sapota	1500-1800 fruits/ plant.	2000-2100 fruits/ plant
6	Custard Apple	70-90 fruits/ plant.	100-150 fruits/ plant
7	Aonla	100-120 Kg fruits/ plant	150-200 Kg fruits/ plant

IV. Output of KVK Intervention:

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

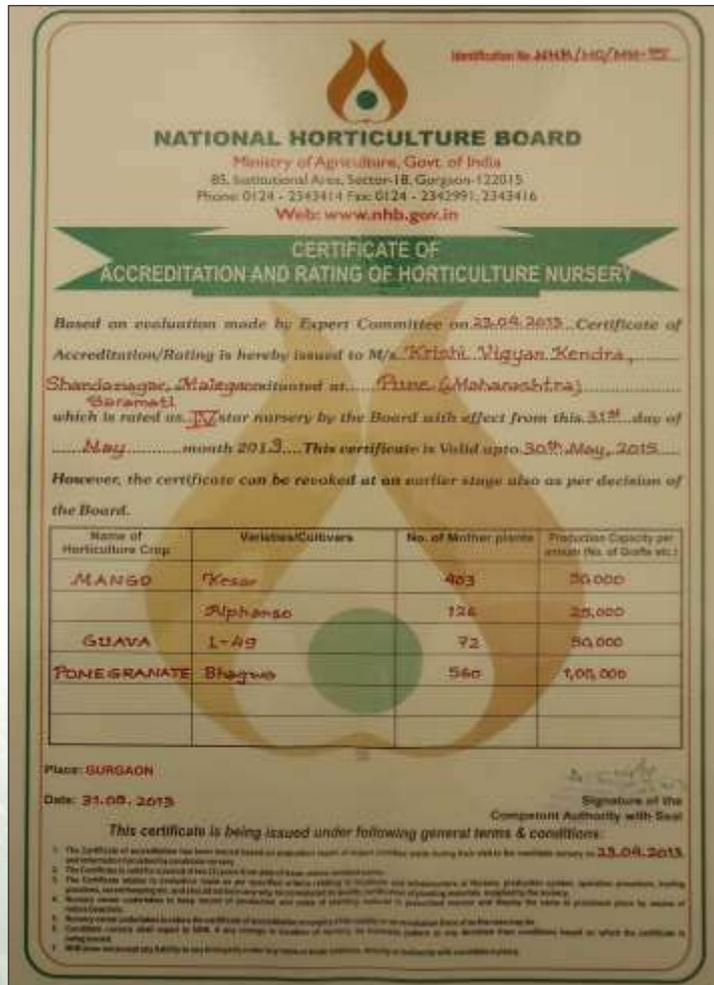
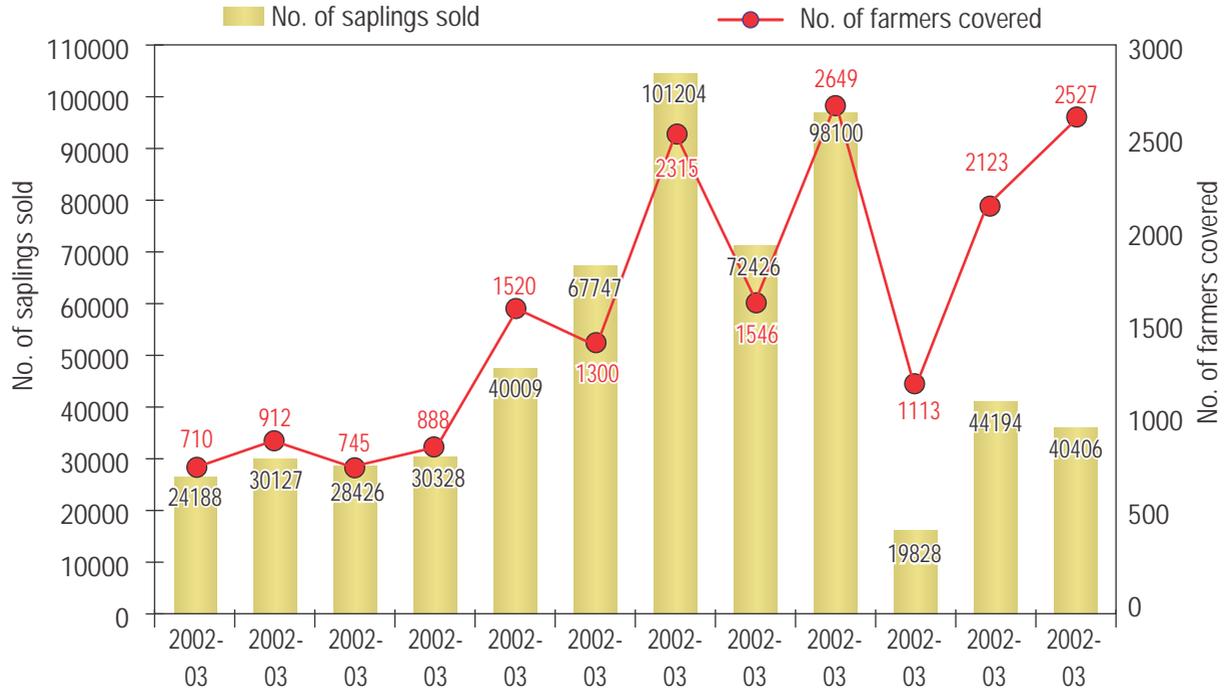
training is organized under a scheme of National Horticulture Mission. Till date, 288 trainees have got trained and many of them have started their own business or have got a good job in Hi-tech nursery.

Table 26 : Number of saplings of fruit crops sold by KVK and number of farmers covered

Year	No. of saplings sold	No. of farmers
2002-03	24,188	710
2003-04	30,127	912
2004-05	28,426	945
2005-06	30,328	888
2006-07	40,009	1,520
2007-08	67,747	1,300
2008-09	1,01,204	2,315
2009-10	72,426	1,546
2010-11	98,100	2,649
2011-12	19,828	1,113
2012-13	44,194	2,123
2013-14	40,406	2,527



Figure 5 : Number of saplings of fruit crops sold by KVK and number of farmers covered



Certificate to KVK Nursery as 4 STAR Nursery awarded by National Horticulture Board, New Delhi

6. Use of bio-fertilizers for increased productivity of crops

I. Technology :

With the renewed focus on organic farming, most of the farmers want to produce healthy fruits of export quality. Bio-fertilizers viz. nitrogen fixing bacteria, phosphate solubilizing bacteria, potash mobilizing bacteria can be effectively used for enhancement of productivity of different crops along with reduction in cost of production by minimizing the use of chemical fertilizers. It also would help to maintain soil health with the improvement in useful soil fauna.

Before KVK intervention, the farmers used to apply the chemical fertilizers in more quantity without the soil testing that resulted in deterioration of soil quality, infertility of soil, etc. The rising cost of the chemical fertilizers also led to increase in cost of production of the farmers.

II. KVK Intervention:

The indiscriminate and excessive application of chemical fertilizers by farmers to increase the production resulted in the increased cost of production, decreased soil health due to loss of useful micro organisms besides reducing the keeping quality. KVK promoted the technology on use of bio-fertilizers, that was unknown to many farmers with only few farmers adopting the practice. With the KVK intervention it was observed that bio fertilizer seed treatment of sorghum, gram, soybean and other crops increased the germination percentage and crop yield.

III. Output:

To increase the farmers awareness regarding the use of bio-fertilizers, KVK has undertaken different

जमिनीची सुपीकता व उत्पादनवाढीसाठी जैविक खते

जैविक खतांचे फायदे:

- 1. जैविक खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.
- 2. जैविक खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.
- 3. जैविक खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.

जैविक खतांचे प्रकार:

- 1. नायट्रोजन स्थितीकरणात्मक (Nitrogen-fixing)
- 2. फॉस्फोरस स्थितीकरणात्मक (Phosphorus-solubilizing)
- 3. पोटॅश स्थितीकरणात्मक (Potash-mobilizing)

नायट्रोजन स्थितीकरणात्मक खते:

- 1. *Azotobacter*
- 2. *Beijerinckia*
- 3. *Cyanoobacteria*
- 4. *Glucanobacter*
- 5. *Herbaspirillum*
- 6. *Thiobacillus*
- 7. *Thiosphaera*
- 8. *Thiostreptomyces*
- 9. *Thiostreptomyces*
- 10. *Thiostreptomyces*

फॉस्फोरस स्थितीकरणात्मक खते:

- 1. *Bacillus*
- 2. *Beijerinckia*
- 3. *Cyanoobacteria*
- 4. *Glucanobacter*
- 5. *Herbaspirillum*
- 6. *Thiobacillus*
- 7. *Thiosphaera*
- 8. *Thiostreptomyces*
- 9. *Thiostreptomyces*
- 10. *Thiostreptomyces*

पोटॅश स्थितीकरणात्मक खते:

- 1. *Bacillus*
- 2. *Beijerinckia*
- 3. *Cyanoobacteria*
- 4. *Glucanobacter*
- 5. *Herbaspirillum*
- 6. *Thiobacillus*
- 7. *Thiosphaera*
- 8. *Thiostreptomyces*
- 9. *Thiostreptomyces*
- 10. *Thiostreptomyces*

सॅन्ड्रीय खतांतून सांभाळा जमिनीचे आरोग्य

सॅन्ड्रीय खतांचे फायदे:

- 1. सॅन्ड्रीय खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.
- 2. सॅन्ड्रीय खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.
- 3. सॅन्ड्रीय खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.

सॅन्ड्रीय खतांचे प्रकार:

- 1. *Bacillus*
- 2. *Beijerinckia*
- 3. *Cyanoobacteria*
- 4. *Glucanobacter*
- 5. *Herbaspirillum*
- 6. *Thiobacillus*
- 7. *Thiosphaera*
- 8. *Thiostreptomyces*
- 9. *Thiostreptomyces*
- 10. *Thiostreptomyces*

मायक्रोबॅक्टेरियल कायचूरा किट

- 1. *Bacillus*
- 2. *Beijerinckia*
- 3. *Cyanoobacteria*
- 4. *Glucanobacter*
- 5. *Herbaspirillum*
- 6. *Thiobacillus*
- 7. *Thiosphaera*
- 8. *Thiostreptomyces*
- 9. *Thiostreptomyces*
- 10. *Thiostreptomyces*

जमिनीची सुपीकता व उत्पादनवाढीसाठी जैविक खते

जैविक खतांचे फायदे:

- 1. जैविक खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.
- 2. जैविक खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.
- 3. जैविक खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.

जैविक खतांचे प्रकार:

- 1. नायट्रोजन स्थितीकरणात्मक (Nitrogen-fixing)
- 2. फॉस्फोरस स्थितीकरणात्मक (Phosphorus-solubilizing)
- 3. पोटॅश स्थितीकरणात्मक (Potash-mobilizing)

नायट्रोजन स्थितीकरणात्मक खते:

- 1. *Azotobacter*
- 2. *Beijerinckia*
- 3. *Cyanoobacteria*
- 4. *Glucanobacter*
- 5. *Herbaspirillum*
- 6. *Thiobacillus*
- 7. *Thiosphaera*
- 8. *Thiostreptomyces*
- 9. *Thiostreptomyces*
- 10. *Thiostreptomyces*

फॉस्फोरस स्थितीकरणात्मक खते:

- 1. *Bacillus*
- 2. *Beijerinckia*
- 3. *Cyanoobacteria*
- 4. *Glucanobacter*
- 5. *Herbaspirillum*
- 6. *Thiobacillus*
- 7. *Thiosphaera*
- 8. *Thiostreptomyces*
- 9. *Thiostreptomyces*
- 10. *Thiostreptomyces*

पोटॅश स्थितीकरणात्मक खते:

- 1. *Bacillus*
- 2. *Beijerinckia*
- 3. *Cyanoobacteria*
- 4. *Glucanobacter*
- 5. *Herbaspirillum*
- 6. *Thiobacillus*
- 7. *Thiosphaera*
- 8. *Thiostreptomyces*
- 9. *Thiostreptomyces*
- 10. *Thiostreptomyces*

सॅन्ड्रीय खतांतून सांभाळा जमिनीचे आरोग्य

सॅन्ड्रीय खतांचे फायदे:

- 1. सॅन्ड्रीय खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.
- 2. सॅन्ड्रीय खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.
- 3. सॅन्ड्रीय खते पृथ्वीतून घेतलेल्या पोषक तत्वांचे साठवणूक करून देतात.

सॅन्ड्रीय खतांचे प्रकार:

- 1. *Bacillus*
- 2. *Beijerinckia*
- 3. *Cyanoobacteria*
- 4. *Glucanobacter*
- 5. *Herbaspirillum*
- 6. *Thiobacillus*
- 7. *Thiosphaera*
- 8. *Thiostreptomyces*
- 9. *Thiostreptomyces*
- 10. *Thiostreptomyces*

मायक्रोबॅक्टेरियल कायचूरा किट

- 1. *Bacillus*
- 2. *Beijerinckia*
- 3. *Cyanoobacteria*
- 4. *Glucanobacter*
- 5. *Herbaspirillum*
- 6. *Thiobacillus*
- 7. *Thiosphaera*
- 8. *Thiostreptomyces*
- 9. *Thiostreptomyces*
- 10. *Thiostreptomyces*

trainings on the use of bio-fertilizers, no. of group discussions and method demonstrations on seed treatment, published articles in newspapers. KVK has also conducted the vocational training programmes on production technologies for bio-fertilizers.

IV. Outcome:

Due to use of bio-fertilizers, the productivity of crops is increased by about 15%. Therefore KVK demonstrated this technology in various crops and showed the results to the farmers. The pomegranate farmers mainly adopted this technology on large scale and got positive results.

Earlier most of the pomegranate farmers were not aware about the use of bio-fertilizers. Based on the soil test report, they started applying the chemical fertilizers as per the requirement only. The use of bio fertilizers by these farmers resulted in the reduction of applications of chemical fertilizers upto 25-30% which minimizing the cost of cultivation by 25%.

Quantifiable difference in cost of cultivation :

The use of bio-fertilizers reduced the application of chemical fertilizers, thus reducing the cost of cultivation by about 25-30%. The application of bio-fertilizers also helped to improve the soil and product quality.

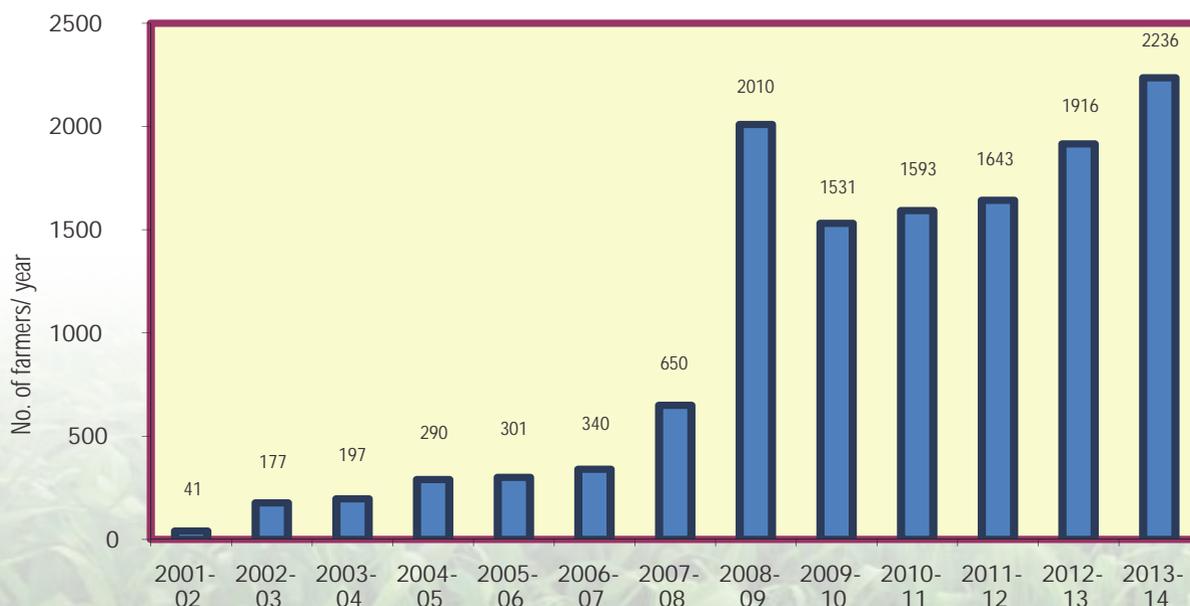
V. Impact :

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 by the farmers. While, in 2013, it has reached to 19,140 kg. The number of farmers also increased from 41 in 2002 to 1916 in 2013. It shows the gradual increase in awareness of the farmers about the use of bio-fertilizers.

Table 27 : No. of farmers using bio fertilizers from KVK

Year	No. of farmers
2001-02	41
2002-03	177
2003-04	197
2004-05	290
2005-06	301
2006-07	340
2007-08	650
2008-09	2010
2009-10	1531
2010-11	1593
2011-12	1643
2012-13	1916
2013-14	2236

Figure 6 : Number of farmers using bio-fertilizers since 2001



7. Use of bio-pesticides for increasing productivity of crops

I. Technology :

Most of the farmers are trying for the export oriented fruit production. As pomegranate is the major crop of the region, and suffers a lot from pests and diseases, for which lot of chemical pesticides and fungicides are used that leads to increased cost of cultivation, residual effects, harmful effects on the useful insect like pollinators and natural enemies, animals and human health.

To tackle this problem, use of bio-pesticide is the best eco-friendly and cost effective strategy. Bio-pesticides viz. *Trichoderma viridae*, *Paeceilomyces liliacinus*, *Metarrhizium anisoplae*, *Beauveria bassiana*, *Verticillium lecanii*, *Noumeria relyii*, *Pseudomonas fluorescence*, *Bacillus subtilis*, *B. thuringeinsis* can be used for crop protection with minimum cost and no residual effects.

II. KVK Intervention :

Farmers use to spray chemical pesticides and fungicides indiscriminately to control the pest/ disease that resulted in the increased cost of production, decreased environmental health, harmful effects on pollinators and natural enemies, residual effect, lower keeping quality and directly affecting the human health.

III. Output:

To create awareness among the farmers regarding the use of bio-pesticides and their effectiveness, KVK has conducted different trainings on the use of bio-pesticides, various group discussions and method demonstrations like seed treatment of *Trichoderma*, published news paper articles to cover the large farming community. KVK has also conducted the vocational training programmes on production technologies for the bio-pesticides.

IV. Outcome :

Due to use of bio-pesticides, the crop productivity is increased by about 15%. Hence, KVK demonstrated this technology in various crops and showed its advantages to farmers. Mostly, the pomegranate farmers adopted this technology on large scale and got positive results.

Most of the pomegranate farmers were not aware about the use of bio-pesticides as preventive measures. They started to use different bio-pesticides as preventive measure and also for pest control on need basis. This resulted in the reduction in use of the chemical pesticides and fungicides upto 30-40% directly minimizing the cost of cultivation by 25%.

Quantifiable difference in cost of cultivation for the farmers:

The use of bio-pesticides reduced the spraying of chemical pesticides and fungicides, thereby reduced the cost of cultivation by about 25-30%. The bio-pesticides use also helped to increase the population of pollinators and natural enemies and improve the product quality.

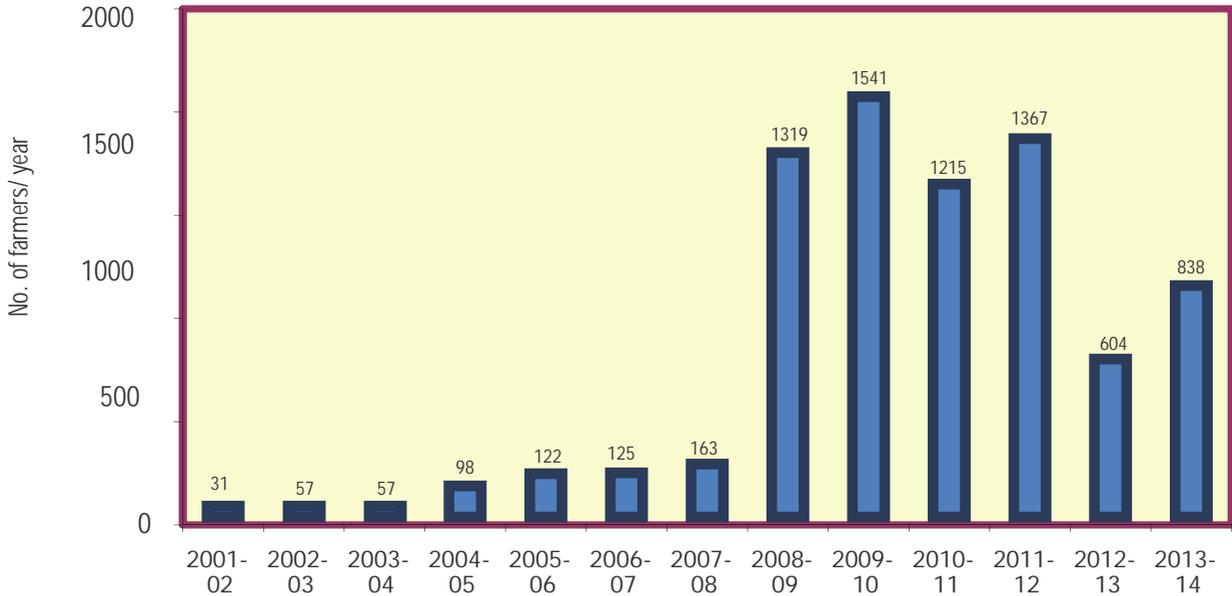
V. Impact :

The data available with KVK from 2001 to 2013 shows that every year there is increase in users of bio-pesticides. In 2002, only 50 Kg of bio-pesticides were used while in 2013 it reached to 8840 Kg. which shows the increase in awareness of the farmers about the bio-pesticides. The number of farmers using bio-pesticides also increased from 31 in 2002 to 838 in 2013.

Table 28 : No. of farmers using bio-pesticides from KVK

Year	No. of farmers
2001-02	31
2002-03	57
2003-04	57
2004-05	98
2005-06	122
2006-07	125
2007-08	163
2008-09	1,319
2009-10	1,541
2010-11	1,215
2011-12	1,367
2012-13	604
2013-14	838

Figure 7 : Number of farmers using bio-pesticides since 2001



अंत्रोवन | **ऑग्री स्पेशल** | **संस्करण, 12 जानेवारी 2014** | **९**

एकात्मिक पीक व्यवस्थापन ठरले दर्जेदार उत्पादनाचे रहस्य

**डाळिंब पिकातील
समस्या साल्या कमी,
वाढवले
एकरी उत्पादन**

डॉ. मिहिर जोशी

विद्यार्थी सहायकाचार्य, वारीवार उत्पादन पध्दतीचा वार पाठवतो. भारतीय व वैदेशी पीक व्यवस्थापनाचा अग्रगण्य कार्यकर्ता आहे. पूर्वी जिण्डाणीस वारीवार पध्दतीचा वारीवार अग्रगण्य कार्यकर्ता आहे. पूर्वी जिण्डाणीस वारीवार पध्दतीचा वारीवार अग्रगण्य कार्यकर्ता आहे.

डाळिंबातील समस्या

पिकाची समस्या साठीच्या उत्पादन पध्दतीचा वारीवार अग्रगण्य कार्यकर्ता आहे. पूर्वी जिण्डाणीस वारीवार पध्दतीचा वारीवार अग्रगण्य कार्यकर्ता आहे.

आयकराचे घेतले भारोपण

आयकराचे घेतले भारोपण. आयकराचे घेतले भारोपण. आयकराचे घेतले भारोपण.

वारीवार पध्दती

वारीवार पध्दतीचा वारीवार अग्रगण्य कार्यकर्ता आहे. पूर्वी जिण्डाणीस वारीवार पध्दतीचा वारीवार अग्रगण्य कार्यकर्ता आहे.

संयोजित व्यवस्थापन - वाढवलेल्या प्रतुष्टीची खात्री

संयोजित व्यवस्थापन - वाढवलेल्या प्रतुष्टीची खात्री. संयोजित व्यवस्थापन - वाढवलेल्या प्रतुष्टीची खात्री.

भवन घराचा पीक व्यवस्थापनातील खात्रीची खात्री

भवन घराचा पीक व्यवस्थापनातील खात्रीची खात्री. भवन घराचा पीक व्यवस्थापनातील खात्रीची खात्री.

वारीवार पध्दती

वारीवार पध्दतीचा वारीवार अग्रगण्य कार्यकर्ता आहे. पूर्वी जिण्डाणीस वारीवार पध्दतीचा वारीवार अग्रगण्य कार्यकर्ता आहे.

डाळिंब पिकातील समस्या

डाळिंब पिकातील समस्या. डाळिंब पिकातील समस्या.

प्रयोगाचे निष्कर्ष

प्रयोगाचे निष्कर्ष. प्रयोगाचे निष्कर्ष.

वारीवार पध्दती

वारीवार पध्दतीचा वारीवार अग्रगण्य कार्यकर्ता आहे. पूर्वी जिण्डाणीस वारीवार पध्दतीचा वारीवार अग्रगण्य कार्यकर्ता आहे.

8. Silage Making and feeding to cross bred cows in Rain fed area to increase the milk productivity

I. Technology :

Dairy enterprise is a major income generating activity in the rain fed and irrigated area of Pune District. Maize and sorghum are major fodder crops grown by the dairy farmers. Out of total population of cattle in the Pune district, 50% is crossbred animals, which require green fodder continuously for higher milk production. Area under fodder crops is only 5% of total area of the district. Green fodder is not available continuously over the year. Sugarcane tops are also available from November to March in the area and there is shortage of green fodder for animals. Dairy, goat and back yard poultry farming are subsidiary source of income generation for the medium and small farmers and marginal farmers in both irrigated and rain fed areas. Livestock farming is secondary source of income for medium, small and marginal farmers.

Thus, livestock management is a most potential area for development. Due to drought situation and low rainfall (450-500 mm) in the area, there is a severe shortage of green fodder and Leguminous fodder in summer season leading to malnutrition, low milk production and repeat breeding in cross bred animals in Rain fed area. Hence, demonstrations on maize green fodder production and silage making were organized by the KVK.

Silage making by using maize green fodder.

Cultivation of fodder Maize : After preparatory tillage of operation, farm yard manure 2.5 tractor trolley, DAP 250 kg, urea 125 kg and 125 kg MOP per ha and Micronutrients 25 kg FeSo₄, 25 kg ZnSo₄ per ha were applied.

Harvesting of fodder crop : Maize green fodder was harvested in month of December at the age of 85-90 days of maize crop at dough stage or half milk line stage. Green fodder crop having 30 % dry matter and 70 % moisture is harvested for silage making.

Filling of silo pit : 20 ft length x 6ft width and 5 ft depth pit or 20ft length, 12ft width and 5 ft. height subsurface silo tank was constructed with bricks. Stones or big soil balls were removed from the pit and blue colored plastic

film of 300 micron was spread in the pit covering all sides of the pit to make it water proof and air tight. Green maize fodder (75%) and fresh sugarcane tops (25%) were chaffed to make 2-2.5 cm small pieces of fodder; then this chaffed fodder was filled in the pit or in the subsurface silo tank layer by layer and pressed manually or by tractor. On each layer, of 1ft height, silage culture @ of 100ml + 1 lit water and urea 1 kg + 05 lit water was mixed separately and solution was sprayed in the silo pit (@ per tonne of chaffed green fodder). Same procedure was repeated till the filling of pit or silo tank. Pit was filled 2-3 ft above the ground level in 3-4 days and closed with plastic film and covered with soil or mud.

Opening of silo pit : Silo pit was opened 45-50 days after the sealing of silo pit from one side and required silage was removed and fed to the crossbred cows.

Quality check :

Good quality : Pleasant aroma, greenish yellowish colour, pH -3.5-4. If colour of silage is black it is considered as spoiled due to improper sealing, pressing, water leakage and improper stage of harvesting of crops.

II. KVK Intervention :

PRA was undertaken and KVK had identified 2 villages in Baramati tehsil, 1 village from irrigated area and 1 village from rain fed area and detailed information on silage making technology was given to dairy farmers in Jalgaon K.P. and Medad village. Three farmers from Jalgaon K.P. and one dairy farmer from Medad village came forward to implement the same. Hence, KVK has organised demonstration of silage making by pit method in the year 2011 in Jalgaon K.P. rain fed village and Medad in irrigated area of Baramati. With available rainfall in month of August and September, maize variety African Tall was cultivated for silage making.

Feeding of silage to cross bred cows: When there is shortage of green fodder in summer season silage 20 kg (Rs.2/kg) + 5-6 kg sorghum dry fodder (Rs.5/ kg)/ + 400g. concentrate (Rs. 20/kg) per lit of milk production + 100gm mineral mixture (Rs.60/kg) was

fed to milk producing cows and data on milk and fat content in milk were recorded (Feed cost Rs.156/day/cow).

Farmers practice: In summer season farmers are feeding Sorghum dry fodder (kadaba) 10 kg and Sugar cane tops 10 kg (Rs.1/kg) + 400gm concentrate per lit of milk production + 100gm mineral mixture to cows (Feed cost Rs. 146/day/cow).

III. Output :

The positive results obtained due to intervention are presented in the table below.

Table 29 : Details of the particulars increased due to intervention

Particulars	Demonstration	Farmers practice	Results
Milk yield/day/cow (in litres)	12.00	10.20	Increase in milk production by 17%
Fat content %	3.80	3.60	Increase in fat content in milk by 5%
Milk price Rs./lit	22.50	22.00	-
Gross Exp./day/cow (Rs.)	189/-	179/-	-
Gross Income/day/cow (Rs.)	270	224	-
Net income / cow / day. (Rs.)	81	46	Increase in Net income by 76%
B:C ratio	1:1.42	1:1.25	-

Table 30 : Details of activities conducted for intervention

Year	Details of activities	No. of Programme	No. of farmers	villages
2012	Training programme	8	222	15
	Group discussion	6	56	3
	Exposure visit	1	230	6
	Leaflet published on silage making	1	1000	35
2013	Training programme	5	261	15
	Group discussion	6	35	6
	Exposure visit	2	46	2
	Leaflet published on silage making	1	1000	33
2014	Training programme	4	136	16
	Group discussion	6	35	6
	Exposure visit	1	42	7
	Leaflet published on silage making	1	1000	31

organized in collaboration with NDDDB, Anand. 28 villages have adopted the silage making on their own after seeing success of this technology.



Considering the positive results of the silage making 20 farmers from the NICRA village adopted silage making in 2014.



Method Demonstration of Silage making

9. Back yard poultry farming for additional income

I. Technology :

Back yard poultry farming in the Pune district is a secondary income generating activity for the farm women. They are maintaining deshi hens which give 60-70 eggs/year, and the weight of adult cock is only 1.5 to 2 kg. They are selling eggs and the cocks for meat purpose. As they are not vaccinating these birds, the incidence of Ranikhet disease was 90-100% in summer season and there is outbreaks of fowl pox in winter season causing 15-20% mortality in chicks. Due to outbreaks of these diseases in the area, there is a risk for commercial poultry farming also and farm women are worried about these diseases.

II. KVK invention :

Vanaraja poultry birds Suitable for backyard farming in rural and tribal areas were developed by the

Project Directorate on Poultry (ICAR), Hyderabad. It is a multi-colored dual purpose bird with attractive plumage. It has better immunity against common poultry diseases and is adaptable to free range rearing.

Hence, Krishi Vigyan Kendra, Pune (Baramati) has organized 30 demonstration on Back yard poultry farming in Malegaon, Pandare of Baramati Block and Mawadi in Purandar. Twenty vaccinated 5 weeks old birds are provided to each family for back yard poultry farming in the year 2006 under KVK Demonstration in convergence with ATMA.

At the age of 5 weeks, these birds are delivered to farm women for rearing in their back yard and available grains like Maize, Sorghum, pear millet and kitchen waste were fed to these birds. These birds could also scavenge for their food from the surrounding.

Table 31 : Details of rearing of chicks for 5 weeks and vaccination with feeding schedule

Age	Vaccination	Preventive Medicines
1-5 days		1. Enrofloxacin liquid. 0.5ml/lit drinking water. 2. Vitamin A, E, D3, C liquid 3 ml for 100 birds in drinking water 3. Electrolytes power 50gm per 1000 birds in drinking water.
2 th day	Lasota vaccine one drop orally.	Vitamin A, E, D3, C liquid 3 ml for 100 birds in drinking water for 3 days to reduce stress of vaccination
14 th day	IBD live vaccine orally	Vitamin A, E, D3, C liquid 3 ml for 100 birds in drinking water for 3 days to reduce stress of vaccination .
3 rd wk.	-	Broton liquid 10ml per 100 birds in drinking water to improve feed intake and growth rate.
4 th wk.	Lasota booster In drinking water	Vitamin A, E, D3, C liquid 3 ml for 100 birds in drinking water for 3 days to reduce stress of vaccination.

Table 32 : Details on brooding and feeding to chicks

Age	Brooding Temperature (°f)	Type of Feed and rate of feeding
1 st wk.	95	First day - crushed maize grain and from 2nd day onwards - Pre starter 20 gm per day per birds
2 nd wk.	95	Pre starter
3 rd wk.	85	Desi starter feed
4 th wk.	-	Desi starter feed
5 th wk.	-	Desi starter feed

Farm women are advised to give RD vaccine (R2B) and Fowl pox vaccine at the age of 8-10 wks and booster after 6 month.

III. OUTPUT:

Seeing the success of above demonstration, KVK Baramati (Pune) has organized large scale demonstration on Vanaraja breed in 5 villages in 3 blocks (i.e. Dive, Mawadi, Belsar in Purandar Tehsil, Pandare, Malegaon in Baramati Tehsil, Khanota in Daund Block). Two field schools were organized under ATMA in Bhor and Velha Tehsil. 13 Training programmes and exposure visits and 5 Field days were organized on Back yard poultry management, Leaflets and 3 programmes through Community Radio Station on Back yard poultry management.

IV. Outcome:

Average egg production 1404 eggs with Vanaraja poultry against 594 eggs per year per family in farmers practice. 136% increase in egg production as compare

to farmers practice. More eggs are available for family consumption by rearing Vanaraja Poultry. Gross income increased by 105% while meat production increased by 44% against farmers practice.

Rearing of 20 Vanaraja birds in back yard resulted in gross income of Rs. 11,020 per year per family.

V. Impact :

By seeing the success of these programmes, there is huge demand for 5-6 wks old Vanaraja birds from the farmers, SHG women and farm women from Baramati, Purandar, Daund, Velha, Bhor. Hence, considering the demand from farming community KVK, Baramati has started Vanaraja Parent Farm and Hatchery for supply of quality chicks and birds. Vanaraja poultry breed for back yard poultry farming was adopted in 8 blocks of Pune District and also spread to 6 districts of Maharashtra (i.e. Pune, Satara, Solapur, Ahemadnagar, Raigad and Thane).

Table 33 : Performance of Vanaraja Birds under Back yard farming.

Sl. No.	Performance Parameters	Data on parameter		% Increase	Results
		Vanaraja	Deshi Birds		
1	Weight at 30 days	450 g	250 g	80%	Eggs & meat production increased by 136% & 44%, respectively
2	Weight at 4 month	2.00 kg	1.25 kg	60%	
3	Weight & age at laying	2.5 kg & 6 month Male 3.6 kg	1.75 kg & 7-8 month Male-2.5 kg	Eggs production started 1-2 month earlier & weight of male increased by 44%	
4	Egg production/year/hen	156	66	136%	
5	Mortality	10% due to dog and cat bite	10% due to dog and cat bite	-	-
6	Total eggs produced/year (9 Hen x 156 eggs)	14.4	594	136%	-
7	Sale of cocks for meat	8	8	-	-
8	Gross income /family /year (20 birds)	11020	5375		105%
9	Gross expenditure (Rs.)	5880	4380		
10	B:C Ratio	1:1:8	1:1.22		



Training programme and Exposure visiton Back yard poultry farming(Pandare).



Supply of Vanaraja Birds Under ATMA programme (Velha)



Table 34 : Details of Vanaraja Birds provided to women by KVK Baramati for back yard farming

Sl. No.	Year	Name of the Blocks Covered	No. of villages covered	No. of birds supplied by KVK	No. of Women Benefited
1	2010-2011	Baramati, Phaltan, Purandar, Indapur	16	2904	
2	2011-2012	Baramati, Phaltan, Purandar, Indapur	21	4596	153
3	2012-2013	Mangaon, Roha, Pen, Murud Janjira	16	12100	242
		Baramati, Shirur, Indapur, Purandar, Bhor, Phaltan	35	8737	404
4	2013-2014	Baramati, Daund, Indapur, Purandar, Bhor, Phaltan, Velha	54	15811	383

10. Loose housing system for crossbred HF cow for increasing milk productivity

I. Technology :

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, and acidosis in crossbred HF cows.

II. Intervention :

To overcome these problems associated with conventional method of animal rearing KVK has introduced the loose housing system. In this system of housing 70sq.ft area is provided under shed for feeding with concrete flooring and 125 sq. ft open paddock provided with sugarcane trash or wheat straw as bedding material which help to absorb the nutrients from urine and moisture from dung and thereby manure production increases by 50%. It also helps to provide comfortable bedding for sitting and standing and help to



Loose housing system dairy farm

maintain animals clean and dry. This system helps to facilitate the animals' mild exercise which helps to reduce digestion problems. Drinking water is made available for 24 hrs.

III. After Innovative Farming technology (IFT) :

1. Results of loose housing system:

IV. Outcome

1. FYM production of dairy farmers increased by 36%
2. Incidence of mastitis is reduced by 90% as animals were maintained clean.
3. Incidence of indigestion and Acidosis is reduced by 75%.
4. Increase in milk yield by 16% and fat content in milk increased by 12%.

V. Impact of Loose housing system :

By seeing the success of this technology SAAM TV has recorded and broadcasted for 3 times. One article was published by SAKAL News paper and more than 95000 dairy farmers from Maharashtra and other state has visited loose housing system model developed at KVK, and Farmers units at Medad Tal. Baramati. In the area of Baramati, 210 farmers adopted the loose housing system for their dairy animals. In the Medad village near to KVK, 15 farmers adopted the loose housings system.

Table 35 : Details of the observations on Loose Housing System

Sl. No.	Particulars	Before intervention	After Intervention of KVK	Remark
1	Average milk yield/day (in litres) 1. Rainy Season 2. Winter season 3. Summer season	175 230 150	199 254 175	
	Average milk production per day	185 lit.	209 lit.	Average increase in milk yield by 2 lit/day/cow
2	Fat content in milk (%)	3.6	4.0-4.2	Increase in fat content in milk due to mild exercise and improvement of digestion
3	No. of Insemination per Conception	2-3	1-2	Due to timely identification of oestrus in cows
4	FYM production per year	56 tractor trailers	76 tractor trailers	Sugarcane trash is used as bedding material in open yard
5	Milking system	Hand milking & time required for milking 1 hr/2 persons	Machine milking & time required 30 minuts/ one person	Due to two can cluster bucket milking
6	Cost of treatment (Rs.)			
	On mastitis /month	1,500	Nil	Due to clean environment in open yard
	On Indigestion /Month	2,000	Nil	Due to mild exercise in open yard and fresh air
7	Availability of water	2-3 times /day	16-18 hrs /day	Water is made available in open yard for 24 hrs



The then DDG (Extension), ICAR, New Delhi Dr. K. D. Kokate & Dr. N. Sudhakar, ZPD, Zone V, Hyderabad visiting Loose housing Dairy farm at Medad. Tal .Baramati.

11. Reaching the Unreached through K-MAS (Kisan Mobile Advisory Services)

I. Technology :

Using messaging system on mobiles : Now a days many farmers even in rural areas possess mobile phones. Communicating to them through mobile SMS (Short Messaging Services) is very fast, less time consuming and cheaper. The KVK has been implementing this system for past 10 years to provide need based agro-advisories to farmers.

II. KVK intervention :

KVK sends SMS about the future activities in collaboration with IMD & Rahuri University regarding Weather information, Disease forecast, Field day programs, about seed/ grafts availability, trainings, agro advisory to registered farmers of CIGs. All these SMS are sent in Marathi Language.

III. Output :

At present more than 15000 farmers from about 180 villages have registered their names with the KVK. In last 5 years more than 877540 mobile SMS were sent. We are arranging to send at least one SMS in 3 days to every farmer. The cost of 1 SMS is just Rs. 0.10 that is very cheap compared to phone calls or letters sent to farmers. Presently the service is free to farmers but we are confident that the farmers will not hesitate to pay for such service in future.

KVK, Baramati provided database of about 7000 farmers to Mahindra Samridhhi for sending SMS related to weather & agricultural technologies free of cost to

farmers under KVK jurisdiction. As per farmers feedback they are receiving sms regularly from Mahindra Samridhhi.

Aim at dissemination of Information -

1. Need based agrometeorological advisory services to the farmers at the right time based on local context and culture.
2. To bring together experts and grass root level communities in a two way communication with the objective of making improved knowledge accessible to all farmers.
3. Dissemination of agro advisory and feedback from farmers through the involvement farmers club.

Focus : Main focus of the endeavour is application of ICT (Information & Communication Technology). It envisages taking advantage of the latest ICT initiatives for improving productivity of crops and augmentation income of farmers through.

1. Internet
2. Mobile phone based extension tool

Area covered : 8 Tehsils (Baramati, Daund, Indapur, Bhor, Purandar, Velha, Phaltan, Malshiras).

No. of farmer's club joined : 153

SMS Type - Weather based agro advisory, animal health care and training programmes etc.

Language used for SMS : Marathi



Mobile SMS send to farmer

IV. Outcome & impact

Table 36 : Feedback from farmers

Name	Village	Feedback
Mr. Ramchandra Dhore	Malshiras	Mobile SMS helped to check the attack of thrips & blight in onion saving plant protection cost due to right time spray & Increase in Yield up to 5q/ha
Mr. Pralahad Ware	Malad	Due to timely advisory, he got 12 tonnes more yield of sugarcane crop and Rs. 25,600/acre additional income
Mr. Ramchandra Madane	Gunawadi	Advisory on animal nutrition, mineral mixture & Vaccination led to increased cow milk production up to 1 to 1.5 liter per day and reduction in disease incidence.
Mr. Dhanshing Jagatap	Jalgaon Kp	Increase in sorghum yield by growing Variety Phule Vasudha (7.5 q/ha)
Mr. Anil Jadhav	Katewadi	Advisory for management of oily Spot (BBD) in Pomegranate was useful to check the attack of oily spot with <i>Bacillus subtilis</i> & <i>Pseudomonas</i> bacteria.
Mr. Atul Shankar Waghmode	Malshirash	Weather and crop advisory useful for adopting proper spray schedule in vegetable crops
Mr. Anil Pandurang Waghmode	Malegaon Bk	Advisory useful for managing Downy mildew in Grape by timely spray

Table 37 : Year wise SMS sent

Content category	2011-2012		2012-2013		2013-2014		2014-2015 (till date)	
	No. of Messages	No. of Farmers	No. of Messages	No. of Farmers	No. of Messages	No. of Farmers	No. of Messages	No. of Farmers
Crop Production	13	16520	21	25414	10	4794	24	32337
Crop Protection	11	2211	26	35331	69	33575	41	33860
Livestock & Fisheries Advisory	2	331	5	5406	5	224	24	3582
Weather Advisory	9	65890	8	25539	48	12239	24	29240
Events information	5	10760	27	29288	43	30648	24	30648
Inputs availability	1	65	3	229	2	416	2	1296
Total	41	95777	90	119229	177	81896	139	130963

12. Direct Marketing through Dhanya Mahotsav (Food Grain Festival)

I. Technology :

In KVK Baramati Jurisdiction area farmers are cultivating paddy, wheat, sorghum, pulses, watermelon, muskmelon, Bengal gram, finger millets, turmeric and vegetables as major crops. Traditionally they sell their products to traders and middle men at low rates whereas consumers are purchasing same products at higher rates. Farmers and consumers both expect reasonable prices for the farm products. To overcome this problem KVK has decided to organize a *Dhanya Mahotsav* (food grain festival) in Baramati. This new initiative for direct marketing of the farm produce from producers to the consumers without any middle man has been undertaken by KVK Baramati since 2013.

II. KVK Intervention :

Most farmers tend to sell the food grains produced in bulk quantities in one go to traders in the market committees which fetches them moderate prices and less net profit. On the other hand consumers expect to get quality farm produce at reasonable prices. Farmers and consumers both expect reasonable prices for the farm produce. In order to achieve this objective, KVK Baramati took the initiative of bringing the farmers and the consumers on one platform where the farmers could directly sell to consumers without any middle man/traders. First festival was organized on 21st April to 23rd April 2013.

III. Outcome

It was the first attempt of the KVK in Baramati to organize a food grain festival. The festival was conducted over 3 days in the April 2013. Farmers from 6 different blocks (Bhor, Velha, Baramati, Indapur, Khed, Purandar and Phaltan) from districts, Pune and Satara participated in the food grain festival with their products. KVK had chosen selected farmers to ensure the availability of variety of farm produce in the festival. In all 35 farmers participated in the festival. 1750 families from Baramati area attended the festival and purchased farm produce worth 15 lakh.

The farm produce available for sale were wheat, rice, Jowar, Bajra, finger millet, pulses, watermelons, musk melons, vegetables, turmeric, honey, raisins, and jaggery. The response from the consumers was so overwhelming that the material that was brought by some farmers to be sold over 3 days got exhausted on first day itself and they had to bring the material again for sale on remaining days. Rice varieties like Indrayani, Ambe Mohor, Tamsal, Basmati and wheat, Sorghum had excellent demand. In these 3 days, 13 tonnes of Jowar, 6.4 tonnes of Wheat, 8.3 tonnes of Rice, 2.15 tonnes of pulses, 2 tonnes of melons, 1.5 tonnes of sugar, 150 kg turmeric powder were sold.

Local Agril. Produce Marketing Committee (APMC) provided the space free of cost to the KVK. The maiden effort raised the bar of confidence of the KVK as well as farmers to a great extent such that *Dhanya Mohotsav* become an annual event of the KVK.

Based on positive results of first year, *Dhanya Mahotsav* (Food Grain Festival) was organized in second year by Krishi Vigyan Kendra (KVK), Baramati on 25-27 April 2014. In 2014, farmers from nine different blocks from four districts viz. Pune, Satara, Sangli and Solapur participated in the food grain festival with their produce. KVK identified farmers to ensure the availability of variety of farm produce in the festival. The farm produce available for sale were wheat, rice, jowar, bajra, finger millet, pulses, watermelons, muskmelons, vegetables, turmeric, Bengal gram powder, honey, raisins, homemade spices, sugar etc. Rice varieties like Indrayani, Ambe Mohor, Tamsal, Basmati, and wheat, jowar, Bengal gram powder had excellent demand. In 3 days, 15.2 tons of rice, 9.1 tons of wheat, 6.2 tons of jowar, 3.15 tons of pulses, 6.2 tons of melons, 1.5 tons of Bengal gram powder, 1.3 tons of sugar, 250 Kg turmeric powder and 1.2 tonnes of vegetables were sold. Nearly 45 farmers and 3150 families participated in the festival and farm produce worth Rs. 28, 44,250/- was sold.



IV. Outcome and impact

Food grain festival -25.04.2014 to 27.04.14

- Total no. of visitors – 3150 families (6300 visitors)

- Total sale of 3 days – Rs. 28,44,250/-
- 45 stalls arranged

Table 38 : Products sold in Food Grain Festival - 2014

Sl. No.	Product	Total quantity sold (kg.)	Local Rate	Festival Rate
1	Rice	15,231	Rs. 25 to 35/kg	Rs. 45 to 60/kg
2	Wheat	90,127	Rs. 1,700/q	Rs. 2,300 to 3,000/q
3	Sorghum	60,241	Rs. 2,000/q	Rs. 2,500 to 2,600/q
4	Pulses	3,191	Rs. 40 to 60/kg	Rs. 80 to 100/kg
5	Musk Melon	4,500	Rs. 15 to 20/kg	Rs. 30 to 35/kg
6	Watermelon	1,531	Rs. 15 to 20/kg	Rs. 35 to 40/kg
7	Vegetables	1,251	Rs. 12 to 15/kg	Rs. 20 to 40/kg
8	Jaggary	5,590	Rs. 35/kg	Rs. 50 to 90/kg
9	Spices	531	-	-
10	Bengal gram powder	1,541	Rs. 50 to 60/kg	Rs. 90 to 100 kg

13. Entrepreneurship Development through Agri Clinic & Agri Business Management

I. Technology

As per mandates of KVK as conducting various training programme for farmers, farm women, rural youth and extension functionaries based on the principle of Learning by Doing. The training are need based and location specific in nature More emphasis is also given on self employment oriented training programmes for school dropouts and unemployed rural youth. These trainings include poultry farming, goat farming, dairy farming, nursery, polyhouse, sericulture, Bee keeping, etc. Many candidates after training have successfully started their own business and get self employed. However some trainees are facing the problem of money to invest in the business.

II. Intervention -

Due to this problem the KVK has started vocational training center Agriclincs and Agribusiness training center in the year 2006 in collaboration with National Institute of Agricultural Extension Management (MANAGE) Hyderabad. The Agricultural and allied graduates and Agri diploma holders are eligible for this training .This is two months residential training which emphasizes on entrepreneurship development of students includes lectures, field visits, Market survey, Hands on experience etc. The main objective of this training is to motivate and train the youth for starting agriculture business and develop themselves as an entrepreneur and for dissemination of new technologies and information to the farmers and to create

employment in their area of work. The participants are charged only Rs. 500 including food and accommodation for two months. After completing the training, they have to submit project reports upto Rs. 20 Lakh to the respective banks and they will get 36% subsidy (44% for Women, SC and ST students) from NABARD.

III. Outcome :

The KVK has started this training center in 2006 and upto year 2014, total 18 training programmes were conducted with total 518 candidates from different districts of Maharashtra like Pune, Satara, Solapur, Ahmednagar, Beed, Aurangabad, Sanagali, Kolhapur, Nanded, Osmanabad, Jalana, Latur, Ratnagiri. These participants were trained as entrepreneurs and given different types of skills and knowledge through the training.

Impact -

Since 2006, total of 518 persons were trained out of which, 208 started different types of businesses like Agro Service Centre. Dairy farming, Goat farming, Poultry farming, Polyhouses, Nursery, Milk collection center, vermi compost units, etc. They also created employment in their area of work and rendering different types of extension services to farmers. The percentage of Success rate of training is 40.15%. In all 52 trainees availed the bank loan and got the subsidy from NABARD.

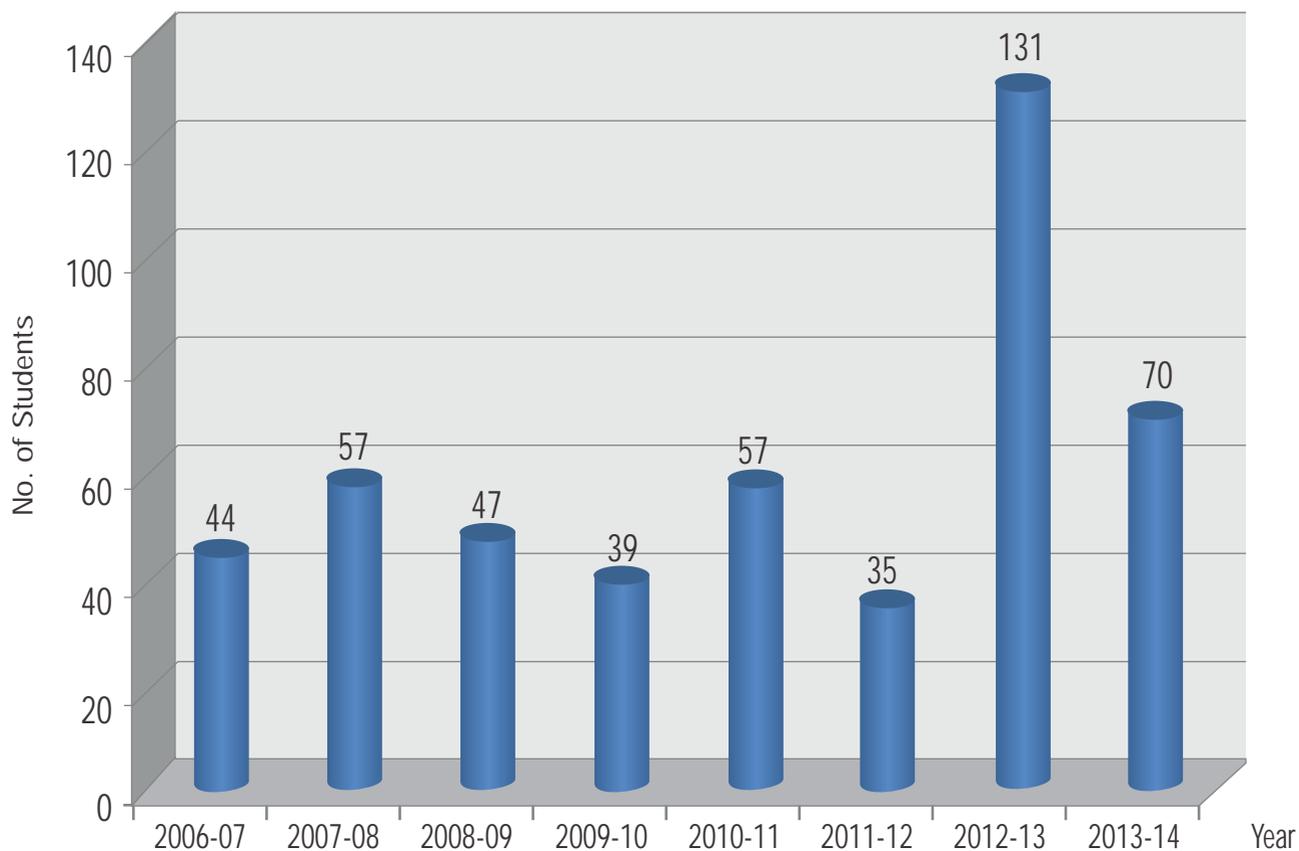


Training under ACABC Course at KVK

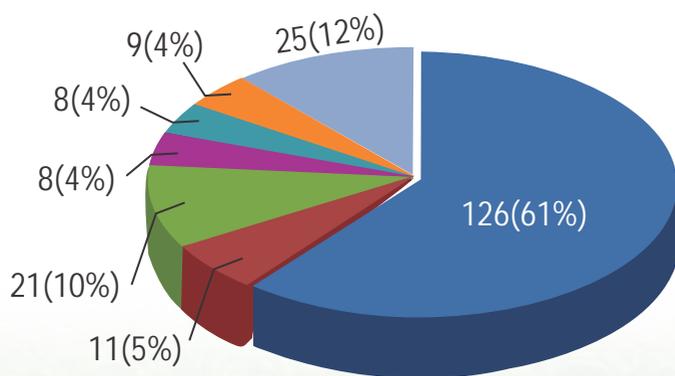


An entrepreneur started own business after completion of training

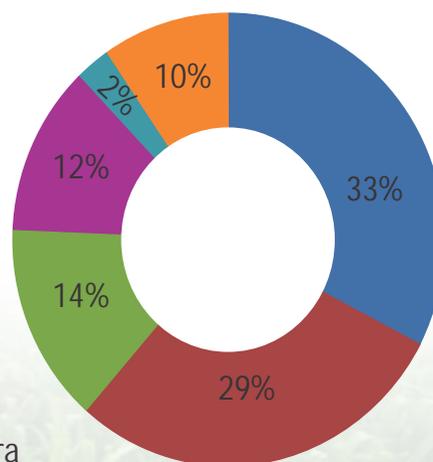
Fig. 8 : No. of students trained (518) 2006-2014



Ventures Established (208) 2006-2014



District wise Students trained



- Agro Service Center
- Nursery
- Dairy Farming
- Vermicompost
- Green House
- Poultry farming

- Pune
- Satara
- Solapur
- Ahmednagar
- Beed
- Other

Success Stories-



Neem Processing Unit - Mr. Deepak Khomane



Agro Service Center - Mr. Umesh Dodmishe



Milk Collection Center : Mr. Vikram Borawake



Nursery - Mr. Sachin Yadav



Poultry Unit - Mr. Rajendra Jagtap



Dairy Unit - Mr. Devendra Shelar

New initiatives of KVK Baramati



Chaitra Palvi



Agricultural Technology Mahotsav



Annual Zonal Workshop of KVK's - Zone V



Swachha Bharat Abhiyan



Implement Bank