Bridging Yield Gaps in Oilseeds - Experiences of KVKs under NMOOP Cluster Frontline Demonstrations

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1. Introduction

Oilseeds occupy an important position in the agricultural economy of India and oilseed crops play the second important role in the Indian agricultural economy next to food grains in terms of area and production. The diverse agro-ecological conditions in the country are favourable for growing nine annual oilseed crops, which include seven edible oilseeds (groundnut, rapeseed & mustard, soybean, sunflower, sesame, safflower and niger) and two non-edible oilseeds (castor and linseed) and several perennial oil bearing tree crops.

India is amongst the largest producer and consumer of vegetable oils in the World. At present, about 26 million hectares of land is under oilseeds cultivation (Directorate of Economics & Statistics). The area under oilseeds has been increasing over time and the production has registered many fold increase but its productivity is still low as compared to other oilseed producing countries in the world. The low and fluctuating productivity is primarily because to cultivation of oilseed crops is mostly done on marginal lands, which are lacking in irrigation and low levels of input use.

Soybean, groundnut, rapeseed and mustard contribute 82% of total inland oilseed production. Per capita consumption has been increasing and is projected to be around 24 kg by 2025. There is a large gap in production and demand of edible oilseeds, leading to growing dependency on import day by day.

1.1 Oilseeds Scenario in India

Presently, annual oilseeds are grown on an area of 26.18 million ha with 31.28 million tonnes production and productivity of 1195 kg /ha for the year ending 2016-17. India is one of the major oilseeds grower and importer of edible oils. India's vegetable oil economy is world's fourth largest after USA, China & Brazil. In India, oilseeds follow cereals, sharing 13.27% of the country's gross cropped area and accounting for nearly 3% of the gross domestic product and 5.98% of the value of all agricultural products. However, the growth in the domestic production of oilseeds has not been able to keep pace with the growth in the demand of the country. Despite being the largest cultivator of oilseeds in the world, India imports about 50% of its requirements owing to the life style changes in dietary pattern and increasing per capita income.

Table 1.1 Oilseeds scenario in India from 1950-51 to 2016-17

Year	Area (Lakh ha)	Production (Lakh tonnes)	Yield (Kg/ha)
1950-51	107.3	51.6	481
1960-61	137.7	69.8	507
1970-71	166.4	96.3	579
1980-81	176	93.7	532
1990-91	241.5	186.1	771
2000-01	227.7	184.4	810
2010-11	272.2	324.82	1193
2011-12	263.1	297.99	1133
2012-13	264.84	309.43	1168
2013-14	285.25	327.49	1153
2014-15	257.26	275.11	1037
2015-16	260.86	252.51	989
2016-17	261.77	312.76	1195

Source: Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI, New Delhi, 2018

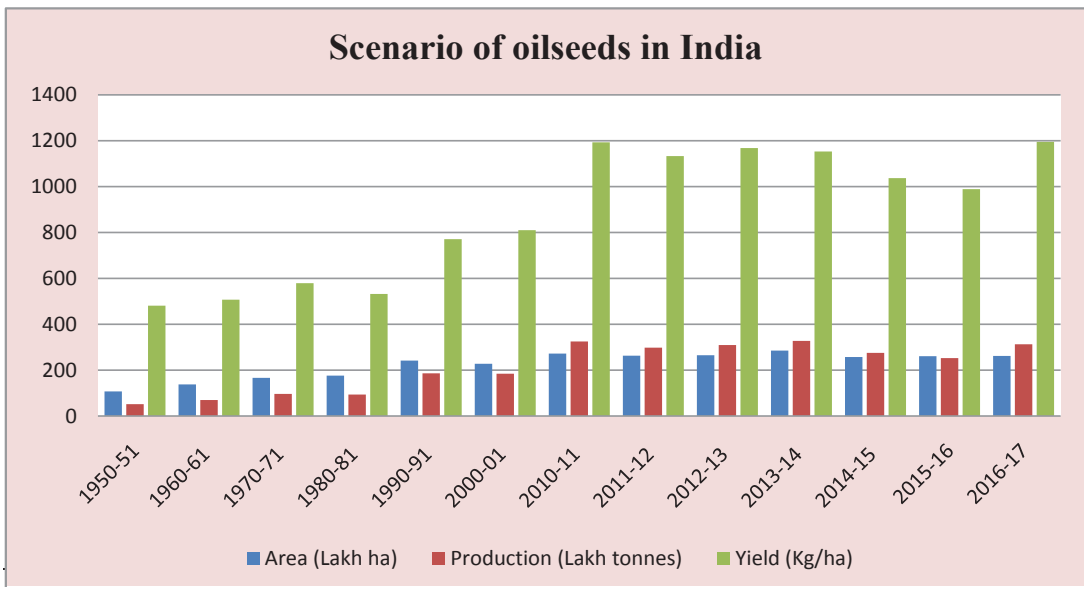

Fig. 1.1 Oilseeds scenario in India from 1950-51 to 2016-17

Source: Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI, New Delhi, 2018

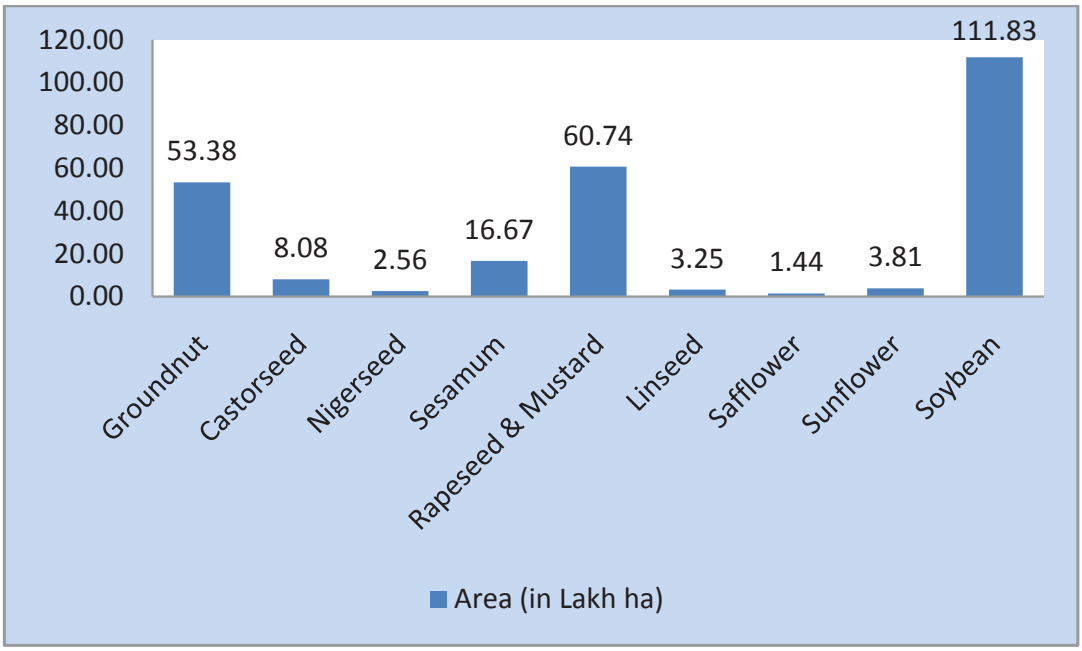

Fig.1.2 Area under Oilseeds in India during 2016-17

Source: Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI, New Delhi, 2018

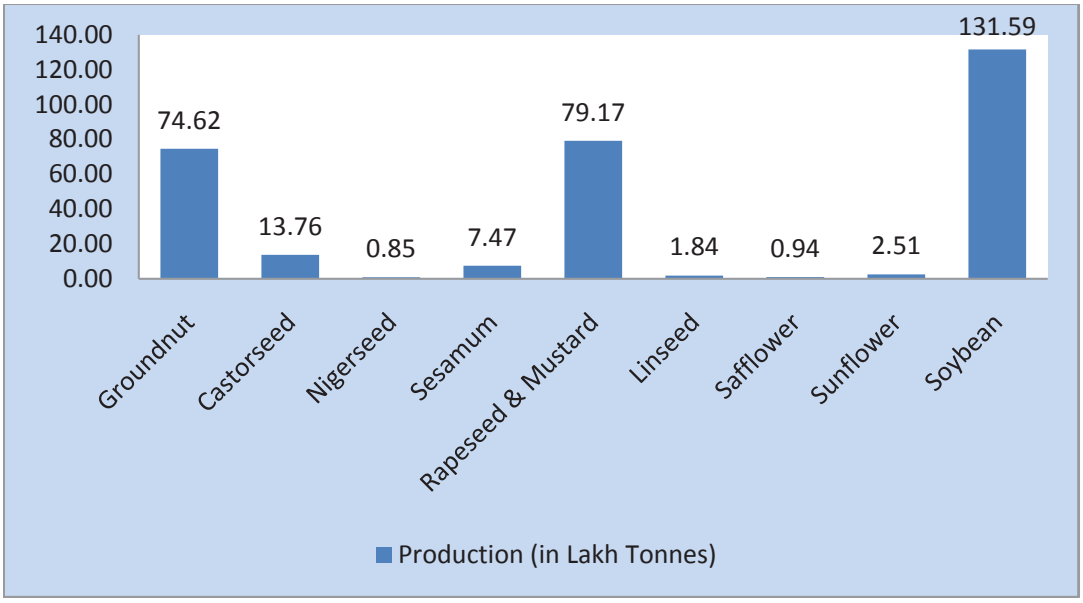

Fig.1.3 Production of Oilseeds in India during 2016-17

Source: Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI, New Delhi, 2018

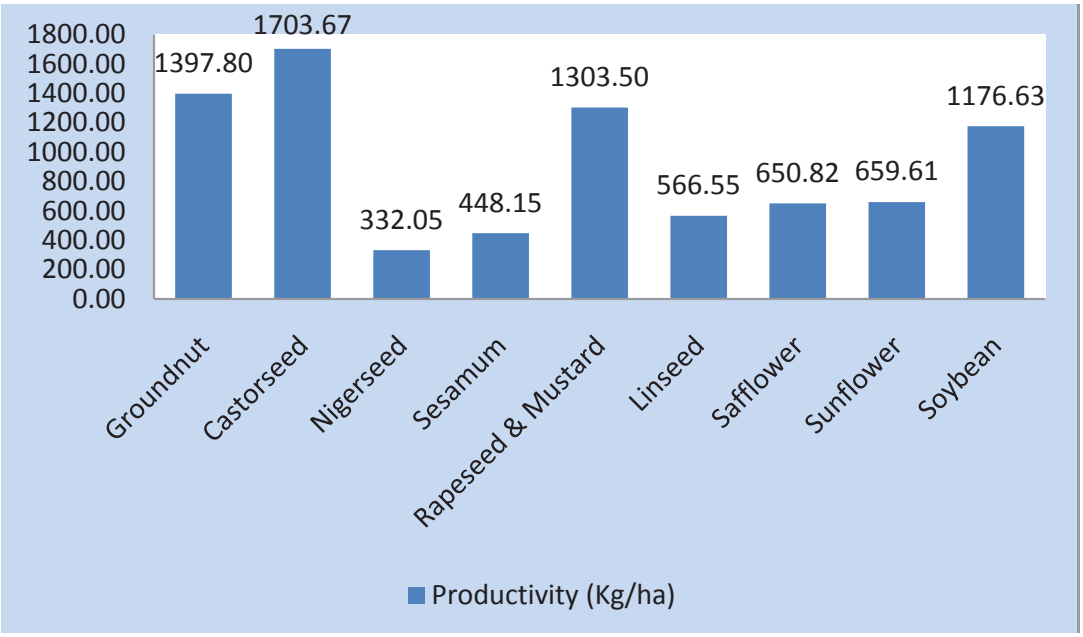

Fig.1.4 Productivity of Oilseeds in India during 2016-17

Source: Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI, New Delhi, 2018

1.2 Constraints in oilseeds production

Oilseed crops are largely grown under rainfed condition (72%) and are more prone to biotic and abiotic stresses. These crops are grown with minimum inputs due to high risk and poor resource base of farmers in rainfed areas. High seed rate and cost of seeds, non-availability of hybrids in case of major oilseeds like groundnut and soybean are other limitations in increasing the productivity of these crops. External price shock on account of availability of cheaper imported oil is a major challenge in this sector.

Major constraints in yield improvement

- Continued dependence on rainfed production system leading to larger fluctuation in area and yield.
- Agro-climatic limitations like adaptability of mustard under saline soil / low water areas, groundnut under low rainfall / drought prone areas, and soybean under upland black cotton soils.

- Farmers' priority to cereals under irrigated condition due to assured buy back.
- Availability of cheaper imported vegetable oil with admissible blending depressing domestic markets of oilseeds leading to area stagnation.
- Lack of assured procurement of oilseeds.

There is a large gap in production and demand of edible oilseeds, leading to growing dependency on import day by day. Productivity of Indian oil seed sector per se is very low that needs to be augmented to save the hard earned foreign exchange. It is, therefore, necessary to exploit domestic resources to maximize production to ensure edible oil security for the country. In order to enhance the production potential of newly released technologies on the farmer's fields at different locations in a given farming system and organized farming and extension activities for farmer and extension workers for dissemination of various technologies, Ministry of Agriculture and farmers Welfare, government of India initiated organization of Cluster frontline demonstration (CFLD) on oilseeds programme under National Mission on Oilseeds and Oil Palm (NMOOP).

1.3 National Mission on Oilseeds and Oil Palm (NMOOP)

The growth in the domestic production of oilseeds has not been able to keep pace with the growth in the demand of the country. Low and unstable yields and uncertainty in returns to investment, which result from the continuing cultivation of oilseeds in rainfed, high risk production environments, are the factors leading to this situation of wide demand-supply gap. To achieve the targeted production the Government of India has initiated Cluster Front Line Demonstrations on Oilseeds under National Mission on Oilseeds and Oil Palm (NMOOP). Accordingly, the ICAR- Division of Agricultural Extension planned to organize Cluster FLDs on Oilseeds during Rabi 2015-16 through Krishi Vigyan Kendras in the country.

Strategy

The strategy to implement the mission includes

1. Increasing Seed Replacement Ratio (SRR) with focus on varietal replacement.
2. Increasing irrigation coverage under oilseeds from 26% to 36%.
3. Diversification of area from low yielding cereals crops to oilseeds crops; inter-cropping of oilseeds with cereals/ pulses/ sugarcane.
4. Use of fallow land after paddy /potato cultivation.

5. Increasing availability of quality planting material enhancing procurement of oilseeds and collection.

1.4 Status of oilseeds production in Zone-X (Andhra Pradesh, Telangana and Tamil Nadu)

Andhra Pradesh, Telangana and Tamil Nadu states are important in terms of area, production and productivity of oilseeds in the country. In these states oilseeds are grown in kharif, rabi and rabi-summer seasons. The total area under oilseeds in Andhra Pradesh is 1144 thousand ha with average productivity of 581 kg/ha and production of 664.2 thousand tonnes. The major oilseeds are groundnut followed by sesame and castor. In Telangana, area under oilseeds is about 522 thousand ha with productivity of 1385 kg/ha with production of 723 thousand tonnes. Soybean occupies major portion followed by groundnut and castor 47373 ha. Oilseed crops occupies 323.1 thousand ha area in Tamil Nadu with 604.1 thousand tones production and 1870 kg/ha productivity. Groundnut is the major oilseed crop occupying 1013 thousand ha area followed by sesame and castor in the state.

Table 1.2 Area, production and productivity of major oilseeds in Andhra Pradesh during 2016-17

Crops	Area ('000 ha)	Production ('000 t)	Productivity(kg/ha)
Groundnut	1013	603	595
Sesamum	64	17	266
Castor	33	16	485
Sunflower	21	21	1000
Niger	6	2	333
Soybean	2	3.2	1612

Source: Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI, New Delhi, 2018

Table 1.3 Area, production and productivity of major oilseeds in Telangana during 2016-17

Crops	Area ('000 ha)	Production ('000 t)	Productivity(kg/ha)
Soybean	277	322	1162
Groundnut	166	342	2060
Castor	45	26	578
Sesamum	21	15	714
Sunflower	6	10	1667
Safflower	4	3	750
Rapeseed and Mustard	3	5	1667

Source: Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI, New Delhi, 2018

Table 1.4 Area, production and productivity of major oilseeds in Tamil Nadu during 2016-17

Crop	Area ('000 ha)	Production ('000 t)	Productivity(kg/ha)
Groundnut	282.5	588.9	2084
Sesame	28.2	10.8	384
Sunflower	7.5	2.9	392
Castor	4.7	1.5	312

Source: Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI, New Delhi, 2018

2. Cluster Frontline Demonstrations (CFLDs) on Oilseeds through KVKs in Zone-X

Following the mission objective, ICAR-Agricultural Technology Application Research Institute, Hyderabad is implementing cluster frontline demonstrations on oilseeds for demonstrating production potential of newly released varieties along with improved technologies of oilseeds through Krishi Vigyan Kendras (KVKs) of Andhra Pradesh, Telangana, Tamil Nadu, Maharashtra and Puducherry. Major technologies followed by the KVKs included new/ improved varieties, sowing methods, seed treatment, integrated nutrient management (INM), use of micro nutrients, bio-fertilizers, intercropping, integrated pest and disease management (IPDM) and integrated crop management (ICM), etc. The main stress was given to reduce the gap between existing potentiality to produce more oilseeds through available technology options, detailed planning and monitoring of crops by the KVKs at critical stages of ongoing CFLD programme.

The guidelines of NMOOP for conducting CFLDs on Oilseed crops

1. The demonstrations of each oilseeds crop should be organized in cluster approach (at least 10 ha for each cluster).
2. The varieties of oilseed crops to be included in the demonstrations should not be older than 10 years.
3. More focus should be given to organize demonstration of oilseeds in rice fallow areas in Eastern India.
4. FLDs will be conducted under the direct supervision of the scientists, they should promote INM and IPM, so as to reduce the cost of cultivation and help farmers realize better return. The KVK should advise the farmers on marketing of the produce. The scientists from KVK will conduct visit to the demonstrations site to resolve problem on spot.
5. Each KVK will furnish cafeteria of interventions for each crop to be undertaken at the demonstration site.

6. The demonstrations should be easily accessible to create awareness among the farmers.
7. Farmers should be trained for seed production, primary processing etc.
8. For individual farmer, FLDs should not exceed more than 2 acres (0.8 ha).

Cluster FLD on Sunflower at KVK, Kurnool (Yagantipalli)

3. Cluster Frontline Demonstrations (CFLDs) on Oilseeds during 2016-17

Cluster frontline demonstration programme on oilseeds was conducted by KVKs in Andhra Pradesh, Telangana and Maharashtra under National Mission on Oilseeds and Oil Palm (NMOOP) during kharif, rabi and summer seasons. A total of 5135 demonstrations were conducted in 2054.5 ha area on groundnut, sesame, sunflower, soybean, safflower and linseed crops.

Table 3.1 Cluster Frontline Demonstrations (CFLDs) on Oilseeds during 2016-17

Crop	State	Allocation		Achievement	
		No. of Demonstrations	Area (ha)	No. of Demonstrations	Area (ha)
Groundnut	Andhra Pradesh	400	160	360	144
	Maharashtra	150	60	50	20
Soybean	Maharashtra	1650	660	1463	585
	Telangana	300	120	0	0
Sesame	Andhra Pradesh	50	20	37	15

Crop	State	Allocation		Achievement	
		No. of Demonstrations	Area (ha)	No. of Demonstrations	Area (ha)
Sunflower	Andhra Pradesh	150	60	100	40
	Maharashtra	150	60	0	0
Total Kharif Season		**2850**	**1140**	**2010**	**804**
Groundnut	Andhra Pradesh	500	200	430	172
	Telangana	250	100	250	100
	Maharashtra	650	260	463	185.5
Sesame	Andhra Pradesh	675	270	740	296
	Telangana	125	50	125	50
	Maharashtra	150	60	150	60
Sunflower	Andhra Pradesh	325	130	340	136
Safflower	Andhra Pradesh	125	50	75	30
	Telangana	175	70	175	70
	Maharashtra	275	109	272	109
Linseed	Maharashtra	150	60	105	42
Total Rabi & Summer Seasons		**3400**	**1359**	**3125**	**1250.5**
Grand Total (Kharif+Rabi+Summer)		**6250**	**2499**	**5135**	**2054.5**

3.1 Performance of Cluster Front Line Demonstrations on Oilseeds during Kharif 2016

A total of 2850 FLDs covering an area of 1140 hectares was allotted to 41 KVKs in Andhra Pradesh, Telangana and Maharashtra states. Out of 1140 ha allocated area, 804 ha area was achieved during Kharif 2016-17. The crops covered are groundnut, soybean, sunflower and sesame.

Table 3.2 Cluster Frontline Demonstrations (CFLDs) on Oilseeds during Kharif 2016

Crops	State	Allocation		Achievement	
		No. of Demonstrations	Area (ha)	No. of Demonstrations	Area (ha)
Groundnut	Andhra Pradesh	400	160	285	144
	Maharashtra	150	60	50	20
	Sub total	**550**	**220**	**335**	**164**
Soybean	Maharashtra	1650	660	1383	585
	Telangana	300	120	0	0
	Sub total	**1950**	**780**	**1383**	**585**

Crops	State	Allocation		Achievement	
		No. of Demonstrations	Area (ha)	No. of Demonstrations	Area (ha)
Sesame	Andhra Pradesh	50	20	39	15
	Sub total	**50**	**20**	**39**	**15**
Sunflower	Andhra Pradesh	150	60	50	40
	Maharashtra	150	60	0	0
	Sub total	**300**	**120**	**50**	**40**
Total Kharif Season		**2850**	**1140**	**1807**	**804**

3.1.1 Varietal Performance of Groundnut CFLDs during Kharif 2016

During Kharif 2016, 285 CFLDs of Groundnut on full packages were demonstrated in 144 ha area by KVKs of Anantapur, Chittoor, Kurnool and Prakasam districts. The technology demonstrated includes improved variety, weed management, nutrient management, integrated pest and disease management under rainfed conditions. The results revealed that the improved variety Dharani increased the yield of groundnut by 12.69 per cent in Chittoor, Kurnool and Prakasam districts which improved the net returns of the farmers with benefit cost ratio of 2.11. K-6 variety with improved package of practices reduced the yield gap by 32.95 per cent in Anantapur and Chittoor districts. In Maharashtra improved variety Phule Bharati with integrated crop management practices resulted in average yield of 26.5q/ha which was 70.96 per cent higher than check plot yield in Jalgon (Pal).

Table 3.3 Technologies of Groundnut demonstrated during Kharif 2016

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	K-6, Dharani	Imidacloprid @2ml and Tebuconazole @ 1g/kg of seed, Trichoderma viride@ 10 g/kg seed	Hand weeding-25 and 45 DAS and Pre emergence application Pendimethalin	N:P_2O_5:K_2O: 20: 40:50 kg/ha	Thrips: Neem oil 2.5l/ha, Tikka Leaf spot: Mancozeb @ 2.5 g/l
Maharashtra	Phule Bharati	Trichoderma viride@ 10 g/kg seed	Hand weeding@ 25 and 45 DAS	N:P_2O_5:$ZnSO_4$: 20:50:10 kg/ha	Tikka leaf spot: Mancozeb @ 2.5 g/l




Demonstration of Polymulch technology at KVK, Jalgaon (Pal)

Table 3.4 Performance of major varieties of Groundnut during Kharif 2016

State	KVK/ District	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Andhra Pradesh	Anantpur (Kalyan-durg), Chit-toor (Kalikiri)	K-6	4.74	7.07	49.05	32.95	2386	5927	0.89	1.28
Andhra Pradesh	Chittoor (RASS), Kurnool (Yaganti-palli), Prakasam (Darsi)	Dharani	12.43	14.00	12.69	11.21	34775	51569	1.69	2.11
Maharashtra	Jalgaon (Pal)	Phule Bharati (JL-776)	15.50	26.50	70.96	41.50	69000	104800	2.50	4.60

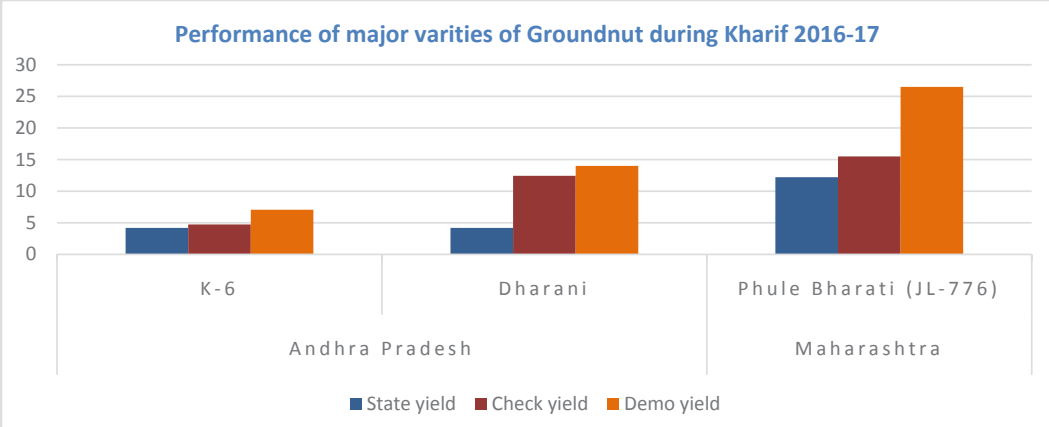

Fig.3.1. Performance of major varieties of groundnut during kharif 2016

3.1.2 Varietal Performance of Sesame CFLDs during Kharif 2016

The varietal demonstration of YLM-66 was taken up in 15 ha by KVK Visakhapatnam (BCT). The yield obtained was 7.66q/ ha which was about 43.71 per cent higher than the check yield. The net returns of Rs. 29595 per hectare and benefit cost ratio of 2.82 in demonstration plot clearly shows better results over farmer's local variety. This improved variety with integrated crop management practices bridged the yield gap between demonstration and check plot by 30.41 per cent.

Table 3.5 Technologies of Sesame demonstrated during Kharif 2016

State	Variety	Seed Treatment	Weed Management	Fertilizer/Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	YLM-66	Dithane M-45 @ 3g/kg	Pre emergence application of Pendimethalin and one hand weeding within 25-30 DAS	10000 kg FYM	Leaf webber: Preventive spray of Neem oil 5ml/l Vector control: Dimethoate 2 ml/l

Table 3.6 Performance of major varieties of Sesame during Kharif 2016

State	KVK	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Andhra Pradesh	Visakhapatnam (BCT-KVK)	YLM-66	5.33	7.66	43.71	30.41	19310	29595	2.05	2.82

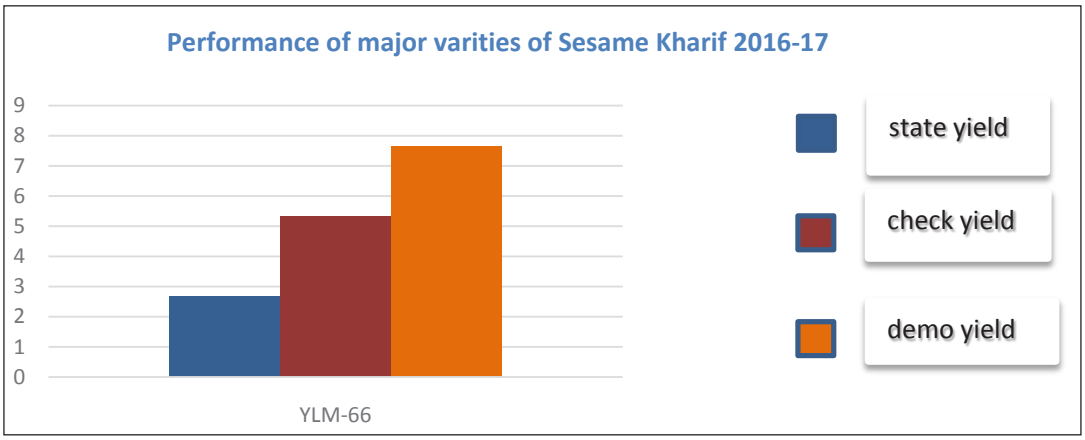

Fig.3.2 Performance of major varieties of Sesame during Kharif 2016

Demonstration of CFLD on Sesame var. YLM 66 at KVK, Visakhapatnam (BCT)

3.1.3 Varietal Performance of Soybean CFLDs during Kharif 2016

The Cluster FLDs on Soybean was allocated to KVKs of Maharashtra and Telangana with a target of 780 ha out of which only Maharashtra was able to take up the demonstrations in an area of 585 ha. The variety MACS 1188 along with integrated crop management in Ahmednagar, Nashik and Pune districts has given the highest yield of 25.56 q/ha and yield advantage of 79.72 per cent over the check plot. Despite of severe droughts the demo plots could successfully get higher yields due to high yielding varieties with various technological interventions like sowing with broad bed furrow planting and integrated crop management practices like seed treatment, soil test based fertilizer application, weed management, integrated pest and disease management.

Table 3.7 Technologies of Soybean demonstrated during Kharif 2016

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Maharashtra	MACS 1188, MAUS 158, Phule Agrani, JS-9560, JS-9305, MAUS-71, MAUS-162, NRC-37	Rhizobium, PSB, Trichoderma	Hoeing and Hand weeding @ 25 and 45 DAS, Spraying of Imazethapyr 10% SL at 15-20 DAS. pendimethalin 30 EC.	FYM: 5 ton at preparatory tillage, NPK: 30:75:30 as Basal application with seed cum fertilizer drill	Girdle beetle, stem borer and hairy caterpillar: Triazophos 16ml or Chlorpyriphos 20ml or Emamectin Benzoate 4g/10l water Spodoptera: Carbendazim + Mancozeb 20g /10 l water, Pheromone trap (Spodo lure)

Table 3.8 Performance of major varieties of Soybean during Kharif 2016

KVK	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
		Check	Demo	Increase (%)		Check	Demo	Check	Demo
Ahmednagar (Bableshwar, Dahigaon), Nashik (YCMOU), Pune (Baramati,Narayangaon)	MACS-1188	14.22	25.56	79.72	44.36	26655	33623	1.82	1.95
Akola, Beed (Ambajogai), Buldhana (PDKV), Hingoli, Jalna, Latur, Osmanabad, Parbhani	MAUS-158	16.93	21.88	29.19	22.62	22930	36289	1.89	2.44
Nanded (Pokharni)	MAUS-71	10.74	18.13	68.81	40.76	26250	33360	2.17	2.59
Solapur (Khed), Wardha, Washim	MAUS-162	19.23	21.80	13.38	11.78	27159	28464	1.88	1.92
Dhule, Jalgaon (Mamurabad)	JS 9305	9.58	14.50	51.36	33.93	15367	21227	1.36	1.86
Jalgaon (Pal), Nagpur (CICR), Nanded (Pokharni), Amravati (Ghatkhed), Nashik (Malegaon)	JS-9560	12.92	16.87	30.59	23.41	17937	24676	1.89	2.15
Buldhana (Jalgaon Jamod), Nandurbar, Sangli, Pune (Baramati), Amravati (Durgapur), KOLHAPUR	Phule Agrani (KDS-344)	24.31	16.09	51.06	33.81	34401	48617	2.05	2.37
Yavatmal	NRC-37	22.00	13.52	62.72	38.54	26837	37395	1.90	2.10

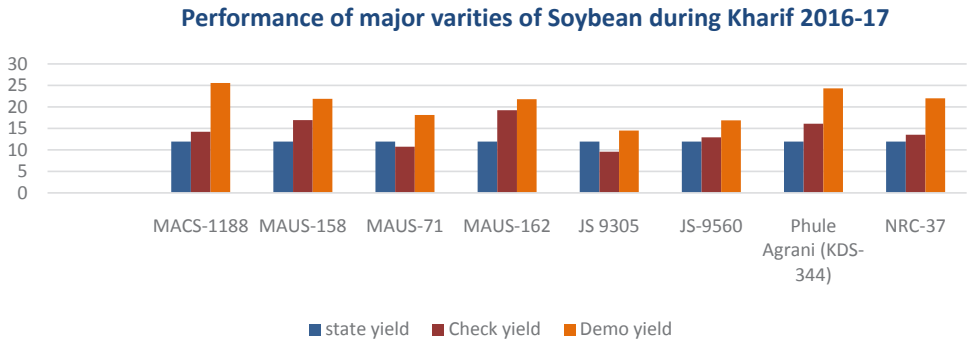

Fig.3.3 Performance of major varieties of Soybean during Kharif 2016

CFLD on Soybean var. MACS 1188 at KVK, Ahmednagar (Bableshwar)

CFLD on Soybean var. Phule Agrani (KDS 344)


CFLD on Soybean var. MAUS 158

3.1.3 Varietal Performance of Sunflower CFLDs during Kharif 2016

The cluster FLDs on Sunflower was allocated to both Andhra Pradesh and Maharashtra but the KVKs of Andhra Pradesh were only able to take up in about 40 ha. CFLDs on sunflower were conducted by 2 KVKs in Kurnool district in kharif. The technology demonstrated was improved hybrid, seed treatment, soil test based nutrient application, pest and disease management. The results revealed that the technology demonstrated increased the yield of sunflower by 21.8 to 44.8 percent when compared with the check yield. The results revealed that about 45 per cent of yield increase was obtained in KVK Kurnool (Banavasi) over the farmer's plot with net returns of Rs. 33,500 per hectare and benefit cost ratio of 2.03.

Table 3.9 Technologies of Sunflower demonstrated during Kharif 2016

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	Sunbred 275, SH-117	Imidacloprid @5ml/kg	Interculture operation with danthi @ 20-25 DAS followed by one hand weeding	NPK @ 60:60:30 kg/ha	Thrips: Acephate @ 1.5 g/l, White flies: Triazophos @2ml /l Leaf spot: Carbendazim @ 1g/l


CFLD on Sunflower at KVK, Kurnool (Yagantipalli)

Table 3.10 Performance of major varieties of Sunflower during Kharif 2016

KVK	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
		Check	Demo	Increase (%)		Check	Demo	Check	Demo
Kurnool (Banavasi)	Sun-bred-275	10.67	15.45	44.80	30.93	13150	33500	1.32	2.03
Kurnool (Yagantipalli)	SH-117	10.23	12.46	21.80	17.89	12355	19545	1.53	1.81

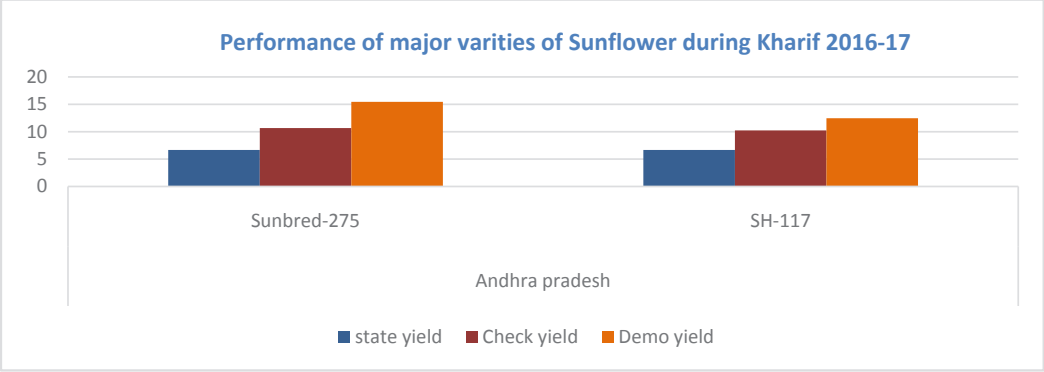

Fig.3.4. Performance of major varieties of Sunflower during *Kharif* 2016

3.2 Performance of Cluster Front Line Demonstrations on Oilseeds during Rabi & Summer 2016-17

Cluster front line demonstrations on oilseeds were conducted by KVKs of Andhra Pradesh, Telangana and Maharashtra states during rabi 2016-17 covering an area of 1250.5 ha with 3125 demonstrations. The crops covered are Groundnut, Sesame, Sunflower, Safflower and Linseed.

Table 3.11 Cluster Frontline Demonstrations (CFLDs) on Oilseeds during Rabi & Summer 2016-17

Crops	State	Allocation		Achievement	
		No. of Demonstrations	Area (ha)	No. of Demonstrations	Area (ha)
Groundnut	Andhra Pradesh	500	200	430	172
	Telangana	250	100	250	100
	Maharashtra	650	260	463	185.5
	Sub total	**1400**	**560**	**1143**	**457.5**
Sesame	Andhra Pradesh	675	270	740	296
	Telangana	125	50	125	50
	Maharashtra	150	60	150	60
	Sub total	**950**	**380**	**1015**	**406**
Sunflower	Andhra Pradesh	325	130	340	136
	Sub total	**325**	**130**	**340**	**136**
Safflower	Andhra Pradesh	125	50	75	30
	Telangana	175	70	175	70
	Maharashtra	275	109	272	109
	Sub total	**575**	**229**	**522**	**209**
Linseed	Maharashtra	150	60	105	42
	Sub total	**150**	**60**	**105**	**42**
Total Rabi & Summer Season		**3400**	**1359**	**3125**	**1250.5**

3.2.1 Varietal Performance of Groundnut CFLDs during Rabi & Summer 2016-17

Krishi vigyan Kendras in Andhra Pradesh, Telangana and Maharashtra states conducted_1143 cluster front line demonstrations on groundnut in 457.5 ha. In Andhra Pradesh the demonstrations were conducted under irrigated situation in red loamy soils with improved package of practices. The average yield recorded in West Godavari and Nellore districts was 39.63q/ha with variety TAG-24 against the local check yield of 31.25q/ha with an increase of 26.8 per cent. Improved variety Dharani with integrated crop management practices increased the yields by 18.1 per cent in Guntur, Kurnool, Prakasam and Anantapur districts with an average yield of 20.64 q/ha compared to check yield of 17.48 q/ha with an increase with net returns of Rs. 53,885 per hectare and benefit cost ratio of 2.27.

Five KVKs in three districts i.e. Mahabubnagar, Nalgonda and Warangal of Telangana implemented CFLDs on groundnut crop during rabi season. The crop was sown in October-November months in red soils under irrigated conditions after kharif greengram and maize. Improved K-6 and K-9 varieties were demonstrated along with recommended package of practices. K-6 variety with integrated crop management practices has given highest yield of 24.50 q/ha with 43.27 per cent increase compared to check yield which realized net returns of Rs. 83472 per hectare and benefit cost ratio of 2.52 in Mahabubnagar and Nalgonda districts.

In Maharashtra, demonstrations of TG-38 recorded highest average yield of 25.83q/ha with technology interventions like improved variety, polythene mulch and Broad Bed Furrow, followed by Phule Unnati with average yield of 23.4q/ha with Integrated Nutrient Management including bio-fertilizers and registering increased yield of 25.81 and 32.45 per cent over check yield respectively.

Table 3.12 Technologies of Groundnut demonstrated during Rabi & Summer 2016-17

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	TAG-24, K-6, Dharani	Tebuconazole @ 1 g/kg, Imidacloprid @ 2 ml /kg, Trichoderma viride @ 10 g /kg seed	Pendimethalin @1 l /acre	FYM @1000 kg /ha, NPK:26:40:50 kg/ha, Zn-25 kg/ha	For sucking pests: Sticky traps for monitoring, Spraying of Imidacloprid @0.3ml/l. Tikka leaf spot: Spraying of Quinalphos@2ml /l water
Maha-rashtra	TAG-24, Phule Unnati, Phule Bharati, Phule Warna, TG-38, TG-39, TKG bold	5 gm Thiram/ kg seed + 250 gm Rhizobium/10 kg seed	Hand weeding at 25 DAS	FYM @5 t/ ha + 25:50:30 NPK/ha	Root knot nematodes: Chlorpyriphos+ Mancozeb at the time of infestation, Leaf spot: Propiconazol 1 g/l
Telangana	K-9, K-6	Imidacloprid-5ml/kg &Tebuconazole-1g/kg of seed	Hand Weeding 20 DAS, Guntaka 45 DAS	Urea 30kg/ acre, SSP 100kg/acre, MOP 20kg/ acre	Leaf miner : Quinalphos @ 2ml/l, Spodoptera: Chlorantraniliprole @0.3 ml and Neem oil @5 ml/l and erection of Pheromone traps @ 4 per acre. Tikka leaf spot: Hexaconazole @2 ml/l

Table 3.13 Performance of major varieties of Groundnut during Rabi & Summer 2016-17

State	KVK	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	In-crease (%)		Check	Demo	Check	Demo
Andhra Pradesh	Chittor (RASS), Srikakulam (Amadlavalasa)	K-6	27.69	29.13	5.20	4.94	88032	117995	2.27	2.85
	Guntur (Lam), Kurnool (Yagantipalli), Kurnool (Banavasi), Prakasam (Darsi), Anantapur (Reddipalli)	Dharani	17.48	20.64	18.10	15.31	33978	53885	1.79	2.27
	Nellore, West Godavari (Undi), West Godavari (V R Gudem)	TAG - 24	31.25	39.63	26.80	21.14	114164	169771	2.06	2.70
Telangana	Mahaboobnagar (Palem), Nalgonda (Kampasagar)	K-6	17.10	24.50	43.27	30.2	63019	83472	2.22	2.52
	Karimnagar (Jammikunta), Nalgonda (Gaddipalli), Warangal Malyal)	K-9	14.57	21.50	47.60	32.23	67955	82407	2.32	2.56
Maharashtra	Pune (Baramati), Sindhudurg, Thane	TG-38	20.53	25.83	25.81	20.51	45653	72550	1.96	2.52
	Parbhani	TG-37A	13.00	17.50	34.62	25.71	23000	46800	1.92	3.13
	Nandurbar	TG-51	16.26	22.99	41.36	29.27	62098	84034	3.17	3.60
	Dhule, Washim, Pune (Narayangaon)	Phule Unnati	17.67	23.40	32.45	24.48	38953	62691	1.81	2.23
	Hingoli, Nanded (Pokharni)	JL 776 (Phule Bharati)	14.34	18.00	25.57	20.33	33152	64254	2.17	3.25
	Raigad	TKG Bold	11.40	18.88	65.57	39.61	8150	17600	1.22	1.41
	Sangli	KDG-128 (Phule Warna)	16.00	22.97	43.56	30.34	51210	73470	2.07	2.35

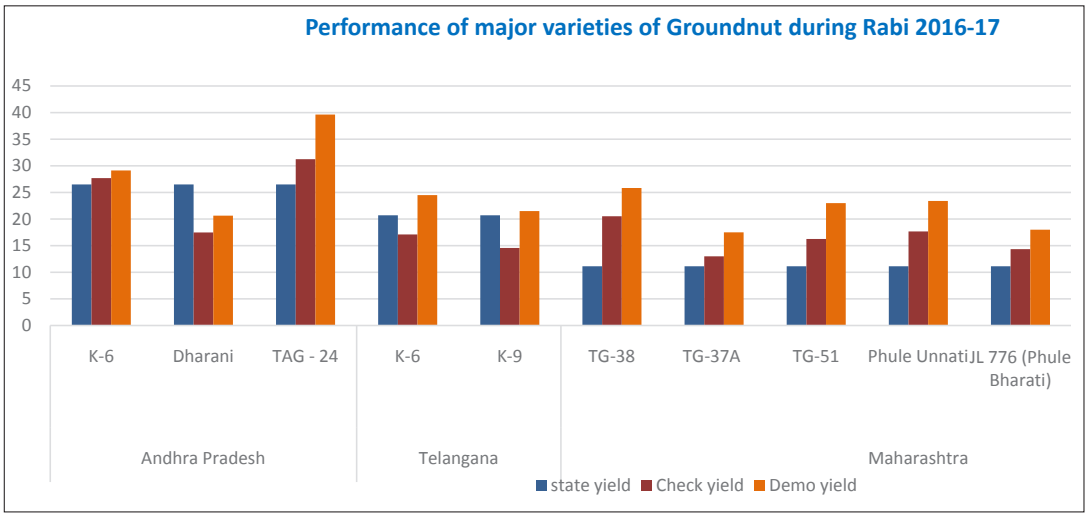

Fig.3.5. Performance of major varieties of Groundnut during Rabi 2016-17

CFLD on Groundnut var. K-6 with IPM at KVK, Nalgonda (Kampasagar)

CFLD on summer Groundnut with BBF and Polymulch at KVK, Pune (Baramati)


Demonstration of Polymulch Technology in Groundnut

3.2.2 Varietal Performance of Sesame CFLDs during Rabi & Summer 2016-17

During rabi season, 1015 cluster FLDs on sesame were conducted by KVKs of Andhra Pradesh, Telangana and Maharashtra states in an area of 406 ha. Varietal demonstrations of YLM-66 and YLM-17 were taken up in 10 KVKs of Andhra Pradesh under irrigated situation. YLM-66 along with integrated crop management practices gave 34.77 per cent increase in yields compared to check with net returns of Rs. 38617 per hectare and benefit cost ratio of 3.49. Variety YLM-17 resulted in highest average yield of 8.88q/ha which increased the yields by 20.82 compared to check yield.

Swetha til with recommended package of practices was demonstrated by KVK, Karimnagar (Jammikunta), resulted in 22.93 per cent increase in yields and benefit cost ratio of 3.72 with net returns of Rs. 41490 per hectare in Telangana state. Sesame was demonstrated in KVKs of Maharashtra in rabi season. The average yield obtained in the demonstrations showed that in Nanded (Pokharni) and Hingoli, an average of 7.2 q/ha yield of sesame was attained with PKV-NT-11 followed by 5.16 q/ha in Akola and Jalgaon districts with AKT-101 against check yield of 4.47 and 4.5 with an increase of 61.07 to 14.47 percent.

Table 3.14 Technologies of Sesame demonstrated during Rabi & Summer 2016-17

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	YLM-66, YLM-17	Mancozeb @ 3g/kg, Carbendazim @ 3g/kg, Captan @ 3g/kg	Pre emergence herbicide pendimethalin @ 2.5 l/ha 2 days after sowing, Manual hand weeding at 15,30,and 45 days after sowing	NPK @ 60:20:20 kg/ha	Spraying of wettable sulphur@3g/l against powdery mildew
Maharashtra	PKV NT-11, AKT-101	Trichoderma @ 5ml/kg followed by Azotobactor and Phosphorus Solubilising bacteria @ 5ml/kg seed	Manual weeding at 15,30,45 DAS	Split application of N at sowing and at 30 DAS by drilling @ 50:25:00	Aphids: Quinolphos 25 EC-2 ml 30-45 and 60 DAS
Telangana	Swetha til	Tebuconazole-1g/kg	Pendimethalin, 2 days after sowing	FYM 500 kg, NPK @ 50:25:25	Jassids, Whitefly: Neem oil, Carbendizam + COC

Table 3.15 Performance of major varieties of Sesame during Rabi & Summer 2016-17

State	KVK	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Andhra Pradesh	East Godavari (Kalvacherla, Pandirmamidi), Kadapa, Kurnool (Yagantipalli), Prakasam (Darsi), Krishna (Garikapadu), West Godavari (V R Gudem, Undi), Vizianagaram	YLM-66	6.24	8.41	34.77	25.8	21156	38617	2.43	3.49
	Guntur (Lam), Srikakulam (Amadalavalasa)	YLM-17	7.35	8.88	20.82	17.22	22125	38448	2.05	3.18

State	KVK	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Telangana	Karimnagar (Jammikunta)	Swetha til	7	8.61	22.93	18.69	27393	41490	2.84	3.72
Maharashtra	Akola, Jalgaon (Mamurabad)	AKT- 101	4.5	5.16	14.67	12.79	17559	25637	1.84	2.19
	Nanded (Pokharni), Hingoli	PKV NT 11	4.47	7.2	61.07	37.91	20507	40545	2.77	5.53

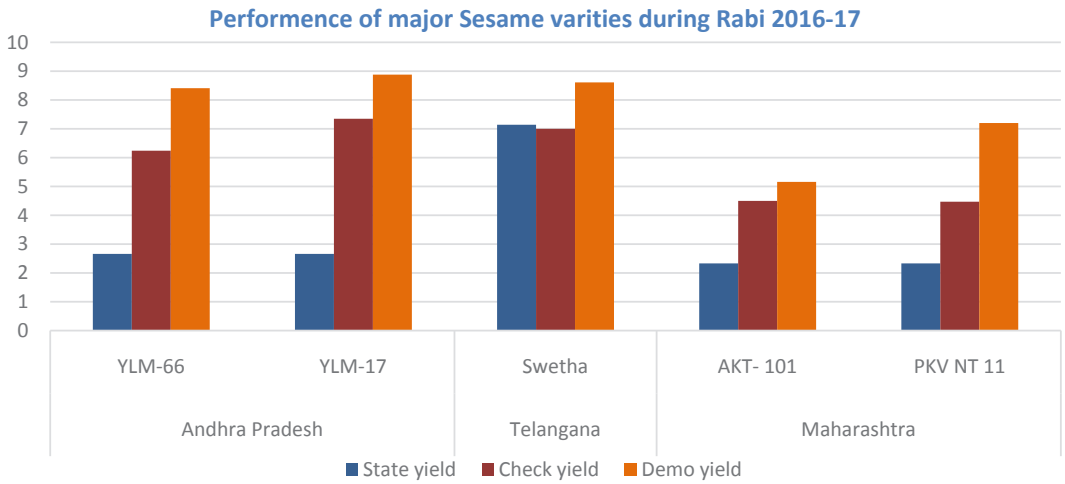

Fig.3.6 Performance of major varieties of Sesame during rabi 2016-17

CFLD on Sesame at KVK, Prakasam (Darsi)

3.2.3 Varietal Performance of Sunflower CFLDs during Rabi 2016-17

In rabi, 340 demonstrations on sunflower were conducted in five districts of Andhra Pradesh with improved package of practices in an area of 136 ha. Varietal demonstration of DRSH -1 with integrated crop management practices has given highest average yield of 25.7 q/ha in Prakasam (Darsi) against the farmers yield of 18.3 q/ha followed by 23 q/ha in Chitoor (RAAS) compared to check yield of 17.3 q/ha registering an increase of 40.44 and 32.95 percent.

Table 3.16 Technologies of Sunflower demonstrated during Rabi 2016-17

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	KBSH-44, SB-275, DRSH-1, NDSH 1012	Imidacloprid @ 5 g/kg seed, Azospirillum @10 g/kg seed, Carbendazim @ 2g/kg	Manual hand weeding @ 15 & 30 days after sowing, Pendimethalin @1 l/ acre 2 DAS	100:60:20, basal application at the time of sowing & topdressing at 30&55 DAS, 7.5t FYM, 75:90:30 kg/ha NPK, borax @ 1kg /ha	White flies and Thrips: spraying with Neem oil @ 5ml/l, Alternaria leaf spot, Necrosis virus: Spraying with acephate @ 1.5g/l and Copperoxychloride @ 3 g/l

Table 3.17 Performance of major varieties of Sunflower during Rabi 2016-17

State	KVK	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Andhra Pradesh	Chittoor (RAAS)	KBSH-44	17.3	23.00	32.95	24.78	12678	28290	1.32	1.68
	Prakasam (Darsi), Kadapa, Kurnool (Banavasi)	SB 275	17.07	20.32	19.04	15.99	45000	48750	2.20	2.39
	Kurnool (Yagantipalli)	NDSH 1012	10.23	12.46	21.80	17.89	12355	19545	1.53	1.81
	Prakasam (Darsi)	DRSH 1	18.30	25.70	40.44	40.43	33700	73250	1.86	2.99

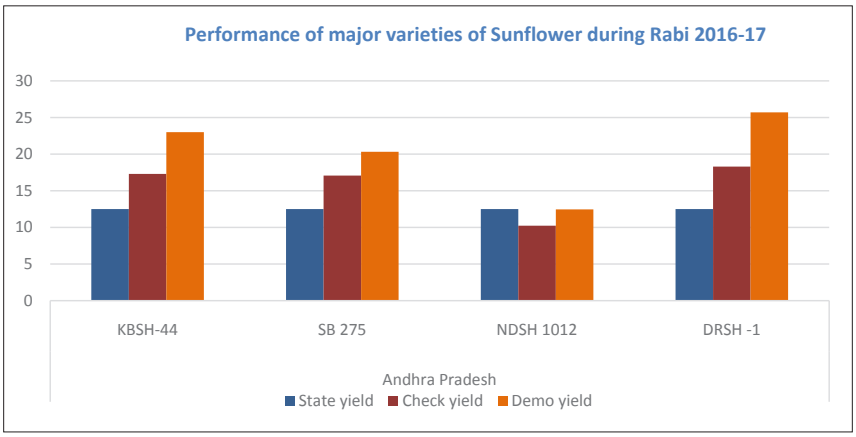

Fig.3.7 Performance of major varieties of Sunflower during Rabi 2016-17

Field day conducted on var. KBSH 44, KVK Chittoor (RASS)

3.2.4 Varietal Performance of Safflower CFLDs during Rabi 2016-17

Krishi Vigyan Kendras of Andhra Pradesh, Telangana and Maharashtra conducted 522 demonstrations of safflower in 209 ha of area during rabi season. In Andhra Pradesh safflower demonstrations were organized under irrigated situation in medium to heavy black soils with variety PBNS-12 and package of practices. An average yield of 10.73 q/ha was obtained in Kurnool (Banavasi) and Anantapur (Reddipalli) against the farmers' productivity of 5.9 q/ha registering an increase of 81.86 percent. Two KVKs of Telangana demonstrated PBNS-12 variety with recommended package of practices and recorded an average yield of 12.9 q/ha with an increase of 29.52 per cent against the local yield of 9.96 q/ha. In Maharashtra, variety PBNS-12 with integrated crop management practices resulted in average yield of 12.39q/ha with yield advantage of 43.18 per cent over the check yield of 8.65 q/ha.

Table 3.18 Technologies of Safflower demonstrated during Rabi & Summer 2016-17

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	PBNS-12	Captan @ 3 g/ kg seed	Pendimethalin @1 l/acre & Dhanti 30 DAS	N @ 40kg/ha, P @ 25kg/ha	Alternaria leafspot: Carbendazim @ 1 gm/l Leaf eating caterpillar: Chlorpyriphos @ 2.5 ml /l
Maharashtra	PBNS-12, SSF-708	Vitavax (Carboxin + Thiram) 3gm/ kg with PSB 25gm, Azato-bactor 25 gm + Trichoderma 5 g/kg seed	One hand weeding @ 30 DAS & 3 hoeings @ 25,40,55 DAS	Compost + ST based fertilizer management with 30 kg N + 60 kg P + 30 kg K per ha, 5kg Sulphur + 5 kg Zinc sulphate	Aphids:Thiomethoxam Anthracnose: Carbendazim + Mancozeb
Telangana	PBNS-12, SSF-708	Carbendazim @ 1 gm/Kg seed & 250gms T. Viride 8gm/ kg seed	Spraying with Pendimethalin 30% @ 2.5 l/ha one day after sowing	16 kg N (20 urea as basal followed by 15 kg urea at 40-45 days), 10 Kg P_2O_5, (60 kg SSP as a basal dose)	Aphids: Spraying of Di-methoate 2 ml/l

Table 3.19 Performance of major varieties of Safflower during Rabi & Summer 2016-17

State	KVK	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Andhra Pradesh	Kurnool (Banavasi), Anantapur (Reddipalli)	PBNS-12	5.9	10.73	81.86	45.01	7500	16523	1.12	1.92
Maharashtra	Beed (Ambajogai), Latur	PBNS-12	8.65	12.39	43.18	30.18	2250	10010	1.12	1.74
	Beed (Khamgaon)	SSF-708	7.6	8.7	14.47	12.64	5740	5770	1.33	1.39
Telangana	Mahabubnagar (Madanapuram), Ranga Reddy	PBNS-12	9.96	12.9	29.52	22.79	12788	20198	1.78	2.14
	Medak (DDS)	SSF-708	7.86	8.7	10.69	9.65	3950	10950	1.24	1.67

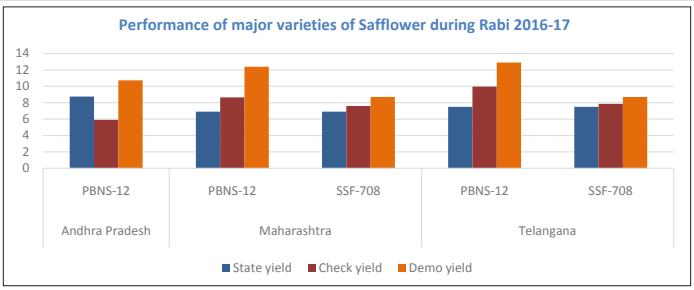

Fig.3.8.Performance of major varieties of Safflower during Rabi 2016-17

CFLD on Safflower var. PBNS-12 at KVK, Beed (Ambajogai)

CFLD on Safflower var. PBNS-12 at KVK, Rangareddy (CRIDA)

CFLD on Safflower var. PBNS-12 at KVK, Mahabubnagar (Madanapuram)

3.2.5 Varietal Performance of Linseed CFLDs during Rabi 2016-17

The demonstrations on linseed conducted in four districts of Maharashtra i.e. Bhandara, Chandrapur, Gadchiroli and Latur with improved variety PKVNL-260 and improved package in rice follows both under irrigated and residual moisture conditions sown during November 2016. An average demonstration yield 3.58q/ha was recorded against check yield of 2.66 q/ha registering an increase of 34.93 per cent in yield with benefit cost ratio of 1.71.

Table 3.20 Technologies of Linseed demonstrated during Rabi 2016-17

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Maharashtra	PKV NL-260	Trichoderma, PSB	Hand weeding after 20 days & hoeing after 35 days	NPK: 25:50:00 kg/ ha	Bud fly & Alterneria blight: Imidacloprid @ 50ml/acre and Mancozeb @ 250 g/acre, Azadi-rachtin 300ppm @ 2ml/l

Table 3.21 Performance of major varieties of Linseed during Rabi 2016-17

State	KVK	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Maharashtra	Bhandara, Chandrapur, Gadchiroli, Latur	PKV NL-260	2.66	3.58	34.93	25.69	3856	8035	1.49	1.71

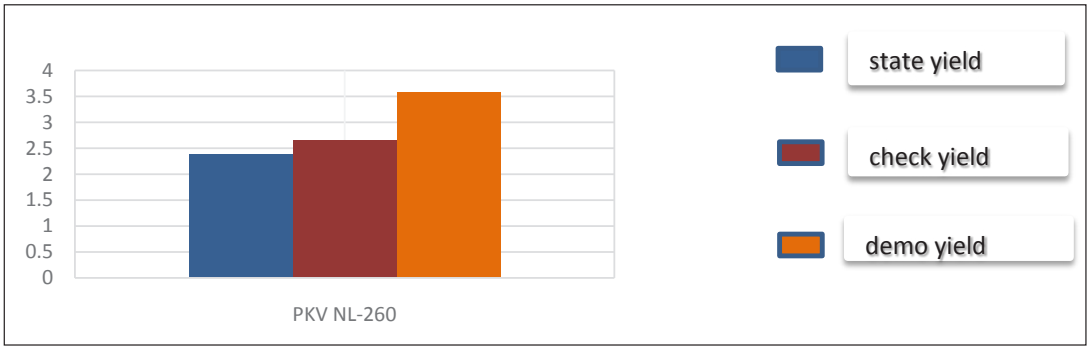

Fig.3.9 Performance of major varieties of Linseed during Rabi 2016-17

CFLD on Linseed var. PKV NL-260 at KVK, Latur

4. Cluster Frontline Demonstrations (CFLDs) on Oilseeds during 2017-18

Cluster Front Line Demonstration Programme on Oilseeds was conducted by KVKs in Zone-10 under National Mission on Oilseeds and Oil Palm (NMOOP) during 2017-18 in kharif, Rabi and summer seasons. The crops covered are groundnut, sesame, sunflower, castor, safflower, soybean and niger. A total of 2630 hectares area was

allotted to 48 KVKs in Andhra Pradesh, Telangana and Tamil Nadu states and the programme was implemented in 2472 ha by organizing 6180 demonstrations with 94 per cent achievement of the total allotted area.

Table 4.1 Cluster Frontline Demonstrations (CFLDs) on Oilseeds during 2017-18

Crop	State	Allocation		Achievement	
		No. of Demonstrations	Area (ha)	No. of Demonstrations	Area (ha)
Kharif					
Groundnut	Andhra Pradesh	280	204	700	510
	Telangana	50	10	125	25
	Tamil Nadu	290	206.8	725	517
Sesame	Andhra Pradesh	50	26	125	65
	Tamil Nadu	10	10	25	25
Sunflower	Andhra Pradesh	40	0	100	0
Castor	Andhra Pradesh	60	60	150	150
	Telangana	20	20	50	50
Soybean	Telangana	40	40	100	100
Total Kharif Season		**840**	**576.8**	**2100**	**1442**
Rabi & Summer					
Groundnut	Andhra Pradesh	330	410	825	1025
	Telangana	160	160	400	400
	Tamil Nadu	440	503.2	1100	1258
Sesame	Andhra Pradesh	360	339	900	848
	Telangana	90	90	225	225
	Tamil Nadu	10	20	25	50
Sunflower	Andhra Pradesh	160	140	400	350
	Tamil Nadu	130	120	325	300
Castor	Andhra Pradesh	30	30	75	75
	Telangana	0	20	0	50
Safflower	Andhra Pradesh	30	38	75	95
	Telangana	30	5	75	12
Niger	Andhra Pradesh	20	20	50	50
Total Rabi & Summer Season		**1790**	**1895.2**	**4475**	**4738**
Grand Total (Kharif + Rabi + Summer)		**2630**	**2472**	**6575**	**6180**

4.1 Performance of Cluster Front Line Demonstrations on Oilseeds during Kharif 2017

During Kharif 2017, a total of 1442 demonstrations were laid out in an area of 576.8 ha by the KVKs of Andhra Pradesh, Telangana and Tamil Nadu states. The crops covered are groundnut, sesame, sunflower, castor and soybean.

Table 4.2 Cluster Frontline Demonstrations (CFLDs) on Oilseeds during Kharif 2017

Crop	State	Allocation		Achievement	
		No. of Demonstrations	Area (ha)	No. of Demonstrations	Area (ha)
Groundnut	Andhra Pradesh	280	204	700	510
	Telangana	50	10	125	25
	Tamil Nadu	290	206.8	725	517
	Sub total	**620**	**420.8**	**1550**	**1052**
Sesame	Andhra Pradesh	50	26	125	65
	Tamil Nadu	10	10	25	25
	Sub total	**60**	**36**	**150**	**90**
Sunflower	Andhra Pradesh	40	0	100	0
	Sub total	**40**	**0**	**100**	**0**
Castor	Andhra Pradesh	60	60	150	150
	Telangana	20	20	50	50
	Sub total	**80**	**80**	**200**	**200**
Soybean	Telangana	40	40	100	100
	Sub total	**40**	**40**	**100**	**100**
Total Kharif Season		**840**	**576.8**	**2100**	**1442**

4.1.1 Varietal Performance of Groundnut CFLDs during Kharif 2017

Out of 1442 total planned demonstrations on oilseeds in the zone, 1052 demonstrations were conducted on groundnut crop in an area of 420.8 ha during Kharif in Andhra Pradesh, Telangana and Tamil Nadu states.

In Andhra Pradesh, technology demonstrated included improved variety, seed treatment, integrated pest and disease management, soil test based nutrient management under rainfed conditions. Highest average demonstration yield of 38.30 q/ha was recorded in K-7 variety in Krishna district with 27.67 % and 12.25 % increase compared to local check and district average yields respectively.

Improved early-maturing and drought tolerant variety of groundnut ICGV-91114 along with recommended package of practices increased the pod yield by 10 per

cent over the local check during kharif season in KVK, Nalgonda (Gaddipalli) under rainfed situations. Farmers were impressed with this early maturing variety and expressed that pod filling is better than check variety even under uneven distribution of rainfall and incidence of tikka leaf spot disease was also low as compared to check variety.

During kharif season improved varieties Dharani, CO-6, CO-7 and Kadiri-9 varieties with recommended package of practices were demonstrated by KVKs in Tamil Nadu in the farmers' fields in cluster approach. These demonstrations resulted in 10.04 to 43.18 per cent increase in yields compared to existing farmers' yields. Highest yields were recorded by Dharani varity and the increase in yield was highest in Dharmapuri district.

Table 4.3 Technologies of Groundnut demonstrated during Kharif 2017

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	Dharani (TCGS-1043), Kadiri Harithandhra, K-7	Imidacloprid @2ml/kg seed+ Tebuconazole @1g/kg seed, Mancozeb @3g/kg seed, Trichoderma viride @10 g/kg seed	Hand weeding at 25 DAS, Pre emergence application of pendimethalin @2.5 l/ha	Gypsum:200 kg/acre NPK @ 20:40:50 kg/ha	Peanut stem necrosis: growing border crop-bajra, Seed treatment - Imidacloprid @ 2 ml/kg + Tebuconazole @ 2 g/kg, Helicoverpa: Novuluron, Early & Late leaf spot: Hexaconazole
Tamil Nadu	CO-6, CO-7, Dharani (TCGS-1043), K-9	Pseudomonas @10g/kg of seed, Trichoderma viride @ 4 g/kg, Rhizobium 50ml, Phosphobacteria 50 ml	Hand weeding at 20 and 40 DAS	NPK @10:10:40 kg/ha, MN mixture-12.5kg/ha, 55 kg Urea, 315 kg Super Phosphate, 130 kg of Potash, NPKS @ 25:50:75:60	Leaf miner and Tobacco caterpillar: fixing light traps - 3 no. Leaf spot and Rust: Cholorothalonil-1000ml/ha
Telangana	ICGV-91114	Dithane M-45 3g/kg seed	Interculture operation with guntaka 20, 40 DAS	125 kg DAP, 250 kg SSP and 75 kg K/ ha	Helicoverpa, Leaf minor, Spodoptera and Sucking pests: Acephate 1.5 g/l, Acetamapride 0.2g/l and Chlorpyriphos 2ml/l

Table 4.4 Performance of major varieties of Groundnut during Kharif 2017

State	KVK	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Andhra Pradesh	Krishna (Garikapadu)	K-7	30	38.30	27.67	21.67	55674	74900	2.44	2.72
	Kalikiri, Chittoor (RASS), Kadapa (Utukur), Kurnool (Banavasi, Yagantipalli), West Godavari (Undi)	Dharani	12.44	15.21	17.63	18.27	22226	39532	1.40	1.80
Telangana	Nalgonda (Gaddipalli)	ICGV-91114	11.00	12.10	10.00	9.00	17776	19710	1.16	1.20
Tamil Nadu	Coimbatore	CO-6	11.45	12.60	10.04	9.12	37200	44904	2.18	2.44
	Vellore	K-9	14.52	20.79	43.18	30.15	42466	87108	2.18	3.45
	Theni	CO-7	16.00	19.92	24.50	19.67	21183	25854	2.13	2.67
	Dharmapuri, Tiruvannamalai, Krishnagiri, Villupuram	Dharani (TCGS 1043)	19.46	22.40	15.10	13.12	42189	58163	2.58	2.98

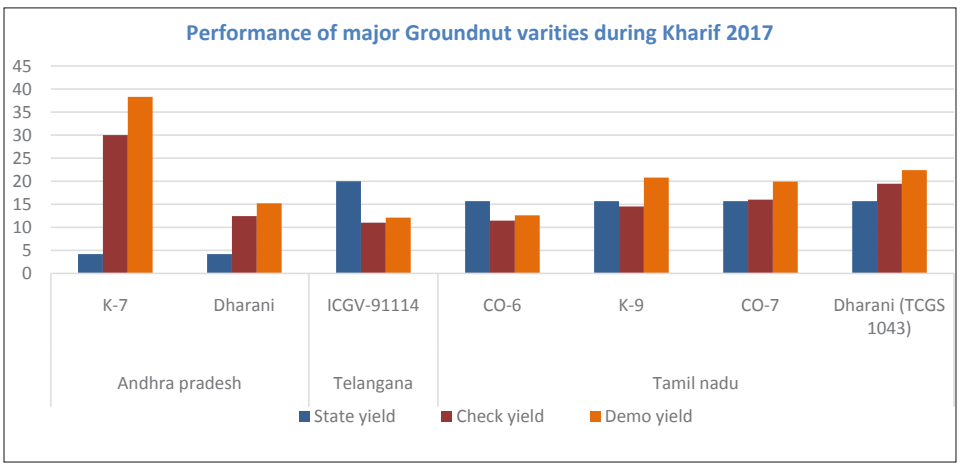

Fig.4.1 Performance of major Groundnut varieties during Kharif 2017

Field on Groundnut var. Dharani: KVK, Kurnool (Yagantipalli)

4.1.2 Varietal Performance of Sesame CFLDs during Kharif 2017

Ninety demonstrations of sesame were conducted in about 36 ha area by the KVKs of Andhra Pradesh and Tamil Nadu states during kharif season.

Table 4.5 Technologies of Sesame demonstrated during Kharif 2017

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	YLM-66	Mancozeb 3g/kg of seed	Hand weeding at 25 DAS	NPK 254:312:66 kg/ha	Thrips and White fly: Spraying with Triazophos 2.0 ml/l Powdery mildew: Wettable Sulphur 3.0 g/l Phyllody: Removal of infected plants
Tamil Nadu	TMV-7	Trichoderma @ 4g/kg of seeds	Application of pre emergence herbicide Pendimethalin @ 2.5 l/ha	NPK @ 75:150:48 kg/ha	Leaf webber: Foliar application of Neem oil 2 % BLB: Difenconozole

In Andhra Pradesh, KVK, Prakasam (Darsi) and KVK, Visakhapatnam (BCT) conducted CFLDs on sesame during kharif season. Improved variety YLM-66 along with other technological interventions resulted in 42.53 per cent increase in yields with an average demonstration yield of 5.53 q/ha over the check yield of 3.88 q/ha. Yields in KVK, Visakhapatnam (BCT) were low due to delayed sowings after 2nd week of june, which lead to severe infestation of sesame phyllody. Improved variety TMV-7 with recommended package of practices was demonstrated by KVK, Theni of Tamil Nadu during kharif under rainfed situation. Increase in yield was 23.44 per cent with an average demonstration yield of 7.53 q/ha against 6.10 q/ha in local check.

Table 4.6 Performance of major varieties of Sesame during Kharif 2017

State	KVK	Variety	Average yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	demo	Check	demo
Andhra Pradesh	Prakasam (Darsi), Visakhapatnam (BCT)	YLM-66	3.88	5.53	42.53	29.83	9426	21190	1.73	1.83
Tamil Nadu	Theni	TMV-7	6.10	7.53	23.44	18.99	25250	38619	2.45	2.87

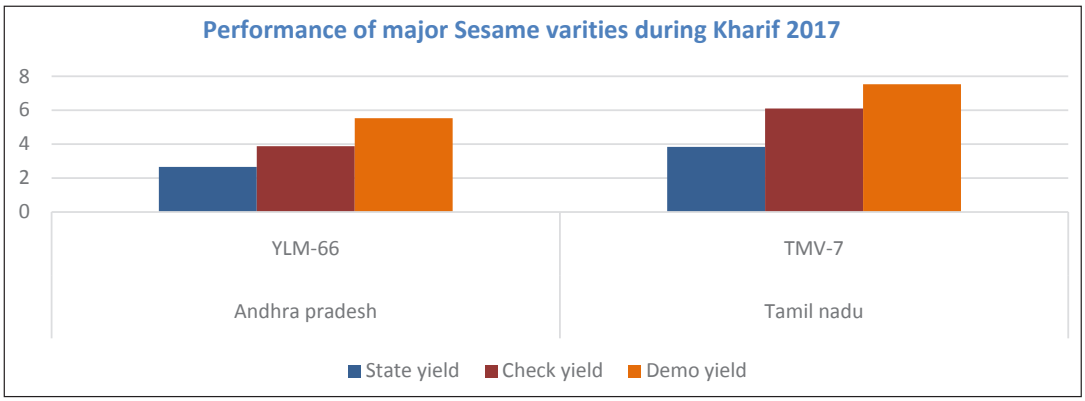

Fig.4.2 Performance of major Sesame varieties during Kharif 2017-18

Field day on Sesame var. YLM 66: KVK, Visakhapatnam (BCT)

4.1.3 Varietal Performance of Castor CFLDs during Kharif 2017

About 200 demonstrations on castor were conducted by KVKs of Andhra Pradesh and Telangana in 80 ha area during kharif season. DCH-519 hybrid which is resistant to *Fusarium* wilt and leaf hoppers resulted in 29.31 per cent yield increase over the existing farmers practice in KVK, Kurnool (Banavasi). Average yield obtained in demonstrations was highest (13.08q/ha) in KVK, Kurnool (Yagantipalli) with castor

hybrid PCH-111 against check yield of 10.85q/ha with recommended package of practices.

In Telangana state varietal demonstrations of DCH-519 hybrid in Mahabubnagar district along with integrated crop management practices increased the yields by 21.16 per cent with average demonstration yield of 7.33 q/ha against the farmers yield of 6.05 q/ha and reported 104.81 per cent increase over district average yield of 3.58q/ha.

Table 4.7 Technologies of Castor demonstrated during Kharif 2017

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	DCH-519 and PCH-111	Trichoderma viride @ 10 g/ kg, Carben-dazim @3g/kg of seed	Pendimethalin @5ml/l as Pre-emargence and 3 intercultiva-tions at 20,40, & 60 DAS with guntaka	NPK@ 30:40:30 kg/ha, 50% N, 100% P & K as basal dose and remaining N 25% 30-35 DAS, another 25% 60-65 DAS with broad casting method, NPK:125:40:30 kg/ha	Spodoptera, Capsule-borer, Semilooper: spraying of Chloro-pyriphos @2.5 ml/l ,Dichlorovas @1 ml/l and Neemoil@3ml/l Botrytis: spraying of Carbendazim @ 1 g/l
Telangana	DCH-519	Carbendazim @1g/kg seed	Hand weed-ing at 40,60 & 80 DAS and Pendimethalin @ 5ml/l (Pre emergence)	2000 kg FYM, NPK @30:16:12 kg/ha	Semilooper, Tobaco leaf eating cater pil-lar, Shoot & Capsule borer: Spraying of Thiodicarb @ 1.5g/l Botrytis grey rot: spraying of Propi-conozole @1ml/l

Table 4.8 Performance of major varieties of Castor during Kharif 2017

State	KVK	Variety	Average yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Andhra Pradesh	Kurnool (Banavasi)	DCH-519	5.80	7.50	29.31	22.66	2000	3600	1.30	1.60
	Kurnool (Yagantipalli)	PCH-111	10.85	13.08	20.55	17.04	18380	28847	1.89	2.58
Telangana	Mahabubnagar (Madanapuram)	DCH-519	6.05	7.33	21.16	23.55	8804	13612	1.67	1.96

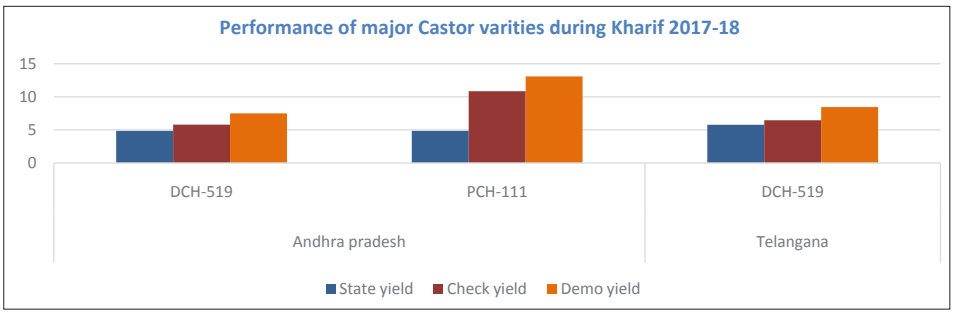

Fig.4.3 Performance of Castor varieties during Kharif 2017

CFLD on Castor var. PCH 111 at KVK, Kurnool (Yagantipalli)

4.1.4 Varietal Performance of Soybean CFLDs during Kharif 2017

Cluster FLDs on soybean crop were conducted during kharif season in Telangana state by the KVKs of Adilabad and Nizamabad districts. High yielding variety Basara (ASb-22) along with recommended package of practices resulted in average yield of 20.01 q/ha against local check yield of 17.13 q/ha with 94.47 per cent increase in yields compared to district average yield of 10.33 q/ha.

Table 4.9 Technologies of Soybean demonstrated during Kharif 2017

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Telangana	Basara (ASB-22)	Trichoderma @ 10 g/kg seed and Carbendazim @1g/kg seed	Imazethapyr @ 250ml/acre and Quizalofopethyl @400ml/acre.	NPK@ 78:25:15 kg/ha	White fly, Stem girdler & Stem fly: Spraying triazophos @ 2 ml/l & Chloranthraniliprole @ 0.3 ml/l

Table 4.10 Performance of major varieties of Soybean during Kharif 2017

State	KVK/ District	Variety	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Telangana	Adilabad, Nizamabad (Rudrur)	Basara (ASB-22)	17.13	20.01	16.88	14.39	24675	34302	1.92	2.28

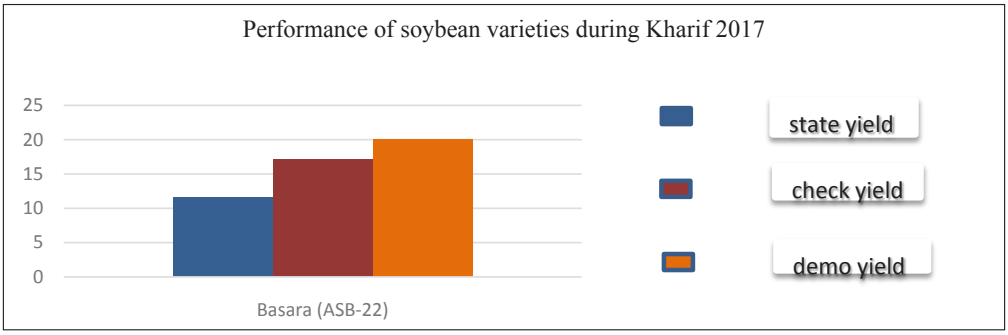

Fig.4.4.Performance of soybean varieties during Kharif 2017

Sowing of Soybean with BBF Planter at KVK, Nizamabad (Rudrur)

Soybean var. ASB 22 (Basara) at KVK, Adilabad

4.2 Performance of Cluster Front Line Demonstrations on Oilseeds during Rabi 2017-18

During rabi season 4738 cluster front line demonstrations were conducted by the KVKs of Andhra Pradesh, Tamil Nadu and Telangana states in an area of 1895.2 ha on groundnut, sesame, sunflower, castor, safflower and niger crops with improved package of practices.

Table 4.11 Cluster Frontline Demonstrations (CFLDs) on Oilseeds during Rabi 2017-18

Crop	State	Allocation		Achievement	
		No. of Demonstrations	Area (ha)	No. of Demonstrations	Area (ha)
Groundnut	Andhra Pradesh	330	410	825	1025
	Telangana	160	160	400	400
	Tamil Nadu	440	503.2	1100	1258
	Sub total	**930**	**1073.2**	**2325**	**2683**
Sesame	Andhra Pradesh	360	339	900	848
	Telangana	90	90	225	225
	Tamil Nadu	10	20	25	50
	Sub total	**460**	**449**	**1150**	**1123**
Sunflower	Andhra Pradesh	160	140	400	350
	Tamil Nadu	130	120	325	300
	Sub total	**290**	**260**	**725**	**650**
Castor	Andhra Pradesh	30	30	75	75
	Telangana	0	20	0	50
	Sub total	**30**	**50**	**75**	**125**
Safflower	Andhra Pradesh	30	38	75	95
	Telangana	30	5	75	12
	Sub total	**60**	**43**	**150**	**107**
Niger	Andhra Pradesh	20	20	50	50
	Sub total	**20**	**20**	**50**	**50**
Total Rabi&Summer Seasons		**1790**	**1895.2**	**4475**	**4738**

4.2.1 Varietal Performance of Groundnut CFLDs during Rabi & Summer 2017-18

About 2683 demonstrations on groundnut were organized by the KVKs of Andhra Pradesh, Tamil Nadu and Telangana in 1073.2 ha area during rabi season on groundnut crop.

In Andhra Pradesh demonstrations were conducted with improved variety Dharani following integrated crop management practices under irrigated situation which recorded 10.95 per cent yield increase over local check. Improved variety K-9 along with recommended package of practices increased the pod yield by 15.97 per cent over the local check in rabi season. K-9 variety recorded 86.64 per cent yield increase compared to district average yield. Highest yield of 25.17 q/ha was recorded in Warangal (Malyal) and increase in yield was recorded as 25.85 per cent over local check. Improved variety VRI-8 with integrated crop management practices registered highest average yield of 28.24q/ha which is 37.94 per cent higher than the yield of farmers practice in Tamil Nadu.

Table 4.12 Technologies of Groundnut demonstrated during Rabi & Summer 2017-18

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	K-7, Dharani, Hari-tandhra, K-9	Tebuconazole @ 1 g/ kg, Imidacloprid @2 ml /kg, Trichoderma viride @ 10g/kg seed	Pendimeth-alin @ 3.25 l/ ha, Imazetha-pyr @750ml/ ha	FYM: 5000kg/ ha, NPKS: 25:40:62.5: 80 kg/ha,	Pest Management: Neem oil @ 5 ml/l, Spinosad @0.3ml/l, Pheromone traps @ 4/acre & sticky traps @ 1o/acre, Disease Manage-ment: seed treatment with Imidacloprid & tebuconazole and foliar application of fungicide SAFF
Tamil Nadu	VRI-8, GJG22, K-9, Dharani, CO-7, TMV-13	Trichoderma viride @200g/ acre, Rrhi-zobium @ 800g and Phosphobacteria @800g, using rice kanji, Treated with fungi-cide (Mancozeb +Carbendazim)	Quizolofop ethyl @ 50g ai/ha and Imazethepyr @ 50g ai/ ha & Hand weeding	NPKS: 25,50,75, 40 kg/ha	Spodoptera: Hand picking and strip-ping, Leaf miner: Dimeth-oate @ 650ml/ha, Root grubs: Spray Carbaryl 50WP 0.2 per cent, Tricho-gramma 2000cc twice (7-10), phero-mone trap @ 1/ha, Methyldemeton 25 EC 1.6ml PCNB (Brassicol 75% WP) 0.5%

Table 4.13 Performance of major varieties of Groundnut during Rabi & Summer 2017-18

State	Variety	KVK	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	Demo	Check	Demo
Andhra Pradesh	Dharani	Prakasam (Darsi), West Godavari (VR Gudem), Kurnool (Yagantipalli), West Godavari (Undi), Chittoor (Kalikiri)	26.88	29.82	10.95	9.80	51329	67888	1.90	2.40
	K-7	Visakhapatnam (Kondempudi)	12.00	15.50	22.58	22.58	27500	37500	1.87	1.93
Telangana	K-9	Warangal (Malyal, Mamnoor), Nalgonda (Kampasagar)	19.91	23.09	15.97	13.77	31335	66070	1.76	2.59
Tamil Nadu	K-9	Vellore, Thoothukudi	19.08	23.28	22.01	18.04	42715	24606	2.27	2.87
	Dharani	Ariyalur, Kancheepuram, Namakkal, Dharmapuri, Sivagangai, Villupuram	15.69	18.88	20.31	16.89	32482	47200	1.98	2.43
	VRI-8	Tiruvannamalai, Karur, Namakkal, Cuddalore	20.47	28.24	37.94	27.51	49743	87824	1.74	2.56
	CO-7	Theni, Tiruvallur, Perambalur, Namakkal	20.00	22.23	11.14	10.03	36673	63112	1.91	2.46
	GJG-9	Namakkal	8.25	11.85	43.64	30.37	22537	43296	1.59	2.17

Field day on Groundnut var. Dharani

Field day on Groundnut var. K 9 at KVK, Warangal (Malyal)

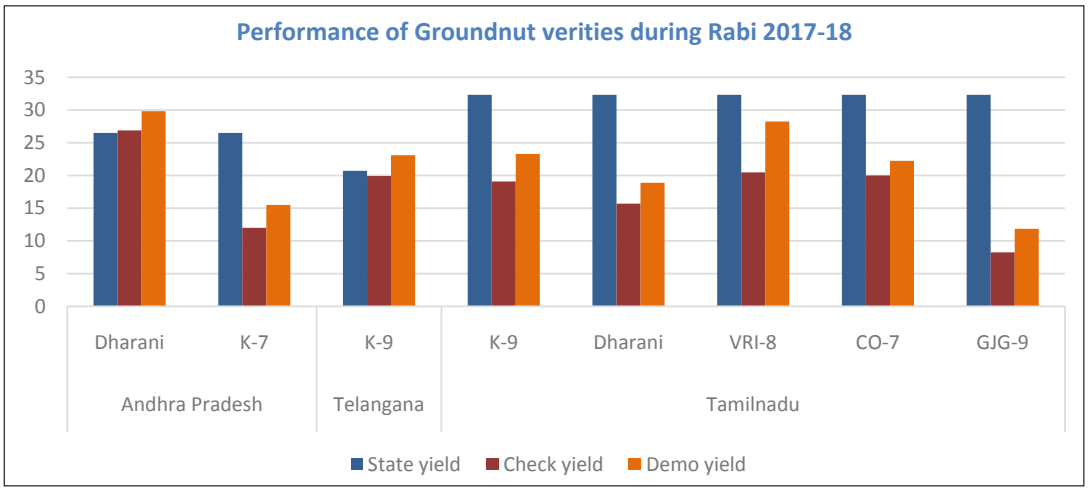

Fig.4.5 Performance of Groundnut verities during Rabi 2017-18

4.2.2 Varietal Performance of Sesame CFLDs during Rabi & Summer 2017-18

About 1123 CFLDs on sesame were conducted in the zone in 449 ha of area by the KVKs of Andhra Pradesh, Tamil Nadu and Telangana states.

Table 4.14 Technologies of Sesame demonstrated during Rabi & Summer 2017-18

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	YLM-66	Carbendazim @ 3 g/kg seed	Quizalofopethyl at 25-35 DAS @625ml/ha	Urea - 16 Kg SSP - 8 Kg MOP - 8 Kg	Powdery mildew: wettable sulphur @ 3g/l for.
Tamil Nadu	TMV-7	Seed treatment with Trichoderma @ 4g/kg of seeds	Hand weeding 20 and 40 DAS	NPK- 70:150:155 kg /ha, Sulphur-250 kg/ha	Leaf webber: Foliar application of Neem oil 2 % Phyllody: Difenconazole
Telangana	Swetha til	Tebuconazole-1gm/kg, Imidacloprid@ 2ml/kg	Spraying of pendimethalin 2.5 l/ha 2 days after sowing	FYM 500 kg, NPK @ 50:25:25, Vermicompost @ 500 kg/ha	Jassids, Whitefly: Neemoil, Carbendizam + COC

Table 4.15 Performance of major varieties of Sesame during Rabi & Summer 2017-18

State	Variety		Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
		KVK	Check	Demo	Increase (%)		Check	demo	Check	demo
Andhra Pradesh	YLM-66	Kadapa (Utukuru), West Godavari (VR Gudem, Undi), Nellore, East Godavari (Pandirimamidi, Kalavacharla), Visakhapatnam (Kondempudi)	6.50	8.32	28.04	21.87	28326	38145	2.63	3.26
Tamil Nadu	TMV-7	Theni	6.10	8.18	34.10	25.42	25250	38619	2.44	3.10
Telangana	Swetha til	Karimnagar (Ramagirikhilla)	7.50	8.65	15.33	13.29	20250	25745	1.02	1.20

Varietal demonstration of YLM-66 with recommended package of practices under irrigated conditions resulted in 28.04 per cent increase in yields over the check yield and 135.65 per cent increase in yields compared to district average yields. Improved variety TMV-7 with other technological interventions resulted in 34.1 per cent increase in yield with an average demonstration yield of 8.18 q/ha against 6.1 q/ha in check in Theni district of Tamil Nadu. KVK, Ramgirikhilla conducted CFLDs on sesame crop in Karimnagar district of Telangana. Technology demonstrated included improved variety Swetha with integrated crop management practices in summer season. These demonstrations resulted in an average yield of 8.65q/ha which is 15.33 per cent higher when compared to local check yield of7.50 q/ha.

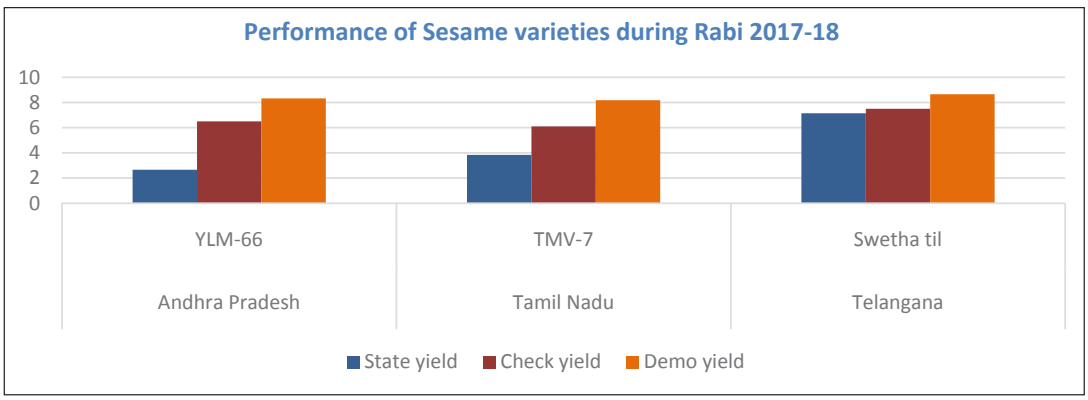

Fig.4.6 Performance of Sesame varieties during Rabi 2017-18

Demonstration of Sesame var. Swetha til at KVK, Karimnagar (Ramagirikhilla)

4.2.3 Varietal Performance of Sunflower CFLDs during Rabi 2017-18

About 650 Cluster frontline demonstrations on sunflower were conducted by KVKs Andhra Pradesh and Tamil Nadu states in 260 ha area during rabi season.

In Andhra Pradesh, cluster frontline demonstrations on sunflower were conducted by four KVKs during rabi season. The technology demonstrated was improved hybrid with integrated crop management practices. KVK, Chittoor (Kalikiri) demonstrated KBSH-53 hybrid (Resistant to powdery mildew) along with integrated crop management practices obtained highest average demonstration yield of 21.11 q/ha. The hybrid NDSH-1012 resulted in average yield of 18.52 q/ha against 15.68 q/ha of check with 18.12 per cent increase in yields which recorded 110 per cent yield increase over district average yields. KBSH 53 hybrid gave 34.41 per cent more yields in demonstration than check in Thoothukudi district where as CO 3 hybrid gave higher yields (15.91 q/ha) compared to other varieties with benefit cost ratio of 2.47 in Tamil Nadu state.

Table 4.16 Technologies of Sunflower demonstrated during Rabi 2017-18

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	KBSH-53, NDSH-1012, SB-275	Bavistin and carbendazim @1g/kg	Manual weeding at 15 & 30 days after sowing, Pre-emergence application of Pendimethalin @2.5 l/ha	NPK: 100,120,30 kg /ha	Spodoptera and Helicoverpa: Neem oil 5ml/l and Larvin 1g/l, Thrips and Helicoverpa: Thiodicarb 75WP @ 300g/ acre, Fipronil@ 400 ml/ acre Alternaria and Bud Necrosis: Carbendazim @ 200g/ acre
Tamil Nadu	KB - 53, Co(SF H)2, COSFV 5, CO-3	Azophos, Imidaclo-prid-7g/kg & Carben-dazim 2g/ kg, Tricho-derma viride @ 4g/kg	Pre-emergence application of Fluchloralin@ 2 l/ha at 5DAS	FYM: 8000 kg/ha NPK: 60:68:45 kg /ha	Capitulum borer: 5% Neem seed kernel extract, marigold as trap crop, Phosaline 35Ec 1000ml/ha, Vectors of YMV, Bemisia tabaci: Yellow sticky trap & Spraying of Imidaclo-prid 17.8 SL 100 ml/ha, Helicoverpa armigera: Spraying of Dichlorvos 76 EC 700ml/ha, Powdery mildew: Propiconazole @0.1%, Leaf blight: Carbendazim @0.1%, Vector control: Imidacloprid @0.05%

Table 4.17 Performance of major varieties of Sunflower during Rabi 2017-18

State	Variety	KVK	Average Yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	demo	Check	demo
Andhra Pradesh	NDSH-1012	Prakasam (Darsi), Kurnool (Yagantipalli)	15.68	18.52	18.12	15.33	23393	35087	1.78	2.25
	SunBred-275	Kadapa (Utukuru)	17.2	18.54	7.79	7.22	20040	27328	1.72	1.85
	KBSH-53	Chittoor (Kalikiri)	19	21.11	11.11	9.99	41763	42191	2.7	2.81
Tamil Nadu	KBSH-53	Thoothukudi	9.59	12.89	34.41	25.6	8568	18388	1.42	1.9
	COSFV-5	Villupuram	10.63	13.52	27.19	21.37	17327	25315	1.87	2.15
	CO-3	Theni	11.7	15.91	35.98	26.46	13731	23703	1.83	2.47

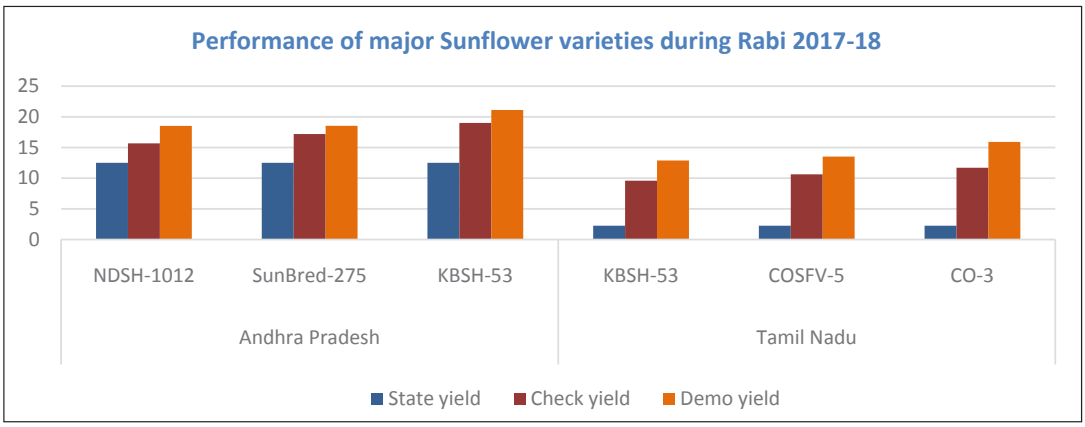

Fig.4.7 Performance of major Sunflower varieties during 2017-18

CFLD on Sunflower hybrid NDSH-1012 at KVK, Kurnool (Yagantipalli)

4.2.4 Varietal Performance of Castor CFLDs during Rabi 2017-18

KVK, Prakasam (Darsi) of Andhra Pradesh conducted 75 CFLDs on castor during rabi season in 30 ha of area. Technology demonstrated included PCH-111 hybrid with integrated crop management practices which resulted increased yields (19%) and net returns (Rs. 16350) compared to check.

Table 4.18 Technologies of Castor demonstrated during Rabi 2017-18

State	Variety	Seed Treatment	Weed Management	Fertilizer/ Nutrient Management	Insect Pest and Disease Management
Andhra Pradesh	PCH-111	Carbendazim @ 3 g/kg seed	Pendimethalin 30% @1.3-1.6 l/acre	FYM:2000 kg /ha, NPK : 70:70:20 kg /ha	Spodoptera, Castor semilooper, Leaf hopper: Thiodicarb 75WP (300g acre), Thiamethoxam 25WG (40g/ acre), Carbendazim (200g/acre)

Table 4.19 Performance of major varieties of Castor during Rabi 2017-18

State	Variety	KVK	Average yield (q/ha)			Yield Gap (%)	Net Returns (Rs/ha)		BC Ratio	
			Check	Demo	Increase (%)		Check	demo	Check	demo
Andhra Pradesh	PCH-111	Prakasam (Darsi)	10.00	11.90	19.00	15.96	8500	16350	1.27	1.52

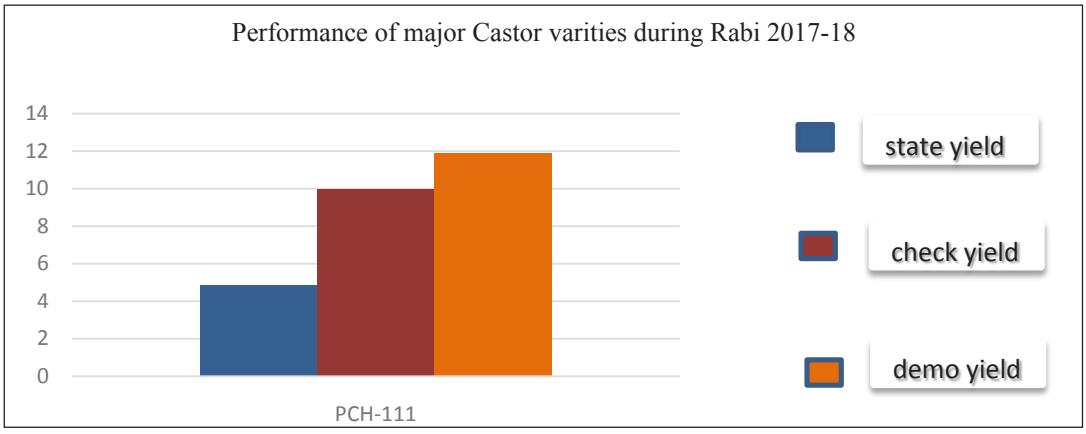

Fig.4.8 Performance of major Castor varieties during Rabi 2017-18

CFLD on Castor var. PCH 111 at KVK, Prakasam (Darsi)

CFLD on Niger at KVK, Visakhapatnam (BCT)

5. Success Stories of CFLD Oilseeds Farmers

5.1 KVK- Chittoor (RASS), Andhra Pradesh

Farmer's Name	:	G.Munisekhar, S/o. Munirathnam Naidu
Village/Tehsil/Dist.	:	Vengalatur, Pichatur, Chittoor
Crop & Variety	:	Groundnut, Dharani
Season	:	Rabi
Soil type	:	Sandy clay loam
Farming situation	:	Rainfed
Seed rate	:	200 kg/ha
Seed treatment	:	Seed was treated with pesticide and fungicide to control sucking pests and leaf spots.
Method of Sowing	:	The seed was sown behind the country plough
Weed Management	:	Pre emergence application of Pendimethalin @ 2.5 l/ha up to 25DAS
Method of Irrigation	:	Surface irrigation was given to the crop at 25-30, 45-50, 65-70, 85-90 and at harvesting stage

Manures & Fertilizers: Soil test based fertilizer application. FYM @ 10 t/ha and entire dose of P (26.8kg/ha) and K (33.5 kg/ha) and half the dose of N (20 kg/ha) was applied before sowing. The remaining dose of N (20 kg/ha) was applied at 30 DAS. 50kg/ha Zinc Sulphate at the time of sowing and 500kg/ha of gypsum at flowering stage to overcome micro nutrient deficiencies.

Plant protection : To control Tikka leaf spot - Hexaconozol ml/l.

Yield (q/ha)

Demonstration: 30.3 q/ha

Farmer's practice: 28.0 q/ha

District average: 6.93 q/ha

State average: 8.11 q/ha

Farmer's Feedback

- Higher yield.
- Good pod & seed development.
- Reduction in cost of fertilizers.
- Tolerant to drought.
- No incidence of bud necrosis disease.
- Higher economic returns.

5.2 KVK- Ariyalur (CREED), Tamil Nadu

Farmer's Name	:	M. Sivasankar, S/o.Mahalingam
Crop & Variety	:	Groundnut, VRI 8
Season	:	Rabi
Soil type	:	Red soil
Farming situation	:	Irrigated
Seed rate	:	125kg/ha
Seed treatment	:	*Trichoderma viride* @4g/kg of seed.
Method of Sowing	:	Machine sowing
Method of Irrigation	:	Surface irrigation
Manures & Fertilizers	:	Soil test based fertilizer application. Farm yard manure @ 5 ton, Urea 150 kg/ha, Super 50 kg/ha, Potash 50 kg/ha, Groundnut Rich 4 kg/ha. Application of TNAU Mineral mixture @12.5 kg/ha.
Weed Management	:	Application of post emergence herbicide Imazethapyr @100g/ha.
Plant protection	:	Spraying of NPV virus @1 l/ha , Setting of pheromone trap @12 No./ha.
Mechanization	:	Seed sowing by seed drill.

Innovative practices adopted by farmer: Spraying of Panchakayva 300 ml/tank at 15 days interval after sowing which reduced fertilizer use.

Yield (q/ha)		26.10 q/ha.
Demonstration	:	18.60 q/ha
Farmers practice	:	22.00 q/ha
District average	:	16.30 q/ha
State average	:	

Farmer's Feedback

- Higher yields compared to farmer's practice of VRI 2.
- By using seed drill labour charges were reduced and the problem of labour scarcity was solved.
- Cost of cultivation was reduced due to integrated crop management practices.

5.3 KVK- Namakkal, Tamil Nadu

Farmer's Name	**:**	N. Mohan, S/o. R.Pudhupatti
Village/Tehsil/Dist.	**:**	R.Pudhupatti, Namakkal
Crop & Variety	**:**	Groundnut, CO-7
Season	**:**	Rabi
Soil type	**:**	Sandy loam
Farming situation	**:**	Irrigated
Seed rate	**:**	125kg/ha
Seed treatment	**:**	*Pseudomonos fluorescence* @10g/kg of seed.
Method of Sowing	**:**	Line sowing
Method of Irrigation	**:**	Drip irrigation.
Manures & Fertilizers	**:**	FYM: 12.5ton/ha, NPK - 25:50:75 kg /ha, Gypsum: 400 kg/ha, Foliar spray of TNAU Groundnut Rich @ 5.0 kg/ha.
Plant protection	**:**	Foliar spray of Imdiacloprid @ 0.5ml/l and soil drenching of Tebuconazole @ 1ml/l of water. Pheromone traps @ 12 no./ha.
Mechanization	**:**	Sowing with seed drill
Yield (q/ha)		
Demonstration	:	11.84 kg/ha
Farmer's practice	:	8.22 kg/ha
District average	:	8.45 kg/ha
State average	:	17.40 kg/ha

Farmer's Feedback

- Recorded more number of pods per plant (41 pods/plant) and higher pod yield per hectare compared to traditional groundnut variety (TMV-7).
- Moderately withstands drought condition.
- Less incidence of root rot due to seed treatment.
- Less incidence of leaf spot.
- Flower retention and pod filling are high.
- ICM practices increased yield of the crop.

5.4 KVK- Adilabad, Telangana

Farmer's Name	:	Ugge Vasanth
Village/Tehsil/Dist.	:	Adilabad
Crop & Variety	:	Soybean, Basara (ASB-22)
Season	:	Kharif
Soil type	:	Black Soil
Farming situation	:	Rainfed
Seed rate	:	70kg/ha
Seed treatment	:	*Trichoderma viride* @ 10 g/kg seed
Date of Sowing	:	24.06.2017
Method of Sowing	:	Line Sowing
Spacing	:	45 X10 cm
Manures & Fertilizers	:	N:P:K @ 12:24:16
Plant p*rotection*	:	*Triazophos @ 2 ml/l, Chlorantraniliprole @ 0.3 ml/l*

Yield (q/ha)

- *Demonstration* : *25 q/ha*
- *Farmer's practice* : *18 q/ha*
- *District average* : *17.2 q/ha*
- *State average* : *11.62 q/ha*

Farmer's Feedback

- Higher yields compared to farmer's practice variety JS 335.
- Constant need based advisories form KVK Scientists.
- Fewer incidences of pests.
- Non shattering variety.

5.5 KVK - Jalgaon Jamod, Maharashtra

Farmers Name	:	Mr. Arun Tukaram Khirodkar
Village/Tehsil/District	:	Jalgaon Jamod, Jalgaon Jamod, Buldana
Crop& Variety	:	Soybean, Phule Agrani
Season	:	Kharif
Seed rate	:	65kg/ha
Seed treatment	:	Rhizobium- 250ml/ha, PSB-250 ml/ha and Tricoderma -150g/ha
Manures & Fertilizers	:	N:P:K @ 30:75:30 at the time of sowing
Method of Sowing	:	Broad Bed Furrow
Yield (q/ha)		
• Demonstration	:	25.30 q/ha
• Farmer's practice	:	23.24 q/ha
• District average	:	10.03 q/ha
• State average	:	11.94 q/ha

Farmer's Feedback

- Good germination percentage due to seed treatment.
- Good vegetative growth of the plant.
- Long duration variety.
- Higher yields with irrigation management and reduced seed rate.

5.6 KVK- Hingoli, Maharashtra

Farmer's Name	:	Archanabai Aabasaheb Kadam
Village/Tehsil/Dist.	:	Waranga, Kalamnuri, Hingoli
Crop & Variety	:	Soybean, MAUS-158
Season	:	Kharif
Soil type	:	Black Soil
Farming situation	:	Rainfed
Seed rate	:	75kg/ha
Seed treatment	:	Bio-fungicide (Tricoderma) and Bio-fertilisers (Rhizobium and PSB)
Manures & Fertilizers	:	Soil test based Nutrition management, Sulphur application 10 kg/ha
Yield (q/ha)		
• Demonstration	:	27.50 q/ha
• Farmer's practice	:	21.30 q/ha
• District average	:	10.68 q/ha
• State average	:	11.94 q/ha

Farmers feedback

- Tolerant to pest and diseases especially for stem fly and bacterial diseases.
- Non shattering variety.
- On an average 75-85 pods per plant were observed.
- ICM technology reduces the cost of cultivation up to 25-30 percent.
- Tolerant to water logging conditions.
- Gives higher yields compared to JS 335 and JS 9305.

5.7 KVK-Chittoor (RASS), Andhra Pradesh

Farmer's Name	:	P.Mangaiah Naidu
Village/Tehsil/Dist.	:	Nandi Mangalam, Puttur, Chittoor
Crop & Variety	:	Sunflower, KBSH-53
Season	:	Rabi
Soil type	:	Red sandy soils
Farming situation	:	Irrigated dry
Seed treatment	:	Seed treatment with Imidachloprid and Mancozeb
Method of Sowing	:	Dibbling of seed on the ridges
Method of Irrigation	:	Ridges and furrow irrigation at 15 DAS, 35DAS, 55 DAS and 75 DAS
Manures & Fertilizers	:	The soil nutrient status was medium in available Nitrogen, Phosphorus and Potassium. Based on soil test results the farmer applied 30kg Nitrogen, 36 kg P_2O_5 and 12 kg K_2O. Complete dose of P and K was applied basal and the N was applied in two split doses i.e. at 30 and 50 DAS. Boron micro nutrient @ 1.0 kg/ha was sprayed at star bud stage to improve the filling of seed and to reduce ill filled grains.
Weed Management	:	Penimethalin @ 2.5 l/ ha.
Plant protection	:	At initial stage of crop growth spodoptera incidence was observed and it was controlled by spraying neem oil @ 2.5 l per ha. There was no major pest or disease incidence observed during crop period.

Yield (q/ha)

- Demonstration : 22.50 q/ha
- Farmer's practice : 9.75 q/ha
- District average : 9.85 q/ha
- State average : 12 q/ha

Farmer's Feedback

- Higher yield.
- Good seed filling.
- No incidence of powdery mildew disease during crop season.
- Higher economic returns with recommended package practices suggested by KVK.

5.8 KVK- Thiruchirappalli, Tamil Nadu

Farmer's Name	:	S.Dhanraj
Village/Tehsil/Dist.	:	Kallur , Musiri, Tiruchirapalli
Crop & Variety	:	Sunflower, Co(SF H)2
Season	:	Rabi
Soil type	:	**S**andy loams
Farming situation	:	Irrigated
Seed treatment	:	Seed treatment with Imidacloprid
Method of Sowing	:	Line sowing
Method of Irrigation	:	Surface Irrigation
Manures & Fertilizers	:	Farm yard Manure- 10 t/ha, Application of TNAU MN mixture, application of *Pseudomonas* and *Trichoderma viride*.
Plant protection	:	Integrated pest and disease management measures.
Mechanization	:	Rotavator for soil preparation, 9 Tyne cultivator for secondary farm operations, bund former.

Yield (q/ha)

- Demonstration : 22.6 q/ha
- Farmer's practice : 16.72 q/ha
- District average : 13.21 q/ha
- State average : 13.42 q/ha

Farmer's Feedback

- Bold seeded high yielding variety.
- Application of MN mixture increased the soil health and yield.
- Pest and disease attack was less due to seed treatment

5.9 KVK- Jammikunta, Telangana

Farmer's Name	:	Prajwal Rao
Village/Tehsil/Dist	:	Shayampet, Karimnagar
Crop & Variety	:	Sesamum, Swetha til
Season	:	Rabi
Soil type	:	Red soil
Farming situation	:	Irrigated conditions
Technology Demonstrated	:	Integrated crop management
Method of Sowing	:	Line Sowing
Method of Irrigation	:	Flooding if needed at critical stages
Seed treatment	:	Tebuconazole & Imidacloprid @ 2 ml/l
Manures & Fertilizers	:	FYM 10 t/ha, Urea, DAP, MOP, Sulfur as Foliar Spray
Plant protection measures	:	Neem oil Spraying
Mechanization	:	Intercultural Operations

Yield (q/ha)

- Demonstration : 10.40 q/ha
- Farmer's practice : 9.15 q/ha
- District average : 8 q/ha
- State average : 7.14 q/ha

Farmer's Feedback

- High yielding and white seeded variety
- Fewer incidences of pests and diseases.

Trainings/Workshops/Monitoring visits conducted by ICAR-ATARI, Hyderabad


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