ANNUAL REPORT

2012-13

भाकृअनुप
ICAR

Zonal Project Directorate, Zone VII
Indian Council of Agricultural Research
Jabalpur, Madhya Pradesh

Citation

Annual Report (2012-13). Zonal Project Directorate, Zone VII, Jabalpur

Compiled and Edited by

Dr. Anupam Mishra, Principal Scientist & I/c ZPD, Zone VII
Dr. U. S. Gautam, Principal Scientist, ZPD, Zone VII
Dr. S. R. K. Singh, Senior Scientist, ZPD, Zone VII
Dr. A. P. Dwivedi, Senior Scientist, ZPD, Zone VII
Dr. Prem Chand, Scientist, ZPD, Zone VII
Dr. Tushar Athare, Scientist, ZPD, Zone VII
Dr. A. K. Singh, Subject Matter Specialist, KVK, Narsinghpur (M. P.)
Dr. Jai Singh, Subject Matter Specialist, KVK, Sidhi (M. P.)
Dr. P. K. Pandey, Scientist, IGKVV, Raipur (C.G.)

Assisted by

Rishiraj Negi, Programme Assistant, KVK, Shahdol (M. P.)
J. B. Shrivastava, Programme Assistant, KVK, Katni (M. P.)
Nitesh Gupta, Programme Assistant, KVK, Chhindwara (M. P.)
Vikas Jain, Programme Assistant, KVK, Damoh (M. P.)
Kishor Kumar Singh, Programme Assistant, KVK, Korea (C. G.)
Gajendra Tandan, Programme Assistant, KVK, Jashpur (C. G.)

Year of publication: 2013

Published by

Zonal Project Director
Zonal Project Directorate, Zone VII
ICAR, Jabalpur (MP)

CONTENTS

Executive Summery

1.	Introduction	1-8
2.	Technology assessment through on-farm testing	9-51
3.	Frontline demonstrations	52-63
4.	Training organized	64-67
5.	Extension activities	68-69
6.	Technology week organized	70-71
7.	Production of quality seed and planting materials	72-78
	Production of bio-productions, production of livestock material	79-82
8.	Details of soil, water and plant analysis	83
9.	Scientific Advisory Committee	84-86
10.	Technological backstopping through literature and media	87
11.	Details of HRD activities Organized by DES and ZPD	88-91
12.	Award and Recognition	92-93
13.	Flagship programmes in Zone-VII	94-97
14.	New initiatives	98-102
15.	Zonal Project Directorate's Publications	103-106

Executive Summary

Zonal Project Directorate, Zone VII has 100 KVKs located in three states namely Madhya Pradesh, Chhattisgarh and Odisha.

KVKs under Zone VII conducted 7911 On Farm Trials on the fifteen thematic areas and assessed 1381 technologies. Analyzed data showed that average number of OFT per KVK was found 15.8, 8.0 and 14.5 in M.P., Chhattisgarh and Odisha, respectively, whereas, on pooled basis it was 13.8 OFT per KVK in Zone VII.

For implementing the technology at wider scale, a total of 14003 FLDs were conducted on oilseeds, pulses, cereals, vegetables, cash crops, agro-forestry, millets and other important area covering the area of 6587.868 ha including, income generating enterprises like poultry, goatary, duckery, farm machinery, mushroom, vermi-compost were also covered under 1604 FLDs. Data showed that highest yield increase was observed in fruits, medicinal plants, vegetables, and pulses.

Zonal Project Directorate organized 14 knowledge management meet with the collaboration of ICAR institutes in which 683 Subject Matter Specialists benifitted in the zone.

For regular knowledge-updating and imparting new skills, total 7206 training courses were organized benefiting 174775 participants including 147161 farmers and farm women, 14254 rural youth and 13360 extension personnel.

For popularizing the technologies in the region, total 51406 extension activities in the form of field days (768), Farmers fair (184), Farm advisory services (3394), Exhibition (338), Film show (1882), etc. were organized which benefited 1006163 farmers and 22349 extension personnel in the Zone-VII.

For enhancing the production through quality seeds and planting materials, total 20727.16 q seeds and 25,47,658 nos planting materials were produced by the KVKs of the Zone VII. In Zone VII, 140 SAC meetings were conducted and 377 newsletters as well as 109 research papers & 329 popular articles were published.

KVKs of zone analyzed 25146 soil samples and 639 water samples though which more than 21000 farmers of 915 villages were benefitted.

Due to hard working with the farming community, ICAR Zonal KVK award was conferred to KVK Jhabua and one farmer also awarded Jagjivan Ram Abhinav Kisan Puraskar. Two Young Scientist Professional awards were also received by the ZPD Scientists.

dk;Z lkjka'k

{ks=h; ifj;kstuk funs'kky; vpy&7 ds vUrxZr 100 df"k foKku dsUnz gSa tks rhu jkT;ksa e/; izns'k] NRrhlx<+ ,oa mM+hlk esa fLFkr gSa A fofHkUUk df"k foKku dsUnzksa us 15 fo"k;ksa ij vk/kkfjr dqy 1381 iz{ks= ijh{k.k vk;ksftr dj dqy 7911 rduhdksa dk eY;kadu fd;k A vkdM+s n'kkZrs gSa fd vkSlru 13-8 iz{ks= ijh{k.k izfr dsUnz gqvk tcfd jkT; Lrj ij ;g dze'k% 15-8] 8-0 vkSj 14-5 e/; izns'k] NRrhlx<+ ,oa mM+hlk esa jgk A

blh vpy ds df"k foKku dsUnzksa }kjk fofHkUu frygu] nygu] vukt] lCth] uxnh] df"k okfudh vkSj dnUu QIyksa ij dqy 14003 vfxze iafDr izn'kZu vk;ksftr fd;s x;s tks fd Hkkxksa ij 6587-868 gsDVs;j {ks= ij Fkk A blds vykok vU; vkneh lHtu dju okyh m/kekss tSls esgxh ikyu] cdjh ikyu] cRr[k ikyu] df"k lq;=] e'k#e] oehZ dEikLV ds vUrxZr dqy 1604 izn'kZu yxk;s x;s A vkdM+ksa ls Kkr gqvk fd mUur izkS|ksfxdh o lefdr ik"k.k izca/ku us mit o`f} esa lokZPp ;ksxnku fd;k tcfd df"k lq;= ,oa QIl izca/ku dze'k% nqljs ,oa rhljs LFkku ij jgs A

df"k foKku dsUnzksa }kjk dqy 7206 izf'k{k.k dk;Zdze vk;ksftr fd;s x;s ftlls 174775 izf'k{k.kkFkhZ ykHkkfUor gq, ftlesa d"kd ,oa efgyk,a] xzkfe.k ;qod] ,oa izlkj dk;ZdrkZ 'kkfey Fks A vkdM+s n'kkZrs gSa fd bu izf'k{k.kkfFkZ;ksa esa iq#"k o efgyk,a ,oa lkekU; ,oa vuqlfpr tkfr@tutkfr dh Hkkxhnkjh lrk"ktud jgh A blds vykok izlkj funs'kky;ksa }kjk dqy dk;Zdze ,oa tkuy bdkbZ }kjk 14 dk;Zdze vk;ksftr vk;ksftr fd;s x;s tks fd lcfU/kr fo"k; fo'k"kKksa ,oa vU; dekpkfj;ksa gsrq vk;ksftr Fkk A

d"kdksa }kjk rduhdksa dks foLrkj #i ls vxhdr djus ds fy, dqy 51406 izlkj dk;Zdze vk;ksftr fd;s x;s ftlesa eq[;r% fdlku fnol ¼768½] fdlku esyk ¼184½] izn'kuh ¼338½] fQYe ¼1882½] bR;kfn 'kkfey Fks ftlds }kjk 1006163 d"kdksa }kjk 22349 foLrkjdehZ ykHkkfUor gq, A

df"k foKku dsUnzksa }kjk dqy 20727-16 dqUry xq.koRrkiw.kZ cht mRiknu ,oa 2547658 jksi.k oLrq,a fd;s x;s A tku esa dqy 140 oSKkfud lykgdkj lfefr dh cBd vk;ksftr fd xbZ 377 lekpkj if=dk]109 'kks/k i= ,oa 329 ykdfiz; ys[k izdkf'kr dh xbZ A

df"k foKku dsUnzksa }kjk feV~Vh ,oa ty ds ueus dk ijh{k.k Hkh fd;k tkrk gS ftlesa vUrxZr 25146 feV~Vh ,oa 639 ty ds ueus dk ijh{k.k fd;k x;k ftlls 95 xkoksa ds 21000 fdlku लाभान्वित हुएA

tku esa fdlkuksa ds lkFk vFkd iz;kl ls df"k foKku dsUn]>kcqvk dks lokZRre tkuy d- oh- d- ,oa Ñ"kd dks txthou jke iqjLdkj feykA blds vykok funs'kky; ds nks ofj"B oSKkfudksa dks Hkh ;qok oSKkfud iqjLdkj ls vyaÑr fd;k x;kA

1. Introduction

Zonal Project Directorate, Zone VII was upgraded in March 2009 which was earlier known as Zonal Coordinating Unit. It was established on 11th September 1979 by ICAR in the campus of Jawaharlal Nehru Krishi Vishwa Vidyalaya at Jabalpur, Madhya Pradesh. The Directorate coordinate, monitor and evaluate the mandated activities of 100 KVKs spread across the three states namely Madhya Pradesh, Chhattisgarh and Odisha. Zonal Project Directorate, Zone VII performs following major activities:

- To formulate, implement, monitor and evaluate programmes organized by Krishi Vigyan Kendras.
- To coordinate project related work of various agencies such as State Agricultural Universities (SAUs), ICAR institutes, Voluntary Agencies and Development Departments.
- To serve as feedback point for research and extension systems.
- To maintain liaison with research and extension institutions.
- To coordinate agri-based schemes for successful implementation and better convergence with State/Central Government departments.

1.1 Particulars of KVKs in Zonal Project Directorate VII

Zonal Project Directorate monitors the activities of 100 KVKs in the three states namely Madhya Pradesh, Chhattisgarh and Odisha. The details are as follows:–

Table 1.1: KVKs across the three state in the Zone VII

Name of State	No of Districts	Details of KVK			
		SAU	NGO	ICAR	Total
Chhattisgarh	27	20	0	0	20*
Madhya Pradesh	50	39	07	01	47
Odisha	30	31	0	02	33**
Total	**107**	**90**	**7**	**3**	**100**

Note: *Including two additional KVKs in larger districts; ** Including three additional KVKs in larger districts
SAU - State Agricultural University; **NGO -** Non-Governmental Organization; **ICAR** - Indian Council of Agricultural Research.

Krishi Vigyan Kendra

Realizing the importance of dissemination of technological information in the changing scenario of food and nutritional security, Indian Council of Agricultural Research made an institutional innovation in the form of KVK. It was also envisaged that technology assessed by the KVK will act as model for the line departments and act as a catalyst to improve the existing systems for better delivery mechanism. For proper functioning, great emphasis was given on the strengthening the physical and human infrastructure of KVKs. The name of the host institution managing the KVKs is given in Table 1.2.

Mandate of KVK

Assessment, refinement and demonstration of technology/products.

Activities of KVK

- On farm testing to identify the location specificity of technologies in various farming systems
- Frontline demonstrations to establish production potentials of newly released technologies on farmers' fields and provide feedback
- Training of farmers and farmwomen to update their knowledge and skills in modern agricultural technologies and training of extension personnel to orient them in the frontier areas of technology development
- Work as knowledge and resource centre of agricultural technology for supporting initiatives of public, private and voluntary sector for improving the agricultural economy of the district
- Create awareness about frontier technologies through various extension activities like Farmer fair, Field day, Strategic campaign, Ex-trainees meet, etc.
- The seed and planting materials produce by the KVKs also be made available to the farmers

Table 1.2: Institutional set-up for operational KVKs under ZPD Zone VII.

S No.	Host Institution	No. of KVKs
1.	**Madhya Pradesh**	**47**
	Jawaharlal Nehru Krishi Vishwa Vidhyalaya, Jabalpur	20
	Rajmata Vijyaraje Scindhia Krishi Vishwa Vidhyalaya, Gwalior	19
	Central Institute of Agricultural Engineering, ICAR, Bhopal	1
	Deen Dayal Research Institute, Chitrakut, Satna	1
	Kasturaba Gandhi National Memorial Trust , Indore	1
	Lok Mata Devi Ahilyabai Holkar Social National Mission, Burhanpur	1
	Kallukheda shikhcha Samiti, Jaora, Ratlam	1
	Deen dayal Krishi Vikas Awam Anusandhan Samiti (DKVAAS) Bhopal	1
	Centre for Rural Development and Environment, Sehore	1
	Shri Malwa Mahila Vikas Samiti, Sironj, Vidisha (sub-judice)	1
2.	**Chhattisgarh**	**20**
	Indira Gandhi Agricultural University, Raipur	20
3.	**Odisha**	**33**
	Odisha University of Agricultural & Technology, Odisha	31
	Central Rice Research Institute, ICAR, Cuttack	1
	Central Institute of Freshwater Aquaculture, ICAR, Bhubneswar	1

The KVKs have sanctioned staff strength of 16 members. The current staff position in KVKs of Zone-VII is given in Table 1. 3. Around 61 per cent posts are filled while remaining

39 per cent are vacant. The percentage of vacant posts is comparatively higher in case technical and administrative category.

Table 1.3: Staff position in KVKs under Zone-VII as on March, 2013

S. no.	State	No. of KVK	PC (1)		SMS (6)		PA (3)		Admn. (6)		Total	
			Sanc.	Filled	Sanc.	Filled	Sanc.	Filled	Sanc.	Filled	Sanc.	Filled
1	Madhya Pradesh	47	47	29	282	178	141	90	282	151	752	448
2	Chhattisgarh	20	20	13	120	98	60	38	120	72	320	221
3	Odisha	33	33	30	198	130	99	62	198	132	528	354
Total		**100**	**100**	**72**	**600**	**406**	**300**	**190**	**600**	**355**	**1600**	**1023**

The details of budgetary information of KVKs in Zonal Project Directorate VII, is given Table 4

Table 1.4: Budgetary information (in Lac) of KVKs and Zonal Project Directorate VII (2012-13)

S. no.	State	Budget Estimate	Revised Estimate	Total Release	Actual Expenditure
1	Madhya Pradesh	3569.00	2897.99	2897.99	2897.66
2	Chhattisgarh	946.95	937.45	937.45	937.45
3	Odisha	1743.05	1720.56	144.00	1708.95
4.	ZPD, Zone VII	108.00	144.00	144.00	138.66
Total		**6367**	**5700**	**4123.44**	**5682.72**

The details of status of infrastructure facilities in KVKs under Zone-VII are given in Table 1.5.

Table 1.5: Status of infrastructure facilities in KVKs under Zone-VII

S. no.	State	No. of KVKs	Admn. Building			Trainees Hotel			Staff Quarters		
			Completed	In progress	NA	Completed	In progress	NA	Completed	In progress	NA
1	Madhya Pradesh	47	32	11	4	36	8	3	34	10	3
2	Chhattisgarh	20	15	0	5	10	0	10	6	0	14
3	Odisha	33	27	0	6	27	0	6	22	0	11
Total		**100**	**74**	**11**	**15**	**73**	**8**	**19**	**62**	**10**	**28**

Note:- NA= Not available

1.2 Agro-climatic Zones (ACZ) in Zonal Project Directorate, Zone VII

Zonal Project Directorate, Zone VII is having 107 rural districts under its jurisdiction, out of which 100 districts have been covered by KVK. The coverage of KVKs under different agro-climatic zones is as given below.

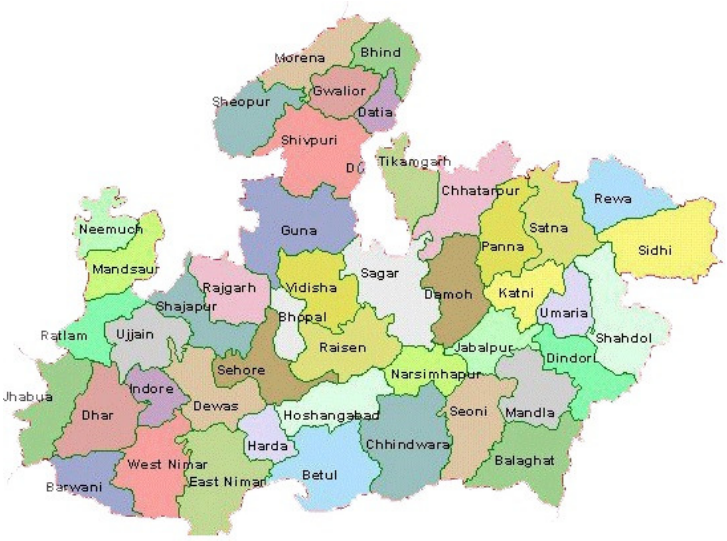
Table 1.6: Agro-climatic Zones under Zone-VII

State	Agroclimatic Zones (ACZ)	KVK	No. of KVKs
M.P.	Chhattisgarh Plain	Balaghat	01
	North Hills of Chhattisgarh	Shahdol, Umaria, Dindori , Mandla	04
	Bundelkhand Region	Datia, Tikamgarh, Chattarpur	03
	Gird Zone	Guna, Gwalior, Morena, Ashoknagar, Shivpuri, Sheopur, Bhind	07
	Kymore Plateau	Satna, Sidhi, Seoni, Jabalpur, Katni, Panna, Rewa	07
	Jhabua Hills	Jhabua	01
	Malwa Plateau	Indore, Dhar, Dewas, Shajapur, Ujjain, Mandsaur, Ratlam, Rajgarh, Neemach	09
	Nimar Valley	Khandwa, Khargone, Badwani, Burhanpur	04
	Satpura Plateau	Chhindwara, Betul	02
	Vindhya Plateau	Sehore, Bhopal, Raisen, Sagar, Damoh, Vidisha	06
	Central Narmada Valley	Narsinghpur, Hoshangabad, Harda	03
Total	**11 ACZs**		**47**
CG	Chhattisgarh Plain	Bilaspur, Durg, Raipur, Raipir-II, Raigarh, Dhamtari, Jangir-Champa, Mahasamund, Korba, Kanker, Rajnandgaon, Kabirdham	12
	Bastar Plateau	Baster, Dantewada, Bijapur, Narayanpur	04
	North Hills of Chhattisgarh	Surguja, Jashpur, Koria, Surguja-II	04
Total	**3 ACZs**		**20**
Odisha	East and South Eastern Coastal Plain	Cuttack, Jagatsinghpur, Kendrapara, Khurda, Nayagarh,Puri	06
	Eastern Ghat High Land	Koraput,Navarangpur	02
	Mid Central Table Land Zone	Angul,Dhenkanal	02
	North Central Plateau	Keonjhar, Mayurbhanj, Mayurbhanj-II	03
	North Eastern Coastal Plain	Balasore, Jajpur,Bhadrak	03
	North Eastern Ghat	Ganjam, Ganjam-II, Kandhamal, Gajapati, Rayagada	05
	North Western Plateau	Sundergarh, Sundergarh-II, Deogarh	03

State	Agroclimatic Zones (ACZ)	KVK	No. of KVKs
	Zone		
	West Undulating Zone	Kalahandi, Nuapada	02
	Western Central Table Land Zone	Bargarh, Jharsuguda, Sambalpur, Boudh Sonepur, Bolangir	06
	South Easterm Ghat	Malkangiri	01
Total	**10 ACZs**		**33**

1.3 Description of the states under Zonal Project Directorate, Zone VII

Madhya Pradesh



There are 50 districts and 11 different agro-climatic zones in the state. The total geographical area of Madhya Pradesh is 30,825 thousand hectare of which 48.57 per cent i.e. 14972 thousand ha is being cultivated out of which 6,449 thousand ha is cultivated more than once. Around 28 per cent of total geographical area is covered by forest in the state. The economy of state is predominantly based on rainfed agriculture (only 1/3rd of gross cropped area is being irrigated) and the major crops are paddy, wheat, maize and sorghum among cereals, chickpea, pigeon pea, black gram and green gram among pulses, soybean, groundnut and mustard among oilseeds and cotton and sugarcane among commercial crops. Horticulture crops like potato, onion, garlic, including fruits like papaya, banana, oranges, mango and grapes are also grown in the state of Madhya Pradesh. In some parts of the state medicinal crops and narcotic crops are also cultivated. As per 2010-11 statistics, country's 25.84 per cent oilseeds, 18.74 per cent pulses and 8.88 per cent wheat are being produced in Madhya Pradesh. Livestock contributes around 24 per cent to the total value of output from agriculture and allied sector. The state is poised for a breakthrough in soybean cultivation. As per CSO estimates, the Gross State Domestic Product (at current prices) during 2011-12 was Rs. 2,59,90,341 lakh, of which Rs. 63,88,289 lakh (24.58%) is coming from agriculture (CSO, 2012). In the state Kharif crops occupy 60 per cent and Rabi crops 40 per cent area with 71.4 per cent area under food grain production. The agriculture of the state is characterized as small holder agriculture (average size of holding is 2.02 ha) and nearly 29.16 per cent of total 15060557 holdings are small (< 2 ha) where the dissemination of

modern agricultural technologies like farm mechanization is challenging task. As per 2004-05 poverty census, around 37 per cent of total rural population is Below Poverty Line in the state. Low literacy (35.45 per cent), undulating topography, large waste land (13.2%), under developed irrigation potential (23%), low ground water utilization, large proportion of rain fed agriculture (75%), practice of Kharif fallows (3.6%), low cropping intensity (143 %), low fertilizer consumption (50 kg/ha), high proportion of low value crops, and high population of low productive live stock are the major constraints of the state. There are 47 KVKs in the state.

Chhattisgarh

Chhattisgarh State comprises of 27 (including 9 newly created districts) districts divided into three agro-climatic zones. It is spread in 13,519 thousand hectares with a gross cropped area of 5,561 thousand ha. Chhattisgarh state is well known for its minerals and tribal culture. Out of the three Agro-climatic Zones of state viz. Chhattisgarh Plains, Bastar Plateau and Northern Hills, the last two zones are dominated by tribal population. In the state, 40.80 per cent of total rural population is Below Poverty Line. The state is endowed with varied soil types, surplus electricity and farmable agro-ecological conditions. The Gross State Domestic Product of state is Rs.1,35,53,634 lakh out of which 19.83 per cent is contributed by agriculture and allied sector. Around 47 per cent of total geographical area is covered by forest in the state which contributes 19 per cent of total value of output from agriculture and allied. About 74 per cent area of Chhattisgarh plains, 97 per cent of Bastar plateau and 95 per cent in Northern Hills are rainfed. The average annual rainfall of the state is 1200-1400 mm. Rice is the main crop grown in about 37 lakh ha area, which covers 78 per cent of net sown area. The next important crops are pulses followed by minor millets, oilseeds and maize. Chhattisgarh state contributes 4.47 per cent of total rice production of the country, while the contribution of maize is 1.35 per cent for the country. It is a mono cropped area with meager irrigation facilities. The cropping intensity of the region is 135 per cent. The average size of holding is 1.51 ha and 35.87 per cent of total holdings area small (< 2 ha) in the state. Fishery

contributes 4.38 per cent to GSDP in the state and there is lot of scope in fish production in the state.

The livestock population of the state is 1.28 crore out of which, 1.01 crore are cattle. Also 60.3 lakh poultry is available in the state. The fish production in the state reaches to about 1.0 Lakh Mt. There are 20 Krishi Vigyan Kendra is working in the state and all are under the administrative control of Indira Gandhi Krishi Vishwavidyalaya, Raipur.

Odisha

The state covers an area of 15,571 thousand ha having 30 administrative districts and 51639 villages. The state is divided into four physiographic divisions and 10 Agro-climatic zones. The Gross State Domestic Product of Odisha during 2011-12 was Rs. 2,26,23,614 lakh. Agriculture is the mainstay of State's economy and substance of life for the people. Agriculture and allied sectors contribute Rs. 41,69,668 lakhs which accounts around 18.43 per cent of GSDP. Crop sector is major component accounting 64.34 per cent to the total value of output from agriculture and allied followed by livestock (17.23 %) and forestry (12.44 %). Fishery contributes considerably i.e. 6 per cent to the total value of output from agriculture. The average size of holding in state is 1.15 ha and 58.36 per cent of total holdings (50,19,476) are small. The state has tropical climate, characterised by high temperature, high humidity, medium to high rainfall and short and mild winters. The normal rainfall of the State is 1,451.2 mm. Flood, drought and cyclone occurs regularly with varying intensity. Due to frequent occurrence of these natural calamities, there is always reduction in the yield of Kharif rice, the major crop of the State. Similarly, in drought years, there is considerable loss in production of pulses and oilseeds both during Kharif and Rabi.The major crops of state are paddy, blackgram, green gram, groundnut, etc. As per 2004-05 poverty census, 46.8 per cent of total population live Below Poverty Line in the state. There are 33 KVKs in the state of which 31 are under the administrative control of OUAT, Bhubaneshwar and rest two are under the control of ICAR institutes.

1.4. Thrust Areas for the KVKs under Zonal Project Directorate VII

The thrust areas identified for the KVKs are mentioned below:-

i. Sustainable production system through location-specific assessment and demonstrations of technology.
ii. Resource conservation through watershed management, soil and water conservation and proper farm mechanization.
iii. Development and promotion of crop and enterprise diversification and alternate land use system.
iv. Integrated pest and disease management.
v. Promoting rural entrepreneurship in livestock, goatery, poultry, fishery, mushroom, etc. by production, processing, value addition and marketing for higher income.
vi. Empowerment of farmwomen and youth through income generating activities and reduction of drudgery.
vii. Alternate livelihood support system for marginal, landless labour and farmwomen to check rural migration.

2. Technology Assessment through On-Farm Testing

The claimed superiority of location specific technologies were tested by KVKs through On-Farm Testings (OFTs) and the numbers of technologies tested as well as trials are given in below mentioned tables. Overall 1,381 technologies were tested in the zone through 7911 different trials (Table 2.1) of which 995 were on crops, 386 on different enterprises like livestock, fishery, mushroom, etc and 75 on different aspects of women empowerment like drudgery reduction, nutritional security, value addition, etc. The highest number of technologies were tested in the state of Madhya Pradesh (744) followed by Odisha (477) and Chhattisgarh (160) as the number of KVKs are also in the same order. The average numbers of technologies tested per KVK are given presented in Figure shows that overall in the Zone 13.8 technologies were tested by each KVK. Average numbers of technologies tested per KVK were ranged from nearly 8 in the state of Chhattisgarh to around 15.8 in the state of Madhya Pradesh.

Table 2.1: State wise overall technology assessed during 2012-13

State	No. of technology assessed	No. of Trials
Madhya Pradesh	744	4217
Chhattisgarh	160	720
Odisha	477	2974
Total	**1381**	**7911**

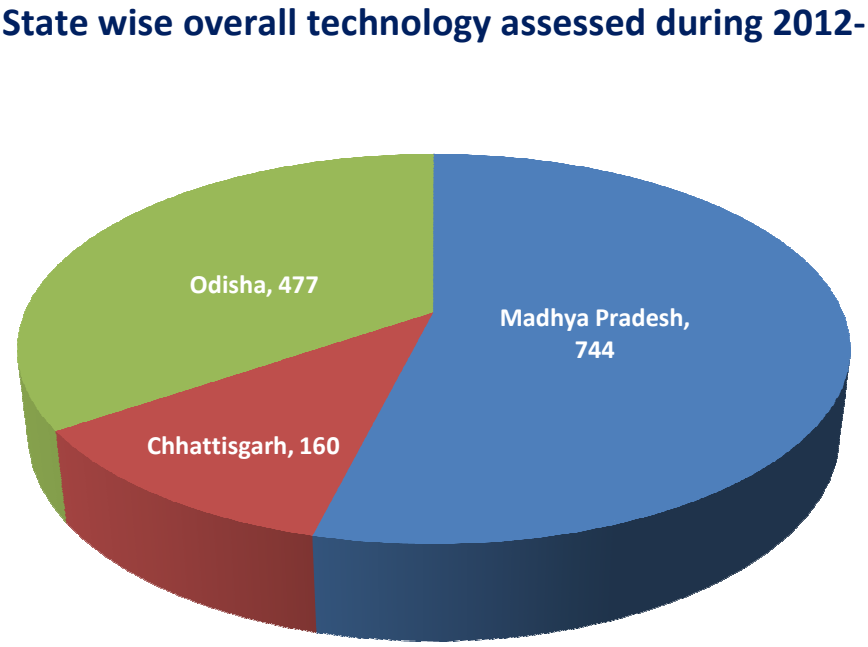


Table 2.2: Category wise OFTs conducted on crops

Crop Category	No of technology assessed	No of Trials
CEREAL	257	1408
FIBRE	11	65
FLOWER	16	86
FODDER	4	20
FORESTRY	4	15
FRUIT	34	183
MEDICINAL	7	37
MILLET	11	55
OILSEED	131	692
PLANTATION	4	32
PULSE	151	814
SPICE	131	706
SUGAR	8	44
TUBER	27	148
VEGETABLE	199	1103
Total	**995**	**5408**

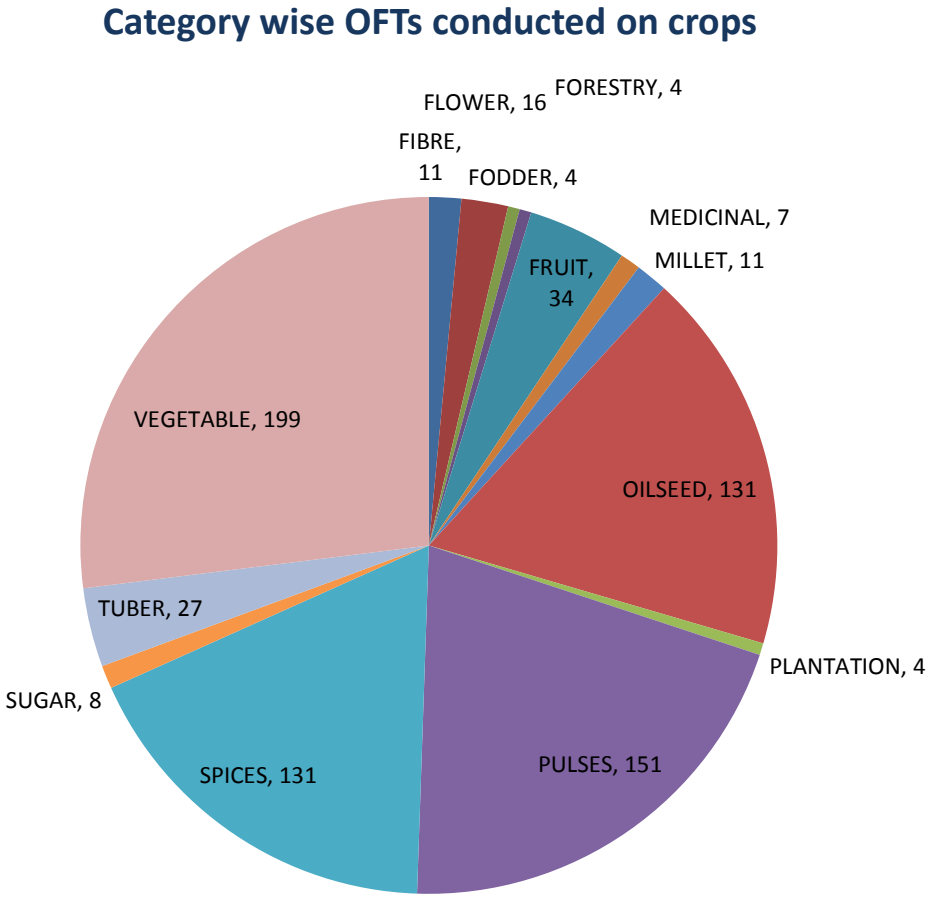


Table 2.3: Thematic Area wise OFTs conducted on crops

Thematic area	No of technology assessed	No of trails
INTEGRATED CROP MANAGEMENT	28	164
INTEGRATED DISEASE MANAGEMENT	107	547
INTEGRATED FARMING SYSTEM	16	74
INTEGRATED NUTRIENT MANAGEMENT	204	1144
INTEGRATED PEST MANAGEMENT	140	751
INTEGRATED PLANT NUTRIENT MANAGEMENT	8	40
FORESTRY	4	20
RESOURCE CONSERVATION TECHNOLOGY	42	242
VARIETAL EVALUATION	343	1873
WEED MANAGEMENT	92	491
NEW CROP INTRODUCTION-HOV	1	5
OTHERS (Nursery management etc.)	10	57
TOTAL	**995**	**5408**

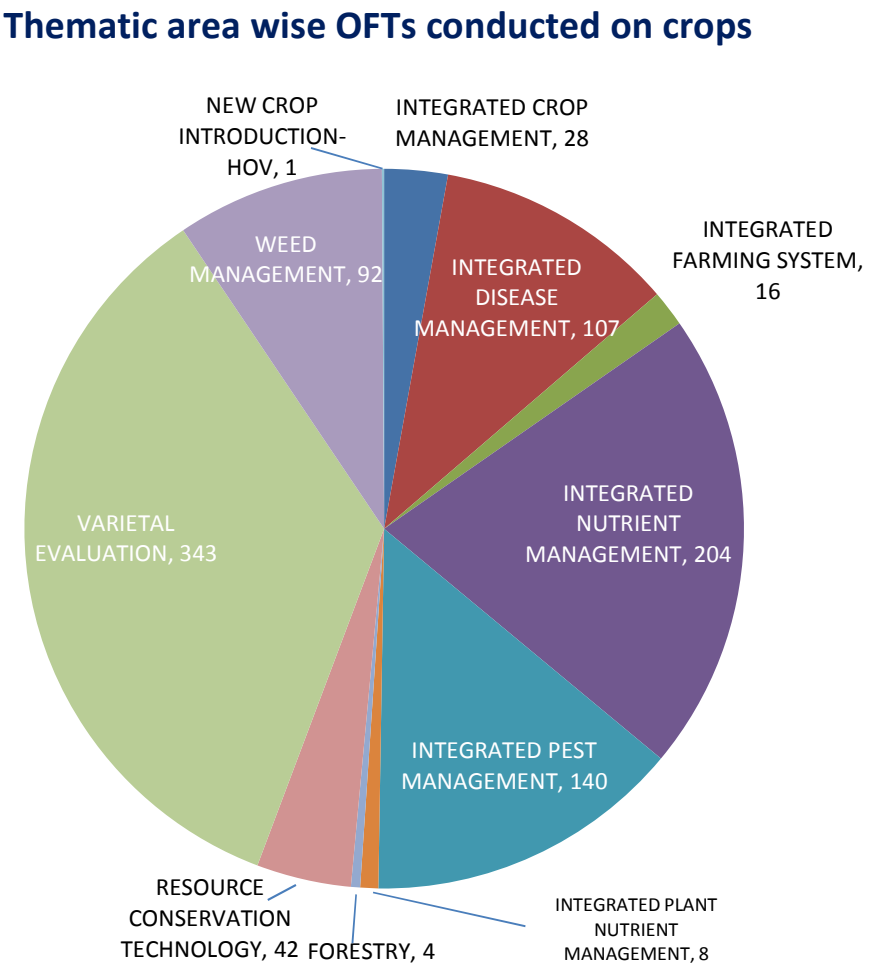
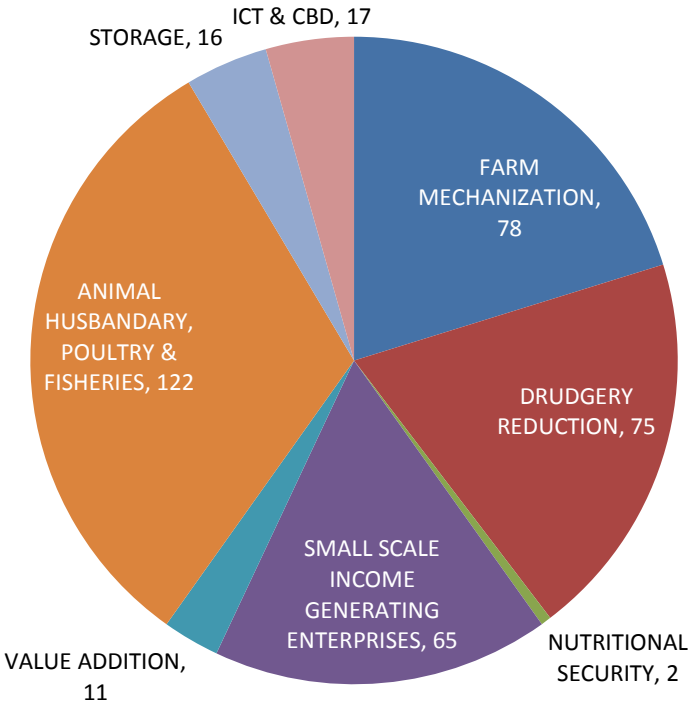


Table 2.4: Thematic area wise number of technologies assessed on enterprises

Thematic Area	No of Technologies	No of Trials
FARM MECHANIZATION	78	401
DRUDGERY REDUCTION	75	575
NUTRITIONAL SECURITY	2	7
SMALL SCALE INCOME GENERATING ENTERPRISES	65	413
VALUE ADDITION	11	51
ANIMAL HUSBANDARY, POULTRY & FISHERIES	122	813
STORAGE	16	73
ICT & CBD	17	170
Total	**386**	**2503**

Thematic Area wise OFTs conducted on Enterprises



Some of the important technologies assessed by KVKs after diagnosing the problems of the area in different sub-heads with major results are given below:

Varietal evaluation

Varietal assessment in Hybrid Paddy

Problem identified: Low yield of hybrid paddy due to use of low yield potential varieties
Technology Assessed: Assessment of improved variety of hybrid paddy JRH 19

Among the various factors responsible for low productivity of hybrid paddy at farmers' field, use of seeds of low potential varieties is most important. With the use of improved variety, the productivity of the crop can be increased. Keeping this in view, KVK Balaghat, Jabalpur, Seoni and Shahdol of Madhya Pradesh planned and conducted on farm trials to assess the performance of the improved variety JRH 19 of hybrid paddy. The results showed that the yield of this variety was 54.83 per cent higher over the farmers' low potential varieties. The number of effective tillers per plant was recorded higher by 125.27 per cent. The net return and BC ratio was found Rs 20084 per ha and 0.57 more with this variety as compared to the farmers low potential variety, respectively. The variety gave very good performance in rainfed situation.

Table: Performance of improved hybrid paddy variety JRH 19

Details	No. of trials	Yield (q/ha)	No. of effective tiller/plant	Net Return (Rs/ha)	BC Ratio
Low yield potential hybrids (Farmers' practices)	15	38.37	9.10	31297	2.69
Improved hybrid paddy variety JRH 19 (Recommended practice)		59.41	20.50	51381	3.26

Problem identified: Low yield due to use of local/unidentified varieties
Technology Assessed: Assessment of improved variety of hybrid paddy *Ajaya*

Use of seeds of local/unidentified varieties is most important among the various factors responsible for low productivity of hybrid paddy at farmers' field,. With the use of improved variety, the productivity of the crop can be increased. Keeping this in view, KVK Cuttuck, Ganjam-I, and Nayagarh of the zone planned and conducted on farm trials to assess the performance of the improved variety 'Ajaya' of hybrid paddy. The results showed that the yield of this variety was 41.82 per cent higher over the farmers' local/unidentified varieties. The number of effective tillers per plant was recorded higher by 50 per cent. The net return and BC ratio was found Rs 16317 per ha and 0.47 more with this variety as compared to the farmers local variety, respectively. The variety gave very good performance in rainfed situation.

Table: Performance of improved hybrid paddy variety Ajaya

Details	No. of trials	Yield (q/ha)	No. of effective tiller/plant	Net Return (Rs/ha)	BC Ratio
Local/unidentified hybrids (Farmers' practices)	24	43.69	18	19697	1.70
Improved hybrid paddy variety Ajaya (Recommended practice)		61.96	27	36014	2.17

Varietal assessment in Paddy

Problem identified: Low yield due to use of local varieties Bhata and Sathia

Technology Assessed: Assessment of improved variety of paddy Indira Barani Dhan 1

Among the various factors responsible for low productivity of paddy at farmers' field, use of seeds of local/unidentified varieties is most important. With the use of improved variety the productivity of the crop can be increased. Keeping this in view, KVK Koria, Raipur, Rajnandgaon and Shahdol of the zone planned and conducted on farm trials to assess the performance of the improved variety Indira Barani Dhan 1 of paddy. The results showed that the yield of this variety was 20.55 per cent higher over the farmers' local varieties. The number of panicles per m^2 was recorded higher by 2.38 per cent. The net return and BC ratio was found Rs 5422 per ha and 0.18 higher with this variety as compared to the farmers local variety, respectively. The variety gave very good performance in rainfed situation.

Table: Performance of improved hybrid paddy variety Indira Barani Dhan 1

Details	No. of trials	Yield (q/ha)	No. of panicles/m^2	Net Return (Rs/ha)	BC Ratio
Local varieties Bhata and Sathia (Farmers' practices)	24	25.25	210	20351	2.10
Improved paddy variety Indira Barani Dhan 01 (Recommended practice)		30.44	215	25773	2.28

Problem identified: Low yield due to use of medium duration variety Swarna due to moisture stress during dry spell in rainfed condition

Technology Assessed: Assessment of improved variety of paddy Sahbhagi

Use of of unappropriate varieties for rainfed situations is most important among the various factors responsible for low productivity of paddy at farmers' field. With the use of improved early variety, the productivity of the crop can be increased. Keeping this in view, KVK Devgarh, Nuapada, and Rayagarda of the zone planned and conducted on farm trials to assess the performance of the improved early variety Sahbhagi of paddy. The results showed that the yield of this variety was 40.13 per cent higher over the farmers' local varieties. The number of effective tillers/plant was recorded higher by 33.33 per cent. The net return and BC ratio was found Rs 8857 per ha and 0.33 additional with this variety as compared to the farmers variety Swarna, respectively. The variety gave very good performance in rainfed situation.

Table: Performance of improved hybrid paddy variety Sahbhagi

Details	No. of trials	Yield (q/ha)	No. of effective tiller/plant	Net Return (Rs/ha)	BC Ratio
Medium duration variety Swarna under rainfed situation (Farmers' practices)	20	30.4	10.5	14183	1.56
Improved early paddy variety Sahbhagi (Recommended practice)		42.6	14	23040	1.89

Varietal assessment in Soybean

Problem identified: Low yield of soybean due to use of medium duration variety
Technology Assessed: Assessment of soybean variety JS 95-60

KVK Bhopal, Hoshangabad, Khargone, and Sagar conduced on farm trial to assess the performance of soybean variety JS 95-60. The results of the assessment showed that the variety gave 38.03 per cent higher production over the old variety JS 335/medium duration variety JS 93-05 (95 days). The pods per plant were also increased by 58.72 per cent. The economic analysis showed that the net return is Rs 8698 per ha additional with this variety. This variety is largely adopted by the farmers due to its extra early maturity (85 days).

Table - Performance of soybean variety JS 95-60

Details	No. of trials	Yield (q/ha)	No. of pods/plant	Net Return (Rs/ha)	BC Ratio
Soybean variety JS 335/ JS 93-05 (Farmers' practices)	23	9.94	34.35	12876	2.42
Soybean variety JS 95-60 (Recommended practice)		13.72	54.52	21574	2.92

Varietal assessment in Sweet corn

Problem identified: Less income due to cultivation of traditional maize varieties
Technology Assessed: Assessment of sweet corn variety Sugar 75

Looking the less income due to cultivation of traditional maize varieties. KVK Badwani and Bolangir conduced on farm trial to assess the performance of sweet corn variety Sugar 75. The results of the assessment showed that the variety, however, yielded 8.41 per cent lower production of number of green cobs/ha over the traditional maize varieties, but the income increased due to its higher price. The unit cob weight also decreased by 20 per cent. The economic analysis showed that the net return and BC ratio is Rs 89250 and 2.14 per ha additional with this variety. This variety is getting popular among the farmers due to its higher profit per unit area.

Table - Performance of sweet corn variety Sugar 75

Details	No. of trials	Unit cob weight (gram)	No. of green cobs/ha	Net Return (Rs/ha)	BC Ratio
Maize traditional varieties (Farmers' practices)	10	250	54700	78050	4.25
Sweet Corn variety Sugar 75 (Recommended practice)		200	50100	167300	6.39

Varietal assessment in Wheat

Problem identified: Low yield of wheat due to use of old varities like – Lok 1

Technology Assessed: Assessment of improved variety of wheat JW 3211 in semi-irrigated condition

Among the various factors responsible for low productivity of wheat at farmers' field, use of seeds of local/ old varieties is most important. With the use of improved variety, the productivity of the crop can be increased. Keeping this in view, KVK Hoshangabad, Sagar and Sidhi of the zone planned and conducted on farm trials to assess the performance of the improved variety JW 3211 of wheat. The results showed that the yield of this variety was 36.53 per cent higher over the farmers' local variety Lok 1. The number of effective tillers per plant was recorded higher by 55.21 per cent. The net return and BC ratio was found Rs 11,829 per ha and 0.42 additional with this variety as compared to the farmers variety Lok 1, respectively. The variety gave very good performance in semi-irrigated situation.

Table: Performance of improved wheat variety JW 3211

Details	No. of trials	Yield (q/ha)	No. of effective tiller/plant	Net Return (Rs/ha)	BC Ratio
Wheat variety Lok 1 (Farmers' practices)	15	26.06	7.1	26830	3.07
Improved wheat variety JW 3211 (Recommended practice)		35.58	11.02	38659	3.49

Problem identified: Low yield of wheat due to use of old varieties like – Lok 1

Technology Assessed: Assessment of improved variety of wheat MP 1203

With the use of improved variety, the productivity of the crop can be increased. Keeping this in view, KVK Gwalior, Khargone, Surguja and Shajapur of the zone planned and conducted on farm trials to assess the performance of the improved variety MP 1203 of wheat. The results showed that the yield of this variety was 25.37 per cent higher over the farmers' local variety Lok 1. The number of panicles/m^2 was recorded higher by 41.57 per cent. The net return and BC ratio was found Rs 12,841 per ha and 0.34 additional with this variety as compared to the farmers variety Lok 1, respectively. The variety gave very good performance in irrigated situation.

Table: Performance of improved wheat variety MP 1203

Details	No. of trials	Yield (q/ha)	No. of panicles /m^2	Net Return (Rs/ha)	BC Ratio
Wheat variety Lok 1 (Farmers' practices)	20	38.67	178	36701	2.92
Improved wheat variety MP 1203 (Recommended practice)		48.48	252	49542	3.26

Varietal assessment in Mustard

Problem identified: Low yield of mustard due to use of old/traditional varieties
Technology Assessed: Assessment of improved variety of mustard Puas Tarak

Important reason behind the low production of mustard is use of seeds of local/ old varieties among the various factors responsible for low productivity. With the use of improved variety, the productivity of the crop can be increased. Keeping this in view, KVK Neemuch, Seoni and Shahdol of the Madhya Pradesh conducted on farm trials to assess the performance of the improved variety Pusa Tarak of mustard. The results showed that the yield of this variety was 56.85 per cent higher over the farmers' old variety. The number of siliqua/plant was recorded higher by 32.51 per cent. The net return and BC ratio was found Rs 14,756 per ha and 0.77 additional with this variety as compared to the farmers old / traditional variety, respectively. The variety gave very good performance in semi-irrigated situation.

Table: Performance of improved mustard variety Pusa Tarak

Details	No. of trials	Yield (q/ha)	No. of siliqua/plant	Net Return (Rs/ha)	BC Ratio
Mustard old/traditional variety (Farmers' practices)	15	11.89	203	23127	2.45
Improved mustard variety Pusa Tarak (Recommended practice)		18.65	269	37883	3.22

Varietal assessment in chickpea

Problem identified: Low yield of chickpea due to use of *dollar* chickpea old varieties
Technology Assessed: Assessment of chickpea variety PKV 4

Various biotic & abiotic factors are responsible for the low yield of chickpea including pest and disease infestation. These are associated with the variety grown also. Farmers are using local *dollar* varieties which are mainly responsible for the low yield. KVK Dewas, Dhar, Indore, Ratlam, and Sehore conducted on farm trial to assess the performance of the improved variety PKV 4. The results showed that the yield of this variety was 30.24 per cent higher over the farmers' variety. The number of pods per plant was also increased by 16.14 per cent. Similarly the net return and BC ratio was also found to be higher by Rs 9,296 and 0.37 with this variety. The variety gave very good performance due to having tolerance to major pests and diseases.

Table: Performance of chickpea variety PKV 4

Details	No. of trials	Yield (q/ha)	Pods/plant	Net Return (Rs/ha)	BC Ratio
Dollar old varieties (Farmers' practices)	26	11.44	33.2	31160	2.51
Improved variety PKV 4 (Recommended practice)		14.90	38.56	40456	2.88

Problem identified: Low yield of chickpea due to use of local/old veriety JG 315
Technology Assessed: Assessment of chickpea variety JG 14

Yield of chickpea influenced by several factors like use of local/old variety, mixed seed, pest and disease infestation. These are associated with the variety grown also. Farmers are using local/old varieties which are mainly responsible for the low yield. KVK Jabalpur, Rewa and Satna conducted on farm trials to assess the performance of the improved variety JG 14. The results showed that the yield of this variety was 26.78 per cent higher over the farmers' variety. The number of pods per plant was also increased by 49.12 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 9,030 and 0.26 with this variety. The variety gave very good performance due to having tolerance to major pests and diseases.

Table: Performance of chickpea variety JG 14

Details	No. of trials	Yield (q/ha)	Pods/plant	Net Return (Rs/ha)	BC Ratio
Local/old varieties like – JG 315 (Farmers' practices)	22	13.74	79.6	26820	2.65
Improved variety JG 14 (Recommended practice)		17.42	118.7	35850	2.91

Problem identified: Low yield of chickpea due to use of local/old veriety JG 315
Technology Assessed: Assessment of chickpea variety JG 11

Farmers are using local/old varieties which are mainly responsible for the low yield. KVK Balaghat, Narayanpur and Tikamgarh conducted on farm trials to assess the performance of the improved variety JG 11. The results showed that the yield of this variety was 31.05 per cent higher over the farmers' variety. The number of pods per plant was also increased by 55.74 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 8,995 and 0.12 with this variety. The variety gave very good performance due to having tolerance to major pests and diseases.

Table: Performance of chickpea variety JG 11

Details	No. of trials	Yield (q/ha)	Pods/plant	Net Return (Rs/ha)	BC Ratio
Local/old varieties like – JG 315 (Farmers' practices)	14	11.08	48.8	21850	2.84
Improved variety JG 11 (Recommended practice)		14.52	76.0	30845	2.96

Varietal assessment in Pigeon Pea

Problem identified: Low yield of pigeon pea due to use of medium duration variety affected by frost during seed setting/maturity

Technology Assessed: Assessment of pigeon pea variety ICPH 2671

Several factors are responsible for the low yield of legumes like pigeon pea associated with the variety grown. Farmers are using medium duration varieties which are usually affected by frost during winter season at the time pod filling/seed setting stage resulting low yield. KVK Dhar, Rewa, Indore, Sehore, Shajapur and Shahdol conducted on farm trial to assess the performance of the improved variety ICPH 2671. The results showed that the yield of this variety was 22.19 per cent higher over the farmers' variety. The number of pods per plant was also increased by 23.59 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 13,657 and 0.68 with this variety. The variety gave very good performance as it escaped from the frost due to early maturity.

Table: Performance of pigeon pea variety ICPH 2671

Details	No. of trials	Yield (q/ha)	Pods/plant	Net Return (Rs/ha)	BC Ratio
Farmers' variety - Asha (Farmers' practices)	30	10.86	203.5	21273	2.50
Improved early variety ICPH 2671 (Recommended practice)		13.27	251.5	34930	3.18

Problem identified: Low yield of pigeon pea due to use of medium duration variety affected by frost during seed setting/maturity

Technology Assessed: Assessment of pigeon pea variety TJT 501

Unlike other legumes, being a long duration crop, several factors are responsible for the low yield of pigeon pea. Farmers are using medium duration varieties which are usually affected by frost during winter season at the time pod filling/seed setting stage resulting low yield. KVK Bhopal, Jabalpur and Raisen conducted on farm trial to assess the performance of the improved variety TJT 501. The results showed that the yield of this variety was 56.85 per cent higher over the farmers' variety. The number of pods per plant was also increased by 34.39 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 17,272 and 1.04 with this variety. The variety performance well in the area, as it escaped from the frost due to early maturity.

Table: Performance of pigeon pea variety TJT 501

Details	No. of trials	Yield (q/ha)	Pods/plant	Net Return (Rs/ha)	BC Ratio
Farmers' variety - Asha (Farmers' practices)	15	10.22	196.3	21865	2.91
Improved early variety TJT 501 (Recommended practice)		16.03	263.8	39137	3.95

Varietal assessment in Cowpea

Problem identified: Low yield of cowpea due to incidence of YMV in Pusa Komal variety
Technology Assessed: Assessment of cowpea variety CP 4

Among the vegetables, Yellow Mosaic Virus (YMV) is a major factor which minimizing the yield of cowpea where old/ local varieties susceptible to YMV are being cultivated. Farmers are using YMV susceptible varieties like Pusa Komal resulting low yield. KVK Bhopal, Jabalpur and Katni conducted on farm trials to assess the performance of the improved variety CP 4. The results showed that the yield of this variety was 42.69 per cent higher over the farmers' variety. The number of pods per plant and length per pod (cm) was also increased by 19.19 and 9.88 per cent respectively. Similarly the net return and BC ratio was also found to be higher by Rs. 31,684 and 1.13 with this variety.

Table: Performance of cowpea variety CP 4

Details	No. of trials	Yield (q/ha)	Pods/ plant	Length/ Pod (cm)	Net Return (Rs/ha)	BC Ratio
Farmers' variety – Pusa Komal (Farmers' practices)	15	77.86	27.1	17.2	45789	3.21
Improved variety CP 4 (Recommended practice)		111.10	32.3	18.9	77473	4.34

Varietal assessment in Okra

Problem identified: Low yield of okra due to use of local/old variety like Pusa Makhmali
Technology Assessed: Assessment of okra variety VRO 22

Several factors are responsible for minimizing the yield of okra, use of local or old variety seeds are most important factors for low fruit production. Farmers are using old varieties like Pusa Makhmali resulting low yield. KVK Datia and Gwalior conducted on farm trials to assess the performance of the improved variety VRO 22. The results showed that the yield of this variety was 24.59 per cent higher over the farmers' variety. The number of fruits per plant was also increased by 19.78 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 35,855 and 0.52 with this variety.

Table: Performance of okra variety VRO 22

Details	No. of trials	Yield (q/ha)	Fruits/ plant	Net Return (Rs/ha)	BC Ratio
Farmers' variety – Pusa Makhmali (Farmers' practices)	10	97.60	18.4	80195	4.18
Improved variety VRO 22 (Recommended practice)		121.60	22.04	116050	4.70

Varietal assessment in Garden Pea

Problem identified: Low yield of okra due to use of local/old variety
Technology Assessed: Assessment of gardenpea variety VRP 6

Several factors are responsible for lowering the yield of garden pea, use of local or old variety seeds are most important factors for low yield. Farmers are using varieties like bonvile resulting low yield. KVK Katni and Panna of zone planned and conducted on farm trials to assess the performance of the improved variety VRP 6. The results showed that the yield of this variety was 102.5 per cent higher over the farmers' variety. The number of pods per plant was also increased by 104.92 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 38,000 and 0.66 with this variety. The variety gave very good performance as the net profit doubled with this variety.

Table: Performance of garden pea variety VRP 6

Details	No. of trials	Yield (q/ha)	Pods/ plant	Net Return (Rs/ha)	BC Ratio
Farmers' variety – Bonville (Farmers' practices)	10	36.05	33.51	34250	2.63
Improved variety VRP 6 (Recommended practice)		73.0	68.67	72250	3.29

Varietal assessment in Tomato

Problem identified: Low yield of tomato due to use of local/old variety
Technology Assessed: Assessment of tomato variety Utkal Raja

Several factors are responsible for lowering the yield of tomato, use of local or old variety seeds are most important factors for reduction in the desired fruit production. Farmers are using old varieties resulting less fruit production. KVK Boudh and Kalahadi of zone planned and conducted on farm trials to assess the performance of the improved variety Utkal Raja. The results showed that the yield of this variety was 26.45 per cent higher over the farmers' variety. The number of fruit per plant was also increased by 47.67 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 45,380 and 0.53 with this variety. The variety performance well in the area.

Table: Performance of tomato variety Utkal Raja

Details	No. of trials	Yield (q/ha)	Pods/ plant	Net Return (Rs/ha)	BC Ratio
Farmers' local / old variety (Farmers' practices)	10	200.40	17.2	91877	2.21
Improved variety Uttkal Raja (Recommended practice)		253.40	25.4	137257	2.74

Integrated Nutrient Management

Integrated Nutrient Management in Paddy

Problem identified: Low yield of paddy due to imbalanced/indiscriminate use of nutrients and no green manuring

Technology Assessed: Assessment of green manuring in paddy

Several factors are responsible for lowering the yield of paddy; imbalanced/indiscriminate use of plant nutrients is one of the major reasons for declining in yield. Farmers are not using the organic resources for nutrient supplement; hence, the soil fertility is declining gradually. Keeping above problem on the priority, KVK Jabalpur and Bilaspur of zone planned and conducted on farm trials to assess the impact of green manuring on the performance of paddy. The results showed that the crop yield was 22.99 per cent higher over the farmers' practice. The number of effective tillers per plant was also increased by 33.56 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 5,733 and 0.20 with this technology. The technology is effective as it increases the crop yield and maintains the soil health and fertility.

Table: Impact of green manuring on the performance of paddy

Details	No. of trials	Yield (q/ha)	No. of effective tillers/ plant	Net Return (Rs/ha)	BC Ratio
No green manuring (Farmers' practices)	09	25.45	298	19142	1.88
Green manuring with *sesbania* (Recommended practice)		31.30	398	24875	2.08

Integrated Nutrient Management in Wheat

Problem identified: Low yield of wheat due to imbalanced/indiscriminate use of nutrients

Technology Assessed: Assessment of integrated nutrient management in wheat

Among the cereals, wheat crop ranks IInd in uptake of major nutrients. Imbalanced/indiscriminate use of plant nutrients are one of the major reasons for declining yield of wheat. Farmers are not using the organic resources for nutrient supplement and appling less/imbalanced use of fertilizers; hence, the soil fertility is declining gradually which significantly affeting the crop yield. Looking the above problem, KVK Narsinghpur, Sagar and Umaria of zone planned and conducted on farm trials to assess the INM (Biofertilizers-Azotobactor & PSB @ 5kg/ha + NPK @ 100:60:40 kg/ha + 5 kg Zn/ha) on soil test basis in wheat. The results showed that the crop yield was 36.03 per cent higher over the farmers' practice. The number of effective tillers per m^2 was also increased by 39.03 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 11,923 and 0.28 with the assessed technology. The technology is effective for irrigated situation as it increases the crop yield and maintains the soil health and fertility for sustainable crop production.

Table: Assessment of INM in irrigated wheat

Details	No. of trials	Yield (q/ha)	No. of effective tillers/ m^2	Net Return (Rs/ha)	BC Ratio
NPK @ 68:46:0 kg/ha (Farmers' practices)	18	27.48	269	26448	2.82
Biofertilizers-Azotobactor & PSB @ 5kg/ha + NPK @ 100:60:40 kg/ha + 5 kg Zn/ha (Recommended practice)		37.38	374	38371	3.10

Integrated Nutrient Management in Groundnut

Problem identified: **Low yield and less oil content in groundnut due to deficiency of Sulphur and Zinc**

Technology Assessed: **Assessment of response of zinc and sulphur in groundnut**

Groundnut is an important oilseed crop. Imbalanced/indiscriminate use of major plant nutrients and no use of micronutrients are the major reasons for declining yield and oil content of groundnut. Farmers are not using the sulphur and zinc containing fertilizers; hence, the status of these nutrients is low in the soil which is affecting the crop yield. Sulphur is responsible for increasing the oil content in the oilseeds. Looking the above problem, KVK Angul and Koraput of zone planned and conducted on farm trials to assess the response of the zinc and sulphur and applied these nutrients @ 5 and 25 kg/ha respectively on soil test basis in groundnut. The results showed that the crop yield was 46.50 per cent higher over the farmers' practice. The number of pods per plant was also increased by 57.75 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 15,842 and 0.34 with the assessed technology. The technology is effective for rainfed situation as it increases the crop yield and maintains the soil health and fertility for profitable crop production.

Table: Response of zinc and sulphur in groundnut

Details	No. of trials	Yield (q/ha)	No. of pods/ plant	Net Return (Rs/ha)	BC Ratio
No use of zinc and sulphur (Farmers' practices)	15	14.41	14.2	32985	2.07
zinc and sulphur @ 5 and 25 kg/ha (Recommended practice)		21.11	22.4	48827	2.41

Integrated Nutrient Management in Mustard

Problem identified: **Low yield of mustard due to sulphur deficiency**

Technology Assessed: **Assessment of response of sulphur in mustard**

Musturd is an important oilseed crop among the oilseeds grown across the zone. Imbalanced/indiscriminate use of major plant nutrients and no use of secondary and micronutrients are the major reasons for declining yield of mustard. Farmers are not using

the sulphur containing fertilizers; hence, the status of this nutrient is low in the soil which is affecting the crop yield. Sulphur is responsible for increasing the oil content in the oilseeds. Looking the above problem, KVK Rewa and Ratlam of zone planned and conducted on farm trials to assess the response of sulphur and applied this nutrient @ 40 kg/ha on soil test basis in mustard. The results showed that the crop yield was 20.34 per cent higher over the farmers' practice. The number of siliqua per plant was also increased by 72.10 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 7,980 and 0.43 with the assessed technology. The technology is effective for semi-irrigated situation as it increases the crop yield and maintains the soil health and fertility for profitable crop production.

Table: Response of sulphur in mustard

Details	No. of trials	Yield (q/ha)	No. of siliqua/ plant	Net Return (Rs/ha)	BC Ratio
NPKS @ 13:35:0:0 kg/ha (Farmers' practices)	10	14.50	103.6	32315	2.96
NPK @ 20:60:20 kg/ha and Sulphur @ 40 kg/ha (Recommended practice)		17.45	178.3	40295	3.39

Integrated Nutrient Management in Soybean

Problem identified: **Low yield of soybean due to sulphur deficiency**
Technology Assessed: **Assessment of response of sulphur in soybean.**

Soybean is an important oilseed crop grown in the black soils. Imbalanced/indiscriminate use of major plant nutrients and no use of secondary and micronutrients are the major reasons for declining yield of soybean. Farmers are not using the sulphur containing fertilizers; hence, the status of this nutrient is low in the soil which is affecting the crop yield. Sulphur is responsible for increasing the oil content in the oilseeds. Looking the above problem, KVK Ashoknagar, Narsinghpur and Ratlam of zone planned and conducted on farm trials to assess the response of sulphur and applied this nutrient @ 25 kg/ha on soil test basis in soybean. The results showed that the crop yield was 32.33 per cent higher over the farmers' practice. The number of pods per plant was also increased by 31.25 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 10,809 and 0.39 with the assessed technology. The technology is effective as it increases the crop yield and maintains the soil health and fertility.

Table: Response of sulphur in soybean

Details	No. of trials	Yield (q/ha)	No. of pods/ plant	Net Return (Rs/ha)	BC Ratio
NPKS @ 13:35:0:0 kg/ha (Farmers' practices)	20	12.99	32	27276	3.13
NPK @ 20:60:20 kg/ha and Sulphur @ 25 kg/ha (Recommended practice)		17.19	42	38085	3.52

Integrated Nutrient Management in Chickpea

Problem identified: Low yield of chickpea due to imbalanced use of NPK fertilizers
Technology Assessed: Assessment of INM in chickpea.

Chickpea is an important pulse crop grown across the zone. Imbalanced/indiscriminate use of major plant nutrients are the major reasons for declining yield of chickpea. Farmers are not using balanced dose of NPK fertilizers; hence, the status of these nutrients is declining in the soil which is affecting the crop yield. Looking the above problem, KVK Dhamtari, Gwalior, Janjgir Champa, Jhabua and Seoni of zone planned and conducted on farm trials to assess the the effect of NPK and applied these nutrients @ 20:60:20 kg/ha on soil test basis in chickpea. The results showed that the crop yield was 32.33 per cent higher over the farmers' practice. The number of pods per plant was also increased by 31.25 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 10,809 and 0.39 with the assessed technology. The technology is effective as it increases the crop yield and maintains the soil health and fertility.

Table: Performance of NPK in chickpea

Details	No. of trials	Yield (q/ha)	No. of pods/ plant	Net Return (Rs/ha)	BC Ratio
NPK @ 13:35:0 kg/ha (Farmers' practices)	26	10.64	27.0	20552	2.41
NPK @ 20:60:20 kg/ha (Recommended practice)		14.62	32.5	30826	2.91

Integrated Nutrient Management in Blackgram

Problem identified: Low yield of blackgram due to imbalanced use of NPK fertilizers
Technology Assessed: Assessment of INM in blackgram.

Several factors are responsible for low yield of blackgram including infestation of pests and diseases. Imbalanced/indiscriminate use of major plant nutrients are the major reasons for declining yield of blackgram. Farmers are not using balanced dose of NPK fertilizers; hence, the status of these nutrients is declining in the soil which is in turn affecting the crop yield. Looking the above problem, KVK Ashoknagar, Guna and Mandsaur of zone planned and conducted on farm trials to assess the the effect of NPK and applied these nutrients @ 20:50:20 kg/ha on soil test basis in blackgram. The results showed that the crop yield was 27.47 per cent higher over the farmers' practice. The number of pods per plant was also increased by 14.31 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 6,178 and 0.45 with the assessed technology. The technology is effective as it increases the crop yield and maintains the soil health and fertility.

Table: Performance of NPK in blackgram

Details	No. of trials	Yield (q/ha)	No. of pods/ plant	Net Return (Rs/ha)	BC Ratio
NPK @ 09:23:0 kg/ha (Farmers' practices)	15	8.41	51.0	16556	2.79
NPK @ 20:50:20 kg/ha (Recommended practice)		10.72	58.3	22734	3.24

Integrated Nutrient Management in Garlic

Problem identified: Low yield of garlic due to imbalanced use of fertilizers

Technology Assessed: Assessment of INM in garlic

Imbalanced/indiscriminate uses of fertilizers are the major reasons for declining yield of garlic. Farmers are not using balanced dose of fertilizers; hence, the status of these nutrients is declining in the soil which is in turn affecting the crop yield. Looking the above problem, KVK Dhar, Guna, Harda, Neemuch, Ratlam and Rewa of zone planned and conducted on farm trials to assess the the effect of INM (2.5 tonne vermicompost/ha + NPKS @ 60:60:30:20 kg/ha) on soil test basis in garlic. The results showed that the bulb yield was 23.68 per cent higher over the farmers' practice. The unit bulb weight and number of cloves per bulb was also increased by 33.15 and 22.28 per cent, respectively. Similarly the net return and BC ratio was also found to be higher by Rs. 34,974 and 0.33 with the assessed technology. The technology is effective as it increases the bulb yield and maintains the soil health and fertility.

Table: Performance of INM in garlic

Details	No. of trials	Bulb yield (q/ha)	Unit bulb weight (gram)	No. of cloves /bulb	Net Return (Rs/ha)	BC Ratio
NPK @ 46:58:0 kg/ha (Farmers' practices)	41	96.63	36.20	20.65	122228	3.49
2.5 tonne vermicompost/ha + NPKS @ 60:60:30:20 kg/ha (Recommended practice)		119.51	48.20	25.25	157202	3.82

Integrated Nutrient Management in Cauliflower

Problem identified: Low yield and small curds of cauliflower due to boron deficiency

Technology Assessed: Assessment of boron in cauliflower

Cauliflower yield is affected by a number of factors including seed, nursery, nutrient and crop management practices etc. Imbalanced/indiscriminate uses of fertilizers and no use of micronutrients are the major reasons for declining yield of cauliflower. Farmers are unable to use balanced dose of fertilizers for major nutrients and no application of boron; hence, the status of these nutrients is declining in the soil which in turn affecting the crop yield. Looking the above problem, KVK Damoh, Guna and Ganjam-I of zone conducted on farm trials to assess the the response of boron with RDF (NPK @ 120:60:60 kg/ha + Boron @ 1 kg/ha) on soil test basis in cauliflower. The results showed that the yield was 21.70 per cent

higher over the farmers' practice. The unit curd weight was also increased by 48.46 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 17,781 and 0.33 with the assessed technology. The technology is effective as it increases the yield and maintains the soil health and fertility.

Table: Effect of INM with boron in cauliflower yield

Details	No. of trials	Yield (q/ha)	Unit curd weight (gram)	Net Return (Rs/ha)	BC Ratio
NPK @ 46:58:0 kg/ha and no use of boron (Farmers' practices)		233.6	586	148193	6.29
NPK @ 120:60:60 kg/ha + Boron @ 1 kg/ha (Recommended practice)		284.3	870	165974	6.62

Integrated Plant Nutrient Management

Integrated Plant Nutrient Management in Wheat

Problem identified: **Low yield of wheat due to imbalanced and inadequate use of fertilizers**

Technology Assessed: **Assessment of IPNM based STCR in wheat**

Cultivation of wheat in irrigated situation affected by several factors under crop management practices; imbalanced/inadequate uses of NPK fertilizers are the major reasons for declining yield of wheat. Farmers are not using balanced doses of NPK fertilizers; hence, the status of these nutrients is declining in the soil which is in turn affecting the crop yield. Balance dose of NPK fertilizers even dose not serve the purpose to get the desired yield, when the soils are low or very low in soil fertility. Looking the above problem, KVK Burhanpur and Hoshangabad of zone conducted on farm trials to assess the the response of Integrated Plant Nutrient Management (IPNM) based on Soil Test Based Crop Response (STCR) setting the target yield 50 q/ha. The NPK doses were calculated by STCR equation and accordingly the fertilizers were applied to supply the nutrients to crop as per requirement. The results showed that the yield was 25.17 per cent higher over the farmers' practice. The number of tillers per m^2 was also increased by 30.23 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 13,117 and 0.44 with the assessed technology. The technology is effective as it serves the purpose in getting the targeted yield and maintains the soil health and fertility.

Table: Response of IPNM based STCR in wheat

Details	No. of trials	Yield (q/ha)	No. of effective tillers/m^2	Net Return (Rs/ha)	BC Ratio
NPK @ 68:46:0 kg/ha (Farmers' practices)	10	40.84	321.41	40133	3.21
NPK @ 120:60:60 kg/ha + Boron @ 1 kg/ha (Recommended practice)		51.12	418.57	53250	3.65

Weed Management

Weed Management in Paddy

Problem identified: Low yield of paddy due to heavy weed infestation
Technology Assessed: Assessment of bispyribac sodium for weed management in paddy

In general the yield of cereal crops like paddy are decreased by 30-35% due to infestation of narrow and broad leaved grassy weeds. Farmers are not using herbicide for weed management timely; hence the crop yield is adversely affected. Looking the above problem, KVK Bastar, Gwalior, Hoshangabad, Mahasamund, Sidhi and Shivpuri of zone conducted on farm trials to assess the the response of bispyribac sodium 10 SC for weed management in paddy. The results showed that the yield was 68.89 per cent higher over the farmers' practice. The number of weeds per m^2 was also increased by 82.77 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 16,155 and 0.41 with the assessed herbicide.

Table: Response of bispyribac sodium for weed management in paddy

Details	No. of trials	Yield (q/ha)	No. of weeds/m^2	Net Return (Rs/ha)	BC Ratio
One mannual weeding (Farmers' practices)	29	27.13	36.40	33745	3.09
Use of bispyribac sodium 10 SC - 25 gram a.i./ha at 15-20 DAT (Recommended practice)		45.82	6.27	49900	3.50

Weed Management in Wheat

Problem identified: Low yield of wheat due to heavy weed infestation
Technology Assessed: Assessment of sulphosulfuron + metsulfuron for weed management in wheat

In general the yield of cereal crops are decreased by 30-35% due to infestation of narrow and broad leaved grassy weeds. Farmers are not caring weed management practices; due to which the crop yield is adversely affected. Looking the above problem, KVK Umaria and Gwalior of the zone conducted on farm trials to assess the the response of sulphosulfuron + metsulfuron for weed management in wheat. The results showed that the yield was 27.36 per cent higher over the farmers' practice. The number of weeds per m^2 was also increased by 89.68 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 10,966 and 0.28 with the assessed herbicide.

Table: Response of sulphosulfuron + metsulfuron for weed management in wheat

Details	No. of trials	Yield (q/ha)	No. of weeds/m^2	Net Return (Rs/ha)	BC Ratio
One mannual weeding (Farmers' practices)	13	32.31	158	30846	2.66
Use of sulphosulfuron + metsulfuron 6 gram a.i./ha at 25 DAS (Recommended practice)		41.15	16.30	41812	2.94

Weed Management in Groundnut

Problem identified: Low yield of wheat due to heavy weed infestation
Technology Assessed: Assessment of Imazathaper for weed management in groundnut

KVK Balasore, Jagatsinghpur and Shivpuri of the zone conducted on farm trials to assess the the response of Imazathaper for weed management in groundnut. The results showed that the yield was 64.75 per cent higher over the farmers' practice. The number of weeds per m^2 was also increased by 71.83 per cent. Similarly the net return and BC ratio was also found to be higher by Rs. 15,703 and 0.53 with the assessed herbicide.

Table: Response of imazathaper for weed management in groundnut

Details	No. of trials	Yield (q/ha)	No. of weeds/m^2	Net Return (Rs/ha)	BC Ratio
One mannual weeding (Farmers' practices)	16	17.7	14	42383	2.40
Use of Imazathaper @ 100 gram a.i./ha at 15-20 DAS (Recommended practice)		29.16	4	58086	2.93

Integrated Pest Management

Integrated Pest Management for pod borer in Chickpea

Problem Identified: Low yield of chickpea due to heavy infestation of pod borer
Technology Assessed: Assesment of Integrated management module for pod borer in chickpea

Pod borer in gram is a major pest responsible for heavy reduction (20-35%) in yield. KVK Shivpuri in Madhya Pradesh and Ganjam-I in Odisha of zone conducted an on farm trial for assessing the integrated management module for pod borer in Chickpea. The result of the on farm trial showed that the yield was increased by 18.85% and insect infestation was decreased by 66.5 %.The net return and BC ratio were increased by Rs. 6,250 per ha and

0.22 respectively . Farmers are satisfied to this technology for pod borer management and they realised that IPM modules in chickpea is better than only use of chemical insecticide.

Table : Performance of IPM module for Management of Pod borer in Chickpea

Details	No.of trials	Yield (q/ha)	Net Return	Insect infestation (%)	BC Ratio
Indiscriminate use of insecticide (Farmer's Practices)	10	12.2	25200	15.6	2.41
Deep summer ploughing + Installation of 'T' shape bird perches@ 20 / ha + application of HNPV@250 L.E./ ha + need based inecticide (Recommended practice)		14.5	31450	5.25	2.63

Integrated Pest Management for Thrips in Onion

Problem Identified: Low yieldof onion due to heavy infestation of Thrips in onion
Technology Assessed: Assesment of Integrated management of Thrips in onion

KVK Devas, Mandsaur and Sidhi of the zone assessed the IPM technology for managing thrips in onion effectively and found it suitable for management of thrips. They also found it effective in minimizing thrips and reduced the insect infestation 79.8% and increased the yield by 21.64%. The net return due to use of this technology increased by Rs. 31,392 per ha. Farmers were satisfied with this technology for thrips management and they realised that IPM modules in onion is better than only use of chemical insecticide. The farmers were involved through training, field day and field visit during the crop growth and at the time of harvesting.

Table : Performance of IPM for thrips management in Onion

Details	No.of trials	Yield (q/ha)	Net Return	Insect infestation (%)	BC Ratio
Indiscriminate use of insecticide (Farmer's Practices)	16	238.0	149363	39.10	6.05
Dipping of seedlings in Imidachloprid – 17.8 SL @ 3 ml / 10 lit water for 2 hour before transplanting + Spray of NSKE @ 5 % at ETL (30 Thriphs / plant) + need based Spray of Insecticide (Recommended practice)		289.5	180755	7.9	6.54

Integrated Pest Management for Shoot and Fruit borer in Brinjal

Problem Identified: Low yield of brinjal due to high infestation of shoot and fruit borer in brinjal

Technology Assessed: Assesment of Integrated management of shoot and fruit borer in brinjal

Fruit and shoot borer in brinjal is a major pest responsible for destrying the fruits and reduction in yield. KVK Harda, Katni, Rewa, Tikamgarh of Madhya Pradesh; KVK Rajnandgaon of Chhhattisgarh and KVK Sonepur and Rayagada of Odisha conducted several on farm trials to manage the pest effectively. Removal of infected plant part + Pheromone trap @ 10 / ha + need based application of insecticides at ETL *viz*. Renoxypyre 20 SC or Thiaocloprid; egg parasite Trichogramma and botanical NSKE was used for managing the pest. The result of the on farm trial showed that the yield was increased by 34.47 % and fruit damage was decreased by 62.62 %. The net return and BC ratio were increased by Rs. 48,598 per ha and 0.56 respectively. Farmers were satisfied with this technology for fruit and shoot borer management and they realised that IPM modules in brinjal is better than only use of chemical insecticide.

Table : Performance of IPM for Shoot and Fruit borer management in Brinjal

Details	No.of trials	Yield (q/ha)	Net Return	Fruit damage (%)	BC Ratio
Indiscriminate use of insecticide (Farmer's Practices)	44	213.24	111730	26.83	3.94
Removal of infected plant part + Pheromone trap + Release of Trichogramma sp. @ 100000 egg / ha + need based application of botanicals/ insecticides at ETL (Recommended practice)		286.74	160328	10.03	4.50

Integrated Pest Management for diamond back moth in Cabbage

Problem Identified: Low yield of cabbage due to heavy infestation of diamond back moth

Technology Assessed: Assesment of fipronil for diamond back moth management

Diamond back moth in cabbage is a major pest responsible for destrying the heads and reduction in yield. KVK Sambalpur and Keonjhar conducted on farm trials to manage the pest effectively. Fipronil 5% SC @ 75 gram a.i. per ha was used for managing the pest. The result of the on farm trial showed that the yield was increased by 10.2% and number of larvae per plant was decreased by 80%. The net return and BC ratio were increased by Rs. 17,875 per ha and 0.23 respectively. Farmers were satisfied with this technology for diamond back moth management in cabbage.

Table : Performance of Fipronil 5% SC for diamond back moth management in cabbage

Details	No.of trials	Yield (q/ha)	No. of larvae /plant	Net Return	BC Ratio
Indiscriminate use of insecticide (Farmer's Practices)	10	245	8.0	63925	2.58
Fipronil 5% SC @ 75 g a.i. per ha (Recommended practice)		270	1.6	81800	2.81

Painted Bug Management in Mustard

Problem Identified: Low yieldof mustard due to heavy infestation of Painted bug
Technology Assessed: Assesment of Imidachloprid for management of painted bug in mustard

KVK Bhind and Shivpuri conducted an on farm trial for assessing the Imidachloprid-17.8 SL for management of painted bug in mustard. The result of the on farm trial showed that the yield was increased by 14.99% and insect infestation was decreased by 58.47%.The net return and BC ratio were increased by Rs. 8,268 per ha and 0.36 respectively given in Table.

Table: Performance of Imidachloprid-17.8 SL for management of Painted bug in mustard

Details	No.of trials	Yield (q/ha)	Net Return	Insect infestation (%)	BC Ratio
No use of chemical (Farmer's Practices)	10	21.79	45599	7.65	2.94
Spraying of Imidachloprid-17.8 SL @ 125ml/ ha (Recommended practice)		18.95	37331	18.42	3.30

Integrated Disease Management

Blast Management in paddy

Problem Identified: Low yield of paddy due to high incidence of blast disease
Technology Assessed: Assesment of tricyclozole for blast management in paddy

Incidence of blast severely damages the paddy crop especially in the old varieties. KVK Janjgir champa, Malkangiri, Panna and Rewa conducted on farm trials on blast management in paddy. Tricyclozole @ 0.06% was used for blast management. The result of the on farm trial showed that the yield was increased by 34.89 % and blast incidence was decreased by

73.08 %. The net return and BC ratio were increased by Rs. 11,539 per ha and 0.40 respectively.

Table : Performance of tricyclozole for blast management in paddy

Details	No.of trials	Yield (q/ha)	Disease incidence (%)	Net Return	BC Ratio
Indiscriminate use of any fungicide after severe infestation (Farmer's Practices)	20	30.07	36.40	20864	2.12
Application of Tricyclozole @ 0.06% (Recommended practice)		40.56	9.8	32403	2.52

Sheath Blight Management in Paddy

Problem Identified: Low yield of paddy due to severe incidence of sheath blight disease
Technology Assessed: Assesment of IDM module for sheath blight management in paddy

Remarkable reduction in yield has been observed due to sheath blight incidence in paddy. KVK Bhadrak and Sidhi conducted on farm trials on sheath blight management in paddy. IDM module i.e. summer plaughing + seed treatment by carbedazim @ 2 gram/kg seed + soil treatment with *Trichoderma viridae* @ 5 kg/ha + need based spray of fungicide (Propiconazole 25 EC @ 1 ml/lit) was assessed for sheath blight management. The result of the on farm trial showed that the yield was increased by 20.56 % and sheath blight incidence was decreased by 78.76 %. The net return and BC ratio were increased by Rs. 6,232 per ha and 0.31 respectively. Farmers were satisfied with this technology for sheath blight management in paddy and they realised that IDM module is better than only use of fungicide.

Table : Performance of IDM module for sheath blight management in paddy

Details	No.of trials	Yield (q/ha)	Disease incidence (%)	Net Return	BC Ratio
Indiscriminate use of any fungicide after severe infestation (Farmer's Practices)	10	32.15	25.8	16269	2.06
Summer plaughing + seed treatment by carbedazim @ 2 gram/kg seed + soil treatment with *Trichoderma viride* @ 5 kg/ha + need based spray of fungicide (Propiconazole 25 EC @ 1 ml/lit) (Recommended practice)		38.76	5.48	22501	2.37

Wilt Management in Chickpea

Problem Identified: Low yield of chickpea due to severe incidence of wilt in chickpea
Technology Assessed: Assesment of T*richoderma viride* for wilt management in chickpea

Wilt is a major disease responsible for low yieild of chickpea especially in local/old susceptible varieties among the pest and diseases of the crop. KVK Dewas and Korea conducted on farm trials on wilt management in chickpea. IDM module i.e. seed treatment by carbedazim @ 2 gram/kg seed followed by *Trichoderma viridae* @ 5 gram/kg seed and soil treatment with *Trichoderma viridae* @ 5 kg/ha was assessed for wilt management. The result of the on farm trial showed that the yield was increased by 23.20 % and no. of infected plants per m^2 was decreased by 73.83 %. The net return and BC ratio were increased by Rs. 7,567 per ha and 0.41 respectively. Farmers were satisfied with this technology for wilt management in chickpea.

Table : Performance of IDM module for wilt management in chickpea

Details	No.of trials	Yield (q/ha)	No. of infected plants/m^2	Net Return	BC Ratio
No seed treatment/treatment by any fungicide (Farmer's Practices)	16	8.32	5.35	12238	1.61
seed treatment by carbedazim @ 2 gram/kg seed followed by *Trichoderma viride* @ 5 gram/kg seed and soil treatment with *Trichoderma viridae* @ 5 kg/ha (Recommended practice)		10.25	1.40	19805	2.02

Leaf curl Management in Chilli

Problem Identified: Low yield (25-40%) of chilli due to severe incidence of leaf curl disease in chilli
Technology Assessed: Assesment of IPM module for leaf curl management in chilli

Leaf curl in chilli is a major disease causes 25-40 % yield loss in chilli due to use of susceptible varieties and non adoption of suitable integrated disease module for disease management. KVK Datia, Kanker and Tikamgarh conducted on farm trials on leaf curl management in chilli. IDM module i.e. Seed treatment with Imidacloprid @2.5 g/ kg + One Spray of NSKE @ 5 % and one spray of Imidacloprid @ 125 ml/ ha before flowering at 15 days interval was assessed for leaf curl management. The result of the on farm trial showed that the green chilli yield was increased by 54.01 % and disease incidence was decreased by 76.07 %. The net return and BC ratio were increased by Rs. 34,910 per ha and 1.24 respectively. Farmers were satisfied with this technology for wilt management in chickpea.

Table : Performance of IDM module for leaf curl management in chilli

Details	No.of trials	Yield (q/ha)	Disease incidence (%)	Net Return	BC Ratio
Spray of any insecticide (Farmer's Practices)	15	76.88	49.60	76066	2.85
Seed treatment with Imidacloprid @2.5 g/ kg + One Spray of NSKE @ 5 % and one spray of Imidacloprid @ 125 ml/ ha before flowering at 15 days interval (Recommended practice)		118.40	11.87	110976	4.09

Resource Conservation Technologies

Problem identified: **Low yield due to late sowing and less return due to high cost of primary tillage**

Technology Assessed: **Assessment of zero tillage technique wheat in rice-wheat cropping system**

Rice-wheat is a major cropping system followed in the state of Madhya Pradesh. Use of long duration paddy varieties and non availability of proper soil moisture the sowing of wheat delayed resulting in low yield. Primary tillage incrases the cost of cultivation and sowing of rabi crop also delayed. KVK, Datia, Gwalior, Jabalpur and Morena assessed zero tillage technology (Direct sowing of wheat by zero till seed drill after paddy harvest) to save time, residual soil moisture and cultivation cost. Results of these trials at showed that the technique enhance the yield of wheat by 10.38 percent and weed population per m2 reduced by 22.43 per cent. Cultivation cost of Rs. 1,800 also saved in zero tillage technique with increase in yield compared to farmers' practice.

Table- Performance of zero tillage in wheat

Details	No. of trials	Yield (q/ha)	No. of weeds/m^2	Cultivation cost saving (Rs/ha)	Net Return (Rs/ha)	BC Ratio
Normal sowing after field preparation (Farmers practice)	25	38.52	107	-	42376	3.25
Direct sowing of wheat after paddy harvest by zero till seed drill (Recommended practice)		42.52	83	1800	50954	4.03

Problem identified: **Poor germination and low yield of soybean due to moisture imbalance**

Technology Assessed: **Sowing of soybean on ridges under Ridge and Furrow system**

KVK, Dhar and Khandwa assessed Ridge and Furrow method of sowing soybean as compared to the normal sowing (sowing in furrow). Poor germination is a major problem in

soybean due to excess rainfall. The ridge & furrow system of sowing enhance moisture regime around the root zone of soybean. It prevents water logging, drains excess water safely through furrow during heavy rain condition and also makes available adequate moisture during dry spell by conserving the rain water in furrows. Results of these trials at two locations showed that this system of sowing enhance the yield by 16 percent compared to farmers' practice due to improved conditions of moisture around the root zone.

Table- Performance of ridge & furrow sowing in soybean

Details	No. of trials	Moisture content (%)	Yield (q/ha)	Pod/plant (Nos.)	BC Ratio
Sowing in furrow (Farmers practice)	10	19	13.4	28	2.2
Sowing of soybean in ridge & furrow system (Recommended practice)		22	15.6	33	2.7

Problem identified: Low yield of soybean due to excess rains in heavy soils

Technology Assessed: Sowing of soybean in Broad Bed and Furrow system

KVK, Guna, Narsinghpur, Sagar and Tikamgarh assessed Ridge and Furrow sowing method by sweep seed drill in soybean as compared to the normal sowing (sowing in furrow). Excess rainfall adversely affects the germination and crop growth. In the Ridge and furrow system, soybean is sown on the ridges. There are furrows left after every ridge. Furrow depth is kept 3-6 inches which works to conserve rain water within the field and to safe discharge of excess water. It enhances the moisture regime in the root zone in adverse conditions of rainfall. Results of these trials conducted at 25 locations showed that this system of sowing enhance the yield by 34.88 per cent. The increase in number of pods per plant was observed by 20.75 per cent. Similarly the net return and BC ratio were Rs. 12,369 and 0.94 higher with the assessed technology.

Table- Performance of Ridge & Furrow sowing in soybean

Details	No. of trials	Yield (q/ha)	Pod/plant (Nos.)	Net return (Rs/ha)	BC Ratio
Sowing in furrow (Farmers Practice)	25	12.7	53	29881	3.28
Sowing of soybean in Ridge and furrow system by sweep seed drill (Recommended practice)		17.13	64	42250	4.22

Problem identified: Low yield of paddy due to traditional system of transplanting

Technology Assessed: Assessment of System of Rice Intensification in paddy

System of rice intensification (SRI) is a resource conservation technique for rice transplanting which promots the proper root development and tillers/plant thereby yield of paddy increases irrespect of the varieties. KVK, Chhindwara, Dhamtari and Sehore assessed the SRI method of transplanting in paddy as compared to the traditional system. Ten to twelve days old seedlings were transplanted @ one seedling/hill at 25 cm plant to plant and row to row spacing. Results of these trials conducted at 19 locations showed that this

system of transplanting enhance the yield by 65.09 per cent. The increase in number of effective tillers per plant and number of grains per panicle was observed by 40.20 and 136.75 per cent respectively. Similarly the net return and BC ratio were Rs. 13,715 and 0.65 higher with the assessed technology.

Table- Performance SRI in paddy

Details	No. of trials	Yield (q/ha)	No. of effective tillers/plant	No. of grains /panicle	Net return (Rs/ha)	BC Ratio
Traditional system of transplanting (Farmers Practice)	19	34.4	20.4	117	22069	2.26
Transplanting of 10-12 days old seedlings @ one seedling/hill at 25 cm plant to plant and row to row spacing (Recommended practice)		56.79	28.6	277	35784	2.91

Small Scale Income Generating Enterprises

Problem identified: **Unawareness of milky mushroom and low yield paddy straw mushroom**

Technology Assessed: **Assessment of performance of milky mushroom**

Seven KVK's from Orissa *viz*.mayurbhanj Balasore, Bhadrak, Jajpur, Jharsugda, Puri and Rayagada conducted 45 trails to assess the performance of milky mushroom. Results showed an increase of Rs 10/- per bed and increase in total yield of 15.4 % with a BC ratio of 2.68. The trails revealed that the performance of milky mushroom was more profitable than the paddy straw mushroom.

Table- Performance of milky mushroom

Details	No. of trials	Yield (kg/bag)	Net return (Rs/ha)	BC Ratio
Paddy straw mushroom (*Volvariella volvaceae*) (Farmers Practice)	45	1.10	39.33	2.12
Milky mushroom (*Calocybe indica)* (Recommended practice)		1.27	49.67	2.68

Problem identified: **Low stored of oyster mushroom due to unavailability of paddy straw and improve use of maize stalk**

Technology Assessed: **Assessment of maize stalk as suitable substrate for Oyster mushroom cultivation**

KVK's from Odisha i.e. Bolangir, Kandhmal and Navrangpur undertook 15 trails to assess the performance of maize stalk as an alternate substrate for oyster mushroom. The results showed an increase 32.73 % in the production over the farmer's practice. The days to first flush recorded decrease of 4 days in the time period from first flush. Net return from per bag showed an increase of Rs 23/- per bag over farmer practice, resulting in benefit cost ratio of 4.23.

Table- Performance of maize stalk as suitable substrate for Oyster mushroom production

Details	No. of trials	Yield (kg/bag)	Days of first flush	Net return (Rs/ha)	BC Ratio
Oyster mushroom production on paddy straw (Farmers Practice)	45	1.10	25	65	3.77
Oyster mushroom production on maize straw (Recommended practice)		1.46	21	88.66	4.23

Drudgery Reduction

Problem identified: **Farm women drudgery causing pain in finger and palm during manual stripping groundnut pods from crop vines and more time consuming**

Technology Assessed: **Assessment of efficiency and drudgery reduction of farm women by using groundnut stripper**

A total of 34 trails were conducted by KVK's Angul, Badwani, Bhadrak, Jajpur and Mahasamund of the zone for the assessment of groundnut for drudgery reduction of farm women. Results revealed that use of groundnut stripper showed lower to incidence of injuries and pain with an increase of 2.53 times more in the stripping efficiency. Results showed that the use of groundnut stripper was a useful mechine to reduce drudgery.

Table- Performance of efficiency and drudgery reduction of farm women by using groundnut stripper

Details	No. of trials	Stripping (Kg/hr)	Increase in output (%)
Mannual stripping (Farmers Practice)	34	5.1	0
Stripping by groundnut stripper (Recommended practice)		18.0	253

Problem identified: **Plucking by hand is time and labour intensive work leading irregular cuts and high drudgery.**

Technology Assessed: **Assessment of Bhindi Plucker for farm women**

KVK Khorda, Balasore, and Dhenkmal (Odisha) conducted 34 trails on assessment of Bhindi plucker for farm women to address the problem of (manual mannuai) plucking by hand.

Results showed an increase of 142.42% in plucking capacity with reduction of drudgery. The farm women also recorded a reduced heart rate while operating with the bhindi plucker.

Table- Performance of Bhindi plucker for farm women

Details	No. of trials	Output (kg/ hr)	Heart rate (No. / min.)
Mannual Plucking (Farmers Practice)	34	3.3	110
Plucking by Bhindi plucker (Recommended practice)		8.0	104

Problem identified: **High drudgery and low efficiency of farm women envolved in maize selling mannually.**

Technology Assessed: **Assessment of Maize seller for drudgery reduction of farm women**

Farm women spending long hours in shelling maize manually. KVK Bolangir, Ganjam-I & II, Mayurbahnj-II, Neemuch, Raigarh and Sonepur undertook 44 trials to assess the performance of tubular maize sheller for drudgery reduction of farm women. Results show an increase of 82.79% in shelling capacity with a decrease in heart rates and negligible injuries to the hands. Tubular maize shellers can be strongly recommended for drudgery reduction in farm women as they also save precious man days with saving of two hours per quintal.

Table- Performance of Tubular maize sheller for drudgery reduction of farm women

Details	No. of trials	Shelling capacity (Kg/ hr)	Heart rate (No. / min.)	Net efficiency (hr/q)	Harvest comfort
Mannual shelling (Farmers Practice)	44	13.3	87	7.51	3-4 injury in finger
Shelling by tubular maize shellers (Recommended practice)		24.33	82	4.11	No injury

Storage

Problem identified: **Loss of food grains due to insect and pest attack during storage**

Technology Assessed: **Assessment of Parad tablets for safe storage of grains**

KVK Bauda and Devgarh conducted trial on proper storage of grains to avoid looses due to attack of pest during storage. Parad tablets were used for safe storage and it was found that loss in grain weight was 0.80 % over farmer's practice (10.4%). No damaged grains were observed in the assessed technology while, 930 grains per thousand grain were infected in farmer's practice. Storage pests of food grains can be very well managed by using one tablet per two kg of food grain.

Table- Performance of Parad tablet in safe storage of grains

Details	No. of trials	No. of damaged grains/1000 grains	Weight loss (kg/q)
No proper storage practices (Farmers Practice)	10	930	10.40
one tablet per two kg of food grain (Recommended practice)		-	0.8

Value Addition

Farm women are unaware about value addition to crops, forest produce and fruits for income and empowerment in the nutritional status of their families. Ten KVKs of the zone undertook trial for the assessment of the value addition aspect in the various areas which resulted in enhanced quality, rich nutritional status and higher net return of the value added products.

Problem identified: **Low income of farm women due to degraded quality of mahua**

Technology Assessed: **Assessment of value addition in mahua**

KVK Mandla and Shahdol conducted trial on value addition in mahua flower. Jelly was the value added product prepared from dry mahua flowers. Results indicate that after value addition Rs. 650 per five kg net return was gained over the farmer's practice. The increase in net income was noted to be 5.5 times higher than the farmer's practice. The women involved in value addition were satisfied with the value addition technique of mahua flowers.

Table- Performance of value addition in Mahua

Details	No. of trials	Cost of value addition (per 5 kg)	Net income (per 5 kg)
No value addition (Farmers Practice)	10	-	100
Preparation of Jelly through value addition (Recommended practice)		270	650

Problem identified: **Mall nutrition in farm women due to imbalanced diet**

Technology Assessed: **Assessment of value addition of wheat flour through processed soybean**

KVK Tikamgarh conducted trial on mal nutrition in farm women. A total of five trials were conducted on farm women through value addition of wheat flour through processed soybean. Value added wheat flour was given in daily diet upto four months. Results indicate that intake of value added wheat flour increased the body weight by 4.46 % and reduced mal nutrition by 24.78 %. The farm women involved in the study were satisfied with the value addition product helped remarkable reduction in mal nutrition.

Table- Performance of value addition of wheat flour through processed soybean

Details	No. of trials	Protein (%)	Body weight of farm women (After 4 months)	Reduction in mal nutrition (%)
Wheat flour (Farmers Practice)	05	7.0	55.96	-
value addition of wheat flour through processed soybean (Recommended practice)		10.3	57.81	24.78

Income Generation

Problem identified: Low germination and high mortality of saplings of flat nursery beds

Technology Assessed: Assessment of improved nursery in plastic trays

KVK Badwani and Khandwa conducted trial on improved nursery in plastic trays. A total of ten trials were conducted on improved nursery raising technique. Results indicate that increase in sapling survival was 28 % higher with improved nursery raising technique. Farmers were satisfied with the improved nursery raising technique in plastic trays.

Table- Performance of improved nursery in plastic trays

Details	No. of trials	Germination (%)	Increase in sapling survival
Flat bed nursery (Farmers Practice)	10	70	-
nursery raising in plastic tray (Recommended practice)		98	28

Farm Machinery

Assessment of Rotavator

Problem identified: Poor seed bed and time consuming methods of field preparation

Technology Assessed: Field preparation by improved implement Rotavator

Fine seed bed is necessary for proper growth of plant. For getting good seedbed, fields are being operated by bullock drawn plough and/or tractor drawn cultivator by the farmers. These implements opens the soils cover but could not able to pulverize the soil. Rotavator blades do multiple cuts and thus pulverize the soil. It prepares fine seedbed for better plants growth.

KVK, Dhar assessed rotavator for field preparation for wheat crop and KVK, Mandsaur assessed for Garlic crop while KVK, Jagatsingpur assessed for puddling of soil before rice planting. Results showed 13% increase in yield, 1.4 times field coverage and 21% more net return.

Table: Performance of improved implement Rotavator

Details	No. of trials	Crop	Yield (q/ha)	Field capacity (ha/hr)	Net Return (Rs/ha)	B:C Ratio
Field preparation by cultivator (Farmers' practices)	5	Wheat	38.56	0.21	40846	2.24
	5	Garlic	81.6	0.19	115200	3.4
	5	Rice	42.0	0.5 puddling index	19000	1.5
Field preparation by Rotavator (Recommended practice)		Wheat	43.95	0.3	49418	2.86
		Garlic	94.2	0.25	140100	3.9
		Rice	45.0	0.7 puddling index	22750	1.6

Assessment of Seed cum fertilizer drill

Problem identified: Low yield due to use of traditional implements for sowing
Technology Assessed: Sowing of crops with seed cum fertilizer drill

Seed cum fertilizer drill was assessed by KVK, Bilaspur and Damoh for wheat crop, KVK, Mayurbhanj, Sonepur and sambalpur for gram crop , KVK, Dhamtari for gram and KVK, Dhar for soybean crop. Bullock drawn manual sowing of seed results in improper plant population, improper placement of fertilizer and more time consumption.

Seed cum fertilizer drill place the seed at proper interval of distance and also place fertilizer just below or nearby the seed for maximum and efficient utilization. It does save seed, fertilizer, and time of operation and provide ease in inter-culture and plant protection operations. Result showed 2.2 times field coverage, 29% more yield and Rs. 5,500 to Rs. 9,200 more net return by using seed cum fertilizer drill.

Table: Performance of improved implement Seed cum fertilizer drill

Details	No. of trials	Crop	Yield (q/ha)	Field capacity (ha/hr)	Net Return (Rs/ha)	B:C Ratio
Sowing with bullock-drawn sowing implements (Farmers' practices)	9	Wheat	20.59	0.2	13363	2.3
	15	Green gram	8.0	0.3	18790	2.37
	5	Chickpea	10.7	0.15	22900	2.5
	5	Soybean	12.2	0.21	20230	2.11
Sowing with seed cum fertilizer drill (Recommended practice)		Wheat	27.64	0.49	18862	2.5
		Green gram	10.50	0.46	26670	2.81
		Chickpea	13.1	0.45	28965	2.7
		Soybean	14.95	0.42	29440	2.6

Assessment of Zero till drill

Problem identified: Low yield due to delay in field preparation for sowing

Technology Assessed: Sowing of crops with zero till drill

To utilize moisture exist in the soil, tillage and sowing operations are need to be completed within short duration especially in Rabi season. Traditional practices of seed bed preparation and sowing require separate operations resulting in moisture loss and delayed sowing. Zero tillage seed drill do both the job of tillage and drilling at once. It opens soil crust, provide space for seed placement and sow the seed with minimum manipulation of soil. It eliminates multiple operations of implements and conserves soil moisture.

KVK, Damoh and Bhopal assessed zero till drill for wheat crop while KVK, Raipur assessed for chickpea in Rabi season. Result showed that Zero till drill operation increases yield by 18% while covering field 2.6 times more than farmers' practice. It also provided Rs.4400 to 6800/- more net return per ha.

Table: Performance of improved implement Zero till drill

Details	No. of trials	Crop	Yield (q/ha)	Field capacity (ha/hr)	Net Return (Rs/ha)	B:C Ratio
Tillage operation with cultivator and Sowing with bullock-drawn sowing implements (Farmers' practices)	12	Wheat	24.3	0.12	38000	3.37
	5	Chickpea	14.06	0.1	31900	3.02
Sowing with Zero till drill (Recommended practice)		Wheat	29.5	0.28	42400	3.52
		Chickpea	15.98	0.3	38700	3.50

Assessment of Raised bed planter

Problem identified: Poor yield due to low germination and moisture stress in flat sowing of soybean

Technology Assessed: Sowing of soybean on ridges by Raised bed planter

Water logging condition affects adversely the germination of soybean. Raised bed planter is used for preparing two furrows with two beds and planting to rows on each bed at proper distance. Furrows are 20-25 cm deep and beds are 45-50 cm wide. Such raised bed maintains optimum moisture conditions near root zone.

KVK, Dindori, Tikamgarh, Ujjain and Khandwa assessed Raised bed planter for sowing soybean in Kharif season. Due to moisture management in heavy rainfall and dry spell period by the raised bed and furrow system, soybean yield was increased upto 40%. Use of this planter resulted in Rs.9900/-ha more net profit.

KVK, Khandwa assessed raised bed planter also in Rabi season for sowing chickpea which resulted in 5% more production and Rs.2300/- more net return per ha.

Table: Performance of improved implement Raised bed Planter

Details	No. of trials	Yield (q/ha)	Field capacity (ha/hr)	Net Return (Rs/ha)	B:C Ratio
Sowing of soybean with Raised bed planter (Farmers' practices)	22	12.91	0.46	28900	3.27
Sowing with seed drill (Recommended practice)		18.14	0.53	38800	3.54

Animal Feed Management

Problem identified: **Low milk yield and profitability due to lack of protein and low dietary energy intakes**

Technology Assessed: **Assessment of feeding by pass fat and protected protein**

KVK Jabalpur, Katni and Gwalior conducted on farm trials on Feeding bypass fat and protected protein resulting in increase avg. milk yield by 21.05 % and 10.99% increase in net return.

Table: Performance of bypass fat and protected protien

Details	No. of trials	Avg. Milk Yield (lit/Lactation)	Net Return (Rs.)	B:C Ratio
No feeding of bypass fat and protected protein in the ration (Farmers' practices)	20	1140	19380	1.29
Feeding of formaldehyde treated bypass protein and bypass fat @ 100 gm each / animal / day (Recommended practice)	05	1380	21510	1.45

Problem diagnosed: **Poor quality nutrient diet results in the lack of essential mineral and vitamin requirement with leads to low production and profitability in milch animals**

Technology assessed: **Assessment of mineral mixture and vitamin supplementation on the milk production of milch animls**

KVK Seoni, Rajgarh, Mandla and Naupada conducted OFT to assess mineral mixture and vitamin supplementation on the milk production of Cow and Buffalow from calving up to six month of lactation and observed 37.03% increase in milk production per day per animal and 33.92% increase in net returns.

Table: Effect of min mix and vitamin supplement on production of Murraha buffalo

Details	No of trial	Av. Milk yied (lit/day/animal)	Net Return(Rs.)	B:C ratio
Dry+green+cake without mineral and vitamin supplement (Farmers' practices)	05	6.2	56000	1.88
Mineral and vitamin supplement @ 50 gram from date of calving to six month of lactation (Recommended practice)	20	8.50	75000	2.10

Problem identified: Low productivity and profitability due to poor feeding management i.e. imbalance ration with poor quality feeds and fodder

Technology assessed: Assessment of Balance feeding with quality fodder and supplements

KVK Ratlam, Kanker, Guna, Rajnandgaon, Sagar and Khandwa conducted OFT on balance feeding in cross bed cows and upgraded buffaloes resulting in increase avg. milk yield by 20.65 % and 44.65 % increase in net return.

Table: Performance of mineral mixture and vitamins in the ration

Details	No of trial	Av. Milk (litr/100days)	Fat (%)	Net Return(Rs.)	B:C ratio
Dry+green+cake without balance feed (Farmers' practices)	10	376	6.5	4528	1.75
Dryfodder 5kg.+ greens 15kg.+ concentrate (18% DCP 70% TDN)1.5kg.+400gm/kg.milk), 50 gram of mineral and vitamin supplement from date of calving to six month of lactation (Recommended practice)	45	480	7.0	6550	2.05

Problem identified: Low milk production and profitability due to high fiber diet, deficiency of essential minerals and enzymes in the ration

Technology assessed: Assessment of yeast culture, fibrolytic enzymes, probiotics and azolla in the ration of the milch animal

KVK Jabalpur, Tikamgarh, Pur, Umaria, Raisen conducted OFT on assessment of yeast culture, fibrolytic enzymes, prebiotics and azolla in the ration resulting in increase average milk yield by 38.32 % and 52 % increase in net return

Table: Performance of yeast culture, fibrolytic enzymes, prebiotics and azolla in milk production

Technology Option	No. of trials	Avg. Milk yield (lit/200 days)	Net Return (Rs.)	B:C Ratio
No use of yeast culture/fibrolytic enzymes and probiotics in the ration (Farmers' practices)	10	347	3030	0.77
Yeast culture/fibrolytic enzymes, probiotics and azolla in the ration (Recommended practice)	28	480	4622	1.64

Problem identified: Low productivity and profitability due to non availability of quality greens feed and fodder

Technology assessed: Assessment of quality green fodder production and impact on milk production

KVK Raigarh conducted OFT on green fodder production of berseem and impact on milk production resulting in increase of avg. milk yield by 52.17 % and 49.43 % increase in net return.

Table : Performance of quality fodder production and impact on milk production

Technology Option	No. of trials	Avg. Milk yield (lit/day)	Net Return (Rs.)	B.C. Ratio
Local variety poor quality fodder production and feeding (Farmers' practices)	5	2.3	3712	1.49
Berseem (J.B.-5) with recommended practices and feeding (Recommended practice)	5	3.5	5547	1.56

Problem identified: Low production and profitability during drought period (April to July) due to unavailability of greens and low plane ration

Technology assessed: Assessment of Urea treated straw feeding in production and reproduction during the drought period

KVK Jashpur conducted OFT on assessment of Urea treated straw feeding during the drought period resulting in increase avg. milk yield by 20 % and 40 % increase in net returns.

Table: Performance of Urea treated straw feeding on milk production during the drought period

Details	No. of trials	Avg. Milk yield (lit/day)	Net Returns (Rs./litr.)	B.C. Ratio
Feeding only dry no greens during the drought period (Farmers' practices)	2	1.0	10	1.50
Feeding dry along with Urea treated straws (Recommended practice)	2	1.2	14	1.63

Problem diagnosed: **Incidence of postpartum problems of dystokia, ROP, poor calved body weight, metritis and metabolic diseases (Ketosis) and poor milk yield in the recently calved buffaloes reduces productivity and profitability**

Technology assessed: **Balanced ration supplementation with mineral mixture 50 g per day per animal and calcium additives 100 ml per day animal for last two months of pregnancy**

KVK Ratlam conducted OFTs on assessment of the balanced feeding with mineral vitamnins supplementation for last two months of pregnancy in buffaloes to control post partom disorders and observed reduction in pp problems by 66% , increase in average calved body weight by 5.16 kg and 50% increase in milk production.

Table: Effect of balanced ration supplemented with mineral mixture and calcium on postpartum disorders and milk yield in buffaloes

Details	No of trail	Incidence of pp disorders %	Body weight of calf at birth	Milk yield 100 days	Net returns	B:C ratio
Farmers Practice (No or poor Feeding during last two months of pregnancy (Farmers' practices)	05	60	23.20	468	8950	1.68
Balanced ration supplementation with mineral mixture 50 g per day per animal and calcium additives 100 ml per day animal for last two months of pregnancy (Recommended practice)	05	20	28.36 kg	702	15220	2.23

Problem diagnosed: **Low production and profitability due to improper feeding management –feeding dry fodder, greens and concentrate separately with different interval results in wastage and improper utilization of feed due to lack of palatability and taste**

Technology assessed: **Balanced feeding with mixing dry fodder (straws), chaffed green fodder, chuni and concentrate mixture supplementation with mineral mixture salt vitamins ext according to body weight, milk status (lactating or pregnant) of the individual animal**

KVK Narsinghpur, Gwalior and Mandsaur conducted OFTs on assessment of the balanced feeding by total mixed ration (TMR) mixing dry fodder(straws), chaffed green fodder, chuni and concentrate mixture supplementation with mineral mixture salt vitamins ext on the production and productivity of the cattle. Observation revealed that average increase in milk yield by 21.00% and 46.0 % increase in net return with better feed utilization by the animal due to palatability and less wastage feed residues.

Table: Effect of total mixed ration (TMR feeding) supplemented with mineral mixture and calcium vitamins on and milk production in lactating cows and buffalos

Technological detail	No of trail	Milk yield (Lit/200days)	Net returns	B:C ratio
Improper feeding management –feeding dry fodder, greens,and concentrate separately at different intervals (Farmers' practices)	05	1200	8000	1.29
Balanced feeding by total mixed ration (TMR) mixing dry fodder(straws), chaffed green fodder, chuni and concentrate mixture supplementation with mineral mixture salt vitamins etc. (Recommended practice)	20	1460	11680	1.55

Animal Disease Management

Problem identified: **High incidence of mastitis in cross bred / high yielding dairy animals resulting in heavy loss in milk production**

Technology assessed: **Assessment of prophylactic practice spray of antiseptic (Vircons) and feeding selenium and vitamin E to control sub clinical mastitis**

KVK Raisen assessed the prophylactic majors for mastitis (spray of antiseptic (Vircons) and KVK Khandwa feeding selenium and vitamin E resulting resulted in 60% reduction in cases of mastitis and average increase in milk yield by 53.98 and 37.10 in net return.

Table: Performance of Vircons antiseptic spray and feeding selenium and vitamin E in control of subclinical mastitis

Details	No. of trials	Disease incidence (%)	Milk yield (lit/ 200days)	Avg. Net Returns (Rs.)	B:C Ratio
Poor prophylactic majors for mastitis (No practice of cleaning of udder and regular testing of subclinical mastitis (Farmers' practices)	5	10	326	47430	2.56
Spray of antiseptic (Vircons) after milking i.e. cleaning of udder prior after milking and supplementation of vit. E for control of subclinical mastitis (Recommended practice)	15	4	502	65030	2.97

Problem identified: **Low production and profitability due to high incidence of calves mortality infested with heavy load of worms**

Technology assessed: **Management of calf mortality and by adopting de-worming schedule and maintaining hygienic condition in the farm**

KVK Seopur Jhabua, Mandla, Satna and Sagar conducted OFT on assessment of piprazine and fenbendazole antihelmentic drug which results in 78.18% reduction in calf mortality and 53.28 % increase in avg. net return.

Table: Performance of broad spectrum antihelmentic drug on calf mortality and milk production

Details	No. of trials	Calf mortality (%)	Avg. Net Returns (Rs.)	B:C Ratio
Do not follow the de-worming schedule occasionally provide deworming medicine (Farmers' practices)	10	55	7000	1.78
Follow up de-worming schedule by broad spectrum antihelmentic drug i.e. de-worming before and after monsoon and follow schedule of de-worming calf (Recommended practice)	26	12	10730	2.40

Problem identified: **Low production and poor body condition score due to infestation of endo parasites (nematodes, cestodes and hook worms) and ecto parasites (tick, mites, lice etc.)**

Technology assessed: **Management of ecto and endo parasite by composite drug (antihelmentic and acaridae)**

KVK Katni, Jhabua, Jabalpur, Narsinghpur and Datia conducted OFT on assessment of composite de-wormer for the management of ecto and endo parasite in cow and buffaloes. This results in reduction of incidence of endo and ecto parasite with increase in milk production by 46.42 % and 48.91 % in net return.

Table: Performance of composite drug (IVERMECTINE) for ecto and endo parasite management

Details	No. of trials	Avg. Milk yield (lit/day)	Avg. Net Returns (Rs.)	B:C Ratio
Farmers follow drug to control endo & ecto parasite separately and that to occasionally (Farmers' practices)	20	2.8	6840	3.28
Control of ecto and endo parasite combined by one composite drug (IVERMECTINE) twice in the year (Recommended practice)	45	4.1	10186	4.31

Problem identified: **Low production and poor body condition score due to infestation of endo parasites (nematodes, cestodes and hook worms ext.)**

Technology assessed: **Management of endo parasite by following schedule of broad spectrum anti - helmantic drugs FENBEDAZOL/ALBENDAZOL**

KVK Sagar and Tikamgarh conducted OFT on assessment of broad spectrum anti helmantic drugs for the control of endo parasite in cow and buffaloes. This results in reduction of incidence of endo parasite with increase in milk production by 24.44 % and 57.50% in net return.

Table: Performance of broad spectrum anti- helmantic drugs (FENBEDAZOL/ ALBENDAZOL) for endo parasite management

Details	No. of trials	Avg. Milk yield (lit/day)	Avg. Net Returns (Rs.)	B:C Ratio
Farmers do not follow drug to control endo parasite and generally use local and herbal home made drugs (Farmers' practices)	05	4.5	14530	1.59
Control of endo parasite by following schedule of broad spectrum anti-helmantic drugs FENBEDAZOL/ALBENDAZOL (Recommended practice)	15	5.6	22886	2.01

Problem identified: **Low production and poor body condition score due to infestation of ecto parasites (tick, mites, lice etc.)**

Technology assessed: **Management of ecto by acaridae drug (flumethrin) and Herbal medicine**

KVK Khurdaconducted OFT on assessment acaridae drug (flumethrin) drugs and KVK Indore by Herbal oils for the control of ecto parasite in cow and buffaloes. Which results in reduction of incidence of ecto parasite (ticks) by 66.0% with 47% in net return?

Table: Performance of acaridae drug (flumethrin) and Herbal oils for ecto parasite management

Details	No. of trials	Tick incidence (%)	Mean Net Returns (Rs.)	B:C Ratio
Farmers do not follow drug to control ecto parasite and generally follow local measures available (Farmers' practices)	20	50	4400	2.6
Control of ecto parasite by following schedule of acaridae drug (flumethrin) and Herbal oils (Recommended practice)	62	17	6500	2.8

3. Frontline Demonstrations

Frontline demonstration is conducted to demonstrate the superiority of frontier and location specific proven technologies of agriculture and allied area among the farming community and extension functionaries for up-scaling in the larger area as well as for generating the production data along with the feedback. During the reporting year, a total number of 14,003 FLDs were conducted on crops including oilseeds, pulses, cereals, vegetables crops, cash crops, agro forestry, millets and other important area covering the total area of 6,587.87 ha in Zone VII (Table 3.1), including, 1604 demonstrations were also conducted on some of the important income generating enterprises like poultry, goatery, duckery, farm machinery, mushroom units vermicompost, etc. though 2,281 units (Table 3.2).

Table 3.1: Summary of FLDs conducted in different areas

S.No	Crops/Enterprises	No of Farmers	Area(ha)/Units
1.	CEREAL	4307	1637.06
2.	FIBRE	75	23
3.	FLOWER	95	15.176
4.	FORESTRY	10	2
5.	FRUIT	47	10.4
6.	GREEN MANURE	20	6
7.	MEDICINAL	27	9.5
8.	MILLET	133	56.4
9.	OILSEED	2238	889.8
10.	PULSE	3330	1248.8
11.	SPICE	590	125.91
12.	SUGAR	25	6.8
13.	TUBER	198	39.272
14.	VEGETABLE	1304	236.305
15.	Enterprises (Cattle, Drudgery Reduction, Dairy, Capacity Building & Group Dynamics, Fisheries, Farm Mechanization, Fodder , Goattry, Integrated Fish Farming, Poultry ,Resource Conservation Technologies, Storage,Value Adition, Bee Keeping, Lac cultivation, Mushroom,Vermicompost)	1604	2281
Total		**14003**	**6587.42**

FLD ON Integrated Nutrient Management

Crop	Area(ha)	No. of Farmers	Performance (Value with Unit) of technologies on different parameters			
			Demo yield (q/ha)	Local check yield (q/ha)	Demo Net Return (Rs/ha)	Local Check Return (Rs/ha)
OILSEED						
Groundnut	1.4	10	0.15	0.12	222.51	133.94
Linseed	3	10	16.13	11.69	36805	24605
Mustard	7	9	22.6	15.65	44880	27340
Niger	5	5	4.65	2.45	8625	6615
Sesame	5	18	4.5	2.7	5461	2398
Soybean	44.1	115	17.08	13.64	32008.64	23391.01
Total	**65.5**	**167**				
CEREALS						
Maize	35.0	70	113.65	74.68	76943.7	40590
Paddy	57.8	198	110.17	87.05	105322.5	75162.65
Wheat	54.1	119	64.23	52.14	59737.92	45991.8
Total	**146.9**	**387**				
PULSES						
Black Gram	30.1	98	18.83	12.21	45834.67	24600.11
Chickpea	23.1	49	25.36	21.94	51856.5	42503.33
Field Pea	5	24	0.1	0.07	228.91	137.39
Green Gram	7.4	25	8.44	6.09	16436.47	9315.03
Green Gram	5	6	9.5	5.5	22740	11120
Pigeon Pea	16	52	34.32	27.09	91876.75	67174.25
Total	**86.6**	**254**				
SPICES & CONDIMENTS						
Chilli	6.0	40	43.8	38.57	65624.5	56231.71
Coriander	2.25	11	15.68	12.75	46615	36545
Garlic	4.46	10	132.37	120.5	200270	174064
Onion	4.25	16	488	406.7	255150	185470
Turmeric (Intercropping Under Teak)	0.10	1	185	148	225700	158000
Total	**17.06**	**78**				

Application of plant growth Regulator (Ethrel) in Cucumber, KVK, Jagatsinghur

This is about Arjun Charan Sethy, a progressive farmer in Gamhapur village of raghunathpur block of Jagatsinghur district of Odisha state. Though he has landed property of 5 acres, he cultivates paddy in 3.5 acres and vegetables in 1.5 acres. Among vegetables cultivation, the principal crops are brinjal, Okra, Cucumber, Okra, Tomato, Chili and pointed gourd. Being ignorant of the better farming practices for growing vegetable, the yield was unable to suffice his requirements. So he decided to convert his vegetable patch into cereal crops like paddy.

KVK Intervention :-

He was attending regularly the farmers training programme conducted by KVK, Jagatsinghpur, and delighted with the knowledge he could incorporated in her field. Observing his keen interest, the KVK team approached him and assessed his resources and prepared action plan for Sri Arjun Charan Sethy. He strictly followed the plan of work and guided by the scientists to grow vegetable. Last year he was given a demonstration on Application of plant growth regulator (Ethrel) in cucumber in Rabi 2012-13 in 0.1ha in wich ethrel was foliar sprayed @ 200ppm once at 2-3 leaf stage to increase the percentage of female flower

Result	Yield q/ha	% change in yield	Female flower	% change in parameter	Cost of cultivation (q/ha)	Gross return	Net.income	BC ratio
FP	156.1		69		60800	141100	80300	2.32
RP	181.6	16.33	81	17.39	61600	176800	115200	2.87

Out come

In the potential patch of 1.5 acres of vegetables crops cucumber was in 0.25 acres. Following all improved package of practices like selection of varieties, fertilizer application, micronutrient application, Hormone application, plant protection measures he could optimize his yield to 16.33%. He spent Rs.61600/ha as cost of cultivation against which he earned Rs. 115200/ha as net profit with a benefit cost ratio of 2.87:1. With immediate success he changed his vision towards vegetable cultivation.

Impact

The KVK scientists though guided Sri Arjun Charan Sethy all through his endeavour, he had committed to work and eagerness to grasp the skills of the new technology helped him to achieve his profit in vegetable cultivation. He is planning to expand his vegetable area from 1.5acres to 2.5 acres by getting support from KVK, Jagatsinghpur.

Integrated Pest Management

Crop	Area (ha)	No. of Farmers	Performance (Value with Unit) of technologies on different parameters			
			Demo yield (q/ha)	Local check yield (q/ha)	Demo Net Return (Rs/ha)	Local Check Return (Rs/ha)
PULSES						
Blackgram(Pulses)	4	10	9.7	7.1	19743	12882.5
Chickpea	38.7	90	29	24.91	60146.45	48482.94
Green Gram	4	15	0.05	0.04	120.12	88.38
Lentil	5	5	16.51	8.63	40858.4	21448.2
Pigeon Pea	18	45	31.74	24.1	71858.55	51571.57
Chilli	8.5	35	115.18	91.29	102921.6	74737.38
Onion	1	5	0.8	0.68	379.27	305.42
VEGETABLE						
Potato	1	10	0.61	0.52	401.08	355.96
Bitter Gourd	1.4	15	135.3	110.36	138516.64	107651.58
Bottle Gourd	0.25	5	238	381	175800	98000
Brinjal	8.435	64	542.84	405.51	83645.82	138917.23
Cabbage	7.9	55	540	461.5	206514.15	166725.54
Cauliflower	0.5	5	0.58	0.47	306.14	234.32
Cucumber	0.4	5	0.35	0.28	133.21	95.07
Okra	1.5	10	40.25	58.17	22419.04	36689.65
Tomato	5.035	22	345.46	278.77	172437.47	134959.39
Total	**105.62**	**396**				

Farmers Envision – Pulse Seed Production

Shri Bidhu Bhusan Kanungo, an arts graduate started growing green gram and black gram eight years back. Due to lack of knowledge on seed production, he used to sell his produce in the local market which leads to very less net return. Apart from that, due to adoption traditional method he was unable to get satisfactory yield and was in search of scientific management techniques for improving production of these crops. Mean while he come across the contact of KVK scientists and learnt how to improve the production by managing the crops scientifically.

He was explained about the different agronomical practices like seed treatment with fungicides and rhizobium culture, nutrient management with emphasis on proper dose and time of application of NPK fertilizers and role of micronutrient B in improving the yield along with timely plant protection measures for control of insect pest and diseases. Application of pre-emergence herbicide like pendimethalin reduced his cost of cultivation by saving man days for manual weeding. Moreover he was informed about short duration high yielding varieties released from BHU, IIPR and GBPAUT which contributed a lot for his higher yield.

A. Yield, Net Return and B:C ratio:

Yield (q/ha)		Gross Return (Rs)		Net Return		B:C ratio	
Green gram	Black gram	Green gram	Black gram	Green gram	Black gram	Green gram	Black gram
13.75	15.00	101750	96000	75488	69738	3.87	2.66

Integrated Disease Management

Crop	Area (ha)	No. of Farmers	Performance (Value with Unit) of technologies on different parameters			
			Demo yield (q/ha)	Local check yield (q/ha)	Demo Net Return (Rs/ha)	Local Check Return (Rs/ha)
CEREALS						
Maize	5	12	52.74	45.03	41488	33936
Paddy	41	117	89.25	65.27	62816.77	37066.81
Paddy Hyb.	5	5	48	42.48	32128	33766
SPICES & CONDIMENTS						
Chilli	15	64	102.66	75.91	89926.23	63479.3
Chilli Hyb.	2	5	30.75	27.55	93433	82588
Ginger	2	10	147.4	112.1	219020	145830
Onion	6	20	261.52	250.29	182893.33	137025
PULSES						
Blackgram	1	5	0.04	0.03	91.79	57.98
Chickpea	25.8	70	29.04	22.69	54819.5	40253.17
Green Gram	3	10	8.99	6.89	28815.5	20871.75
Pigeon Pea	2.5	5	15	11	41200	28700
Total	**108.3**	**323**				

Ginger cultivation Using IDM for Higher Income KVK, Bargarh

Sri Jasobanta Budhia, a progressive farmer of village Raisobha of Bhatli block is normally growing vegetables like Cauliflower, Cabbage, Brinjal and spices like ginger, turmeric, chilli etc. in his field along with paddy and sugarcane. But he was not satisfied with the return of ginger cultivation owing to the poor yield potential of the local regenerated variety. Once after attending a training on profitable ginger cultivation of KVK, Bargarh he had contacted with the KVK to adopt the new technology for making this a more remunerative one.

Looking towards his interest, KVK has provided him rhizome rot tolerant HYV *"Suprabha"* through FLD. He has followed the mulching techniques for weed control and moisture conservation in soil. KVK scientist also advised him to go for seed treatment with fungicides like Ridomil 72 MZ, maintaining appropriate plant population, drip irrigation with timely INM and IPDM practices.

After following KVK guidelines he is able to earn a gross income of Rs 58,000/- by investing Rs 32,000/- for ginger cultivation in half acre of land. By observing his success the other nearby farmers are interested to adopt the ginger cultivation in larger area. So, he is now playing a key role to provide his own produce of this Suprabha var. to the other farmers of the district through ATMA by which he is now gaining popularity among the farming community of the Bargarh district.

Figure 1KVK Intervention in farmer field

Figure 2 Drip irrigation in ginger field

Resource Conservation Technologies

Crop	Area (ha)	No. of Farmers	Performance (Value with Unit) of technologies on different parameters			
			Demo yield (q/ha)	Local check yield (q/ha)	Demo Net Return (Rs/ha)	Local Check Return (Rs/ha)
OILSEED						
Soybean	11	27	15.89	13.71	28500	24595.25
Paddy	33.1	72	111.97	81.3	131514.08	86504.39
Wheat	5	12	18.6	16	17390	14400
Total	**49.1**	**111**				

Empowering Turmeric seed grower with ridge and furrow planting resource conservation technology

Most of the farmers are Ratlam district grown old and un identified variety of the turmeric with conventionial method and flood irrigation system without scientific management as a result of they do not get potential yield, ultimetaly received poor monetary returns. In Ratlam district wide scope of seed replacement by improved variety is there. If the farmers applied recommended practices of crop production as a result of farmers can get potential yield and higher income. There is need to motivate the farmers to produce their own seeds for their sowing purpose as well as to multiply and sell to other farmers this will increase seed replacement ratio in the district.

Technology Introduce

Ridge and furrow planting system with drip irrigation and recommended package and practices grading, packing and selling as seed.

KVK Intervention

Personnel discussion, On & Off Campus training, linkage with Horticulture Department, awareness to micro irrigation and fertigation system, scientist visit to farmers field, Exposure visits viz Nizamabad (A.P.), Sangli (Maharashtra) & Jhansi (U.P.)

Comparative expenditure of traditional and improved method of cultivation

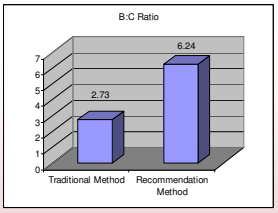
S.N.	Particular	Expenditure of Traditional Method (In Rs.)	Expenditure of Recommendation Method (In Rs.)
1	Land Preparation	5000	5500
2	Planting Material	82500	135000
3	Sowing	3700	4000
4	Inter culture Operation	25000	26000
5	Manuring	20000	24000
6	Chemical fertilizer	10000	12000
7	Plant Protection Measure	9000	10000
8	Irrigation & Crop watch	10000	15000
9	Harvesting	14000	14000
10	Grading	6500	7000
11	Packing	6500	7000
	Total	**192200**	**259500**

Performance of demonstration

Particular	Yield (q/ha)	Avg. cost (Rs./ha)	Gross Income	Net Income (Rs/ha)	B:C Ratio	% increase yield
Traditional Method	105	192200	525000	332800	2.73	71.42
Recommendation Method	180	259500	1620000	1360500	6.24	

Outcome:

- Planting material produce by the farmers – 180 q.
- Increase in annual income of the farmers / farmers family.
- Promotion of spices and best use of land.



Impact:

- Village Riyavan is now famous for authentic good quality planting material of turmeric. Now, Nanalal doesn't go to market to sell his produce, market person comes to his door to buy his produce.

Small Scale Income Generating Enterprises

Crop	Area(ha)	No. of Farmers	Performance (Value with Unit) of technologies on different parameters			
			Demo yield (q/ha)	Local check yield (q/ha)	Demo Net Return (Rs/ha)	Local Check Return (Rs/ha)
Bee Keeping	16	16	0.04	0.03	5.43	3.04
Lac	0.24	10	1.35	0	63150	0
Low Tunnel	10	10	0.47	0.26	20.75	4.02
Mushroom	563	175	1725.7	149.27	2797.58	522.84
Vermi Compost	11	15	0.04	0.01	9.05	1.94
Total	**600.24**	**226**				

Self employment through secondary agriculture

Background: Pratima Mohapatra w/o Basanta Kumar Mohapatra, village- Durgaparasad Block- Boudh, Dist- Boudh is a landless house wife. She was interested to start an income generation enterprise by tilising locally available resources.

Intervention:

She has been trained on mushroom cultivation and value addition of fruits and vegetables in different training programmes organized by KVK, Boudh. Different methods of raising mushroom beds like soaking straw, pasteurizing straw and preparing mushroom beds, taking care of mushroom beds and harvesting mushroom were demonstrated through KVK FLD programmes. Subsequently by her own effort she set up a small mushroom production unit at Durgaprasad. Initially she started mushroom cultivation in a small scale by investing Rs. 600/- she got a net income Rs. 6000/- from oyster mushroom in a period of 2 months. Along with it she also started preparing value added Amla products (Amla churna). In which by investing Rs. 675/- she got net income 1500/- . Her hard work along with technical advice and support given by the scientist of KVK, Boudh made the unit a great success.

Impact:

Now she is cultivating mushroom throughout the year i.e. Paddy straw from June to October and oyster from November to February. Now she is earning a monthly income about Rs 4000/- from fresh mushroom and Rs. 12000/- in a year from value added Amla product. House wives and farm women in and around the locality were inspired by her success had started mushroom cultivation and value added Amla churna preparation of their own. Now Mrs. Mohapatra has also become master trainers for other farm women. She has also got financial assistance of Rs. 15000/- from District Collector for value addition enterprises and also financial assistance of Rs. 80000/- from Horticulture Dept for mushroom cultivation. She is very much contented with her effort and income.

Drudgery Reduction

Crop	Area(ha)	No. of Farmers	Performance (Value with Unit) of technologies on different parameters			
			Demo yield (q/ha)	Local check yield (q/ha)	Demo Net Return (Rs/ha)	Local Check Return (Rs/ha)
Groundnut	5	5	0.22	0.07	1.45	0.85
Improved Sickle	1	5	1.5	1.44	301.98	292.57
Maize Sheller	5	5	0.18	0.06	76.47	36.27
Okra	10	10	0.08	0.05	291.26	553.4
Paddy	1	10	1.44	0.29	43.27	23.08

Total	22	35				

Value Addition, Capacity Building and Storage

Crop	Area(ha)	No. of Farmers	Performance (Value with Unit) of technologies on different parameters			
			Demo yield (q/ha)	Local check yield (q/ha)	Demo Net Return (Rs/ha)	Local Check Return (Rs/ha)
Big	20	20	15.04	10.04	37882.19	22628.1
Paddy	1	150	32.4	29.2	91280	84620
Potato	2	5	220.92	194.28	83460	69640
Bee Keeping	16	16	0.04	0.03	5.43	3.04
Lac	0.24	10	1.35	0	63150	0
Low Tunnel	10	10	0.47	0.26	20.75	4.02
Mushroom	563	175	1725.7	149.27	2797.58	522.84
Vermi Compost	11	15	0.04	0.01	9.05	1.94
Wheat	1	40	28.7	27.8	41700	43940
Aonla	14	24	23593.33	11735	3636.67	518.67
Mahua	5	5	0.7	0.52	15.06	6.8
Paddy	5	5	0.58	0.52	11.54	10.48
Total	**648.24**	**475**				

Farm Machinery for Mechanization

Crop	Area(ha)	No. of Farmers	Performance (Value with Unit) of technologies on different parameters			
			Demo yield (q/ha)	Local check yield (q/ha)	Demo Net Return (Rs/ha)	Local Check Return (Rs/ha)
Bullock Drawn Dora	5	5	17.7	14.8	37100	29900
Cotton	1	5	0.08	0.07	110.64	64.4
Drudgery Reduction	0.06	6	225	75	1800	0
Groundnut	4.5	15	2.6	1.7	6015.59	4195.13
Lentil / Seed Cum Fertilizer Drill	2	5	8.56	7.12	18054	12806
Mustard	1	10	20.31	17.45	49961	41245
Paddy	29	58	89.43	77.63	77318.47	59373.06
Paddy Drum Seeder	1	5	0.28	0.24	209.8	139.86
Pigeon Pea	12.25	32	31.98	26.43	62985.75	64778.75
Potato	2	5	220.92	194.28	83460	69640
Rotavator	8.5	30	30.67	25.55	38171.83	31813.5
Soybean	17	35	16.82	13.88	26065.83	18797.17
Wheat	13	30	62.97	54.04	61199.75	55123.5
Total	**96.31**	**241**				

Livelihood from custom hiring of farm machinery and implements, KVK -Angul

An ITI trained youth-Mr. Prasant Kumar Dehury, of Chhendipada block entered the business of custom hiring by purchasing a tractor with cultivator availing Govt. subsidy. In order to pay back his loan early, Prashant made an attempt to rent his tractor and implements, which was a turning point. The returns were more and encouraged Prashant to take the business seriously. With the passage of time and his earnings, continue to increase. He acquired more implements and machine (see Table) and employing tractor drivers for execution of the work. Prashant today is a role model in the village and a resource person in KVK Angul. As a result land levelling; there is a change in cropping system and increase in productivity.

Sl. No.	Name of implement / machinery	No. of units	Av. hours of hiring per annum	Cost of hiring (Rs. /hr.)	Gross income	Cost involved	Net return	BC Ratio
1.	Tractor	4	-	-	-	-	-	-
2.	Cultivator	4	600	500	300000	210000	90000	1.43
3.	M.B. Plough	3	2400	500	1200000	840000	360000	1.43
4.	Leveller	3	2400	500	1200000	840000	360000	1.43
5.	Axial flow paddy thresher	2	600	500	300000	210000	90000	1.43
	TOTAL				**3000000**	**2100000**	**900000**	

Animal Feed Management and Disease Management

Crop	Area(ha)	No. of Farmers	Performance (Value with Unit) of technologies on different parameters			
			Demo yield (q/ha)	Local check yield (q/ha)	Demo Net Return (Rs/ha)	Local Check Return (Rs/ha)
Poultry	500	5	2400	1778	227.8	172.8
Goat	63	35	99	68.5	1249.5	754.5
Total	**563**	**40**				

KVK, Bargarh

Profitable Vanaraja Rearing – A boon for rural women

It has been recognised that backbone of the rural poor women economy is backyard poultry rearing. One can earn daily income by sale of egg and periodical income by sale of birds with a low investment. However, the profit from rearing of local poultry bird is very low owing to its poor egg yield potential and body weight.

So, KVK Bargarh has carried out demonstration on rearing management on Vanaraja poultry for higher profit owing to its rapid growth and more egg laying capacity. Through this programme a rural girl Miss Bijli Kumbhar D/o Sri Makardwaja Kumbhar of village Tamparsara was convinced to rear Vanaraja poultry as after leaving school she had engaged herself in local poultry rearing. So, she has been provided with 20 numbers of 21 days old chicks and trend on proper feeding and rearing management with timely vaccination schedule.

By following KVK advice she could able to earn a gross income of Rs 12800/- from both meat and egg with a minimum maintenance expenditure of Rs 3500/- for these birds. Being influenced by this success now she has been rearing 200 birds in a unit from which she is earning Rs 7500/- per month. She has nearly saved Rs 70,000/- for her marriage in near future. She is also planned to make a poultry unit with capacity of 500 birds. By observing the success more egg lying potential of Vanaraja poultry the other local poultry farmers have shown their interest for this profitable Vanaraja breed.

4. Training Organized

Training has been considered a key component for updating the knowledge and imparting the new skill to the participants. There was great emphasis on the organizing trainings both for the farmers as well as for the trainers so that equilibrium could be maintained in the KVKs. Data shows the significant increase in the number of trainings and participants. In total, 7206 courses benefitted to 174775 participants including farmers and farm women, rural youth, extension personnel and sponsored from different agencies given in Table 4.1.

Table 4.1: State wise, category wise training programmes conducted by the KVKs in Zone VII during 2012-13

Type	No. of courses				Participants			
	CG	MP	Odisha	Zone VII	CG	MP	Odisha	Zone VII
Farmers & Farm Women	1037	2995	1766	5798	35490	68635	43036	147161
Extension personnels	67	348	222	637	1764	8173	3423	13360
Rural youth	65	374	332	771	1960	6543	5751	14254
Vocational Training	76	251	168	495	2473	5520	2420	10413
Total	**1245**	**3968**	**2488**	**7701**	**41687**	**88871**	**54630**	**185188**

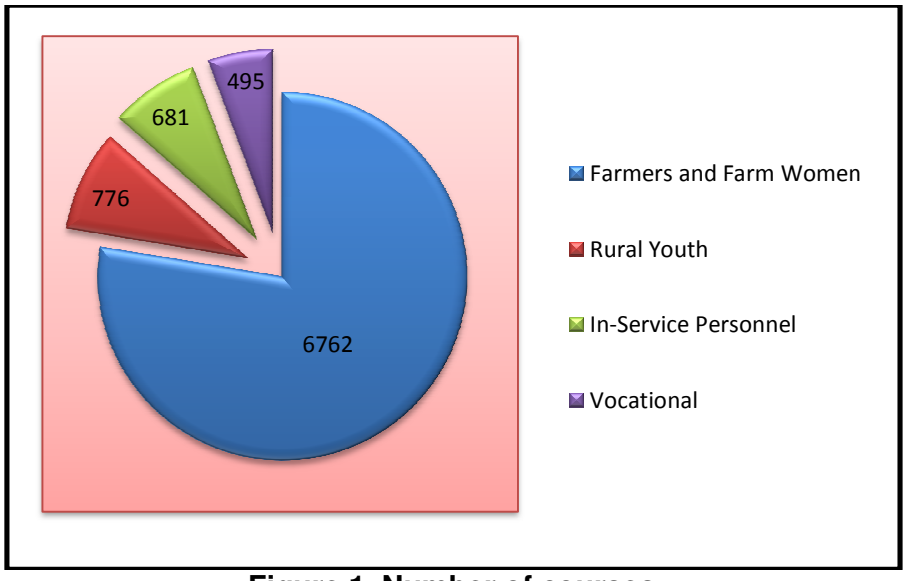


Figure 1. Number of courses

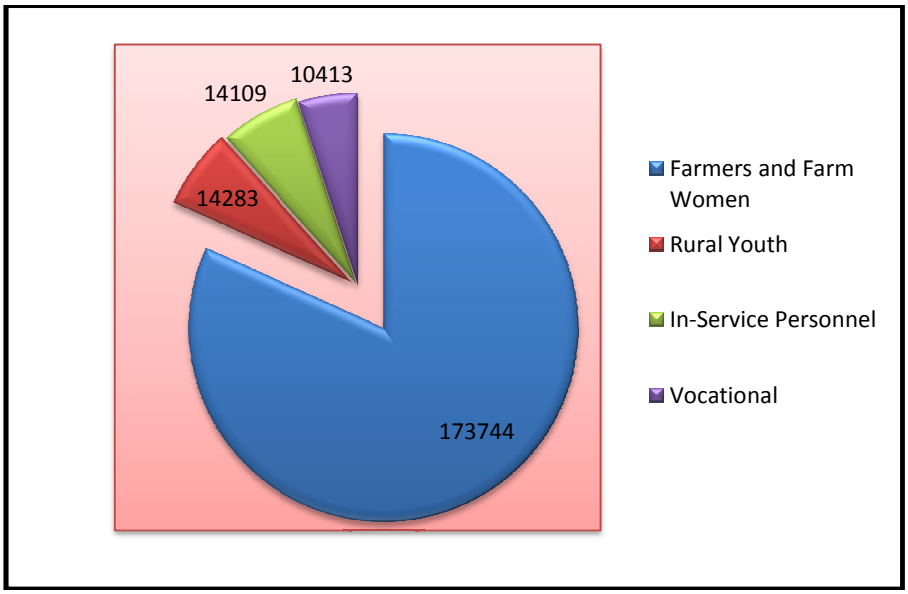


Figure 2. Number of participants

Table 4.2: Training for farmers and farm women including sponsored training programmes by the KVKs in Zone VII during 2012-13

Major Theme	No	Total		
		M	F	T
Horticulture	949	19986	4668	24654
Livestock	614	11042	3761	14803
Agronomy	2566	57223	12097	69320
Others	507	10698	2168	12866
Soil Health	747	14761	2884	17645
Agril. Engineering	511	11116	1896	13012
Home Science/Women empowerment	802	5565	14287	19852
Production of Inputs at site	66	841	751	1592
Total	**6762**	**131232**	**42512**	**173744**

Table 4.3: Training for Rural youths including sponsored training programmes by the KVKs in Zone VII during 2012-13

Category	No	Total		
		M	F	T
Agril. Engg.	22	426	159	585
Agro forestry	4	62	4	66
Capacity Building	16	219	103	322
Crop Production	207	1970	516	2486
Farm Mechanization	14	207	55	262
Horticulture	113	1692	642	2334
IPM	42	720	366	1086
Leadership development	3	41	9	50
Livestock	54	759	235	994
Mobilisation of social capital	2	77	0	77
Processing	7	65	57	122
Small Scale Income Generation	209	2742	1415	4157
Soil Sampling & testing methods	7	162	91	253
Storage	4	57	39	96
Value addition	33	231	340	571
Others	39	644	178	822
Total	**776**	**10074**	**4209**	**14283**

Table 4.4: Training programmes for Extension Personnel including sponsored training programmes by the KVKs in Zone VII during 2012-13.

Category	No.	Total		
		M	F	T
Agril. Engg.	29	491	257	748
Agroforestry	1	25	0	25
Capacity Building	9	100	55	155
CBD	73	1178	347	1525
Crop Production	126	2404	274	2678
Forestry	7	105	13	118
Home Science	41	226	497	723
Horticulture	77	1100	434	1534
IDM	4	85	2	87
IFS	4	74	14	88
INM	46	859	240	1099
IPM	129	2181	506	2687
Livestock	39	473	267	740
NRM	1	13	0	13
Small Scale Income Generation	30	307	257	564
Soil	7	199	7	206
Other	58	877	242	1119
Total	**681**	**10697**	**3412**	**14109**

Table 4.5: Details of Vocational training programmes carried out by KVKs for rural youth in Zone VII during 2012-13.

Category	No	Total		
		M	F	T
Agril. Engg.	17	389	56	445
Crop production	108	1995	926	2921
Home Science	32	98	633	731
Horticulture	91	1377	650	2027
IDM	1	123	27	150
IFS	4	50	0	50
INM	1	20	5	25
IPM	12	247	13	260
Livestock	34	404	96	500
Small Scale Income Generation	125	1535	932	2467
Soil Sampling and Analysis	3	73	12	85
Storage	4	70	22	92
Others	63	495	165	660
Total	**495**	**6876**	**3537**	**10413**

5. Extension Programmes

With the objective of creating awareness about frontier technologies, a number of extension activities were organised by KVK at campus and at farmers' fields in the villages. These extension activities include method demonstration to small group to kisan mela for huge gathering. It also includes use of old communication techniques of poster exhibition to latest technique of SMS. Broadly, these activities are (i) advice based like Farm advisory services, lectures delivered as resource person and method demonstration (ii) Animal related like animal health and vaccination camp (iii) Literature based like exhibition, extension literature and popular article (iv) media based production of CD/DVD, Film show, News paper coverage, radio talks and TV talks (v) meeting based like ex-trainee sammelan, celebration of important days, club meet, farmers' seminar, field day, group meet, gosthi, mela SHG meeting and workshops (vi) soil related activities like soil health camp and soil test campaign (vii) visit based activities like diagnostic visits, exposure visits, farmers visit to KVK and scientists visits to farmers fields. Quanta of these activities are presented state wise graphically. In all 51406 activities were conducted and 9.83 lakh farmers, farm women, rural youth and extension workers were benefited (Table 5).

Table 5: Details of extension activities organized by the KVKs during 2012-13

Activity	No. of activities	Detail of Participant												
		Farmers /others							Extension Personnel			Total of farmers and extension personnel		
		Others		SC/ST		Total								
		M	F	M	F	M	F	T	M	F	T	M	F	T
Agri mobile clinic	135	661	41	609	137	1270	178	1448	137	35	172	1407	213	1620
Animal Health Camp	106	2837	455	1733	583	4509	1038	5543	230	97	284	4757	1094	5892
Celebration of important days	191	7924	2571	4366	3013	12290	5584	17874	519	172	691	12809	5756	18565
Diagnostic visits	3990	10122	1637	8204	1554	18326	3191	21517	693	101	794	19019	3292	22311
Electronic Media (CD./DVD)	6	0	0	0	0	0	0	0	13	2	15	13	2	15
Exhibition	338	289419	7023	49410	7103	338829	14126	352955	1907	310	2217	340736	14436	355172
Exposure visits	62	949	82	477	50	1426	132	1558	34	4	38	1460	136	1596
Extension Literature	677	19469	3720	10450	2181	29919	5901	35820	1105	149	1254	31024	6050	37074
Extrainees Sammelan	164	2130	510	1443	419	3573	929	4502	138	27	165	3711	956	4667
Farm advisory Services	3394	7093	1250	3337	933	10430	2183	12613	606	61	667	11036	2244	13280
Farm Science Club conveners meet	142	2142	392	672	175	2814	567	3381	107	17	124	2921	584	3505
Farmers Seminar	122	3070	423	1467	463	4537	886	5423	249	43	292	4786	929	5715
Farmers visit to KVK	14978	17414	2532	10448	1518	27862	4050	31912	881	108	989	28743	4158	32901

Activity	No. of activities	Detail of Participant												
		Farmers /others							Extension Personnel			Total of farmers and extension personnel		
		Others		SC/ST		Total								
		M	F	M	F	M	F	T	M	F	T	M	F	T
Field Day	768	14996	2761	10307	2914	25303	5675	30978	989	195	1184	26292	5870	32162
Film Show	1882	22876	4954	14179	4900	37055	9854	46909	1259	357	1616	38314	10211	48525
Group meetings	1285	9186	2102	7960	2252	17146	4354	21500	426	89	515	17572	4443	22015
Kisan Ghosthi	591	10057	1640	8506	2503	18563	4143	22706	607	99	706	19170	4242	23412
Kisan Mela	184	78797	14914	62790	13042	141587	27956	169543	2553	430	2983	144140	28386	172526
Lectures delivered as resource person	2944	45485	6641	22563	6108	68048	12749	80797	2591	383	2974	70639	13132	83771
Mahila mandals conveners meetings	4	0	4	4	16	4	20	24	0	0	0	4	20	24
Method Demonstrations	791	4774	1176	3397	1300	8171	2476	10647	371	88	459	8542	2564	11106
News paper coverage	2223	812	252	750	222	1562	474	2036	470	8	478	2032	482	2514
Popular articles	721	3268	648	1844	379	5112	1027	6139	188	31	219	5300	1058	6358
Radio talks	631	0	0	0	0	0	0	0	5	3	8	5	3	8
Scientific visit to farmers field	13830	43564	5745	22315	6316	65879	12061	77940	1148	274	1422	67027	12335	79362
Self help group conveners meeting	215	1155	2163	675	969	1830	3132	4962	77	69	146	1907	3201	5108
Soil health Camp	35	755	33	1074	333	1829	366	2195	68	4	72	1897	370	2267
Soil test campaigns	60	961	100	579	156	1540	256	1796	28	1	29	1568	257	1825
TV talks	338	475	230	356	45	831	275	1106	403	3	406	1234	278	1512
Workshop	148	1405	437	2532	402	3937	839	4776	1031	95	1126	4968	934	5902
Farmer-Scientist Interface	46	400	66	870	351	1270	417	1687	147	51	198	1417	468	1885
Plant Health Camps	122	80	2	77	2	157	4	161	1	1	2	158	5	163
Soil Sample Testing	265	971	100	759	171	1730	271	2001	28	1	29	1758	272	2030
Awareness Camps	3	502	0	82	25	584	25	609	9	0	9	593	25	618
Participatory Rural Appraisal	4	82	7	244	15	326	22	348	29	13	42	355	35	390
Others	11	205	47	55	36	260	83	343	21	3	24	281	86	367
Total	**51406**	**604036**	**64658**	**254534**	**60586**	**858509**	**125244**	**983749**	**19068**	**3324**	**22349**	**877595**	**128527**	**1006163**

Note: M-Male, F-Female and T-Total

6. Technology week

Technology week concept was given to the KVKs for showcasing the available technologies to the district level extension functionaries and farmers. During technology week, farmers could directly interact with KVK experts, technology generators and extension personnel which would result in higher adoption of the technology. Status of Technology week organized by KVKs in Zone VII is given in Table 6.

Table 6: Details of technology week organized by the KVKs during 2012-13

No. of KVK	Types of Activities	No. of Activities	Number of Participants	Related crop/livestock technology
78	Animal health camp	9	678	Livestock
	Awareness camp	9	499	Mushroom Production, Bio Control
	Bio Fertilizers (q)	200.06	204	vermicompost
	Diagnostic Practical's	659	4746	Cereals, Oilseed,Pulses, Vegetable etc
	Distribution of Literature (No.)	22871	45564	Newsletter,pamphlets,popular articale etc
	Distribution of Livestock specimen (No.)	5233	613	Livestock
	Distribution of Planting materials (No.)	116581	53671	Vegetable & Fruits
	Distribution of Seed (q)	1111.5	3880	Cereals,Oilseed,Pulses etc.
	Drudgery reduction	1	25	Improved sickle, sugarcane stripper, sunflower thresher
	Ex trainees meet	6	200	Discuss about latest technology & feed back about adoption of technology.
	Exhibition	122	22745	Latest technologies, livestock etc.
	Exhibition of farm implement	1	25	Seed drill, Turmeric boiling drum, cono weeder, M.B plough, Rake weeder, Groundnut decorticator, Groundnut stripper, Maize sheller
	Exposure visit	3	140	Seasonal Crop
	Fair	57	33578	Crops and others enterprises
	Famers' Club convention	1702	50291	Demonstration of Crop varieties & Livestock
	Farm Visit	13	804	Cereals, Oilseeds, Pulses, Vegetable, live stock etc
	Farmers Scientist inter action programme	2	87	Crops and others enterprises
	Field Day	421	15522	Crop, live stock

No. of KVK	Types of Activities	No. of Activities	Number of Participants	Related crop/livestock technology
	Film show	1	25	Fish farming
	Fish feed management	41	555	Fish feed management techniques
	Gajar ghas & Vermicomposting	0	0	Control measures of gajarghas etc.
	Gajar Ghas Jagruta Saptah	355	10582	Discuss about the technology adoption
	Gosthies	1	25	Plant Protection chenicals
	IPM	1389	23251	Crops/Livestock
	Lectures organized	6	588	Kharif and rabi crop management practices, Integrated Nutriect, Pest and Disease management, livestock, fisheries etc.
	Live Demonstration	7	Mass	
	News coverage	1	40	
	Plant health camp	5	470	Latest Scientific technologies on various crop & livestock's
	Road show	1	100	
	Seminar	1	120	
	SHG Sammelan	3	150	Soil test based fertilizer recommendation
	Soil health Awareness campaign	4	170	Soil health management
	Soil health camp	0	0	
	Seed treatment campaign	1	25	Tomato soup and pickle
	Value addition			
	World Environment Day	2	84	Workshop on gender sensitization and Training program
	Workshop	9	678	Livestock
	Total number of farmers visited the Technology week		**270370**	

7. Production of quality seed and planting materials

Availability of the quality seeds timely and adequate happened to be the major constraints to the farmers. Therefore, it was taken as challenge and appropriate steps were taken at the KVKs for helping the farmers in this regard. With industrious efforts, a considerable progress has been made and there is increase in seed quantity as well as other planting materials as shown in the following Tables 7.1 and 7.2. The KVKs of the zone produced 20727.16 q of seed and 25.48 lakhs numbers of planting material of different crops live cereals, pulses, oilseeds, vegetables, medicinal plants, fruits, etc. and distributed among farmers. Besides, KVKs of the zone also produced bio-products and livestock products at their farms.

Table 7.1: Category-wise seed and planting material produced by the KVKs in Zone VII

State	2012-13	
	Seed (q)	Planting material (no)
Chhattisgarh	2959.40	135250
M.P.	12781.58	1570836
Odisha	4986.18	841572
Total	**20727.16**	**2547658**

Table 7.2: Status of seed production (q) in Madhya Pradesh

Crop Category	Crop	Quantity (q)	Value (Rs)	Provided to No of Farmers
Cereals	Barley	1.92	3840	7
Cereals	Maize	147.21	679730	6
Cereals	Paddy	1253.67	2379700	1128
Cereals	Wheat	5232.66	7702198	1504
Fodder	Berseem	0.5	-	5
Fruits	Aonla	0.5	600	1
Fruits	Guava	0.01	1200	1
Medicinal	Ashwagandha	0.04	-	5
Millets	Kodo	9.85	19500	-
Oilseeds	Groundnut	22.5	-	-
Oilseeds	Linseed	6.25	25000	-
Oilseeds	Mustard	69.875	46900	317
Oilseeds	Mustard	69.875	46900	317
Oilseeds	Niger	0.6	-	0
Oilseeds	Sesame	5.3	8000	78
Oilseeds	Soybean	3707.1	12210026	795
Ornamental crops	Marigold	0.74	370000	-
Pulses	Black Gram	138.59	308515	87
Pulses	Chick pea	449.15	2163400	92
Pulses	Gram	1491.3	3434101	699

Crop Category	Crop	Quantity (q)	Value (Rs)	Provided to No of Farmers
Pulses	Guar	0.7	13020	2
Pulses	Lentil	20.6	-	15
Pulses	Pea	44.7	25000	16
Pulses	Pigeon pea	105.94	282247	316
Pulses	Urd	2	-	17
Total		**12781.58**	**29719877**	**5408**

Table 7.3: Status of Seed production (q) in Odisha

Crop Category	Crop	Quantity (q)	Value (Rs)	Provided to No of Farmers
Cereal	Paddy	3983.52	2558875	230
Fodder	Dhanicha	2.6	8300	30
Oilseeds	Groundnut	21.66	90986	10
Oilseeds	Niger	0.6	2970	-
Oilseeds	Toria	2.21	10586	-
Others	Mushroom	806.9	13520	-
Others	Sunhemp	2	-	-
Pulse	Blackgram	1.86	2000	-
Pulses	Arhar	19.87	79709	-
Pulses	Green gram	8.22	56664	48
Pulses	Pigeon pea	6.53	46335	45
Spices	Turmeric	130	412500	65
Vegetable	Tomato	0.21	15945	30
Total		**4986.18**	**3298390**	**458**

Table 7.4: Status of Seed production (q) in Chhattisgarh

Crop Category	Crop	Quantity (q)	Value (Rs)	Provided to No of Farmers
Cereals	Maize	120.2	144240	301
Cereals	Paddy	2040.79	2343171	42766
Cereals	Wheat	346.2	383725	663.5
Minor millets	Ragi	38	82402	1008
Oilseeds	Lathyrus	21.2	3600	23
Oilseeds	Linseed	14.35	10050	176
Oilseeds	Mustard	7.26	15000	363
Oilseeds	Safflower	1.8	5400	9
Oilseeds	Soybean	86.7	314377	289
Pulses	Blackgram	12.85	209145	161
Pulses	Chickpea	173	288700	305

Crop Category	Crop	Quantity (q)	Value (Rs)	Provided to No of Farmers
pulses	Field pea	38.8	11400	18
Pulses	Pea	18.25	-	45
Pulses	Pigeon Pea	14	133200	175
Spices	Ginger	1		3
Spices	Turmeric	8	4000	28
Vegetables	Potato	17	11900	17
Total		**2959.4**	**3960310**	**46350.5**

Table 7.5: Status of Seed production (q) in Zone-VII

Crop Category	Crop	Quantity (q)	Value (Rs)	Provided to No of Farmers
Fruits	Aonla	0.5	600	1
Pulses	Pigeon pea	146.34	548491	536
Medicinal	Ashwagandha	0.04	-	5
Cereals	Barley	1.92	3840	7
Fodder	Berseem	0.5	-	5
Pulses	Black Gram	153.3	519660	248
Pulses	Chick pea	622.15	2412100	397
Fodder	Dhanicha	2.6	8300	30
pulses	Field pea	38.8	11400	18
Spices	Ginger	1	-	3
Pulses	Gram	1491.3	3434101	699
Pulses	Green gram	8.22	56664	48
Oilseeds	Groundnut	44.16	80986	10
Pulses	Guar	0.7	13020	2
Fruits	Guava	0.01	1200	1
Millets	Kodo	9.85	19500	-
Oilseeds	Lathyrus	21.2	3600	23
Pulses	Lentil	20.6	-	15
Oilseeds	Linseed	20.6	35050	176
Cereals	Maize	267.41	813970	307
Ornamental crops	Marigold	0.74	370000	-
Others	Mushroom	806.9	13520	-
Oilseeds	Mustard	147.01	108800	997
Oilseeds	Niger	1.2	2970	0
Cereal	Paddy	7174.98	6919246	44059
Pulses	Pea	63.05	28000	61
Vegetables	Potato	17	11900	17
Minor millets	Ragi	38	82402	1008
Oilseeds	Safflower	1.8	5400	9
Oilseeds	Sesame	5.3	8000	78

Crop Category	Crop	Quantity (q)	Value (Rs)	Provided to No of Farmers
Oilseeds	Soybean	3766.8	12524403	1084
Others	Sunhemp	2	-	-
Vegetable	Tomato	0.21	15945	30
Oilseeds	Toria	2.11	10586	-
Spices	Turmeric	268	829000	158
Pulses	Urd	2	-	17
Cereals	Wheat	5578.86	8085923	2167.5
Total		**20727.16**	**36978577**	**52217**

Table 7.6: Status of planting material production (no) in Madhya Pradesh

Crop Category	Crop	Quantity (nos)	Value (Rs)
Flowers	Gaillardia	810	205
Flowers	Marigold	7406	2491
Flowers	Rose	8044	892
Forest Species	Amaltas	200	-
Forest Species	Bamboo	13848	52888
Forest Species	Cassia sama	500	5000
Forest Species	Eucalyptus	3100	13000
Forest Species	Gulmohar	100	1000
Forest Species	Kachnar	1000	5000
Forest Species	Mahua	100	-
Forest Species	Sesum	1239	6390
Fruits	Aonla	10205	57010
Fruits	Bael	14	84
Fruits	Bahera	13	130
Fruits	Custard Apple	10056	64458
Fruits	Guava	8655	82828
Fruits	Jack fruit	1160	13590
Fruits	Jamun	20	200
Fruits	Karonda	15591	41728
Fruits	Lemon	1930	17204
Fruits	Mango	647	3645
Fruits	Mango, gauva, karonda, katahal. Sitaphal, drumstick etc.	2935	17053
Fruits	Papaya	7725	32966
Fruits	Pomegranate	557	10740
Fruits	Tamarind	300	1500
Medicinal	Alobera	4	80
Ornamental crops	Ashok	264	3640
Ornamental crops	Chameli	29	232

Crop Category	Crop	Quantity (nos)	Value (Rs)
Ornamental crops	Chandani	56	448
Ornamental crops	Croton	54	1080
Ornamental crops	Duranta brown	14106	48
Ornamental crops	Faikus	19	380
Ornamental crops	Ratrani	18	112
Ornamental crops	Shuo Plant	612	6523
Ornamental crops	Tikoma	500	2500
Ornamental crops	Various flowers plants	132890	41231
Spices	Chilli	242487	16481
Spices	Onion	419860	29689
Vegetables	Bitter Gourd	3	24
Vegetables	Brinjal	161867	14555
Vegetables	Brocali	2050	378
Vegetables	Cabbage	11990	3130
Vegetables	Cauliflower	36958	10944
Vegetables	Red cabbage	1575	473
Vegetables	Sponge Gourd	2	16
Vegetables	Tomato	299337	42768
Vegetables	Various vegetables plants	150000	-
Total		**1570836**	**604734**

Table 7.7: Status of planting material production (nos) in Odisha

Crop Category	Crop	Quantity (nos)	Value (Rs)
Flowers	Marigold	52025	16048
Forest species	Bamboo, Acacia mangium, Hillbrom grass	2375	7950
Fruits	Mango	4587	47562
Fruits	Papaya	2882	16573
Medicinal	Kumkum	500	-
Medicinal saplings	Aloe vera, Brahmi, Stivia, Aswagandha	26	130
Plantation	Acacaia, Teak, Bamboo,Mahagony,Seasonal flowers	8000	27000
Plantation	Drumstick	839	4968
Plantation	Eucalyptus	30	70
Plantation	Forest saplings	847	4235
Plantation	Mangium	348	224
Plantation	Teak	1379	5588
Spices	Chili	27388	14478
Vegetables	Brinjal, Tomato, Cauliflower,Cabbagae, Knol khol	505368	73250
Vegetables	Broccoli	12250	-

Crop Category	Crop	Quantity (nos)	Value (Rs)
Vegetables	Cabbage	19890	5315
Vegetables	Capsicum	14500	250
Vegetables	Cauli flower	48160	21036
Vegetables	Pointed gourd	1570	6626
Vegetables	Tomato	138608	29170
Total		**841572**	**280473**

Table 7.8: Status of planting material production (nos) in Chhatisgarh

Crop Category	Crop	Quantity(nos)	Value (Rs)
Fruits	Drumstick	50	300
Fruits	Papaya	200	200
Spices	Chilli	3000	-
Spices	Onion	8000	1800
Tuber	Sweet Potato	56000	24000
Vegetable seedlings	Tomato, Cauliflower, Brinjal	50000	1500
Vegetables	Brinjal	11000	-
Vegetables	Cabbage	1500	-
Vegetables	Tomato	5500	-
Total		**135250**	**27800**

Table 7.9: Status of Planting Material Production (nos) in Zone-VII

Crop Category	Crop	Quantity (q)	Value (Rs)
Flowers	Gaillardia	810	205
Flowers	Marigold	59431	18539
Flowers	Rose	8044	892
Forest Species	Amaltas	200	-
Forest Species	Bamboo	16223	60838
Forest Species	Cassia sama	500	5000
Forest Species	Eucalyptus	3100	13000
Forest Species	Gulmohar	100	1000
Forest Species	Kachnar	1000	5000
Forest Species	Mahua	100	-
Forest Species	Sesum	1239	6390
Fruits	Aonla	10205	57010
Fruits	Bael	14	84
Fruits	Bahera	13	130
Fruits	Custard Apple	10056	64458
Fruits	Drumstick	50	300
Fruits	Guava	8655	82828
Fruits	Jack fruit	1160	13590
Fruits	Jamun	20	200
Fruits	Karonda	15591	41728

Crop Category	Crop	Quantity (q)	Value (Rs)
Fruits	Lemon	1930	17204
Fruits	Mango	8169	68260
Fruits	Papaya	10807	49739
Fruits	Pomegranate	557	10740
Fruits	Tamarind	300	1500
Medicinal	Kumkum	500	-
Medicinal saplings	Aloe vera, Brahmi, Stivia, Aswagandha	30	210
Ornamental crops	Ashok	264	3640
Ornamental crops	Chameli	29	232
Ornamental crops	Chandani	56	448
Ornamental crops	Croton	54	1080
Ornamental crops	Duranta brown	14106	48
Ornamental crops	Faikus	19	380
Ornamental crops	Ratrani	18	112
Ornamental crops	Shuo Plant	612	6523
Ornamental crops	Tikoma	500	2500
Ornamental crops	Various flowers plants	132890	41231
Plantation	Acacaia, Teak, Bamboo,Mahagony,Seasonal flowers	8000	27000
Plantation	Drumstick	839	4968
Plantation	Eucalyptus	30	70
Plantation	Forest saplings	847	4235
Plantation	Mangium	348	224
Plantation	Teak	1379	5588
Spices	Chili	272875	30959
Spices	Onion	427860	31489
Tuber	Sweet Potato	56000	24000
Vegetable seedlings	Tomato, Brinjal, Chilli, Cauliflower	728235	89305
Vegetables	Bitter Gourd	3	24
Vegetables	Brocali	14300	378
Vegetables	Cabbage	33380	8445
Vegetables	Capsicum	14500	250
Vegetables	Cauli flower	85118	31980
Vegetables	Pointed gourd	1570	6626
Vegetables	Red cabbage	1575	473
Vegetables	Sponge Gourd	2	16
Vegetables	Tomato	593445	71938
Total		**2547658**	**913007**

Production of Bio-products

Status of bio-agents/bio pesticides/ bio fertilizers production by the KVKs are presented in Table 7.10.

Table 7.10: Production of bio-agents / bio pesticides/ bio fertilizers by KVKs in Madhyapradesh

Major Group Bio agent/Bio fertilizers/Bio Pesticides	Name of the Product	Qty (In Kg)	Qty (In No)	Amount (Rs.)		Number of KVK
				Cost of inputs	Gross income	
Bio Agents	Earth worm (Esinia foetida)	533		0	68550	4
Bio Agents	Trichoderma viridi	5	2204	1000	55100	1
Bio Fertilizer	Azotobactor		1125	7400	42500	1
Bio Fertilizer	BGA	32		320	320	1
Bio Fertilizer	PSB		48880	1003761	369940	3
Bio fertilizer	Raj Vijay Honey	23.79		90000	175000/-	1
Bio Fertilizer	Rhizobium		46518	90525	307749	3
Bio Fertilizer	Vermi compost	9826.13		316073	431520	34

Table 7.11: Production of bio-agents / bio pesticides/ bio fertilizers by KVKs in Chhatishgarh

Major Group Bio agent/Bio fertilizers/Bio Pesticides	Name of the Product	Qty (In Kg)	Qty (In No)	Amount (Rs.)		Number of KVK
				Cost of inputs	Gross income	
Bio Agents	Earth worm (Esinia foetida)	40		4800	16000	1
Bio Agents	Trichoderma viridi	5		1000	1500	1
Bio fertilizer	Vermi compost	139.33		4100	71698	6
Bio Pesticide	Panchgavya, Agneyastra, Neem extract	12		3500	4200	1

Table 7.12: Production of bio-agents / bio pesticides/ bio fertilizers by KVKs in Odisha

Major Group Bio agent/Bio fertilizers/Bio Pesticides	Name of the Product	Qty (In Kg)	Qty (In No)	Amount (Rs.)		Number of KVK
				Cost of inputs	Gross income	
Bio Agents	Earth worm (Esinia foetida)	50.15		14128	23256	5
Bio fertilizer	Raj Vijay Honey	21	841	5250		1
Bio fertilizer	Vermi compost	121.07		49724	54735	9
Bio Agents	*Trico card (Trichogramma chilonis)*		200	0	0	0
Bio Fertilizer	PSB		48880	1003761	369940	3
Bio Agents	Raj Vijay Honey	23.79		90000	175000	1
Bio Fertilizer	Rhizobium		46518	90525	307749	3
Bio Fertilizer	Vermi compost	9826.13		316073	431520	34

Production of Livestock materials

Status of Livestock Production production by the KVKs of Zone VII is presented in Table 7.13.

Table 7.13: Status of Livestock Production in KVKs under Madhya Pradesh during 2012-13

Name of the animal/bird/aquaties	Breed	Type of production	Quintity (No./Kg)	Value (in Rupees)	No. of KVKs
Cattle	Cross beed	Milk (Lit)	7784	194,595	1
Cattle	Sahiwal	Milk (Lit)	4347.5	95601	1
Buffalo	Murrah	Milk (Lit)	5525.55	130977.9	1
Fisheries	Pangesia Suchi, Rohu and Catla	Adult	460	18500	2
Goat	Jamunapari	Kids	20	0	2
Poultry	Krishna-Jand Kadaknath	Bird	320	48900	2

Table 7.14: Status of Livestock Production in KVKs under Chhatishgarh during 2012-13

Name of the animal/bird/aquaties	Breed	Type of production	Quintity (No./Kg)	Value (in Rupees)	No. of KVKs
Fisheries	Rohu, Katla & Mrigal	Adult Fish	220	10000	2
Fisheries	Katla-Rohu-Mrighal, Mangur	Fingerlings	20000	18000	1
Poultry	Local	Eggs	350	1050	1
Duckery	Naghans, Khaki Camble	Eggs	150	750	1

Table 7.15: Status of Livestock Production in KVKs under Odisha during 2012-13

Name of the animal/bird/aquaties	Breed	Type of production	Quintity (No./Kg)	Value (in Rupees)	No. of KVKs
Cattle	Red Sindhi cross Jersey	Milk	2475	48722	1
Fisheries	IMC	Adult Fish	280		1
Fisheries	IMC	Fingerlings	373360	105650	4
Fisheries	Indian carp	Adult Fish	158.5	5850	2
Fisheries	Indian carp	Fingerlings	10000	3500	2
Fisheries	Colour Fish	Fish pairs (No.)	80	800	1
Poultry	Banaraja	Bird (No.)	200	18000	1
Poultry	Banaraja, Chhabro and Rainbow	Chicks	12361	370250	13
Duckery	Khakichambel	Ducklings (No.)	150	6000	1
Honey bee	Apis Cerana indica	Honey	12	3000	1
Mushroom	Paddy straw mushroom spawn , oyster mushroom spawn	Mushroom spawn	639	19360	4
Turkey		chicks	10	3500	1
vermicompost	*Eisnia foetida*	Vermicompost	600	3000	1

Table 7.16: Status of Livestock Production in KVKs under Zone-VII during 2012-13

Name of the animal/bird/aquaties	Breed	Type of production	Quintity (No./Kg)	Value (in Rupees)	No. of KVKs
Cattle	Cross beed	Milk (Lit)	7784	194,595	1
Cattle	Sahiwal & Red Sindhi cross Jersey	Milk (Lit)	6822.5	144323	2
Buffalo	Murrah	Milk (Lit)	5525.55	130977.9	1

Name of the animal/bird/aquaties	Breed	Type of production	Quintity (No./Kg)	Value (in Rupees)	No. of KVKs
Fisheries	Pangesia Suchi, Rohu, Mrigal and Catla	Adult	838.5	34350	6
Fisheries	IMC	Adult Fish	280		1
Fisheries	IMC	Fingerlings	373360	105650	4
Fisheries	Katla-Rohu-Mrighal, Mangur	Fingerlings	30000	21500	3
Fisheries	Colour Fish	Fish pairs(No.)	80	800	1
Goat	Jamunapari	Kids	20	0	2
Poultry	Banaraja	Bird (No.)	200	18000	1
Poultry	Krishna-Jand Kadaknath	Bird	320	48900	2
Poultry	Local	Eggs	350	1050	1
Poultry	Banaraja, Chhabro and Rainbow	Chicks	12361	370250	13
Duckery	Khakichambel	Ducklings(No.)	150	6000	1
Duckery	Naghans, Khaki Camble	Eggs	150	750	1
Honey bee	Apis Cerana indica	Honey	12	3000	1
Mushroom	Paddy straw mushroom spawn , oyster mushroom spawn	Mushroom spawn	639	19360	4
Turkey		Chicks	10	3500	1
vermicompost	*Eisnia foetida*	Vermicompost	600	3000	1

8. Details of soil, water and plant analysis

Soil and water testing is an import activity of KVK for improving the soil fertility and sustainability of agricultural production. During the year the KVKs of zone analyzed 25146 soil samples and 639 water samples though which more than 25 thousand farmers of 915 villages were benefitted (Table 8). The highest numbers of samples were tested in the state of Madhya Pradesh followed by Odisha and Chhattisgarh. The KVK wise details of soil and water samples tested are given in Table 8.

Table 8 : Summary of soil and water samples tested by the KVKs in Zone-VII during 2012-13

State	Details	No. of Samples	No. of Farmers	No. of Villages covered
Madhya Pradesh	Soil samples	18831	16706	440
	Water samples	86	66	30
Chhattisgarh	Soil samples	262	200	12
Odisha	Soil samples	6053	4527	271
	Water samples	553	378	162
Zone-VII	**Soil samples**	25146	21423	723
	Water samples	639	444	192
	Total	25785	21867	915

9. Scientific Advisory Committee meetings

The Scientific Advisory Committee meetings were conducted to get necessary guidance and support to carry out the mandated activities of KVK in a more planned and scientific manner by participating the members from research institution, ZPD, line department, farmers, etc. The Committee monitors progress and facilitate in-depth exchange of views in specific fields. The Committee evolves the scientific and technical vision documents for the KVK, reviews periodically and takes further course of action as deemed fit for further scientific and technological activities of the KVK. Therefore, all KVKs were asked to conduct the meetings on the periodical basis (twice in a year). Total 140 SAC meetings conducted are presented in Table 9. Out of 99 functional KVKs, 95 KVKs have conducted their SAC. 45 KVK have conducted twice while 50 KVK have conducted once.

Table 9: Status of SAC conducted by KVKs during 2011-12

State	Host	S. No.	Name of KVKs	No. of SACs Conducted
Chhattisgarh	IGKV		Baster	1
Chhattisgarh	IGKV		Bilaspur	1
Chhattisgarh	IGKV		Dantewada	1
Chhattisgarh	IGKV		Dhamtari	1
Chhattisgarh	IGKV		Durg	1
Chhattisgarh	IGKV		Janjgir Champa	1
Chhattisgarh	IGKV		Jashpur	-
Chhattisgarh	IGKV		Kanker	1
Chhattisgarh	IGKV		Kawardha	1
Chhattisgarh	IGKV		Korba	1
Chhattisgarh	IGKV		Korea	1
Chhattisgarh	IGKV		Mahasamund	1
Chhattisgarh	IGKV		Raigarh	1
Chhattisgarh	IGKV		Raipur	1
Chhattisgarh	IGKV		Rajnandgon	1
Chhattisgarh	IGKV		Sarguja	1
Chhattisgarh	IGKV		Narayanpur	1
Chhattisgarh	IGKV		Bijapur	1
Chhattisgarh	IGKV		Gariyaband	1
Chhattisgarh	IGKV		Balrampur	1
Total				**19**
Madhya Pradesh	JNKVV		Balaghat	2
Madhya Pradesh	JNKVV		Betul	2
Madhya Pradesh	JNKVV		Chhatarpur	2
Madhya Pradesh	JNKVV		Chhindwara	2
Madhya Pradesh	JNKVV		Damoh	2

State	Host	S. No.	Name of KVKs	No. of SACs Conducted
Madhya Pradesh	JNKVV		Dindori	2
Madhya Pradesh	JNKVV		Harda	2
Madhya Pradesh	JNKVV		Hoshangabad	2
Madhya Pradesh	JNKVV		Jabalpur	2
Madhya Pradesh	JNKVV		Katni	2
Madhya Pradesh	JNKVV		Mandla	2
Madhya Pradesh	JNKVV		Narsinghpur	2
Madhya Pradesh	JNKVV		Panna	2
Madhya Pradesh	JNKVV		Rewa	2
Madhya Pradesh	JNKVV		Sagar	2
Madhya Pradesh	JNKVV		Seoni	2
Madhya Pradesh	JNKVV		Shahdol	2
Madhya Pradesh	JNKVV		Sidhi	2
Madhya Pradesh	JNKVV		Tikamgarh	2
Madhya Pradesh	JNKVV		Umaria	2
Madhya Pradesh	RVSKVV		Ashoknagar	2
Madhya Pradesh	RVSKVV		Badwani	2
Madhya Pradesh	RVSKVV		Bhind	2
Madhya Pradesh	RVSKVV		Datia	2
Madhya Pradesh	RVSKVV		Dewas	2
Madhya Pradesh	RVSKVV		Dhar	2
Madhya Pradesh	RVSKVV		Guna	2
Madhya Pradesh	RVSKVV		Gwalior	2
Madhya Pradesh	RVSKVV		Jhabua	2
Madhya Pradesh	RVSKVV		Khandwa	2
Madhya Pradesh	RVSKVV		Khargone	2
Madhya Pradesh	RVSKVV		Mandsaur	2
Madhya Pradesh	RVSKVV		Morena	2
Madhya Pradesh	RVSKVV		Neemuch	2
Madhya Pradesh	RVSKVV		Rajgarh	2
Madhya Pradesh	RVSKVV		Shajapur	2
Madhya Pradesh	RVSKVV		Sheopur	2
Madhya Pradesh	RVSKVV		Shivpuri	2
Madhya Pradesh	RVSKVV		Ujjain	2
Madhya Pradesh	NGO		Burhanpur	2
Madhya Pradesh	NGO		Indore	2
Madhya Pradesh	NGO		Ratlam	2
Madhya Pradesh	NGO		Raisen	2

State	Host	S. No.	Name of KVKs	No. of SACs Conducted
Madhya Pradesh	NGO		Satna	1
Madhya Pradesh	NGO		Sehore	2
Madhya Pradesh	ICAR		Bhopal	2
Total				**91**
Odisha	OUAT		Angul	1
Odisha	OUAT		Balasore	1
Odisha	OUAT		Bargarh	1
Odisha	OUAT		Bhadrak	1
Odisha	OUAT		Bolangir	1
Odisha	OUAT		Boudh	1
Odisha	CRRI		Cuttack	1
Odisha	OUAT		Deogarh	1
Odisha	OUAT		Dhenkanal	1
Odisha	OUAT		Gajapati	1
Odisha	OUAT		Ganjam	1
Odisha	OUAT		Jagatsinghpur	1
Odisha	OUAT		Jajpur	1
Odisha	OUAT		Jharsuguda	1
Odisha	OUAT		Kalahandi	1
Odisha	OUAT		Kandhamal	1
Odisha	OUAT		Kendrapara	1
Odisha	OUAT		Keonjhar	1
Odisha	CIFA		Khurda	1
Odisha	OUAT		Koraput	1
Odisha	OUAT		Malkangiri	1
Odisha	OUAT		Mayurbhanj	1
Odisha	OUAT		Nabarangpur	1
Odisha	OUAT		Nayagarh	1
Odisha	OUAT		Nuapada	1
Odisha	OUAT		Puri	1
Odisha	OUAT		Rayagada	1
Odisha	OUAT		Sambalpur	1
Odisha	OUAT		Sonepur	1
Odisha	OUAT		Sundargarh	1
Total				**30**
Total – Zone VII				**140**

10.Technological backstopping through technical literatures and media

10.1 Newsletter

Status of Newsletter published by the KVKs during 2012-13 are presented in Table 10.1

Table 10.1: State wise Newsletter published by the KVKs during 2012-13

State	No. of issues	No. of copies printed	No. of copies distributed
Madhya Pradesh	4	116100	109290
Chhattisgarh	4	13500	13292
Odisha	4	42000	40380
Zone VII	**--**	**171600**	**162962**

10.2. Publications

Status of literature and print media published by the KVKs during 2012-13 are presented in Table 10.2

Table 10.2: Category wise literature and print media published by the KVKs of Zone VII during 2012-13

Category	No. of KVKs	Number
Research Paper	25	109
Technical bulletins	14	30
Technical reports	13	97
Other reports		
Abstracts	5	32
Popular Articles	28	329
Pumphlet (No. of Copies)	3	20
Leaflets/Folder (No. of Copies)	22	131
Book/Booklet (No. of Copies)	16	38
Conceptual Paper	1	1
Extension Literature	5	16
Folder (No. of copies)	18	90
News paper Coverage	23	357
Newsletter	43	160
Poster	1	2
Technical Folder	2	12
Training Material	1	1
Year Planner	12	11
CDs (No. of Copies)	19	39
DVDs (No. of Copies)	5	8
Total	**256**	**1483**

11. Details on HRD activities

Table 11.1: HRD activities organized in identified area for KVK staff by the Directorate of Extension

Title of Training	Date	No. of Programme	No. of Participant	No. of KVKs involved
Indira Gandhi Krishi Vishwavidyalaya, Raipur (Chhattisgarh)				
Orientation programme of Programme Assistant (Comp. Assistance)	05-06/12/2012	01	19	19
Orientation programme of SMS	13-15/12/2012	01	31	20
Modern approaches for extension data analysis using software	19-21/12/2012	01	31	20
Total		**03**	**81**	**--**
Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur (Madhya Pradesh)				
Pre Zonal Workshop of KVKs	18-19/04/2012	1	34	21
Technological Backstopping on Methodology of Soil, Plant and Water Testing	18-20/06/2012	1	08	08
Technological Backstopping on Methodology of Soil, Plant and Water Testing	21 -22.06.2012	1	08	08
Convergence Plan of Technology trough KVKs	03-0 4/07/2012	1	38	20
Technological Backstopping on Component of Technology Park and Review of Progress of Technological Park	24/09/2012	1	38	20
Technological Backstopping on Convergence and Review of Program of Central and State Government Programs and KVKs.	02/02/2013	1	34	20
Total		**06**	**160**	**--**
Rajmata Krishi Vishwa Vidyalaya, Gwalior (Madhya Pradesh)				
EFC Review Meeting of KVKs	11/04/ 2012	1	39	24
Pre- Zonal workshop of KVKs	22-23/04/2012	1	48	24
Workshop on Agropedia	13/05/ 2012	1	49	24
Integrated pest and disease management practices in important crops	26-27/07/ 2012	1	23	23
Crop diversification for livelihood security	23-24 /08/2012	1	34	24
Off season vegetable cultivation	17-21/09/ 2012	1	27	0
Underutilized fruits & vegetables	6-7/10/ 2012	1	34	24
Workshop on “Technology Dissemination Action Plan of KVKs”	13-14/12/2012	1	34	24
Participatory Extension Approaches for commercial Agriculture	27-28/12/2012	1	33	24
Improved Agriculture Technology	03-05/01/ 2013	1	60	1

Title of Training	Date	No. of Programme	No. of Participant	No. of KVKs involved
Integrated farming system for sustainable livelihood	9-10/01/ 2013	1	30	24
Conservation of Agricultural Biodiversity	28 Feb. to 01 Mar. 2013	1	34	24
Total		**12**	**445**	**--**
Total Zone		**21**	**686**	**--**

Table 11.2: HRD activities organized by Zonal Project Directorate in collaboration with ICAR Institute in identified areas for KVK staff

Training Topic	Date	Venue	No. Of Participants	Collaborating Institute
Recent Production Technology of Kharif Crops for Middle Level Officers of Department of Agril in Bundelkhand Region of M. P.	15-17/5/2012	KVK Tikamgarh	31	National Rainfed Area Authority, New Delhi
Training-Cum-Workshop on Weed Management	28-29/6/2012	ZPD, Zone VII, Jabalpur	32	Directorate of Weed Science research, Jabalpur
Training – cum-Workshop on Soybean	6-7/7/2012	DSR, Indore	50	Directorate of Soybean Research, Indore
Training-cum-workshop on Rice Production Technology	11-12/7/2012	CRRI, Cuttak	52	Central Rice Research Institute, Cuttak
Training-Cum-Workshop in Fishery Technology	12/7/2012	CIFA, Bhubaneswar	52	Central Institute of Freshwater Aquaculture, Bhubaneswar
Training–cum-Workshop on Livestock Production Management	18/7/2012	ZPD, Zone VII, Jabalpur	22	Nanaji Deshmukh Pashu-Chikitsa Vigyan Vishwavidyalaya, Jabalpur
Review Workshop on Climate Resilient Agriculture	24-25/7/2012	RVSKVV, Gwalior	38	Rajmata Vijayraje Scindhia Krishi Vishwa vidyalaya, Gwalior
Training- cum-Workshop on Farm Mechanization	7-8/8/2012	KVK Bhopal	42	Central Institute of Agril Engineering, Bhopal
KVK Knowledge Exchange Meet 2012	27-29/8/2012	DRWA, Bhubaneswar	75	Directorate of Research on Women in Agriculture, Bhubaneswar

Training Topic	Date	Venue	No. Of Participants	Collaborating Institute
Interface of KVK with PDADMAS, Bengaluru	4/10/2012	ZPD, Zone VII, Jabalpur	21	Project Directorate on Animal Disease Monitoring and Surveillance (PDADMAS), Bengaluru
Training- cum-workshop on Soil Fertility Management	9-10/10/2012	IISS, Bhopal	52	Indian Institute of Soil Science, Bhopal
Training- cum-workshop on Pulses production under NFSM	16-17/10/2012	ZPD, Zone VII, Jabalpur	36	ZPD, Zone VII, Jabalpur
KVK ATMA Interface	5-6/2/2013	Hotel Palash, Bhopal	155	Govt of Madhya Pradesh
Training cum Workshop on vKVK and KVK Net	2/3/2013	ZPD, Zone VII, Jabalpur	25	Indian Institute of Technology, Kanpur
Total			**683**	

Table 11.3: KVK Visit/Workshop/Training/Symposium attended by the ZPD Staff/Scientist

S. No.	Particulars	No. of Programmes
1	Training	08
2	Workshop	11
3	Conference	05
4	Seminar	04
5	KVK Visit	98
6	Any other	11
Total		**137**

Table 11.4: Footfall of farmers in KVKs of Zone VII

KVK	Particulars of Farmer				Officials / Officers Visit	Public Representative /VIPs/VVIPs
	Individual		Group			
	Self Financed	Sponsored	Self Financed	Sponsored		
Madhya Pradesh	26258	5325	4817	25775	3415	342
Chhattisgarh	3258	2074	865	9484	1043	447
Odisha	13943	544	688	4635	1152	141
Total	**43459**	**7943**	**6370**	**39894**	**5610**	**930**

12. Awards and Recognitions

Zonal Best KVK Award:

Jhabua received "Best Krishi Vigyan Kendra Award 2011 (Zone VII)" at 7th National Conference held at PAU, Ludhiana for working with 87 per cent tribal farmers, motivating them for adopting line sowing, kadaknath poultry, control of Red hairy caterpillar and formation of 11 SHGs to produce certified seeds of Maize, Soybean, Wheat and Gram.

Jagjivan Ram Abhinav Kisan Puraskar

Jagjivan Ram Abhinav Kisan Puraskar (Zonal, Zone VII) for the year 2011 was awarded to Mr. Vilas Tijare Dist. Seoni for his initiative in development of water-chestnut based integrated farming system dated 16 July 2012 by Hon'ble Union Minister of Agriculture & food processing, Government of India in the presence of Hon'ble D.G. ICAR Dr. S. Ayyappan, Secretary & Director General, ICAR, New Delhi. He integrated different enterprises, viz. fish culture, Mango plantation, Dairy farming, and water chestnut cultivation under the technical guidance of KVK Seoni.

Dr. M. S. Randhwa Memorial Award

Dr K.D. Kokate received Dr. M. S. Randhwa Memorial Award by National Academy of Agricultural Sciences, New Delhi for his outstanding contribution in Agricultural Administration, Transfer of Technology, and Social Sciences for the Biennium 2011-12. As DDG (AE), ICAR since 2009 his contributions include reforms in technology application, market linkages, synergy and partnership with stakeholders, ICT application for knowledge management via mobile based

agro advisory and e-connectivity to 8 Zonal Project Directors and 192 KVKs across the country, contigent crop planning for drought mitigation, advisory to 1.3 million farmers, organizing programmes for sustainable crop yield, and technologies related to climate resilient agriculture.

Young Scientist Award

1. Dr. S. R. K. Singh, Senior Scientist (Ag Extn.), Zonal Project Directorate, Zone VII, Jabalpur was conferred Young Scientist Award by the Society for Community Mobilization for Sustainable Development (MOBILIZATION), New Delhi in recognition of his outstanding work done in the field of research, extension and monitoring during 6th National Seminar on " Emerging Challenges and Paradigm for Sustainable Agri-Rural Development", held during December 18-20, 2012 at Dr. Y. S. Parmar University of Horticulture and Forestry, Solan (H.P.).

2. Dr. A. P. Dwivedi, Senior Scientist (Agronomy), Zonal Project Directorate, Zone VII, Jabalpur was conferred Young Scientist Associate Award by the Bioved Research Institute of Agriculture & Technology, Allahabad, U.P. in recognition of his outstanding work done in the field of Agronomy for research, extension and monitoring during 15th Indian Agricultural Scientists & Farmers Congress, held during 22-24 February, 2013 at Vigyan Parishad , University of Allahabad, Allahabad, U.P.

13. Flagship Programmes in Zone VII

1. Kisan Mobile Advisory (KMA)

Kisan Mobile Advisory (KMA) is the easiest ICT tool working successfully for dissemination of latest information to the farmers and farm women in the states of Madhya Pradesh, Chhattisgarh and Orissa. This ICT based *alternate agricultural information and rural delivery mechanism through Mobile phone* was initiated during 2007 in ZPD Zone VII, Jabalpur. It is based on the linear model of communication. This is the unique programme for making linkages between different stakeholders who are key players for making Indian agriculture sustainable in the coming future through intensive use of ICT tools like mobile phone. Short Message Service (SMS) is being provided by KVKs to the farmers. KVKs implemented the programme and during 2012-13, total 7265 text messages were sent which benefitted to 274188 users by the operational KVKs in the Zone

Table 13.1: Details of KMA during 2012-13 in KVKs of Zone VII

State	No. of KVK	No. of Messages	No. of Farmers	No. of Extension Personnel	Total Beneficiary
M.P.	47	4007	117905	5113	127025
CG	20	406	59823	4511	64740
Odisha	33	2852	76474	3097	82423
Zone VII	100	7265	254202	12721	274188

2. Climate Resilience Agriculture through KVKs under NICRA

Zonal Project Directorate, Zone VII monitor the performance of 14 NICRA KVKs namely KVK Balaghat, KVK Chhattarpur, KVK Datia, KVK Guna, KVK Morena, KVK Satna, KVK Tikamgarh in Madhya Pradesh, KVK Bhatapara, KVK Bilaspur, KVK Dantewara in Chhattisgarh, KVK Kendrapara, KVK Ganjam, KVK Jharsuguda, KVK Sonepur in Orrisa. These KVKs are conducting the field activities as per their approved action plan. Module-wise progress are given here:

Natural Resource Management: Under this module, a total of 1238 farmers benefited and cover the 938.6 ha area in the Zone VII. Out of 1238 farmers (570 for M.P, 154 for CG, and 514 for Odisha) and covered the area 659.5 ha M.P, 142.3 ha CG, and 136.8 ha Odisha in all intervention BC ratio ranged from 1.31 to 3.90 in these activities.

Crop Production: Under this module, total 2062 farmers benefited and covered the 1026.58 ha area in the Zone VII during the year 2012-13. Out of 2062 farmers (1055 for M.P, 217 for CG, and 579 for Odisha) and covered the area 657.38 ha in M.P, 57.4 ha in CG, and 250.5 ha in Odisha in all intervention. BC ratio ranged from demonstration 2.2 to 7.2 and 1.2 to 6.1 in farmer practice.

Livestock and Fisheries: Under this module, total 4315 farmers benefited and covered the 5685.6 Unit/No/ha area in the Zone VII during the year 2012-13. Out of 4315 farmers (1813

M.P, 193 CG, and 670 Odisha) and covered the area 1661 ha in M.P, 260 ha CG, and 1738.2 ha Odisha in all intervention. Output (q/ha) percent increased range 11.8 to 75.0 and BC ratio ranged from demonstration 1.7 to 4.4 and 1.8 to 4.4 in local. The maximum BC ratio 4.4 was obtained in "Use of community lands for fodder production during droughts / floods" intervention.

Institutional interventions module, 5529 farmers benefited and covered the 3270 Unit/No/ha area in the Zone VII during the Year 2012-13. Out of 5529 farmers (3794 farmers in M.P, 26 + 1(SHG group) in CG, and 1709 in Odisha) and covered the area 2061.8 ha in M.P, 14.7 ha in CG, and 1193.5 ha in Odisha in all intervention.

A total 8874 farmers benefited through capacity building in the Zone VII. Out of 3815 farmers (1590 male and 234 female in M.P, 842 male and 209 female in CG, and 612 male and 328 female in Odisha) during the training, 125 courses were covered.

NRM activities Monitored by ZPD Scientists at Datia KVK

Vaccination programme KVK Morena

Farmer training at NICRA village Dantewara

Custom hiring activities Monitored by D. Kathal Research Associate, NICRA at Balaghat KVK

VCRMC activities Monitored by Dr. S.R.K. Singh, PI, NICRA at Datia

Farmers visited custom hiring center at Datia KVK

Green manuring at NICRA village Datia

Mushroom production training to woman SHG at KVK Bilaspur

Monitoring by CIAE Scientist at KVK Kendrapara

In order to create awareness among the farmers in region, large numbers of extension activities were organized by KVK at the farms and the farmer's fields. 5264 farmers benefited through 1030 farmers Kishan goshti , 412 farmers Field day, 1144 farmers by Animal Health camp, 267 farmers by Soil Health Camp,1258 farmers by Nursery Seedlings, 618 farmers by group discussion and 206 farmers benefited through Exposure Visit in during the reporting period.

The testimony of the success of NICRA activities is the number of visitors including dignitaries to the custom hiring centers at NICRA village also wide publicity by the print and electronic media as well as through ICAR website and CRIDA newsletter.

3. Technological Demonstration for Harnessing Pulse Productivity

This programme addressed application of selected technologies related to five major pulse crops viz. chickpea, pigeon pea, green gram, black gram and lentil. The programme envisages demonstrating production potential of newly developed technologies and varieties of pulses at farmers' fields through KVKs to enhance production of pulses in the country. In of Madhya Pradesh and Odisha state, 19 KVKs have conducted demonstration on the field of 415 farmers in area of 200.7 ha in Kharif-2012.

The promising varieties of pulse crops like pigeon pea (JKM-189, TUT-501, ICPH-2671, Shekhar-2), black gram (PU-35, JU-3, JU-86) were taken for demonstration. During the Rabi 2012-13, in Madhya Pradesh and Odisha, 22 KVKs have identified 976 farmers for demonstration on an area of 390.4 ha. Out of 976 demonstrations 720 were conducted in Chickpea, 171 in Lentil, 69 in Green gram and 16 in Black gram respectively. The important pulse crops like Chickpea (JG-16, JG-11), Lentil (JL-3), Black gram, and Green gram were taken for demonstration.

4. Tribal Sub Plan (TSP)

This scheme is aimed for 'Enhancing Pulses Production for Food, Nutritional Security and livelihoods of Tribal Community through Demonstration and Training'. TSP is operational in 10 KVKs located in the tribal region of the M.P. and Chhattisgarh. 212 demonstrations were conducted in different pulse crops during the Kharif 2012 with an area of 85 ha with Black gram (PU-35, JU-3, JU-86) and

Pigeon pea (JKM-189, TUT-501) varieties. During the Rabi 2012-13 the selected KVKs have conducted demonstration with 600 farmers on an area of 240 ha. Varieties like JG-11, JG-16 of Chickpea and JL-3 of Lentil are being demonstrated for enhanced production of pulses. KVKs have organized Field Days for enhanced production of pulses.

Regarding the average demonstrated yield of important crops like gram was ranged from 6.10 to 18.1 qt.ha^{-1} to in demonstrated yield whereas, the average yield of framers' practices was ranged between 3.88 to 11.70 qt.ha^{-1} . In case of pegionpea, the average demonstrated yield was reported with range of 8.90 to 16.25 qt.ha^{-1} while, in farmers' practices the range of average yield was found between 6.05 to 10.25 qt.ha^{1}. The average yield of lentil demonstrations was reported with ranged between 6.15 to 11.40 qt.ha^{-1} against the farmer practices which was ranged from 3.90 to 6.15 qt.ha^{-1}. As per concern of fieldpea, the average yield of demonstration plots was recorded in range between 6.51 to 10.80 qt.ha^{-1} against the farmers' practices which was 4.09 to 8.25 qt.ha^{-1}. The average demonstrated yield of blackgram was recorded in range between 2.62 to 10.90 qt.ha^{-1} against the farmers' practice which was 1.10 to 6.7 qt.ha^{-1}. In case of greengram, the average yield was 10.62 qt.ha^{-1} in demonstration plots against the farmers' practices which was reported 6.25 qt.ha^{-1}.

5. ISOPOM on Maize-

In an effort to enhance the production and productivity of Maize under ISOPOM 312 demonstrations spread out in 312 acres of area were conducted. The new HYV and hybrids of maize like HQPM-1, Proagro4640, Scorpio, Hycel were demonstrated on farmers' field by eight KVKs During the Kharif 2012 with the average demonstrated yield 35.74 qt. ha^{-1} against the average productivity of the zone i.e. 19.78 qt. ha^{-1} . During the Rabi 2012-13, the demonstration on HYV and Hybrids of maize were undertaken with varieties: HQPM-1, Proagro6212, Hybrid-8255, P-3501, JM-216, Hycel, etc. Ten KVKs were conducted the demonstration in area of 300 acre with 300 numbers of demonstrations at farmers field. The average demonstrated yield of the above programme was 56.82 qt. ha^{-1} against the average productivity in Zone i. e. 40.46 qt. ha^{-1} in Rabi season.

14. New Initiatives

KVK is performing very well in the farmers' condition through its well planned mandated activities under the guidance of Division of Agricultural Extension and monitoring system of the ZPD with Director Extension. But due to lack of proper documentation of its works and impact, only few KVK got recognition and appreciation from the farmers and other authorities. Keeping in view the importance of the matter, ZPD Zone VII initiated the work and documented the various activities done by the KVK during previous 5-10 years. The impact was measured on the basis of following parameters -

1. KVK Knowledge Exchange Meet 2012

KVK Knowledge Exchange Meet 2012 was organized at DRWA, Bhubaneswar on 27-29 September, 2012 With the vision of Dr. K.D.Kokate, Deputy Director General (Ag Extn.), ICAR, New Delhi, ZPD Zone VII initiated the Knowledge Exchange Meet. Dr. V. Venkatasubramanian, ADG (Agril. Extn.) inaugurated the KVK Knowledge Exchange Meet 2012 of ZPD, Zone VII KVKs at DRWA, Bhubaneswar. The event was inaugurated in the presence of the Dr. Krishna Srinath, Director, DRWA, Bhubaneswar, Dr. Anupam Mishra ZPD, Zone VII and all seven ZPDs of respective Zones. During inaugural address , Dr. Venkatasubramanium has emphasized on the issue of knowledge management in agriculture through more interaction, communication, discussion, deliberation, acquisition as well as maintaining the knowledge resources at the KVK level. He appreciated the initiative taken by ZPD, Zone VII, Jabalpur through which KVK subject matter specialists got the opportunity to interact with ZPDs, DRWA Scientists, the fellow scientists in their area of expertise.

Dr. Anupam Mishra during his address emphasized the need of the such knowledge exchange for enhancing the competency and efficiency of the KVK Scientists. He pointed out that ZPD, Zone VII has completed six capacity building programme of KVK Scientists with commodity based ICAR Institutes and SAUs - DWSR, Jabalpur, DSR, Indore, MPPCVV, Jabalpur, CIFA, Bhubaneswar, CRRI, Cuttack, CIAE, Bhopal, etc. Also interface with PDADMAS, Bengaluru and IISS, Bhopal is to be held in October, 2012.

Dr. Krishna Srinath, Director DRWA, Bhubaneswar has appreciated the initiative of such event of Knowledge Exchange among the scientist of DRWA with the practical experiences of the KVK Scientists.

On the occasion, Dr. Prabhukumar, ZPD, Zone VIII presented the KVK initiatives on the marketing of the farmers produce through branding as well as proper market linkages.

An exhibition was laid out comprising the promising technology, success story and products made by the 39 KVKs at DRWA, Bhubaneswar, Odisha.

During three days programme, participants were presented the XI Plan period progress apropos their Horticulture and Home Science and also the action plan for 2012-13 was discussed with the experts. Then on the basis of the location of the KVK in the Agro-climatic

Zones, all the participants were divided into seven group and after through discussion they presented their group opinion about the integrated action of the Horticulture and Home Science based on the mandated activities of the KVK.

The programme was conducted by Dr. S.R.K.Singh, Senior Scientist (AE) with the help of DRWA Coordinating Team Dr. A.K.Shukla, PS (Hort.) & IC PME, Dr. Anil Kumar, PS (AS), Dr. Kundan Kishore, Sr. Sci. (Hort.) and Dr. Abha Singh, Sr. Sci. (F&N). A total of 46 KVK participants were attended and benefitted with this programme. Participants were also exposed to the technology of the CIFA, Bhubaneswar and DRWA, Bhubaneswar.

2. KVK ATMA Interface for Joint Strategic Plan for sustaining double digit growth in Madhya Pradesh

KVK ATMA interface was conducted at Bhopal during February 5-6, 2013 in which Shree R.Parshuram, Chief Secretary, Govt of MP inaugurated two days **KVK- ATMA Interface for joint strategy plan for sustainable double digit agricultural growth in MP**. The Chief Secretary expressed the expectation of state government from KVK and ATMA for sustaining the agriculture growth and appropriate strategy for approaching the all category of farmers He emphasized the need for group approach based coordinated efforts. He appealed all the KVK to cover 5000 farmers' upto sowing kharif season through technology, input and technical information effectively.

Dr. M.M. Upadhyay, Agricultural Production Commissioner, Govt. of MP emphasized to connect all category of farmers i.e. resource rich, resource moderate and resource poor farmers for making sustainable agricultural process in the state through active role of KVK & ATMA.

Dr. V.S. TomaSr, Vice Chancellor, JNKVV Jabalpur during his speech classified that KVK will work in convergence mode with ATMA for speedy growth as its sustainability in long run.

Dr. A.K. Singh, Vice Chancellor, RSKVV Gwalior has emphasised on the technology interventions on natural resource management for moisture conservation and yield assurance in the rainfed condition. He instructed the KVK for giving attention on the KVK ATMA linkage in institutional manner.

Dr. Anupam Mishra Zonal Project Director has presented the experience and impact of KVK & ATMA linkage as gave joint action plan with role clarify of KVK & ATMA along with other departments.

Dr. Ravindra Pastore, Commissioner MNREGA, Govt. of MP has proposed business plan through farmers producer organisation for transition from production led to market driven agriculture mode . He shared his experience of making such FPO's and its profitable performance.

Shri R.K.Swai, Principal Secretary, Agriculture has narrated that state has performed very well in agriculture and this interface will help in its future progress.

Dr. D.N.Sharma Director, Agriculture, Govt of M.P. has expressed his great concern on KVK ATMA convergence ffor the future course of action and expressed his satisfaction on the collaborative work done by KVK & ATMA in various districts of M.P.

Besides Shri Sudesh Kumar Principal Secretary, Horticulture , Shri Anurag Shrivastava, Director Horticulture, Shri K.C. Paliwal Add. Director ATMA, Director Extension Services, Joint Director (Agriculture), Project Director ATMA, Programme Coordinators of Madhya Pradesh, , NGO personnels, Chairman NGO and many State officials, total 140 Participants attended the programme. The attitude and interest of state government is testimonies by the presence of top officials from the state department. During concluding session, PC, KVKs and PD, ATMA presented the strategy and approaches along with the input and budget requirements for reaching the 5000 targeted farmers in the Kharif 2013-14. Dr. S.R.K. Singh, Dr. Prem Chand and Mr. Tushar Athare coordinated the Programme.

The action points emerged were:

Outreach

1. Formation of functional Self help group/Commodity interest group/Farmers interest group for selected 5000 farmers on the block level for better monitoring.
2. Messaging to 20 lakh farmers by KVK simultaneously.
3. Identification of database preparing agency for preparing the database of One (1) crore farmer's having cellphone in Madhya Pradesh.
4. Identification and selection of 5000 practicing farmers on the basis of their resources and socio-economic condition.
5. Identification of functional SHGs and its further up scaling into farmer producer organization (FPO) for its marketing.
6. Initiation of Farmer Feedback mechanism by two ways messaging.
7. Technical literature with expert's detail to be supplied to all 5000 farmers.

Production plan

8. Preparation of growth target (10-20%) based District-wise Production Plan for ensuing Kharif 2013-14 for two major field crops, two horticultural crops, animal husbandry, fishery, etc. by the KVK & ATMA.
9. Estimating the input requirement (seed, fertilizer, bio-fertilizer, pesticides) for targeted farmers', crops and area in the district.
10. Submission of district-wise farm implements requirement for the selected crops/enterprise.

11. Preparation of activity chart depicting the clear cut role of KVK ATMA and all concerned agencies.
12. For cross learning among farmers and extension workers, a mechanism to be devised.

Capacity Building for Business Plan

13. Training of farmers and *para* extension workers on the cutting edge production technology.
14. Capacity building of the farmers producer organization/company in the group mobilization and input-output marketing through better knowledge, credit and market linkages.
15. Proposal submission for infrastructure development for all above works at KVK under RKVY.
16. Cross-sectoral dialogue with evaluation sheet.
17. Promotion of PPP model with clear objectives.

Monitoring & Evaluation

18. Monthly monitoring by APC and ZPD/DES at state level.
19. KVK ATMA monitoring plan to be devised at district level.

Documentation & Promotion

20. Initiation of Awards for KVK and farmers (rainfed/irrigated) for both the season kharif and rabi.
21. Documentation of silent change in the society.

3. Capacity Building of the KVK Personnel in collaboration with ICAR Institutes

Knowledge management happened to be the important aspects for the scientists as well as policy makers in the agriculture. As Indian agriculture is transforming from primary secondary agriculture , knowledge management will play a key it has presumed to that knowledge exchange could be one of the effective way for managing the knowledge of all stakeholders of agriculture production system. Keeping in view the importance of knowledge management, ZPD, Zone VII has initiated

knowledge exchange meet of the KVK Subject Matter Specialists with commodity specific ICAR Institutes.

Till date, ZPD, Zone VII has completed 12 such programmes in the term of capacity building programme. These were focussed on weed management , soybean production technology, rice production technology, fishery technology, livestock production management, Climate resilient agriculture, farm mechanization, Interface on Animal Disease monitoring and surveillance, Social fertility management, pulse production under NFSM, TSP and Zonal Workshop etc. All these programmes were conducted with adequate interaction and discussion with scientists and KVK participants. As scientists having latest knowledge and information on new advancement in agricultural technology and KVK SMS having vast field experiences on technological as well as social issues emerged in fields in technology acceptance and adoption.

4. Bulk Messaging to the farmers

Keeping in view the importance of the technical information and its application for the farming community, Bulk Messaging has been initiated in the KVK of Madhya Pradesh on pilot basis and after its initial success; it will be implemented through all KVK of Zone VII. Dr. K.D.Kokate, DDG (AE) had inaugurated the system at KVK Shivpuri during his visit and review to the KVK work.

15. Zonal Project Directorate's Publications

i. Research Articles

1. Seeralan, S., Anupam Mishra, A.Roy, S.V.Ngachan and A.K.Tripathi (2012). Likelihood assessment of women adopting piggery realted technologies in Meghalaya. *Journal of Community Mobilization and Sustainable Development*, Vol. 7 (1), 141-144, January – June, 2012.
2. S.R.K. Singh**,** A.P. Dwivedi and N. Kumar (2012). Performance of tomato (Lycopersicon esculentum) varieties in north-west Himalayan region. *Progressive Horticulture*, Vol. 44 (2), 338-339, 2012.
3. S.R.K.Singh**,** U.S.Gautam and S.K.Pandey (2012). Comparative study of agricultural extension approaches in Uttarakhand. *Indian Res. J. of Ext. Edu.*, Vol. 12 (3), Sept., 2012, Pp. 116-120.
4. A.P. Dwivedi, R.P.Singh, A. Mishra, S.R.K. Singh and Mamta Singh (2012). Effect of Technological Interventions on Yield and Economics of Pigeon pea. *Journal of Extension Education*, Vol. XVI, Nos. 1 & 2 , 2011, pp. 22-26.
5. R.P.Singh, A.P. Dwivedi, S.R.K. Singh**,** A. Mishra, and Mamta Singh (2012). Integrated Pest Management in Pigeon Pea: Adoption and Constraints of the Growers. *Journal of Extension Education*, Vol. XVI, Nos. 1 & 2 , 2011, pp. 38-44.
6. A.P.Dwivedi, S.R.K.Singh, A.Mishra, R.P.Singh and Mamta Singh (2011). Adoption of improved production technology of pigeon pea. *Journal of Community Mobilization and Sustainable Development*, Vol. 6 (2), 150-154, July – December, 2011.
7. Prem Chand, Smita Sirohi and Deepak Rathi (2011). Assessment of women empowerment in dairying: a study of semi-arid Rajasthan. *Indian Journal of Dryland Agricultural Research and Development*, 26(2): 28-32.
8. A.P. Dwivedi, A. Mishra, S.R.K. Singh**,** R.P.Singh, and Amit Jha (2012). Multiplier effect of zero tillage technology on resource conservation in wheat cultivation. *Journal of Community Mobilization and Sustainable Development*, Vol. 7 (1), 137-140, January – June, 2012.
9. M.Chaturvedi, M.K.Dubey, S.R.K.Singh and S.Gaur (2012). Constraints in empowering the women with reference to Jabalpur district of Madhya Pradesh. *JNKVV Research Journal*, 46(3): 398-399.
10. R.K.Singh, S.R.K.Singh and U.S.Gautam (2013). Weed control efficiency of herbicides in irrigated wheat. *Indian Res. J. of Ext. Edu.*, Vol. 13 (1), January., 2013, Pp. 126-128.
11. S.Chouhan, S.R.K.Singh, A.K.Pande, U.S.Gautam (2013). Adoption dynamics of improved sugarcane cultivation in Madhya Pradesh. *Indian Res. J. of Ext. Edu*., Vol. 13 (2), May, 2013, Pp. 26-30.
12. P.Rajan, M.K.Dubey, S.R.K.Singh and M.A.Khan (2013). Factors affecting knowledge of fish farmers regarding fish technology. *Indian Res. J. of Ext. Edu*., Vol. 13 (2), May, 2013, Pp. 126-128.

13. Prem Chand and Smita Sirohi (2012). District level sustainable livestock production index: Tool for livestock development planning in Rajasthan. *Indian Journal of Agricultural Economics* 63 (2): 199-212.

ii. Technical Bulletins/ Mannual

1. A.Mishra, A.P.Dwivedi, S.R.K.Singh (2012). Training Manual on Recent Production Technology of Kharif Crops for Bundelkhand Region of M.P. Pp. Zonal Project Directorate, Zone-VII Jabalpur, Madhya Pradesh.
2. S.R.K.Singh Anupam Mishra and U.S.Gautam (2012). Footfall in KVK (Farmers & dignitaries). Pp.74. Zonal Project Directorate, Zone VII, Jabalpur.
3. Anupam Mishra, S.R.K.Singh, V. P. Chahal, U. S.Gautam, A.P. Dwivedi, Prem Chand, Tusar Athare and P. Adiguru (2012). *KVK Terminology*. Pp. 256. Zonal Project Directorate, Zone-VII Jabalpur, Madhya Pradesh.
4. Anupam Mishra, S.R.K.Singh, V. P. Chahal, U. S.Gautam, A.P. Dwivedi, Prem Chand and Tusar Athare (2012). *Proceedings of KVK Knowledge Exchange Meet*. Pp. 43. Zonal Project Directorate, Zone-VII Jabalpur Madhya Pradesh.
5. Anupam Mishra, V. P. Chahal, S.R.K.Singh, Prem Chand and T. R Athare (2013) "*Strategy for Common Mission for sustaining double digit growth in agriculture*" Proceedings of KVKA-ATMA Interface. Pp. 32. Zonal Project Directorate, Zone-VII Jabalpur Madhya Pradesh.
6. *Madhya Pradesh mein Krishak labhartha yojnayen*. 2013. Pp. 80. Zonal Project Directorate, Zone-VII Jabalpur Madhya Pradesh.
7. *Chhattisgarh mein Krishak labhartha yojnayen*. 2013. Pp. 119. Zonal Project Directorate, Zone-VII Jabalpur Madhya Pradesh.
8. *Orissa mein Krishak labhartha yojnayen*. 2013. Pp. 50. Zonal Project Directorate, Zone-VII Jabalpur Madhya Pradesh
9. Anupam Mishra, U. S.Gautam, Tushar Athare, S.R.K.Singh, A.P. Dwivedi and Prem Chand (2012). Technology Application & Dissemination – Case Studies of KVK-ATMA Convergence. Pp. 30. Zonal Project Directorate, Zone-VII Jabalpur Madhya Pradesh.
10. XXI Meeting of ICAR Regional Committee –II: Status Report. 2012. Zonal Project Directorate, Zone-VII Jabalpur Madhya Pradesh.

11. XXII Meeting of ICAR Regional Committee –VII: Status Report. 2012. Zonal Project Directorate, Zone-VII Jabalpur Madhya Pradesh.

iii. Book Chapters

1. Seeralan, S., Anupam Mishra, A.Roy, S.V.Ngachan and Raj Sarvanan (2012). Issues of effective technology transfer in North East hill region. In: Resilient Shifting Cultivation: Challenges and Opportunities. ICAR Research Complex for NEH Region, Nagaland Centre, Jharnapani, Medziphema, Nagaland. Pp. 99-103.
2. S.R.K.Singh, U.S.Gautam, Anupam Mishra, A.P.Dwivedi and N.Kumar (2013). Promoting Resource Conservation Technologies in Pulses through Krishi Vigyan Kendra**.** In: Resource Conservation Technologies in Pulses, IIPR, ICAR, Kanpur.
3. Prem Chand, Rajesh Sharma, Smita Sirohi, Ram Singh and G. L.Meena (2013) Indian agribusiness management: a critical SWOT Analysis" In: *Approaches for agricultural development*. (Accepted)
4. K.P Singh and Prem Chand (2013) Conservation agriculture: Challenges and opportunities" In: *Conservation agriculture: The new paradigm*.

iv. Scientific/technical review

	Authors	Book chapter
1.	Arun Bhatt, Birendra Prasad and Abhishek Bahuguna	Successful Information Technology (IT) for Agriculture and Rural Development (*Book Chapter*)

v. Presentations in Conferences/Symposia/Seminars/Other forums

1. S.R.K.Singh**,** U.S.Gautam, Anupam Mishra, A.P.Dwivedi (2012). Women Empowerment through Improved Tools and Implements in agriculture. Paper presented during *National Seminar on Empowerment of Women through Gender Budgeting in India* held at Jabalpur during Nov. 30 to Dec. 1, 2012.

2. S.R.K. Singh, Anupam Mishra, U.S.Gautam, A.P. Dwivedi and Prem Chand (2012). Yield Gap Analysis of Sugarcane - an approach for sustainable development. Paper presented during *6th National Seminar on "Emerging Challenges and Paradigm for Sustainable Agri-Rural Development*" held during December 18-20, 2012 at YS Parmar University of Horticulture and Forestry, Solan, H.P.

3. S.R.K.Singh, A.Mishra and U.S.Gautam (2012). Alternative extension approaches for fastening technology transfer. Paper presented in *National Workshop on Recent Trends in Impact Assessment and Best Practices* held at KVK CIFA, Bhubaneswar during December 12-13, 2012 jointly with Association of Aquaculturists.

4. A.P.Dwivedi, Anupam Mishra, U.S.Gautam, S.R.K. Singh, and Prem Chand (2012). Seed Quality Assurance of Pigeon Pea through Crop Production and Protection Technology. Paper presented during *6th National Seminar on "Emerging Challenges and Paradigm for Sustainable Agri-Rural Development*" held during December 18-20, 2012 at YS Parmar University of Horticulture and Forestry, Solan, H.P.

5. A.P.Dwivedi, Anupam Mishra, U.S.Gautam, S.R.K. Singh, Prem Chand and Amit Jha (2012). Enhancing pigeonpea productivity through production and protection technology. Paper presented during *3rd International Agronomy Congress, 2012* held during Nov. 26-30, 2012 at New Delhi, India.

6. S. Agrawal, S.R.K. Singh and N.K.Khare (2012). Economic Empowerment of Women through Regular Income and Employment. Paper presented during *National Seminar on Empowerment of Women through Gender Budgeting in India* held at Jabalpur during Nov. 30 to Dec. 1, 2012.

7. Prem Chand, Smita Sirohi, S. K. Sirohi and Anupam Mishra (2012), "Sustainability of livestock breeding practices: Empirical evidences from semi-arid Rajasthan", Paper Presented during International Conference on "Extension Education in the Perspective of Advances in Natural Resource Management in Agriculture" Organized during 19-21 December, 2012 at SKRAU Bikaner, Rajasthan.

8. R. K. Yogi, K. K. Datta, Shalander Kumar, Prem Chand, Rishikanta Singh, G.L. Meena, L. R Gurjar, K.B Vedamurthy, S. M. Firoze. D. Babu and S.R.S Rathore (2013) Dairy farming: An impending area for harnessing the opportunities in arid and semi arid zones" National seminar on agribusiness potential of Rajasthan, march, 19-20, 2013 at IABM, SKRAU Bikaner, Rajasthan.

vi. Technical/ popular articles

Anupam Mishra, T.R. Athare and Prem Chand (2013) "Institutional arrangement and policy support for documentation, research, up-scaling and capacity building of ITK" In: National Workshop on ITK at NIRD, Hyderabad, AP.