

ANNUAL REPORT

2009-10



Zonal Project Directorate (Zone-V)

CRIDA Campus, Santoshnagar
Hyderabad - 500059 A.P

Citation

ZPD(Zone-V) Annual Report 2009-10.
Zonal Project Directorate(Zone-V), Hyderabad.

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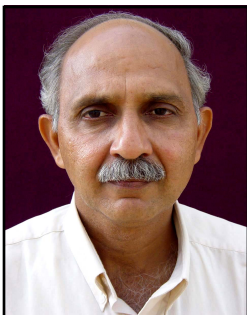
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Published by

Zone project Director(Zone-V)
CRIDA Campus, Santoshnagar
Hyderabad-500059

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Leonar Advertising
Himayatnagar Hyderabad.
Web: www1leonaradvertising.com



PREFACE

In order to facilitate effective monitoring of various transfer of technology projects, the ICAR created eight Zonal Project Directorates formerly known as Zonal Coordination Units for formulation, implementation, monitoring and evaluation of technology assessment, refinement and demonstration activities in general and by KVKs in specific. The Zonal Project Directorate (Zone-V) with its headquarter situated at CRIDA Campus, Santoshnagar, Hyderabad is vested with responsibility of monitoring various transfer of technology projects funded by the Council in two states viz. Andhra Pradesh and Maharashtra.

At present there are 59 KVKs in the zone, including 25 in Andhra Pradesh and 34 in Maharashtra. During the year, KVKs assessed and refined 396 technologies through 3448 on-farm trials. A total of 10801 Front Line Demonstrations covering 3767.81 ha under oilseeds, pulses and other field and horticultural crops was organized by KVKs in Zone-V. The major crops covered were groundnut soybean, castor, sesamum, sunflower, safflower, redgram, bengalgram, greengram, blackgram, cotton, rice, wheat, maize, etc.

KVKs organized 5033 training programmes covering 157218 participants that include 121560 farmers and farmwomen, 20890 rural youth and 14768 extension functionaries besides organizing 10521 extension activities with a participation of 584980 farmers, farmwomen and extension personnel. In order to accelerate rapid dissemination of information on improved farm technologies, KVKs brought out 1114 publications. KVKs also produced 5389.07 q of seed and 1132760 saplings of elite species of field and horticultural crops.

In order to ascertain the soil health and to make crop specific nutrient recommendations in the prevailing micro-farming situations, KVKs analyzed 72167 samples benefitted 64686 farmers and farm women belonging to 8746 villages in Andhra Pradesh and Maharashtra. Apart from this, about 88186 farmers were given direct access to institutional resources through six Agricultural Technology Information Centres in Zone-V. A total of 22 HRD activities benefitting 853 KVK staff covering 55 KVKs in Zone-V were jointly organized by the seven directorates of extension and the ZPD (Zone-V).

I express my gratitude to Dr. S. Ayyappan, Secretary, DARE and Director General, ICAR, Dr. K. D. Kokate, Deputy Director General (AE), Dr. A. K. Mehta, Assistant Director General (AE) and Dr. V. Venkatasubramanian, Assistant Director General (AE) for their continued guidance and support in implementing the mandate.

I am thankful to Dr. K. Dattatri, Principal Scientist, Dr. K. Mahadeva Reddy, Senior Scientist, Dr. G. Rajender Reddy, Field Officer, Mr. K. Srinivasa Rao, Assistant Finance and Accounts Officer and Mrs. S. Hemalatha, Personal Assistant for their pain taking efforts in analyzing huge data, preparing manuscript and bringing out the Annual Report at a very short notice.

N. Sudhakar
Zonal Project Director

EXECUTIVE SUMMARY

Indian Council of Agricultural Research upgraded the Zonal Coordination Unit to the status of Project Directorate during 2009. The mandate of Zonal Project Directorate is to formulate, implement, monitor and evaluate various strategies on technology assessment, refinement and demonstration mainly through Krishi Vigyan Kendras in Zone-V that includes Andhra Pradesh and Maharashtra states.

At present there are 59 KVKs in the zone which include 25 in Andhra Pradesh and 34 in Maharashtra. Of the 25 KVKs in Andhra Pradesh 15 are with State Agricultural Universities (SAU), two with ICAR institutes and eight with Non-governmental Organizations (NGO). In Maharashtra, 11 KVKs are with SAUs, one with ICAR institute, 21 with NGOs and one with Open University.

During the year, KVKs assessed and refined 396 technologies by laying out 3448 on-farm trials. Out of 396 technologies tested, 283 technologies were assessed and refined on crops followed by the technologies related to women and children (64) and animals (49). The main thematic areas covered in case of animals are fertility management, feed and fodder management, nutrition management, evaluation of breeds, disease management, production and management and breed improvement, while in case of crops the thematic areas include varietal evaluation, integrated pest management, integrated nutrient management, resource conservation technologies, integrated farming systems, weed management, integrated disease management and seed and planting material production. Under empowerment of rural women the on-farm trials were conducted in thematic areas viz. health and nutrition, drudgery reduction and entrepreneurship development.

KVKs in Andhra Pradesh assessed 136 technologies by conducting 1019 on-farm trials, while KVKs in Maharashtra assessed 169 technologies by organizing 1632 trials. A total of 27 technologies were refined by KVKs in Andhra Pradesh by organizing 173 trials and KVKs in Maharashtra conducted 624 trials to refine 64 technologies.

A total of 1852 front line demonstrations covering 778.60 ha under oilseeds were organized by KVKs in Zone -V. The major oilseed crops that were covered under demonstrations include groundnut, soybean, castor, sesamum, sunflower and safflower etc. In case of pulses, KVKs organized 1375 demonstrations covering 556 ha during kharif and rabi seasons. The major crops covered under demonstrations are redgram, bengalgram, greengram, blackgram etc. A total of 2167 demonstrations covering an area of 1511 ha were organized to demonstrate various improved technologies in cotton crop. Similarly, KVKs in Andhra Pradesh and Maharashtra organized 2399 demonstrations covering 922.21 ha on other crops i.e. cereals, commercial crops, fodder and horticultural crops. KVKs also organized 1983 demonstrations on improved tools and implements, 738 and 287 demonstrations on livestock species and empowerment of women respectively.

Training is an important activity of KVK which play a pivotal role in enhancing the knowledge and skill about various improved technologies. During the year, KVKs in Zone-V organized 5033 training programmes covering 157218 participants that include 121560 farmers and farmwomen, 20890 rural youth and 14768 extension functionaries. KVKs in Andhra Pradesh organized 1781 training courses with a participation of 55325 farmers including farmwomen, rural youth and extension functionaries, while the KVKs in Maharashtra conducted 3252 courses with a total of 101893 beneficiaries. The main thematic areas covered under training include integrated crop management, improved tools and implements, capacity building and group dynamics, women empowerment, improved production practices for horticultural crops, productivity enhancement in livestock species, integrated pest management and soil health and fertility management.

KVKs in Zone-V also organized 662 sponsored training programmes covering 28185 farmers and farm women and rural youth. In order to facilitate entrepreneurship development, income generation and self-employment especially among rural youth and school dropouts, KVK organized 374 vocational training programmes covering 9287 beneficiaries. The important thematic areas include value addition, integrated crop management, poultry farming, nursery and grafting, production of bio-agents and bio-pesticides, sheep and goat rearing etc.

To create awareness on improved agricultural technologies the KVKs of Zone-V organized 10521 extension activities with a participation of 584980 farmers, farmwomen and extension personnel. The extension activities included advisory services, exposure visits, animal health camps, technology week, group discussions, method demonstrations, soil health camps, kisan melas, kisan ghosti, etc. In order to accelerate rapid dissemination of information on improved farm technologies, KVKs in Zone-V brought out 1114 publications. KVKs also supplied 5389.07 q of seed and 1132760 saplings of elite species of field and horticultural crops to farmers.

KVKs also have undertaken soil and water testing to ascertain the soil nutrient status and also to make soil test based nutrient recommendations in the prevailing micro-farming situations in the district. A total of 72167 samples including 55135 of soil, 15217 of water, 667 of plant and 722 of petiole were analyzed by the KVKs that benefitted 64686 farmers belonging to 8746 villages in Andhra Pradesh and Maharashtra.

The Directorates of Extension of State Agricultural Universities and Zonal Project Directorate facilitate technological backstopping and Human Resource Development to the KVKs through training, seminars, workshop etc. A total of 22 HRD activities benefitting 853 KVK staff covering 55 KVKs in Zone-V were jointly organized by the five directorates of extension and the Zonal Project Directorate in Zone- V.

To facilitate direct access of farmers to institutional resources, ICAR established six Agricultural Technology Information Centres in Zone-V with the objective of single window delivery of various technology products. During the year a total of 88186 farmers visited the six ATICs to know the latest technology information and to obtain critical technology products viz. seed and panting material.

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INTRODUCTION

Zonal Project Directorate

The National Organizing Committee constituted to celebrate the Golden Jubilee of the Indian Council of Agricultural Research (ICAR) during 1979-80 envisaged a massive programme viz. Lab to Land Programme for continuous flow of economically viable technology from laboratories to the farmers' fields. In this regard, it was decided to adopt 50000 small and marginal farmers and landless labourers throughout the country to transfer available farm technologies comprising of crop production, livestock farming, farm tools and implements, pisciculture, sericulture, apiculture etc. including crop-livestock integration and the same was implemented from September, 1979. In order to achieve the same, the country was divided into eight zones and as a result of this, the Zonal Coordination Unit for Transfer of Technology, Zone-V was established in September, 1979 as Cess Fund Scheme at Andhra Pradesh Agricultural University, Hyderabad primarily to monitor the activities of the Lab to Land Programme in the states of Andhra Pradesh and Maharashtra. Subsequently in 1985, the unit was shifted to the campus of Central Research Institute for Dryland Agriculture, Hyderabad. The Unit was given the responsibility of monitoring of Lab to Land Programme until 1986. Later during the year the unit was brought under the plan scheme of ICAR.

In 1987, the Council gave the unit additional responsibility of monitoring other ICAR supported Transfer Of Technology Projects viz. Krishi Vigyan Kendras (KVK), Trainers Training Centre (TTC), National Demonstration Scheme (NDS), Operational Research Projects (ORP), All India Coordinated Project on SC / ST (AICRP SC/ ST) and Special Projects on Oilseeds that were implemented in the zone. During 1990 and 1991, the Front Line Demonstrations (FLD) on oilseeds under Oilseeds Production Programme (OPP) and pulses under National Pulse Projects (NPP), farm implements and cotton are also being monitored by Unit. In 1995, a pilot project on Institute Village Linkage Programme (IVLP) was undertaken and implemented in zone. In 1998, Zonal Research Stations under the State Agricultural Universities (SAU) were strengthened to take up the additional functions of KVKs and these re-mandated KVKs are also being monitored.

The X and XI Five Year Plan (FYP) period witnessed phenomenal growth of KVKs in the country including the establishment of new KVKs in Zone-V that covering the states of Andhra Pradesh and Maharashtra. During XI FYP period, Council has approved establishment of 97 new KVKs which include establishment of 24 additional KVKs in geographically larger districts, 12 each in states of Andhra Pradesh and Maharashtra. In view of this the Council has upgraded all the eight Zonal Coordination Units to the status of Directorates and thus Zonal Project Directorate (ZPD), Zone-V came into existence during the year 2009.

The Directorate has the following mandates

- ▶ To formulate, implement, monitor and evaluate strategies on technology assessment, refinement and demonstration programme of the Council in the zone
- ▶ To initiate, plan, coordinate and execute the extension research to support and improve technology dissemination system.
- ▶ To link KVK efforts to strengthen extension approaches viz. consortium, convergence, public-private partnership, farmer-led and market-lead extension in their respective regions.
- ▶ To coordinate the work relating to transfer of technology programme of the various agencies such as agricultural universities, ICAR institutes, state and central govt. agencies, financial institutions, affiliated agriculture and home science colleges, voluntary agencies and the transfer to technology centres in their respective regions.
- ▶ To serve as feedback mechanism for technology generations system

The Directorate falls under the administrative control of Division of Agricultural Extension of ICAR headed by the Deputy Director General (Agricultural Extension) who is assisted by the Assistant Director Generals, Principal Scientists, Senior Scientists and Deputy Secretary. The Zonal Project Directorate is headed by Zonal Project Director who is assisted by the Principal Scientists, Senior Scientists, Computer Programmer, Assistant Administrative Officer, Assistant Finance and Accounts Officer, Personal Assistant, Assistant, Junior Accounts Officer, Upper and Lower Division Clerks, a Driver and Supporting Staff. A modest infrastructure for smooth functioning of the Directorate was built in the campus of Central Research Institute for Dryland Agriculture, Santoshnagar, Hyderabad.

Krishi Vigyan Kendra

Krishi Vigyan Kendra (Farm Science Centers), an innovative science-based institution, was established to impart vocational skill training to the farmers and field-level extension workers. The need for vocational training in agriculture and allied fields through KVK grew substantially catering the increasing demand for improved/agricultural technology by farmers. The farmers not only require knowledge and understanding of intricacy of new technologies, but also more skills to adopt the same in varied and complex field situation on their farms. In view of this, the role of KVK was further enhanced by adding the responsibility of on-farm testing and front-line demonstrations of major agricultural technologies to dovetail the same in location specific environment. In order to equip the present day farmers to face the challenges of information explosion and to bridge the digital divide, KVKs were given the other responsibility of acting as knowledge and resource centre of agricultural and allied technologies. The mandate of KVKs is,

- ▶ On-farm testing to identify the location specificity of agricultural technologies under various farming systems.
- ▶ Organize frontline demonstrations to establish production potential of technologies on the farmer's fields.
- ▶ Training of farmers to update their knowledge and skills in modern agricultural technologies and extension personnel to orient them in the frontier areas of technology development.
- ▶ To 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

KRISHI VIGYAN KENDRA

Status

At present there are 59 KVKs in Zone-V which include 25 in Andhra Pradesh and 34 in Maharashtra (Table 1). Of the 25 KVKs in Andhra Pradesh, 15 are with SAU, two with ICAR institutes and eight with Non-governmental Organizations (NGO). In Maharashtra, 11 KVKs are with SAUs, one with ICAR institute, 21 with NGOs and one with Open University.

Table 1. Status of KVKs

State	No. of Districts	No. of KVKs				Total
		SAU	ICAR	NGO	Others	
Andhra Pradesh	23	15	2	8	0	25
Maharashtra	35	11	1	21	1	34
Total	58	26	3	29	1	59

Staff

The details of staff position of different KVKs are given in Table 2. Out of 888 posts sanctioned in the zone, 719 are filled (81%). The Programme Coordinators are in position at 38 out of 55 KVKs in the zone, while the number of Subject Matter Specialists in position is 257 (80%) and the number of Programme Assistants is 111 (69%).

Table 2. Consolidated staff position

Category	Andhra Pradesh			Maharashtra			Total		
	S	F	V	S	F	V	S	F	V
Programme Coordinator	22	17	5	33	21	12	55	38	17
Subject Matter Specialist	124	85	39	197	172	25	321	257	64
Programme Assistant	62	42	20	98	69	29	160	111	49
Administrative Staff	51	41	10	71	63	8	122	104	18
Auxiliary Staff	41	33	8	60	48	12	101	81	20
Supporting Staff	57	54	3	72	74	-2	129	128	1
Total	357	272	85	531	447	84	888	719	169

S: Sanctioned F: Filled V: Vacant

Infrastructure

In order to facilitate proper functioning of KVKs, modest infrastructure is provided by ICAR. The details of land, buildings, vehicles and other facilities are presented in Table 3. The other infrastructure such as soil and water testing lab, rainwater harvesting structure and e-connectivity are being provided to only selected few KVKs, while the buildings and vehicles are provided to all the KVKs by ICAR.

Table 3. Details of infrastructure available with KVKs

State	Land (ha)			Admn. Building		Farmers Hostel		Staff Quarters		Demo Units	Vehicles		SW TL	RW HS	E-Co nnec tivity
	<10	10-20	20>	A	UP	A	UP	A	UP		Jeep	Tra ctor			
Andhra Pradesh	1	12	9	18	2	21	1	13	4	22	22	22	18	1	12
Maharashtra	1	16	16	28	3	30	1	24	3	33	33	33	30	11	22
Total	2	28	25	46	5	51	2	37	7	55	55	55	48	12	34

A: Available UP: Under Progress
SWTL: Soil and Water Testing Lab RWHS: Rainwater Harvesting Structure



Office building of KVK Satara



Poultry demonstration unit at KVK Krishna

Revolving Fund

The total revolving fund generated by KVKs in the zone is Rs. 3,25,84,900/- of which Rs.1,26,92,959/- is generated by KVKs in Andhra Pradesh and Rs. 1,98,91,941/- by KVKs in Maharashtra (Table 4).

Table 4. Status of revolving fund in KVKs of Zone-V

State	Opening Balance on 01.04.09 (Rs.)	Revenue (Rs.)	Closing Balance on 31.03.10 (Rs.)
Andhra Pradesh	9842551	2850408	12692959
Maharashtra	16828028	3063913	19891941
Total	26670579	5914321	32584900

In Andhra Pradesh, KVK Kurnool has the highest balance of revolving fund (Rs. 30,09,421/-) followed by Guntur (Rs. 13,96,849/-) and Warangal (Rs. 12,29,163/-) and KVK wise fund position is furnished in Table 5.

Table 5. Status of revolving fund in KVKs of Andhra Pradesh

KVK	Opening Balance on 01.04.09 (Rs)	Revenue (Rs.)	Closing Balance on 31.03.10 (Rs.)
Mahaboobnagar	4500	12400	16900
Medak	171126	-63022	108104
Adilabad	103046	5680	108726
West Godavari	368091	-257499	110592
Prakasam	45525	72111	117636
Anantapur	127611	-2368	125243
Karimnagar	418687	-229333	189354
Ea Godavari	64809	114175	178984
Kadapa	212512	33328	245840
Vizianagaram	128966	116983	245949
Nellore	257659	69989	327648
Nizamabad	286058	52901	338959
Vishakapatnam	484752	36878	521630
Chittoor	506000	95000	601000
Srikakulam	637554	43484	681038
Krishna	590675	282920	873595
Nalgonda	914465	200933	1115398
Khammam	644514	506416	1150930
Warangal	436936	792227	1229163
Guntur	1297029	99820	1396849
Kurnool	2142036	867385	3009421
Total	9842551	2850408	12692959

In Maharashtra, KVK Amaravati (D) has the highest balance Rs. 27,73,960/- followed by Pune, Rs. 18,09,447/- and Washim, Rs. 16,01,000/- and KVK wise fund position is presented in Table 6.

Table 6. Status of Revolving Fund in KVKs of Maharashtra

KVK	Opening Balance on 01.04.08 (Rs.)	Revenue (Rs.)	Closing Balance on 31.03.09 (Rs.)
Kolhapur	15071	2200	17271
Solapur	32857	50341	83198
Nashik	1204287	-1095366	108921
Gondia	332853	-212432	120421
Amaravati-G	61000	80000	141000
Latur	111225	41759	152984
Sangli	190000	-8000	182000
Hingoli	126665	75760	202425
Parbhani	219760	43383	263143
Ratnagiri	368668	-61559	307109
Sindhudurg	315136	5285	320421
Raigadh	357000	-7000	350000
Gadchiroli	209000	179000	388000
Nandurbar	345522	83529	429051
Osmanabad	448000	-18000	430000
Jalna	666000	-175000	491000
Chandrapur	599000	-85000	514000
Ahmednagar	476000	54000	530000
Dhule	555586	0	555586
Yavatmal	595000	55000	650000
Wardha	935244	-26928	665958
Bhandara	757748	-50356	07392
Thane	736905	103904	840809
Jalgaon	580700	329600	910300
Aurangabad	684463	365911	1050374
Washim	1599298	-529580	1069718
Buldhana	893674	185779	1079453
Satara	453000	694000	1147000
Beed	1558000	43000	1601000
Pune	828596	980851	1809447
Amaravati-D	571770	2202190	2773960
Total	16828028	3063913	19891941

Scientific Advisory Committee (SAC) Meetings

The number of SAC meetings conducted by KVKs is given in Table 7. Out of 55 KVKs, 16 KVKs conducted SAC meetings once, while 29 KVKs conducted the meeting twice. The SAC meetings were not conducted by 10 KVKs.

Table 7. Details of SAC meeting conducted in Zone-V

State	Total no. of KVKs	No. of KVKs conducted SAC Meeting			
		Once	Twice	Total	Not Conducted
Andhra Pradesh	22	2	20	22	0
Maharashtra	33	14	9	23	10
Total	55	16	29	45	10

ACHIEVEMENTS

Technology Assessment and Refinement

KVKs play a key role in the assessment and refinement of technologies to location specific condition by organizing various on-farm trials. KVKs plan the trials based on problems in major crops/enterprises in the district. The problem identification and prioritization of thrust areas, planning, execution and evaluation of trials is the fundamental activity of KVKs. The details of thrust areas include,

- ▶ Yield optimization in field crops, fruits, vegetables and other commercial crops through improved varieties, integrated nutrient management and organic farming strategies
- ▶ Integrated pests and disease management in field and horticultural crops
- ▶ Scientific management of dairy and small livestock with appropriate feeding, breeding and health management practices
- ▶ Introduction and popularization of improved varieties/hybrids of crops
- ▶ Crop diversification and alternate land use systems
- ▶ Empowerment of women through improved nutrition and health, income generation and drudgery reduction
- ▶ Promotion of horticulture as a mechanism of crop diversification, augmenting family income and national income through export
- ▶ Natural resource management for sustainable productivity
- ▶ Value addition, processing and market facilitation of household and commercial enterprises
- ▶ Soil and water conservation, watershed management for drought proofing and sustainable rainfed farming
- ▶ Small scale mechanization for saving time and reducing cost and drudgery
- ▶ Popularization of crop production technologies and integrated farm development strategies
- ▶ Increasing income from fishery enterprises through production, processing and marketing enhancing activities

During the year, KVKs have assessed and refined 396 technologies in different locations by laying out 3448 on-farm trials on the farmers' fields (Table 8). Out of 396 technologies tested, 283 technologies were assessed and refined on crops followed by women and children (64), animals (49).

Table 8. Details of technologies assessed and refined by KVKs in Zone-V

Particulars	State	Category	No. of technologies	No. of trials	No. of KVKs
Assessment	AP	Animals	12	161	9
		Crops	108	714	21
		Women empowerment	16	144	8
		Total	136	1019	
	MS	Animals	19	169	16
		Crops	117	950	33
		Women empowerment	33	513	16
		Total	169	1632	
	Total		305	2651	
Refinement	AP	Animals	5	23	2
		Crops	18	85	5
		Women empowerment	4	65	3
		Total	27	173	
	MS	Animals	13	72	11
		Crops	40	287	21
		Women empowerment	11	265	8
		Total	64	624	
	Total		91	797	
Assessment and Refinement	AP	Animals	17	184	11
		Crops	126	799	26
		Women empowerment	20	209	11
		Total	163	1192	
	MS	Animals	32	241	27
		Crops	157	1237	54
		Women empowerment	44	1237	24
		Total	233	2256	
	Total		396	3448	

AP: Andhra Pradesh MS: Maharashtra

The details on thematic area wise on-farm trials conducted by KVKs in Andhra Pradesh and Maharashtra are furnished in Table 9 to 11. The main thematic areas covered in case animals are fertility management, feed and fodder management, nutrition management evaluation of breeds, disease management, production and management, breed improvement and post harvest technology and quality improvement, while in case of crops the thematic areas include varietal evaluation, Integrated Pest Management (IPM), Integrated Nutrient Management (INM), resource conservation technologies, integrated farming systems, weed management, Integrated Disease Management (IDM) and seed and planting material production. Under empowerment of rural women, the on-farm trials were conducted in thematic areas viz. health and nutrition, drudgery reduction and entrepreneurship development.

Table 9. Details of thematic area wise technologies assessed and refined by KVKs in Zone-V

Category	Thematic Area	No. of technologies	No. of trials	No. of KVKs
Animals	Breed improvement	2	17	2
	Disease management	4	31	4
	Evaluation of breeds	3	61	3
	Feed and fodder management	19	109	15
	Fertility management	8	118	6
	Nutrition management	7	68	7
	Post harvest technology and quality improvement	1	3	1
	Production and management	5	18	4
	Total	49	425	
Crops	Improved farm machinery	13	82	9
	Integrated crop management	22	143	15
	Integrated disease management	12	71	8
	Integrated farming systems	17	108	14
	Integrated nutrient management	53	371	32
	Integrated pest management	56	403	32
	Post harvest technology and quality improvement	13	115	11
	Resource conservation technology	17	122	14
	Seed/planting material production	2	17	2
	Varietal evaluation	65	495	31
	Weed management	13	109	10
	Total	283	2036	

Table 9. Contd...

Category	Thematic Area	No. of technologies	No. of trials	No. of KVKs
Women Empowerment	Drudgery reduction	23	318	19
	Entrepreneurship development	4	35	4
	Health and nutrition	37	634	30
	Total	64	987	
Grand Total		396	3448	

Table 10. Details of thematic area wise assessment of technologies by KVKs in Zone-V

Category	Thematic Area	No. of technologies	No. of trials	No. of KVKs
Animals	Disease management	4	31	4
	Evaluation of breeds	3	61	3
	Feed and fodder management	10	66	9
	Fertility management	6	110	5
	Nutrition management	4	50	4
	Post harvest technology and quality improvement	1	3	1
	Production and management	3	9	3
	Total	31	330	
Crops	Improved farm machinery	12	72	9
	Integrated crop management	17	118	13
	Integrated disease management	6	38	9
	Integrated farming systems	16	103	13
	Integrated nutrient management	33	227	25
	Integrated pest management	41	316	24
	Post harvest technology and quality improvement	8	79	7
	Resource conservation technology	14	107	11
	Seed/planting material production	1	10	1
	Varietal evaluation	65	495	31
	Weed management	12	99	10
	Total	225	1664	
Women Empowerment	Drudgery reduction	21	298	17
	Entrepreneurship development	3	30	3
	Health and nutrition	25	329	21
	Total	49	657	
Grand Total		305	2651	

Table 11. Details of thematic are wise refinement of technologies by KVKs in Zone-V

Category	Thematic Area	No. of technologies	No. of trials	No. of KVKs
Animals	Breed Improvement	2	17	2
	Feed and Fodder Management	9	43	7
	Fertility Management	2	8	2
	Nutrition Management	3	18	3
	Production and Management	2	9	1
	Total	18	95	
Crops	Improved farm machinery	1	10	1
	Integrated crop management	5	25	5
	Integrated disease management	6	33	3
	Integrated farming systems	1	5	1
	Integrated nutrient management	20	144	14
	Integrated pest management	15	87	11
	Post harvest technology and quality improvement	5	36	5
	Resource conservation technology	3	15	3
	Seed/planting material production	1	7	1
	Weed management	1	10	1
	Total	58	372	
Women Empowerment	Drudgery reduction	2	20	2
	Entrepreneurship development	1	5	1
	Health and nutrition	12	305	130
	Total	15	330	
Grand Total		91	797	

KVKs in Andhra Pradesh assessed the suitability of 136 technologies by conducting 1019 on-farm trials covering animals (161), crops including horticultural species (714) and empowerment of rural women (144). Similarly in case of Maharashtra KVKs assessed 169 technologies by organizing 1632 trials that include animals (169), crops including horticultural species (950) and women empowerment (513). The state wise details of technologies assessed by KVKs are presented in Table 12 and 13.

Table 12. Details of thematic area wise assessment of technologies by KVKs in Andhra Pradesh

Category	Thematic Area	No. of technologies	No. of trials	No. of KVKs
Animals	Disease Management	2	15	2
	Evaluation of breeds	1	45	1
	Feed and fodder management	3	9	3
	Fertility management	3	85	2
	Post harvest technology and quality improvement	1	3	1
	Production and management	2	4	2
	Total	12	161	
Crops	Improved farm machinery	2	13	2
	Integrated crop management	1	6	1
	Integrated disease management	5	28	4
	Integrated farming systems	10	47	7
	Integrated nutrient management	13	65	9
	Integrated pest management	20	136	10
	Post harvest technology and quality improvement	1	25	1
	Resource conservation technology	10	70	7
	Varietal evaluation	41	283	17
	Weed management	5	41	3
	Total	108	714	
Women Empowerment	Drudgery reduction	6	27	4
	Entrepreneurship development	1	2	1
	Health and nutrition	9	115	7
	Total	16	144	
Grand Total		1019	136	

Table 13. Details of thematic area wise assessment of technologies by KVKs in Maharashtra

Category	Thematic Area	No. of technologies	No. of trials	No. of KVKs
Animals	Disease management	2	16	2
	Evaluation of breeds	2	16	2
	Feed and fodder management	7	57	6
	Fertility management	3	25	3
	Nutrition management	4	50	4
	Production and management	1	5	1
	Total	19	169	
Crops	Improved farm machinery	10	59	7
	Integrated crop management	16	112	12
	Integrated disease management	1	10	1
	Integrated farming systems	6	56	6
	Integrated nutrient management	20	162	16
	Integrated pest management	21	180	14
	Post harvest technology and quality improvement	7	54	6
	Resource conservation technology	4	37	4
	Seed/planting material production	1	10	1
	Varietal evaluation	24	212	14
	Weed management	7	58	7
	Total	117	950	
Women Empowerment	Drudgery reduction	15	271	13
	Entrepreneurship development	2	28	2
	Health and nutrition	16	214	14
	Total	33	513	
Grand Total		169	1632	

A total of 27 technologies were refined by KVKs in Andhra Pradesh by conducting 173 trials covering animals (23), crops (85) and women (65). Similarly KVKs in Maharashtra organized 624 trials to refine 64 technologies covering animals (72), crops (287) and women (265). The state wise details on refinement of technologies are furnished in Table 14 and 15.

Table 14. Details of thematic area wise refinement of technologies by KVKs in Andhra Pradesh

Major Group	Thematic Area	No. of technologies	No. of trials	No. of KVKs
Animals	Feed and fodder management	3	14	2
	Production and management	2	9	1
	Total	5	23	
Crops	Integrated disease management	4	20	1
	Integrated farming systems	1	5	1
	Integrated nutrient management	7	36	4
	Integrated pest management	4	16	3
	Resource conservation technology	2	8	24
	Total	18	85	
Women Empowerment	Entrepreneurship development	1	5	1
	Health and nutrition	3	60	2
	Total	4	65	
Grand Total		27	173	

Table 15. Details of thematic area wise refinement of technologies by KVKs in Maharashtra

Major Group	Thematic Area	No. of technologies	No. of trials	No. of KVKs
Animals	Breed improvement	2	17	2
	Feed and fodder management	6	29	5
	Fertility management	2	8	2
	Nutrition management	3	18	3
	Total	13	72	
Crops	Improved farm machinery	1	10	1
	Integrated crop management	5	25	5
	Integrated disease management	21	13	2
	Integrated nutrient management	13	108	10
	Integrated pest management	11	71	8
	Post harvest technology and quality improvement	5	36	5
Crops	Resource conservation technology	1	7	1
	Seed/planting material production	1	7	1
	Weed management	1	10	1
	Total	40	287	
Women Empowerment	Drudgery reduction	2	20	2
	Health and nutrition	9	245	9
	Total	11	265	
Grand Total		64	624	

Performance of Technologies

The performance of various technologies vis-a-vis parameters of evaluation under assessment and refinement is presented below.

Evaluation of zero tillage maize in rice fallows

In order mitigate severe shortage of human labour and draft power coupled with limited irrigation water and resultant delayed planting of maize grown on irrigated black soils under rice-maize production system in Karimnagar, Andhra Pradesh, KVK evaluated the suitability of zero tillage in maize. Results showed that planting of maize under zero tillage conditions in rice fallows increased the yield (66.00 q/ha), net returns (Rs. 39125/ha) and Benefit Cost Ratio (BCR), besides significant reduction in cost of cultivation.

Technology options	No. of trials	Cost of cultivation (Rs./ha)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Normal panting of Maize - Farmers Practice	20	22363	63.25	30767	2.37
Zero Tillage Maize - Recommended Practice		16295	66.00	39125	3.40

In similar study on intensive rice-rice system on loamy soils in Srikakulam, Andhra Pradesh, KVK assessed the performance of zero tillage in maize to reduce the labour requirement and increase the productivity. Planting of maize under zero tillage system resulted in increased cob length (21 cm), cob weight (269 g), 100 seed weight (57.50 g), yield (57.50 q/ha) and BCR (3.19) compared to conventional methods of planting behind plough.

Technology options	No. of trials	Cob length (cm)	Cob weight (g)	100 seed weight (g)	Yield (q/ha)	BCR
Sowing behind plough - Farmers Practice	3	18.00	229	29	55.00	2.75
Zero Tillage - Recommended Practice		21.00	269	31	57.50	3.19

On irrigated clay loam soils of Visakhapatnam, Andhra Pradesh, maize grown under zero tillage system gave higher yield (38.00 q/ha) and net returns (Rs. 13300/ha) compared to farmer practice of planting behind the plough.

Technology options	No. of trials	Yield (q/ha)	BCR
Planting behind the plough - Farmers Practice	5	33.00	8550
Zero Tillage Maize in rice fallows - Recommended Practice		38.00	13300

Improvement of rice productivity on saline-alkali soils

To improve the productivity of kharif rice grown on saline-alkali soils under intensive rice-rice coastal ecosystem, KVK assessed the performance of improved management practices suitable for irrigated sandy clay loams of Nellore, Andhra Pradesh. In-situ incorporation of dhaincha + gypsum with RDF ((150:75:50 NPK + Zn SO₄ @ 100 kg/ha) + bio-inoculant 10 kg/ha gave higher number of tillers (417/m²), grains (131/panicle), yield (44.02 q/ha), net returns (Rs.18520/ha) and BCR (1.64) compared to management practices without bio-inoculants.

Technology options	No. of trials	Tillers (count/m ²)	Grains (count/panicle)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Application paddy straw 5.00 tons + 250 kg SSP and nitrogen 120 kg/ha - Farmers Practice	5	325	120	34.20	10020	1.36
In-situ incorporation of dhaincha + gypsum with RDF (150:75:50 NPK + Zn SO ₄ @ 100 kg/ha) - Recommended Practice		395	127	39.59	14252	1.51
In-situ incorporation of dhaincha + gypsum with RDF (150:75:50 NPK + Zn SO ₄ @ 100 kg/ha) + bio-inoculant 10 kg/ha - Refined Practice		417	131	44.02	18520	1.64

Evaluation of ridge-furrow method in cucumber

In view of lack of control over flood irrigation and rotting of fruits due to excess moisture that account for 30 per cent losses to farmers in Visakhapatnam, Andhra Pradesh, KVK evaluated ridge and furrow methods of planting in cucumber grown on rice based production system. Planting of cucumber on ridges and furrows gave higher number of fruits (20/plant), yield (250 q/ha) and net returns (Rs. 77500/ha) besides five days early fruiting compared to flat bed planting.

Technology options	No. of trials	No. of fruits/plant	Days to 50 % flowering	Yield (q/ha)	Net returns (Rs./ha)
Flat bed planting - Farmers Practice	10	45	15	175	47500
Ridge and furrow planting - Recommended Practice		40	20	250	77500

Alternative portray technology for raising chillies seedlings

KVK Dhule, Maharashtra conducted an on-farm trial to assess the performance of various methods of raising chillies seedlings. Raising of chillies seedlings in plastic portrays reduced the seed rate (100g/ha) and number of days to first picking (55-60 days) and increased the yield (130 kg/ha).

Technology options	No. of trials	Seed rate (g/ha)	Days for first picking	Yield (q/ha)	BCR
Raising of chilli seedling in flat bed method - Farmers Practice	3	1500	65-70	90	0.97
Raising of chilli seedlings by adopting raised bed method - Recommended Practice		1000	60-65	120	1.16
Use of plastic tray technology for raising hybrid chilli seedling - Recommended Practice		100	55-60	130	1.45

Assessment of peg toothed weeder in cotton

In an on-farm trial, KVK Dhule, Maharashtra assessed the performance of modified peg toothed weeder to reduce the drudgery of farm women in hoeing of irrigated cotton. The results indicated that there is considerable reduction in pulse rate (10) and energy spent (1.51 kg/minute) apart from increased area coverage (0.30 ha/ individual/day) and BCR (3.33) by using modified MPKV peg toothed weeder compared to MPKV peg toothed weeder.

Technology options	No. of trials	Area covered (ha/individual/day)	Energy expenditure (kj/minute)	Difference in pulse rate from idle state	BCR
MPKV Peg Toothed Weeder- Farmers Practice	10	0.18	3.20	22	2.09
Modified MPKV Peg Toothed Weeder - Refined Practice		0.30	1.51	10	3.33

Assessment of improved sickles

Three different kinds of sickles by KVK Nashik and two sickles by Satara were assessed to reduce the drudgery of farm women in harvesting of rice and wheat crops grown on irrigated cereal based production system. Results indicated that harvesting of rice or wheat with Vaibhav Sickle and Laxmi Sickle reduced the energy requirement and heart beat of farm women and facilitated in harvesting more area compared to Traditional Sickle (Nashik). Similarly, the area coverage, labour requirement and cost of harvesting by using Laxmi Sickle was comparatively lower than Vaibhav Sickle (Satara). As per the end users feedback, Vaibhav Sickle is more suitable for harvesting rice crop, while the same is true with as Laxmi Sickle in case of wheat.

Technology options	No. of trials		Weight of sickle (g)	Heart beat (+/- / minute)	Energy require-ment (kg/ minute)	Area coverage		Labour (number /ha)	Cost of harvest- ing (Rs. /Ha)
	Nashik	Satara				Nashik (m²/h)	Satara (minutes / m²)		
Traditional Sickle - Farmers Practice	10	6	350	115	9	130	-	-	-
Laxmi Sickle (MPKV, Rahuri) - Recommended Practice			220	110	8	145	152.40	36.29	1814
Vaibhav Sickle (BSKKV, Dapoli) - Recommended Practice			190	120	8	159	172.30	41.20	2051

Assessment of long handle khurpi in irrigated groundnut

KVK Sangli assessed the performance of long handle khurpi to reduce the drudgery of farm women involved in various intercultural operations in groundnut grown under protected irrigation conditions. Weeding and other intercultural operations with long handled khurpi resulted in significant reduction in back, neck and wrist pain (60%), labour requirement (30/ha) cost of intercultural operations (Rs.1500/ha) compared to traditional khurpi.

Technology options	No. of trials	Drudgery reduction (%)	Labour requirement (number/ha)	Cost of inter culture (Rs./ha)
Traditional Khurpi - Farmers Practice	10	Severe & sustained pain of spinal card, neck and wrist	50	2500
Long Handled Khurpi (MAU, Parbhani) - Recommended Practice		60 % less pain in spinal card, neck and wrist	30	1500



Interculture with long handled khurpi

Assessment of rice transplanter

To mitigate the shortage of labour and increase the yield and net returns, KVK Chittoor assessed the performance of rice transplanter developed by ANGRAU, Hyderabad. Transplanting of rice with mechanized transplanter gave higher number of tillers, grains, yield, net return and BCR compared to manual transplantation

Technology options	No. of trials		Tillers (number/hill)		Grains (number /panicle)		Yield (q/ha)		Net returns (Rs./ha)		BCR	
	K	R	K	R	K	R	K	R	K	R	K	R
Transplantation - Farmers Practice	2	2	15.8	14.3	114	107	6.71	6.25	40418	38224	2.51	2.28
Transplantation with transplanter - Recommended Practice			17.2	16.1	135	122	7.56	6.81	52474	49837	3.26	2.72

K:Kharif; R:Rabi

Studies on direct seeding in rice

In order dispense with huge expenditure on raising nursery and subsequent manual transplantation, KVK assessed the performance of different methods of seeding of rice grown under rice-rice-pulse system in East Godavari district, Andhra Pradesh. Results showed that direct seeding of rice with TNAU row seeder significantly reduced the seed requirement (37.50 kg/ha) and duration (125 days) and increased tillers (24/hill), yield (69.60 q/ha), net returns (Rs. 44298/ha) and BCR (3.77) besides seeding more area (1.00 ha/day/person) compared to other methods.

Technology options	No. of trials	Seed rate (kg/ha)	Area coverage (ha/day/person)	Duration (days)	Tillers (count/hill)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Rice nursery & transplantation - Farmers Practice	8	75.00	0.008	135	18	62.60	35024	2.82
Direct seeding with KVK Row Seeder - Recommended Practice		40.00	0.800	125	22	67.40	42393	3.65
Direct seeding with TNAU Row Seeder - Recommended Practice		37.50	1.000	125	24	69.60	44298	3.77

In a similar study conducted by KVK Kurnool, direct seeding with drum seeder gave higher number of hills (38.8 /m^2), yield (76.90 q/ha), net returns (Rs. 82907/ha) and BCR (5.2) besides reducing the cost of seeding in rice grown on irrigated low lands compared to manual transplantation.

Technology options	No. of trials	Tillers (count/hill)	Cost of seeding (Rs./ha)	Hills (count/ m^2)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Manual transplantation - Farmers Practice	5	23.4	22.6	4500	69.65	69043	3.9
Direct seeding with DRR Drum Seeder - Recommended Practice		18.8	38.8	300	76.90	82907	5.2



Operation of drum seeder



Performance of direct seeded rice

Similarly, KVK Karimnagar also assessed the performance of direct seeding of rice grown on light to medium soils under rice-rice production system in Karimnagar, Andhra Pradesh. Direct seeding with seed cum ferti drill substantially reduced the seed rate (37.50 q/ha) and cost of cultivation (Rs. 23420/ha) and increased the yield (66.25 q/ha), net return (Rs. 39715) and BCR (2.70).

Technology options	No. of trials	Seed rate (kg/ha)	Cost of cultivation (Rs./ha)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Rice nursery and transplantation - Farmers Practice	6	75.00	26525	65.00	35420	2.33
Direct seeding with Seed cum Ferti drill - Recommended Practice		37.50	23420	66.25	39715	2.70

Evaluation of bio intensive pest management in rice

In order to minimize the incidence of stem borer, leaf folder, brown plant hopper and blast that account for 60 per cent yield loss in irrigated rice, KVK, Kadapa, Andhra Pradesh assessed the performance of a Bio-intensive Pest Management (BIPM) module developed by Acharya N. G. Ranga Agricultural University, Hyderabad. Bio-intensive management of pest and diseases significantly reduced the leaf folder incidence (2.60/hill) and dead hearts (3.00/ m²) apart from increasing yield (54.43 q/ha), net return (Rs. 163290/ha) and BCR (3.31) compared to farmers practice of spraying of conventional pesticides and fungicides.

Technology options	No. of trials	Leaf folder incidence (damage leaves/ hill)	Stem borer damage (dead hearts/ m ²)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Spraying of conventional pesticides and fungicides - Farmers Practice	5	26.20	19.40	51.34	154026	2.66
BIPM module (Seed treatment with <i>Pseudomonas fluorescence</i> @ 8 g/kg, <i>Beauveria bassiana</i> @ 10 ¹³ spores/ha, spraying of <i>Pseudomonas fluorescence</i> @ 5 g/l, release <i>Trichogramma japonicum</i> @ 1 lakh /ha after sighting egg masses of either leaf folder or stem borer, spray <i>Bacillus thuringensis</i> (halt) @ 500 g/ha and need based application of 5% NSKE) - Recommended Practice		2.60	3.00	54.43	163290	3.31

In an another on-farm trial conducted by KVK Kurnool, the bio-intensive management of pests and diseases in rice effectively controlled leaf folder (3.1 %), stem borer (4.10 %) and blast (3.1 %) besides significantly increasing the yield, net return and BCR of rice grown on irrigate low lands during kharif and rabi seasons.

Technology options	No. of trials	Leaf folder damage (%)	Stem borer damage (%)	Blast incidence (%)
Spraying of conventional pesticides and fungicides - Farmers Practice	5	5.5	8.6	9.3
BIPM (Seed treatment with <i>Pseudomonas fluorescens</i> @ 8 g/kg + release of <i>Trichogramma japonicum</i> @ 1 lakh/ha + Bird perches @ 10/ha + spray of <i>Beauveria bassiana</i> 10 ¹³ spores/ha + spray <i>Bacillus thuringensis</i> @ 2 kg/ha + Need based application of 5% NSKE - Recommended Practice		3.1	4.1	3.1

Technology options	Yield (q/ha)		Net returns (Rs./ha)		BCR	
	Kharif	Rabi	Kharif	Rabi	Kharif	Rabi
Spraying of conventional pesticides and fungicides - Farmers Practice	64.69	71.81	61387	40741	3.1	2.34
BIPM (Seed treatment with <i>Pseudomonas fluorescens</i> @ 8 g/kg + release of <i>Trichogramma japonicum</i> @ 1 lakh/ha + Bird perches @ 10/ha + spray of <i>Beauveria bassiana</i> 10 ¹³ spores/ha + spray <i>Bacillus thuringensis</i> @ 2 kg/ha + Need based application of 5% NSKE) - Recommended Practice	68.63	75.38	67599	45706	3.4	2.53



Bio-intensive management of rice pests and diseases

In a similar study, KVK Karimnagar also assessed the performance of bio-intensive management of pest and disease management in rice grown on irrigated sandy loams under intensive rice-rice system during 2008-09 and 2009-10. Both methods i.e usage of granular insecticides and bio-intensive management of pest and diseases reduced the incidence of stem borer and increased the yield, while the cost of pest and disease control is significantly lower under bio-intensive management than granular application of insecticides.

Technology options	No. of trials	Stem borer damage (%)		Yield (q/ha)		Cost of pest and disease control (Rs./ha)
		2008-09	2009-10	2008-09	2009-10	
Granular insecticide (3G or 4G) - Farmers Practice	4	5.52	2.62	55.0	48.75	750
Seed treatment with <i>Pseudomonas</i> @ 8 g/kg + <i>Tricogramma</i> release @ 1.0 lakh/ha + <i>Bacillus thuringensis</i> spray @ 2 kg/ha + <i>Pseudomonas</i> spray @ 5 g/l - Recommended Practice		6.67	3.09	57.5	47.50	2200

Assessment of IPM module for control of yellow stem borer in rice

In view of indiscriminate usage of pesticides that result in increased cost of cultivation, resurgence of other pests and pollution of rice ecosystem in intensive rice-rice system in West Godavari, Andhra Pradesh, KVK assessed the performance of IPM module developed by Acharya N. G. Ranga Agricultural University, Hyderabad for control of yellow stem borer in rice grown on black soil under canal irrigation system. Control of yellow stem borer by IPM package significantly reduced dead hearts (1.76 %), white ears (6.19 %) and gave higher yield (60.84 q/ha), net returns (Rs. 31226/ha) and BCR (2.05) compared to conventional use of pesticides.

Technology options	No. of trials	Dead hearts (%)	White ears (%)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Indiscriminate use of pesticides - Farmers Practice	7	2.62	21.9	55.80	23794	1.73
Carbofuran 3G in nursery one week before pulling +clipping of leaf tips + mass trapping of male moths with pheromone traps @ 20-25/ha + release of <i>Trichogramma japonicum</i> @ 1 lakh /ha + need based usage of pesticides - Recommended Practice		1.76	6.19	60.84	31260	2.05

Management of mealy bugs in cotton

To minimize the incidence of mealy bug that account for 60 per cent yield loss in cotton grown on irrigated vertisols of Kadapa, Andhra Pradesh, KVK assessed the performance of IPM package developed by Acharya N. G. Ranga Agricultural University, Hyderabad. Control of mealy bug through IPM package significantly reduced the incidence of mealy bug and increased the yield (19.81 q/ha), net return (Rs. 130500/ha) and BCR (3.51) compared to conventional spray of pesticides.

Technology options	No. of trials	Mealy bug incidence (score)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Conventional spray of pesticides - Farmers Practice	5	1.40	18.17	105098	2.79
IPM package (Removal of alternate host, deep summer ploughing, removal stubbles of previous cotton crop, prophylactic stem application of monocrotophos, spraying of <i>Verticillium lacani</i> @ 5 g/l, spraying of profenophos (0.6%) along with detergent powder @ 0.5 g/l) - Recommended Practice		0.20	19.81	130500	3.51

KVK Jalgaon conducted six on-farm trial to find out suitable method for controlling mealy bugs infestation in rainfed cotton. Spraying of Verticilium @ 50 g/ 10 l water + rosin soap 250 g along with stem application of imadochlorpid @ 5ml/100 ml water at 35, 50 and 75 DAS increased the yield (22.60 q/ha), net returns (Rs. 36240/ha) and benefit to cost ratio (3.01) compared to other technology options.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
No control - Farmers Practice	6	17.30	23520	2.30
Malathion dust @ 25 Kg/ha + monocrotophos @ 15 ml/10 l water - Recommended Practice		19.50	28800	2.61
Spraying of <i>verticilim lecanni</i> @ 50 g/10 l water + fish oil rosin soap 250 g + Stem application of Imadochlorpid @ 5 ml/100 ml water painted with brush on cotton stem (5 cm) at 35, 50 and 70 DAS - Refined Practice		22.60	36240	3.01

Management of *Spodoptera litura* infestation in soybean

In an on-farm trial, KVK Jalna assessed the performance of IPM package developed by NCIPM, New Delhi to control spodoptera infestation in soybean grown on rainfed cotton based production system. Higher yield and net return are noted with IPM.

Technology options	No. of trials	Larva (Number /one running meter row)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Need based spray of indoxacarb (14.5%SC) @ 400 ml/ha - Farmers Practice	10	5.88	11.25	7000	2.75
IPM Package (1. Growing trap crop castor along the border 2. Destruction of egg masses 3. Hand collection of young larvae 4. Installation of Pheromone traps (10 / ha) 5. Spraying of 5 % NSKE 6. Need based spay of <i>Beauveia bassiana</i> @ 1.5 Kg/ha) - Recommended Practice		7.35	13.12	10000	3.71

Management of safflower aphids

KVK Nandurbar assessed the performance of technologies for controlling aphid infestation of safflower grown on residual moisture in black cotton soils in Nandurbar district of Maharashtra. Results indicated that spraying of 5 % NSKE on four border rows or 180 cm from the border + need based spray of dimethoate (0.05 %) on four peripheral rows or 180 cm from the border reduced the aphid and cost of spraying even though there is substantial reduction in aphid population with conventional blanket spraying of chemical pesticides. However, the yield of safflower in both the treatments remained the same.

Technology options	No. of trials	Count of aphids (Days after spraying)			Cost of spraying (Rs./ha)	Yield (q/ha)	BCR
		30	45	60			
Two to three blanket sprays of pesticides on whole field - Farmer practice	5	12	6	8	1350	13.50	2.41
Spraying 5% NSKE + need based spray of Dimethoate (0.05%) both on peripheral four border rows or 180 cm of border rows - Recommended Practice		14	19	25	320	13.50	2.21

In another on-farm trial, KVK Washim, Maharashtra assessed the refined practice of directed spray of methyl demeton (25 EC) on only two border rows at the first sighting of aphids. Results showed that directed spray of methyl demeton on two border rows not only reduced the aphid count (10.30/plant) and cost of spraying (Rs. 350/ha), but also significantly increased the yield (12.10 q/ha), net returns (Rs. 12910/ha) and BCR (2.12) compared to recommended practice of two sprays of methyl demeton at ETL and farmers practice of two sprays of imidacloprid.

Technology options	No. of trials	Aphids (number/ plant)	Cost of spraying (Rs./ha)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Two sprays of imidacloprid - Farmers Practice	8	61.00	1140	8.20	3840	1.33
Two sprays of methyl demeton at ETL - Recommended Practice		21.40	840	10.90	9320	1.81
Directed spray of methyl demeton on two border rows at the first sighting of aphids - Refined Practice		10.30	350	12.10	12190	2.12

Control of pod borer in bengalgram

To minimize the pod borer infestation in bengalgram grown under irrigated cotton/ soybean based production system, KVK Washim assessed the refined strategy of management i.e spraying of neem seed extract (5 %) at 25, 45 and 60 Days After Sowing (DAS). There was significant reduction in incidence and damage (1.20/m row and 5.10 %) of pod borer and increase in yield (13.20 q/ha), net return (Rs. 15020/ha) and BCR (2.18) by spraying of neem seed extract (5 %) at 25, 45 and 60 days compared to recommended practice of two sprays of neem seed extract (5 %) at 45 and 60 days and three times spraying of pesticides at 25, 45 and 60 DAS.

Technology options	No. of trials	Pod borers (number/ m row)	Pod borer damage (%)	Cost of spraying (Rs./ha)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Spraying of chloropyriphos (0.03 %) at 25 DAS + cypermethrine (0.04 %) at 45 DAS + Indoxiacarb (0.04 %) at 60 DAS - Farmers Practice	8	2.40	11.30	1440	8.70	4340	1.31
Spraying of neem seed extract (5%) at 45 & 60 DAS - Recommended Practice		1.53	8.50	140	11.30	11100	1.87
Spraying of neem seed extract (5%) at 25, 45 & 60 DAS - Refined Practice		1.20	5.10	210	13.20	15020	2.18

Management of fruit borer in bhendi

To minimize the damaged and malformed fruits, KVK Kolhapur assessed the performance of refined practice of managing fruit borer incidence in bhendi grown under irrigated sugarcane based production system in Kolhapur district of Maharashtra. Need based spray of indoxacarb and *Bacillus thuringiensis* and trapping of fruit borer moths through pheromone traps significantly reduced the fruit borer damage (2%) and increased the yield (14.5 q/ha), net returns (Rs.174000/ha) and benefit to cost ratio (1.87).

Technology options	No. of trials	Damaged fruit (%)	Fruits yield (q/ha)	Net returns (Rs./ha)	BCR
Spraying of Endosulfan - Farmers Practice	5	31	6.0	72000	1.12
Need based spray of Deltamethrin (5 ml/10 l water) and need based spray neemark(4%) - Recommended Practice		7	11.2	138000	1.65
1. Installation of pheromone traps 2. Need based spray of Indoxacarb (5 ml/10 l water) 3. <i>Bacillus thuringiensis</i> culture (20 ml/ 10 l water) and coragen (5 ml/10 l water) in sequential manner at an interval of 5 days - Refined Practice		2	14.5	174000	1.87

Management of fruit fly in ridge gourd

To minimize the fruit fly damage in ridge gourd grown on medium black soil during kharif season in Solapur district, Maharashtra, KVK assessed the performance of improved practice of installing Fly-T Trap with Baco-lure (5-15 traps/ha). Control of fruit flies using Fly-T traps along with need based spray of insecticides significantly reduced the intensity of damaged fruits and number sprays of pesticide besides increasing the yield, net returns and BCR.

Technology options	No. of trials	Damaged fruits (%)	No. of sprays	Cost of control (Rs./ha)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Indiscriminate spray (15-17 sprays) of systemic insecticides - Farmers Practice	4	25.25	17	6270	358.38	394213	3.76
Fly-T Trap with Baco-lure (5-15 traps/ha) along with need based spray of pesticides - Recommended Practice		10.25	11	7505 including cost of fly traps (Rs.1235 /ha)	412.38	453613	4.06

Management of midge in chillies

To minimize the severity of midge in chillies grown on rainfed alfisols under protective irrigation in Prakasam district, Andhra Pradesh, KVK assessed different methods of managing midge. Spraying of NSKE (5%) before floral initiation followed by spraying of fipronil (0.2 %) 15 days later reduced the midge incidence (12.50 %) and increased the yield (36.35 q/ha) and BCR (3.56) compared to spraying of Triazophos.

Technology options	No. of trials	Pest incidence (%)	Yield (q/ha)	BCR
Spraying of Triazophos (0.15 %) - Farmers Practice	10	28.00	24.50	2.32
Spraying of NSKE (5%) before floral initiation followed by spraying of Fipronil (0.2 %) 15 days later - Refined Practice		12.50	36.35	3.56

Management of wilt in pigeonpea

To minimize the incidence of wilt disease in pigeonpea grown on rainfed alfisols of Nalgonda, Andhra Pradesh, KVK evaluated the performance of pigeonpea cv. PRG-158 along with usage Trichoderma. Results indicated that cv. PRG-158 along with seed treatment with *Trichoderma viride* @ 3 g/kg and soil application of *Trichoderma viride* @ 2 kg/ha and 180 kg/ha neem cake resulted in effective control of wilt incidence and increased the yield (10.20 q/ha), net returns (Rs. 35700/ha) and BCR (3.09) compared to growing of either LRG-30 or 41 alone.

Technology options	No. of trials	Wilt incidence (%)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv. LRG-30 or 41- Farmer Practice	5	0.30	8.80	27104	2.60
Cv. PRG-158 along with seed treatment with <i>Trichoderma viride</i> @ 3g/kg and soil application of <i>Trichoderma viride</i> @ 2 kg/ha and 180 kg/ha neem cake - Recommended Practice		0.00	10.20	35700	3.09

Micro-nutrient management in wheat grown on calcareous soils

In order to improve the micronutrient availability (zinc and iron) and yield of wheat grown under cereal based production in calcareous soils in Sangli, Maharashtra, KVK refined and assessed the nutrient management strategies. Chelating of zinc sulfate and ferrous sulfate in Farm Yard Manure (FYM) for 10 days before basal application of nutrients as per soil test values and crop based recommendation resulted in high availability of zinc (16 ppm) and iron (37 ppm) and significant increase in yield (28.58 q/ha), net returns (Rs. 25720/ha) and BCR (2.29) compared to application of nutrients as per own assessment of farmers and blanket application of crop specific recommended dose of nutrients.

Technology options	No. of trials	Concentration (ppm)		Yield (q/ha)	Net returns (Rs./ha)	BCR
		Zn	Fe			
Application of 5.00 t FYM + 57.5:20 N and P/ha - Farmers Practice	10	7.50	21.00	21.38	11650	1.83
Application of 50 t FYM + 120:60:60 kg NPK + 20 kg Zinc Sulphate + 25 kg Ferrous Sulphate /ha and seed treatment with Azotobactor @ 250g/10 kg seed - Recommended Practice		11.00	30.00	25.00	19500	2.08
50 t FYM/ ha + soil test based nutrient application for N, P, K, Zn and Fe + seed treatment with Azotobactor @ 250 g/10 kg seed & chelating Zinc Sulfate & Ferrous Sulfate in well decomposed FYM for 8-10 days before application - Refined Practice		16.00	37.00	28.58	25720	2.29

Soil test based fertilizer management in rice

KVK assessed the performance of soil test based nutrient management in rabi rice grown on sandy clay loam soils in Chittoor, Andhra Pradesh. Soil test based nutrient application either in kharif or rabi season as per crop specific recommendation resulted in higher tillers, grains, yield, net returns and BCR compared to farmers practice.

Technology options	No. of trials	Tillers (number /hill)	Grains (number /panicle)	Yield (q/ha)	Net returns (Rs./ha)	BCR
208:36:36 NPK kg/ha - Farmers Practice	5	14.50	97	5.76	29657	2.06
Soil test based NPK - 150:60:32 + 20 kg/ha Zinc Sulphate - Recommended Practice		17.0	125.6	6.10	32665	2.15

Management of zinc deficiency in rice

In view of 70 per cent of irrigated black soils being deficient in zinc and resultant low productivity of rice, KVK Kurnool conducted an on-farm trial and assessed foliar application of zinc in rice. Results showed that foliar application of 0.2 per cent chelated zinc twice at five day interval resulted in increased tillers (19.4/hill), grains (166), yield (67.21 q/ha), net returns (Rs. 67112/ha) and BCR (2.99) compared to soil application of zinc.

Technology options	No. of trials	Tillers (count /hill)	Grains (count /panicle)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Application of 25 kg/ha Zinc Sulphate - Farmers Practice	5	14.50	146	62.13	59351	2.75
Application of 50 kg/ha Zinc Sulphate - Recommended Practice		17.60	159	65.56	63740	2.84
Foliar spray of 0.2 percent chelated zinc twice at five day interval - Refined Practice		19.40	166	67.21	67112	2.99



Foliar application of chelated zinc in rice

Soil test based nutrient management in soybean

KVK Osmanabad assessed the performance of soil test based nutrient management to improve the yield of soybean grown under rainfed oilseed based production system. Results showed that application of sulphur along N, P and K as per soil test values enhanced the availability of nutrients N, P and S, yield (11.80 kg/ha), net returns (Rs. 14640/ha) and BCR (2.17) compared to blanket application of nutrients either on own assessment by farmers or as per the crop specific recommendation.

Technology options	No. of trials	Soil available nutrients			Yield (q/ha)	Net returns (Rs./ha)	BCR
		P (kg/ha)	K (kg/ha)	S (ppm)			
27 kg/ha N + 69 kg/ha P i.e. One bag DAP per acre - Farmer's Practice	5	14.5	314	9.40	7.80	6575	1.57
30:60:30 Kg NPK/ha - Recommended Practice		18.8	326	8.60	10.30	11690	1.97
Soil test based NPK application + sulphur 20 kg/ha - Refined Practice		16.4	368	14.80	11.80	14640	2.17

Yield improvement in chickpea grown on heavy black soils

To minimize the incidence of wilt and improve the growth and yield of irrigated chickpea grown on heavy black soils of Pune, KVK assessed the performance of various technology options. Results showed that seed treatment with PSB, rhizobium, trichoderma and VAM (25:25:5:25 g/kg) + soil application of vermicompost, trichoderma and VAM (500:5:5 kg/ha) significantly reduced the wilt incidence (6.90 %) and increased the yield (16.25 kg/ha) and BCR (3.40) compared to other management practices without VAM (either seed dressing or soil application).

Technology options	No. of trials	Wilt incidence (%)	Wilt control (%)	Yield (q/ha)	BCR
Seed treatment with 25:25:5 g/kg seed with PSB, Rhizobium and Trichoderma - Farmers Practice	10	30.41	10.15	8.13	1.7
Seed treatment with 25:25:5 g/kg seed with PSB, Rhizobium and Trichoderma + Soil application of 500:5 kg/ha Vermicompost & Trichoderma - Recommended Practice		12.26	61.40	14.15	2.9
Seed treatment with 25:25:5:25 g/kg seed with PSB, Rhizobium, Trichoderma and VAM + Soil application of 500:5:5 kg/ha Vermicompost, Trichoderma and VAM - Recommended Practice		6.90	80.21	16.25	3.40

Nutrient management in pigeonpea

KVK Jalna, Maharashtra assessed the performance of nutrient management strategy for improving the yield of rainfed pigeonpea by conducting five on-farm trials. Seed inoculation with rhizobium and PSB and biofertilizers @ 250 gm/10 kg of seed + 75 % RDF (25 and 50 kg/ha N and P) as basal dose increased the yield (19.25 q/ha), net returns (Rs. 74150/ha), BCR (4.58) besides considerable reduction in wrinkled seed (30%) compared to basal application of RDF (25 and 50 kg/ha N and P).

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR	% reduction of wrinkled seeds
RDF (25 and 50 kg/ha N and P) as basal dose - Farmers Practice	5	17.45	66310	4.12	0
Seed inoculation with Rhizobium and PSB Biofertilizers @ 250 gm/10 kg of seed + 75 % RDF (25 and 50 kg/ha N and P as basal dose) - Recommended Practice		19.25	73150	4.58	30

Nutrient management in BT Cotton

In an on-farm trial, KVK Kurnool assessed the performance of different doses of nutrients suitable for cotton grown on irrigated black soils in Kurnool district, Andhra Pradesh. Results showed that application of 150:75:100 kg/ha NPK gave higher bolls (61.80/plant), yield (25.33 q/ha), net returns (Rs. 41805/ha) and BCR (2.94) compared to other doses of nutrients.

Technology options	No. of trials	Boll (count/plant)	Yield (q/ha)	Net returns (Rs./ha)	BCR
240:200:38 kg/ha NPK - Farmers Practice	5	58.90	24.69	36291	2.43
120:60:60 kg/ha NPK - Recommended Practice		44.70	21.32	32810	2.60
150:75:100 kg/ha NPK - Refined Practice		61.80	25.33	41805	2.94



Nutrient management in BT cotton

De-navelling and distal stock feeding of nutrients in banana

To improve the bunch and fruit size and quality of banana, KVK Nandurbar assessed the performance of de-navelling and distal stalk feeding of N, K and S nutrients through cow dung slurry developed by Indian Institute of Horticultural Research, Bangalore. Results indicated that de-navelling and distal stalk feeding of nutrients increased the bunch weight (920 q/ha), net returns (Rs.330475/ha) and BCR (4.95) besides reducing the number of days for harvest after emergence of the bunch compared to conventional de-navelling of male flowers alone.

Technology options	No. of trials	Days to harvest	Bunch weight (kg)	Yield (q/ha)	Net returns (Rs./ha)	BCR
De-navelling of male flowers - Farmers Practice	5	126	19	760	258600	4.10
De-navelling male flower and shoot feeding of N, K and S through distal stalk - Recommended Practice		105	23	920	330475	4.95

Yield improvement through pruning and fertilizer management in grapes

To increase the yield of grapes grown on light soils of northern parts of Solapur district, Maharashtra, KVK assessed the performance of fortnightly spraying of enriched cow dung slurry (20 kg cow dung + 20 l cow urine + 2 kg jaggery + 500 g PSB + 500 g Azotobactor + 2 kg powdered chickpea dal +2 kg SSP in 500 l water) along with pruning and application of recommended dose of nutrients. Fortnightly application of enriched cow dung slurry along with October pruning and application of 265:250:330 NPK (kg/ha) significantly increased the bunch size (320 g), berry size (14.52 mm), TSS (20.12 %), yield (288 q/ha), net returns (Rs. 265774/ha) and BCR (2.19) compared to other methods.

Technology options	No. of trials	Bunch weight (kg)	Berry size (mm)	TSS %	Yield (q/ha)	Net returns (Rs./ha)	BCR
October Pruning & 250:200:150 kg/ha N:P:K - Farmers Practice	8	244.25	12.57	16.92	219.83	132086	1.60
October Pruning & 265:250:330 kg/ha N:P:K - Recommended Practice		268.00	13.42	18.52	241.20	176614	1.80
October Pruning & 265:250:330 kg/ha N:P:K + Fortnightly application of cow dung slurry (1 l/plant) - Refined Practice		320.00	14.52	20.12	288.00	265774	2.19

Nutrient management in rabi onion

In an on-farm trial, KVK Solapur tested the refined method of nutrient management to improve the quality and yield of rabi onion grown under protective irrigation system. Application of recommended dose of nutrients along with three sprays of IAA and zinc substantially improved the quality (53.46 % of A grade bulbs) and yield (287 q/ha) compared to other methods of nutrient management. However, the benefit to cost ratio (6.56) in case of application of nutrients as per the crop specific recommendation without using IAA and Zinc was higher.

Technology options	No. of trials	Percentage			Yield (q/ha)	Net returns (Rs./ha)	BCR
		A grade (>6 mm dia)	B grade (4-6 mm dia)	C grade (2-4 mm dia)			
90:60:0 NPK (kg/ha) - Farmers Practice	10	33.05	29.35	37.15	218.00	310359	6.15
150:50:80 NPK (kg/ha) - Recommended Practice		51.10	29.79	18.27	255.05	374407	6.56
150:50:80 NPK (kg/ha) + 3 sprays of IAA (300 ppm) + Zinc (0.05 %) - Refined Practice		53.46	33.69	13.93	287.00	389429	5.74

Assessment for rust tolerance in wheat

In an on-farm trial, KVK Washim assessed the suitability of cv. Vimal (AKW-3722) of wheat grown under protective irrigation under wheat based cereal production system in Washim district, Maharashtra. Results showed that the yield (24.37 q/ha), net returns (Rs. 31681/ha) and BCR (2.40) was higher with cv. Vimal compared to cv. LoK-1.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv. LoK-1- Farmers Practice	14	19.75	25181	1.91
Cv. Vimal (AKW-3722) - Recommended Practice		24.37	31681	2.40

Introduction of rice cv. BPT-2270 in Nellore district

In an on-farm trial KVK Nellore assessed the suitability of a fine grained improved rice cv. BPT-2270 suitable for kharif season in blast and brown plant hopper endemic areas under intensive rice-rice production system in Nellore, Andhra Pradesh. Rice cv. BPT-2270 gave higher number of tillers (482/m²), grains (152/panicle), yield (62.56 q/ha), net returns (Rs. 46286/ha) and BCR (1.33) compared to cv. CR-1009.

Technology options	No. of trials	Tillers (count /hill)	Grains (count /panicle)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv. CR-1009 - Farmers Practice	5	466	130	58.21	34395	1.12
Cv. BPT-2270 - Recommended Practice		482	152	62.56	46286	1.33

Introduction of blast and BPH tolerant varieties in Nellore district

In an on-farm trial KVK Nellore assessed the suitability of fine grained improved rice varieties suitable for rabi season in blast and brown plant hopper endemic areas under intensive rice-rice production system in Nellore, Andhra Pradesh. Rice cv. NDLR-7 gave more tillers (430/ m²), grains (139/panicle), yield (65.15 q/ha), net returns (Rs. 56520/ha) and BCR (1.65) compared to cv. NLR-34449 and cv. BPT-5204.

Technology options	No. of trials	Tillers (count /hill)	Grains (count /panicle)	Blast incidence (score)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv. BPT-5204 - Farmers Practice	5	419	128	6-8	63.36	42191	1.34
Cv. NDLR-7 - Recommended Practice		430	139	1-2	65.15	56520	1.65
Cv. NLR-3449 - Recommended Practice		427	125	0-1	65.78	39890	1.31

Assessment of cv. Amber for popcorn production

In an on-farm trial, KVK Jalna assessed the performance of maize cv. Amber for popcorn production under protected irrigated conditions. Results showed that growing of maize cv. Amber increased the yield (107.5 q/ha) and BCR (2.67) compared to non-descript local variety for pop corn production. The popcorn made from cv. Amber has higher market price (Rs. 75/kg) compared to popcorn from non-descript local variety (Rs. 25/kg) as popcorn is not only crisp with full puffing ability but also has more acceptable white colour.

Technology options	No. of trials	Yield (q/ha)	Market price for popcorn (Rs./kg)	BCR	Quality of popcorn
Non-descript variety for popcorn - Farmers Practice	5	60	25	1.66	Poor market quality
Maize cv. Amber for popcorn - Recommended Practice		107.5	75	2.67	Superior quality with white, crisp and full puffing ability

Evaluation of drought tolerant groundnut varieties

To enhance the productivity of groundnut grown on alfisols under rainfed oilseed based production system in Kadapa district, Andhra Pradesh, KVK assessed the performance of different varieties for drought tolerance. Results showed that cv. Greeshma gave higher yield (13.40 q/ha), net returns (Rs. 34740/ha) and BCR (2.40) followed by cv. ICGV-91114 and cv. TPT-25.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv.JL-24 - Farmers Practice	5	10.45	18820	2.1
Cv. ICGV-91114 - Recommended Practice		12.50	30800	2.3
Cv. TPT-25 - Recommended Practice		11.83	26088	2.3
Cv. Greeshma - Recommended Practice		13.40	34740	2.4

In another on-farm trial, KVKs Karimnagar, Andhra Pradesh, also evaluated the performance of groundnut cv. Greeshma on irrigated alfisols under cereal oilseed system. Groundnut cv. gave higher pod yield, net returns and BCR compared to age old variety TMV-2.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv. TMV-2 - Farmers Practice	6	18.00	28362	2.18
Cv. Greeshma - Recommended Practice		21.87	38277	2.52

KVK Kurnool also evaluated different varieties of groundnut suitable for planting on rainfed alfisols of Kurnool district, Andhra Pradesh. Groundnut cv. TG-37A gave higher number of pods (13.76/plant), shelling per cent (71.38 %), yield (8.45 q/ha), net returns (Rs. 11805/ha) and BCR (1.87) followed by Greeshma, ICGV-9114 and TMV-2.

Technology options	No. of trials	Pods/plant	Shelling %	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv. TMV-2 - Farmers Practice	5	8.12	67.80	5.80	4900	1.30
Cv. ICGV-91114 - Recommended Practice		11.48	69.00	7.50	8955	1.60
Cv. APNL-888 (Greeshma) - Recommended Practice		12.64	70.08	7.91	10185	1.75
Cv. TG-37A - Recommended Practice		13.76	71.38	8.45	11805	1.87

Varietal evaluation in groundnut

To improve the productivity of groundnut grown on irrigated clay loams of Visakhapatnam district, Andhra Pradesh, KVK assessed the performance of cv. K-6 suitable for rabi season. Results showed cv. K-6 gave higher number of pods (22/plant), 100 seed weight (62.8 g), yield (30.21 q/ha) and net returns (Rs. 47435/ha) compared to non-descript local variety.

Technology options	No. of trials	Pods (count/plant)	100 kernel weight (g)	Pod yield (q/ha)	Net returns (Rs./ha)
Non-descript variety - Farmers Practice	5	14	59.2	20.64	31115
Cv. K-6 - Recommended Practice		22	62.8	30.21	47435

Varietal evaluation in sesamum

KVK, Kadapa, Andhra Pradesh evaluated the performance of different varieties of sesamum suitable for cultivation under residual moisture on medium to heavy soils in Kadapa. Results showed that cv. Swetha gave significantly higher yield (12.07 q/ha), net returns (Rs.37952/ha) and BCR (7.9) followed by cv. YLM-66, cv. Gowri and cv. Chandana.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv. Gowri - Farmers Practice	4	7.95	23120	5.2
Cv. Swetha - Recommended Practice		12.07	37952	7.9
Cv. Chandana - Recommended Practice		9.29	19739	4.7
Cv. YLM-66 - Recommended Practice		10.98	33983	7.1

Varietal evaluation in niger

KVK, Thane evaluated different varieties of niger suitable for rainfed cereal + oilseed based production system. Cv. Phule Karala performed better than cv. IGP-76 and local cv. Jawahar in terms of yield (5.10 q/ha), net returns (Rs. 12613/ha) and BCR (1.97).

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Local variety (cv. Jawahar) - Farmers Practice	8	3.35	3863	1.30
Cv. IGP-76 - Recommended Practice		4.45	9363	1.72
Cv. Phule Karala - Recommended Practice		5.10	12613	1.97

Assessment of improved castor hybrid PCH-111

KVK Rangareddy, Andhra Pradesh assessed the performance of improved castor hybrid PCH-111 in rainfed alfisols under castor or sorghum-fallow sequence. Results showed that new castor hybrid PCH-111 gave higher yield (11.67 q/ha), net returns (Rs. 16374/ha) and BCR (2.76) compared to GCH-4.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Hybrid GCH-4 - Farmers Practice	5	8.60	10790	2.33
Hybrid PCH-111 - Recommended Practice		11.67	16374	2.76

Varietal evaluation in pigeonpea

In an on-farm trial, three varieties of pigeonpea were evaluated for suitability on rainfed alfisols under kharif pulse based production system of Chittoor district, Andhra Pradesh. Results showed that cv. TRG-22 gave higher yield (6.55 q/ha), net returns (Rs. 11180/ha) and BCR (1.95) compared to cv. LRG-41 and Chittoor Local.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv. Chittoor Local - Farmers Practice	12	4.02	2488	1.21
Cv. LRG-41 - Recommended Practice		5.55	7743	1.66
Cv. TRG-22 - Recommended Practice		6.55	11180	1.95

Assessment of pigeonpea cv. PRG-158

To mitigate the problem of wilt disease and increase the productivity of pigeonpea grown on rainfed alfisols under pigeonpea-fallow system in Rangareddy district, Andhra Pradesh, KVK assessed the performance of cv. PRG-158. Planting of cv. PRG-158 on rainfed alfisols increased the yield (11.50 q/ha), net returns (Rs. 26400/ha) and BCR (3.54).

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv. LRG-30 - Farmers Practice	8	8.50	17800	2.89
Cv. PRG-158 - Recommended Practice		11.50	26400	3.54

In a similar study on rainfed loamy soils in Vizianagaram, Andhra Pradesh, pigeonpea cv. PRG-158 gave higher number of branches (5.6/plant), pods (302/plant), yield (17.30 q/ha), net returns (Rs. 16000/ha) and BCR (1.8) compared non-descript local variety.

Technology options	No. of trials	Branches (count/plant)	Pods (count/plant)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Non-descript Konda Kandi - Farmers Practice	6	4.8	264	12.50	3000	1.0
Cv. PRG-158 - Recommended Practice		5.6	302	17.30	16000	1.8

Introduction of greengram cv. TM-96-2 in rice fallows of Nellore

To restore soil fertility and for additional returns under intensive rice-rice coastal ecosystem in Nellore, Andhra Pradesh, KVK assessed the suitability of introducing a short duration greengram variety in rice fallows. Growing of greengram cv. TM-96-2 in rice fallows gave higher yields (5.89 q/ha), net returns (Rs.14255/ha) and BCR (2.84) compared to cv. ML-267.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Cv. ML-267 - Farmers Practice	5	4.90	12560	2.19
Cv. TM-96-2 - Recommended Practice		5.89	14255	2.84

Evaluation of turmeric varieties

To increase the productivity of turmeric grown on tribal high lands in Vizianagaram, Andhra Pradesh, KVK evaluated suitable varieties. Results showed that cv. Rajendra Sonia had higher rhizome weight (35.20 g), yield (28.56 q/ha) and BCR (1.71) compared to cv. Duggirala and Red Turmeric.

Technology options	No. of trials	Weight of rhizome	Yield (q/ha)	BCR
Non-descript Red Turmeric - Farmers Practice	15	28.0	17.20	1.00
Cv. Rajendra Sonia - Recommended Practice		35.2	28.56	1.71
Cv. Duggirala - Recommended Practice		33.2	21.92	1.37

Evaluation of multi-cut bajra varieties for green fodder

In order to combat fodder shortage, KVK Jalna evaluated the performance of a multi cut bajra variety BAIF Selection grown on light soils of rainfed Jalna. Growing of cv. BAIF Selection resulted in higher green fodder yield (350 q/ha), net returns (Rs. 12250/ha) and BCR (4.75) compared to non-descript dual purpose local variety.

Technology options	No. of trials	Green fodder yield (q/ha)	No. of cuttings	Net returns (Rs./ha)	BCR
Non-descript dual purpose bajra variety - Farmers Practice	5	150	1	6000	2.75
BAIF Multicut bajra variety - Recommended Practice		350	3	12250	4.75

Assessment of cv. Phule Vasudha for rabi season

KVK Satara assessed the suitability of improved sorghum cultivar cv. Phule Vasudha for rabi season on medium to heavy soils under protective irrigation. The length of ear head (25.04 cm), fodder yield (44.28 q/ha), grain yield (18.98 q/ha), net returns (Rs. 22179/ha) and BCR (2.44) of cv. Phule Vasudha were significantly higher, while the weight of 1000 grain (52.82 g) was higher in cv. Phule Yashoda.

Technology options	No. of trials	Length of ear head (cm)	1000 grain weight (g)	Fodder yield (q/ha)	Grain yield (q/ha)	Net returns (Rs/ha)	BCR
Cv. Phule Yashoda - Farmers Practice	14	22.97	52.82	40.53	16.63	19161	2.25
Cv. Phule Vasudha - Recommended Practice		25.04	49.10	44.28	18.98	22179	2.44

Quality and yield improvement in onion

KVK Nashik, assessed the performance of refined nutrient management strategy to improve the quality, shelf life and yield of irrigated onion in Nashik district of Maharashtra. Application of 20-25 t of FYM + 100:50:50 NPK/ha and three foliar sprays of 2.5 ml/l silicon increased the bulb weight (70 g), shelf life (3.0 months), yield (210 q/ha) and net returns (Rs. 49230/ha) besides significant reduction in storage losses (15%) compared to recommended and farmers practices.

Technology options	No. of trials	Bulb weight (g)	Shelf life (months)	Storage loss (%)	Neck thickness	Yield (q/ha)	Net returns (Rs./ha)
FYM 1 - 2 tons + 60:30:00 NPK/ha - Farmers Practice	8	50	2.0	30	Broad	180	31650
FYM 20-25 tons + 100:50:50 NPK/ha - Recommended Practice		50	2.5	20	Broad	200	27250
FYM 20-25 tons +100:50:50 NPK/ha + 3 Foliar spray of silicon @ 2.5 ml/l @ Nursery 20-25 days after transplanting and 25-30 days after 2nd spray - Refined Practice		70	3.0	15	Compact	210	49230

Yield and quality improvement in onion

KVK Osmanabad refined the recommended practice of nutrient management by adding lihosin a vegetative growth retardant that aid in increasing the quality and yield of onion grown under protective irrigated conditions. Spraying of lihosin @ 6 ml/l of water along with RDF (100:50:50 NPK/ha) increased the number of A and B market grades bulbs, yield (248 q/ha), net returns (Rs. 124000/ha) and BCR (3.64) compared to other nutrient management practices.

Technology tptions	No. of trials	Grades of bulbs	Yield (q/ha)	Net returns (Rs./ha)	BCR
60:30:30 NPK kg/ha - Farmers Practice	8	C & D	178	89000	2.96
100:50:50 NPK kg/ha - Recommended Practice		B & C	206	103000	3.21
100:50:50 NPK kg/ha + Spraying of lihosin @ 6 ml /l of water 75 days after transplantation - Refined Practice		A & B	248	124000	3.64

Weed management in rice

In view of acute shortage of labour to perform manual weeding, KVK assessed the performance of different weed control methods in rice grown on light sandy loams under rice based cereal-cereal production system in Chittoor district, Andhra Pradesh. Pre-emergence application of pretilachlor @ 1.0 l/ha three days before transplantation followed by post-emergence application of 2-4D sodium salt @ 1 kg a.i/ha which completely dispenses the manual weeding resulted in increased yields, net returns and BCR compared to other methods even though pre-emergence application of pretilachlor @ 1.0 l/ha followed by one hand weeding gave slightly higher yield, net returns and BCR.

Technology options	No. of trials		Grains (number /panicle)		Yield (q/ha)		Net returns (Rs./ha)		BCR	
	K	R	K	R	K	R	K	R	K	R
Two manual weedings at 20 and 40 DAT - Farmers Practice	13	13	121.5		5.83	6.07	28360	6.07	1.83	2.08
Pre-emergence application of Pretilachlor @ 1.0 l/ha three days before transplantation and one hand weeding at 25-30 DAT - Recommended Practice			130.2		6.31	6.57	35480	6.57	2.11	2.37
Pre-emergence application of Pretilachlor @ 1.0 l/ha three days before transplantation + Post emergence application of 2,4-D Sodium salt @ 1 kg/ha - Recommended Practice			119.0		5.8	6.31	30670	6.31	1.98	2.30

K: Kharif | R: Rabi

Effect of polythene mulch on productivity of irrigated groundnut

To overcome the problem of severe weed infestation on account of shortage of labour, KVK Raigadh assessed the performance of groundnut grown on polythene mulch (7m gauge) under protected irrigation system. Planting of groundnut on Broad Bed and Furrow (BBF) and covering of beds with 7m gauge polythene sheet reduced the days to initial germination (5 days), full germination (11 days), 50 per cent flowering (30 days) and full maturity (120 days) and significantly increased the pod and kernel yield (30.45 and 18.27 q/ha), net returns (Rs. 11700/ha) and BCR (1.90) compared to groundnut grown on flat bed system without polythene mulch.

Technology options	No. of trials	Days to initial germination	Days to full germination	Days to 50 % flowering	Days to maturity	Pod yield (q/ha)	Kernel yield (q/ha)	Net returns (Rs./ha)	BCR
Groundnut on flat bed system - Farmers Practice	2	11	18	40	128	17.20	10.32	1500	1.10
Ground on BBF and Polythene mulch (7 gauge) - Recommended Practice		5	11	30	120	30.45	18.27	11700	1.90

In a similar study, KVK Sindhudurg also assessed the performance of black polythene mulch on productivity of irrigated groundnut grown on well drained irrigated soils in Sindhudurg, Maharashtra. Results showed that the planting of groundnut on raised beds covered with transparent polythene mulch and need based herbicide application or planting on raised beds covered with black polythene mulch alone resulted in significant increase in germination percent, pod yield, net returns and BCR ratio apart from significant reduction in weed intensity compared to planting of groundnut on flat bed.

Technology options	No. of trials	Germi-nation (%)	Weed intensity	Pod yield (q/ha)	Net returns (Rs./ha)	BCR
Flat bed without polythene mulch + no herbicide - Farmers Practice	5	85.10	44.40	16.90	7750	1.22
Raised bed + transparent polythene mulch + herbicide - Recommended Practice		96.98	12.58	33.20	29550	1.72
Raised bed + black polythene mulch up to 30-35 DAS + no herbicide - Refined Practic		98.12	2.46	32.06	26700	1.50

Management of moisture stress in sunflower

To mitigate moisture stress in sunflower grown on rainfed medium soils of Kurnool, Andhra Pradesh, KVK assessed the performance of different technologies to increase the yield. Formation of conservation furrow after 30 DAS with planting distance of 30 X 60 cm significantly increased the head size (14.12 cm), test weight (5.32 g), yield (12.34 q/ha), net returns (Rs.19350/ha) and BCR (2.6) compared to 30 X 60 cm and solid row at 30 cm spacing.

Technology options	No. of trials	Head diameter (cm)	Test weight (g)	Yield (q/ha)	Net returns (Rs./ha)	BCR
30 X solid row Farmers - Practice	5	10.78	4.55	10.10	13750	2.1
30 X 60 cm row - Recommended Practice		13.38	5.04	11.37	16925	2.4
30 X 60 cm row and conservation furrow @ 30 DAS - Recommended Practice		14.12	5.32	12.34	19350	2.6



Performance of conservation furrow in sunflower

Studies on planting ratios in soybean and pigeonpea intercropping

To minimize the excess vegetative growth and resultant heavy pod borer damage in pigeonpea, an on-farm trial on assessment of row ratios of soybean and pigeonpea intercropping on heavy black soils under sugarcane based production system was conducted by KVK Sangli. Results showed that planting of soybean and pigeonpea in a row ratio of 4:1 resulted in more number of pods in both soybean and pigeonpea (53.62 and 178.92/plant respectively) and 100 grain weight of pigeonpea (10.54 g), significantly reduced the pod borer damage (5.93) and increased the yield of soybean and pigeonpea (23.72 and 13.79 q/ha respectively), besides higher net returns and BCR (Rs. 52969/ha and 2.45 respectively) from the intercropping system.

Technology options	No. of trials	Pods (number/plant)		Pigeonpea		Yield (q/ha)		Net returns (Rs./ha)	BCR
		Soybean	Pigeonpea	Pod borer damage (%)	100 grain weight (g)	Soybean	Pigeonpea		
Planting soybean + pigeonpea in 3:1 rowratio on ridges and furrows system - Farmers Practice	6	49.64	164.81	14.70	10.51	21.75	12.57	45121	2.21
Planting soybean pigeonpea in 4:1 row ratio on ridges and furrows system - Recommended Practice		53.62	178.92	5.93	10.54	23.72	13.79	52969	2.45

Evaluation of intercropping in field beans

In order to cope up with frequent crop failures due to drought, KVK Kadapa, Andhra Pradesh assessed the suitability of groundnut as an intercrop in field beans grown on rainfed alfisols. Introduction of groundnut as intercrop in field bean resulted in higher equivalent yield (35.12 q/ha), net returns (Rs. 46386/ha) and BCR compared to monocropping of field bean.

Technology options	No. of trials	Yield (q/ha)			Net returns (Rs./ha)	BCR
		Field beans	Groundnut	Equivalent yield		
Field beans monocropping - Farmers Practice	4	20.25	-	20.25	26800	2.95
Groundnut + Field beans (10:1 ratio) - Recommended Practice		19.63	8.38	35.12	46387	3.26

Control of alternate bearing in mango

In order to induce regular bearing in cv. Banishan, KVK assessed the performance of reduced dose of hormonal spray (potassium di-hydrogen phosphate) along with recommended dose of nutrients on mango grown on rainfed alfisols under protective irrigation in Kadapa district, Andhra Pradesh. Results indicated that foliar spray of 3 g/l of KH_2PO_4 along with recommended dose of nutrients and pruning gave higher yield (100.20 q/ha), net returns (Rs. 112000/ha) and BCR (2.47) compared to foliar spray of 10 g/l of KH_2PO_4 along with recommended dose of nutrients and pruning and conventional practice of no specific measures to control alternate bearing.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
No specific measures - Farmers Practice	5	81.70	90523	2.14
Pruning + RDF (1:1:1 kg NPK/ plant) + KNO_3 @ 10 g/l foliar spray - Recommended Practice		95.30	109000	2.38
Pruning + RDF (1:1:1 kg NPK/ plant) + KH_2PO_4 @ 3 g/l foliar spray - Refined Practice		100.20	112000	2.47

Intercropping of tapioca in cashew nut

In order to enhance the income of tribal farmers of rainfed uplands in East Godavari, KVK assessed the suitability of tapioca as intercrop in 10-15 years old cashew plantation. Intercropping of tapioca in existing cashew nut plantation resulted in higher yield (main and intercrop), net returns (Rs. 53172/ha) and BCR (4.2) compared to either cashew mono cropping or intercrop of local fodder.

Technology options	No. of trials	Yield (q/ha)		Cost of cultivation (Rs./ha)	Net returns (Rs./ha)	BCR
		Cashew	Intercrop			
Cashew mono crop - Farmers Practice	12	8.23	-	9850	35415	1.35
Cashew + rainfed fodder - Recommended Practice		8.05	1.00 (Local fodder)	9970	34705	1.34
Cashew + tapioca - Recommended Practice		8.35	91.00 (Tapioca)	12500	53172	1.42

Efficacy of bypass fat on quality and milk yield of cross bred cows

To increase the fat content and milk yield of cross bred milch cattle, KVK Osmanabad refined and assessed various strategies of managing nutrition under resource medium situation. Feeding of bypass fat @ 100 g/day/cow along with feeding green fodder + dry fodder + concentrate mixture @ 50 to 200 g /day/ cow/l of milk improved the fat content (3.60 %), milk yield (13.30 l/day/animal) and net returns (Rs. 33.25/day/ animal) of cross bred cows.

Technology options	No. of trials	Fat content (%)	Milk yield (l/animal/day)	Net returns (Rs./day/animal)
Feeding green fodder + dry fodder + concentrate mixture @ 50 to 200 g /day/ cow/l of milk - Farmers Practice	3	3.20	7.00	28.00
Feeding green fodder + dry fodder + concentrate mixture @ 50 to 200 g / day/ cow/l of milk + mineral mixture - Recommended Practice		3.50	10.80	32.40
Feeding green fodder + dry fodder + concentrate mixture @ 50 to 200 g / day/ cow/l of milk + bypass fat @ 100 g/day/cow - Refined Practice		3.60	13.30	33.25

Effect of area specific mineral mixtures on repeat breeding and milk yield

In order to combat repeat breeding and improving the milk yield of HF cross bred cattle under sugarcane based stall feeding system in Pune, Maharashtra, KVK formulated and assessed the performance of feeding 100 g area specific mineral mixtures. Feeding of 100 g area specific mineral mixtures per cow resulted in significant reduction of repeat breeding (6%) and increased the milk yield (14.50 l/cow/day), fat content (3.90 %), net returns (Rs. 30249/animal/year) and BCR (2.60) compared to blanket use of 50 g branded mineral mixture and conventional practice without mineral mixtures.

Technology options	No. of trials	Milk yield (l/day/cow)		Fat content (%)	Occurrence of repeat breeding	Net returns (Rs./cow /year)	BCR
		Early lactation	Mid lactation				
Conventional feeding without mineral mixtures - Farmers Practice	10	12.50	-	3.60	16.00	20731	2.00
50 g branded mineral mixtures - Recommended Practice		13.00	11.60	3.70	12.00	28708	2.28
100 g area specific mineral mixtures - Refined Practice		14.50	12.60	3.90	6.00	30249	2.60

Effect of feeding sunflower heads on milk production in buffalos

To combat mineral deficiency and resultant low milk yield of buffalos, KVK, Kadapa assessed the performance of grounded sunflower heads as feed substitute (source of rich minerals) in milch buffalos. Feeding of grounded sunflower head to milch buffalos significantly increased the milk yield (752.4 q/ ha) and BCR (3.30) compared to feeding of commercial feed or roughages.

Technology options	No. of trials	Milk yield (l/lactation)	BCR
Feeding of roughages - Farmers Practice	5	561.6	2.30
Feeding of commercial feed - Recommended Practice		711.8	2.68
Feeding of grounded sunflower heads - Refined Practice		752.4	3.30

Effect of homemade concentrate on goats

To enrich the nutritive content of homemade concentrate and facilitate growth of kids under free grazing system in drought prone Solapur district, Maharashtra, KVK refined and assessed the recommended practice of feeding kids with homemade concentrate along with 200 g of azolla until 90 days after birth. Feeding homemade concentrate @ 200 g/day/kid along with 25 per cent substitution with azolla up to 90 days after birth resulted in better growth (15.47 kg/kid), net returns (Rs. 615/kid) and BCR (1.50) compared to disproportionate feeding of spoiled grains under open free grazing system.

Technology options	No. of trials	Weight at 6 th month (kg/kid)	Net returns (Rs./kid)	BCR
Disproportionate feeding of spoiled grains - Farmers Practice	6	12.45	274	1.22
Feeding homemade concentrate @ 200 g/day/ kid (mashed maize- 37% + wheat bran - 20% + groundnut cake- 25% + gram Chuni - 15% + mineral mixture 2.5 % + common salt - 0.5%) up to 90 days after birth - Recommended Practice		14.37	441	1.34
Substitution (25 %) of homemade concentrate with azolla and feeding the same 200 g/day/kid up to 90 days after birth - Refined Practice		15.47	615	1.50

Effect of homemade poultry feed on of backyard poultry

To minimize the feed cost and improve the growth and egg yield of non-descript breed, KVK Pune devised a low cost homemade feed and assessed the same on back yard flock size of 18 birds. Feeding of backyard hen with starter mash up to 4 to 6 weeks and finisher mash up to 7 to 12 weeks resulted in significant increase in egg production (182/hen/year), net income (Rs. 7300/flock/year) and BCR (2.9) compared to feeding of bajra grain alone.

Technology options	No. of trials	Egg production (number/ hen/year)	Laying capacity (%)	Net returns (Rs./flock /year)	BCR
Feeding of 50-60 g bajra grain/hen/day - Farmers Practice	15	121	60	4745	2.6
Feeding of 50-60g homemade poultry feed 1. Starter mash of Maize grain, bajra grain, DORB, GNC, fish meal, lime stone powder, common salt, vitamin & mineral mixture (14.5, 43.5, 0.0, 36.0, 5, 0.4, 0.3 and 0.1) 2. Finisher mash of Maize grain, bajra grain, DORB, GNC, fish meal, lime stone powder, common salt, vitamin & mineral mixture (16.5, 49.5, 4.0, 25.0, 4.0, 0.5, 0.4, and 0.1 proportion) up to 7-12 weeks - Recommended Practice		182	90	7300	2.9

Water quality management in fresh water fisheries

In view of low dissolved oxygen concentration and resultant poor growth of plankton and fish in culture pond of fresh water fisheries, KVK Nalgonda assessed the performance of water exchange (25%) + application of lime (300 kg/ha) and vermicompost (1 t/ha) to improve the productivity of fish. Water exchange along with application of lime and vermicompost gave higher yield (3.10 q/ha), net returns (Rs. 60000/ha) and BCR (1.77) compared to traditional method of only water exchange.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Water exchange - Farmers Practice	5	2.40	48000	1.55
Water exchange (25%) + application of lime (300 kg/ha) and vermicompost (1 t/ha) - Recommended Practice		3.10	60000	1.77

Assessment of *Pangasius* species in composite fish culture

As the monoculture of *Pangasius sp.* is less remunerative, KVK West Godavari, Andhra Pradesh assessed the suitability of the same in composite fish culture along with indian carp i.e catla and rohu in fresh water fish ponds in Godavari delta. Composite fish culture of *Pangasius sp.* along with Catla and rohu significantly increased the yield (13.25 q/ha), net returns (Rs. 209250/ha) and BCR (1.48) compared to monoculture of *Pangasius*.

Technology options	No. of trials	Yield (q/ha)	Net returns (Rs./ha)	BCR
Monoculture of <i>Pangasius sp.</i> - Farmers Practice	3	11.50	154000	1.38
Composite culture of <i>Pangasius sp.</i> with Catla and Rohu - Recommended Practice		13.25	209250	1.48

Evaluation of floating pellet feeds in *Pangasius* culture

To minimize the leaching loss and drudgery in handling of bulky mash feed that result in poor nutrition and growth of *Pangasius sp.*, KVK assessed the performance of floating feed pellets for suitability in freshwater fish ponds in delta of West Godavari, Andhra Pradesh. Feeding of *Pangasius* with floating feed pellets resulted in increased growth (200 g/month), yield (17.50 q/ha), net returns (Rs. 229600/ha) and BCR (1.56) compared to feeding of sinking pellets or mash feeds.

Technology options	No. of trials	Weight gain (g/month)	Yield (q/ha)	Net returns (Rs./ha)	BCR
Use of mash feeds - Farmers Practice	3	100	11.50	154000	1.38
Use of sinking pellets - Recommended Practice		120	13.25	209250	1.48
Use of floating feed pellets - Recommended Practice		200	17.50	229600	1.56

Assessment of fuel efficient chullah

KVK Jalgaon and Nashik and KVK Satara conducted on-farm trials to assess the performance of Single Burner Compact Chullah and Laxmi Smokeless Chullah respectively to reduce the drudgery of farm women and improve the fuel efficiency. Results showed that there is substantial saving of fire wood requirement (5.25 kg/week) and expenditure on firewood (Rs. 22.75/week) besides considerable improvement in cooking environment by using Single Burner Compact Portable Chullah developed by Tamil Nadu Agriculture University (TNAU), Coimbatore.

Technology options	No. of trials	Fire wood requirement (kg/week)	Cost of firewood (Rs./week)	Blackening of vessels and smoke output
Traditional Chullah - Farmers Practice	10	15	65	Considerable
Single Burner Compact Portable Chullah (TNAU, Coimbatore) - Recommended Practice		9.75	42.25	Very less

Similarly, there is substantial reduction in firewood requirement and cost and time to cook one kilogram of food by using improved Lakshmi Smokeless Chullah developed by Appropriate Rural Technology Institute, (ARTI), Pune.

Technology options	No. of trials		Fire wood requirement (g/kg food cooked)		Cost of cooking (Rs./kg food Cooked)		Time of cooking (minutes/kg food cooked)	
	Nashik	Satara	Nashik	Satara	Nashik	Satara	Nashik	Satara
Traditional Chullah - Farmers Practice	10	6	1010	10097.50	4.40	4.39	27	25.50
Laxmi Smokeless Chullah (ARTI, Pune) - Recommended Practice			650	625.00	2.50	2.50	20	19.00

Assessment of low cost solar dryer

KVK Nandurbar assessed the performance of low cost solar dryer to minimize the loss and reduce the time and space required for drying of amla candy. Preparation of amla candy using Low Cost Solar Dryer developed by MPKV, Rahuri improved the quality of candy and fetched higher market price (Rs. 200/kg) besides 20 per cent reduction in drying time compared to conventional open air drying.

Technology options	No. of trials	Price of candy (Rs./kg)	Drying time (days/batch)	Quality of candy
Conventional open air drying - Farmers Practice	5	140	10	More smudged candy
Low Cost Solar Dryer (MPKV, Rahuri) - Recommended Practice		200	8	Whitish to yellowish hue and no smudging

Supplementation of amylase rich foods in weaning children

In view of high incidence of malnutrition and resultant poor growth of weaning children, KVK assessed the performance of improved methods to prevent malnutrition among weaning children mostly belonging economically weaker sections in Warangal district, Andhra Pradesh. Breast feeding + supplementation with 75 g/day amylase rich food (ragi 50% + greengram 25% + sugar 15% + skim milk powder 10%) resulted in higher growth in terms of weight gain (1.40 kg) compared to breast feeding or breast feeding along with ICDS food supplementation.

Technology options	No. of trials	Weight gain (kg)
Breast feeding - Farmers Practice	15	1.00
Breast feeding + supplementation with ICDS food - Recommended Practice		1.10
Breast feeding + supplementation with 75 g/day amylase rich food (Ragi 50% + Greengram 25% + Sugar 15% + Skim Milk Powder 10%) - Refined Practice		1.40

Management of anemia in adolescent girls

In view of high incidence of miscarriages and under weight babies that are attributed to poor nutrition and resultant anemia during adolescence, KVK assessed the performance of improved methods to prevent malnutrition and anemia among adolescent girls mostly belonging to economically weaker sections in East Godavari, Andhra Pradesh. Supplementation of normal diet with 100 g/day iron folic acid + vitamin C and 30g/day amylase rich supplements resulted in higher weight gain (40.00 kg), hemoglobin (11.10 g/dl) and Body Mass Index (BMI) compared to normal diet alone or normal diet with iron folic acid + vitamin C.

Technology options	No. of trials	Body weight (kg)	Hb level (g/dl)	BMI
Normal diet - Farmers Practice	8	37.00	7.50	17.50
Normal diet + 100 mg/day iron folic acid and vitamin C supplementation up to 6 months - Recommended Practice		37.50	9.00	18.00
Normal diet + 100 mg/day iron folic acid and vitamin C tablet + diet supplementation with 30 g finger millet + 30 g groundnut + 40 g jaggery/day up to 6 months - Refined Practice		40.00	11.10	20.00

In a similar study in Warangal, Andhra Pradesh, normal diet along with iron folic acid supplementation along with 40 g sprouted greengram and lemon juice and de-worming resulted in increased hemoglobin (11.50 g/dl) levels compared to normal diet or normal diet with iron folic acid supplementation.

Technology options	No. of trials	Hb level (g/dl)
Normal diet - Farmers Practice	8	10.60
Normal diet + 100 mg/day iron folic acid for three months and de-worming once - Recommended Practice		11.30
Normal diet + iron + folic acid tablet/day for three months + 40 g sprouted greengram + lime juice, de-worming once - Refined Practice		11.50

Bio-logical control of uzi-fly in silk worms

KVK assessed various methods of controlling uzi-fly infestation that account for 20-30 per cent yield losses of resource poor sericulturists in Chittoor district, Andhra Pradesh. Results showed that release of *Nesolynx thymus* along with physical and chemical methods significantly reduced the incidence of uzi-fly (2%), gave more yield (60 kg/100 DFLs) and net return (Rs. 7200/100 DFLs) compared to either physical or physical and chemical methods.

Technology options	No. of trials	Incidence of uzi-fly (%)	Yield (kg/100 DFLs)	Net returns (Rs./100 DFLs)
Nylon netting of doors and windows - Farmers Practice	5	20	45	5300
Nylon netting + Anti-chamber + Uzi trap near doors and windows + Application of uzicide @ 5-6 ml/m ² - Recommended Practice		8	55	6875
Nylon netting + Anti-chamber + Uzi trap near doors and windows + Application of uzicide @ 5-6 ml/m ² + Releasing two pouches of <i>Nesolynx thymus</i> /100 DFL's on 2 nd day of 5 th instar and mounting stage - Recommended Practice		2	60	7200

Frontline Demonstrations

KVKs organize frontline demonstrations (FLDs) to demonstrate the production potential of the important varieties and various production technologies in a given farming situation. Training programmes and field days are organized for extension workers and farmers in the demonstration plots for rapid dissemination of improved technologies.

Oilseeds

A total of 1852 demonstrations covering 778.60 ha under oilseeds (kharif and rabi) were organized by KVKs in Zone-V (Table 16). The major oilseed crops covered under FLDs in Andhra Pradesh include groundnut, soybean, castor, sesamum, sunflower and safflower, while groundnut, soybean, niger, sunflower, safflower and sesamum were covered in Maharashtra.

Table 16. Details of crop wise state wise area under FLD Oilseeds during 2009-10

State	Crop	Area(ha)	No. of demonstrations
Kharif			
Andhra Pradesh	Castor	34.80	79
	Groundnut	69.40	147
	Niger	3.00	3
	Sesamum	9.00	20
	Soybean	35.00	88
	Total	151.20	337
Maharashtra	Groundnut	35.00	88
	Niger	30.00	76
	Sesamum	7.00	18
	Soybean	203.00	521
	Total	275.00	703
Total		426.20	1040
Rabi			
Andhra Pradesh	Groundnut	81.00	209
	Sesamum	15.00	35
	Safflower	5.00	25
	Sunflower	50.00	118
	Total	151.00	387
Maharashtra	Groundnut	154.00	301
	Safflower	14.80	35
	Sesamum	13.80	34
	Sunflower	18.80	55
	Total	201.40	425
Total		352.40	812

Frontline demonstrations on castor were conducted in five districts of Andhra Pradesh in kharif rainfed situation, covering Southern Telangana (Mahaboobnagar, Nalgonda and Ranga Reddy) and Scarce Rainfall (Kadapa and Kurnool) Zones. Improved variety Haritha, balanced fertilizers and pest management technologies gave 8.03 q/ha against the local check yield of 6.12 q/ha (Table 17).

In Andhra Pradesh, FLDs on kharif groundnut were conducted in four districts i.e., Kadapa, Kurnool, Nalgonda and Warangal under rainfed situation. Improved varieties (Greeshma, K-6 and ICGV-91114) along with integrated pest and disease management gave higher yield (9.48 q/ha) compared to local check (7.43 q/ha). In irrigated situation, improved varieties (K-6 and Greeshma) along with integrated nutrient and pest management resulted higher yield (31.45 q/ha) compared to local check (26.50 q/ha). In Maharashtra, FLDs on groundnut were organized on rainfed black and lateritic soils to demonstrate the efficacy of improved varieties (JL-501, JL-286, TAG-24 and Konkan Gaurav), balanced fertilizer application including bio-fertilizers and plant protection measures. There was 39.17 per cent increase in yield due to improved technologies as compared to local check.

During rabi season, FLDs on groundnut were conducted in 12 districts of Andhra Pradesh under irrigated situation. Improved varieties (TG-37 A, K-6, Greeshma and Vemana i.e K-134) along with recommended package of practices gave higher yield (27.00 q/ha) compared to local check (22.21 q/ha). In Maharashtra, improved varieties, nutrient management and chemical weed control resulted in 34.98 per cent higher yield over local check.

Frontline demonstrations on niger were organized in tribal areas of Vishakapatnam (Andhra Pradesh) and Ratnagiri and Thane (Maharashtra) districts. High yielding varieties (KGN-2, Phule Karla and IGP-76) along with improved management practices resulted in higher yield response (50.66 %) compared to local check.

In case of soybean, FLDs were conducted under rainfed and irrigated situations to demonstrate the efficacy of improved varieties (DS-228, MAUs-71, JS-9305 and TAMS-9821) and improved management practices viz. nutrient management, weed control, plant protection etc. Under irrigated conditions, improved varieties and management practices resulted in higher yield (18.92 q/ha) compared to local check (14.42 q/ha), while the improved management practices gave 14.31 q/ha of yield of rainfed soybean compared to 11.46 q/ha in local check.

Frontline demonstrations on safflower were conducted in Parbhani and Washim (Maharashtra) and Medak (Andhra Pradesh) districts with improved varieties (PBNS-12 and PBNS-40), integrated nutrient management and improved plant protection measures. The improved technologies resulted in increased yield of 27.12 per cent compared to local check.

In case of sunflower, FLDs were organized by KVKs during rabi season under irrigated conditions with hybrids and improved management practices. The average yield recorded in the demonstration was 13.43 q/ha in Andhra Pradesh and 11.58 q/ha in Maharashtra which was 14.68 and 39.85 per cent higher than local check yield.

Table 17. Performance of Front Line Demonstrations on Oilseeds during 2009-10

Crop	State	Season	No. of demos.	Area (ha)	Yield (q/ha)		% increase in yield
					Improved practice	Farmers Practice	
Castor	AP	Kharif Rainfed	79	34.80	8.03	6.12	31.20
Ground nut	AP	Kharif Rainfed	79	40.00	9.48	7.43	27.59
		Kharif Irrigated	35	20.00	31.45	26.50	18.67
	MS	Kharif - Rainfed	114	40.00	15.69	11.23	39.71
	AP	Rabi Irrigated	192	75.60	27.00	22.21	21.56
	MS	Rabi Irrigated	203	68.00	22.38	16.58	34.98
Niger	AP	Kharif - Rainfed	3	2.50	2.70	1.90	29.60
	MS	Kharif - Rainfed	63	25.00	4.55	3.03	50.66
Safflower	MS	Rabi Rainfed	36	15.00	9.20	7.00	31.42
	AP	Rabi Rainfed	25	5.00	7.09	6.23	14.00
Sesamum	MS	Kharif - Rainfed	18	7.00	3.69	3.50	5.40
	AP	Kharif Irrigated	12	5.00	6.83	5.27	29.60
	MS	Rabi Irrigated	22	8.80	3.56	2.09	41.29
	AP	Rabi Irrigated	61	23.40	6.33	4.54	39.42
Soybean	MS	Kharif - Rainfed	308	128.80	14.31	11.46	24.86
	MS	Kharif Irrigated	174	70.90	18.92	14.42	31.20
Sunflower	AP	Rabi Irrigated	101	45.00	13.43	11.71	14.68
	MS	Rabi Irrigated	50	17.30	1.58	8.28	39.85

AP: Andhara Pradesh MS: Maharashtra



FLD on zero tillage in sunflower

Pulses

In case of pulses, 1375 demonstrations covering 556 ha were conducted by KVKs in kharif and rabi seasons in Zone-V (Table 18). The major crops that were covered under FLDs include redgram, bengalgram, greengram and blackgram.

Table 18. Details of crop wise state wise area under FLD Pulses during 2009-10

State	Crop	Area(ha)	No. of demonstrations
Kharif			
Andhra Pradesh	Greengram	13.20	40
	Redgram	98.80	214
	Total	112.00	254
Maharashtra	Blackgram	10.00	25
	Redgram	129.00	331
	Total	139.00	356
Total		251.00	610
Rabi			
Andhra Pradesh	Bengalgram	77.00	185
	Blackgram	10.00	28
	Greengram	15.00	37
	Total	102.00	250
Maharashtra	Bengalgram	203.00	515
Total		305.00	765

Frontline demonstrations on greengram were organized in kharif and rabi seasons in Andhra Pradesh. Improved variety (LGG-460) and recommended package of practices gave 32.00 to 46.76 per cent more yield compared to local check (Table 19).

In case of blackgram, KVK Sangli (Maharashtra) conducted FLDs during kharif season under rainfed situation with improved variety (TAU-1) and nutrient management. There was a higher yield response (46.76 %) due to improved variety along with nutrient management compared to farmers practice. In rabi, the demonstrations were organized under rainfed/ residual moisture condition with improved varieties viz. LBG-709, 752 and 645 and improved management practices which resulted in higher yield (7.9 q/ha) than local check (6.22 q/ha).

Frontline demonstrations on redgram were conducted under rainfed and irrigated situation in Andhra Pradesh and Maharashtra states with improved varieties (PRG-158, TRG-22, LRG-41, PKV-Tara, BDN-708, BSMR-736, Vipula and AKT-8811) and nutrient management. Results showed that improved varieties along with nutrition management resulted in higher yield (10.76 q/ha) of rainfed redgram compared to local check (8.35 q/ha) in Andhra Pradesh, while in Maharashtra the average yield of demonstration and local check was 10.49 and 7.77 q/ha respectively. Under irrigated situation, improved management practices along with variety gave higher yield (18.29 q/ha) compared to local check (15.49 q/ha).

KVKs in Andhra Pradesh and Maharashtra organized FLDs on bengalgram under rainfed and irrigated situation. In Andhra Pradesh improved varieties viz. JG-11 and JAKI-9218 along with nutrient management and plant protection measures and in Maharashtra high yielding varieties viz., Vijay, Digvijay, Vishal, JAKI-9218, AKG-46 along with nutrient management and improved plant protection measures against pod borer were demonstrated.

Results showed that improved varieties and management practices gave higher yield of bengalgram both in Andhra Pradesh (16.36 q/ha) and Maharashtra (14.45 q/ha) states under rainfed conditions. Similarly under irrigated situation, varieties and management practices along with recommended practices resulted in higher yield (20.25 q/ha in Andhra Pradesh and 16.11 q/ha in Maharashtra) compared to local check.

Table 19. Performance of Front Line Demonstrations on Pulses during 2009-10

Crop	State	Season	No. of demos.	Area (ha)	Yield (q/ha)		% increase in yield
					Improved practice	Farmers Practice	
Bengalgram	AP	Rabi Irrigated	37	16.00	20.25	15.81	28.00
		Rabi Rainfed	116	54.00	16.36	13.74	19.06
	MS	Rabi Irrigated	261	115.80	16.11	12.28	31.18
		Rabi Rainfed	238	95.10	14.45	11.70	23.50
Blackgram	MS	Kharif - Rainfed	25	10.00	10.37	7.57	36.98
	AP	Rabi Rainfed	38	15.00	7.90	6.22	27.00
Greengram	AP	Kharif - Rainfed	22	8.20	7.25	4.94	46.76
		Rabi Rainfed	37	15.00	4.90	3.71	32.07
Pigeonpea	AP	Kharif - Rainfed	90	40.00	10.76	8.35	28.86
	MS	Kharif Irrigated	90	33.20	18.29	15.49	18.07
		Kharif - Rainfed	309	120.80	10.49	7.77	35.00

AP: Andhara Pradesh MS: Maharashtra



FLD on Pigeonpea cv. PRG-158



FLD on Bengalgram Jaki-9218

Cotton

In case of cotton, a total of 2167 demonstrations covering an area of 1511 ha were organized to demonstrate improved technologies viz. crop management, pest management and farm implements (Table 20).

Table 20. Details of FLD on cotton organized by KVKs during 2009-10

State	Technology	Area(ha)	No. of demonstrations
Kharif			
Andhra Pradesh	Production technology	143.40	202
	IPM	250.00	269
	Farm Implements	-	0
	Total	393.40	471
Maharashtra	Production technology	216.00	534
	IPM	726.40	973
	Farm Implements	275.00	342
	Total	1217.40	1849
Total		1511.00	2167

The response of various improved technologies demonstrated on cotton is presented in Table 21. In Andhra Pradesh, multi-component demonstrations resulted in highest yield response (19.60 %) while the same was true with improved varieties in Maharashtra (44.98 %). The overall response of improved technologies in cotton yield in Zone-V was 21.33 per cent.

Table 21. Performance of Front Line Demonstrations on cotton during 2009-10

State	Technology	Area (ha)	No. of demos.	Seed cotton yield (q/ha)		% increase
				Improved practice	Farmers practice	
Andhra Pradesh	Integrated Crop Management	8.00	20	23.80	19.90	19.60
	Integrated Nutrient Management	129.40	167	15.74	13.32	15.83
	Variety	250.00	269	21.76	18.43	17.75
	Integrated Pest Management	41.60	104	19.89	14.81	26.15
Maharashtra	Integrated Crop Management	6.00	15	21.05	20.15	3.25
	Integrated Nutrient Management	160.40	396	23.12	18.87	23.89
	Variety	14.00	34	15.75	10.46	44.98
	Integrated Pest Management	726.40	973	17.00	14.23	19.18
Total/ Weighted Average		1335.80	1978	19.76	16.27	21.33

Other crops

. KVKs in Andhra Pradesh and Maharashtra organized 2399 FLDs covering 922.21 ha on other crops viz. cereals, commercial crops, fodders and horticultural crops (Table 22 a). The state wise details of FLDs on other crops is furnished in Table 22 b and 22 c.

Table 22 a. Details of crop wise area under FLD on other crops during 2009-10

Category	Crop	Area (ha)	No. of demonstrations
Cereals	Fingermillet	10.00	31
	Maize	25.00	57
	Rice	353.64	619
	Sorghum	47.70	124
	Wheat	106.80	311
	Total	543.14	1142
Commercial Crops	Sugarcane	18.00	46
	Tobacco	5.00	12
	Total	23.00	58
Fodders	Berseem	0.10	20
	Lucerne	2.00	10
	Maize	5.20	13
	Marvel Grass	1.00	10
	Napier	0.40	8
	Pearlmillet	22.80	51
	Sorghum	8.10	81
	Yeshwant grass	2.00	10
	Total	41.60	203
Total (Field Crops)		607.74	1403
Fruits	Banana	22.10	39
	Custard Apple	7.20	18
	Guava	14.40	22
	Lime	13.50	52
	Mango	13.20	48
	Pomegranate	12.20	53
	Sweet Orange	32.40	74
	Watermelon	12.00	47
	Total	127.00	353
Ornamental Crops	Marigold	2.40	14
	Tuberose	8.67	36
	Total	11.07	50

Table 22 a. Contd...

Category	Subcategory	Crop	Area (ha)	No. of demonstrations
Horticultural Crops	Fruits	Mango	9.00	20
		Sweet Orange	16.80	35
		Watermelon	8.00	40
		Total	33.80	95
	Plantation Crops	Cashew	1.20	9
		Total	1.20	9
	Spices and Condiments	Turmeric	3.00	4
		Total	3.00	4
	Vegetables	Bhendi	2.50	5
		Brinjal	2.00	16
		Chillies	9.20	31
		Onion	4.40	25
		Tapioca	2.00	8
		Tomato	19.40	41
		Total	39.50	126
	Total		77.50	234
Grand Total			242.90	664

Table 22 b. Details of crop wise area under FLD on other crops organized by KVKs in Maharashtra during 2009-10

Category	Subcategory	Crop	Area (ha)	No. of demonstrations
Field Crops	Cereals	Fingermillet	6.00	18
		Maize	10.00	23
		Rice	225.34	339
		Sorghum	47.70	124
		Wheat	106.80	311
		Total	395.84	815
	Commercial Crops	Sugarcane	18.00	46
		Total	18.00	46
	Fodders	Berseem	0.10	20
		Lucerne	2.00	10
		Maize	5.20	13
		Marvel Grass	1.00	10
		Napier	0.40	8
		Pearlmillet	17.80	41
		Yeshwant grass	2.00	10

Table 22 b. Contd...

Category	Crop	Area (ha)	No. of demonstrations
Plantation Crops	Cashew	2.20	14
	Total	2.20	14
Spices and Condiments	Garlic	0.90	7
	Turmeric	5.80	11
	Total	6.70	18
Vegetables	Beans	8.05	34
	Bhendi	8.00	22
	Bittergourd	4.00	10
	Bottlegourd	2.00	22
	Brinjal	9.10	49
	Chillies	50.05	137
	Onion	48.20	190
	Potato	4.50	15
	Tapioca	2.00	8
	Tomato	31.60	74
	Total	167.50	561
Total (Horticultural Crops)		314.47	996
Grand Total		922.21	2399

Table 22 c. Details of crop wise area under FLD other crops organized by KVKS in Andhra Pradesh during 2009-10

Category	Subcategory	Crop	Area (ha)	No. of demonstrations
Field Crops	Cereals	Fingermillet	4.00	13
		Maize	15.00	34
		Rice	128.30	280
		Total	147.30	327
	Commercial Crops	Tobacco	5.00	12
		Total	5.00	12
	Fodders	Pearlmillet	5.00	10
		Sorghum	8.10	81
		Total	3.10	91
Total			165.40	430

Table 22 c. Contd...

Category	Subcategory	Crop	Area (ha)	No. of demonstrations
Field Crops		Total	28.50	112
	Total		442.34	973
Horticultural Crops	Fruits	Banana	22.10	39
		Custard Apple	7.20	18
		Guava	14.40	22
		Lime	13.50	52
		Mango	4.20	28
		Pomegranate	12.20	53
		Sweet Orange	15.60	39
		Watermelon	4.00	7
		Total	93.20	258
	Ornamental Crops	Marigold	2.40	14
		Tuberose	8.67	36
		Total	11.07	50
	Plantation Crops	Cashew	1.00	5
		Total	1.00	5
	Spices and Condiments	Garlic	0.90	7
		Turmeric	2.80	7
		Total	3.70	14
	Vegetables	Beans	8.05	34
		Bhendi	5.50	17
		Bittergourd	4.00	10
		Bottlegourd	2.00	22
		Brinjal	7.10	33
		Chillies	40.85	106
		Onion	43.80	165
		Potato	4.50	15
		Tomato	12.20	33
		Total	128.00	435
	Total		236.97	762
Grand Total			679.31	1735

In case of cereals, the improved technologies increased the yield of finger millet by 23.90 per cent, while it was 17.64, 36.00 and 21.54 per cent in case of rice, sorghum and wheat (Table 23). The range of yield response increase was 29.00 to 166.77 per cent in fodders, 13.91 to 29.71 per cent in fruits, 19.19 to 24.39 per cent in ornamental crops and 16.71 to 95.48 per cent in vegetable crops.

Table 23. Performance of Front Line Demonstrations on other crops during 2009-10

Crop	Area (ha)	No. of demonstrations	Yield (q/ha)		% increase
			Improved practice	Farmers practice	
Cereals					
Finger Millet	10.00	31	14.33	11.57	23.90
Rice	125.15	330	48.06	40.85	17.64
Sorghum	33.70	85	23.57	17.33	36.00
Wheat	58.80	169	26.46	21.77	21.54
Commercial Crops					
Sugarcane	9.00	23	115.20	96.34	19.58
Fodder Crops					
Berseem	0.10	20	6.20	4.75	30.53
Lucerne	2.00	10	10.50	8.00	31.25
Marvel Grass	1.00	10	344.00	235.00	46.3
Napier	23.00	59	165.98	116.49	29.00
Sorghum	8.10	81	50.00	18.75	166.67
Yeshwant grass	2.00	10	300.00	220.00	36.36
Fruits					
Banana	22.10	39	636.17	555.76	14.46
Custard Apple	7.20	18	143.75	123.00	16.87
Guava	14.40	22	147.49	129.47	13.91
Mango	13.20	48	60.45	52.45	15.25
Pomegranate	12.20	53	109.47	88.42	23.80
Sweet Orange	27.60	58	139.76	120.73	15.76
Watermelon	8.00	27	83.50	64.37	29.71

Table 23. Contd...

Crop	Area (ha)	No. of demonstrations	Yield (q/ha)		% increase
			Improved practice	Farmers practice	
Ornamental Crops					
Marigold	2.40	14	42.19	33.92	24.39
Tuberose	8.67	36	20.18	16.93	19.19
Plantation Crops					
Cashew	2.20	14	8.37	5.91	41.62
Spices					
Garlic	0.90	7	50.20	41.00	22.44
Turmeric	5.80	11	197.56	171.37	15.28
Vegetables					
Beans	8.05	34	23.57	15.19	55.16
Bhendi	8.00	22	40.68	34.65	17.40
Bitter gourd	6.00	32	204.75	153.66	33.24
Brinjal	9.10	49	276.87	141.63	95.48
Chillies	50.05	137	54.83	45.37	20.85
Onion	48.40	190	219.55	188.11	16.71
Tapioca	2.00	8	86.00	68.00	26.47
Tomato	26.70	62	288.27	246.87	16.79



FLD on wheat - cv. Vimal



FLD on Zero Tillage in maize



FLD on Aphids control in wheat



FLD on Soil Test Based Recommendation in rice



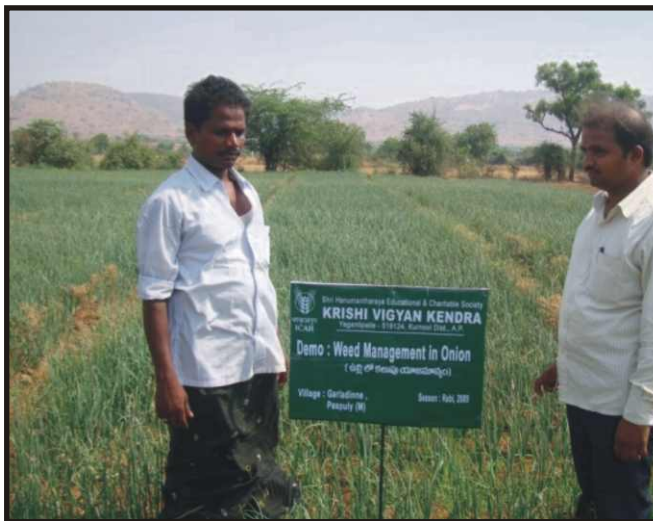
FLD on IPM in chillies



FLD on fruit and shoot borer in brinjal



FLD on chillies cv. Jayanti



FLD on weed management in onion

Tools and Implements

KVKs organized 1983 demonstrations on improved tools and implements with an aim to reduce the drudgery of farm women and facilitate timely field operations viz. ploughing, sowing and planting, weeding and intercultural operations and harvesting and threshing (Table 24 a & 24 b).

Table 24 a. Details of FLDs on improved tools and implements during 2009-10

State	Crop	Number of demonstration
Andhra Pradesh	Bhendi	88
	Chickpea	10
	Chillies	8
	Cotton	30
	Groundnut	20
	Jasmine	10
	Others	3
	Rice	34
	Total	203
Maharashtra	Bhendi	13
	Chickpea	30
	Cotton	978
	Groundnut	154
	Maize	77
	Mango	7
	Others	10
	Rice	209
	Soybean	94
	Wheat	208
	Total	1780
Zone	Bhendi	101
	Chickpea	40
	Chillies	8
	Cotton	1008
	Groundnut	174
	Jasmine	10
	Maize	77
	Mango	7
	Others	13
	Rice	243
	Soybean	94
	Wheat	208
	Total	1983

Table 24 b. Details on operation wise FLD on tools and implements organized by KVKs in Zone-V

State	Technology demonstrated	Number of demonstration
Andhra Pradesh	Harvesting and threshing	130
	Interculture and Weeding	21
	Post Harvest Processing	13
	Sowing and Planting	39
	Total	203
Maharashtra	Harvesting and threshing	483
	Interculture and Weeding	136
	Others	70
	Ploughing and land preparation	398
	Post Harvest Processing	155
	Sowing and Planting	234
	Spraying	304
	Total	1780
Zone	Harvesting and threshing	13
	Interculture and Weeding	157
	Others	70
	Ploughing and land preparation	39
	Post Harvest Processing	168
	Sowing and Planting	273
	Spraying	304
Total		1983

The performance of improved tools and implements under FLDs vis-à-vis the relevant indicators of performance viz. saving of labour, time required for completing the field operation, energy expenditure, field performance, output, cost of field operations etc. is presented in Table 25.

Table 25. Performance of improved tools and implements under FLD on implements (2009-10)

Implement	Crop	No. of demos.	Area (ha)	Performance Indicator			% increase in yield
				Parameter	Improved Practice	Farmers Practice	
Aero Blast Sprayer	Cotton	100	100.00	Labour Saving	124	258	-52.00
Bhendi Plucker	Bhendi	98	5.00	Harvesting time (hrs/acre)	91.95	81.41	13.00
Bullock Driven Sprayer	Soybean	25	25.00	Labour man hr/ha	1.9	16	-88.00
Cotton Picking Apron	Cotton	130	3.00	Average Energy Expenditure (kJ/min.)	129.7	111.6	16.00
Cotton Slasher	Cotton	15	30.00	Field	0.25	0.1	150.00

Table 25. Contd...

Implement	Crop	No. of demos.	Area (ha)	Performance indicator			% increase in yield
				Parameter	Improved practice	Farmers practice	
				Capacity ha/hr)			
Dibbler	Cotton1	100	100.00	Labour Saving	21	16	31.00
Digger - Bullock Drawn	Ground nut	10	5.00	Output (ha./hr.)	0.0285	0.00625	356.00
Disk Harrow - Tractor Drawn	Cotton	25	25.00	Output (ha./hr.)	0.4	0.0375	967.00
Drum Seeder (TNAU Model)	Rice	20	10.00	Net Returns (Rs./ha)	37770	23250	62.00
Dung Collector	Others	10		Work output (kg/hr)	18	10	80.00
Fertidrill cum Planter PAU	Wheat	19	21.00	Cost (Rs./ha)	570	750	-24.00
Grain Cleaner - Manual double screen	Wheat	50		Work output (Kg/ hr)	81.62	26.9	203.00
Grain Cleaner cum Grader	Maize	41	239.00	Cost of operation (Rs./q)	9	32	-72.00
Groundnut Decorticator	Ground nut	60	1080.00	Cost (Rs./q)	220.3	114.752	92.00
Groundnut stripper (CRIDA Model)	Ground nut	8	2.50	Cost of operation (Rs./ha)	726	1650	-56.00
Hand Hoe - Serrated Blade Hoe	Cotton	62	36.40	Hoeing cost (Rs./ha)	368	509	-28.00
Harvester - Nutan	Mango	5	0.05	No. of fruits harvested/hr	208	178	17.00
Maize Sheller	Maize	45		Work output (kg/hr)	41.20	14.60	182.00
Manual Groundnut Decorticator	Ground nut	55		Work output (kg/hr)	16.34	0.50	3168.00
Planter - Cup Feed Bullock Drawn	Ground nut			Time required (hr/ha)			
Planter - Six Row (CRIDA)	Chickpea	10	4.00	Yield (q/ha)	18.28	13.40	36.00
Planter - Tractor Drawn Inclined Pate -CRIDA	Wheat	58	40.00	Cost (Rs./ha)	5635	9641	-42.00

Table 25. Contd...

Implement	Crop	No. of demos.	Area (ha)	Performance indicator			% increase in yield
				Parameter	Improved practice	Farmers practice	
Pneumatic Planter	Cotton	18	25.00	Field capacity(ha/hr)	0.80	0.15	433.00
Power operated grain cleaner	Wheat	20	221.00	Time taken for cleaning grading hr/qt	0.66	1.62	-59.00
Ridger Bull-cock drawn	Cotton	50	50.00	Output (ha./hr.)	0.303	0.25	21.00
Rotavator	Cotton	323	265.00	Cost of operation (Rs/q)	3617.40	4268.38	-15.00
Seed Cum Ferti Drill - M.A.U.	Soybean	15	6.00	Field capacity (ha/hr)	1.15	0.90	28.00
Sickle Dhana lakshmi	Rice	197	50.00	Drudgery reduction (kg/m ²)	246.77	286.91	-14.00
Sickle Gujarat	Wheat	12	12.00	Output (m ² /hr)	8.35	2.52	231.00
Sickle- Serrated Sickle	Wheat	10		Capacity/ ha/hr	0.12	0.10	20.00
Sickle- Vaibhav	Wheat	20	20.00	Cost of operation (Rs/q)	305	255.00	20.00
Slasher- Self Propelled Rotoslasher	Cotton	20	4.00	Cost of operation (Rs./ha)	1450	410	254.00
Sprayer- Aero Blast Sprayer	Cotton	142	100.00	Cost (Rs/q)	100.96	250.133	-60.00
Sprayer- Battery Operated Knapsack	Cotton	10	10.00	Cost (Rs./ha)	150	210	-29.00
Sprayer- Pesto Blat Sprayer	Mango	2	3.00	Cost (Rs./ha)	162	410	-60.00
Sprayer- Uni-Blast/Single Piston	Cotton	25	25.00	Capacity output (ha/hr)	0.46	0.43	7.00
Stalk Uprooter -Tractor Drawn	Cotton	25	25.00	Output (ha./hr.)	0.40	0.05	700.00
Stripper- Motorized (CRI-DA) model	Ground nut	15	9.00	Cost of operation (Rs./ha)	814	1700	-52.00
Transplanter	Rice	6	3.00	Net Returns (Rs./ha)	43770	39940	10.00

Table 25. Contd...

Implement	Crop	No. of demos.	Area (ha)	Performance indicator			% increase
				Parameter	Improved practice	Farmer practice	
Vegetable Preservator - CRIDA	CRIDA-Preservator	3		Shelf life (days)	5	2	150.00
Weeder - Power, Cono-weeder, PAU	Cotton	52	35.70	Weeding efficiency	98.30		98.30
Weeder - Power Drawn (TNAU)	Bhendi	5	2.20	Cost of operation (Rs./ha)	210	570	-63.00
Wheel Hoe	Rice	26	12.00	Weeding cost (Rs./ha)	431.50	1432	-70.00
Wheel Hoe - Twin Wheel	Soybean	12	5.00	Field capacity (ha/hr)	0.01	0.001	900.00

Livestock Species

In order to demonstrate the efficacy of improved technologies, KVKs organized 702 FLDs on various livestock species. The state and enterprise wise details on demonstrations is furnished in Table 26.

Table 26. Details of FLD on livestock and other enterprises organized by KVKs during 2009-10

State	Enterprise	Number of demonstration
Andhra Pradesh	Dairy	35
	Fisheries	21
	Poultry	200
	Total	256
Maharashtra	Dairy	267
	Fisheries	30
	Poultry	79
	Sheep and Goat	70
	Total	446
Zone	Dairy	302
	Fisheries	51
	Poultry	279
	Sheep and Goat	70
	Total	702

The performance of various improved technologies vis-à-vis the indicators with regard to livestock species is presented in Table 27. The improved technologies significantly increased the milk yield (15.17 to 47.36 %) and reduced the incidence of mastitis and other diseases (70.00 %) in dairy animals. In case of poultry, improved breeds Giriraja, Vanaraja and Gramapriya were evaluated for meat and egg yield, while feed concentrate was tested for weight gain in sheep and goat.

Table 27. Performance of technologies under FLD on livestock enterprises during 2009-10

Technology	No. of demos.	Performance indicator			% increase
		Parameter	Improved practice	Farmer practice	
Dairy					
Mineral supplement	50	Milk Yield (l/animal/day)	18.77	13.77	36.31
Feed supplements - Green fodder - Ramkel Sorghum	76	Milk yield (l/lactation)	291.70	222.82	30.91
Mineral mixtures	35	Milk Yield (l/animal/day)	8.35	7.25	15.17
Urea (4%) treated paddy straw	56	Milk yield (l/lactation)	54.41	42.74	27.30
Urea (4%) treated paddy straw	20	Milk yield (l/lactation)	5.60	3.80	47.36
California Mastitis Reagent	10	Accuracy of diagnosis (%)	70.00	0	70.00
CMT Kit	5	No. of events of mastitis/lactation	0	8	-800.00
Poultry					
Giriraja Breed	58	Live weight of bird (g) after 3 moths	2611.51	858.72	51.02
Vanraja Breed	6	Live body weight of birds 8 weeks age (kg)	0.61	0.45	37.75
Gramapriya Breed	125	Eggs (No./Bird /year)	1934	750	52.62
Vaccination	5	Mortality rate	0.04	0.08	-50.00
Sheep and Goat					
Concentrate feed	70	Weight gain in kids (kg)	145.93	26.11	458.90

Enterprises

The enterprises wise performance of improved technologies vis-a-vis performances indicators in presented in Table 28. In case of mushrooms, improved milky mushrooms species gave higher yield response (42.85%), while it was true with other improved technologies viz. bed cleaning and disinfestation in case of sericulture.

Table 28. Performance of technologies under FLD on other enterprises during 2009-10

Enterprise	Technology Demo-nstrated	No. of demos.	Performance Indicator			% increase
			Parameter	Improved Practice	Farmer Practice	
Mushrooms	Milky Mushroom Species	5	Production (g/harvest)	500	350	42.85
Sericulture	Bed clean-ing using nylon nets	10	Cocoon yield (kg/100 DFL)	52	40	30.00
Sericulture	Bed disinfec-tion using powder dusters	10	Cocoon yield (kg/100 DFL)	53	43	26.19
Vermi-culture	Composting	11	No. of day for composting	90	150	-40.00

Gender specific technologies

To relieve farm women of household drudgery and improve the health and nutritional status of women and children, KVKs in Maharashtra organized 252 front line demonstrations (Table 29). The results of demonstrations on improved cookers (Sarai Pranali and Kisan) and smokeless stoves (ARTI and Multi-fuel cook stove) showed significant reduction in fuel requirement by 280.08 and 109.53 per cent respectively. The demonstrations on improved amylase diet showed increased growth in infants (40.00 %) and fortified iron diet increased the hemoglobin content (110.00 %) in pregnant women. Similarly, the demonstrations on water purifier showed reduced fluorine content to the extent of 174.28 per cent.

Table 29. Performance of technologies on health and nutrition of women under FLD (2009-10)

Technology	No. of demos.	Performance Indicator			%
		Parameter	Improved Practice	Farmer Practice	
Cooker (Sarai Pranali and Kissan Cooker)	35	Fuel consumption (g/1 kg rice)	375.10	1428.60	280.08
Smokeless stove (ARTI Chullah, CIAE Multifuel cook stove)	52	Fuel consumption (g/1 kg rice)	430.35	901.75	109.53
Improved diet (Amalyze diets)	45	Body weight (kg/child)	14.00	10.00	40.00
Iron fortified diet	10	Increase in Hb (g)	2.10	1.00	110.00
Nutritional Gardening	60	Body Wt (kg)	37.03	3.00	12.12
Water Purifier	50	Fluorine content (ppm)	1.40	3.84	174.28

Training

General Training

Training is an important activity of KVK which play a pivotal role in enhancing the knowledge and skill about various improved technologies. KVKs assess the training needs and prioritize need based training programmes for various clientele group. The training for farmers and farm women is primarily focused on knowledge and skills, while it is entrepreneurship development and knowledge on frontier areas of science and technology in case of rural youth and extension personnel respectively.

In all, 5033 training programmes were conducted with 157218 participants including 121560 farmers, 20890 rural youth and 14768 extension functionaries (Table 30). KVKs in Andhra Pradesh organized 1781 training courses with a participation of 55325 farmers, rural youth and extension functionaries, while the KVKs in Maharashtra conducted 3252 courses with a total participation of 101893 beneficiaries.

The main thematic areas covered under training include integrated crop management, improved tools and implements, capacity building and group dynamics, women empowerment, improved production practices for horticultural crops, productivity enhancement in livestock species, integrated pest management and soil health and fertility management.

The details on training courses vis-à-vis coverage of disciplines is given in Table 31. A total of 701 courses covering 22477 participants on crop production was conducted by KVKs followed by 637 (18875) on women empowerment, 562 (21063) on plant protection, 536 (17768) on horticultural crops, 474 (14851) on livestock production and management etc.

Table 30. Details of client wise training programmes organized by KVKs of Zone V

State/Clientele	Number of Courses	Other beneficiaries			SC/ST beneficiaries			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Andhra Pradesh										
Extension functionaries	189	2560	1427	3987	901	784	1685	3461	2211	5672
Farmers and farm women	1264	19948	10073	30021	6415	4847	11262	26363	14920	41283
Rural youth	328	3407	2817	6224	996	1150	2146	4403	3967	8370
Total	1781	25915	14317	40232	8312	6781	15093	34227	21098	55325
Maharashtra										
Extension functionaries	286	5746	1407	7153	1346	597	1943	7092	2004	9096
Farmers and farm women	2454	40588	13948	54536	16824	8917	25741	57412	22865	80277
Rural youth	512	6605	2702	9307	2047	1166	3213	8652	3868	12520
Total	3252	52939	18057	70996	20217	10680	30897	73156	28737	101893

Table 30. Contd...

Zone										
Extension functionaries	475	8306	2834	11140	2247	1381	3628	10553	4215	14768
Farmers and farm women	3718	60536	24021	84557	23239	13764	37003	83775	37785	121560
Rural youth	840	10012	5519	15531	3043	2316	5359	13055	7835	20890
Total	5033	78854	32374	111228	28529	17461	45990	107383	49835	157218

Table 31. State wise and discipline wise details of training programmes conducted for farmers

Discipline	Andhra Pradesh		Maharashtra		Total	
	No. of courses	No. of participants	No. of courses	No. of participants	No. of courses	No. of participants
Agricultural engineering	17	574	131	3832	148	4406
Agro-forestry	4	105			4	105
Capacity building and group dynamics	60	2198	118	3460	178	5658
Crop production	254	8527	447	13950	701	22477
Fisheries	58	2258	41	1135	99	3393
Women empowerment	280	8389	357	10486	637	18875
Horticulture						
a. Fruits	66	1840	165	5085	231	6925
b. Medicinal and aromatic plants	2	213	4	242	6	455
c. Ornamental plants	16	436	10	183	26	619
d. Plantation crops	11	398	8	499	19	897
e. Spices	3	102	23	1059	26	1161
f. Tuber crops	4	139	4	59	8	198
g. Vegetable Crops	57	1491	163	6022	220	7513
h. Total	159	4619	377	13149	536	17768
Livestock production and management	115	3121	359	11730	474	14851
Plant protection	174	6134	388	14929	562	21063
Production of inputs at site	40	1249	22	551	62	1800
Soil Health and fertility management	103	4109	214	7055	317	11164
Grand Total	1264	41283	2454	80277	3718	121560

A total of 840 training programmes covering 20890 rural youth were conducted by KVKs in Zone-V (Table 32). The main thematic areas for training include integrated farming (94), value addition (62), small scale processing (53), production of organic inputs (52) etc.

Table 32. State wise and discipline wise details of training programmes conducted for rural youth.

Theme	Andhra Pradesh		Maharashtra		Total	
	No. of courses	No. of participants	No. of courses	No. of participants	No. of courses	No. of participants
Integrated farming	18	512	76	2106	94	2618
Value addition	24	686	38	904	62	1590
Small scale processing	31	479	22	454	53	933
Production of organic inputs	19	468	33	896	52	1364
Poultry production	15	324	34	791	49	1115
Tailoring and Stitching	31	824	9	168	40	992
Protected cultivation of vegetable crops	11	361	27	483	38	844
Nursery Management of Horticulture crops	07	223	31	552	38	775
Vermi-culture	17	526	18	534	35	1060
Sericulture	25	290	7	193	32	483
Dairying	07	279	25	603	32	882
Rural Crafts	23	673	6	139	29	812
Sheep and goat rearing	06	229	21	502	27	731
Repair and maintenance of farm machinery and implements	8	280	16	327	24	607
Post Harvest Technology	8	234	15	394	23	628
Planting material production	11	260	12	367	23	627
Seed production	13	357	9	165	22	522
Mushroom Production	10	276	8	231	18	507
Production of quality animal products	10	18	5	111	15	296
Commercial fruit production			11	357	11	357
Composite fish culture	5	156	5	110	10	266
Bee-keeping	3	76	5	116	8	192
Training and pruning of orchards	4	66	3	81	7	147
Ornamental fisheries	2	42	3	88	5	130
Quail farming	2	70	2	38	4	108
Fry and fingerling rearing			4	145	4	145
Piggery			2	40	2	40
Fish harvest and processing technology	1	8	1	20	2	28
Shrimp farming			1	20	1	20
Others	17	486	63	1585	80	2071
Total	328	8370	512	12520	840	20890



Training on vermiculture



Training on compost making

In Zone-V, 475 training courses with a participation of 14768 extension personnel covering various thematic areas viz. productivity enhancement in field crops (83), integrated pest management (67), integrated nutrient management (39), low cost and nutrient efficient diet designing (38), information networking among farmers (29) etc. were organized by KVKs (Table 33).

Table 33. Training for Extension Functionaries including sponsored training programmes

Theme	Andhra Pradesh		Maharashtra		Total	
	No. of courses	No. of participants	No. of courses	No. of participants	No. of courses	No. of participants
Productivity enhancement in field crops	34	1026	49	1605	83	2631
Integrated pest management	27	802	40	1435	67	2237
Integrated nutrient management						
Low cost and nutrient efficient diet designing	20	519	18	532	38	1051
Information networking among farmers	5	165	24	649	29	814
Protected cultivation technology	7	206	14	461	21	667
Group dynamics and farmers organization	8	219	12	254	20	473
Care and maintenance of farm machinery and implements	1	79	15	339	16	418
Management in farm animals	2	4	6	255	8	259
Capacity building for ICT application	5	128	8	413	13	541

Table 33. Contd...

Theme	Andhra Pradesh		Maharashtra		Total	
	No. of courses	No. of participants	No. of courses	No. of participants	No. of courses	No. of participants
Production and use of organic inputs	5	168	8	266	13	434
Gender mainstreaming through SHGs	5	250	6	155	11	405
Rejuvenation of old orchards	9	356	2	94	11	450
Formation and Management of SHGs	6	193	2	46	8	239
Household food security	6	170	2	40	8	210
Women and child care	4	121	1	17	5	138
Others	25	641	35	1037	60	1678
Total	189	5672	286	9096	475	14768

**Training of Village Level Workers**

Sponsored Training

In view of better infrastructure and qualified manpower, KVKs facilitate various research institutes, line departments of state and central government, financial institutions etc. in organizing sponsored training in rural areas. KVKs organized 662 sponsored training programmes covering 28185 farmers and rural youth (Table 34). The important organizations that contributed to sponsored training include Agricultural Technology Management Agency (ATMA), National Horticultural Mission (NHM), National Bank for Agriculture and Rural Development (NABARD), etc. The important thematic areas include increasing the production and productivity of crops (13197), soil health and fertility management (1960), capacity building and group dynamics (822), income generation activities (1650), vermiculture (471), livestock production and management (4325) etc.

Table 34. Training for Extension Functionaries including sponsored training programmes

Thematic area	Andhra Pradesh		Maharashtra		Total	
	No. of courses	No. of participants	No. of courses	No. of participants	No. of courses	No. of participants
Increasing production & productivity of crops	47	4694	147	8503	194	13197
Soil health and fertility management	37	544	64	1416	101	1960
Capacity building and Group Dynamics	76	620	5	202	81	822
Income generation activities	48	1100	11	550	59	1650
Vermiculture	51	337	1	134	52	471
Livestock production and management	1	65	37	4260	38	4325
Processing and value addition	6	356	21	1256	27	1612
Household food security	7	446	13	412	20	858
Information networking	4	206	12	420	16	626
Vegetables	1	10	14	548	15	558
Production of inputs at site	7	250	3	130	10	380
Protected cultivation			10	336	10	336
Fruits			9	332	9	332
Poultry production and management	2	4	6	255	8	259
Drudgery reduction	1	50	3	110	4	160
Repair of farm machinery, tools and implements	1	25	2	50	3	75
Resource conservation technology	3	192			3	192
Sericulture	2	53	1	23	3	76
Apiary	1	21	1	24	2	45
Mushroom cultivation	2	32			2	32
Planting material production			2	114	2	114
Animal Disease Management	1	38			1	38
Composite fish farming	1	28			1	28
Poultry farming			1	39	1	39
Grand Total	299	9071	363	19114	662	28185



Training programme sponsored by ATMA

Vocational Training

In order to facilitate entrepreneurship development, income generation and self-employment especially among rural youth and school dropouts, KVKs organize vocational training programmes. In all, 374 vocational training programmes covering 9287 rural youth were organized by KVKs during 2009-10 (Table 35). The important thematic areas include value addition, tailoring, integrated crop management, poultry farming, nursery and grafting, production of bio-agents and bio-pesticides, sheep and goat rearing etc..

Table 35. Details of vocational training programmes organized by KVKs

Themeatic area	Andhra Pradesh		Maharashtra		Total	
	No. of courses	No. of participants	No. of courses	No. of participants	No. of courses	No. of participants
Value addition	18	417	54	1126	72	1543
Tailoring, stitching, embroidery, dying etc.	32	785	6	117	38	902
Integrated crop management	11	236	20	817	31	1053
Poultry farming	3	86	27	823	30	909
Nursery, grafting etc	14	172	13	337	27	509
Production of bio-agents, bio-pesticides etc.	4	119	13	178	17	297
Sheep and goat rearing	2	76	15	310	17	386
Vermi-culture	8	93	9	204	17	297
Mushroom cultivation	12	286	4	70	16	356
Seed production	8	152	7	106	15	258
.Agri para-workers, para-vet training	3	70	7	216	10	286
Dairy farming	2	55	8	218	10	273
Rural Crafts	7	156	3	57	10	213

Table 35. Contd...

Small scale processing unit	2	76	8	168	10	244
Commercial floriculture	6	68	1	66	7	134
Ornamental fisheries	5	30	2	34	7	64
Capacity building and group dynamics			6	367	6	367
Repair and maintenance of farm machinery and implements	6	137			6	137
Apiculture	2	55	2	77	4	98
Commercial vegetable production			4	445	4	445
Composite fish culture	1	50	3	71	4	121
Protected cultivation of vegetables and flowers			4	83	4	83
Commercial fruit production			3	94	3	94
Sericulture			3	60	3	60
Organic farming			1	30	1	30
Grand Total	149	3170	225	6117	374	9287

Extension Activities

To create awareness among farmers about improved agricultural technologies, KVKs in Zone-V organized 10521 extension activities covering 584980 participants. The extension activities included advisory services, exposure visits, animal health camps, technology week, group discussions, method demonstrations, soil health camps, kisan melas, kisan ghosti, etc. The details of extension activities organized by KVKs are given in Table 36 a. KVKs in Andhra Pradesh organized 5612 extension activities covering 220926 participants and the corresponding figures for Maharashtra are 4909 and 364054 (Table 36 b and c).

Table 36 a. Details of Extension Activities organized by KVKs in Zone V

Extension activity	No. of courses	Farmers and farm women			Extension functionaries			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Advisory Services	1225	12314	3198	15512	2433	721	3154	14747	3919	18666
Agri mobile clinics	53	4851	425	5276	124	33	157	4975	458	5433
Animal Health Camps	152	6484	2485	8969	802	539	1341	7286	3024	10310
Celebration of important days	189	7422	4928	12350	548	1624	2172	7970	6552	14522

Table 36 a. Contd...

Extension activity	No. of courses	Farmers and farm women			Extension functionaries			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Diagnostic visits	638	28510	5760	34270	6160	2023	8183	34670	7783	42453
Exhibitions	206	40235	8464	48699	23548	3317	26865	63783	11781	75564
Ex-trainees sammelans	66	4224	1184	5408	381	242	623	4605	1426	6031
Farm Science Club	60	3032	886	3918	66	44	110	3098	930	4028
Farmers visit to KVK	1400	39062	8811	47873	2214	499	2713	41276	9310	50586
Field Day	468	35190	4941	40131	2345	513	2858	37535	5454	42989
Film Shows	268	29694	9794	39488	14435	3632	18067	44129	13426	57555
Group discussions	568	9072	2769	11841	2238	686	2924	11310	3455	14765
Kisan Ghosthi	223	18374	6203	24577	2475	1810	4285	20849	8013	28862
Kisan Mela	224	37587	12644	50231	6317	1434	7751	43904	14078	57982
Kisan Rally	22	3233	488	3721	127	51	178	3360	539	3899
Lectures	751	18805	5817	24622	2754	566	3320	21559	6383	27942
Self-help group meetings	60	213	723	936	107	267	374	320	990	1310
Method Demonstrations	671	10691	3918	14609	1803	832	2635	12494	4750	17244
News paper coverage	1165	0	0	0	0	0	0	0	0	0
Scientific visit to farmers field	1176	14244	5210	19454	1361	405	1766	15605	5615	21220
Self Help Group meeting	131	1029	1977	3006	66	616	682	1095	2593	3688
Seminars	73	4926	1342	6268	633	346	979	5559	1688	7247
Soil health Camp	133	3271	1046	4317	236	64	300	3507	1110	4617
Technology Week	29	8471	3375	11846	1138	534	1672	9609	3909	13518
Workshops	107	14854	5610	20464	692	197	889	15546	5807	21353
Grand Total	10521	384486	105250	489736	74005	21239	95244	458491	126489	584980

Table 36 b. Details of Extension Activities organized by KVKs in Andhra Pradesh

Extension activity	No of activities	Farmers and farm women			Extension functionaries			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Advisory Services	1047	4792	1126	5918	1081	422	1503	5873	1548	7421
Agri mobile clinics	17	780	260	1040	21	5	26	801	265	1066
Animal Health Camps	41	1207	402	1609	468	331	799	1675	733	2408
Celebration of important days	59	1989	2909	4898	248	1043	1291	2237	3952	6189
Diagnostic visits	349	5351	925	6276	2097	360	2457	7448	1285	8733
Exhibitions	41	29095	4469	33564	21739	2888	24627	50834	7357	58191
Exposure visits	83	1233	538	1771	30	32	62	1263	570	1833
Ex-trainees sammelans	12	216	268	484	160	80	240	376	348	724
Farm Science Club	30	488	37	525	4	2	6	492	39	531
Farmers visit to KVK	550	14865	4668	19533	1328	87	1415	16193	4755	20948
Field Day	134	5724	1579	7303	1028	203	1231	6752	1782	8534
Film Shows	106	2583	1398	3981	450	234	684	3033	1632	4665
Group discussions	372	5422	1901	7323	1805	590	2395	7227	2491	9718
Kisan Ghosthi	87	13353	3161	16514	1164	398	1562	14517	3559	18076
Kisan Mela	31	20505	4726	25231	4347	968	5315	24852	5694	30546
Kisan Rally	19	3233	488	3721	127	51	1783	360	539	3899
Mahila Mandals meetings	20	64	318	382	2	57	59	66	375	441
Lectures	370	6653	2120	8773	1738	447	2185	8391	2567	10958
Method Demonstrations	331	4495	1905	6400	1330	685	2015	5825	2590	8415
News paper coverage	854	0	0	0	0	0	0	0	0	0
Scientific visit to farmers field	872	6310	1111	7421	702	190	892	7012	1301	8313
Self Help Group meeting	53	201	1265	1466	3	413	416	204	1678	1882
Seminars	41	1994	459	2453	181	86	267	2175	545	2720
Soil health Camp	72	1734	496	2230	119	39	158	1853	535	2388
Technology Week	10	1162	434	1596	101	33	134	1263	467	1730
Workshops	11	469	105	574	17	6	23	486	111	597
Total	5612	133918	37068	170986	40290	9650	49940	174208	46718	220926

Table 36c. Details of Extension Activities organized by KVKs in Maharashtra

Extension activity	No of activities	Farmers and farm women			Extension functionaries			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Advisory Services	178	7522	2072	9594	1352	299	1651	8874	2371	11245
Agri mobile clinics	36	4071	165	4236	103	28	131	4174	193	4367
Animal Health Camps	111	5277	2083	7360	334	208	542	5611	2291	7902
Celebration of important days	130	5433	2019	7452	300	581	881	5733	2600	8333
Diagnostic visits	289	23159	4835	27994	4063	1663	5726	27222	6498	33720
Exhibitions	165	1140	3995	15135	1809	429	2238	12949	4424	17373
Exposure visits	380	2765	2714	30179	972	212	1184	28437	2926	31363
Ex-trainees sammelans	54	4008	916	4924	221	162	383	4229	1078	5307
Farm Science Club	30	2544	849	3393	62	42	104	2606	891	3497
Farmers visit to KVK	850	24197	4143	28340	886	412	1298	25083	4555	29638
Field Day	334	29466	3362	32828	1317	310	1627	30783	3672	34455
Film Shows	162	27111	8396	35507	13985	3398	17383	41096	11794	52890
Group discussions	196	3650	868	4518	433	96	529	4083	964	5047
Kisan Ghosthi	136	5021	3042	8063	1311	1412	2723	6332	4454	10786
Kisan Mela	193	17082	7918	25000	1970	466	2436	19052	8384	27436
Kisan Rally	3	0	0	0	0	0	0	0	0	0
Lectures delivered	381	12152	3697	15849	1016	119	1135	13168	3816	16984
Mahila Mandals meetings	40	149	405	554	105	210	315	254	615	869
Method Demonstrations	340	6196	2013	8209	473	147	6206	vv669	2160	8829
News paper coverage	311	0	0	0	0	0	0	0	0	0
Scientific visit to farmers field	304	7934	4099	12033	659	215	874	8593	4314	12907
Self Help Group meeting	78	828	712	1540	63	203	266	891	915	1806
Seminars	32	2932	883	3815	452	260	712	3384	1143	4527
Soil health Camp	61	1537	550	2087	117	25	142	1654	575	2229
Technology Week	19	7309	2941	10250	1037	501	1538	8346	3442	11788
Workshops	96	14385	5505	19890	675	191	866	15060	5696	20756
Total	4909	250568	68182	318750	33715	11589	45304	284283	79771	364054



Vaccination of goats

Publications

To disseminate the information on improved agricultural technologies, KVKs of Zone-V brought out 1114 publications which include 439 popular articles, 34 newsletters, 169 folders, 11 CDs, 7 VCDs etc. The details of publications by the KVKs are given in Table 37.

Table 37. Details of Publications by KVKs in Zone-V

State	Type of publication	Number publications	Number of copies
Andhra Pradesh	Booklets	3	150
	Electronic Media (CD)	3	84
	Electronic Media (VCD)	1	100
	Extension Literature	57	39600
	Leaflets/folders	72	58470
	News Letters	27	201
	Popular Articles	105	33
	Research Papers	8	4
	Technical Bulletins	45	26600
	Technical Reports	75	258
	Total	396	125500
Maharashtra	Booklets	6	3300
	Display Boards	10	0
	Electronic Media (CD)	8	81
	Electronic Media (VCD)	6	255
	Extension Literature	71	41162
	Handbill	1	1
	Leaflets/folders	97	79632
	Magazine	1	500
	News Letters	7	86200
	News Paper Articles	27	0
	Popular Articles	334	2077
	Research Papers	38	4
	Technical Bulletins	18	6200
	Technical Reports	94	571
	Total	718	219983

Table 37. Contd...

State	Type of publication	Number publications	Number of copies
Zone	Booklets	9	3450
	Display Boards	10	00
	Electronic Media (CD)	11	165
	Electronic Media (VCD)	7	355
	Extension Literature	128	80762
	Handbill	1	1
	Leaflets/folders	169	138102
	Magazine	1	500
	News Letters	34	86401
	News Paper Articles	27	0
	Popular Articles	439	2110
	Research Papers	46	8
	Technical Bulletins	63	32800
	Technical Reports	169	829
	Grand Total	1114	345483

Critical Technology Products

In order to facilitate rapid transfer of improved technologies, KVKs produce improved seed and planting material of elite species, various bio-products, improved livestock breeds and species and supply them to farmers and farm women.

Seed and Planting Material

KVKs produced 5389.07 q of seed material (cereals 3480.28 q, oilseeds 611.4 q, pulses 1056.7 q etc.) and supplied to 14423 farmers (Table 38 a). KVKs also produced 1132760 saplings (434367 vegetables, 383192 fruits, 84024 forest species, 98416 ornamental plants etc.) and supplied to 11499 farmers (Table 38 b).

Table 38a. Details of production and supply of seed by KVKs of Zone-V

State	Category	Quantity (q)	Value (Rs)	No. of farmers
Andhra Pradesh	Cereals	2614.43	5044446	5875
	Fibers	3	9000	5
	Flowers	8.8	16400	120
	Fodders	107.16	47244	3510
	Fruits	9	1500	0
	Oilseeds	199.41	805240	827
	Pulses	893.26	677937	1362
	Vegetables	1.81	6943	120
	Total	3836.87	6608710	11819
Maharashtra	Cereals	865.85	1498022	962
	Fibers	49.23	132628	0
	Flowers	20	10000	20
	Fodders	10	1000	7
	Fruits	19.9	29000	0

Table 38a. Contd...

State	Category	Quantity (q)	Value (Rs)	No. of farmers
Maharashtra	Oilseeds	411.99	1125507	855
	Others	1.02	7680	45
	Pulses	163.53	691892	530
	Spices	2	0	0
	Vegetables	8.68	96722	185
	Total	1552.2	3592451	2604
Zone	Cereals	3480.28	6542468	6837
	Fibers	52.23	141628	5
	Flowers	28.8	26400	140
	Fodders	117.16	48244	3517
	Fruits	28.9	30500	0
	Oilseeds	611.4	1930747	1682
	Others	1.02	7680	45
	Pulses	1056.79	1369829	1892
	Spices	2	0	0
	Vegetables	10.49	103665	305
	Grand Total	5389.07	10201161	14423



Seed production in onion by tribal farmers



Seed production of cv. BML-6 - Maize

Table 38 b. Details of production and supply of planting material by KV Ks of Zone-V

State	Enterprise	Quantity No.	Value (Rs)	No. of farmers
Andhra Pradesh	Forest Species	4860	24100	312
	Fruits	53941	774405	2595
	Ornamental Plants	8359	46304	359
	Others	50000	50000	8
	Plantation crops	19088	326200	342
	Vegetables	3175	12760	77
	Total	139423	1233769	3693

Table 38b. Contd...

Maharashtra	Fodder crops	42473	16085	195
	Forest Species	79164	414649	253
	Fruits	329251	6000494	5753
	Ornamental Plants	90057	128718	518
	Others	1010	8280	3
	Plantation crops	18044	298380	325
	Spices	146	1480	18
	Tubers	2000	2000	20
	Vegetables	431192	302079	721
	Total	993337	7172165	7806
Zone	Fodder crops	42473	16085	195
	Forest Species	84024	438749	565
	Fruits	383192	6774899	8348
	Ornamental Plants	98416	175022	877
	Others	51010	58280	11
	Plantation crops	37132	624580	667
	Spices	146	1480	18
	Tubers	2000	2000	20
	Vegetables	434367	314839	798
	Grand Total	1132760	8405934	11499

Bio-products

KVKs produced 338412.55 kg of bio-fertilizers, 91197 kg of bio-fungicides and 279869.50 kg of bio-pesticides and supplied to 60279 farmers. The details of production of bio-products are given in Table 38 c.

Table 38c. Details of production and supply of bio-products and bio-agents by KVKs of Zone-V

State	Category	Quantity (number)	Quantity (kg)	Value (Rs)	No. of farmers
Andhra Pradesh	Bio-fertilizers	11	79231.5	870227	903
	Bio-fungicide	1580	2551	245400	439
	Bio-pesticides	970	12198	222232	199
	Total	2561	93980.5	1337859	1541
Maharashtra	Bio-fertilizers	5871	259181.05	1515508	5869
	Bio-food	0	45.98	410 45	109
	Bio-fungicide	65411	88646	8099899	51447
	Bio-pesticides	848	267671.5	466471	1313
	Total	72130	615544.53	10122923	58738

Table 38c. Contd...

Zone	Bio-fertilizers	5882	338412.55	2385735	6772
	Bio-food	0	45.98	40145	109
	Bio-pesticides	1818	279869.5	688703	1512
	Grand Total	74691	709525.03	11460782	60279

Livestock Species

KVKs produced 665500 fingerlings, 39708 poultry species, 525 sheep and goat etc. of elite species and supplied to 7750 farmers (Table 38 d).

Table 38 d. Details of production and supply of livestock, sheep and goat and poultry breeds and fish fingerlings by KVKs Zone-V

State	Enterprise	Quantity (number)	Quantity (kg)	Value (Rs)	No. of farmers
Andhra Pradesh	Dairy	20	6503	190769	0
	Fisheries	605000	3017	38020	170
	Poultry	15095	797.5	718256	3879
	Rabbit	9	0	2050	0
	Sheep and Goat	60	770	155550	28
	Total	620184	11087.5	1104645	4077
Maharashtra	Dairy	40	0	276000	149
	Fisheries	60500	35	44000	74
	Poultry	24613	1555	523867	2911
	Sheep and Goat	465	4295.8	676148	539
	Total	85618	5885.8	1520015	3673
Zone	Dairy	60	6503	466769	149
	Fisheries	665500	3052	82020	244
	Poultry	39708	2352.5	1242123	6790
	Rabbit	9	0	2050	0
	Sheep and Goat	525	5065.8	831698	567
	Grand Total	705802	16973.3	2624660	7750

Soil and water testing

KVKs under take soil and water testing primarily to ascertain the nutrient status of fields earmarked for technology assessment and refinement so as to make soil test based nutrient recommendations in various micro-farming situations in the district. A total number of 72167 samples including soil (55135), water (15217), plant (667), petiole (772) etc. were analyzed by the KVKs benefitting 64686 farmers of 8746 villages (Table 39).

Table 39. Details of soil and water testing by KVKs of Zone-V

State	Details	No. of samples	No. of farmers	No. of villages	Amount (Rs.)
Andhra Pradesh	Soil Samples	8339	6672	825	266075
	Water Samples	497	447	137	12796
	Total	8836	7119	962	278871
Maharashtra	Manure/fertilizer/micronutrient Samples	426	54	29	26490
	Petiole Samples	722	722	0	0
	Plant Samples	667	344	29	37175
	Soil Samples	46796	42914	5868	3476754
	Water Samples	14720	13533	1858	594130
	Total	63331	57567	7784	4134549
Zone	Manure/fertilizer/micronutrient Samples	426	54	29	26490
	Petiole Samples	722	722	0	0
	Plant Samples	667	344	29	37175
	Soil Samples	55135	49586	6693	3742829
	Water Samples	15217	13980	1995	606926
	Grand Total	72167	64686	8746	4413420



Soil Testing Lab at KVK Pune

Rainwater Harvesting

During the year 2007, ICAR provided rain water harvesting and micro-irrigation system to facilitate rapid dissemination of knowhow among farmers through demonstration and training. The details of training programmes on rain water harvesting conducted by KVKs are given in Table 40. A total of 63 courses were conducted for 1637 farmers and farmwomen and extension personnel.

Table 40. Details of training programmes conducted by KVK in rain water harvesting

State	KVK	Number of Courses	No. of Participants		
			Male	Female	Total
Andhra Pradesh	Rangareddy	10	409	57	466
	Total	10	409	57	466
Maharashtra	Amaravati (D)	10	114	162	276
	Beed	3	39	0	39
	Buldhana	15	167	0	167
	Dhule	2	51	8	59
	Jalna	7	273	22	295
	Nandurbar	6	301	34	335
	Total	53	945	226	11171
Grand Total		63	1354	283	1637

Technological Backstopping

The Directorates of Extension of State Agricultural Universities and Zonal Project Directorates facilitate technological backstopping and Human Resource Development (HRD) to the KVKs through training and capacity building, seminars, workshop etc. There are five Directorates at Zone-V under Acharya N. G. Ranga Agricultural University and Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Mahatma Phule Krishi Vidyapeeth, Marathwada Agricultural University and Dr. Punjabrao Deshmukh Krishi Vidyapeeth in Maharashtra. A total of 22 HRD activities benefitting 853 KVK staff in Zone-V were jointly organized by the directorates of extension and the Zonal Project Directorate (Zone-V). The details of HRD activities are furnished in Table 41.

Table 41. Details of training programmes and meetings conducted by ZPD (Zone-V) and SAUs of Andhra Pradesh and Maharashtra during 2009-10

Organization	Workshop/ meeting/ training	No. of programmes	No. of participants	No. of KVKs
ANGRAU, Hyderabad	Action plan meeting of KVKs (14-15th May 2009) at EEI, Rajendranagar, Hyderabad	1	105	22
	Diagnosis and management of insect pests, diseases and nutritional deficiencies of important crops	1	5	5
	State Level Technical programme meetings of KVKs (27-30th May 2009) at university Auditorium, Rajendranagar, Hyderabad	1	187	22
	Training on Cereals Production technology at RARS, Warangal (18-20th March 2010)	1	20	20
	Training on Cost Reduction technologies for sustainable agriculture (22-24th February 2010) at Rajendranagar, Hyderabad	1	8	8
	Training on Oilseeds Production technology at ANGRAU, Rajendranagar, Hyderabad (15-17th 2010)	1	17	17
	Training on Pulses Production technology at RARS, Lam, Guntur (24-26th February, 2010)	1	16	16

Table 41. Contd...

BSKKV, Dapoli	Soil and water conservation (9-11 th March 2010)	1	8	6
	Use of non nonconventional energy resources for employment (17-19 th March 2010)	1	6	5
	Value added products of Milk (24-26 th February 10)	1	9	6
Dr. PDKV, Akola	Action plan workshop 19-20 May 09)	1	120	11
	HRD Training on Organic Farming (29-30 th January 2010)	1	26	11
	HRD Training on Processing Technology for Fruit and Vegetable crops (24-25 th February, 2010)	1	29	11
	HRD training on production technology for dryland fruit crops (15-16 th January 2010)	1	23	11
MAU, Parbhani	Contingency crop planning and management one day workshop (24 th August 2009)	1	52	8
	Fruit Crop management HRD training programme	1	20	8
	Kharif pre planning and technology	1	24	8
MPKV, Rahuri	Action Plan Workshop of KVKs (18-20 th March 2010)	1	103	10
	Efficient Irrigation Water management for increasing crop production (09-10 th February 2010)	1	13	13
	Pests and Diseases Management of Major Kharif crops (11-12 th March 2010)	1	16	16
	Processing technologies of fruits & vegetables (27-28 th January 2010)	1	16	16
ZPD, Hyderabad	Action Plan Workshop on FLD Cotton	1	30	15
Total		22	853	

Agricultural Technology Information Centre

In view of greater need for direct access of farmers to institutional resources, ICAR established 44 Agricultural Technology Information Centres (ATIC) at some of the renowned institutions of National Agricultural Research System during 1997-98. In Zone-V, six ATIC were established, one each at five State Agricultural Universities viz. Acharya N. G. Ranga Agricultural University, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Mahatma Phule Krishi Vidyapeeth, Marathwada Agricultural University and Dr. Punjabrao Deshmukh Krishi Vidyapeeth in Maharashtra and one at ICAR research institute i.e Central Research Institute for Cotton Research, Nagpur, Maharashtra.

During the year, a total of 88186 farmers visited the six ATICs to access the latest technological information and critical technology products viz. seed and planting material. ATICs published latest technical information in the form of books, bulletins and electronic print format viz. compact disks and digital virtual discs for the benefit of farmers. The details on number of publications by ATICs are furnished in Table 42. A total 39459 copies of various publications were sold by ATICs which benefitted 34474 farmers with a revenue of Rs. 2389077/- .

Table 42. Details of publication by ATICs

Particulars	Number	Revenue (Rs.)	Number of farmers
Books	14530	757224	10530
Technical bulletins	19144	1509767	19071
Technology inventory	4730	90226	4690
CDS	529	16080	93
DVDS	526	15780	90
Total	39459	2389077	34474

Similarly, various critical technology products such as seed and planting material of improved varieties of crops, elite breeds of livestock, improved farm implements etc. were sold by ATICs which a generated revenue of Rs.15543362/- and benefitted 22151 farmers and farmwomen (Table 43). ATICs in Zone-V also facilitated other technology advisory and services viz. soil and water testing, plant diagnostics, exhibitions and radio and television programmes which benefitted 68038 farmers (Table 44).

Table 43. Details of technology products produced and supplied by ATICs

Particulars	Quantity	Revenue (Rs.)	Number of farmers
Seeds (q)	2692.53	12720437	11681
Planting materials (number)	89606	334315	970
Livestock (number)	33	61163	33
Bio-products (q)	3.65	337266	2981
Farm Implements (number)	8103	461121	4350
Products (packets)	1314	81060	826
Others (number)	1310	1548000	1310
Total		15543362	22151

Table 44. Details of technology services provided by ATICs

Particulars	Number of farmers
Soil and water testing	3359
Plant Diagnostics and surveillance	1349
Joint advisory with line departments	63010
Mobile exhibitions organized	17
Radio and TV programmes	303
Total	68038



Farmer visit to ATIC, MPKV, Rahuri