Technology Assessment, Refinement and Transfer

A number of activities were taken up for technology assessment, refinement and demonstration of technology/product and its dissemination through training of farmers and extension personnel. At present, there are 541 Krishi Vigyan Kendras (KVK) sanctioned by the ICAR which include 364 under State Agricultural Universities, 37 under ICAR Institutes, 89 under NGOs, 32 under State Governments and the remaining 19 under various other organizations.

Treatment of animals

KRISHI VIGYAN KENDRAS

The activities of the KVK are enumerated here.

On-farm trials

The KVKs took up 4,109 on-farm trials (OFT) involving 537

On-farm trials by KVKs

Crops/ enterprises	Varietal/ feed evaluation	Nutrient management	Cropping system/ farming system	Resource conservation*	Weed management	Insect/ disease management	Farm implements and tools	Total
Cereals	28 (354)	33 (322)	24 (165)	2 (76)	11 (74)	24 (123)	1 (9)	123 (1,123)
Oilseeds	13 (80)	25 (155)	15 (53)	–	5 (54)	12 (118)	1 (6)	71 (466)
Pulses	13 (86)	19 (91)	9 (42)	1 (20)	3 (9)	17 (196)		642 (444)
Commercial crops	7 (75)	10 (43)	3 (11)	–	1 (1)	14 (169)	2 (13)	35 (312)
Vegetables, fruits and flowers	31 (278)	40 (290)	35 (145)	2 (13)	7 (37)	72 (628)	–	187 (1,391)
Livestock production and management	8 (25)	27 (187)	3 (10)	–	–	5 (38)	–	43 (260)
Fishery	–	–	4(17)	–	–	–	–	4 (17)
Home science	–	10 (96)	–	–	–	–	–	10 (96)
Total	100 (898)	164 (1,184)	93 (443)	5 (109)	27 (175)	144 (1,272)	4(28) (28)	537 (4,109)

*Resource conservation also includes zero-tillage; figures in parenthesis indicate the number of trials.

technologies on various aspects of agriculture including varietal evaluation (100), nutrient management (164), cropping system/ farming system (93), resource conservation (5), weed management (27), insect/disease management (144), and farm implements and tools (4).

Varietal evaluation

Performance of improved wheat varieties in Jharkhand: KVK, West Singbhum conducted on-farm trial to evaluate the performance of wheat variety K 9170 over Sonalika presently cultivated by the farmers. K 9170 with seed rate of 150 kg/ha produced significantly higher grain yield (35.08 q/ha), highest net return (Rs 15,581/ha) and highest B : C ratio of 2.56.

Assessment of salt tolerant rice varieties in tsunami affected low-lying valley areas of Andaman and Nicobar Islands: KVK, Port Blair conducted on-farm trial on three improved varieties of rice–BTS 24, Sumathi, and CSR 7-1 with the popular variety C 14-8 for their performance in tsunami affected low lying locations in Andamans. BTS 24 registered 61% increase in yield over farmer's adopted variety C 14-8 and 7% increase over Sumathi, another improved variety.

Performance of potato varieties for yield and late blight incidence in Bihar: Performance of potato varieties (Kufri Puskar, Kufri Arun, and Kufri Jawahar) for higher yield and tolerance to late blight was assessed in 0.12 ha area by involving 10 farmers in surrounding villages of KVK, Darbhanga during *rabi* season. Both Puskar and Arun varieties were tolerant to late blight. Puskar recorded highest yield level of 228 q/ha resulting in an increase of 36% over Arun and 52% over locally adopted variety. There was no incidence of late blight in Kufri Puskar and Kufri Arun, while Kufri Jawahar and locally adopted variety had disease score of 2 and 3 respectively.

Performance of tomato varieties in Andhra Pradesh: KVK, Kadapa conducted on-farm trial on three varieties of tomato at three different locations under protective irrigation system. The yield of improved variety (US 618) was 50.87 tonnes/ha, which was 30% higher than locally adopted non-descriptive variety, with highest B : C ratio of 1.96.

- KVKs conducted 4,109 on-farm trials involving 537 technologies on varietal evaluation, nutrient management, insect and pest management, cropping system, weed management, resource conservation, and farm implements and tools.
- The performance of wheat variety K 9170 with seed rate of 150 kg/ha over Sonalika produced higher grain yield (35.08 q/ha), highest net return (Rs 15,581/ha) and highest B : C ratio of 2.56.
- Both the potato varieties Puskar and Arun were tolerant to late blight, while kufri Jawahar and locally adopted variety had disease score of 2 and 3 respectively.

Performance of okra varieties in Himachal Pradesh: KVK, Hamirpur evaluated the performance of three improved varieties of okra, viz. Prabhani Kranti, P 8 and Tulsi against the non-descriptive locally adopted variety. Tulsi variety yielded highest (140 q/ha) followed by Parbhani Kranti (135 q/ha) and P 8 (120 q/ha) with 52, 47 and 30% increase in yield over local variety respectively.

Performance of capsicum varieties in Himachal Pradesh: The performance of two varieties of capsicum, Bomby and Orebelle against the non descriptive variety in use in the fields of 10 farmers was evaluated for yield by KVK, Solan. Orebelle variety yielded highest (1,160 q/ha) followed by Bomby (1,015 q/ha), which was 231 and 190% higher than locally adopted variety. B: C ratio of Orebelle was the highest. KVK, Kinnaur (Himachal Pradesh) evaluated the performance of four hybrids/varieties of capsicum, California Wonder, Solan Hybrid II, Bharat and Capsicum Hybrid 041 against the non descriptive variety in use, at the fields of four farmers. Capsicum Hybrid 041 and Solan Hybrid II yielded 211.2 q/ha and 210.3 q/ha respectively, followed by Bharat (205.4 q/ha) and California Wonder (170.7 q/ha). The increase in yield over farmers adopted non-descriptive variety was 91.1% for Capsicum Hybrid 041, 90.3% for Solan Hybrid II, 85.9% for Bharat and 54.5% for California Wonder.

Performance of cucumber varieties in Himachal Pradesh: KVK, Kinnaur evaluated the performance of four varieties of cucumber, Khira 75, Khira 90, Khira Hybrid 1 and Amrit Hybrid against the non-descriptive variety in use at the fields of three

Performance of US 618 and NS 5005 on yield and income of tomato

Variety	Duration (days)	Plant height (cm)	No. of fruits/plant	Yield (tonnes/ha)	% increase in yield	B : C ratio
Local variety	125	90	22	39.12	–	1.34
US 618	155	165	35	50.87	30.03	1.96
NS 5005	125	120	27	43.56	11.34	1.54

farmers covering 1.25 ha. The yield was in the order of Amrit Hybrid > Khira Hybrid 1 > Khira 90 > Khira 75 > local Khira (Control). The yield of Amrit hybrid was double than the locally adopted variety.

Performance of different varieties of broccoli in Himachal Pradesh: KVK, Kinnaur evaluated the performance of three varieties of broccoli namely Palam Samridhi, Fiesta Hybrid and Calabrese Hybrid against the variety in use (Green Head) at the fields of two farmers. Fiesta Hybrid yielded 207.3 q/ha followed by Palam Samridhi (196.7 q/ha) and Calabrese Hybrid (190.8 q/ha) with Fiesta Hybrid showing highest increase in yield over control.

Performance of brinjal varieties in Bihar: KVK, Jamui undertook on-farm trial with three hybrids of brinjal, viz. Swarna Shyamli, Swarna Shakti, and Pusa Hybrid 9 on farmer's field in Nawadeeh village of Khaira block. The locally adopted variety Pusa Kranti was taken as control. Pusa Hybrid 9 achieved 50% flowering in 48 days with average fruit weight of 149 g and was the highest yielder. The highest yield was recorded in Pusa Hybrid 9 (610 q/ha). Swarna Shyamli was an early flowering variety with bigger fruits, but less number of fruits per plant.

Performance of maize varieties in Himachal Pradesh: The performance of four varieties of maize, viz. Plant gene, Ganga Kaveri, Bio Seed and Polo against the non-descriptive variety in use at farmers' fields was evaluated by the KVK, Hamirpur. Ganga Kaveri yielded highest followed by Bio Seed, Polo and Plant Gene respectively. Ganga Kaveri also yielded 44% more than the locally adopted variety.

Performance of rice cultivars under upland situation in Bihar: KVK, Sheikhpura conducted on-farm trial on rice to assess the performance of three rice cultivars along with non-descriptive variety adopted by the farmers under upland situation, the results show that Prabhat gave the highest yield, which was 50% more than the non-descriptive variety adopted by the farmers.

Performance of rice cultivars in Bihar

Variety	Yield (q/ha)	Increase in yield (%)
Farmers variety	20	–
Prabhat	30	50
Gautam	28	40
Richaria	18	–

Performance of mustard (*raya*) varieties under rainfed condition in Bihar: KVK, Sheikhpura conduced on-farm trial to assess the performance of three mustard varieties, viz. Pusa Jai Kisan, Pusa Bahar, and Pusa Bold with locally grown non-descriptive variety as check under rainfed condition. Pusa Jai Kisan gave the highest yield (12 q/ha) which was 50% more than the locally grown, non descriptive variety.

Yield performance of cultivars of mustard under rainfed condition

Variety	Yield (q/ha)	Increase in yield over control (%)
Local variety	8	–
Pusa Jai Kisan	12	50.0
Pusa Bahar	10	25.0
Pusa Bold	11	37.5

Yield evaluation of sunflower hybrids in Punjab: KVK, Nawanshahar evaluated the yield performance of two new hybrids of sunflower, PSFH 652 and PSFH 569 against PSFH 118 at farmers' fields. PSFH 652 yielded (30.43 q/ha) and PSFH 569 (28.76 q/ha), being 12 and 6% higher over PSFH 118 (locally grown variety) respectively.

Performance of varieties of sunflower

Variety	Yield (q/ha)	(%) Increase in yield over control
PSFH 118 (Locally grown)	27.16	–
PSFH 652 (Improved)	30.43	12
PSFH 569 (Improved)	28.76	5.8

Nutrient management

Performance of rice varieties under different nutrient levels in Jharkhand: On-farm trial was conducted by KVK, West Singhbhum on performance of rice variety IR 64 under different nutrient levels against the local variety Bhojana. The grain yield of

- Integrated nutrient management not only reduced 60% infestation of coconut mite but also increased yield by 98% compared to farmers' practice.
- Line-sowing of sunflower gave 15% higher yield over farmers' practice of broadcasting and ridge sowing.
- The productivity of low land rice can be enhanced by soil application of *Azospirillium* 7.5 kg/ha + 40 kg N/ha in the form of urea through mud ball in two equal splits.
- Application of NAA @ 20 ppm + 10 ppm GA resulted in higher yield (98.4 q/ha) besides reducing fruit and flower drop.

Performance of IR 64 variety of rice at different nutrient levels

Level of nutrients	Tillers/ m^2	Grain yield (q/ha)	Cost of production (Rs/ha)	Net return (Rs/ha)	B : C ratio
Bhojana + farmers' practice of nutrient application (40 kg N: 20 kg P/ha)	18	16.30	7,650	2205	1.29
IR 64 + farmers' practice (40 kg N : 20 kg P/ha)	26	24.70	7,850	6,745	1.86
Bhojana + balanced dose of nutrients (80 : 40 : 20 kg NPK kg/ha)	28	26.40	9,225	6,375	1.69
IR 64 + Balanced dose of nutrients (80 : 40 : 20 kg NPK kg/ha)	34	36.80	9,425	11,335	2.20
CD at 5%		8.65		4,585	0.33

Selling price of grain: @ Rs 450/q.

IR 64 was found to be 36.8 q/ha when grown with balanced dose of nutrients (80 : 40 : 20 kg NPK/ha). It also gave significantly higher net returns (Rs 11,355/ha) and B : C ratio of 2.20.

Enhancing productivity of low land rice using *Azospirillium* and mode of urea application in West Bengal: The farmers of South 24 Parganas use 40 kg N/ha as top dressing through urea by broadcasting method in rice, leading to loss in nitrogenous fertilizer through leaching as well as flooding. KVK, South 24 Parganas conducted on-farm trial on soil application of *Azospirillium* in combination with urea through mud balls. The soil application of *Azospirillium* (7.5 kg/ha) along with the farmer's practice increased yield by 5.5% over farmers' practice of top dressing of 40 kg N/ha. The maximum yield was recorded under the treatment of soil application of *Azospirillium* 7.5 kg/ha + 40 kg N/ha in the form of urea through mud ball in two equal splits. Thus through judicious application of nitrogenous fertilizer in combination with biofertilizer, the productivity of low land rice can be enhanced.

Optimum combination of inorganic and organic sources of nutrients for rice in Uttar Pradesh: KVK, Raebareli conducted on-farm trial on rice crop grown through combination of inorganic and organic nutrients. The highest grain yield (41.5 q/ha) as well as highest net returns were recorded with N : P : K @ 120 : 60 : 60 kg/ha when applied in 50 : 50 ratio through inorganic fertilizers and vermicomposting.

Optimum combinations of inorganic and organic sources of nutrients for higher rice yield

Nutrient combination	Yield (q/ha)
Farmers' practice (Non application of vermicompost)	32.0
NPK @ 120 : 60 : 60 kg/ha (inorganic source)	40.0
NPK @ 120 : 60 : 60 kg/ha (vermicompost)	36.8
NPK @ 120 : 60 : 60 kg/ha(50% inorganic and 50% vermicompost)	41.5

Effect of nitrogen on yield of *gobhi sarson* (mustard) in Punjab: KVK, Faridkot conducted on-farm trial to assess the effect of different levels of nitrogen on the yield of *gobhi sarson*. The results indicate that 125 kg/ha of nitrogen gave highest yield (22.62 q/ha) of *gobhi sarson*.

Effect of Boron application in cauliflower in Bihar: KVK, Banka conducted on-farm trial on effect of application of boron on cauliflower at different levels. The application of boron @ 10 kg/ha along with other recommended practices gave yield of 282 q/ha as compared to 277 q/ha by application of boron @ 7.5 kg/ha.

Effect of nutrient sources on yield of garlic bulb in Maharashtra: KVK, Jalna conducted on-farm trial on yield of garlic bulb. Application of 50% recommended dose of fertilizers with 800 kg vermicompost and 400 g PSB/ha resulted in increase

Effect of nutrient application through different sources on size and yield of garlic bulb

Sources of nutrients	Bulb size (mm)	Yield of bulb (q/ha)
Application of 10 cartloads of FYM + 40 kg N and 20 kg P through chemical fertilizer/ha	13.56	18.69
Application of 25 cartloads of FYM + 50 kg each NPK/ha	24.44	20.87
50% dose of T2 + 800 kg vermicompost + 400 g PSB/ha	29.60	22.61
SE ± (P=0.05)	0.944	0.530
CD 5% level	2.175	1.224

of bulb size (29.6 mm) and higher bulk yield of 22.61 q/ha.

Effect of micronutrient spray on yield of sweet orange in Maharashtra: KVK, Jalna conducted on-farm trial to assess the effect of micronutrients spray on yield of sweet orange. Two sprayings of NAA 2 ml/10 litre of water at the stage of pea size fruit and 15 days after first spray followed by micronutrient (micnell-32) 40 g/10 litre resulted in increase number of fruits (744/tree) and higher yield (177 kg/tree)

Effect of micronutrient spray on yield of sweet orange

Micronutrients	No. of fruits/ tree	Yield (kg/ (kg/tree)
No control measures for management of fruit drop	443.96	94.83
Spraying of NAA 2 ml/10 litre at pea size fruits followed by second spray after 15 days	660.92	153.41
Spraying of NAA 2 ml/10 litre at pea size fruits followed by second spray after 15 days + spraying of micronutrient (micnelf-32) solution 40 g/10 litre of water	744.72	177.23
SE ± (P=0.05)	18.77	4.452
CD 5% level	43.29	10.267

Effect of humic acid on yield of sugarcane in Maharashtra: KVK, Ahmednagar conducted on-farm trial at 10 locations to assess the efficacy of application of humic acid on growth of root and cane yield of sugarcane in alkali soils with three treatment combinations. Application of recommended dose of fertilizer (250 : 115 : 115 NPK kg/ha) + 25 tonnes/ha FYM + 3.75 kg/ha humic acid resulted in higher tillering (6.63) and cane yield (17.76%) besides increased internodal length (18.64%) compared to other treatments.

Management of fruit and flower drop in chilli in Maharashtra: KVK, Sholapur conducted on-farm trial to assess the effect of growth regulators on fruit and flower drop in chilli at three locations. Application of NAA @ 20 ppm + 10 ppm GA resulted in higher yield (98.4 q/ha) besides reducing the fruit and flower drop.

Insect and pest management

Management of complex disease problem in green pea during off season in Himachal Pradesh: Farmers in Mandi district cultivate vegetables in the off-season to get better price, however, the yield is low due to complex disease problems. KVK, Mandi conducted on-farm trial to control complex disease problems in green pea with five treatments. Seed treatment with fungicide (Carbendazim @ 2.5 g/kg) + Soil application of bioagent @ 2.5 kg/62 kg FYM/ha was found to be most effective with a yield of 68.5 q/ha, which was 79% higher than the yield

Effect of different control measures on control of disease and yield of green pea

Control measures	Yield (q/ha)	Increase (%)	B : C ratio
Farmers' practice (No control measure)	38.3	–	4.1
Seed treatment with fungicide (carbendazim @ 2.5 g/kg)	52.6	37	5.9
Soil application of bioagent (*Trichoderma viridae*) @ 2.5 kg/62 kg FYM/ha	50.5	32	5.2
Seed treatment with bioagent (*Trichoderma viride*) @ 4 g/kg seed	40.6	6	4.3
Seed treatment with fungicide (carbendazim @ 2.5 g/kg) and Soil application of bioagent (*Trichoderma viride*) @ 2.5 kg/62 kg FYM/ha	68.5	79	7.1

Effect of growth regulators on fruit and flower drop in chilli

Growth regulator	Plant height (cm)	Average branches (number)	Fruits (No.)	Fruit length (cm)	Fruit weight (g)	Fruit/flower drop (%)		Yield (q/ha)
						Fruit	Flower	
No use of growth regulators	62	7	155	7	1.86	9	17	80
Use of NAA @20 ppm	62	7	163	7	1.87	2	3	88
Use of T_2 + GA @ 10 ppm	70	7	163	9	2.10	2	3	98

obtained through farmers' practice of no control measure (38.3 q/ha).

Management of shoot and fruit borer (*Leucinode orbonalis*) and yield of brinjal in Pakur district of Jharkhand: KVK, Pakur conducted on- farm trial on management of shoot and fruit borer in brinjal. Results revealed that the low infestation 4% and highest yield (239 q/ha) was obtained by spraying Imidachloprid at the interval of 15 days.

Effect of practices on control of shoot and fruit borer (*Leucinode orbonalis*) and brinjal yield

Control measures	Yield (q/ha)	Extent of infestation (%)	B : C ratio
Dimethoate spray @ 2 ml/litre, 2–3 times (farmer's practice)	120	20	4.2
Carbaryl or Malathion spray @ 2 ml/litre and spray with Cypermethrin @ 1 ml/litre of water (before fruit setting) —recommended practice	280	12	5.6
Soil application of neem cake, 8% @ 500 kg/ha during transplanting, repeated during flowering stage, spray of neem oil @ 2 ml/litre of water and spray of monocrotophos @ 1.5 ml/litre of water 15 days later-refined practice	291	8	6.1

KVK, Gadag in Karnataka conducted a similar trial on control of shoot and fruit borer of brinjal resulting in drastic reduction in infestation to 8% and extra yield of 171 kg/ha over farmers' practice.

Performance of rice varieties for Pest/disease tolerance in Nellore district of Andhra Pradesh: KVK, Nellore conducted on-farm trial for identification of suitable blast resistance rice varieties for *rabi* season. Among the varieties, NLR 34449 gave highest average yield of 7.82 q/ha with lowest incidence of blast. Among the BPH tolerance varieties tested, NDLR 7 gave highest average yield of 82.95 q/ha followed by NDLR 8 (74.40 q/ha). The locally popular BPT 5204 appears to be tolerant to both blast as well as brown plant hopper and could be replaced by NLR 34449 in blast endemic areas and by NDLR 7 or 8 in BPH prone areas.

Management of gram pod borer by intercropping of coriander with chickpea in Karnataka: KVK, Chitradurga conducted on-farm trial on management of gram pod borer through intercropping of coriander with chickpea. Growing coriander with chickpea is an indigenous practice that needed standardization in terms of proportion of rows between main crop and the intercrop. Intercropping at 6 : 2 ratio gave better control of gram pod borer as well as a better B : C ratio. Pod borer infestation reduced to 25% and 24 kg/ha more yield equivalent was obtained without any additional cost.

Effect of intercropping of coriander with chickpea on control of pod borer and yield

Intercrops	Yield (q/ha) Chickpea	Coriander	Pest infestation	B : C ratio
Chick pea as sole crop (Local practice)	8.20	–	36	1.55
Chick pea + Coriander (6 : 1)	7.50	0.8	30	1.63
Chick pea + Coriander (6 : 2)	7.12	1.2	25	1.66

Assessment of appropriate control measure on control of pod borer in chickpea in Bihar: On farm- trial was conducted by KVK, Banka to assess the performance of intercropping and spray schedule for control of gram pod borer. The intercropping was compared with that of insecticide application [Methyl Parathion (2%) 20 kg/ha]. The intercropping of gram + coriander (6 : 1) was equally effective like application of methyl parathion in controlling pod borer. It is therefore advisable to grow for intercropping of gram + coriander (6 : 1) as it is biological control and sustainable.

Performance of intercropping and insecticide spray on control of gram pod borer

Treatment	Yield (q/ha)	Increase in yield over control%
Endosulphan (2%) (farmers' practice)	7.26	–
Methyl Parathion (2%) 20 kg/ha	9.60	32
Gram + Coriander (6 : 1)	9.71	34
CD at 5% level 0.116		
CV (%) 1.53		

Control of coconut mite through nutrient management in Karnataka: Two on-farm trials were conducted in Udupi district located in high rainfall coastal agro-eco system, and in Hassan, located in the transitional zone of Karnataka. Because of the management practices by farmers, the yield under farmers' practice is higher in Udupi than in Hassan district. Three different nutrients management approaches were assessed for control of coconut mite and to enhance yield. Integrated nutrient management not only imparted resistance against mite and reduced about 60% infestation at both the locations but also increased yield by 98% as compared to farmers' practice.

Effect of nutrient management on control of coconut mite and yield in Udupi dist

Level of nutrients	Yield (nuts/tree/year)	Infestation (%)	B : C ratio
50 kg FYM + 1 kg complex fertilizer/tree/year NPK 170 : 120 : 400 g/plant (May and June)	52	82	1.76
NPK 330 : 200 : 800 g/plant (September and October) + 2 kg of lime + 0.5 kg of Mg SO_4 + 50 kg FYM/plant	85	46	2.60
NPK 170 : 120 : 400 g/plant (May and June) NPK 330 : 200 : 800 g/plant (September and October) + 2 kg of lime + 0.5kg of Mg SO_4 + 50 kg FYM/plant + Neem cake@ 2kg/plant	103	22	3.07

Effect of nutrient management on control of coconut mite and yield in Hassan district

Level of nutrients	Yield (nuts/tree/year)	Infestation (%)	B : C ratio
Farmers' Practice (Non-use of fertilizer and plant protection chemicals)	32	87	1.06
Application of FYM 50 kg/palm, 500: 320: 1200 g of NPK/tree	58	60	1.82
Growing of field bean as intercrop and application of FYM 50 kg/palm + RDF + neem cake 2 kg + Borax 50 g and spraying of neem oil + garlic extract on bunches for short trees and root feeding of 5% Azadiracthin.	86	27	2.86

Management of tomato fruit borer (*Helicoverpa armigera*) in Karnataka: KVK, Haveri conducted on-farm trial on management of fruit borer in tomato and compared the effect of three practices, including farmers' practice, recommended practice, and further refined practice. Spraying of Spinosad 48 SC (0.1 ml/litre) gave better control of borer (incidence reduced from 26.4% in farmers practice to 8.5% in the treated plots) and gave about 34.3% increased yield.

Assessment of different control measures of Alternaria leaf blight in chrysanthemum in Karnataka: KVK, Haveri conducted on- farm trial to compare the efficiency of Propiconazole (0.1%) with the farmers' practice, and presently recommended spraying of Mancozeb (0.2%) to manage the Alternaria leaf blight in chrysanthemum. The refined practice of spray of Propiconazole (0.1%) reduced the incidence of disease in comparison of the recommended practice and farmers' practice and had 52.1% less disease incidence and 34.3% higher yield than farmers' practice.

Effect of Spinosad 48 SC in control of tomato fruit borer (*Helicoverpa armigera*) and tomato yield

Treatments	Borer damage (%)	Yield (q/ha)	% increase in yield over farmers' practice	B : C ratio
Endosulfan spray individually and in combination with other insecticides, 4 times (farmers' practice)	26.4	84	–	2.32
Carboryl (4 g/l)/Endosulfan (2 ml/litre)/Fenvelerate (0.5 ml/litre)/Dimethoate @ 1.7 ml/litre (recommended Practice)	12.6	103	22.3	2.60
Spinosad 48 SC (0.1 ml/litre) - refined practice	8.5	111	34.3	2.80

Cropping system

System of Rice Intensification (SRI): The system of rice intensification, popularly known as SRI method was assessed in different locations with different treatment combination. Farmers in Kerala often face the shortage of irrigation water in several crops, particularly in upper valleys, and also shortage of labour at various critical stages of crop. KVK, Kollam, Kerala conducted on-farm trial on SRI in rice. SRI method is labour intensive in the beginning stages but not so in the later stages of the crop growth, while the direct seeding of rice is comparatively labour saving as well as productive. Results show that in Kollam district use of paddy seeder gave highest yield of 65 q/ha. If paddy seeder is not possible to be used, farmers could take up SRI method.

Comparison of paddy seeder sowing at 20 × 20 cm and rotary weeding with SRI method in Kerala

Treatments	Rice yield (q/ha)	B : C ratio
Transplanting of 25 day old seedlings, hand weeding, continuous submergence (traditional practice)	35	1.05
Transplanting of 10 day old seedlings, one per hill at 30 × 30 cm spacing, rotary weeding, irrigation) at hair line cracking stage (SRI practice)	57	1.36
Sowing with paddy seeder at 20 × 20 cm spacing, rotary weeding, irrigation at hair line cracking stage	65	1.45

KVK, Koppal, Karnataka conducted similar on-farm trial to evaluate the effects of SRI method in comparison to improved practice and farmer's present practice and found that SRI method was more promising than the regular transplanting method of rice cultivation with highest yield and B : C ratio.

Performance of intercropping of potato with maize/ mustard in Bihar: KVK, Jamui conducted on-farm trial on intercropping in potato/maize and potato/mustard against the farmers' practice of sole cropping of potato. Both the intercropping system was found to be better than the sole crop of potato in terms of total income, net income and benefit: cost ratio. The results show that potato + mustard (4 : 1) intercropping was more profitable for Jamui district based on highest net return and benefit: cost ratio of 1.65.

- System of Rice Intensification (SRI) was more promising than the regular transplanting method of rice cultivation with higher yield and B : C ratio.
- Line sowing in sunflower was found to be most beneficial with about 15% higher yield over farmers' practice of broadcasting.
- Sowing of pigeon pea at 120 × 120 cm spacing resulted in 34% increased yield over farmers' practice besides substantial reduction in seed rate.

Assessment of different sowing methods of sunflower in Haryana: KVK, Ambala conducted an on-farm trial to assess the performance of three different sowing methods, i.e. line sowing, ridge sowing and broadcasting (farmers' practice) on yield of sunflower. Farmers in Ambala district sow sunflower crop by broadcasting, thereby causing difficulty in adoption of appropriate plant protection and intercultural operations. Line sowing was found to be most beneficial with about 15% higher yield over farmers' practice of broadcasting (17 q/ha).

Performance of different tillage methods on wheat yield in Punjab: KVK, Faridkot conducted on-farm trial on the effect of different tillage methods (Conventional, Zero tillage and Rotary tillage) on yield of wheat (variety PBW 343) in rice-wheat rotation. Rotary tillage practice gave around 19% higher yield (48 q/ha) while zero tillage practice gave around 14% higher yield (46 q/ha) against the conventional practice (40 q/ha).

Performance of intercropping of banana with vegetables in West Bengal: KVK, Dakshin Dinajpur conducted on-farm trial to assess the sole cropping of banana compared to intercropping of vegetables like tomato, cucumber and green pea, as it was expected to give more profit from optimum utilization of time and space. Among the three vegetables assessed, green pea was found to be

Effect of intercropping of potato with maize/mustard on yield and net return

Cropping system	Average yield (q/ha)		Cost of cultivation (Rs/ha)	Total income (Rs/ha)	Net income (Rs/ha)	B : C ratio
	Potato	Maize				
Potato sole crop	242	–	35,200	82,348	47,148	1.34
Potato + Maize (2 : 1)	214	39	36,600	92,060	55,460	1.53
Potato + Mustard (4 : 1)	233	11	35,700	94,504	58,804	1.65

best with a B : C ratio of 2.1. Further, it was compatible with the banana canopy and showed no effect on plant height and girth of the pseudostem. Tomato was found to be least compatible.

Effect of different crop geometry on yield of pigeonpea in Andhra Pradesh: KVK, Karimnagar, conducted on-farm trial on spacing in pigeonpea to maintain optimum plant population through line and square methods of sowing. Sowing of pigeon pea at 120 × 120 cm spacing resulted in 34% increased yield over farmers' practice besides substantial reduction in seed rate.

Weed management

Assessment of different chemical weed control measures on onion yield in Karnataka: Though both KVK, Chitradurga and KVK, Haveri have taken up the same on-farm trial, the agroclimatic situations were different as Haveri district is located in Transitional zone and Chitradurga in dry zone of Karnataka. While hand weeding gave good control of weeds in Chitradurga district, but not in Haveri district due to continuous rains. Use of Oxyfluorfen 23.5% EC (1.1 litre in 1,000 litre/ha) gave 26% increase in yield over hand weeding in Haveri, but there is no difference in Chitradurga district.

Effect of Butachlor and Oxyfluorfen on weed control and yield of onion in Karnataka

Level of nutrients	Yield (q/ha)	Increase in yield (%)	Extent of weed control (%)
Two hand weeding (farmers practice)	179	–	67.64
Butachlor 50 EC (2 litre in 1,000 litre/ha) Recommended practice	206	15	72.25
Oxyfluorfen 23.5% EC (1.1 litre in 1,000 litre/ha) Refinement	227	26	83.50

- Zero tillage not only lowers the cost of land preparation, irrigation, herbicides and labour but also facilitates timely sowing.

Zero-tillage

Effect of zero-tillage on wheat yield and economics under rice-wheat system: Zero-tillage has become popular among the farmers due to increase in productivity under rice-wheat system. In zero-tillage, wheat is directly sown without disturbing the soil, thereby lowering the cost of land preparation, irrigation, herbicides and labour; besides facilitating timely sowing.

KVK, Kaithal, Haryana conducted on-farm trial on the fields of six farmers covering 9.6 ha to assess the performance of PBW 343 variety of wheat sown by conventional method and by zero-till-cum-fertilizer-seed drill. Zero-tillage practice gave around 5% higher yield (41 q/ha) than that obtained by conventional practice (39 q/ha) in Kaithal, and 6.6% higher yield in Sirmaur. It also saved Rs 3,975/ha in field preparation and sowing, besides, reducing the population of *Phalaris minor* considerably, thus saving the cost of weedicide.

Effect of zero-tillage practice on wheat yield (PBW 343) and cost of cultivation in Haryana

Treatments	Grain yield (q/ha)	*Phalaris* population (no/m^2)	Advancement of sowing (days)	Saving (Rs/ha)
Conventional practice	39	57	–	–
Zero-tillage practice	41	47	5	3,975

KVK, Sirmaur conducted on-farm trial in 25 farmers fields (15 ha) to evaluate the performance of wheat sown by conventional method and by zero-tillage-cum-fertilizer-seed drill. Zero-tillage practice gave around 7% higher yield (32 q/ha) than that obtained by conventional practice (30 q/ha).

Effect of Pendimethalin and Oxyflurofen on weed control and yield of onion in Karnataka

Weed control measure	Yield (q/ha)	Increase in yield (%)	Cost of weeding (Rs/ha)	Extent of weed control (%)
Two hand weeding (farmers' practice)	230	–	2,300	100
Pendimethalin @ 1.0 a.i./ha	210	(–) 10.0	800	90
Oxyflurofen @ 0.06 a.i./ha	230	–	900	100

Nursery Management

Assessment of Nursery management of chilli in Andhra Pradesh: KVK, Guntur conducted on-farm trial on chilli to assess the effect of two nursery management practices in relation to farmers' practice. Chilli nursery raised in pro-trays under shade net resulted in higher germination (90–95%) with no seedling mortality.

Soil and water conservation

Effect of soil/water conservation measures on growth and yield of cotton in Maharashtra: KVK, Akola, conducted on-farm trial to assess the effect of soil and moisture conservation practices on productivity of rainfed cotton. Results indicated that the cotton yield was 24% higher by formation of contour bunds compared to local practice of sowing along the slope without any soil conservation measures.

Effect of contour bunds on plant growth and yield of cotton

Soil conservation pratice	Plant height (cm)	No. of branches/plant		Seed cotton yield (q/ha)
		Monopodia	Sympodia	
Sowing along the slope without soil and water conservation measure	36.3	2	8.6	8.59
In situ soil and water conservation practices	39.6	3	11	9.82
Contour bunding for conservation of run-off water	43.5	4	12	10.68

Farm implements

Efficiency of harvesting tools for rice in Orissa: KVK, Kalahandi conducted on-farm trial to assess various harvesting tools for rice in terms of efficiency. The field capacity of reaper was significantly higher than *desi* sickle and improved sickle for harvesting of rice. The average field capacity of reaper was found to be 0.2 ha/hr compared to 0.006 ha/hr of improved sickle and 0.005 ha/hr of *desi* sickle.

Evaluation of different harvesting tools

Harvesting tool	Field capacity (ha/hr)	Saving in time (%)	Cost of harvesting (Rs/ha)	Saving in cost (%)
Desi sickle	0.005	–	1,500	–
Reaper	0.2	97.5	485	68
Improved sickle	0.006	20	1,250	17

Fishery

Assessment of pond preparation and stocking density on yield and income of fish farmers in West Bengal: Absence of proper stocking of fish and other management practices reduced productivity of fish ponds. Farmers' practice of improper pond preparation, high stocking density and minimum post stocking care was assessed against the scientific pond preparation and optimum stocking density (50 lakhs/ha) and proper post stocking care by the KVK, South 24 Parganas, West Bengal. It was found that by optimizing stocking, enhancing natural productivity (i.e. production of natural fish food organisms) of pond and maintaining an alkaline pH of pond water by regular liming—the production can be increased by up to 22.5% over the farmers' practice. In addition, daily application of supplementary feed throughout the culture period further boosted production up to 55% more than the farmers' practice.

Effect of pond preparation, optimum stocking density and post stocking care on yield of table size fish from medium sized ponds

Treatments	Yield (q/ha)	Increase (%)
Improper pond preparation, high stocking density and minimum post stocking care (farmers' practices)	10.00	–
Scientific pond preparation and optimum stocking density (50 lakh/ha)	12.25	22.5
Scientific pond preparation, optimum stocking density (50 lakh/ha) and recommended post stocking care	15.50	55.0

Poultry

Assessment of poultry strains under backyard condition in Andaman and Nicobar Islands: KVK, Port Blair conducted on-farm trial on backyard poultry rearing by comparing *desi* Nicobari fowl with improved Nicobari fowl and Nico rock for their

Performance of improved poultry strain under backyard poultry production

Parameters	Improved Nicorbari fowl	*Desi* Nicobari fowl	Nico rock
Body weight at 8 weeks (g)	424 ± 5.35	305 ± 4.5	409 ± 6.15
Body weight at 20 weeks (g)	1120 ± 9.39	1050 ± 8.37	1050 ± 8.37
Age of sexual maturity (days)	174 ± 1.9	185 ± 1.3	172 ± 1.65
Weight at sexual maturity (g)	1425 ± 11.75	1387 ± 11.7	1574 ± 10.12
Annual egg production (No.)	156 ± 6.2	145 ± 3.17	179 ± 5.8
Mortality (%)	5.7	4.9	5.3
Net return (Rs/bird/annum)	347	310	427

productivity in terms of body weight, egg production and net return.The performance of Nico rock was rated to be the best with higher egg production (179 eggs/year), 1.574 kg body weight and net returns of Rs 427/bird/year.

Small ruminants

Assessment feeding systems on body weight gain in beetal goat in Haryana: KVK, Ambala conducted on-farm trial to assess the effect of different feeding systems on body weight gain of beetal goat. Intensive grazing (farmers' practice) was compared with grazing + partial feeding and stall feeding (backyard system).

Effect of stall feeding and grazing on body weight gain of beetal goat

Treatments	No. of goats/ farmer	Body weight gain (kg at 5 months age)	Increase in weight over control
Intensive grazing	2	15.0	–
Grazing+Partial feeding	2	18.0	20%
Stall feeding (backyard system)	2	16.5	10%

Results show that grazing + partial feeding was most effective method of feeding of beetal goats based on body weight at the age of 5 months.

Child nutrition

Management of malnutrition in children in Maharashtra: KVK, Jalna, conducted on-farm trial to assess diet for increase in weight gain of child. Normal diet with soybean supplements for 60 days resulted in increase in child weight (525 g) and reduced illness by 31.25%.

- KVKs organized 53, 974 frontline demonstrations including 52,412 on oilseeds, pulses, cotton and other important crops besides 1,562 demonstrations.

Frontline demonstrations

During the year, 53,974 frontline demonstrations were organized including 52,412 on oilseeds, pulses, cotton and other important crops covering an area of 24,969.8 ha; besides 1,562 demonstrations on various enterprises.

Pulses: During the year, 9,055 demonstrations were conducted covering 2,745.3 ha. The percentage increase in yield varied from 34.4 in bengalgram to 62.9 in frenchbean and on an average pulse

Frontline demonstrations on pea at KVK, Pulwama, Jammu & Kashmir

- Normal diet with soybean supplements for 60 days resulted in gain in child weight (525 g) and reduced illness by 31.25%.

Frontline demonstration on pulses

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Increase (%)
			Demonstration	Local	
Bengalgram	2,582	906.9	16.8	12.6	34.4
Redgram	1,590	509.2	14.6	10.8	38.6
Greengram	1,596	503.2	11.6	8.4	40.7
Blackgram	1,395	432.6	9.2	6.6	42.8
Lentil	781	171.8	12.5	8.3	47.5
Field pea	312	83.4	18.1	11.6	60.4
Rajmash	503	75.8	11.5	7.6	58.3
Mothbean	70	35.0	4.9	3.1	56.3
Cowpea	77	14.0	9.8	6.6	47.9
Horsegram	93	6.5	7.0	4.6	51.5
Frenchbean	52	5.0	13.9	8.5	62.9
Lathyrus	4	2.0	11.7	7.3	60.3
Total/weight average	9,055	2,745.3	13.6	9.9	37.1

crops under demonstration gave 37.1% more yield than farmers' practice.

Cotton: A total of 2,347 demonstrations covering an area of 1,800.3 ha were conducted. This includes 35 high yielding and pest-tolerant varieties and hybrids, INM and IPM technologies, and farm implements. Training programmes (166) covering 6,391 farmers and 57 training programmes for 1,836 extension functionaries were organized, besides 55 field days with 5,556

IPM demostration of alternate host (marigold) on cotton at KVK, Jalna, Maharashtra

Publications

Two hundred and sixty two KVKs have started publication of quarterly newsletters in local languages as well as in English and Hindi for the benefit of the farming community. These newsletters contain information on agricultural operations for the coming quarter, besides useful articles on improved practices related to crop production, fruits and vegetable cultivation, livestock production and management, home science, use of improved tools and implements, etc. The newsletters also carry the schedule of training programmes of the KVK in the ensuing quarter and are widely circulated to the farmers, gram panchayats and development departments.

participants, 26 kisan mela with 7,094 participants, and publication of 686 extension literatures. In addition, 391 other extension activities (3,784 participants) were undertaken, viz. radio/TV talk, newspaper coverage, exhibitions, group discussion, etc.

Oilseeds: During the year, 17,064 demonstrations were conducted covering 5,969.9 ha on different oilseed crops including

Frontline demonstrations on oilseeds

Crop	No. of farmers	Area (ha)	Yield (q/ha)		Increase (%)
			Demonstration	Local	
Mustard	4,065	1431.0	16.1	11.9	37.3
Groundnut (*kharif*)	1,669	527.3	18.8	13.8	40.3
Groundnut (*rabi*)	2,315	988.0	18.7	14.6	29.5
Soybean	2,418	659.3	19.8	13.8	66.8
Sesame	1,562	543.1	7.1	5.1	39.1
Sunflower	1,204	542.2	15.0	11.1	37.4
Toria	1,184	344.2	12.2	8.8	45.4
Castor	520	232.9	15.2	11.1	40.7
raya	433	177.0	23.8	18.8	26.9
Niger	551	159.2	4.5	2.8	63.0
Linseed	465	154.6	8.5	6.1	46.6
Safflower	228	106.1	8.8	6.9	32.8
Gobhi Sarson	450	105.0	25.8	19.8	30.6
Total/weight average	17,064	5,969.9	15.8	11.7	34.8

castor, groundnut, niger, sesame, soybean, sunflower, linseed, mustard, safflower and toria. The percentage increase in yield varied from 26.9 in raya to 66.8 in soybean and on an average oilseed crops under demonstration gave 34.8% more yield than farmers' practice.

Other crops: During the year, 23,946 demonstrations were conducted covering 14,454.4 ha on different cereals, horticultural and other commercial crops.

Frontline demonstrations on other crops

Crop	Number of demonstrations	Area (ha)
Cereals	11,522	4,418.9
Millets	1,210	433.6
Cash crops	1,219	671.4
Fodder crops	157	25.0
Fruits	892	1,898.1
Vegetables	6,859	5,841.7
Plantation crops	420	183.1
Spices	618	140.5
Flower crops	236	35.0
Tuber crops	256	36.7
Green manure crops	13	5.5
Farm implements	215	340.4
Pisiculture	164	175.8
Fish production	152	243.3
Others*	13	5.4
Total	23,946	14,454.4

*include water recharging, bio-fuel etc.

Other enterprises: 1,562 demonstrations were conducted on 10,200 units of various enterprises including apiculture, dairy, duckery, piggery, poultry, mushroom, etc.

Frontline demostration on backyard poultry

Second National Conference on KVK

The Second National Conference on KVK was organized on 26–27 November 2006 at Acharya N.G.Ranga Agricultural University, Hyderabad which was participated by the Programme Co-ordinators of the KVKs, Vice Chancellors and Directors of Extension Education of State Agricultural Universities, Directors of ICAR Institutes, Senior Officers of the Department of Agriculture and Co-operation, Secretaries of major states, representatives from ATMA, besides Chairman/ Secretaries of the NGOs having KVKs. The conference was inaugurated by the Hon'ble Union Minister of Agriculture on 26 November. Three KVKs namely, KVK, Chitrakoot (Uttar Pradesh), KVK, Gadag (Karnataka), and KVK, Jhunjhunu (Rajasthan) were conferred upon the Best KVK Award for the year 2005. The technical sessions of the conference were Strategic technological interventions, Policy frame work for technology development and delivery system, and Knowledge management at the KVK. An exhibition was organized with the participation of State Agricultural Universities, ICAR Institutes, KVKs, and various input agencies. As a follow-up of the recommendations of the First National Conference, three sensitization workshops, each of four days duration, were organized on Process of Knowledge Management for Programme Co-ordinators at Punjab Agricultural University, Ludhiana, Punjab (13–16 July); Zonal Co-ordinating Unit, Kanpur, Uttar Pradesh (28–31 August); and KVK, Trivandrum,Kerala (12–15 September); in which nearly 100 Programmes Co-ordinators, 12 Scientists from the Zonal Co-ordinating Units, and 2 Scientists from the ICAR Headquarters participated.

Second National Conference on KVK at Acharya N.G. Ranga Agricultural University, Hyderabad

Frontline demonstrations on various enterprises

Enterprise	Number of demonstrations	Units (No)
Apiculture	48	76
Biofeed (*Azolla*)	36	51
Dairying	371	2,097
Duckery	77	545
Mushroom	55	49
Piggery	6	7
Poultry	696	5,792
Quail farming	130	1,303
Sheep and goat production	143	280
Total	1,562	10,200

Training programmes

During the year, 40,672 training programmes were organized with the participation of 10, 71,657 farmers including rural youth and in-service extension personnel.

Farmers' training: A total of 29,836 training programmes were organized benefitting 8.16 lakh farmers and farmwomen on various aspects of crop production, horticulture, livestock production and management, group dynamics, farm implements and machinery, agroforestry, fishery, biotechnology, plant protection, soil fertility, women in agriculture and others.

Training programmes for farmers and farmwomen

Areas of training	No. of courses	No. of participants		
		Male	Female	Total
Crop production	7,494	190,881	32,862	223,743
Horticulture	5,305	119,623	30,703	150,326
Plant protection	4,640	99,087	21,758	120,845
Home science	3,589	10,885	79,182	90,067
Livestock production and management	3,189	57,263	23,258	80,521
Soil fertility management	1,459	31,736	6,139	37,875
Farm implements and machinery	1,113	21,142	6,515	27,657
Group dynamics	1,095	27,516	9,010	36,526
Fishery	539	9,596	2,888	12,484
Agroforestry	441	8,311	1,688	9,999
Women in agriculture	309	226	6,343	6,569
Mushroom production	55	1,020	414	1,434
Apiculture	47	729	245	974
Sericulture	30	501	106	607
Food technology	25	104	471	575
Medicinal and aromatic plants	23	450	114	564
Vermicomposting	22	498	233	731
Biotechnology	10	265	60	325
Others	451	9,076	4,990	14,066
Total	29,836	588,909	226,979	815,888

Training on Bee-keeping at KVK, U.S. Nagar, Uttarakhand

Training for rural youths: The training programmes for rural youth were organized. Use of farm power and machinery, group mobilization, agroforestry, biotechnology, crop production, fisheries, horticulture, hybrid seed production, Livestock production and management, cultivation of medicinal plants, plant protection,

Training course for rural women on bee-keeping at KVK, Pulwama, Jammu and Kashmir

Training course for rural youth on soft-wood grafting

Training programmes for rural youth

Areas of training	No. of courses	No. of participants		
		Male	Female	Total
Horticulture	1,319	20,935	9,026	29,961
Home science	1,290	3,255	25,984	29,239
Crop production	1,020	19,484	4,451	23,935
Livestock production and management	851	13,250	5,525	18,775
Plant protection	825	15912	4,083	19,995
Farm implements and machinery	336	6,343	1,284	7,627
Group dynamics	296	5,210	1,946	7,156
Soil fertility and management	232	4,648	1,258	5,906
Fisheries	168	2,581	978	3,559
Agroforestry	108	1,423	541	1,964
Women in agriculture	87	116	1,809	1,925
Apiculture	67	1377	236	1,613
Mushroom production	47	835	134	969
Vermicomposting	22	455	51	506
Sericulture	10	181	31	212
Others	188	3,080	2,528	5,608
Total	6,866	99,085	59,865	158,950

post harvest technology, soil-fertility management, women in agriculture and other income generating activities. As many as 6,866 skill oriented training programmes were organized for 1.59 lakhs rural youth.

Training programmes for in-service extension personnel: A total of 3,970 training programmes were conducted covering 96,819 participants. These training programmes were organized mainly for extension functionaries working in government and non-governmental organizations related directly or indirectly with the development of agriculture. The training was imparted to upgrade their knowledge and skills in horticulture, animal husbandry, soil conservation, biotechnology, fishery, etc. through participatory training methodologies, field visits and other interactive methods.

Extension functionaries are being trained on paneer preparation at KVK, Sikar, Rajasthan

Training programmes for in-service extension personnel

Areas of training	No. of courses	No. of participants		
		Male	Female	Total
Crop production	1,027	24,450	3,240	27,690
Plant protection	635	12,793	1,988	14,781
Horticulture	567	10,533	1,841	12,374
Home science	430	2,251	9,195	11,446
Group dynamics	377	7,589	1,564	9,153
Livestock production and management	274	4,777	709	5,486
Farm implements and machinery	192	3,485	753	4,238
Soil fertility and management	203	4,543	790	5,333
Agroforestry	58	1,147	121	1,268
Fisheries	45	726	72	798
Women in agriculture	33	115	597	712
Others	129	3,071	469	3540

Sponsored training programmes: Out of a total 40,672 training programmes (10.72 lakh participants) conducted by the KVKs for the farmers and farm women, rural youth, and in-service extension personnel; 5,879 training programmes were conducted on sponsorship by various organizations covering 1.94 lakh participants. The participants were from various government and

- KVKs organized 29,836 training programmes for farmers, 6,866 skill-oriented programmes for rural youth and 3,970 training programmes for in-service personnel. Out of total 40,672 training programmes; 5,879 were sponsored by various organizations.

Sponsored training programme

Areas of training	No. of courses	No. of participants		
		Male	Female	Total
Crop production	1,820	63,268	9,206	72,474
Horticulture	1,294	34,718	7,727	42,445
Plant protection	725	16,910	3,821	20,731
Home science	486	1,545	11,120	12,665
Livestock production and management	450	8,535	3,197	11,732
Farm implements and machinery	272	5,218	730	5,948
Group dynamics	264	7,337	2,089	9,426
Soil fertility management	189	7,186	1,318	8,504
Fishery	60	1,168	285	1,453
Rural crafts	30	7	467	474
Agroforestry	23	1,035	214	1,249
Women in agriculture	20	347	491	838
Mushroom cultivation	18	274	265	539
Apiculture	16	256	154	410
Vermicomposting	11	187	138	325
Others	201	4,610	762	5,372
Grand Total	5,879	152,601	41,984	194,585

Extension activities

Activities	No. of programmes	Beneficiaries
Advisory services	48,048	104,479
Diagnostic visits	14,386	36,782
Field days	2,459	144,085
Group discussions	2,239	98,297
Kisan goshties	2,104	179,106
Film shows	1,673	60,355
Self-help groups	1,791	5,630
Kisan melas	839	2,013,882
Exhibitions	788	1,309,582
Scientist's visit to farmers' field	775	4,457
Plant/Animal health camp	1,744	53,643
Farm science club	419	5,809
Farmer's field school	345	1,250
Agricultural exhibition	284	107,661
Ex-trainee sammelan	163	5,338
Farmers seminar	186	22,629
Demonstrations method	101	2,331
Special day celebration	99	12,069
Exposure visit	46	1,422
Others	59	21,113
Total	78,548	4,189,920

non-governmental organizations associated directly or indirectly with the development of agriculture, sponsored by NABARD, DRDA, CAPART, ATMA, DBT, DST, State Department of Animal Husbandry, State Department of Agriculture, State Department of Women and Child Welfare and State Department of Horticulture.

Extension activities

The KVKs organized 78,548 extension activities covering 41.90 lakh farmers and others to create awareness about improved agricultural technologies. The activities include field days, kisan melas, kisan gosthies, exhibitions, ex-trainees sammelan, advisory services, film shows, diagnostic services, agro-clinics, organizing farm science club, and formation of self-help groups (SHGs).

- KVKs organized 78,548 extension activities to create awareness about improved agricultural technologies.

In addition, 8,482 newspaper coverages, publication of 2,231 popular articles and 6,075 extension literatures, 90 bulletins, 1,800 telephone advices, 3786 radio and TV talks were taken up by the KVKs.

Farmers to farmers interaction organized at KVK, Akola, Maharashtra

Production of seeds by the KVKs

Crop	Seed (q)
Cereals	56,666.74
Oilseeds	10,165.39
Pulses	5,391.64
Commercial crops	1,954.41
Vegetables	8,473.62
Spices	69.90
Fodder crops	32.59
Green manure crops	22.02
Mushroom spawn	4.88
Medicinal crops	2.05
Total	82,783.24

Production of planting materials, livestock strains and fingerlings by the KVKs

Categories	Number	Categories	Number
Vegetables	3,054,603	Mulberry	310,751
Fruits	1,842,943	Tobacco	50,000
Ornamentals	255,486	Medicinal	21,302
Spices	219,596	Aromatic	1,500
Fodder slips	829,500	Livestock strains	2,966,205
Plantation	338,030	Fingerlings	31,990
Forestry	210,111	Total	10,196,308
Biofuel	64,291		

Seed production – Onion, Hybrid Castor (RHC-1) and Chillies (RCH-1)

Production of Bioproducts

The KVKs produced 492,150 kg biofertilizer, 62,421 kg biopesticide, 5,780 litres baculoviruses, 100 litres neem oil, and 49,000 bioagents (Cards) for availability to the farmers.

Products	Quantity
Biofertilizers (kg)	
Acetobacter	100
Aspergillus sp.	751
Azotobacter	2,950
Azolla	15,852
Azospirillium	4,641
Phosphobacterium	6,261
Rhizobium	5,170
Vermicompost	456,425
Total	492,150
Biopesticides (kg)	
Beauveria bassiana	225
Pseudomonas sp.	7,619
Trichoderma harzianum	13,590
Trichoderma viride	40,977
Verticillium	10
Total	62,421
Baculoviruses (litres)	
NPV (*Helicoverpa armigera*)	2,650
NPV (*Spodeptera litura*)	3,130
Total	5,780
Botanical Pesticides	
Neem oil	100
Bioagents (Number)	
Chrysoperla carnea (Cards)	45,000
Trichogramma chilonis (Cards)	4,000
Total	49,000

Production of seed/planting material

The KVKs produced 82,783.24 quintal of seeds of cereals, oilseeds, pulses and vegetables. In addition, 71.98 lakh saplings/ seedlings of fruits, vegetables, spices, medicinal plants, ornamental plants, plantation crops and forest species were produced. Also 29.98 lakh livestock strains and fingerlings were produced for availability to the farmers.

Monitoring mechanism

During the year, Zonal Workshops (11) were organized with the participation of KVKs to review the action plan, achievements and formulation of plan of action for the next year. Similarly 18 State-level Workshops were organized to review the frontline demonstrations on oilseeds and pulses. To upgrade the knowledge and skills of KVK staff, Workshops (25) were organized under HRD Programme and 7 travelling workshops were also organized.

Interface at district level

To strengthen research extension linkages the KVKs organized 334 interface meetings involving scientist and development officials at the district level.

Scientific advisory committee

During the year, 326 Scientific Advisory Committee Meetings were organized in KVKs to review the work done during the year and formulation of action plan for the next year.