

Highlights of FLDs Conducted by the Centres during the Year 2017-18

North Zone

Punjab Agricultural University, Faridkot

Climate and its Effects on Cotton Crop

The weather during the season was dry at the start and frequently humid during monsoon period. Light to medium rainfall in isolated patches throughout the cotton growing area during sowing period resulted in crust formation and hence forced some of the farmers to re-sow or plough the cotton fields. Due to this problem, ten FLDs and eight FLDs were failed under FLDs ICM and Desi cotton respectively during this year. The total amount of rainfall received at Regional Research Station, Faridkot during the year was 376.5 mm in 19 rainy days. The maximum rainfall of 179.1 mm was recorded during June when flowering and fruiting period started.

Scenario of Insect Pests and Diseases

Whitefly remained a threat to cotton in Punjab resulting in little economic loss to cotton crop in Mansa and Fazilka districts where rainfall was less. However the incidence of CLCuD was medium to high. The current season also witnessed heavy incidence of thrips in some parts of the state. As regards bollworms, there was no serious incidence of the complex as more than 95 percent area was under *Bt* cotton (BGII).

Front Line Demonstrations on ICM

During the year, the centre had conducted thirty demonstrations on cotton ICM in 66 farmers' fields in 33 villages of Fazilka, Bathinda and Mukatsar. The technologies demonstrated under ICM were time of sowing, optimal plant population, balanced nutrition, weed management and High Density Planting System. The cotton variety demonstrated was *G. hirsutum* variety F 2228. This year, majority of cotton growers could harvest good yield. As a result of better yields, farmers got good net profit from cotton cultivation. Under ICM, the average B: C ratio remained higher (2.01) than farmers' practices (1.62). The specific impact of agronomic practices demonstrated under ICM was worked out and given below

Sr. No.	Improved practices	No. of FLDs	Seed cotton Yield (kg/ha)		% Increase over Check
			FLD's	Check	
1	Optimal plant population	11	1850.0	1619.1	14.3
2	Ideal time of sowing	14	2233.6	1977.9	12.9
3	Weed management	17	1967.6	1757.1	12.0
4	Balanced nutrition	14	2063.6	1863.6	10.7
	Average		2028.7	1804.4	12.4

In general, under FLDs on ICM, an average seed cotton yield of 2029 kg/ha was recorded over the farmers' practice average of 1804.4 kg/ha. It is an average increase of 12.4 % higher seed cotton yield in demonstration over the farmers' practices.

Front Line Demonstrations on Desi / ELS/ Seed Production of ELS cotton

A total of thirty demonstrations were conducted with two desi varieties (FDK124, & LD949) in 60 farmers' fields at Fazilka, Bathinda, Faridkot, and Mukatsar. In these demonstrations, an average seed cotton yield of 2243 kg/ha was recorded over the farmers' practices (2050 kg/ha). It is an average increase of 9.4 % higher seed cotton yield in demonstration over the farmers' practices. The average B:C ratio of FLDs remained higher (1.57) than farmers' practices (1.30).

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Punjab	68	16	5	6 (1,72,000 farmers)	22
Total	68	16	5	6	22

Chaudary Charan Singh Haryana Agricultural University, Hisar

Climate and its Effects on Cotton Crop

During the *Kharif*, 2017 crop season, monsoon onset was in time and few heavy rain events were recorded in the month of June, July, August and September. In the month of May maximum temperature 40.8 °C was recorded whereas in the month of June it was 37.2 °C. During flowering and fruiting stage (July to September) total rainfall 235.1 mm was received as compared to normal 299.8 mm.

Scenario of Insect Pests and Diseases

During *Kharif*, 2017 monsoon onset was in time and few heavy rain events were recorded. The crop growth was excellent during entire crop season. The season was favorable for cotton crop

and there was very less incidence of sucking pests. The rainfall distribution was also very good and ultimately good seed cotton yield was harvested.

Front Line Demonstrations on ICM in Cotton

Twenty demonstrations of ICM in cotton with yield maximization techniques for Bt cotton hybrids viz., INM, IPM, Soil and water management, improved agronomic practices were carried out in fifty farmers' fields. The highest seed cotton yield of Bt cotton under ICM component was obtained by Mrs. Poonam Devi w/o Balwant Village MP Rohi, Fatehabad, Mr. Satpal s/o Raghbir Village Ban Mandori, Fatehabad and Mr. Ramesh Kumar s/o Udai Singh Village Ratia, Bhuna (3000 kg/ha each). In these demonstrations 9.77 per cent higher seed cotton yield was recorded as compared to the local farmer's practices.

Front Line Demonstrations on Desi / ELS/ Seed production of ELS cotton

Twenty demonstrations on *desi* cotton were carried out in fifty farmers' fields with the objectives to popularize high yielding and non shedding desi cotton varieties, minimize the infestation of whitefly, minimize the insecticidal sprays, minimize the inoculums of CLCuD and development and identification of suitable varieties for the cotton- wheat cropping system. The highest seed cotton yield of desi cotton was obtained by Mr. Ram Mehar s/o Sadhu Ram Village Bhaini Amirpur, Jind (3250 kg/ha) followed by Mrs. Krishan Kumari w/o Duli Chand Village Ludas, Hisar (2900 kg/ha) and Mr. Balwant s/o Fateh Singh Village Julehra, Jind (2800 kg/ha). In these demonstrations 9.26 per cent higher seed cotton yield was recorded as compared to the local farmers' practices.

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
CCS HAU, Hisar	10	10	2	2	10
Total	10	10	2	2	10

ICAR - Central Institute for Cotton Research, Sirsa

Front Line Demonstrations on ICM in Cotton

FLDs of CSH-3129 on 40 hectares area of 100 farmers of 51 villages in Haryana, Punjab & Rajasthan States were conducted during 2017-18 crop season by ICAR- CICR, Sirsa. The highest seed cotton yield of the variety CSH-3129 was obtained as 3000 kg/ha as against the seed cotton yield of Bt hybrid (2500 kg/ha). The variety gave 20.00% increase over the Bt hybrid

RCH 773. Average seed cotton yield of 100 FLD's on CSH-3129 conducted was 1641 kg/ha compared to the average seed cotton yield of Bt hybrids as farmers' practice (1627 kg/ha). An average increase of 0.88% was obtained by the farmers for the variety CSH-3129 over the Bt hybrids. The cost benefit ratio of CSH-3129 was 1.15 against Farmer's (1.05) and farmer was benefited by Rs 9448 /ha by growing CSH-3129 in comparison to Bt hybrid. The average fibre quality parameters (length, strength & micronaire) of this variety CSH-3129 demonstrated under FLD in Haryana & Rajasthan was better than the fibre quality parameters of Bt hybrid. Performance of 78 out of 100 farmers was considered and that of 22 farmers was not taken into account due to poor plant stand affected by high temperature/storm/rains.

Eighty FLDs on CSH-3075 were conducted in 200 farmers' fields at 87 villages in Haryana, Punjab & Rajasthan states during 2017-18 under High Density Planting System (HDPS). The highest seed cotton yield of 3000 kg/ha was obtained cultivating the variety CSH-3075 under HDPS with spacing of 67.5×10 cm. Whereas the average seed cotton yield of Bt hybrid (67.5×60 cm) grown by corresponding farmer was 2500 kg/ha. The variety gave 20.00 % increase over the Bt hybrid RCH-773. Average seed cotton yield of 200 FLD's on CSH-3075 (HDPS) conducted was 1731 kg/ha. Whereas the average seed cotton yield of Bt hybrids at farmers field was 1578 kg/ha. An average yield increase of 10.96 % was obtained by the farmers for the variety CSH-3075(HDPS) over the Bt hybrids. The cost benefit ratio of CSH-3075 was 1.20 against Farmers' practice (1.02) and farmer was benefited by Rs 12753 /ha by growing CSH-3075 (HDPS) in comparison to Bt hybrid.

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Sirsa Haryana	18	3	2	4	2 bulletins + 2 Video Recorder
Total	18	3	2	4	4

S.K. Rajasthan Agricultural University, Sriganaganagar

Climate and its Effects on Cotton Crop

During the year, the centre received 271 mm rainfall in 35 rainy days. During the month July, the maximum rainfall of 73.9 mm was received.

Front Line Demonstrations on ICM in Cotton

Twenty FLDs on full package of practices of *G. hirsutum* Bt cotton hybrids were conducted in 20 hectares of 50 farmers fields in the districts Sriganagar and Hanumangarh. The average seed cotton yield obtained under FLDs was 3091 kg/ha which 12.27 % increase than the farmers' practice (2753 kg/ha).

Front Line Demonstrations on Desi / ELS/ Seed production of ELS cotton

A total of twenty FLDs on Desi cotton variety RG 8 in twenty hectares of 50 farmers' fields were conducted in the districts Sriganagar and Hanumangarh. Average seed cotton yield of 2224 kg/ha was received in FLDs as against the average yield of farmers' practices (2080 kg/ha), which is an average increase of 16.54%.

Central Zone

Navsari Agricultural University, Surat

Climate and its Effects on Cotton Crop Surat

Surat

Regular monsoon was started in the second week of June and effective rainfall during June 4 to 10th (141.2 mm) facilitated sowing of some of the FLDs. Pre-emergence weedicides (Pendimethalin) was applied in some of the plots only due to sudden and early rain than previous year which hampered initial weed growth and interrupted weeding. During the month of July, heavy rainfall received in the 29th standard week and caused water logging condition in the field. However, with proper management for drainage the water, situation was handled. During August, again good rainfall was received. Split dose of nutrients was given and interculturing and manual weeding was performed during 32 and 33rd standard weeks. Dry spell during first week of the July, August and September facilitated inter culturing and other agronomical practices resulting in the better growth and development of cotton crops as well as neat and clean first pickings. Total 1187.2 mm rainfall was received at the station in 49 rainy days. Average minimum and maximum temperature was 24.6°C and 31.9°C, respectively. However, unseasonal rain received during 49th STW (05/12 to 07/12) due to Okhi cyclonic pressure affected quality of second picking. Overall the season was moderate for the cotton crop.

Bharuch

The monsoon was started with 16.0 mm rainfall during 2nd week of June-2017. An effective rainfall of 39.6 mm and 25.8 mm was received during 25th and 26th SMW, respectively. Sowing of cotton experiments was started during last week of June and most of experiments almost sown by 2nd week of July. During July, 166 mm rainfall in 18 rainy days helped for

germination. Less rain received during 28th July to 19th August. The crop condition was retained after 160.5 mm rain during 20th to 31st August. Total 484.7 mm rainfall was received in 43 days. All the cultural operations and plant protection measures adopted timely resulted in excellent crop condition.

Scenario of Insect Pests and Diseases

Surat

Amongst insect pests, thrips and leaf hopper found above ETL populations during August-September in vegetative and squaring stages and controlled by proper plant protection measures. Pink bollworm population was remained below ETL during the flowering and boll formation stages. Scattered incidence of Mealybug was observed after cessation of rainfall. On non Bt, scattered population of *Spodoptera* and above ETL population of *Helicoverpa* was recorded which was managed effectively. However, in the later part of the season, pink bollworm infestation was found above ETL and was controlled. Amongst disease, BLB was moderate to severe and Alternaria was low to moderate. Insect pests and diseases were manageable. In the cotton growing areas of Bharuch, Narmada, Surat and Tapi districts, sowing of cotton was completed during the last week of June on receiving good rainfall. Dry spell during monsoon facilitated cultural operations and pest management well. On farmers fields' amongst insects, leaf hopper, thrips, mealybug and pink bollworm and amongst diseases, BLB, Alternaria, leaf reddening and parawilt were observed during survey in Bharuch, Surat and Narmada districts. No major incidence of pink bollworm was noticed on farmers' fields except above ETL population and damage in second and third pickings in few fields of Bharuch and Narmada districts. On account of unexpected rain during December, parawilt type symptoms observed during diagnostic visit in Jambusar/Vagra Taluka of Bharuch district and remedial measures were suggested. Timely advisory issued and pest status regularly updated and communicated.

Bharuch

In early stage of crop, the incidence of thrips was found above threshold level. Jassids was observed throughout the crop period and crossed threshold level many times. Population of mealy bug, aphids and whitefly were low. Among bollworms, *Helicoverpa* and *Earias* was noted moderate to high on non Bt and deshi cotton. The population of pink bollworm was low. No severe diseases observed during the crop season.

Front Line Demonstrations on ICM in Cotton

Twenty demonstrations on ICM in cotton were conducted in twenty hectares of farmers' fields in Bharuch district. Integrated nutrient management through organic source (City compost) and Bio fertilizer (Culture of Azetobacter, Phosphorous Solubilizing Bacteria, Potash Mobilizing Bacteria), IPM for sucking pest management through Flonicamid 50 WG in initial crop window for conservation of natural enemies and monitoring of pink bollworm through pheromone trap with PBW lure and management at critical stage on public sector released G. Cot. Hy. 8 BG II were demonstrated to the beneficiaries of cotton farmers in Amod Taluka of Bharuch district. The average seed cotto yield obtained in the FLD fields was 1580 kg /ha as against the farmers' practice (1519 kg/ha).

Front Line Demonstrations on Desi / ELS/ Seed production

Twenty demonstrations on seed production of GN Cot 25 (*G. herbaceum*) were demonstrated in rain fed pockets of Jambusar Taluka of Bharuch district (Traditional/ conventional area of desi cotton). The other critical inputs viz., Biofertilizers (Azetobacter, KMB, PSB) and Novelty organic liquid fertilizer as organic nutrients and insecticides for sucking pests management (Flonicamid 50WG) and BW management Pheromone traps with PB lure, Quinalphos 25EC and Chlorantraniliprolle 18.5 SC) are distributed for quality seed production. The average seed produced in the FLDs was 842 kg/ha and the lint was 538 kg/ha.

Front Line Demonstrations on Intercropping in cotton

Twenty demonstrations on intercropping in cotton were conducted in twenty hectares of farmers' fields. With the normal cultivation of commercial Bt hybrid G.Cot.Hy. 8 (BG II) and the promising pulse crop variety of Green gram (GAM-5) as intercrop in Bt hybrid G.Cot.Hy 8 (BG II) was demonstrated to the beneficiaries of Mangrol Taluka of Surat district. The critical inputs viz., Novelty organic liquid fertilizer and insecticides for PBW management (Prophenophos (40%+Cypermethrin (4%))) and leaf hopper and thrips management (Flonicamid 50WG) were given to the FLD beneficiaries. The average seed cotton yield obtained in FLD was 2556 kg / ha plus intercrop yield of 572 kg/ha as against the farmers' practice of solo cotton (2181 kg/ha).

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Gujarat/ Bharuch	10	4	-	4	-
Total	10	4	-	4	-

Junagadh Agricultural University, Junagadh

Climate and its Effects on Cotton Crop

The regular monsoon was started from 1st week of June with precipitation of 22.8 mm but satisfactory rainfall for sowing was received during 4th week of June, 2017 i.e. 133.5 mm. All the FLDs were sown on 4th week of June, 2017. The maximum rain (197.5 mm) was received during 29th standard week in the season. Total 804.4 mm rain was received during the entire season with 43 rainy days. Germination in all the experiments was quite good and satisfactory. However, necessary gap filling was done to maintain proper plant stand. The crop condition was good and satisfactory due to timely and even distribution of rainfall during the entire *kharif* season but the day night temperature differences were found significant during the month of October, 2017. The mean of maximum temperature was recorded above 36^oC and minimum was recorded below 25^oC. This climatic condition adversely affected the cotton growth. Irrigation was applied through flood and by drip in later stage as and when it was needed. However, crop growth was recovered successfully later on. Cultural operations *viz.*, weeding, interculturing and top dressings of fertilizer were done timely. In general weather condition was remained moderately favorable to the cotton crop.

Scenario of Insect Pests and Diseases

Initiation of all foliar disease was recorded late in *Kharif*-2017. *Alternaria* leaf spot disease was initiated during the second week of October. Bacterial leaf blight was noted in the second week of July, while the Grey mildew disease not occurred during the season. Maximum disease intensity of *alternaria* leaf spot was found during third week of november-2017. Maximum bacterial leaf blight was recorded during second week of August-2017. Soil borne diseases *viz.*, wilt was noted 5 to 10%. Parawilt in some of the patches was observed mid and late period during season but farmer field was remaining high. Reddening was recorded medium in some genotypes. Aphid incidence was started from 31st standard week and continued up to end of the season. The maximum aphid population (80.05 aphids/ 3 leaves) was recorded during 50th standard week of 2017. The incidence of jassid was observed throughout the season but it was severe from 34th to 46th standard week. The highest population of jassid (26.85 jassid nymphs/ 3 leaves) was noted during 36th standard week. Thrips population was started from 31st standard week, and continued up end of the season but it was more and less incidence. The highest population was recorded during 35th standard week (35.80 thrips / 3 leaves). Whitefly population was found throughout the season but it was below ETL. The highest population was noted during 44th standard week (13.85 whitefly/3 leaves). The incidence of mite, mirid bugs and mealy bugs

were very low throughout the season. In case of natural enemies, the population of Coccinellids, Chrysoperla and Spiders was noted throughout the season. The incidence of Helicoverpa was observed low throughout the season. The incidence of *Earias* was started from 49th to 51st standard week with low larval population. The incidence of pink bollworm was started from 41st standard week and continued up to end of season, but it was severe from 49th standard week to 52nd standard week of 2017. The highest larval population was recorded during 50th standard week of 2017 (15.00 larva / 20 green bolls).

Front Line Demonstrations on ICM in Cotton

Twenty front line demonstrations were conducted in 32 farmers' fields to demonstrate integrated cotton crop management practices on different Bt cotton hybrids. The average seed cotton yield was observed as 2721.09 kg/ha at different taluka of Junagadh district. The average seed cotton yield of farmers' practices was observed as 2505.97 kg/ha. Overall, the average net realization obtained in FLD was Rs. 68270.9/- ha as compared to farmers' practices (Rs. 53819.1/-). The cost benefit ratio was observed as 6.34 and 3.96 in FLDs on ICM and farmers' practices, respectively.

Front Line Demonstrations on Intercropping in cotton

Twenty front line demonstrations were conducted to demonstrate intercropping with cotton crop in different taluka of Junagadh and Rajkot district on different Bt cotton hybrids. The average seed cotton yield was observed as 2556.3 kg/ha with intercrop seed yield of 571.5 kg/ha in FLDs, while average seed cotton yield of 2181.3 kg/ha was obtained on farmers' practices by cultivating single cotton crop. The average net realization obtained in FLD was Rs. 99065.7/ha as compared to Rs. 36404.2/- in farmers practices. The cost benefit ratio was observed as 8.4 and 2.5 in FLDs on inter-cropping and farmers practices, respectively.

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Gujarat / Junagadh	7	4	5	3	3
Total	7	4	5	3	3

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola

Front Line Demonstrations on ICM in Cotton

A total of fifteen demonstrations on ICM were conducted in fifteen hectares of farmers' fields with cotton variety AKH 081 under High Density Planting System in the villages Chipi, Sangvi, Tajnapur, Suryakhed, Tamsi, Saikheda, Bhadumari and Wagada. The average seed cotton yield obtained was 1202 kg/ha as against the farmers' practice (1160 kg/ha).

Front Line Demonstrations on Intercropping in cotton

Five demonstrations on cotton intercropping with pulses (AKA 7 & PKV Tara and AKA 7 & Maruti) were conducted in village Chipi of Akola district. The average seed cotton yield was observed as 636 kg/ha with intercrop seed yield of 395 kg/ha in FLDs, while average seed cotton yield of 1134 kg/ha was obtained on farmers' practices by cultivating single cotton crop.

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Akola	5	-	1	10	4
Total	5	-	1	10	4

Marathwada Agricultural University, Nanded

Climate and its Effects on Cotton Crop

The total rainfall received during *kharif* 2017 season at Nanded was 996.2 mm and at Aurangabad was 434 mm (June - December, 2017) as against average rainfall of 880.71 mm and 650 mm. Thus deviation over average was +13.11% and -33.24% of the district. The rainfall was distributed with 45 rainy days during the season at Nanded and 16 rainy days in Aurangabad. As regard to monthly distribution of rainfall, in Nanded district, deficit rains were received during July, September, October and November whereas June and August months had excess rains. In Aurangabad district, long dry spell was observed in July and August months. The season was started in 24th meteorological week (second week of June) and rains received in 24th and 25th MW (second and third week of June) facilitated sowing of cotton trials in 25th met week and onwards. Showers in 26th and 27th MW in June – July immediately after sowing were helpful for satisfactory germination which resulted in good plant stand and early crop growth. Scanty rains in 30th – 31st MW in August during vegetative stage had reduced growth of the crop initial which was recouped after rains in 32nd MW (August first fortnight). Heavy and continuous rains in

Nanded district received in 34th MW (third week of Aug.) associated with higher humidity coincided in square formation and flowering stage resulted to heavy square shedding. Whereas, long dry spell in Aurangabad district during growth and development stage, reduced crop growth. Supplemental irrigation through drip has minimized ill effects of 42 days dry spell. However, this has reduced intercrop yields.

Scenario of Insect Pests and Diseases

During the crop season, the overall incidence of sucking pests was moderate to high and pink bollworm incidence was severe at the end of crop season. Heavy incidence of jassids (31.30 /3 leaves) was observed during 36th MW. Maximum thrips infestation (66.40 thrips /3 leaves) and whiteflies (24.70 / 3 leaves) were recorded during 35th MW. The pink bollworm infestation was noticed after 33rd MW. The per cent fruiting body damage recorded the highest of 82.00% during 52nd MW. Incidence of *Alternaria* was found wide spread with 10.25 to 20.00 PDI and was peak in 48th MW, bacterial blight was in range of 6.50 to 17.35 PDI with peak in 46th MW and grey mildew intensity was varied from 5.75 to 9.15 PDI. The incidence of parawilt was observed from 0.00 to 5.00 PDI in 34th MW.

Front Line Demonstrations on ICM in Cotton

Twenty demonstrations on ICM in cotton were conducted in fifty farmers' fields in taluks Wagad and Bhokar of Nanded district and taluks Mudolwadi and Paithan of Aurangabad district. The technologies demonstrated were optimum plant population (18518 plants / ha – Spacing 120 x 45 cm under rainfed), recommended dose of fertilizer (120:60:60 NPK kg / ha), foliar application of 2% Urea, DAP & KNO₃ and Spray of 0.2% MgSO₄. The average seed cotton yield obtained in FLD was 1275 kg/ha as against the farmers' practice (1122 kg/ha). The average additional benefit of FLDs on ICM was Rs.9992 / ha with the B: C ratio of 1.32.

Front Line Demonstrations on Desi / ELS/ Seed production of ELS cotton

Twenty demonstration on improved varieties *viz.* PA 08 and PA 528 were conducted in taluks Borgaon and Fulambri in Aurangabad district. The average seed cotton yield obtained in FLD was 938 kg/ha as against the farmers' practice (1047 kg/ha). The average additional benefit of FLDs on Desi cotton was Rs.6236/ ha with the B:C ratio of 1.31.

Front Line Demonstrations on Intercropping in cotton

Twenty demonstrations on Cotton + Green gram (1:2 or 1:1) and Cotton + Black gram (1:1) were conducted in the fifty farmers' fields of taluks *viz.*, Borgaon A, Mudolwad, Paithan and Fulambri of Aurangabad district and taluks *viz.*, Wagad & Bhokar of Nanded district. The average seed cotton yield obtained in FLD was 1402 kg / ha plus intercrop yield of 293 kg/ha as

against the farmers' practice of solo cotton (1628 kg/ha). The average additional benefit of FLDs on intercropping in cotton was Rs.3873 / ha with the B:C ratio of 1.61.

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Nanded	4	1	0	1	-
Aurangabad	3	2	1	-	-
Total	7	3	1	1	-

Mahthama Phule Krishi Vidyapeeth, Rahuri

Climate and its Effects on Cotton Crop

Total rainfall received at Mahatma Phule Krishi Vidyapeeth, Rahuri during the year 2017 was 642.0 mm in 34 rainy days as against average rainfall of 535 mm, which was 20 per cent more than the average. However, there was an uneven distribution of rainfall during the season. Out of the total rainfall, 355 mm rainfall was received only in two meteorological weeks (34 and 38). There was almost dry spell from fourth week of July to second week of August during crop growth period which resulted in increasing the population of sucking pest i.e. thrips, the vector of Tobacco Streak Virus (TSV) disease, particularly on early sown crop.

Scenario of Insect Pests and Diseases

Alternaria blight was the major disease observed during the year. On research farm the incidence of disease was first noticed on 25th July (30 MW). The disease progressed thereafter gradually. TSV incidence was up to 15 and 23 per cent on research farm and farmers field, respectively. Due to water logging conditions as a result of high rainfall, para wilt occurred on some of the farmer's field. The population dynamic study on *Bt* (RCH 2Bt) and Non-*Bt* (DCH-32) revealed that the population of jassids varied from 3.06 to 14.66 / 3 leaves during the season with the peak in 36 MW. The incidence of aphids ranged from 3.54 to 123.52/ 3 leaves with its peak in 48MW. The population of thrips varied from 0.32 to 117.22/ 3 leaves and peaked in 36MW. Whitefly population ranged from 1.78 to 8.94 / 3 leaves during the season with the peak in 38MW. The infestation *H. armigera* on green fruiting bodies varied from 0.57 to 3.76 per cent during the season. The incidence of *E. vittella* on green fruiting bodies ranged from 1.15 and 9.19 %. The open boll and locule damage due to *P. gossypiella* varied from 5.89 to 87.52 and 2.95 to 43.76 per cent, respectively. The population of natural enemies in cotton ecosystem varied from 0.10 to

8.30 predators / plant during the season. In general, the crop growth was not satisfactory during the season. *P.gossypiella* was major pest and *Alternaria* blight was major disease observed during the crop season while sporadic incidence of Tobacco streak Virus (TSV) was observed in Ahmednagar district which caused sever losses in yield at farmers' fields.

Front Line Demonstrations on ICM in Cotton

Twenty demonstrations on ICM in cotton were conducted in fifty farmers' fields in Rahuri, Sangamner, Pathardi and Newasa tahsils of Ahmednagar district. The technologies demonstrated were optimum plant population (12345 plant /ha), recommended dose of fertilizers (125:65:65 kg/ha NPK) and foliar spray of 2% urea and DAP. The average seed cotton yield obtained in FLD was 1769 kg/ha as against the farmers' practice (1539 kg / ha).

Front Line Demonstrations on Intercropping in cotton

Twenty demonstrations on cotton intercropping with blackgram, soybean, pigeonpea, greengram and groundnut were conducted in fifty farmers' fields at Rahuri, Srigonda, Pathardi, Newasa and Rahata. The average seed cotton yield obtained in FLD was 1598kg / ha plus intercrop yield of 757 kg/ha as against the farmers' practice of solo cotton (1391 kg/ha).

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Rahuri	10	2	-	-	-
Pathardi	3	1	-	-	-
Rahata	1	1	-	-	-
Newasa	1	1	-	-	-
Total	15	5	-	-	-

South Zone

University of Agricultural Sciences, Dharwad

Front Line Demonstrations on ICM in Cotton

Thirty FLDs were conducted on ICM in cotton in thirty farmers' fields. The components demonstrated under ICM were potential ruling Bt cotton hybrid, balanced nutrition (100:50:50 NPK kg/ha + 25 kg MgSO₄), split application of N & K i.e, 25% as basal and 25% each at 30, 60, 90 DAS, foliar nutrition (1% All 19 + 1% MgSO₄ + Planofix) and need based PP measures for sucking pests. The seed cotton yield was in the range of 1500 kg/ha to 2500 kg/ha under ICM plots as against the SCY of 1312 kg/ha to 2314 kg/ha under Farmers Practice. The average

SCY of all thirty FLDs under ICM was 2087 kg/ha as compared to the average SCY of 1894 kg/ha obtained with Farmers practice which is about 9.25 per cent higher under ICM. The average additional Net profit under ICM was Rs. 7,581/ha with a B:C ratio of 2.02 which was about 14.90 per cent higher as compared to the net profit obtained with Farmers Practice.

Front Line Demonstrations on Desi / ELS/ Seed production of ELS cotton

FLD on newly released cotton Desi variety (DDhc-11) v/s Present variety (Jayadhar)

There were Eighteen FLDs undertaken in different villages of Gadag and Dharwad district. The sowings were completed by the second week of September commencing from last week of August. The recently released Desi variety DDhc-11 was taken under FLD and the present variety Jayadhar as Check. The production practices remained same for both the varieties. The seed cotton yield (SCY) of DDhc-11 variety was in the range of 520 kg/ha to 950 kg/ha as against the SCY of 480 kg/ha to 785 kg/ha with the check variety Jayadhar. The average SCY of FLDs of DDhc-11 was 703 kg/ha as compared to the average SCY of 599 kg/ha obtained with Jayadhar variety which was about 17.4 per cent higher with DDhc-11. The average additional Net profit with DDhc-11 was Rs. 4253/ha with a B:C ratio of 2.01 which was about 34.3 per cent higher as compared to the net profit obtained with the check variety Jayadhar. Since there was less rainfall than average yearly rainfall, the yield levels are slightly less this year.

FLDs on newly released Non Bt Cotton Hybrid DHH-263 v/s Present Hybrid DHH-11

There was one FLD undertaken in Sambapur village of Gadag district. The sowing was undertaken on June 30th 2017. The recently released H x H Non Bt hybrid DHH-263 was taken under FLD and the present Non Bt hybrid DHH-11 was taken as Check. The production practices remained same for both the hybrids. The seed cotton yield (SCY) of DHH-263 was 1210 kg/ha as against the SCY of 1100 kg/ha with the check hybrid DHH-11. The SCY obtained with DHH-263 which was about 10.0 per cent higher than DHH-11. The additional Net profit with DHH-263 was Rs. 5172/ha with a B:C ratio of 1.50 which was about 32.9 per cent higher as compared to the net profit obtained with the check hybrid DHH-11. The overall yield levels this year are slightly low as there was prolonged drought period during flowering and the rainfall received was almost 25% less than average yearly rainfall.

FLDs on newly released *Hirsutum* Non Bt variety ARBH-813 v/s present variety Sahana

There was one FLD undertaken in Hallikeri village of Dharwad district. The sowing was completed on 7th July 2017. The recently released *hirsutum* Non Bt variety ARBH-813 was taken

under FLD and the present Non Bt *hirsutum* variety Sahana was taken as Check. The production practices remained same for both the varieties. The seed cotton yield (SCY) of ARBH-813 was 975 kg/ha as against the SCY of 880 kg/ha with the check variety Sahana. The SCY obtained with ARBH-813 which was about 10.7 per cent higher than Sahana. The additional Net profit with ARBH-813 was Rs. 3765/ha with a B:C ratio of 1.62 which was about 24.2 per cent higher as compared to the net profit obtained with the check variety Sahana. The overall yield levels in this year in *Hirsutum* Non Bt varieties are slightly low as there was less rainfall of almost 25% than average yearly rainfall.

Front Line Demonstrations on Intercropping in cotton

Twenty FLDs were undertaken on the intercropping systems in Bt cotton compared with the farmers practice of sole Bt cotton. Ten FLDs on Bt cotton + Green gram (1:1) and Five each were with Bt cotton + Green pea (1:2) and Bt cotton + Ground nut (1:1), respectively. The FLDs were scattered over different villages of Belagavi district. The sowing of Bt cotton and the component intercrops were sown simultaneously on the same day with corresponding row ratios of different intercrops as specified. Sole Bt cotton under the same set of production practices were taken as check to compare the yield and economics Bt cotton + intercropping systems.

1. **Bt cotton + Green gram (1:1) :** The average seed cotton yield under Ten FLDs was 1716 kg/ha with an additional average yield of 563 kg/ha green gram under the intercropping system, while under sole cotton the average SCY of five FLDS was 1810 kg/ha. The average additional profit under the intercropping system was Rs. 16,258/- over sole cotton with a Intercropping system B:C ratio of 2.84.
2. **Bt cotton + Ground nut (1:1) :** The average seed cotton yield under Five FLDs was 1510 kg/ha with an additional average yield of 665 kg/ha groundnut under the intercropping system, while under sole cotton the average SCY of five FLDS was 1603 kg/ha. The average additional profit under the intercropping system was Rs. 12,965/- over sole cotton with a Intercropping system B:C ratio of 2.39.
3. **Bt cotton + Peas (1:2) :** The average seed cotton yield under Five FLDs was 1269 kg/ha with an additional average yield of 1626 kg/ha green peas under the intercropping system, while under sole cotton the average SCY of five FLDS was 1368 kg/ha. The average additional profit under the intercropping system was Rs. 35,333/- over sole cotton with a Intercropping system B:C ratio of 2.76.

Extension Activities

	Extension Programme
--	----------------------------

State/ District	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Karnataka					
Belagavi dist.	10	3	--	4	TV talks : 04 Radio talks : 05
Dharwad/dist.	10	6	1	6	News paper coverage : 04
Gadag/dist.	5	3	--	1	Radio tips : 12
Total	25	12	1	11	25

University of Agricultural Science, Raichur

Climate and its Effects on Cotton Crop

The region experienced with drought for 45 days during second fortnight of June and entire month of July in many parts of the region. So the sowings were taken during first week of August. Excess rainfall received during August and September month caused stunted growth. The rainfed cotton grown in the region suffered from moisture stress in few pockets and later the crop growth was normal.

Scenario of Insect Pests and Diseases

The major outbreak of insect pest was jassids in cotton. As per the diagnostic report, about 15-20 percent loss due to jassids in rainfed areas and about 20-25 per cent loss was noticed in irrigated. The other major pest outbreak was Myrid bug incidence in major areas causing major damage through boll drop. Pink boll worm incidence was noticed in some areas.

Front Line Demonstrations on ICM in Cotton

Thirty demonstrations on ICM were conducted in 30 hectares of farmers' fields in Hokrani, Hemanala, Purthipli, Kasaba Lingasugur, Ganamur and Yeragera villages of Raichur District, Chigaratti, Itagi and T. Vadagera villages of Yadgir District, Kadyapur and Andola of Kalaburagi District and Shaliganur and Havinala villages of Ballari District. The technologies demonstrated were foliar sprays of 19:19:19, MgSO₄, and Bio-20 (Mixture of both macro and micro nutrients) and spraying of Fipronil against jassids and Lamda Cyalothrin against pink boll worm and usage of Planofix to reduce the boll drop. The average seed cotton yield obtained in FLD was 2753 kg/ha as against the farmers' practice (2419 kg/ha). The average additional profit obtained due to FLD technology was Rs.20186 with the B:C ratio of 2.51.

Extension Activities

	Extension Programme
--	----------------------------

State/ District	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Raichur, Kalaburagi, Yadgir and Ballari Districts of Karnataka State	5 visits	5 Meetings	2	Training / Awareness programmes on ICM, leaf reddening management, nutrient management, water management and crop protection	Coverage of Training programmes on leaf reddening management in local news papers DD teecast of leaf reddening management
Total	5	5	2	5	2

University of Agricultural Sciences, Chamrajnagar

Front Line Demonstrations on ICM in Cotton

Thirty demonstrations on ICM in cotton were conducted in 145 farmers' fields at villages viz., Bhogayanahundi, Raghavapura, Tagaluru, Agathagowdanahalli, Lokkanahalli, Chikkamalapura, Madahalli, Hosapura, Nenekatte, Madapattana and Bettadamadahalli in Chamrajnagar district on popular cultivars viz., MRC-7351, Bahubali, Minerva and Namdari. The average seed cotton yield obtained in FLD was 1107 kg/ha as against the farmers' practice (944 kg/ha). The average additional profit obtained due to FLD technology was Rs.9140 /ha with the B:C ratio of 2.40.

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
chamrajnagar	25	-	1	5	-

Tamil Nadu Agricultural University, Coimbatore

Implementing centers

Center	FLD	Nos
Department of Cotton	ELS cotton	10
CRS, Srivilliputtur	Intercropping in cotton	20
CRS, Veppanthattai	Integrated Crop Management	20
RRS, Kovilpatti	Desi cotton	10
	Total	60

Climate and its Effects on Cotton Crop

Department of Cotton, CPBG, Coimbatore

During the cropping period from August 2017 to Feb 2018, mean maximum temperature was ranged from 29.8⁰C to 32.3⁰C and the mean minimum temperature was from 18.9⁰C to 23.5⁰C. The mean relative humidity was ranged from 83 to 88 per cent which was on a higher side favouring the pest. The mean evaporation ranged from 4.3 to 7.1 mm / day. There were 27 rainy days with a cumulative receipt of 498.5mm rainfall. During September 2017 and October 2017 months, higher rainfall of 218.1 and 132.6 mm respectively were received whereas December 2017 and January 2018 months experienced very low rainfall of 1.2 and 2.2 mm respectively. The rainfall was normal during the cropping period and the average mean rainfall was 470.7 mm in 24 rainy days.

Cotton Research Station, Veppamnthattai

Cotton was cultivated under winter rainfed condition. The rainfall was around 842.5 mm for the year 2017-18 and during the cropping season, the rainfall was around 660 mm and there were continuous rains during square formation, flowering and boll formation which lead to flower and boll droppings with higher vegetative growth. The crop productivity was low minimizing the yield and reduction in the yield loss upto 30- 40 per cent was observed.

Scenario of Insect Pests and Diseases

Department of Cotton, CPBG, Coimbatore

Incidence of spotted, American boll worms, stem weevil and root rot complex were noticed. The population was kept under control through timely plant protection interventions.

Cotton Research Station, Veppamnthattai

Incidence of the sucking pests viz., jassids, thrips was higher. Incidence of the *Spodoptera* and pink bollworm was also noticed in the crop.

Front Line Demonstrations on ICM in Cotton

Twenty demonstrations on ICM in cotton were conducted in Venganoor, Veppanthattai, Annukur, Thondamanthurai, Venbavur and Nerkunam villages of Perambalur district by Cotton Research Station, Veppamnthattai. The technologies demonstrated were ridge formation and sowing of the cotton seeds in the ridges and furrows, pre-emergence herbicide application, recommended fertilizer dose application, growing of refugee crop, split application of inorganic fertilizer, micronutrient application, biocontrol agent's application, intercultural operation with junior hoe and power tiller and foliar nutrition with cotton plus and water-soluble fertilizer. The average seed cotton yield obtained in FLD was 2355 kg/ha as against the farmers' practice (1911 kg/ha).

Front Line Demonstrations on Desi / ELS/ Seed production of ELS cotton

A total of ten demonstrations on ELS cotton variety Co - 14 were conducted in ten hectares of farmers' fields in the villages Salayapalayam, Kothai mangalam, Andipatti and Ramiyam palayam of Coimbatore districts by Department of Cotton, CPBG, Coimbatore. The average seed cotton yield obtained in FLD was 1895 kg/ha as against the farmers' practice (1338 kg/ha). The average additional profit obtained due to FLD technology was Rs.23836 /ha with the B:C ratio of 1.75. A total of ten FLDs on Desi cotton variety K 12 (TKA 9102/2) along with check K11 were conducted by Agricultural Research Station, Kovilpatti in Ettayapuram, Vilathikulam and Ottapidaram villages of Tuticorin district.

Front Line Demonstrations on Intercropping in cotton

Twenty FLDs were conducted on cotton varieties SVPR 2, SVPR 5 and TCH 1819 intercropped with black gram and green gram in 20 hectares of farmers' fields in Thummakundu, P.Subbalapuram, M.Subbulapuram and V.Redrapatti villages of Madurai district, Puliparaipatti, A.Subramaniapuram, Melapalayapuram and Iluppaiyoor villages of Virudhunagar district and C. Kumareddaiapuram village of Tuticorin district by Cotton Research Station, Srivilliputhur. The average seed cotton yield obtained from the FLDs was 1481 kg/ha with 113 kg of intercrop yield as against farmers' practice of solo cotton (1251 kg/ha) under rainfed condition. Under irrigated condition the average seed cotton yield obtained from the FLDs was 2013 kg/ha with 280 kg of intercrop yield as against farmers' practice of solo cotton (1775 kg/ha). In the demonstrations, higher seed cotton yield of 18.37 and 13.98 per cent than the Farmers' Practice under rainfed and irrigated conditions respectively was realized. Percent yield increase of the varieties SVPR 2, SVPR 5 and TCH 1819 were observed to be 15.83, 15.99 and 21.74 respectively. Intercropping of green gram and black gram produced an additional 155 and 146 kg/ ha grains under rainfed and 290 and 270 kg/ ha grains under irrigated conditions respectively. Similarly, adoption of good varieties resulted in an additional income of Rs 24584 and 18415 per ha than Farmers' practice in irrigated and rainfed situations.

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Coimbatore /	14	2	-	2	-
Madurai	6	2	-	1	--
Virudhunagar	6	2	1	1	-
Thoothukudi	4	1	-	-	-
Perambalur	5	1	-	-	-
Total	35	8	1	4	-

ICAR- Central Institute for Cotton Research, Coimbatore

Front Line Demonstrations on ICM in Cotton

During the summer irrigated season, twenty demonstrations on ICM on cotton are being conducted in fifty farmers fields of Tirupattur block, Vellore district of Tamil Nadu. The technologies viz., Integrated Weed Management, Integrated Nutrient Management and Integrated Pest Management, application of growth regulators and soil test based fertilizer recommendation are being demonstrated in twenty hectares.

Front Line Demonstrations on Desi / ELS/ Seed production of ELS cotton

During summer irrigated season, twenty demonstrations on ELS cotton variety Surabhi are being conducted in fifty farmers fields of Uthangarai block, Krishnagiri district of Tamil Nadu.

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Coimbatore Krishnagiri	1	1	-	1	-

ANGRAU, Guntur

Climate and its Effects on Cotton Crop

A total rainfall of 628.0 mm was received in 61 rainy days as against decennial average of 769.9 mm. The onset of S - W monsoon was normal and facilitated for taking up sowings from second fortnight of June to first fortnight of August. Majority of the sowings were taken up during first fortnight of July. The rains received during the months of August and September helped for good vegetative growth. Further, the high soil moisture coupled with high temperatures promoted luxuriant vegetative growth in the crop. The weather prevailed during the month of October facilitated for good square formation and flowering. However, the humid and cloudy weather (microclimate) was congenial and lead to rotting in the early formed bolls. The excess moisture prevailed during the peak reproductive phase resulted in square, flower and boll drop and eventually affected the seed cotton yield to an extent of 1-2 q/acre.

Scenario of Insect Pests and Diseases

Regarding the pest scenario, during the crop season among the sucking pests leafhoppers were very active and number of leafhoppers per three leaves ranged from 3.30 to 21.40. The incidence crossed ETL during major part of the crop growth period. The incidence of other sucking pests viz., aphids, thrips and whiteflies was low during the crop growth period. The incidence of *Helicoverpa* was negligible. The incidence of pink boll worm was above ETL during the crop season. The incidence ranged from 0.4 to 7.2 larvae/ten bolls in DCH 32. The highest incidence of 7.2 larvae/10 bolls was recorded in DCH 32 during 44th std week (29th October - 4th November). The incidence of *Spodoptera* ranged from 0 to 9.5 per five plants. The activity of natural enemies was low during the season.

Front Line Demonstrations on ICM in Cotton

A total of seventeen (1hectare each) front line demonstrations were conducted in cotton with integrated crop management practices as improved technology and farmers practice as control in Edlapadu, Karusola, villages of Edlapadu mandal of Chilakaluripeta subdivision and PeddaMadduru, Malladi, Didugu villages of Amaravathi mandal of Guntur district during 2017-18. The popular Bt hybrids Jaadoo was cultivated. The following best management practices were adopted in the FLD plots.

1. Seed treatment with imidacloprid 70 WS @ 5 g / kg followed by, treatment with *Trichoderma viride* @ 10 g / kg .
2. The recommended 150:60:60 NPK kg/ha. N and K given in 3-4 splits at 20 days interval starting from 20 DAS. Foliar application of 2% KNO₃ at flowering and boll development stages. Foliar application of MgSO₄ @ 1% twice at 45 and 75 DAS; Boron @ 0.15% twice at 60 and 90 DAS.
3. Setting up of yellow sticky traps @ 10 per acre for monitoring whitefly incidence.
4. No insecticide spray upto 60 DAS. Neem oil sprays @ 1.0 l/acre + detergent powder @ 1.0 g or sandovit @ 0.5 ml or Teepol 0.5 ml/l.
5. Hand picking of *Helicoverpa* and *Spodoptera* larvae, and egg masses of *Spodoptera*.
6. One spray of novaluron @1.0 ml/l or lufenuron @1.25ml/l for the control of *Spodoptera* on need basis only
7. Errection of pheromone traps @ 4/acre for monitoring pink boll worm.
8. For control of pink boll worm spraying of persistent insecticides like thiodicarb 75 WP @ 1.5 g/l or profenophos @ 2 ml/l or quinalphos 25 EC @ 2.5 ml/l or chlorpyriphos 20 EC @ 2.5 ml/l at 15 days interval.
9. At the crop final stage, spray synthetic pyrethroids such as cypermethrin 10 EC @ 1.25 ml/l or lambda cyhalothrin 5 EC @ 1.0 ml/l

The mean seed cotton yield of 2547 kg/ha was realized in integrated crop management plots as against 2203 kg/ha in farmers practice. The cost of cultivation incurred was Rs. 64126 per ha in integrated crop management as against Rs. 64370 per ha in farmers practice. The benefit cost

ratio in integrated crop management was 1.73 as against 1.49 in farmers practice. This might be due to timely control of pink bollworm with recommended chemicals.

Front Line Demonstrations on Desi / ELS/ Seed production of ELS cotton

A total of thirteen (one hectare each) front line demonstrations were conducted on cotton redgram intercropping as improved technology and sole cotton as farmers practice in Bollapalli and Savalyapuram villages of Vinukonda subdivision of Guntur district during 2017-18. The popular Bt hybrids Jaadoo or RCH 659 and redgram variety LRG 41 were cultivated in 4:2 row ratio. In control plot sole cotton crop was cultivated. The mean cotton equivalent yield of 2240 kg/ha was realized in intercropping plots as against 1869 kg/ha in sole cotton plots. The benefit cost ratio realized in cotton redgram system was 1.65 as against 1.38 in sole cotton plots. The cotton redgram intercropping system is found to be sustainable and remunerative under rainfed conditions of Guntur district.

Extension Activities

State/ District	Extension Programme				
	Scientist visit	Farmers meeting	Field days	Awareness programme/ Kisan Melas	News/ Paper/Radio/ Video coverage
Guntur Nellore Prakasam	-	-	-	-	26