Significant Achievements of Krishi Vigyan Kendra Chandel, Manipur

From 2006-2007 to 2016-2017

ICAR Research Complex for NEH Region,
Manipur Centre, Imphal-795004

Editorial Board

Citation: Deepak Singh, Dehkhohao Doungel, A. Ameeta Devi, Y. Prabhabati Devi, Th. Motilal Singh, Ts. Leenda Monsang, Kl. Levish Chongloi, K. Sonamani Singh (2017). Significant Achievements of Krishi Vigyan Kendra Chandel, Manipur. 44 pages, ICAR Research Complex for NEH Region, Manipur Centre, Imphal.

E – Published by Joint Director, ICAR RC for NEH Region, Manipur Centre, Imphal – 795004

Online published on dated 15th March, 2017

A. Training Programme : As a mandated activity towards human resource development, the KVK organized-728 number of training programme for 16013 numbers of beneficiaries including practicing farmers, farm women, rural youths and extension functionaries, sponsored and vocational training during 2006-07 to 2016-2017 .The farmers and farm women trained were 9344 in number and courses offered were 470 .In providing training to rural youths 118 numbers of courses were offered for benefit of 2231 participants where 59 numbers of courses were organized for 1202 extension functionaries. KVK conducted 55 training course during the period 2006-07 to 2016-17 by different agency which benefited a total of 2106 participants. Out of total participants 857 were male and 1249 were female. Under vocational training programme KVK conducted 26 vocational training courses which benefited a total of 1130 participants.

Category	**No. Of courses conducted**	**Grand total**		
		Male	**Female**	**Total**
Farmers & Farm Women	470	4207	5137	9344
Rural Youth	118	795	1436	2231
Extension Functionaries	59	564	638	1202
Sponsored training	55	857	1249	2106
Vocational training	26	766	364	1130
Total	**728**	**7189**	**8824**	**16013**

.The major areas covered were integrated crop management, seed production, cropping system, integrated farming system, resource conservation technology, water management, nursery management, integrated pest management, rejuvenation of old orchard, gender mainstreaming through SHGs, integrated nutrient management, Management of farm animals, livestock feed and fodder production, value addition, nutritional gardening, Drudgery reduction, women empowerment etc. Both on and off campus courses were conducted by the KVK the requirement of clientele

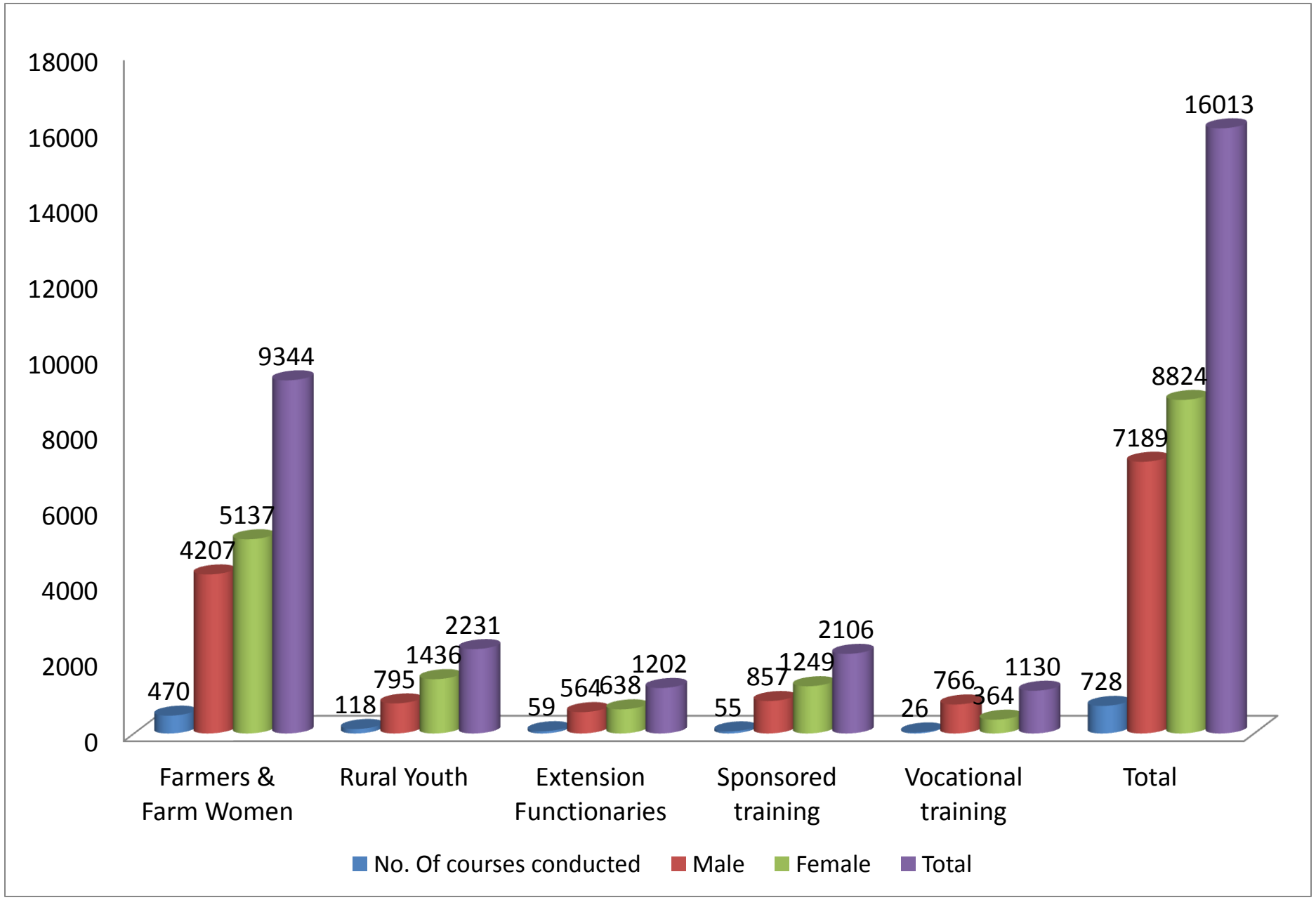
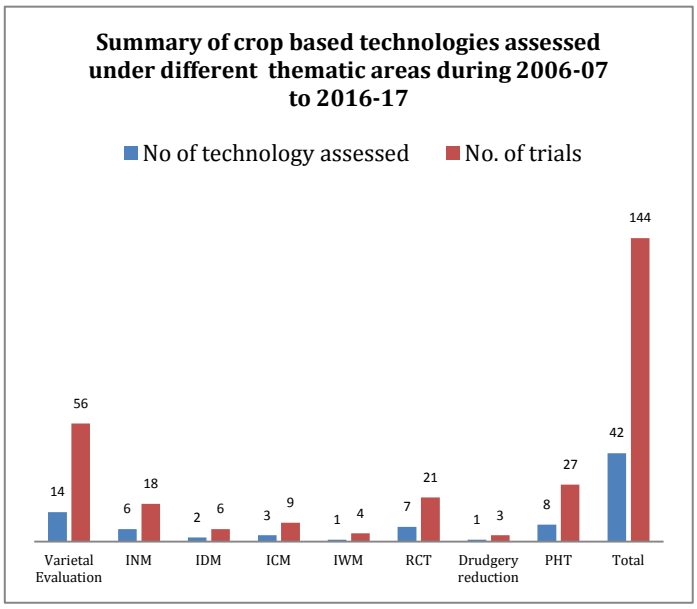
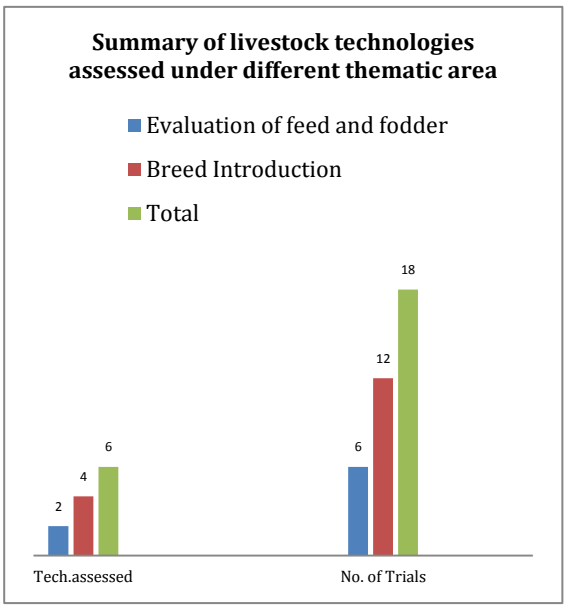


Fig. Distribution of beneficiaries trained by the KVK Chandel during 2006-07 to 2016-

B. Assessment and Refinement of Technologies: Technology Assessment and Refinement (TAR) refer to a set of procedures whose purpose is to develop recommendation for a particular agro-climatic situation/location through assessment and refinement of recently released technology through participatory approach. Its refers to the process or set of activities before taking up new scientific information for its dissemination in a new production system. On this aspect during 2006-07 to 2016-17, a total 48 technologies were undertaken up on different area of crop enterprises by the KVK Chandel for their assessment to identify location specific technologies under local farming situations with 144 nos. of trials indicated in Fig. major thematic area included for assessment were varietal evaluation with 56 nos. of trials, Integrated Nutrient Management (INM-18),Integrated Disease Management (IDM-6), Integrated Crop Management (ICM-9), Integrated Weed Management(4), Resource Conservation of Technology (21), Drudgery reduction (3) and Post-Harvest Technology (PTH-27) . A total of 6 technologies with 18 nos. of trials related to livestock enterprises such as piggery, poultry and duckery were taken up for assessment with major thematic area of evaluation of feed and fodder(6) and Breed introduction (12) .The details of information mention in fig. below mention below.





List of 48 assessed Technologies by KVK

Sl.no	Title of Technology	Assessment period	Either converted in FLD or not
Crop based technologies assessed: Thematic area-Varietal evaluation			
1	Varietal evaluation of Kufari Megha and Kufari Jyoti potato	2011-12 to 2013-14	Under taken in FLD in 2014
2	Assessment of yield potential and component of rapeseed mustard var. M-27	2013-15	Under taken in FLD in 2015
3	Varietal evaluation of Rabi maize var. Pusa composite-3	2014-16	Under taken in FLD in 2016
4	Varietal evaluation of field pea (Var.HUDP-15)	2016-17	Under assessment
5	Assessment of yield performance of	2011 -12 to	The Sweet potato (Var. Gouri

	Sweet potato(Var.Gouri)	2014-15	)dislike to the farmers on the basis of their taste .So variety not considered for FLD
6	Evaluation of varietal performance of cabbage(Var. Rare Ball)	2011-12 t0 2012-13	Under taken in FLD in 2013
7	Evaluation of varietal performance of onion (Var. Prema and Nasik red)	2013-14 and 2014-15	Under taken in FLD in 2014
8	Performance evaluation of garlic variety(Var. Jamuna safed-4)	2013-15	Under taken in FLD in 2015
9	Varietal evaluation of French bean varietiesArkaAnupam under rainfed condition	2014-15	Under taken in FLD in 2014
10	Performance of rice var.RCM-5 under different eco system	2011-12 and 2012-13	Under taken in FLD in 2013
11	Varietal evaluation of rice(Var.RCM-12 & RCM-13) for higher yield in transplanted condition	2015-16 to 2016-17	Still under trial in 2017-18
12.	Evaluation of Yield performance of soybean var. JS-335 under different dates of sowing	2011 to 2013	Under taken in FLD in 2013
Thematic area-Integrated Nutrient Management			
1	Low yield in ginger due to imbalance application of fertilizer	2014-15	-
2	Low yield in turmeric due to imbalance application of fertilizer	2014-15	-
3	Effect of lime on groundnut-maize intercropping system	2013 and 2014	Under taken in FLD in 2015
4	Assessment the performance of lime on rapeseed mustard	2013 and 2014	Under taken in FLD in 2015
5	Integrated Nutrient Management (INM) in turmeric	2015-16 and 2016-17	Refinement is required in technology to convert in FLD
6	Integrated Nutrient Management (INM) in ginger	2015-16 and 2016-17	Refinement is required in technology to convert in FLD
Thematic area: Integrated Disease Management			
1	Integrated Disease Management of Alternaria Blight of mustard	2016-17	OFT is continuing in 2017-18
2	Integrated Diseases Management of Sheath Blight of Rice	2016-17	OFT is continuing in 2017-18
Thematic area: Integrated Crop Management			
1	Integrated crop management of rice	2012-15	Under taken in FLD in 2015
2	Integrated crop management of soyabean	2012-15	Under taken in FLD in 2015
3	Integrated crop management of groundnut	2012-15	-
Thematic area: Integrated Weed Management			
1	Integrated weed management in rice	2012-13 and 2013-14(2 years)	The spacing from plant to plant was 20 cm and row to row also 20 cm and 20 days old seedling was transplanted in the field and per hills 2 seedlings was practices under taken in FLD in 2015.
Thematic area: Resource Conservation Technology			
1	Performance of field pea under conservation tillage	2012 and 2013	The OFT results indicated that minimum tillage/root opening conservation technology significantly increase the

			plant height, yield, no of pods /plant, no of seed/pod and 1000 grain weight than no tillage (Farmer practice). This technology undertaken in FLD in 2014 but due to unavailability of machine and hilly topography is constraints to continuing this technology.
2	Moisture management in lentil var. K-75	2012 and 2013	Mulching with life saving moisture management technology undertaken in FLD in 2014.
3	Performance of rapeseed mustard (Var. M-27) under Zero tillage technology	2012 to 2014	KVK assessed the performance of rapeseed mustard (M-27) under zero-tillage condition against traditional sowing method of rapeseed in two locations. The results reflected that under zero tillage variety M-27 performed well and gave maximum yield (9.40q/ha) that is 2q more yield than traditional method (7.30q/ha) and B:C ratio also just double than traditional method.
4	Management of soil conservation through mini terraces	2012 to 2014	Mini terraces with riserbunds(0.7mm with 3cm riser bunds is found highly stable technology and its under taken in front line demonstration in 2105.
5	Soil moisture retention through mulching	2011 and 2012	Not converted in FLD
6	Low-cost water harvesting structure	2013 &2014	Regarding the solution of these problems KVK Chandel assessed the low water harvesting structure e.g. Jalkund and their impact on crop diversification and increasing the cropping intensity also from 2013 and 2014 in 4 selected villages. Jalkund technology undertaken in FLD in 2015.Its most successful technology in Chandel district.
7	Assessment of Sprinkler Irrigation in cabbage in foothills area	2013 and 2014	Not converted in FLD due to higher cost of implementation of technology under FLD
Thematic area-Drudgery reduction			
1.	Using of tubular maize sheller for drudgery reduction of farm women	2013 and 2014	Successful drudgery reduction technology converted in FLD in 2015
Thematic area-Post harvest technology			
1.	Efficacy of different preservatives on shelf life of green chilli pickle	2012 and 2013	In experiment green chilli was preserved with mustard oil and vinegar and stored in sterilized bottle. The shelf life of green chilli pickle increases from 4 to 12 months. After three months there was change in colour and texture of green chilli pickle in farmers' practice. This technology undertaken in FLD in 2014
2.	Efficacy of different packaging material on shelf life of green mango pickle	2012 and 2013	Mango pickle packed with polyethylene polythene packet and sealed with sealing machine. Its increase 1year self life. This technology undertaken in FLD in 2014.
3.	Efficacy of different packaging material on shelf life of dry fish	2013 and 2014	The technological option viz,Packaging in Polyethylene polythene packet (100 μ)

			against farmers used technology viz., Packaging in ordinary polythene packet were evaluated at farmers field. The two years pooled data reflected that the Packaging in Polyethylene polythene packet (100 µ) gives self life of dried fish was more than 5.5 months without changes in texture while in farmers practices the self life was recorded only 2 months. This technology undertaken in FLD in 2015.
4.	Efficacy of different packaging material on shelf life of fermented fish	2011-12 and 2012-13	Packaging fermented fish in Polyethylene polythene packet (100 µ) can extent shelf life for 3 months without any deterioration. This technology undertaken in FLD in 2015.
5.	Fermentation of soybean with Bacillus starter	2013 and 2014	The two years pooled data indicated that Bacillus starter takes only 26 hrs for fermentation of soybean seed while in farmers practices (Fig leaves) takes 93 hrs. So Bacillus starter significantly reduce the duration over the farmers practices and its also increase self life. This technology undertaken in FLD in 2015.
6	Efficacy of natural dye on different fabric	2012-13 & 2013-14	Dyeing with *Cucurma longa* + salt no any change in colour while washing and ironing with well affinity to dye. Dyeing with Curcurma longa observed that change in colour while washing and ironing with poor affinity to dye. Dyeing with Curcurma Longa and salt increases colour fastness and affinity to dyeing. So this Technology undertaken in FLD in 2015.
7	Efficacy of preservatives on storability and quality of amla candy	2015-16 and 2016-17	The results showed that Preservation of amla candy with sugar@250g/kg, KMS@1g/kg and Citric acid @ 1g/kg of amla had better no change in colour, texture and taste up to maintain at least 18 months as compared to other treatment. In case of farmers practices change in colour and texture started from 8 months onwards and test is not good also.
8	Efficacy of mordant on natural dye	2015-16 and 2016-17	The results showed that Marigold dye and copper sulphate@5g/l water) and Marigold dye and alum@5gm/l water have goodresults, in both treatment no change in colour while affinity to dye. This technology consider for FLD.

Assessed livestock based Technology: Thematic area-Evaluation of Feed and Fodder			
1	Assessment of nutrient supplement on growth performance of crossbred Hampshire Pig	2015-16 and 2016-17	Among the tested technological option (30%Maize + 30%Rice Bran + 40% Kitchen Waste and De-worming every 2 moths interval with mineral mixture 2gm/Kg of feed during gestation period) was found best on all the tested parameters like sexual maturity (Months), Age of first farrowing, litter size at birth (nos.) and litter size at weaning (nos.). Its undertaken in FLD in 2017-18.
2	Rearing of cross bread Hampshire pigs under different feeding trial	2014-16	The tested technology (30% Maize+ 40% Kitchen waste+ 30% Colocassia& Routine deworming at 2 months' interval) increased body weight, litter size at birth , age of 1st farrowing (Months) and reduced the age of sexual maturity than the farmers practices (40% with bran, 60 % kitchen waste).The feed combination (30% Maize+ 40% Kitchen waste+ 30% Colocassia& Routine deworming at 2 months' interval) popularized through line department as well as KVK in various extension activities. This technology undertaken in FLD in 2017-18.
Thematic area : New Breed Introduction			
1	Breed evaluation of Berkshire & Hampshire	2014-2016	Piggery is very profitable enterprises for Chandel district but farmers generally use local breed of pig that is uneconomical due to poor body weight gain. KVK assessed high yielding breed like Berkshire and Hampshire on various parameters for their performance in location specific situation. The tested paramerts indicated Hampshire is superior on all the paramerts except body weight and age of 1st farrowing. Since the litter size of Berkshire pig is lesser than Hampshire pig. Berkshire pig propagation is not encouraged. The New breed Hampshire consider for FLD in 2016.
2	Assessment of Back yard duckery farming of Khaki Campbell	2014 and 2015	In Chandel district local duck breed give low egg productivity. For the solution of this problem KVK, Chandelwas evaluated improved breed Khaki Campbell. On all tested parameters Khaki Campbell was more superior than local breed and its gave net income Rs.12000 /unit with B: C ratio 1.9.Khaki Campbell consider in FLD in 2016.
3	Varietal evaluation of CARI-Nirbheek and CARI-Shyama	2016-17 and 2017-18	On Farm Trail was conducted to introduce new poultry breed for higher

	poultry birds		production of eggs and meat at 5 different locations using improved breeds(CARI-Nirbheek and CARI-Shyama) and compare with local breed. Among the tested breeds CARI Nirbheek and CARI Shyama both breeds had better body weight (Kg) in male and female, age of first laying(days),laying capacity/year, egg weight and B:C ratio than local check.But in CARI Nirbheek had more body weight (Kg) in male and female, less age of first laying (days), more laying capacity/year, more egg weight and B:C ratio also than CARI Shyama. Both breeds are in under testing condition.
4	Assessment the performance of Vencobb 400 broiler birds		The Vencobb 400 was found superior on all the tested parameters like body weight at 45days (kg), survibility (%) , But however the feed conversion ratio is more in Hubbard Classic (2.1) than Vencobb 400(1.9). Vencobb 400 broiler birds under testing condition.

C. Front Line Demonstration: KVK Chandel conducted frontline demonstration only on those technologies suited to their micro location as proved by their own assessment and refinement through OFTs. They can conducted FLD on any technology assessed and refined and found undoubtedly suitable by any other agency involved in developing technologies for regions/agro-climatic zones that include or similar to the KVK micro location. The main objective of Front-line demonstrations is to demonstrate latest crop production technologies and its management practices in the farmer's field under different agro-climatic regions and farming situations. While demonstrating the technologies in the farmer's field, the scientist are required to study the factors contributing towards higher crop production, field constraints of production and thereby generate the production data and feedback information. Front-line Demonstrations are conducted in a block of two or four hectares land in order to have better impact of the demonstrated technologies on the farmers and field level extension functionaries.

1. FLD on nutritional gardening on nutritional and social economic status: Malnutrition is a serious nutritional problem in rural areas, resulting in different types of diseases, hampering physical growth and retarding brain development.in rural areas. The KVK Chandel continuously conducted FLD from 2011-12, 2013-14 and 2015-17(5 years). The results of three years pooled data indicated that under nutritional status under demonstration consumption of vitamin and mineral rich food in daily diet for 5 to 6 months while in local only 3-4 months and its change 57.14 in parameters. Under socio-economic status, family income increase Rs. 500/week against Rs.200/week in local from nutritional gardening. The result suggests that nutritionalgardening hasproved a feasible livelihood strategy for resource poor people in terms of nutrient as well as calorie intake and economic performances.



Impact of FLD on Nutrition Garden: The impact of FLD on nutrition garden was shown in terms of consumption of vitamin and mineral rich green leafy vegetables, other vegetable roots and tubers. It also helps in increasing socio-economic status of the families which are engaging in nutrition gardening. Before the introduction of nutrition garden, people do not know the importance of red and green colour fruits and vegetables. They are not aware about the importance of carrot, beet root, broccoli, palak which are very important for healthy living. After the implementation of FLD on nutrition garden, many nutrient rich high yielding fruits and vegetables are planted in their home garden. People are more concern about nutrition and health aspect. In the present study it was found that there was increase in consumption of green leafy vegetables from 2 kg to 5 – 6 kg per week, other vegetables from 1 kg to 3 - 4 kg per week and tubers reduce from 4 kg/week to 2 kg/week and also the income of the family increases from Rs. 2000/month to Rs. 8000/month. In Chandel district, it was first demonstrated in


Monsang Pantha village. After seeing the performance, it was then spread to the neighbouring villages like Japhou and Liwa Sarie, Chandolpokpi, Wangparal, Liwa Khullen, Teraphai, Molnoi, Aimol Khullen. In Chandel district due to the effort of the KVK, this technology is successfully adopted and people became healthier by consuming vitamin and mineral rich fruits and vegetables from their home-garden without spending much money. They also sold the surplus products to the market, which indirectly help in improving the family income thereby improving their standard of living.

2. FLD on improved spreading tool

Enterprise	Technology (give details)	No. Of farmers/ Farm Women	No. Of Units/ Item etc.	Performance parameters/ indicators	Data on parameters in relation to technology demonstrated		% Change
					Demo	Local	
Drudgery reduction	Improved spreading tool	3	3	i) Spread/ hr	100 kg/20 mins.	100kg/40 mins.	- 50
				ii) Physiological fatigue	No stress in back and waist	Severe stress in back & waist	

Impact of spreading tool

Spreading of Paddy is a very drudgery prone activity performed by the farm women. This actively is very strenuous and time taking process and if it is performed for a long period of time, it gives severe stress & strain to the waist and shoulder. KVK Chandel conducted FLD on "Improved spreading tool in order to reduce drudgery of farm women. It was demonstrated in terms of stress & strain and also work efficiency per hour. In the present study it was found that 100 kg paddy can be spread and pick up in 20 min as compared with 100 kg/40 min in traditional method. There was no stress & strain in waist & shoulder. This technology was demonstrated in 6 villages and after seeing the effectiveness of this technology, 10 more villages adopted this technology as a means to reduce drudgery for farm women.

3. Front Line Demonstration on Garden pea var. Arkel: The KVK Chandel consider this variety for FLD from 2011-12 to 2015-16 (5years) continuously in five villages comprising 40 farmers and its covered 10 ha area .The details of pooled data of 5 years of Arkel is mention in table.

Crop	Technology demonstrated	Demonstration Yield (qt/ha)			Yield of local Check	Increase in yield	Avg. Cost of Cultivation. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	B:C Ratio
		H	L	A	qt/ha	%				
Garden Pea	Arkel	19.26	17.44	18.34	13.30	28.2	43252	163376	120104	3.7:1

Among the 40 demonstrations average yield was 18.34 q/ha and 28.2% yield increase in demonstrated technology (Var. Arkel) over local check. The average cost of cultivation was Rs.43252/ha and average gross return was recorded Rs.163376/ha with avg. net return Rs.120104/ha and B:C ratio was 3.7. Feedback with the farmers this variety is more economical and required less management practices specially for insect and pest than local variety. Now this field pea variety more popular among the farmers and replace the old variety.

4. FLD on cabbage (Var. Rare ball) for higher productivity: The frontline demonstrations conducted on cabbage var. Rare ball in district through KVK from 2012-13 and 2013-14 (2 years).This improved cabbage var. demonstrated at 16 location of Chandel kullen village and its covered only 12 ha area. The average yield of demonstration was 197. 50 q/ha, according to existing data 36.20% yield increased in demonstration over the check. On the economic parameters average net return was Rs.61,000/ha, while the average cost of cultivation and average gross return were Rs.2,95,500 and Rs.2,34,500 respectively. The feedback of farmers

regarding improved var. Rare ball was satisfactory, because its more suitable variety among the available variety due to good yield potential and tolerant to insect and diseases.

5. **FLD on improved banana var.Grand Naine:**Banana is most popular horticulture crop in Chandel district but farmers are using traditional varieties resulted got low yield then cultivation of banana is not more profitable. On the basis of result of annual progress report of ICAR Research Centre for NEH Region Manipur Centre reported that the banana var. Grand Naine is more suitable for valley as well as hilly regions of Manipur states. On the basis of recommendation of ICAR, Manipur Centre, This variety consider for Front-Line Demonstrations in 2013-14 at three location of Chandel district in 0.75 ha. . The average yield of demonstration was 49,57 q/ha, according to existing data 12.10% yield increased in demonstration over the check. On the economic parameters average net return was Rs.120600/ha, while the average cost of cultivation and average gross return were Rs.1,05,000and Rs.2,25,600 respectively. The feed back of farmers regarding improved var. Grand Naine was satisfactory, because its more suitable variety among the available variety due to good yield potential and tolerant to insect and diseases.

6. FLD on RC Maniphou 10: ICAR Research Centre for NEH Region, Manipur Centre released Centre released RCM-10 in 2005 for low land area. The duration of crop is between 125-130 with 55 q/ha yield potential. The special feature of this variety is resistant to blast disease and grain quality is medium bold, soft cooking quality. Its suitable for foot hills and hill region also. For the popularization of RCM-10, KVK Chandel conducted total 46 demonstrations in 27 ha comprising 23 villages of the district from 2011-12 to 2014-15 (5 years). . The average yield of demonstration was 52.25q/ha, according to existing data 32.25% yield increased in demonstration over the check. On the economic parameters average net return was Rs.38890./ha, while the average cost of cultivation and average gross return were Rs. 51250 and Rs. 90140 respectively. On the basis of recommendation of farmers, this variety was also suitable under the water scarcity condition for 4-7 days no in reduction was recorded in their

potential yield. So this variety more liked by the Chandel district farmers. The farmers participated in many extension activities like field days, farmers field school , Kisan sammelan etc. he showed their positive response for RC maniphoue-10.

Farmers overview on FLD: The farmers in whose field seen in the FLD undertaken were glad even if in some farmers field scarcity of water was observed. The rice variety RCManiphou-10 find much favorable by farmers for its flavor and high yield.

7. FLD on RC Maniphou -11: ICAR Research Centre for NEH Region, Manipur Centre released RCM-11 in 2011 and recommended for valley and terraced areas of Meghalaya and Manipur.

The duration of crop is between 130-135 with 60 q/ha yield potential. The special feature of this variety is resistant to leaf blast, neck blast disease and moderate resistant to Brown Plant Hopper (BPH). The grain quality is long slender grain, soft cooking quality. It's suitable for foot hills and hill region also. For the popularization of RCM-11, KVK Chandel conducted total 6 demonstrations in 6 ha comprising 3 villages of the district from 2011-12 to 2013-14 (3Year). The average yield of demonstration was 39.5q/ha, However according to existing data only 7.50% yield increased in demonstration over the check. On the economic parameters average net return was Rs.30915./ha, while the average cost of cultivation and average gross return were Rs. 48500 and Rs. 79,415 respectively. So this variety more liked by the Chandel district farmers.The farmers participated in many extension activities like field days, farmers field school ,Kisan sammelan etc, he showed their positive response for RC maniphoue-11 and happy with less use of plant protection chemicals due to resistance of leaf and neck blast.

7. **FLD on Maize variety Vijay Composite:** The Vijai composite is high yeilding variety released by Panjab Agriculture University in 1967.The salient feature of this variety is medium maturing composite (100-110 days) which has shown wide adaptability to the Indian Sub-continent. Posses considerable resistance to foliar diseases. The quality of grain is Medium, yellow, flint to semi-flint. The average yield is 60q /ha. KVK Chandel conducted total 34 demonstrations in 10 ha comprising 2 villages of the district from 2013-14 to 2014-15 (2

years). The average yield of demonstration was 35.50 q/ha, according to existing data 29.50% yield increased in demonstration over the check. On the economic parameters average net return was Rs.36770./ha, while the average cost of cultivation and average gross return were Rs. 31550 and Rs. 70570 respectively. As per field observations of farmers this variety was less susceptible of major foliar diseases of maize.

8.Performance of Giriraja Bird under FLD: The Giriraja poultry breed released in 2009 by Central Agriculture University, Imphal. Based on requirement of the district, high production potential poultry bird (Giriraja breed) has been introduced and popularized as a source of sustainable livelihood for rural resource poor farmers and farm women.

- ✓ The KVK Chandel conducted 10 front line demonstrations in Chandonpokpi village (Chandel). Each demonstration 10 Giriraja bird (A dual purpose bird for backyard poultry) provide to selected farmers under FLD programme.
- ✓ Under demonstration it was found that adult body weight of male (61.44%) and in female (56.92%) increased than local check.
- ✓ In respect to egg laying capacity Giriraja produced 33.33% more egg/year than local check.
- ✓ Regarding size of eggs, average Giriraja egg weight was 60gm while in local only 45g means 25.0% increase in the parameters of size of egg.
- ✓ The overall better results were found in compare to local bird. So farmer were delighted to new breed and start small scale poultry farming in three village of Chandel district and popularization these Giriraja breed in more number of villages and small scale commercial poultry farming started in different villages of Chandel.

9. FLD on Vanaraja under backyard poultry farming: The Vanaraja poultry developed from the Project Directorate for Poultry, Hyderabad. The KVK, Chandel popularized Vanaraja breed in adopted village Chandonpokpi and Island from 2012-14 (3 years) continuously. The results of FLDs are described below.

- ✓ Under demonstration it was found that in respect to adult body weight of male Vanraja (133%) and in female Vanaraja (155%) increased than local check.
- ✓ Age of 1st laying in Vanaraja (Demon) is 5.5months while in local breed 7.5months resulted 36.3% change in the parameters due to the Vanaraja breed over the local breed.
- ✓ In respect to egg laying capacity Vanaraja produced 75% more egg/year than local check.
- ✓ Regarding weight of eggs, average Vanaraja egg weight was 55 gm while in local only 45g means 22.2% change in the parameters of weight of egg.

The overall better results were found inVanaraja compare to local bird. So farmer were delighted to new breed and start small scale poultry farming inmore village of Chandel district and popularization these Vanaraja breed in more number of villages and small scale commercial poultry farming started in different villages of Chandel.

Impact of FLD on rearing Vanaraja Birds : KVK introduced Vanaraja birds in the year 2010 under FLD programme in 3 village namely Mongsang Pantha, Tuishemi and Teraphai by selecting 5 farmers each from 3 villages and total no. of 15 farm women were given 20 Vanaraja chicks (2 weeks old) were given and selected as beneficiaries since backyard Poultry is mostly women's domain and the main objective for keeping poultry is to get supplementary income and also for consumption during special occasions. Generally, they reared for their own consumption and for selling in and around the villages. Vanaraja birds is widely accepted by the villages. The acceptability among the people was found to be high as these birds have a triple advantage in term of colour and hardiness like local birds early laying age, high egg laying capacity and higher weight gain over the local birds with minimum supplementation of locally available feed ingredients. These Vanaraja birds starts laying at the age of 5 months and laying capacity in 140-150 eggs/year but in local desi birds at 7 months & only 80 eggs per year. Above these condition there is a wide demand of new improved birds among the farmer and it starts popularization of Vanaraja from farmers to farmers and horizontally spread from village to village. Villager use to sold eggs for hatching purpose and brouded by local desi hen like wise propagation is expanded and many villagers approached KVK for more training and more demand of Vanaraja chicks where KVK also help them in the best level by supplying more trainings, leaflets, folder film shows etc. now more than 15 village covered and propagated this birds under 3 Blocks in Chandel districts viz Tengnoupal, Machi and Chandel blocks and more villages are Molnoi, Zion, Chandonpokpi, Komlathabi, Island, Ziontlang, Lanbung, Taphun, Liwa sarei, Mongsang pantha, Teusemi, Terapahai, Damjol etc. so, Vanaraja birds is one of the most suitable breed of birds required for sustainable production in small scale intensive system with existing feed resources.

10. Popularization of Khaki Campbell Duck for egg production:The duckery breed Khaki Campbell developed by the ICAR Research Complex for NEH Region Meghalaya in 2012. The KVK, Chandel popularized this breed in adopted village Chandonpokpi and Island from 2013-16 (4 years). The average results of two years data of FLDs are presented below.

- ✓ Age of 1st laying start in Khaki Campbell (Demon) is 5.5 months while in local breed 7.0 months resulted 27.2% change in the parameters due toKhaki Campbell breed over the local breed.[
- ✓ In respect to egg laying capacity Khaki Campbell produced double egg/year than local check.
- ✓ Regarding weight of eggs, average Khaki Campbellegg weight was 60 gm while in local only 52 gm means 15.5% change in the parameters of weight of egg.
- ✓ The overall better results were found in Khaki Campbell breedcompare to local bird. So farmer were delighted to new breed and start small scale duck farming in more village of Chandel district and popularization this breed in more number of villages for small scale commercial duckery farming started in different villages of Chandel.

Impact of Study of Khaki Campbell: Duckery farming is one of the traditional farming system under backyard condition. Farmer used to rear local desi duck with a very poor performance in egg production with a meagre amount of feed. KVK intervented to introduce Khaki Campbell duck for more egg production in the year 2013 at Komlathabi villages to 10 farmers given 20 duckling each. As the egg production is double times more then local duck i.e. 140 eggs given by Khaki Campbell. Per year as against of only 78 egg in care desi duck. Farmer use to sell the eggs for their daily maintenance requirement and other nearby villages used to purchase eggs for hatching purpose and they starts liking and try to propagate among the villages and now 5 more villages starts rearing Khaki Campbells duck i.e. Tuisemi, Ziontlang, Liwa Sarei, Damjol etc. in this way acceptance of Khaki Campbell is highly remarkable. And these Khaki Campbell duck farming can be recommended in more number of villages in Chandel District as it can improve their living status by selling of eggs and meat within a shorter period of time and could earn more income from farming.

11. Front line demonstration on Wheel hoe (Single-tyne): Front line demonstration on three tyne wheel hoe was carried out in three different location in rabi crops of 0.5 ha each in Monsang Pantha & Japhou villages. it is observed that in the case of thetriple tyne wheel hoe, the average field capacity through demonstration was found to be 0.012 ha/h. However, the average field capacity of local check i.e. manual was recorded to be 0.001 ha/h. Thus, there was 1100 per cent increase in field capacity over local check.

Financial Year	Area (ha) / No.	No. of beneficiary	Performance Parameters/indicator	Data on parameters in relation to technology demonstrated		% Change in the parameters/ B:C ratio
				Demo	Local Check	%
2006 – 07	NA					
2007 – 08	0.5	3	Weeding efficiency	75%	100%	33 %
2008 – 09			Field capacity	0.012 ha/h	0.001 ha/h	1100 %

The use of better inputs like improved seed, sowing method, balanced use of fertilizer and proper management of insect pest may result in higher productivity of crops along with the use of wheel hoe for weeding as well as intercultural operations.

Impact of FLD: From the above discussion, it can be concluded that front line demonstration have shown that the use of better input like improved seed, sowing method balanced use of fertilizer and proper management of insect pest along with the use of wheel hoe may result in higher productivity of rabi crops. The productivity gain under FLD over farmer's practices created awareness and motivated the other farmers to adopt improved technology of wheel hoe in the district. Compared to conventional manual weeding prevalent in the tribal belt, this weeder was a blessing for the farmers. Drudgery reduction was the main attractive feature of this weeder. This weeder has now become very popular and the technology has spread to many other villages too.

12. FLD on Improved Wheel hoe (Three-tyne): Front line demonstration on single tyne wheel hoe was carried out in three different fields of 0.5 ha each in Chandonpokpi and Ziontlang villages. Results of demonstration in Table 1 have shown that under demonstration plots the wheel hoe field capacity was found to be substantially more than that under local check during both years. The average field capacity of wheel hoe through demonstration was found to be

Year	Area (ha) / No.	No. of beneficiary	Performance Parameters/indicator	Data on parameters in relation to technology demonstrated		% Change in the parameters
				Demo	Local Check	%
2009 – 10	0.5	3	Weeding efficiency	80%	100%	25 %
2010 – 11			Field capacity	0.0135 ha/h	0.0034 ha/h	297 %

0.0135 ha/h. However, the average field capacity of local check i.e. manual was recorded to be 0.0034 ha/h. Thus, there was 297 per cent increase in field capacity over local check. Besides drudgery reduction, this implement has been found to be 25 percent more efficient in weeding and saved almost 85 percent on cost of operation. Compared to the traditional *khurpa* it also showed a 5-8 percent increase in yield. This three-tyne weeder has been adopted by many other farmers of other neighbouring villages too.

13. FLD on Improved sickle: Front line demonstrations on improved serrated sickle were carried out in three different fields of 0.5 ha each in Monsang Pantha village. It was found that the improved serrated sickle had an angle of 180^{o} substantially 3 percent more than that of local sickle which has an angle of 175^{o}. During the three years i.e. 2011-12 to 2013-2014, the average time consumption of field operation using the improved serrated sickle through demonstration was found to be 20.2 hour/ha

However, the average time consumption of field operation using the local sickle was found to be to be 27.3 hour/ha. Thus, there was 35 per cent saving in operating time. The drudgery reduction in the improved serrated sickle was the distinct feature of this front line demonstration. There is 26 % saving in the harvesting time with use of serrated sickle over the ordinary sickle. Similarly, economical benefit is upto the extent of 25 % due to the reason that ordinary sickle requires its sharpening more frequently which wastes both time & money.

The productivity of the serrated sickle was measured and was found to be higher than the ordinary sickles but significant productivity difference appeared from 15-minute period. Again here, the use of better inputs like improved seed, sowing method, balanced use of fertilizer and proper management of insect pest may result in higher productivity of crops along with the use of improved serrated sickle for weeding as well as intercultural operations. As an impact of this technology, farmers in most of the villages in the district now use the new light-weight improved serrated sickle.

Financial Year 2008 – 09	Area (ha) / No.	No. of beneficiary	Performance Parameters/indicator	Data on parameters in relation to technology demonstrated		%Change in the parameters
				Demo	Local Check	%
2011 - 12	0.5	3	a) Angle	180^{o}	175^{o}	3 %
2012 - 13			b) Time consumption	20.2 hour/ha	27.3 hour/ha	35 %
2013 - 14			c) Level of drudgery	Low	High	-

14. FLD on Cono Weeder: Front line demonstration on cono weeder was carried out in three different SRI paddy fields of 0.5 ha each from 2011-12 to 2013-14 in two villages of Nungourok and Unapal. Results of demonstration in Table have shown that under demonstration plots the cono weeder had a field capacity which was found to be substantially more than that under local check during all the years. The average field capacity of cono weeder through demonstration was found to be 0.0124 ha/hr. However, the average field capacity of local check i.e. manual was recorded to be 0.0034 ha/hr. Thus, there was 72.5 per cent increase in field capacity over local check. Farmers also reported an increase in yield (around 9 %) due to the use of Cono weeder when compared to conventional weeding. Farmers in many villages now use the cono weeder in their conventional (non-SRI) paddy fields too.

15. FLD on Pedal *operated* paddy thresher: Front line demonstration on pedal operated paddy thresher was carried out in three different fields of 0.5 ha each from 2014-15 to 2016-17. The villages covered were Monsang Pantha, Japhou and Lambung. Results of demonstration have been shown in below Table. The average broken grains in pedal operated paddy thresher was 0.8 % whereas that in manual threshing was observed to be 2. The difference between the parameters was 150 per cent.

The average total grain loss in the pedal operated paddy thresher was 1.2 % as against 3 % in the manual threshing displaying a clear 150 percent saving in grain through the demonstration. The threshing capacity of pedal operated paddy thresher was 44 kg/h whereas that of manual threshing was 31 kg/h. The pedal operated paddy thresher was thus 42 per more efficient in terms of threshing capacity.

Financial Year	**Area (ha) / No.**	**No. of beneficiary**	**Performance Parameters/indicator**	**Data on parameters in relation to technology demonstrated**		**%Change in the parameters/**
				Demo	**Local Check**	**%**
2014 - 15	0.5	3	Broken grains (per cent)	0.8	2	150
2015 - 16			Total grain loss (per cent)	1.2	3	150
2016 - 17			Threshing capacity kg/h	44	31	42
			Threshing efficiency (per cent)	98	96	2
			Labour requirement (man-days/ha)	5	20	300
			Cost of operation (Rs/ha)	7000	6400	9.4

The pedal operated paddy thresher required 5 labourers to operate and thresh the yield of 1 ha of paddy field. On the other hand, 20 labourers were needed to thresh 1 ha of field manually. Thus, a grand total of 300 per cent could be saved in man-days/ha. This in turn translates to 9.4 per cent savings in terms of cost of operation/ha.

Traditionally, the tribal farmers of Chandel never allow any foreign body or implement to be taken inside the paddy field. After a lot of convincing, the farmers were amazed with the efficacy of the thresher. The farmers have now adopted this thresher due to its numerous advantages.

The paddy stalks being fed into the thresher

The paddy grains after being threshed

16. FLD on height adjustable wheel hoe: Front line demonstration on height adjustable wheel hoe was carried out in three different cabbage & chilli fields of 0.5 ha each from 2014-15 to 2016-17 at Monsang Pantha, Japhou and Hnatham villages. Results of demonstration have been shown in below table. The average weeding depth in fields operated with height adjustable wheel hoe was observed to be 6 cm and the weeding depth covered by the local *khurpa* was only 2 cm. In terms of weeding depth a total of 200 per cent advantage was shown by the height adjustable wheel hoe.

The height adjustable wheel hoe required only 2 labourers to carry out weeding and other intercultural operations in a field of 1 ha whereas 12 labourers were engaged for manual weeding with *khurpa* in 1 ha field. This clearly shows an advantage of saving of labour man-days of 500 per cent. This in turn also led to a saving of 500 per cent in terms of cost of operation of weeding and other intercultural operations in 1 ha field. The farmers of Chandel normally practice hand weeding which consumes a lot of time and also causes severe back pain. Lack of labour for weeding & other intercultural operations during the rabi season has always been another factor for low productivity. Now, this height adjustable wheel hoe has been widely appreciated & adopted by the farmers due to its efficacy & light-weight which is easily operated by women farmers too.

Financial Year	**Area (ha) / No.**	**No. of beneficiary**	**Performance Parameters/indicator**	**Data on parameters in relation to technology demonstrated**		**%Change in the parameters**
				Demo	**Local Check**	**%**
2014 - 15	0.5	3	Weeding depth (cm)	6	2	200
2015 - 16			Labour requirement (labour/ha)	2	12	500
2016 - 17			Cost of operation (Rs.)	400	2400	500

The farmer operating the height-adjustable wheel hoe in his cabbage field

Concluding Remarks: It is difficult for massive large-scale mechanization in the hills of Chandel, but the light-weight & handy tools & implements have been a huge success and adopted by the farmers of the district.

D. Frontline demonstrations on oilseed and Pulses from 2006-07 to 2016-17.

Oilseeds : Oilseeds are cultivated in Chandel district both in rabi and kharif season, though rabi season occupies more area than kharif oilseeds. As per the practice of the farmers, groundnut, soybean, mustard and black gram were identified to conduct frontline demonstrations with improved varieties/seeds, package of practices and newer technologies. Performance of demonstrations of oilseed crops in kharif and rabi season are as follows:

Kharif Oilseed: During kharif from 2007-16, the KVK demonstrated groundnut and soybean as kharif oilseed crops. Out of total area under FLD of 54.0 ha and its comprising 166 beneficiaries. Among this groundnut occupied (22. 0 ha) with 59 beneficiaries and soybean occupied 32 ha with 107 beneficiaries .The details of performance of demonstrations are mention below.

Year	Area(ha)	No of Beneficiary	Demonstration Yield (qt/ha)			Yield of local Check	Increase yield	Avg. Cost of Cultivation. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	B:C Ratio
			H	L	A	Qt /h	%				
Kharif oilseeds- Soybean var. JS-335											
2007-08	2.0	5	18.8	17.95	18.36	10.85	69.22	31500	73440	41940	2.33
2008-09	2.0	8	18.50	18.20	18.35	10.85	69.12	31500	73400	41900	2.33
2009-10	3.0	12	18.03	17.14	17.56	10.85	61.84	32275	79020	46745	2.44
2010-11	4.5	12	19.20	18.00	18.59	10.85	71.33	32275	83655	51380	2.59
2011-12	5.0	15	18.84	18.25	18.54	11.84	36.08	32275	83430	51155	2.58
2012-13	3.0	12	18.25	18.20	18.22	11.85	34.96	32700	91000	58300	2.78
2013-14	4.0	14	18.50	17.20	17.85	11.85	33.61	33000	71400	38400	2.16
2014-15	3.0	14	18.70	17.50	18.10	11.85	33.70	33000	99550	66550	3.0
2016-17	5.50	15	18.75	16.50	18.82	13.64	27.52	33547	92254	58707	2.75
Total/Average	**32**	**107**	**18.61**	**17.66**	**18.26**	**11.60**	**48.59**	**32452**	**83016**	**50564**	**2.55**

D1. Demonstrations on soybean crop var.JS-335: Soybean is important kharif oilseed crop in Chandel district. This variety released from Indian Institute of Soybean Research, Jabalpur in 1994. It is resistant to Bacterial pustule, Bacterial blight, Bud blight and Alternaria leaf blight. The crop duration of this variety from 95-100 days. The recommended yield potential is from 25 to 30 q/ha under irrigated condition. The crop duration of this variety from 95-100 days. KVK Chandel conducted frontline demonstration on Soybean crop var-JS335 in 32 ha with 107 beneficiaries .In pooled data of nine years reflected that demonstration plot highest 18.61, lowest 17.66 and average 18.26 q/ha yield were recorded and in demonstration plots gaves 48.59% more yield over the check . In respect of benefit-cost ratio also, no marked difference as observed. On the economics parameters the average cost of cultivation was recorded Rs.32452/ha, average gross return was Rs. 83016/ha and net return was Rs.50564/ha.

Impact of FLDs on Soybean crop var.JS-335: The results revealed that FLD recorded higher yield as compared to farmers practice over the years of study. The improved technology recorded average yield of 1861 kg/ha which was 48.59 per cent higher than that obtained with farmers practice of 1160 kg/ha. The improved technology gave higher gross return of Rs. 83016./ha, net return of Rs. 50564 /ha with benefit cost ratio 2.55 as compared to local check . Though substantial progress has been made in evolving techniques to obtain high yields of oilseed, their production per hectare has remained the same for the last few decades. Production and productivity of soybean crop is declining in Chandel district in general. To boost the production and productivity of oilseed crops (Soybean) KVK Chandel are conducting frontline demonstrations. The main objective of frontline demonstrations on soybean is to demonstrate and popularize the improved technologies on farmers' fields for effective transfer of generated technology and fill the gap between recommended practices and farmers' practices. Frontline demonstrations in soybean during Kharif season were studied for 9 years (Kharif 2007 to 2016) in Chandel district of Manipur. There was a wide yield gap between the potential and demonstration yields in soybean crops mainly due to technology and extension gaps. The frontline demonstrations on soybean crop indicated that per cent increase in yield over farmers practice ranged from 27.52 to 71.33 per cent over nine years. It was further observed that in terms of economics, Soybean crops recorded higher net returns per hectare compared to farmer's practice during all the years. The benefit cost ratio of demonstration plots ranged from 2.16 to 3.0 in soybean .its indicating the urgent need to motivate the farmers to adopt economical viable technologies for increasing production, productivity and profitability of soybean crops. After continuously demonstrations on JS-335 from 2007 to 2016 in various villages of Chandel district their impacts are now in 31 villages this Soybean variety cultivated by the farmers and satisfactory improve the farmers yield.




D2: Demonstration on groundnut:

Demonstration on groundnut Var. ICGV-86590: ICGV 86590 was released in 1991 by the Central Sub-Committee on Crop Standards, Notification, and Release of Varieties, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, for rainy-season cultivation. The special characteristics of this variety is high-yielding, resistant to rust, and

tolerant of late leaf spot. Matures in 96-123 days in the rainy season in India, low field incidence of bud necrosis disease and stem and pod rots, tolerant of *Spodoptera litura*, average shelling turnover 65% and average oil content 48%. KVK Chandel conducted frontline demonstration on groundnut crop var. ICGV-86590 undertaken during 2011-12 and 2012-13 in 10 ha with 17 beneficiaries. The three years data pooled and its represent that in demonstration plot highest, lowest and average yield were 18.3, 18.1 and 18.22 q/ha respectively and 30.96% more yield recorded in demonstrated technology over the local check. In respect of benefit-cost ratio also, no marked difference as observed. The economic performance details mention in graph.

D3. Demonstration on groundnut Var. ICGS76: KVK Chandel conducted frontline demonstration on groundnut crop var.- ICGS 76 from 2007-08 to 2016-17 in 12 ha with 42 beneficiaries .The pooled data of nine years. Its represented that in demonstration plot highest 15.56, lowest 14.6 and average 16.88 q/ha yield were recorded and 43.76% more yield recorded in demonstrated plot over the local check. In respect of benefit-cost ratio also, no marked difference as observed. The details of performance of FLDs are mention in table and graphs.

Year	Area (ha)	Beneficiary	Demonstration Yield (qt/ha)			Yield of local Check	Increase yield	Avg. Cost of Cultivation. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	B:C Ratio
			H	L	A	qt/h	%				
Kharif Oilseed- groundnut Var. ICGS - 76											
2007-08	2	5	16.50	16.22	16.36	11.54	41.76	51000	81750	30750	1.60
2008-09	2	6	17.60	17.27	17.44	11.54	51.12	51000	87200	36200	1.70
2009-10	1	4	16.82	16.00	16.41	11.54	44.20	51000	82050	31050	1.60
2010-11	2	7	16.9	15.56	16.23	11.54	40.64	51000	81150	30150	1.59
2011-12	0.25	1			16.20	11.54	40.38	51475	81000	29525	1.57

2012-13	0.25	1	18.04	17.66	17.85	11.54	54.67	51475	89250	37775	1.73
2013-14	0.25	1	18.55	17.05	17.80	12.58	41.49	51475	89000	37525	1.72
2014-15	0.25	1	18.90	17.30	18.10	12.58	43.87	51475	90500	39025	1.75
2015-16	-	-	-	-	-	-	-	-	-	-	-
2016-17	4.0	16	16.75	14.37	15.56	10.0	35.73	50405	95387	44982	2.20
Total/Average	**12**	**42**	**15.56**	**14.6**	**16.88**	**11.6**	**43.76**	**51145**	**86365**	**35220**	**1.71**

Impact of FLDs of groundnut var.ICGS-76 and ICGV-86590 : KVK Chandel conducted frontline demonstration on groundnut crop var.- ICGS 76 from 2007-08 to 2016-17 in 12 ha with 42 beneficiaries and ICGV-86590 with 17 beneficiaries from 2011-12 to 2012-13. Before the establishment of the KVK farmers generally cultivated local variety without any scientific package of practices. Prior conducting FLDs KVK scientist organized training programme for scientific knowledge of package of practices. KVK has started FLD programme to accelerate the production of crop. Latest recommended package of practices are demonstrated on farmers field under direct supervision of KVK scientist. In ICGS-76 increase average of nine years data is 43.76% yield while in ICGV-86590 increase 30.96% over the local check, But however the maximum net return recorded in ICGV-86590(Rs.39,387/ha) followed by ICGS-76 (Rs.35,220/ha).In Chandel district 25 villages now successfully cultivated these varieties and getting good yield .The main constraints perceived by the beneficiary farmers were; non remunerative price for groundnut, high cost of inputs viz., seeds, fertilizers and chemicals, timely unavailability of inputs, poor marketing facility and can notstored farm production for long period to fetch high price.

Kharif Pulses:

D4. Demonstration of Blackgram Var.T9: During kharif season from 2007-08 to 2014-15, KVK demonstrated only Blackgram var. T-9 in 40 ha area comprising with 106 farmers of various villages in Chandel district. The eight years yield data pooled and calculated average data of all tested parameters. The highest, lowest and average yield were 7.67, 6.90, 7.29 q/ha respectively and 27.27% increased yield over the check. The details of performance of demonstrations are mention below

Year	Area (ha)	Beneficiary	Demonstration Yield (qt/ha)			Yield of local Check	Increase yield	Avg. Cost of Cultivation. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	B:C Ratio
			H	L	A	qt/h	%				
Kharif Pulses: Blackgram var.T-9											
2007-08	5	12	7.25	6.8	7.03	5.54	26.89	26734	42180	15446	1.57
2008-09	5	15	8.10	6.88	7.49	5.54	35.19	26734	44940	18206	1.68
2009-10	5	17	7.45	6.25	6.85	5.54	23.65	26734	41100	14366	1.53
2010-11	5	10	7.60	7.00	7.30	5.54	31.76	26734	43800	17066	1.63
2011-12	6	12	7.71	7.18	7.45	5.54	25.33	26734	37250	10516	1.39
2012-13	5	11	7.20	7.00	7.10	5.54	21.97	27695	42600	14905	1.53
2013-14	4	14	8.10	6.90	7.50	5.54	26.13	28160	48750	20590	1.73
2014-15	5	15	8.00	7.25	7.62	5.54	27.29	28500	49530	21030	1.70
Total/ Average	**40**	**106**	**7.67**	**6.90**	**7.29**	**5.54**	**27.27**	**27253**	**43768**	**16515**	**1.60**

Impact of FLDs on T-9: The yields of Kharif pulse crop (Black gram var.T-9) can be increased to a greater extent even under rain fed situations by adopting the recommended practices and improved technology in Chandel district of Manipur. Favourable benefit: cost ratio is self-explanatory of economic viability of the frontline demonstrations and encouraged the farmers for adoption of interventions imparted. It is also observed that higher extension gap emphasized that there is further need to educate the farmers for adoption of improved technologies so that poor farmer with limited resources could improve their livelihood and diversify their farming situation. In Chandel district due to the efforts of KVK cultivation of kharif pulse blackgram var.T-9 more than 35% increase from the




2006-07. In Chandel district 15 villages now successfully cultivated this variety and getting satisfactory yield.

D5. Demonstration of rapeseed mustard var.M-27: Oilseed cultivation in the Chandel district faces several constrains, such as water scarcity during post-monsoon season, lack of irrigation facilities, short time lag after rice harvest for seed sowing and high incidence of pests and diseases in late sown crops As a result, only monocropping of rice is practiced and the farmers leave their land fallow. KVK Chandel conducted frontline demonstration on rapeseed mustard var. M-27 from 2007-08 to 2013- 14 with zero tillage technology .The yield potential compare with under conventional tillage. The seven years yield and economic data are pooled.

Year	Area(ha)	Beneficiary	Demonstration Yield (qt/ha)			Yield of local Check	Increase yield	Avg. Cost of Cultivation. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	B:C Ratio
			H	L	A	qt/h	%				
Rabi oilseed -Rapeseed mustard var.M-27											
2007-08	5	10	8.80	7.86	8.33	6.30	32.22	17292	29155	11863	1.65
2008-09	5	8	9.20	9.00	9.10	6.30	44.44	17292	31850	14558	1.84
2009-10	5	10	9.00	8.95	8.98	6.30	42.53	17292	31325	14033	1.81
2010-11	15	20	9.50	9.10	9.30	6.30	47.61	17292	32550	15258	1.88
2011-12	20	19	9.40	9.00	9.20	7.30	20.65	17652	32200	14548	1.82
2012-13	20	22	9.00	8.25	8.62	7.30	15.31	17652	30170	12518	1.70
2013-14	10	18	9.20	8.80	9.00	7.30	18.88	17652	31500	13848	1.78
Total/ Average	**80**	**107**	**9.15**	**8.70**	**8.93**	**6.72**	**31.66**	**17446**	**31250**	**13803**	**1.78**

Impact of FLDs of M-27: KVK Chandel conducted frontline demonstration on rapeseed mustard var. M-27 from 2007-08 to 2013- 14 with zero tillage technology .The yield potential compare with under conventional tillage. The seven years yield and economic data are pooled in above table.Due to lack of irrigation facilities and uncertainty of rain during *rabi* season, farmers in Chandel district of Manipur are reluctant to grow *rabi* crops and vast area in the district remains fallow after rice from November to June. Taking into consideration the above facts, yield

performance of rapeseed varieties, M-27, were evaluated in 80 ha under zero tillage cultivation and compared with crops grown in 10 ha under conventional tillage. Since there was no rain throughout the crop period, the growth and yield parameters in all the rapeseed-mustard varieties were better in zero tillage practice than conventional tillage due to residual soil moisture after rice harvest. The pooled data indicated that under zero tillage condition average yield of seven years was 8.93 q/ha while under conventional method yield was recorded only 6.72 q/ha. Due to only application of zero tillage machine its increase 31.77 % more yield over the conventional method of seed sowing of rapeseed mustard. Total 12 villages of Chandel district now rapeseed mustard cultivated with the zero tillage machine after the harvesting of rice.

Demonstration of Rabi Pulses : Amongrabi pulses crop field pea is the most important crop in Chandel district. It is a predominately rainfed crop grown in different land situation like rice fallows, upland. Pulses short duration leguminous crop, enriches soil fertility. Major rabi pulses in the Manipur states are grown in rabi season are field pea, Rajma and blackgram. KVK Chandel conducted frontline demonstration of fieldpea var. Rachana in 20 ha comprising 47 demonstrations in various villages of Chandel district from2011-12 to 2014-15.

D6. Demonstration on field pea Var. Rachna: Field Pea is very popular crop. Its green pods as well as dry seeds are in great demand for cooking as vegetable and as pulse, respectively in Manipur. It is highly nutritive containing high percentage of proteins, carbohydrates, vitamins A &K and calcium and phosphorus. . KVK Chandel conducted frontline demonstration of fieldpea var. Rachna in 31 ha comprising 96 demonstrations in various villages of Chandel district from2007-2008 to 2014-15.The details of eight years FLDs data mention below.

Year	Area(ha)	Beneficiary	Demonstration Yield (qt/ha)			Yield of local Check	Increase yield	Avg. Cost of Cultivation. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	B:C Ratio
			H	L	A	qt/h	%				
Rabi pulses-Fieldpea var. Rachna											
2007-08	5	21	13.96	12.64	12.30	9.32	31.97	30029	55350	25321	1.84
2008-09	5	16	14.63	14.35	14.49	9.32	55.47	30029	65205	35176	2.17
2009-10	5	20	14.35	13.86	14.10	9.32	50.21	30029	63450	33421	2.11
2010-11	3	7	14.50	14.02	14.26	10.12	40.90	30029	64170	34141	2.13
2011-12	2	6	14.10	13.90	14.00	10.12	38.33	30029	63000	32971	2.09
2012-13	3	6	13.78	13.00	13.39	10.12	32.31	31000	66950	35950	2.15
2013-14	3	8	14.40	13.80	14.10	10.12	39.32	31000	70500	39500	2.27
2014-15	5	12	15.70	12.50	14.10	10.12	39.32	35000	70500	35500	2.0
Total/Average	**31**	**96**	**14.42**	**13.50**	**13.84**	**9.82**	**39.59**	**30893**	**64890**	**33997**	**2.09**

The average of eight years data represented that the highest yield (14.42q/ha), lowest yield (13.50 q/ha) and average yield 13.48 q/ha) were recorded. The average increased yield over the check was 39.59% and average net profit was Rs.33997/ha with B:C ratio 2.09 .

Impact of FLDs on field pea: The impact of FLD on field pea var. Rachna production technologies were shown in two terms, namely area increment and productivity increment. It was found in the present study that there was 160 ha to 380 ha area increase, and 9.82 q/ha to 13.84 q/ha productivity increase after conducted the FLD programme. In both the cases, the area increment and productivity increment were divided in to three categories, namely low, medium and high and shown that the total 76.00 per cent were having low, 16 per cent medium and 8 per cent belong from high area increment of field pea var. Rachna. In productivity increment the total 44 per cent belongs from low, 30 per cent medium and 26 per cent respondents belongs from high productivity increment. In Chandel district due to the efforts of KVK now 32 villages covered this technology. To increase the production and productivity of field pea, theimproved production technology has to be adopted by the farmers. In adoption of field pea production technology FLD play very important role todissemination of improvedpackage of practices . The productivity gain under FLD over traditional practices of field pea crops cultivation created greater awareness and motivated the other farmers to adopt appropriate production technology of field pea in the district. The selection of critical input and participatory approach in planning and conducting the demonstration definitely help in the transfer of technology to the farmers.

E. Demonstrations conducted under Tribal Sub Plan: The Tribal Sub-Plan (TSP) strategy was evolved for the rapid socio-economic development of tribal people and for bridging the gap between their levels of livelihood to that of the general communities. The KVK Chandel was involved in this scheme till their establishment. The KVK conducted various activities throughout the last 10 years which favoured the livelihood upliftment of tribal people. The scheme ensured the direct benefit to the individual or families belonging to schedule tribes adopting various agricultural and allied sectoral activities e.g. Agricultural farming, Horticulture, Animal husbandry, Fish production, Vocational training and so on.

E1. **Demonstration of Rice var. RC Maniphou-10 under TSP:** RC Maniphou - 10 was released as a state variety in the year 2007 at ICAR RC for NEH Region, Manipur Centre, Lamphelpat.It is high yield potential (5.5 -6.5t/ha), resistant to blast under Manipur situation and moderately tolerant to sheath blight**:**RC Maniphou-10 (RCM-10) is a medium tall (70- 90cm) derivative of cross between Prasad and IR-24. It is tolerant to neck blast and leaf blast. Its average yield is 5 tonnes per hectare. This variety matures

in 120 -125 days and is suitable for main kharif season (July-September). It has anthocyanin pigmentation at the base, stigma and grain apiculus with well exerted erect flag leaves. It has a high tillering ability and bears about 150-250 spikelets per panicle.. Due to these traits KVK Chandel consider this variety for front line demonstration in 2012-13 to increase the production and productivity of rice in the district and replacement of local low yielding rice variety. From 2012 to 2016 KVK demonstrated this technology in 40 ha comprising 32 villages of Chandel with 56 beneficiaries under various programmes of TSP with the collaboration of ICAR Manipur Centre. The details performance of frontline demonstration describe in table:

Crop	Year	Area (ha)	Beneficiaries	Demonstration Yield(qt/ha)			Yield of local Check (q/ha)	Increase in yield (%)	Avg. Cost of Cult. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	C:B Ratio
				H	L	A						
Rice	2012-13	10	15	62.40	54.40	58.40	36.50	37.50	48500	116800	68300	2.4
Rice (SP)	2015-16	10	15	54.00	45.00	49.50	30.60	38.18	60000	135000	75000	2.25
Rice (STRC)	2015-16	5	10	41.40	32.40	36.90	30.60	17.07	60000	125600	65600	2.0
Rice	2016-17	5	5	54.39	46.77	50.58	39.60	21.70	87600	126450	38850	1.44
Rice	2016-17	5	6	51.97	44.21	48.09	39.60	17.65	87600	120225	32625	1.37
Rice (STRC)	2016-17	5	5	64.44	43.20	53.82	39.60	26.42	87600	134550	73500	1.53
	Average	**40**	**56**	**54.76**	**44.33**	**49.54**	**36.08**	**26.42**	**71883**	**126437**	**58979**	**1.83**

STCR=Soil Test Crop Response, SP= Seed Production

Impact of FLDs on RC Maniphou-10: The results revealed that FLD recorded higher yield as compared to farmers practice over the three years of study. The improved technology recorded average yield of 49. 54 q/ha which was 26.42 per cent higher than that obtained with farmers practice of 36.08 q/ha. The RC Maniphou-10 gave higher gross return of Rs. 126437/ha, net return of Rs. 58979/ha with benefit cost ratio 1.83 as compared to local check. Due to high yielding and short duration as compared to the local check. Farmers are now adopting more than approximately 1200 ha in Chandel district. The horizontal spread of this technology more than 41 villages.

E2: Demonstration of Rice var. RC Maniphou-7(RCM-9) under TSP: RC Maniphou-7(RCM-9), a gamma irradiated mutant of Punshi, is a high yielding variety released in 2000 for Manipur. It has tolerance to blast. It yield ranges from 5 to 7 t/ha. It is also known by different local synonyms like, Punshi mutant, M-58, M-50, M-15, Charongphou and Niphuthokpi. It is slightly short day and is suitable for main and late seasons. It matures in 135 to 145 days depending on sowing time. It has high tillering ability (15-20/hill) and long panicles with 300-450 spikelets, distinguishing from other cultivars by its well exerted profuse whitish panicles at flowering stage and it is moderate resistant to leaf blast, sheath blight and stem borer .KVK Chandel conducted frontline demonstrations in 64 ha with102 beneficiaries in 2012-13,2014-15,2015-16 and 2016-17(four years) .The pooled data of four years reflected that average yield in demonstrated plots recorded 54.26 q/ha, which is 33.07% more than farmers technology (33.07q/ha). The RC Maniphou-7 gave higher gross return of Rs.116115 /ha, net return of Rs.53409 /ha with benefit cost ratio 1.83 as compared to local check.

Crop	Year	Area(ha)	Beneficiaries	Demonstration Yield (Qt/Ha)			Yield of local Check	Increase in yield	Avg. Cost of Cult. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	C:B Ratio
				H	L	A						
Rice	2012-13	12	18	72.00	55.00	63.50	36.50	42.51	48500	127000	78500	2.61
Rice (SP)	2014-15	10	16	60.30	55.17	57.73	36.50	36.77	48500	121374	72874	2.5
Rice (STCR)	2014-15	12	18	56.50	53.50	55.00	36.50	34.82	48500	82500	34000	1.7
Rice (SP)	2015-16	10	17	51.20	47.50	49.35	30.60	37.99	60000	128000	68000	2.13
Rice (STRC)	2015-16	5	10	62.28	45.00	53.64	30.60	42.95	60,000	82,800	22,800	1.3
Rice (SP)	2016-17	5	9	55.81	42.26	52.03	39.60	23.89	87600	130075	42575	1.48
Rice	2016-17	5	7	52.37	45.73	49.05	39.60	19.26	87600	122625	35025	1.39
Rice(STCR)	2016-17	5	7	64.44	43.20	53.82	39.60	26.42	87600	134550	73500	1.53
Total/average		**64**	**102**	**59.36**	**48.42**	**54.26**	**36.18**	**33.07**	**66037**	**116115**	**53409**	**1.83**

Impact of FLDs on RC Maniphou-7(RCM-9): Under popularization of new rice variety (RC Maniphou-7), KVK Chandel conducted 102 demonstrations in 23villages of Chandel district in four years. The KVK Chandel organised 13 extension activities like field days, radio talk, TV talk, Kisan Gosthi etc. for popularization of high yielding variety and replacement of traditional rice variety either in foot hills and Jhum land area also. The responses of farmers during FLDs were very positive for this variety because it matures between 135 to 145 days depending on sowing time. It has high tillering ability and long panicles with spikelets, distinguishing from other cultivars by its well exerted profuse whitish panicles at flowering stage and it is moderate resistant to leaf blast, sheath blight and stem borer. Now a days this variety is very popular among the farmers and near about 2000ha area this particular variety cultivated in the district.

Demonstrations plots on RC Maniphou-7

E3: Demonstration of Soybean Var. -JS 335 under TSP: The KVK Chandel with the collaboration of ICAR Manipur Centre in various sponsored demonstrations were conducted in 2013-14 and 2016-17.Under soybean crop KVK Chandel conducted in 23.5ha with 49 tribal farmers in Chandel district. The details of FLDs performance are mention in table and graphs. The improved variety and package of practices increase 12.44% yield over the farmer's practices.

Crop	Year	Area (ha)	Beneficiaries	Demonstration Yield (qt/ha)			Yield of local Check	Increase in yield	Avg. Cost of Cult. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	C:B Ratio
				H	L	A						
Soybean (SP)	2013-14	10	18	16.9	18.7	17.8	11.85	33.42	33000	71200	38200	2.15
Soybean	2013-14	08	16	18.2	16.9	17.5	11.85	32.47	33000	70200	37200	2.12
Soybean	2016-17	5.5	15	19.1	17.8	18.8	13.64	27.52	34127	93849	59722	2.75
Av./ Total		**23.5**	**49**	**18.0**	**17.8**	**18.0**	**12.44**	**31.13**	**33375**	**78416**	**45040**	**2.34**

E4: Demonstration of groundnut under TSP: The KVK Chandel with the collaboration of ICAR Manipur Centre in various sponsored demonstrations were conducted in 2013-14 to 2016-17 except 2015-16..Under groundnut crop KVK Chandel conducted in 55ha with 108 tribal farmers in Chandel district. The details of FLDs performance are mention in table and graphs. The improved variety and package of practices increase 39.92 % yield over the farmer's practices with B:C ratio 3.03.

Crop / Enterprise	Year	Area (ha)	Beneficiaries	Demonstration Yield (qt/ha)			Yield of local Check	Increase in yield	Avg. Cost of Cult. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	C:B Ratio
				H	L	A						
Groundnut	2013-14	10	20	24.95	22	23.47	12.58	46.39	44000	140820	96820	3.20
Groundnut (SP)	2013-14	10	15	19.50	21.5	20.50	12.58	38.63	44000	123000	79000	2.70
Groundnut (SP)	2014-15	8	12	21.50	20.8	21.15	12.58	40.52	38800	148050	109250	3.80
Groundnut (STCR)	2014-15	5	10	24.00	20.2	23.60	12.58	46.69	38800	165200	126400	4.20
*Groundnut	2014-15	5	10	21.50	20.8	21.15	12.58	40.52	38800	148050	109250	3.80
Groundnut(SP)under MGMG	2016-17	7	10	17.48	12.36	14.92	10.00	32.97	56400	157320	100920	2.78
Groundnut(SP)	2016-17	4	23	16.75	14.37	15.56	10.0	35.73	56400	124480	68080	2.20
Groundnut(SP under STCR)	2016-17	3	5	19.14	16.48	17.81	10.0	43.85	56400	142480	86080	2.52
Groundnut	2016-17	3	3	16.21	14.09	15.15	10.0	33.99	56400	121200	64800	2.14
	Total/ Average	**55**	**108**	**20.11**	**18.06**	**19.25**	**11.43**	**39.92**	**47777**	**141177**	**93400**	**3.03**

***Groundnut demonstration under Directorate of Groundnut Research, Junagrah**

Impact of groundnut FLDs under TSP : The FLDs results indicated that the yield of groundnut in the conducted years increased successively due to FLD which had a good impact over the tribal farming community of Chandel district as they were motivated by the new agricultural technologies applied in the frontline demonstration. Moreover from first year onwards, farmers cooperated enthusiastically in carrying out FLDs which lead to encourage results in the subsequent years. More and more use of latest technologies with high yielding varieties will subsequent change different this alarming trend of galloping extension gap. The yield of groundnut crops increases 39.92% under rainfed condition by adopting the only recommended practices and improved technology in Chandel district. The favourable benefit cost ratio is self-explanatory of economic viability of the FLDs and encouraged the farmers for adoption of interventions imparted. It is also observed that higher extension gap emphasized that there is further need to educate the farmers for adoption of adoption of improved technologies. Regarding the impact of FLDs now more than 50 villages in all four blocks successfully cultivating groundnut cultivation with the technical support of KVK.

E5: Demonstration of high yielding varieties of garden pea and fieldpea under TSP: Field Pea is very popular crop. Its green pods as well as dry seeds are in great demand for cooking as vegetable and as pulse, respectively in Manipur. It is highly nutritive containing high percentage of proteins, carbohydrates, vitamins A &K and calcium and phosphorus. . KVK Chandel conducted frontline demonstration of field pea on various field pea varieties from 2012-13 to2016-17 except 2014-15 on var. Rachna, HUDP-15, Arkel and GS-10 in 42 ha comprising 88 demonstrations in various villages of Chandel district under TSP with the collaboration of ICAR Manipur Centre. The details of eight years FLDs data mention below.

The pooled data of eight years reflected that average yield in demonstrated plots recorded 15.60 q/ha, which is 29.41% more than farmers technology (11.06q/ha). The field pea varieties gave higher gross return of Rs.73997 /ha, net return of Rs.42644 /ha with benefit cost ratio 2.33 as compared to local check.

Crop / Enterprise	Year	Area (ha)	Beneficiaries	Demonstration Yield (Qt/Ha)			Yield of local Check	Increase in yield	Avg. Cost of Cult. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	C:B Ratio
				H	L	A						
Garden pea var.Azad-1	2012-13	5	10	17.75	15.80	16.77	10.12	39.65	33000	67080	34080	2.0
Field pea var.HUDP-15	2012-13	5	10	15.10	13.10	14.10	10.12	28.22	30028	70500	40472	2.3
Fieldpea var.HUDP-15	2013-14	5	10	15.10	13.10	14.10	10.12	28.22	30028	70500	40472	2.30
Fieldpea var. Rachna	2013-14	5	10	15.80	14.60	15.20	10.12	33.42	30500	76000	45500	2.49
Fieldpea var. Arkel	2013-14	5	10	18.90	18.10	18.50	17.50	5.40	30500	92500	62000	3.03
Fieldpea var. HUDP-15,(SP)	2013-14	10	12	14.70	13.50	14.10	10.12	28.22	30500	70500	40000	2.31
Garden pea var. Arkel	2015-16	5	20	17.80	15.53	16.66	10.12	39.10	35000	83300	48300	2.30
Field pea var.GS-10	2016-17	02	06	16.58	14.22	15.4	10.31	33.05	31268	61600	30332	1.97
	Total/ average	**42**	**88**	**16.46**	**14.74**	**15.60**	**11.06**	**29.41**	**31353**	**73997**	**42644**	**2.33**

Impact of Field pea FLD: The yield of field pea crop can be increased to a greater extent under rainfed condition by adopting in Chandel district of Manipur. Favourable benefit cost ratio is self-explanatory of economic viability of the front line demonstrations and encourage the farmers for adaptation of intervention imparted. FLDs conducted by KVK its reduced technological gap and extension gap after that in Chandel district more than 3000 ha replace the old cultivars with new field pea varieties and its increased near about 30% more production with adaptation of new varieties,

Demonstration on mustard:KVK Chandel conducted frontline demonstration of rapeseed mustard on two varieties (M-27 and NPJ-112) from 2013-14 to2016-17 except 2014-15 in 38 ha comprising 63 demonstrations in various villages of Chandel district under TSP with the collaboration of ICAR Manipur Centre. The details of eight years FLDs data mention below.

Crop	Year	Area(ha)	Beneficiaries	Demonstration Yield (qt/ha)			Yield of local Check	Increase in yield	Economics of demo(Rs/ha)			
				H	L	A			Avg. Cost of Cult. (Rs/ha)	Avg. Gross Return (Rs/ha)	Avg. Net Return (Rs/ha)	C:B Ratio
Mustard var.M-27	2013-14	5	8	9.80	9.0	9.4	7.30	22.34	17652	32900	15248	1.86
Mustard var.NPJ-112	2013-14	5	10	9.98	10.26	10.12	7.30	27.86	17652	35420	17768	2.0
Mustard var.M-27(SP)	2013-14	10	18	9.20	8.80	9.0	7.30	18.88	17652	31500	13848	1.78
Mustard var.M-27	2015-16	5	10	8.27	6.74	7.50	6.12	18.40	17630	30000	12370	1.7:1
Mustard var.M-27	2015-16	3	07	8.64	6.82	7.73	6.12	20.82	18470	46380	27910	2.5:1
Mustard var.M-27(SP)	2016-17	10	10	8.65	6.83	7.74	6.17	20.28	18735	46440	27705	2.47
Total/ average		**38**	**63**	**9.09**	**8.07**	**8.58**	**6.71**	**21.43**	**17965**	**37106**	**19141**	**2.05**

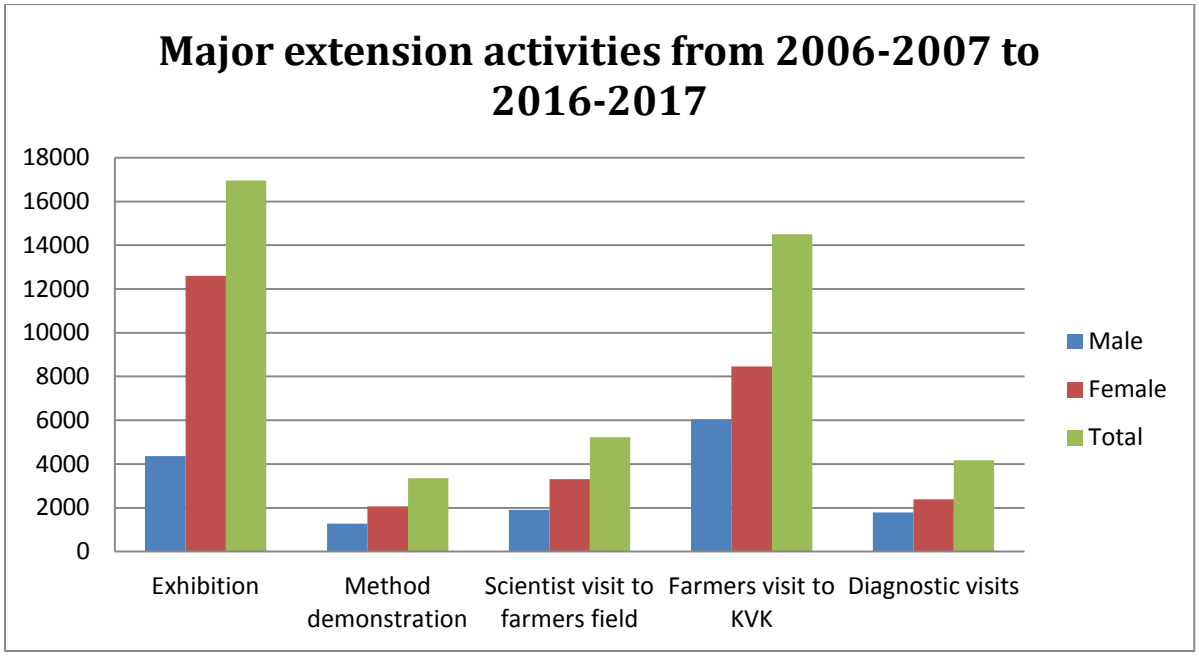
The pooled data of three years reflected that average yield in demonstrated plots recorded 8.58 q/ha, which is 21.43% more than farmers technology (6.716q/ha). The rapeseed mustard varieties gave higher gross return of Rs.37106 /ha, net return of Rs.19141/ha with benefit cost ratio 2.05 as compared to local check.

EXTENSION PROGRAMMES : In creating awareness among farmers about the benefit of advanced agricultural and allied technologies, scientific livestock rearing, soil testing, group farming and other related aspects, the KVK Chandel organized 3383number of various extension activities to reach out 71950farmers and extension officials. Among the beneficiaries farmers constituted 70623number of participants and 1271 were extension officials. Gender-wise classification indicates that 46057 number of women took part in various extension activities against 24566number of farmers. In respect of extension officials, however, only 214members were women extension officials and 1077 were male extension officials. The overall participation trained indicates that nearly 65.21% of the total participants belonged to women category. In respect of programme organized, farmers' visit to KVK where 247 number of programmes were organized by the KVKs to facilitate 14400 farmers and farmwomen to visit KVKs. Advisory service was the most important programme for the KVKs who provided 482 number of advisory services to 922 number of farmers and farmwomen. The KVK scientist also paid visit 1283 times to the farmers' field to interact with 5226 numbers of farmers and farmwomen followed by 9136 times diagnostic visit to provide solution against crop/livestock related problem of 4170 number of farmers. The KVKs also extended their expertise through delivering 120 number of lectures as resource person. Other important extension activities carried out by

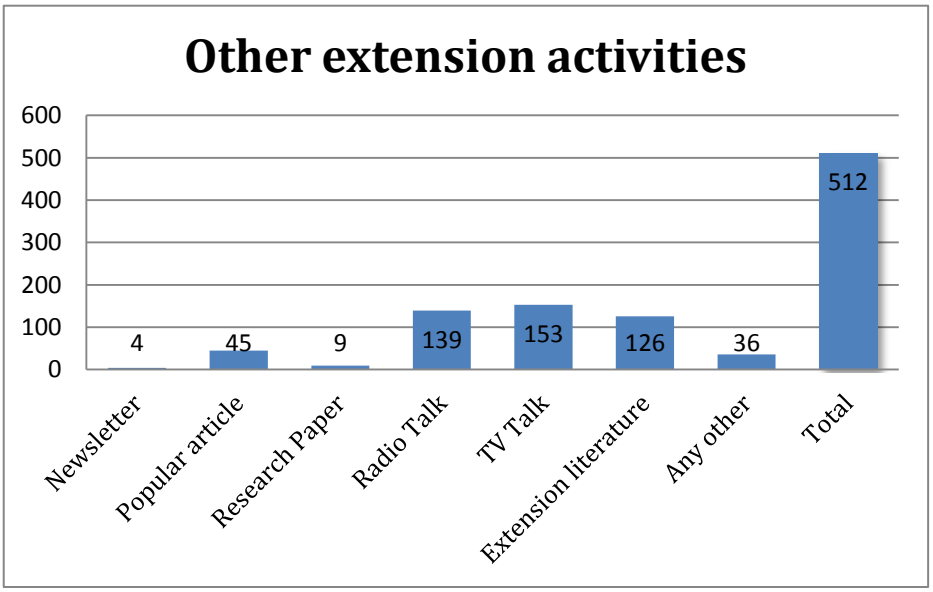
the KVKs include conducting kisan gosthi, field day, film show, method demonstration, group meeting, soil test campaign, self-help group mahilamandal and farm science club, conveners' meet, celebration of important days and others.

Table:Extension activities conducted by KVK Chandel from 2007-2017

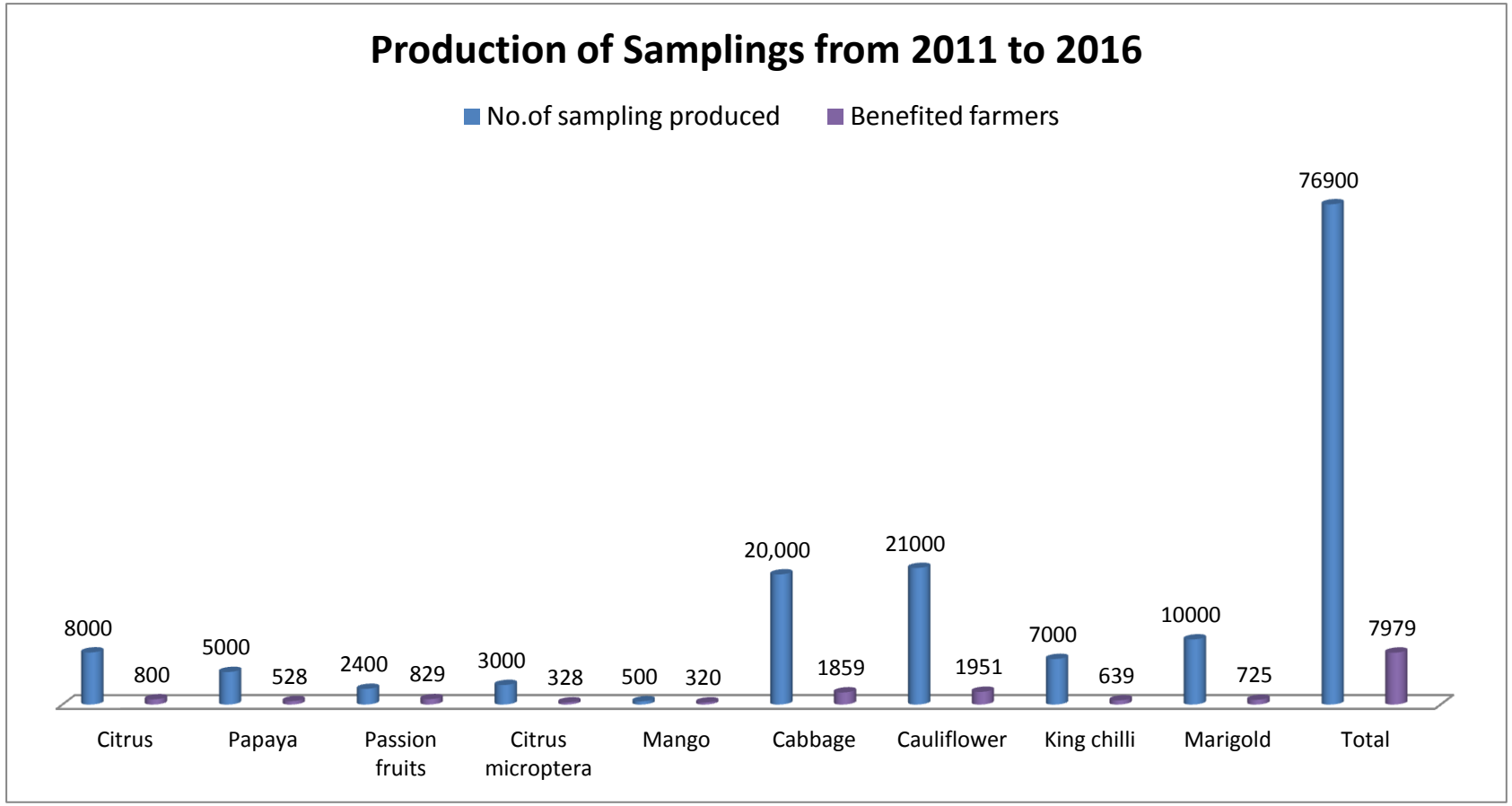
Nature of Extension Activity	No of activities	Farmers			Extension Officials			GrandTotal		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Field Day	45	983	1267	2250	15	12	27	998	1279	2277
Kisan Mela	48	831	1630	2461	60	22	82	891	1652	2543
Kisan Ghosthi	36	241	839	1080	12	6	18	253	845	1098
Exhibition	56	4215	12585	16800	148	19	167	4363	12604	16967
Film Show	69	685	2420	3105	0	0	0	685	2420	3105
Method demonstration	210	1128	2047	3175	153	27	180	1281	2074	3355
Farmers seminar	16	546	945	1491	18	0	18	546	963	1509
Wrokshop	60	348	547	895	15	5	20	363	567	930
Group meeting	143	1159	1359	2518	35	10	45	1194	1369	2563
Lecture delivered as resource persons	258	1273	1777	3050	126	19	145	1399	1796	3195
Advisory Services	482	305	529	834	67	21	68	372	550	922
Scientist visit to farmers field	1283	1739	3296	5035	174	17	191	1913	3313	5226
Farmers visit to KVK	247	5982	8418	14400	65	39	104	6047	8457	14504
Diagnostic visits	163	1749	2381	4130	35	5	40	1784	2386	4170
Exposure visit	64	305	655	960	0	0	0	305	655	960
Ex-trainees Sammelan	18	123	327	450	12	0	12	135	327	462
Soil health Camp	5	163	452	615	10	0	10	173	452	625
Animal Health Camp	21	105	525	630	21	0	21	126	546	672
Soil test campaigns	25	93	271	364	15	0	15	108	271	379
Celebration of important days (specify)	126	1746	2394	4140	73	12	85	1819	2406	4225
Technology week organised	8	847	1393	2240	23	0	23	870	1393	2263
Total	**3383**	**24566**	**46057**	**70623**	**1077**	**214**	**1271**	**25625**	**46325**	**71950**



10.1 Other Extension activities: The KVKs also exercised for other means of communication like publishing through newspaper, radio/TV talks, writing popular article, preparing extension literature as well as organizing awareness camps etc. The KVK Chandel conducted 512 number of such extension activities for the benefit of farmers. The KVKs prepared and distributed 126 extension literature depicting cultivation technique of crops, vegetables, livestock rearing etc. in english and local vernacular . KVK also published 45popuplar articles on various thematics areas.Regarding TV (153) and Radio (139) has been delivered on various topics by the subject matter specialists and four newsletter of KVK published its contain various important activities of KVK.



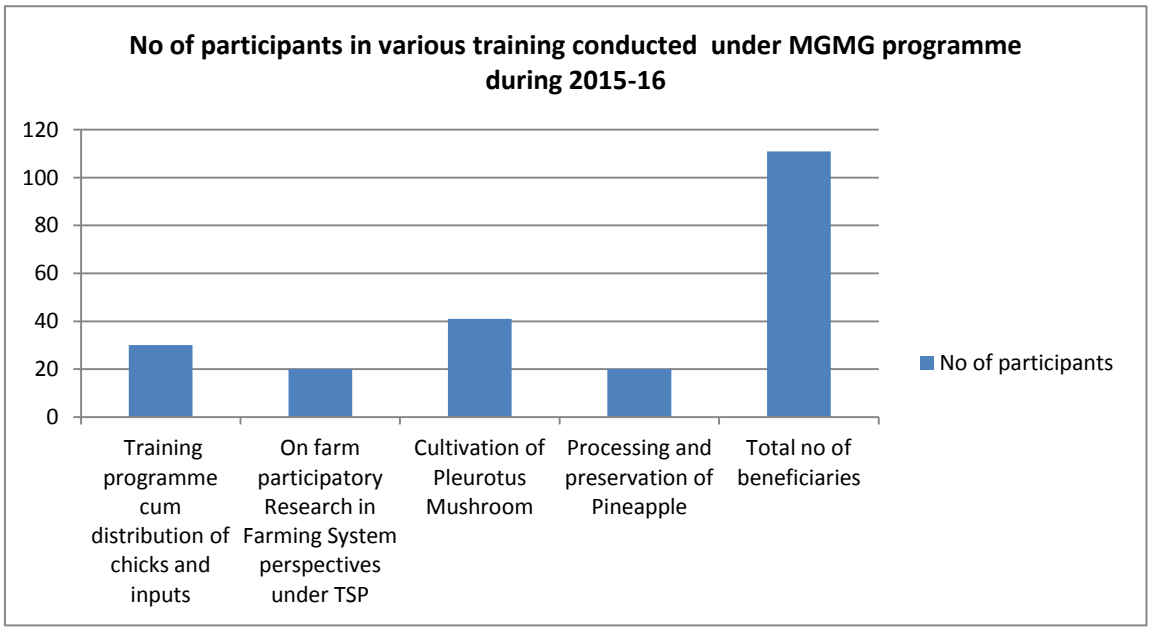
Production of Planting matterials : Seedlings, saplings and other planting materialswere produced to supply among the farmers of the neighbouring locality and the district. During 2011-16, 76,900 no. of planting materials were produced by the KVK . The number of beneficiaries covered under this programme was 7979 in the district. Among Vegetable seedlings cauliflower(21,000), Cabbage (20,000), Kingchilli(7000), marigold(10,000), Citrus(8000), Papaya (5000), Passion fruits (2400), Citrus micropetera(3000) and mango (550) were produced.

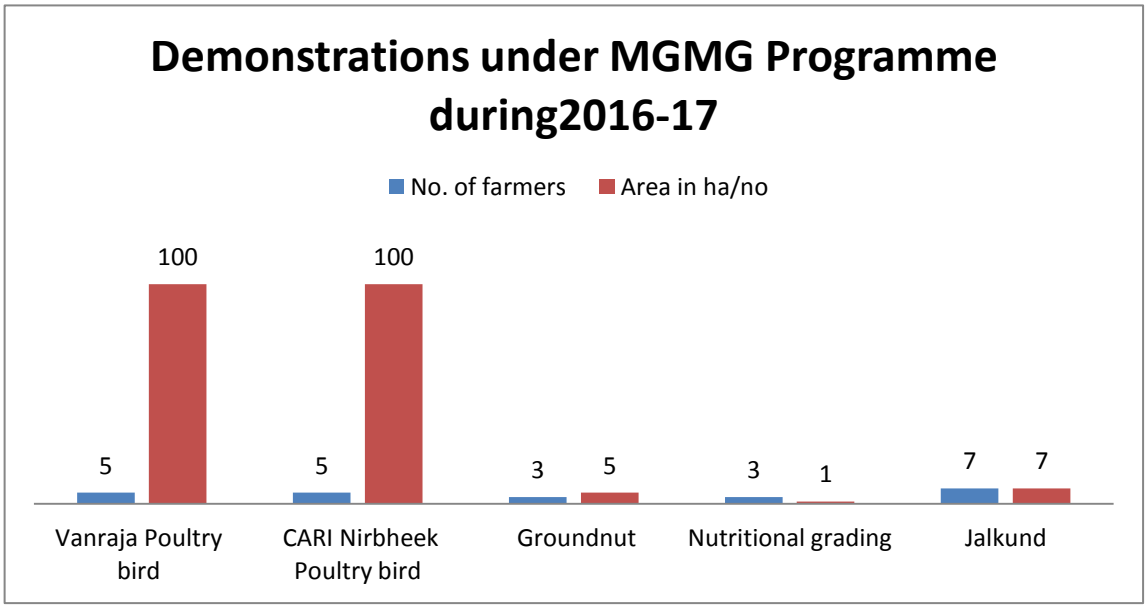


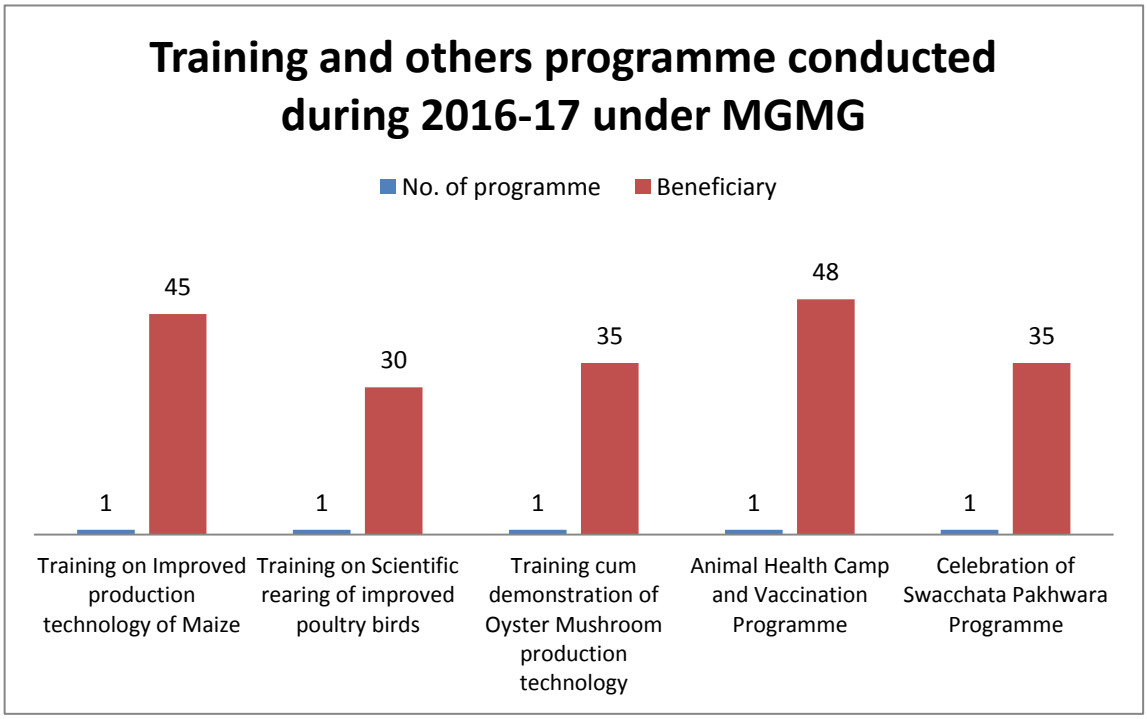
Special Flagship programme Conducted:

A. World Soil Day: The 68th UN General Assembly declared 2015 as the "International Year of Soils (IYS)" and 5th December as the "World Soil Day'' which aimed to increase awareness and understanding of the importance of soil for food security and essential ecosystem functions. The soil is considered as a critical component of the natural system and as a vital contributor to human wellbeing. Considering the importance, KVK Chandel celebrated "World Soil Day'' on 5th December, 2015-16 and 2016-17. Out of total 257 farmers participated. As a part of programme, KVK Chandel analysed the soil samples to know the soil status of farmers' field in the district. The soil samples were made available by the KVK personnel. The KVK chandel pertaining distributed 180 soil health cards, World Soil Day was celebrated on 05th Dec, 2015 at KVK Chandel Monsang Pantha in the presence of degenatories Shri. Nunglhung Victor, MLA 41 constituency Chandel, Shri. Robert Kshetrimayum, IAS, DC Chandel, Sri J. P. Kabui Programme Coordinator (I/C) and other district level officers. Awareness was created among the farmers on the significance of soil health and 250 soil health cards were also distributed to the participating Chandel district farmers.

B. MGMG Programme: In Chandel district Chandonpokpi village was adopted for MGMG by ICAR RC for NEH Region Manipur centre with the collaboration of KVK Chandel in 2015. Base line surveys were conducted to collect information on the demographic details, description of farming situation, major crop grown, cropping pattern, infrastructural facilities available, problems in agriculture and organizations working in the village. Preliminary analysis indicated that major crop in selected village was Paddy, Pulses, Ginger, Turmeric, Kingchilly and vegetables crops. Major problem were water scarcity, high cost and unavailability of labours, unavailability of scientific agricultural implements and quality seed. The KVK Chandel with collaboration of ICAR Research Complex for NEH Region Manipur Centre conducted these following programmes under MGMG in 2015-16 and 2016-17.


No of participants in various training conducted under MGMG programme during 2015-16
120
100
80
60
40
20
0
Training programme cum distribution of chicks and inputs
On farm participatory Research in Farming System perspectives under TSP
Cultivation of Pleurotus Mushroom
Processing and preservation of Pineapple
Total no of beneficiaries
No of participants


Demonstrations under MGMG Programme during2016-17
No. of farmers
Area in ha/no
5
100
5
100
3
5
3
1
7
7
Vanraja Poultry bird
CARI Nirbheek Poultry bird
Groundnut
Nutritional grading
Jalkund


Training and others programme conducted during 2016-17 under MGMG
No. of programme
Beneficiary
1
45
1
30
1
35
1
48
1
35
Training on Improved production technology of Maize
Training on Scientific rearing of improved poultry birds
Training cum demonstration of Oyster Mushroom production technology
Animal Health Camp and Vaccination Programme
Celebration of Swacchata Pakhwara Programme

C. Pradhan Mantri Fasal Bima Yojana(Crop Insurance Scheme): A one day awareness programme on Pradhan Mantri Fasal BeemaYojna cum farmers' fair was organised at Krishi Vigyan Kendra, Chandel . Shri Nunghlung Victor, MLA, 41 A/C, Chandel, Shri Sambunat Singh, MCS, ADC, Chandel, Shri Manglem Monsang, ADC Member, 11 Pantha, DCC, Chandel, Dr Deepak Singh, Programme Coordinator, KVK, Chandel and Shri Ramesh Sharma, Branch Manager, SBI, Chandel graced the function as presidium members. An interaction programme, exhibition, and technology demonstration were also organized at this occasion.


List of success stories:

1. KVK interventions for water conservation through Jal Kund: A success story of Mr. Kh. Samuel, Chandonpokpi Village
2. Farmer participatory seed production of groundnut - a viable option for increasing the income of the farmer
3. Establishment of rural food processing units: a viable option for increasing the income of tribal farmer through processing and preservation of fruits and vegetables :A success storyTecha Ronglo and Mrs. Ng. Harmila
4. A successful entrepreneur developed through piggery farming for sustainable income generation: A success storiesof Lalum Mate, Molnoi Village, Chandel
5. Sprinkler irrigation- a viable option for optimizing water usage: A success storyY. Romeo Chothe in Chandel district.
6. A successful piggery farmer Ng. Angamin Liwa Sarei village Chandel.
7. Enterprise on value added product from guava: A success story of Mrs. Ng. Harmila from Liwa Sarei, Chandel.
8. Enterprise on processing and value addition of bamboo shoot: A success story of Mrs. Ng. Harmila from Liwa Sarei, Chandel.
9. Enterprise on processing and preservation of pineapple: A success story of SH. Roslyn, Monsang Pantha. Chandel district.
10. Enterprise on processing and preservation of pineapple: A success story of Techa Hongsha Khangshim Village, Chandel.
11. A successful poultry farmer-A success story of M. Grace,Tuishemi village Chandel district.
12. A successful poultry farmer-A success story of Khamding Monsang,Monsang Pantha village Chandel.

Others important activities:

Sl.no	Activity	Numbers
1	International, National, Zonal Workshop, Seminar and participation etc.	46
2	Participation in training programmes as resource persons	85
3	Staff attending training programme under HRD development	78
4	TV /Radio Talks	40
5	Participation in important meeting	126
6	**Publication**	
	A. Research Paper	10
	B. Success stories published	10
	C. Abstract published in abstract book	16
	D. Leaflet publication	34
	Total	**445**

Award / recognitions:

- Dr. Deepak Singh, Programme Coordinator received **"Distinguished Scientist Award-2014"** for the outstanding performance of Plant Pathology by Society for Upliftment of Rural Economy Varanasi (U.P) on the occasion of National Conference on Rural Livelihood Security through Innovative Agri-entrepreneurship during 12-13th March 2016 held at ICAR Central Potato Research Station Patna.
- Ts Leenda Mosang, SMS-Plant Breeding received **"Best Poster Award"** in National Seminar on "Integrated Agri-Horticultural and Allied Research for Food and Nutritional Security in the Era of Global Climate Disruption" organized by ICAR RC for NEH Region, Umiam Meghalaya from 4-6th March, 2016pp.133.
- KVK, Chandel received **"Best Stall Award"** on "Farmers Fair on Mithun Mela in Senapati district organized by ICAR- NRC Mithun Nagaland, and Chief Conservator of Forest, Govt. of Manipur from 15-17th Feb, 2016.
- Dr. Deepak Singh, Senior Scientist & Head, received "**Reviewer Excellence Award"** as a reviewer of NASS rated Indian Journal of Agriculture Research and Legume Research an International Journal" for the significant and outstanding contribution to the Journal for the last so many years on dated 19thNov.2016
- Dr. Deepak Singh, Senior Scientist and Head Received "Certificate of appreciation" for significant contribution in promotion of community based processing and value addition of horticultural crops in Chandel district under TSP by Joint Director, ICAR Manipur Centre, Imphal.
- Y. Prabhawati Devi, SMS (Home Science) Received "Certificate of appreciation" for significant contribution in promotion of community based processing and value addition of horticultural crops in Chandel district under TSP by Joint Director, ICAR Manipur Centre, Imphal.

29. Farmers Award:

1. Recognition in Conference on Farmers First for Conserving Soil & Water Resources in North Eastern Region (FFCSWR-2017)
2. 1st Award for Best Wheat Cultivator in Chandel district was given in 2014 by United Tribal Development Project, UTDP, Chandonpokpi.
3. 2nd Award for Best Wheat Cultivator in Chandel district was given in 2014 by United Tribal Development Project, UTDP, Chandonpokpi.