

10. GENERAL

10.1 List of Publications

Research papers published by the Institute's scientists NAAS rating > 6

1. Chaudhury S., Bhattacharyya T., Wani S.P., Pal D.K., Sahrawat K.L., Nimje A., Chandran P., Venugopalan M.V. and Telpande B. (2016). Land use and cropping effects on carbon in black soils of semi-arid tropical India. *Current Science*, 110 (9), 1692-1698. (NAAS rating: 6.93)
2. El-Moghny M. Abd, Santosh H. B., Raghavendra K. P., Sheeba J. A., Singh S. B. and Kranthi K. R. (2017). Microsatellite marker based genetic diversity analysis among cotton (*Gossypium hirsutum*) accessions differing for their response to drought stress. *J. Plant Biochem. Biotechnol.* doi:10.1007/s13562-016-0395-1 (NAAS Rating: 7.35).
3. Jandrajupalli; Naik V.Chinna Babu, Ghodke Amol, Kranthi Sandhya, Kranthi K. R., Singh Bir Pal, Choudhary Jaipal Singh and Krishna MSR. (2016). Population genetic structure of cotton pink bollworm, *Pectinophora gossypiella* (Saunders) (Lepidoptera: Gelechiidae) using mitochondrial cytochrome oxidase I (COI) gene sequences from India: *Mitochondrial DNA Part A*, 2470-1408. (NAAS Rating: 7.21).
4. Kranthi S., Ghodke A. B., Raghavendra K.P., Mandle M., Nandanwar R., Satija U., Kumar R., Desai H., Udikeri S. S, Dhara Jothi B., Bheemanna M, Monga D. and Kranthi K. R. (2016). Mitochondria CO-I based genetic diversity of the cotton leafhopper *Amrasca bigutulla bigutulla* (Ishida) populations from India. *Mitochondrial DNA*, p.No-1-56. (NAAS Rating: 7.21)
5. Meena R.A., Monga D., Venugopalan M.V., Ahuja S.L. and Sahay Ratna. (2016). Screening of *Desi* cotton (*G. arboreum*) suitable for surgical properties. *Journal of Scientific and Industrial Research*, 75: (9) 570-573. (NAAS Rating: 6.50)
6. Prasanna R., Ramakrishnan B., Ranjan K., Venkatachalam S., Kanchan A., Solanki P., Monga D., Shivay Y.S. and Kranthi S. (2016). Microbial inoculants with multifaceted traits suppress *Rhizoctonia* populations and promote plant growth in cotton *J. Phytopathol*, 164: 1030-1042. (NAAS-6.82).
7. Reddy D. D., Blaise D., Kumrawat B. and Singh A.K. (2016). Evaluation of Integrated Nutrient Management Interventions for Cotton (*Gossypium hirsutum*) on a Vertisol in Central India. *Communications in Soil Science and Plant Analysis*, 48:4,469-4,475. (NAAS Rating: 6.39).
8. Sethi K., Siwach P. and Verma S. K. (2015). Assessing genetic diversity among six populations of *Gossypium arboreum* L. using microsatellites markers. *Physiology and Molecular Biology of Plants*, 21 (4): 531-539. (NAAS rating 7.25).
9. Vennila S., Yadav S. K., Wahi P., Kranthi S., Amutha A. and Dharajothi B. (2016). Seasonal Dynamics, Influence of Weather Factors and Forecasting of Cotton Sap Feeders in North India (2016). Proceedings of the National Academy of Sciences, India Section B: Biological Sciences. DOI: 10.1007/s40011-016-0776-1. (NAAS Rating: 6.00)
10. Waghmare V. N., Rong J., Rogers C.J., Bowers J.E., Chee P.W., Gannaway J.R., Katageri I. and Paterson A.H. (2016). Comparative transmission genetics of introgressed chromatin in *Gossypium* polyploids. *American Journal of Botany*, 103: 719-730. (NAAS Rating: 8.81).

Research papers published by the Institute's scientists NAAS rating < 6

1. Aga T. M., Tambe V. J., Nagrare V. S. and Naikwadi Bhausahab. (2016). Parasitoid, *Aenasius arizonensis* (Girault) (Hymenoptera: Encyrtidae): Its biology, morphometrics, host stage preference and use in biological control. *Journal of Biological Control*, 30(2): 91-98. (NAAS Rating: 3.96).
2. Arunkumar, N., Gulsar Banu J., Gopala-

- krishnan N. and Prakash A.H. (2017). Isolation, screening and characterization of microbial surfactants producing wax degrading bacteria from cotton mealybugs, *Phenacoccus solenopsis* Tinsley and *Ferrisiavirgata* Cockerell (Homoptera: Pseudococcidae). *Journal of Entomology and Zoology Studies*; 5(2): 1191-1195. (NAAS Rating: 5.6).
3. Arunkumar, N., Gulsar Banu J., Gopalakrishnan N. and Prakash, A.H. (2017). Wax Degrading Bacteria: Scope and Applications in Agriculture. *International Journal of Current Microbiology and Applied Sciences*. 6(2): 649-664. (NAAS Rating: 5.3).
 4. Banu J.G., Meena K. S., Selvi C. and Manickam S. (2017). Molecular marker-assisted selection for nematode resistance in crop plants. *Journal of Entomology and Zoology Studies* 5(2): 1307-1311. (NAASrating - 5.53).
 5. Blaise D., Bonde A.N., Reddy D.D., Patil V.D., Dhawan A.S., Aladakatti Y.R., Vadivel A. and Ratnakumari S. (2016). Nutrient management options for rainfed cotton grown on vertisols. *Indian Journal of Fertilisers*, 12(10): 46-52. (NAAS Rating: 3.78).
 6. Dhara Jothi B., Kranthi Sandhya and Naik Chinna Babu. (2016). Efficacy of transgenic Bt cotton hybrids on pink bollworm, *Pectinophora gossypiella* (Saunders) under irrigated and rainfed conditions of south and central India. *Journal of Applied Zoological Research*, 27 (2): 143-148. (NAAS Rating: 2.63).
 7. Meena RA, Monga D, and Sahay Ratna. (2016). Effect of defoliation on maturity behavior and seed cotton yield in cotton. *J. Cotton Res. & Dev.* 30 (1) 63-65. (NAASrating 3.41)
 8. Nagrare V. S., Sheeba J.A., Bhoyar P., Naikwadi B. and Satija U. (2017). Biochemical changes in cotton plants due to infestation by cotton mealybug *Phenacoccus solenopsis* Tinsley (Hemiptera: Pseudococcidae). *Journal of Applied and Natural Science*, 9 (1): 382 - 388. (NAAS Rating: 5.08).
 9. Nagrare V. S., Deshmukh A. J., Dharajothi B., Amutha M., Kumar Rishi, Kranthi S. and Kranthi K.R. (2016). Sampling methodology for assessing field population of mirid, *Campylomma livida* infesting cotton. *Indian Journal of Plant Protection*, 44 (2): 250-250. (NAAS Rating: 4.90).
 10. Nagrare V.S. and Naikwadi B. (2016). An outbreak of gall inducing thrips *Gynaikothrips uzeli* Zimmermann (Thysanoptera : Phlaeothripidae) on *Ficus benjamina* Linn. in central India. *Journal of Entomology and Zoology Studies*; 4(5): 294-296. (NAAS Rating: 5.53)
 11. Nagrare V.S., Kranthi S., Kranthi K.R., Naik V. Chinna Babu, Deshmukh V., Naikwadi B. and Dahekar A. (2016). Relative toxicity of insecticides against cotton mealybug *Phenacoccus solenopsis* Tinsley (Hemiptera: Pseudococcidae) and its fortuous parasitoid *Aenasius bambawalei* Hayat (Hymenoptera: Encyrtidae). *Journal of Applied and Natural Science*, 8 (2): 987 - 994. (NAAS Rating: 5.08).
 12. Pable D., Chatterji S. and Venugopalan M.V. (2016). Soil quality assessment of two cotton growing agroecological subregions of Vidarbha, Maharashtra. *Indian Journal of Soil Conservation*, 44(3): 343-349. (NAAS Rating: 5.20).
 13. Pable D., Chatterji S. and Venugopalan M.V. (2016). Soil quality assessment in rainfed cotton growing environs of Vidarbha, Maharashtra. *International Journal of Agricultural Science and Research*, 6 (4): 243-250. (NAAS Rating: 4.13).
 14. Raju, AR. (2017). Leaf Reddening in Bt Hybrid Cotton. *Agri Res & Tech*, 3(4): 1-4.
 15. Rathinavel, K. (2017). Effect of seed treatments on viability and vigour of cotton seeds (*Gossypium hirsutum* L.) under ambient storage. *Journal of Cotton Research and Development*. 31(1):1-6. (NAASrating - 3.41).
 16. Sankaranarayanan K., Venugopalan M.V. and Rajendran K. (2016). Pulses are companion crop for soil fertility improvement and pest

- control in cotton – A review, *Indian Journal of Agronomy*, vol 61, Special issue, 230-237. (NAAS Rating: 5.46)
17. Waghmare V.N. and Salame R.V. (2016). CNA 1051 (IC0613964; INGR15016) - An induced virescent mutant of diploid cotton (*Gossypium arboreum* L.). *Indian Journal Plant Genetic Resources*, 29(2): 203-205. (NAAS Rating: 5.12).
18. Waghmare V.N. and Salame R.V. (2016). CNH 1102 (IC0611336; INGR15015) - A high ginning outturn germplasm of Upland cotton (*Gossypium hirsutum* L.). *Indian Journal Plant Genetic Resources*, 29(2): 202-203. (NAAS Rating: 5.12).

10.2 : List of on-going Projects

| S. N. | Project title & Investigators | Duration |
|-------------------------|---|----------|
| Crop Improvement | | |
| 1. | Cotton Breeding Program (CBP) | |
| | CBP 1: Improvement of tetraploid and diploid cottons for fibre properties through population improvement approaches. V.N. Waghmare (PI), Vinita Gotmare (PA), O.P. Tuteja (PA), S. K Verma | 2000-20 |
| | CBP 2: Studies on genetic enhancement of <i>G. hirsutum</i> . T. R. Loknathan (PI) | 2002-17 |
| | CBP 3: Development of drought tolerant genotypes with good fibre quality in <i>G. hirsutum</i> . Suman Bala Singh (PL), A. H. Prakash (PA) | 2008-17 |
| | CBP 4: Breeding of Upland cotton for improved fibre quality and resistance to biotic stress (Jassid). S. M. Palve (PI) | 2005-21 |
| | CBP 5: Development of long staple <i>G. hirsutum</i> variety with improved fibre strength. S. Manickam (PL), V. N. Waghmare (PA), S. L. Ahuja (PA) | 2008-17 |
| | CBP 6: Development of early maturing, medium staple varieties and hybrids Resistant to CLCuV. O. P. Tuteja (PL), D. Monga (PA), S. K. Verma (PA), Rishi Kumar (PA), S. M. Palve (PA) | 2008-17 |
| | CBP 7: Development of <i>G. hirsutum</i> genotypes with high yield and high GOT. S. L. Ahuja (PL), R. A. Meena (PA), D. Monga (PA), Rishi Kumar (PA) | 2012-18 |
| | CBP 8: Development of high yielding, early maturing extra long staple <i>G. barbadense</i> genotypes with high GOT. K. P. M. Dhamayanthi (PL), R. B. Singandhupe (PA), M. Saravanan (PA) | 2012-17 |
| | CBP 9: MAS/MAB for water-logging in cotton. V. Gotmare (PL), S.E.S.A. Khader (PA), M. Saravanan (PA), J. H. Meshram (PA), J. Annie Sheeba (PA) | 2012-20 |
| | CBP 10: Breeding for early maturity compact plant type and jassid tolerance in cotton. H. B. Santosh (PI), S. Manickam (PA) | 2014-19 |
| | CBP 11: Identification of male sterile plants in genetic male sterility (GMS) using molecular markers. O. P. Tuteja (PL), S. B. Singh (PA), M. Saravanan (PA) | 2012-17 |
| | CBP 12: Development of cotton leaf curl virus resistant genotypes using <i>G. arboreum</i> / <i>G. herbaceum</i> through introgression. S. K. Verma (PI), O. P. Tuteja (PA), D. Monga (PA), Rishi Kumar (PA), V. Gotmare (PA), H. B. Santosh (PA) | 2015-21 |
| | CBP 13: Breeding to improve performance of <i>Gossypium herbaceum</i> for adaptation to climate change in central India. D. V. Patil (PI), Punit Mohan (PA) | 2015-20 |
| | CBP 14: Development of high yielding, early maturing Asiatic cotton (<i>Gossypium arboreum</i>) genotypes suitable to south zone. A. Manivannan (PI), Punit Mohan (PA), M. Saravanan (PA), V. N. Waghmare (PA), N. Gopalakrishnan (PA) | 2015-20 |



| S. N. | Project title & Investigators | Duration |
|------------------------|--|----------|
| 2. | Cotton Germplasm Management Program (CGMP) CGMP 1: Collection, conservation, evaluation, documentation and maintenance of germplasm of cultivated species of <i>Gossypium</i> . Punit Mohan (PL), S. Manickam (PA), R. A. Meena (PA), K. P. M. Damayanthi (PA), S. S. Mahajan (PA), M. Saravanan (PA) | 2006-17 |
| | CGMP 2: Conservation, characterization and utilization of wild species, races of cultivated species and synthetic polyploids of <i>Gossypium</i> . V. Gotmare (PL), G. Balasubramani (PA). | 2008-18 |
| | CGMP 3: Exploration, collection and conservation of land races of desi cotton and perennials and from different regions of India. M. Saravanan (PL) | 2011-17 |
| 3. | DUS characterization and DNA finger printing of public sector cotton varieties. V. Santhy (PL), H. B. Santosh (PA) | 2012-17 |
| 4. | Studies to improve the seed and boll setting efficiency in cotton. R. A. Meena (PL), R. Kumar (PA), K. Rathinavel (PA) | 2012-18 |
| 5. | Evaluation of exogenous application of plant growth hormones and other chemicals on seed yield and quality of cotton. S. Mahajan (PI) | 2015-17 |
| Biotechnology | | |
| 6. | Deployment of biotechnological tools for enhancing cotton seed by -product utilization: Reduction of gossypol content using CYP6AE14 gene. K. P. Raghavendra (PI), S. Kranthi (PA), G. Balasubramani (PA), K. Velmourougane (PA), Savita Santosh (PA) | 2014-17 |
| 7. | Basic Studies on Somatic embryogenesis of Cotton. Joy Das (PI), Rakesh Kumar, S.B. Nandeshwar (PA) | 2015-17 |
| 8. | Development of novel methods for gene delivery into cotton. Rakesh Kumar (PI), Joy Das (PA) | 2015-17 |
| Crop Production | | |
| 9. | Allelopathy as an alternative weed management strategy in cotton. B. Desouza (PI), P. Nalayini (PA), A. Manikandan (PA) | 2012-18 |
| 10. | Evaluation of nano-formulated micronutrients foliar spray for yield maximization in different cotton genotypes. D. Kanjana (PI) | 2012-17 |
| 11. | Correlation of leaf colour transmittance with relation to soil/plant nutrient status. J.A. Sheeba (PI) | 2014-17 |
| 12. | Evaluation of structured water for cotton production. P. Nalayini (PI) | 2014-19 |
| 13. | Efficient nitrogen fixing legumes for cotton based cropping systems. A. Manikandan (PI), P. Nalayini (PA) | 2015-20 |
| 14. | Development of remunerative cotton based cropping systems based on conservation agriculture principles. R. Raja (PI), D. Kanjana (PA) | 2015-19 |
| 15. | Survey, surveillance and identification of weeds of Economic Value in Cotton Based Cropping System. S. N. Rokde (PI) | 2015-17 |
| 16. | Participatory evaluation of technology for improving profitability in calcareous soils. A.R. Raju (PI), S. N. Rokde (PA), R. B. Singandhupe (PA), Anuradha Narala (PA) A. Manikandan (PA) | 2016-20 |
| 17. | Exploiting the epigenetic transgenerational inheritance of stress responsive traits for imparting abiotic stress tolerance to cotton. J A. Sheeba (PI) | 2016 -21 |
| 18. | Impact of Institutional Credit on Cotton Farming in Vidarbha Region of Maharashtra. A. Narala (PI), S. M. Wasnik (PA), N. Gokte (PA), V. Gotmare (PA) | 2016-17 |

| S. N. | Project title & Investigators | Duration |
|------------------------|---|----------|
| 19. | Development of interactive decision support systems for cotton pest management with prerecorded voice modules. M. Sabesh(PI), K. R. Kranthi (PA), C. Karpagam (PA) | 2016-19 |
| 20. | Bio-efficacy trials of plant growth promoter based on cow urine and waste human hair to improve the cotton crop productivity. B. Desouza (PI), G. I. Ramkrushna (PA) | 2016-17 |
| 21. | Influence of nitrogen (urea) and organophosphate (Monocrotophos) on crop duration, flowing, fruiting and insect pests in cotton. G. I. Ramkrushna G.I. (PI), R. Pande (PA) | 2016-17 |
| Crop protection | | |
| 22. | Gene discovery for useful traits. K. R. Kranthi (PI), S. Kranthi (PA), K. P. Raghavendra (PA), K. Velmourougane (PA), J. A. Sheeba (PA), A. Sampath Kumar (PA) | 2014-19 |
| 23. | Role of epicuticular wax in reaction of cotton genotypes to whitefly/CLCuD. Rishi Kumar (PI), D. Monga (PA), S. Kranthi (PA), J. A. Sheeba (PA) | 2014-17 |
| 24. | Isolation and characterization of endophytes in cotton and endo-symbionts in bollworms. M. Amutha (PI) | 2012-17 |
| 25. | Production, stabilisation, formulation and validation of microbial agents and their natural products against insects and nematode pests of cotton. J. Gulsar Banu (PL), M. Amutha (PA) | 2012-17 |
| 26. | Development of reverse transcription loop mediated isothermal amplification (RT- LAMP) for early detection of cotton leaf curl and tobacco streak viruses of cotton (<i>G. hirsutum</i>). S. P. Gawande (PI), D. Monga (PA) | 2015-18 |
| 27. | Studies to identify the most virulent strains of entomophthogenic fungi for whitefly control. S. K. Sain (PI), D. Monga (PA), S. Kranthi (PA), Rishi Kumar (PA), T. Prabhulinga (PA), D. Nagrale (PA) | 2016-19 |
| 28. | Diversity analysis of Whitefly (<i>Bemisia tabaci</i>), predators and parasitoids. T. Prabhulinga (PI), S. Kranthi (PA), Rishi Kumar (PA), M. Amutha (PA), V. Chinna Babu Naik (PA) | 2016-18 |
| 29. | Evaluation of cotton PGPR for broad spectrum resistance against insect pests and diseases. Dipak T Nagrale (PI), T. Prabhulinga (PA) | 2016-19 |
| 30. | Whitefly: Studies on ecology and host plant resistance. Rishi Kumar (PI), S. K. Sain (PA), T. Prabhulinga (PA), S. Kranthi (PA), D. Monga (PA) | 2016-20 |
| 31. | Exploring novel dispensers to enhance the trapping efficacy of gossyplure in managing pink bollworm in cotton. K. Rameash (PI), B. Dharajothi (PA) | 2016-17 |
| 32. | Push-pull strategy for management of pink bollworm in cotton. Vivek Shah (PI), Pooja Verma (PA) | 2016-19 |
| 33. | Studies on chemical cues mediating sucking pests and natural enemy interactions in cotton eco-system. T. N. Madhu (PI), Rishi Kumar (PA), Shankarganesh (PA) | 2016-18 |
| 34. | Enhancing the efficacy of yellow sticky traps using essential oils against sucking pests in cotton. T. N. Madhu (PI), Rishi Kumar (PA), Shankarganesh (PA) | 2016-17 |
| 35. | Technology Mission on Cotton MM I TMC MM 1.1: Development of multi -gene constructs and Bt cotton varieties for sustainable pest management. K. R. Kranthi (PI), S. B. Singh (PA), K. P. Raghavendra (PA), S. B. Nandeshwar (PA), G. Balasubramani (PA), K. Velmourougane (PA), S. Kranthi (PA), H. B. Santosh (PA) TMC MM 1.2: Marker Assisted Breeding for cotton leaf curl disease (CLCuD), bacterial leaf blight (BLB) and nematodes resistance in cotton. V. N. Waghmare (PI), A. Sampath Kumar (PA), N. Narkhedkar (PA), S. Manickam (PA), J. Gulsar Banu (PA), | 2012-17 |



| S. N. | Project title & Investigators | Duration |
|-------|--|--------------------|
| | H. B. Santosh (PA), S.K. Verma, D. Monga (PA) TMC MM 1.4: Evaluation of genotypes and a grotechniques for high density planting system and surgical cotton varieties. M. V. Venugopalan (PI), B. Desouza (PA), V. Chinna Babu Naik (PA), Punit Mohan (PA), T. R. Lokanathan (PA), A. R. Raju (PA), A. Sampath Kumar (PA), K. Shankarnarayanan (PA), S. L. Ahuja (PA), R. A. Meena (PA) TMC MM 1.5 : Simulation models/electronic gadgets to predict insect infestation, bollworm resistance to Bt cotton, area, production and price of cotton. S. Kranthi (PI), K. R. Kranthi (PA), V. S. Nagrare (PA), V. Chinna Babu Naik (PA), Anuradha Narala (PA), A. H. Prakash (PA), M. Amutha (PA), K. Shankarnarayanan (PA), Isabella Agarwal (PA), B. Dharajothi (PA), Rishi Kumar (PA), M. Sabesh (PA), J. A. Sheeba (PA) TMC MM 1.6 : e-Kapas network and technology documentation. S. M. Wasnik (PI), A. H. Prakash (PA), S. Usha Rani (PA), O. P. Tuteja (PA), M. Sabesh (PA), Anuradha Narala (PA), N. Gopalakrishnan (PA) TMC MM I 1.7: Development of cotton picking machinery for small scale cotton production systems. G. Majumdar (PI) | |
| | Externally funded projects | |
| 36. | Consortia Research platform- Natural Fiber Development of tissue culture technology for cotton fibre initiation. S. B. Nandeshwar (PI), Rakesh Kumar (PA), Joy Das (PA) | 2015-17 |
| 37. | Consortia Research Platform on biodiversity. Punit Mohan (PI), V. Gotmare (PA), J. H. Meshram (PA), S. Manickam (PA), R. A. Meena (PA) | 2014-17 |
| 38. | DST : Design & Development of a cotton picking head. G. Majumdar (PI) | 2012-17 |
| 39. | DST : Development of vision based expert system for vacuum picking of cotton. G. Majumdar (PI) | 2013-17 |
| 40. | NSP: National Seed Project (Crops). K. Rathinavel (PI) | 1999-17 |
| 41. | DUS: Implementation of PVP legislation 2001 and DUS testing of cotton under ICAR-SAU system. K. Rathinavel (PI) | 2003-17 |
| 42. | MSP: ICAR project on seed production in agricultural crops and fisheries. P. R. Vijayakumari (Nd Offi), V. Santhy (PA), K. Rathinavel (PA), R. A. Meena (PA) | 2007-17 |
| 43. | NASF: Molecular characterization and validation of fiber strength genes with fiber specific promoter for improvement in cotton. G. Balasubramani (PI), K. P. Raghvendra (PA), J. Amudha (PA), S. B. Nandeshwar (PA) | 2012-17 |
| 44. | NPTC: Transgenics in crops. Insect and disease resistant transgenic cotton. G. Balasubramani (PI), J. Amudha (PA), S. B. Nandeshwar (PA), K. P. Raghvendra (PA), Suman Bala Singh (PA) | 2012-17 |
| 45. | NICRA: National Innovations in climate resilient agriculture NICRA: Climate change- adaptation and mitigation strategies in cotton. S.E.S.A Khader (PI), A. H. Prakash (CoPI), B. Desouza (CoPI), M.V. Venugopalan (CoPI) NICRA: Development of IPM strategies to combat whitefly and other emerging pests of cotton. S. Kranthi (PI), V. S. Nagrare (PA), T. Prabhulinga (PA), D. Monga (PA), Rishi Kumar (PA), M. Sabesh (PA) | 2013-17 2016-19 |
| 46. | Mahyco: Monitoring changes in baseline susceptibility to Cry toxins in the cotton bollworm, <i>H. armigera</i> , pink bollworm and <i>Spodoptera litura</i> . Sandhya Kranthi (PI), K. R. Kranthi (CoPI), V. Chinna Babu Naik (CoPI) | 2012-17 |

| S. N. | Project title & Investigators | Duration |
|-------|--|----------|
| 47. | GEAC: Event based approval mechanism. S. Kranthi (PI), K. R. Kranthi (CCPI) | 2010-17 |
| 48. | Consortia Research Platform IIHR (Lead centre): ORP on Management of sucking pests in horticultural crops. S. Kranthi (PI), M. Amutha (PA) | 2014-17 |
| 49. | DST: Entomopathogenic -endophytes mediated plant defense as a novel approach for the management of bollworms in cotton. M. Amutha (PI) | 2013-17 |
| 50. | Maha. Govt: Crop pest surveillance and advisory project (CROPSAP) in Maharashtra. V. S. Nagrare (PI) | 2010-17 |
| 51. | ICAR Extramural: Introgression of genes for whitefly and CLCuD resistance in upland cotton (<i>G. hirsutum</i>). V.N. Waghmare (PI), S. M. Palve (CoPI), (S. B Nandeshwar (CoPI), Rakesh Kumar (CoPI), D. Monga (CoPI), S. K. Verma (CoPI), Rishi Kumar (CoPI) | 2016-17 |
| 52. | Gender Knowledge System in Agriculture (ICAR Flagship Project). S. Usha Rani (CCPI) A. Narala (Co PI) | 2015-17 |
| 53. | DST-SERB : Evaluation of selectivity of insecticides against different mealy bug species and their major natural enemies associated with cotton, tomato, brinjal and papaya. K. Shankarganesh (PI) | 2016-18 |
| 54. | DST-SEED: Exploration and development of thermal tolerant strain of biocontrol agent, <i>Acerophagus papayae</i> for sustainable management of papaya mealybug, <i>Paracoccus marginatus</i> in crops. K. Shankarganesh (PI), C. Karpagam | 2016-19 |
| 55. | DST-SERB-Effect of thermal stress on fitness traits of two mealybug pests, <i>Phenacoccus solenopsis</i> , and <i>Paracoccus marginatus</i> and their parasitoids <i>Aenasius bambawalei</i> and <i>Acerophagus papaya</i> . K. Shankarganesh (PI), S. Kranthi (CoPI), K. Rameash (CoPI) | 2016-19 |

10.3 : Consultancy, Patents, Commercialization of Technology

Patent submitted and published in IPINDIA website:

A complete patent application was submitted by Er. A. Majumdar *et al* (2016) for the invention of "A Simple Device to Detect Specific Hues" (Filing is under process).

Revenue Generation

| Particular | Amount (Rs.) |
|--|---------------------|
| Sale of Farms Produce | 35,27,868.40 |
| Licence Fee | 2,70,815.00 |
| Application fee from candidates | 4,600.00 |
| Income generated from internal resource generation | 60,000.00 |
| Miscellaneous Receipts | 14,31,302.50 |
| Sale of Bt detection kits | 1,600.00 |
| Total | 52,96,185.90 |

MoU signed by ICAR-CICR

1. MoU was signed between ICAR-CICR, Nagpur

and M/s. Innovative Bioscience, Samartha Nagar, Ajni Sq., Nagpur for Yellow sticking Trap on 28 April 2016.

2. MoU was signed between ICAR-CICR, Nagpur and Better Cotton Initiative, Jasola, and New Delhi on development of an 'APP' for sustainable Cotton Production in India on 2nd Jun 2016.

3. MoU was signed between ICAR-CICR, Nagpur and M/s. Ankur Seeds Pvt Ltd. Nagpur for "Registered varieties seeds for potential commercialization" on 26th Dec 2016.

10.4 : Significant Decisions of RAC and IRC

Research Advisory Committee Review Meeting

Research Advisory Committee (RAC) meeting was held at ICAR-Central Institute for Cotton Research (CICR), Nagpur from 1-2 December 2016. The meeting was held under the Chairmanship of Dr. B.V. Patil, Director of Education, University of

Agricultural Sciences, Raichur, Karnataka.

Dr. K. R. Kranthi, Director, ICAR - CICR, Nagpur welcomed the Chairman and members of RAC. In his introductory remarks, the Chairman RAC expressed his happiness over the crop condition in the country during 2016-17. He reiterated that timely sowing, well distributed rainfall and above all the relentless training and information campaign coordinated by ICAR-CICR, SAUs and State governments that kept the key pests (pink bollworm and whitefly) under control were the reasons for high yields expected this year. He stressed on strengthening research on control of pink bollworm, mechanical picker for small farms and compact early varieties with Bt suitable for High Density Planting. Action Taken Report (ATR) was placed before the RAC for deliberation. Dr. B. V. Patil, Chairman, RAC expressed satisfaction on ATR and appreciated the research efforts of the institute.

Dr. K.R. Kranthi, Director ICAR-CICR, in his presentation "Global and National Cotton Perspectives" emphasized that sustainable cotton production depends upon prudent use of water and agrochemicals. He presented the National and Global cotton scenario and narrated the reasons for enhanced yields (>1500 kg lint/ha) achieved by Australia, China, Brazil, Turkey, Mexico and Israel. The reasons for low yields and approach to improve cotton yields in India were also elaborated. The Chairman and the members of RAC widely appreciated the presentation.

Research Advisory Committee members along with the Director, ICAR-CICR and Heads of divisions/sections/regional stations visited different experimental fields and laboratories and interacted with the scientists regarding the research programmes being implemented. They also visited the polyhouse where backcrossing of F₁ (Tg2E-13 event) with their corresponding recipients and crossing of donor (CH12 event) with recipients is being carried out. The research achievements during 2016 were presented by Heads of the Division of Crop Improvement, Crop Production, Crop Protection, I/c Biotechnology Section, Head CICR Regional Station Coimbatore



and Dr. O.P. Tuteja from Regional Station Sirsa. The work done was reviewed thoroughly. The committee appreciated the efforts and made specific recommendations:

1. CICR has developed excellent cultures with specific economically important trait values (earliness, compact plants, zero monopodia, fibre quality, drought tolerance, sucking pest tolerance etc). Desired traits can be combined by adopting appropriate breeding strategies like multiple crossing (involving more than four parents), diallele selective mating system, early generation intercrossing or by subjecting the segregating populations to different mating systems to obtain good recombinants.
2. Based on the results of the multilocation trials involving 21 Bt varieties, the commercial release and subsequent seed production of the most adaptable and high yielding varieties may be expedited.
3. ICAR-CICR should sponsor varieties, irrespective of their performance in AICRP on cotton trials, to State Varietal Evaluation Trials and promising ones must also be released through State Varietal Release Committees.
4. Research on the contribution of microbiome including PGPR towards lint yield, fibre quality and stress tolerance needs to be explored.
5. Rearing system for whitefly and protocol for screening for whitefly tolerance needs to be standardized and a dedicated rearing facility may be developed through proper funding support.

6. Resistance to CLCuD in the reported germplasm lines may be confirmed using Agro-infectious clones of virus biotypes.
7. There is a need to prioritize the projects and improve focus on immediate issues confronting cotton production (Whitefly, Pink bollworm, HDPS, Bt varieties, Picker, Long linted *desi* cotton etc.). Projects of lesser importance can be shelved. Young scientists must concentrate on basic research with latest methodology (state of art protocols).
8. The road map discussed and finalized during the golden jubilee celebrations of AICRP on Cotton during 9-10 November 2016 to achieve 1000 kg lint per hectare can form the basis for future cotton research and development.
9. Large scale validation and performance evaluation of newly identified varieties of long linted *G. arboreum* under different soil and climatic environments of HDPS needs to be undertaken for which funding may be sourced from Council.
10. There is a strong genotype x environment interaction in *G. hirsutum* and *G. arboreum*. The segregating populations (F_2 to F_6) are subjected to different seasonal climatic variation and the characters identified during F_2 stage may not be reproduced in later generations. Seasonal climate data need to be correlated to yield to unravel this. A different planting window or other environmental modification may work better.

The Chairman and members of RAC also released CICR Technical Bulletin on "Whitefly and CLCuD management strategies for cotton in North India". RAC meeting concluded with the vote of thanks proposed by Dr. V.N. Waghmare, Head, Division of Crop Improvement, ICAR-CICR, Nagpur.

Institute Research Committee (IRC) meeting

The first Mid-term Institute Research Committee (IRC 2016) meeting was conducted on 23 June 2016 at CICR, Nagpur. Dr K. R. Kranthi, Director CICR Nagpur Chaired the meeting. Chairman in his introductory remarks, directed the scientists to bring their projects into logical conclusion without



waiting for long period. He asked the researchers to identify the best legume as intercrop in cotton that can fix up nitrogen and thus reduce the chemical fertilizer load into the soil. Dr Kranthi stressed to evaluate large no. of germplasm lines to shortlist amongst them for various traits. He expressed satisfaction over increase in *desi* cotton area in North India where outbreak of whitefly was experienced last year.

The second mid-term IRC 2016 meeting was conducted on 5 October 2016 at CICR, Nagpur. Dr K. R. Kranthi Director CICR Nagpur Chaired the meeting. Chairman in his introductory remarks desired that scientists who are working on basic aspects of research should also have an applied aspect and must make a difference now or later. He mentioned that in electronics tremendous progress has been made and that advancement in electronics can be utilized as special vehicle to translate ideas into products. Areas like remote sensing, laser sensing etc. can also be explored. He further emphasized to look at possibility for robust publication in reputed journals. He also made an appeal to scientists to think for newer ideas, even out of box.

Dr V.S. Nagrare, Secretary IRC and Dr J.H. Meshram, Joint Secretary, IRC coordinated both the meetings.

10.5 : Other Important Workshop/Symposia/Meetings

National Workshop on Indigenous (*Desi*) Cotton in India

A national workshop on "Indigenous (*Desi*) Cotton in India" was jointly organized by Yuva Rural Association (Y.R.A.), ICAR-CICR and SAHAJA

SAMRUDHA at ICAR-Central Institute for Cotton Research, Nagpur from 28 to 30 November, 2016. The purpose of the workshop was to chalk strategies to tap the forgotten potential of indigenous cotton, to revive Khadi in real sense as envisaged by Gandhi and Kumarappa and to provide more sustainable alternatives to the cotton farmers of the country.

The workshop was inaugurated Dr. Sharad Nimbalkar, Former Vice Chancellor of Dr. Punjabrao Deshmukh Krishi Vidyapeeth, Akola. The inaugural programme began with a welcome speech from Shri Datta Patil, Director General, Yuva Rural Association. Shri Daniel Anand Raj, Senior Programme Officer, SWISSAID in his address stressed upon the need to bring together all the stakeholders of indigenous cotton and removing the bottlenecks in cotton value chain. Dr K. R. Kranthi, Director, CICR, Nagpur exhorted the need for a blueprint to promote indigenous cotton. He further stated that water, cost of cultivation and chemical pesticides are the three factors that decide the cultivation of cotton. Shri Rajeev Baruah, India Country Manger, Better Cotton Initiative stated the need for mainstreaming the technology available for indigenous cotton using the good quality varieties developed by public sector institutions. Dr. Nimbalkar suggested to develop varieties with big boll size in indigenous cotton and to suggest a more rational in price fixation of inputs and output of cotton cultivation. The inaugural session was followed by technical sessions.

Some of the major issues discussed were:

- Indigenous cotton seed quality and availability of seeds in order to attain seed sovereignty
- Issues in cropping systems management and sustainability of *desi* cotton
- Processing of indigenous cotton
- Problems in marketing of indigenous cotton and price received by farmers
- Crop improvement of indigenous cotton
- Niche areas of indigenous cotton production.
- Analyzing its bottlenecks in indigenous cotton production and preparing a roadmap to increase availability and ensuring sustainable

cotton value chain

The workshop brought together different stakeholders involved in the indigenous cotton value 'chains to address the challenges related to scaling up of indigenous cotton. Around 70 personals representing researchers, farmers, spinners, weavers, NGOs, and entrepreneurs and private sector players and social entrepreneurs have participated in the workshop.

SAARC Regional Consultation Meeting

A three day SAARC Regional Consultation Meeting was jointly organized by ICAR-Central Institute for Cotton Research, Nagpur and SAARC Agriculture Centre (SAC), Bangladesh at CICR. The meeting was held from 29-31 August 2016. Twelve participants from the SAARC countries namely, Afghanistan, Bangladesh, Bhutan, Pakistan, India and SAC attended the meeting. Dr. K. R. Kranthi, Director, CICR introduced the Chief Guest Dr. C. D. Mayee and welcomed the participants. Director, CICR in his introductory remarks briefed the importance of the meeting in different aspects covering cotton crop, textile industry and foreign exchange earnings. He also stressed the dynamic cotton cultivation patterns across countries which affects the global trade through imports and exports. He explained the need of synchrony between crop management practices and critical stages of cotton crop. He strongly opined that there is tremendous scope to improve the yield levels of the cotton in SAARC region which can be achieved through narrowing the window period of flowering and fruiting and high density planting. Dr. Tayan Raj Gurung, Senior Program Specialist, SAARC Agriculture Centre, Dhaka, Bangladesh explained the initiatives of SAARC Agriculture Centre and about Cotton program. He expressed his gratitude to Director General (ICAR), Director (CICR), Asian Cotton Research and Development Network (ACRDN) for Regional Consultation Meeting and ministries of the respective SAARC countries for nominating the participants. He opined that outcomes of the meeting in terms of policy and technology guidelines will have far reaching consequences.



Dr. C. D. Mayee, Former Chairman, ASRB, New Delhi and Chief Guest of the meeting in his inaugural address called for production and productivity technologies for the SAARC countries and suggested three strategies for lint productivity enhancement in SAARC countries *viz.*, a target cotton yield of 1000 kg per hectare, strong extension network for efficient technology transfer and better resource utilization. He also suggested SAARC countries to take advantage of network of ICAR institutes including CICR and All India Cotton Improvement Programme (AICCIP). The inaugural session was concluded with the vote of thanks proposed by Dr. Blaise Desouza, Head, Division of Crop Production, CICR, Nagpur. Country presentations on status of cotton, challenges and opportunities were made by Mr. Abdulrahimzai, Head of Industrial and Oil crops, Afghanistan; Dr. Farid Uddin, Executive Director, Cotton Development Board, Bangladesh; Mr. Chorten, Extension Officer of Bhutan; Dr. Venugopalan, CICR, India; Mr. Ghimire, Department of Agriculture, Nepal and Dr. Dil Baugh Mohammad, Principal Scientific Officer, Central Cotton Research Institute, Pakistan. Following the country presentations, four lead presentations on various aspects were made by Dr. Waghmare on cotton improvement, cotton production by Dr. Desouza, cotton protection by Dr. S. Kranthi and Ginning and post-harvest by Dr. Shukla of GTC. "Cotton Production in SAARC, Problems analysis & Way forward" was the major theme area for discussions followed by a Brainstorming session which was initiated by Dr. Gurung, SAARC. He stressed on the importance of this meeting to benefit the small cotton growing countries that do not have adequate resources to

conduct research. The session was facilitated by Dr. Desouza, Head, Crop Production and Fatema Nasrin of SAC, Dhaka during which the major challenges were prioritized. The common problems were considered as tackling the problem of bollworms, drought and salinity tolerance and the production constraints of high input use and cost of cultivation. An Action Plan was prepared by mutual consultation for the various issues. The major solution to enhancing production at a low cost of cultivation was taking up cultivation of early maturing varieties with high density planting systems. Also one of the suggestions made by Dr. Mayee, Former Chairman, ASRB was initiating a common SAARC cotton adaptive research trials. Dr. Gurung emphasized that the most suitable variety could then be released through SAARC and identified as of regional importance. India and Pakistan jointly agreed to share their production technologies with the cotton growing countries of SAARC. Furthermore, they also expressed to conduct in-country trainings. The participants also visited Ginning Training Centre, Nagpur, Bhagirath Mills and MGIRI, Wardha which was co-ordinated by Dr. Lokanathan, CICR. The programme concluded with the Valedictory session Chaired by Dr. P.B. Kale, Director, MGIRI, Wardha. Certificates were distributed to the participants by the Chief Guest, Dr. Kale. The programme was co-ordinated by Dr. Desouza, Head, Crop Production, CICR, Nagpur.

24th Meeting of ICAR Regional Committee No.VII

The 24th meeting of ICAR Regional Committee No.VII was held during September, 8-9 2016 at International Centre Goa, Goa under the Chairmanship of Dr. Trilochan Mohapatra, Secretary, DARE & Director General, ICAR, New Delhi.

Hon'ble Minister for Agriculture, Sports & Youth Affairs, Tribal Welfare and Animal Husbandry & Veterinary Services, Govt. of Goa, Shri Ramesh Tawadkar, inaugurated the 24th meeting of ICAR Regional Committee No.VII at International Centre Goa on 8th September 2016 in the presence of Shri Pandurang Pundalik Fundkar, Hon'ble Minister for Agriculture and Horticulture,



Government of Maharashtra and Shri Mahadev Jankar, Hon'ble Minister for Animal Husbandry & Dairy Development and Fisheries Development, Govt. of Maharashtra. The Inaugural session was Chaired by Dr. Trilochan Mohapatra, Secretary, DARE, GOI & Director-General, ICAR New Delhi. Dr. N.P. Singh, Director ICAR-CCARI, Goa welcomed the dignitaries on the dais and participants.

In his opening remarks, Dr. K. Alagusundaram, Dy Director General (Agrl. Engg.) & Nodal Officer, ICAR Regional Committee VII briefed about the importance of the meeting and provided glimpse of landscape of the region No. VII and challenges faced by farmers.

Shri Chhabilendra Roul, Additional Secretary (DARE) & Secretary ICAR in his special address stressed the need to increase the productivity in agriculture and also to sustain the productivity. He called for increasing income of the farmers by reducing cost of production and increasing productivity to make agriculture profitable.

Chairman of the Regional Committee Dr. T. Mohapatra, Secretary, DARE, GOI and DG, ICAR, New Delhi in his address, briefed about the genesis of the regional committees. He explained that the regional committee meeting is an occasion where senior officials from central government and state government meet and arrive at solutions to the problems in agriculture and allied sectors. He also added that such meetings help scientists to reorient their research programmes to address immediate and futuristic problems expressed in the meeting.

He also briefed about the various schemes and programmes initiated by the central government during the last two years. He stressed on the target to double the income of the farmer in next five years. He added that even in consecutive two years of drought, India could feed its population and there was an export of surplus food grains. He lauded the states of the region for their achievements in agriculture and allied sector. He appreciated the leadership role of Maharashtra in sugarcane, cotton, grapes, onion and garlic, Chhattisgarh in rice production and Goa in fish production and horticulture and Madhya Pradesh in pulse production. This year being an *International Year of Pulses*, he urged that we should bring the imports to zero by increasing yield and production of pulses in the region. Extrapolation of the achievements of one state to other state of the region with similar agro climatic features is very much needed. He also suggested for diversification in agriculture, by integrating with animal husbandry, fisheries, horticulture to increase the farm income. Farmers in agriculture should get into gainful employment so that agriculture becomes a profitable venture. He also insisted for quality agriculture education and urged that agriculture universities to get accreditation and improve the standard of education.

Shri Pandurang Pundalik Fundkar, Hon'ble Minister for Agriculture and Horticulture, Government of Maharashtra complimented the DG, ICAR for conducting the regional committee in this region. He briefed about the climate, agro ecological and diversities of cropping pattern of Maharashtra and suggested for a discussion on effect of climate change on crop yield. He informed that, the Jalyukta Shivar Yojana has yielded good results and it is getting overwhelming response from farmers of Maharashtra. He also praised the central government schemes in agriculture and explained the strides made in the field of agriculture and horticulture sector by Maharashtra.

Shri Mahadev Jankar, Hon'ble Minister for Animal Husbandry & Dairy Development and Fisheries Development, Govt. of Maharashtra highlighted various schemes being promoted by Government

of Maharashtra for development of animal husbandry and fisheries.

In his presidential address, Shri Ramesh Tawadkar, Hon'ble Minister for Agriculture, Sports & Youth Affairs, Tribal Welfare and Animal Husbandry & Veterinary Services, Govt. of Goa stressed the need to double crop yields and increase the farm income. He suggested for the adoption of high-tech and protected agriculture by providing subsidy to the extent of 100%. Further he emphasized the various programs initiated by state government of Goa to attract youth to agriculture and animal husbandry. He also advised deliberations on technology transfer to farmers, agriculture education, dairy development and horticulture production of state Goa and the region in the technical sessions. He expressed his happiness for organizing this meeting in Goa as it

would facilitate agricultural officers in the state to discuss pressing issues faced by the state.

The programme was compered by Dr. M. V. Venugopalan, Principal Scientist, ICAR-CICR, Nagpur. Dr. K.R. Kranthi, Director, ICAR-Central Institute for Cotton Research, Nagpur and Member Secretary of the CAIR Regional Committee - VII proposed the vote of thanks.

The inaugural session was followed by technical session under the gracious presence of Shri Pandurang Pundalik Fundkar, Hon'ble Minister for Agriculture and Horticulture, Government of Maharashtra and Shri Mahadev Jankar, Hon'ble Minister for Animal Husbandry & Dairy Development and Fisheries Development, Govt. of Maharashtra and chaired by Dr. Trilochan Mohapatra, Secretary, DARE & DG, ICAR



10.6: Participation of Scientists in Seminars/Symposia/Workshops/Meetings

| Sr. No. | Seminars/Conferences/Symposia / Workshops/ Meetings | Place and Date | Participants |
|---------|---|---------------------------------------|---|
| 1. | AICRP Annual meeting | Surat 7-9 April 2016 | K. R. Kranthi, S. Kranthi, D. Blaise, G. Balaubramani, M.V. Venugopalan, V.S. Nagrare, D. Monga, O.P. Tuteja, R.A. Meena, Rishi Kumar, S. K. Verma, A.H. Prakash, N. Gopalakrishnan, K. Rathinavel, S. Manickam, B. Dharajothi, K.P.M. Damayanthi, K. Sankaranarayanan, J. Gulsar Banu, S. Usha Rani, M. Sabesh, A. Manivannan, M. S. Yadav |
| 2. | Launch of ICAR Biosafety Portal and Third Training Workshop for Institute Biosafety Officers (IBOs) | New Delhi, 13 April 2016 | V. S. Nagrare |
| 3. | Annual Group Meeting of AICRP - National Seed Project (crops) | Thrissur 19-21 April, 2016 | K. Rathinavel |
| 4. | World Cotton Research Conference-6 | Goiânia, Brazil 2-6 May 2016 | K.R. Kranthi, S. M. Palve, J.H. Meshram, P. Nalayini, S. Usha Rani |
| 5. | State level steering committee meeting of CROPSAP | Pune 14-15 June 2016 | V.S. Nagrare |
| 6. | 11 th Meeting of Expert Committee-National Innovations In Climate Resilient Agriculture | New Delhi 14-16 June 2016 | M. V. Venugopalan |
| 7. | Fourth training workshop on 'Confined Field Trial' | New Delhi, 5 July 2016 | V. S. Nagrare |
| 8. | Conference on Innovations in Agricultural Mechanization- Development of Linkage among R&D Institutes-Industry-Farmers | New Delhi, 7-8 July, 2016 | G. Majumdar |
| 9. | XI Annual Review Meeting of ICAR Seed Project | Pantnagar. 17-18 August, 2016 | P. R. Vijayakumari |
| 10. | Regional Consultation Meeting on "SAARC Regional Coordinated Cotton Technology Exchange Program | ICAR-CICR, Nagpur 29 August, 2016 | K.R. Kranthi, S. Kranthi, D. Blaise, V. N. Waghmare, M.V. Venugopalan, S.B. Nandeshwar |
| 11. | International training workshop on Comparative Studies in Regenerative Food Systems in India | Dharamitra, Wardha 31 August, 2016 | M.V. Venugopalan |
| 12. | Regional Committee Members Meeting of BCI, India | New Delhi 2 September, 2016 | M.V. Venugopalan |



| Sr. No. | Seminars/Conferences/Symposia / Workshops/ Meetings | Place and Date | Participants |
|---------|---|---|--|
| 13. | 24 th Meeting of ICAR Regional Committee No. VII | Goa, 8-9 September 2016 | K.R. Kranthi, V.N. Waghmare, M.V. Venugopalan, G. Balasubramani, K. P. Raghavendra |
| 14. | National Symposium on Agrarian Crisis in Vidarbha - Challenges and Options | Nagpur. 18 September, 2016 | V.N. Waghmare, S.S. Mahajan, S.M. Wasnik, V.S. Nagrare, D.T. Nagrale |
| 15. | 4 th Annual South Asia Biosafety Conference | Hyderabad, 19-21 September, 2016 | V.S. Nagrare |
| 16. | Fifth Training Workshop for IBOs | Hyderabad 22 September, 2016 | V.S. Nagrare |
| 17. | Seminar on Development in Soil Science: Climate change and its influence on NRM | Dapoli 22-23 September, 2016 | M.V. Venugopalan |
| 18. | POCRA Workshop | Pune 3-4 Oct. 2016 | D. Blaise, R.B. Singandhupe |
| 19. | Global Cotton & Textiles Teams Meeting | New Delhi 19 October, 2016 | M. V. Venugopalan |
| 20. | International Agro - Biodiversity Conference 2016 | New Delhi 6-7 November, 2016 | V.N. Waghmare, Punit Mohan, J. H. Meshram, R.A. Meena, D. Monga S. Manickam |
| 21. | International Conference - Integrated Land Use Planning for Smart Agriculture. -An Agenda for Sustainable Land Management | NBSS&LUP, Nagpur 10 -13 November, 2016 | M. V. Venugopalan |
| 22. | 'Agro - Vision' - National Agricultural Exhibition for farmers of Central India | Nagpur, 12-13 November, 2016 | D. V. Patil |
| 23. | 4 th International Agronomy Congress- Agronomy for Sustainable Management of Natural Resources, Environment, Energy and Livelihood Security to Achieve Zero Hunger Challenge | New Delhi, 22-26 November, 2016 | D. Blaise, K. Sankaranarayanan, G. I. Ramkrushna |
| 24. | Development of Roadmap for Organic Farming Sector in Madhya Pradesh | Bhopal, 25 November, 2016 | D. Blaise |

| Sr. No. | Seminars/Conferences/Symposia / Workshops/ Meetings | Place and Date | Participants |
|---------|--|---|--|
| 25. | National workshop on indigenous cotton | Nagpur, 28 November 2016 | K. R. Kranthi, V.N. Waghmare, S. Kranthi, D. Blaise, M.V. Venugopalan, V.S. Nagrare, D. T. Nagrale |
| 26. | Innovative and current advances in agriculture and allied sciences (ICAAAS-2016) | Hyderabad 10-11 December, 2016 | H. B. Santosh, Savitha Santosh |
| 27. | National Symposium on 'Climate smart agriculture for nematode management' | Goa, 11-13 January, 2017 | Nandini Gokte Narkhedkar |
| 28. | Meeting of the Hindi Parliamentary Committee | Coimbatore, 12 January, 2017 | V .N. Waghmare |
| 29. | Revival of Desi cotton | Nanded, 16 January, 2017 | D. Blaise |
| 30. | Workshop on KRISHI(Knowledge based Resources Information System Hubs for Innovations in Agriculture) | New Delhi 24-25 January, 2017 | Rishi Kumar |
| 31. | XIV National Seed Seminar Food Security through augmented seed supply under climate uncertainties | IARI, New Delhi 28-30 January, 2017 | V. Santhy |
| 32. | Meeting to discuss Draft Note on "Best Global Practices for a Sustainable Cotton Roadmap in India" | Mumbai 02 February, 2017 | K.R. Kranthi, D. Blaise M.V. Venugopalan |
| 33. | Meeting on finalization of report on Best Practices for sustainable cotton roadmap in India-Min of Textiles, GOI | Mumbai, 09 February, 2017 | K.R. Kranthi, D. Blaise, M.V. Venugopalan |
| 34. | Brainstorming Session as a part of Platinum Jubilee Celebrations of ISG&PB | New Delhi 11 February, 2017 | V.N. Waghmare |
| 35. | International conference on Emerging areas of Environmental Science and Engineering" | Hisar 16-18 February, 2017 | S. K. Verma |
| 36. | Regional Workshop on "Skill Development in Agriculture-Kaushal Vikas se Krishi Vikas" | Hyderabad 20 February, 2017 | S.M. Wasnik |
| 37. | Inter Drought-V | Hyderabad, 21- 25Feb, 2017 | J.H. Meshram |

| Sr. No. | Seminars/Conferences/Symposia / Workshops/ Meetings | Place and Date | Participants |
|---------|---|---------------------------------|--|
| 38. | XIII Indian Agricultural Science Congress | Bengaluru, 21-24 February, 2017 | T.R. Loknathan, S.M. Palve, H.B. Santosh |
| 39. | BCI - Maharashtra and MP stakeholder | Amravati, 23 February, 2017 | M.V. Venugopalan |
| 40. | Meeting to discuss guidelines for approval of Bt cotton varieties containing deregulated events | New Delhi 20 March, 2017 | M.V. Venugopalan |
| 41. | Meeting to discuss Phase II of TMC | New Delhi, 22 March, 2017 | D. Blaise |

10.7: Distinguished Visitors

| Name & Designation | Organisation | Date |
|--|--|--------------------------|
| Nagpur | | |
| Shri Nitin Gadkari, Union Minister for Road Transport, Highways & Shipping | Ministry for Road Transport, Highways & Shipping, GOI, New Delhi | 16.04.2016 |
| Shri Krupal Balaji Tumane, Member of Parliament | Ramtek constituency | 16.04.2016 |
| Dr. Trilochan Mohapatra, Secretary DARE & Director General (ICAR) | ICAR, New Delhi | 27.10.2016 09.03.2017 |
| Coimbatore | | |
| Dr. R.K. Singh, ADG (CC) | ICAR, New Delhi | 07.09.2016 |
| Dr. J. S. Chauhan, ADG (Seeds) | ICAR, New Delhi | 20.10.2016 |
| Dr. Trilochan Mohapatra, Secretary, DARE & Director General (ICAR) | ICAR, New Delhi | 10.11.2016 |
| Sirsa | | |
| Dr. R. K. Singh, ADG (CC) | ICAR, New Delhi | 17.08.2016 |
| Dr J. S. Sandhu , DDG(CS) | ICAR, New Delhi | 23.10.2016 |



10.8 : Personnel

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MS Ladaniya, Director (Additional Charge) (from 16.03.2017)

Project Coordinator (Cotton)

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Sirsa

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Nagpur

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Coimbatore

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Plant Physiology

Nagpur

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Coimbatore

S E S A Khader, Principal Scientist (Retired on 31.05.2016)

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Biochemistry (PS)

Nagpur

Ms Pooja Verma, Scientist, poojaverma1906@gmail.com

Coimbatore

N Gopalakrishnan, Principal Scientist, gopal55@rediffmail.com

Microbiology (PS)

Nagpur

K Velmourougane, Scientist, velicar@gmail.com (on study leave)

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Live Stock Management

S N Rokde, Principal Scientist, sunilrokde_2007@rediffmail.com (LMP) (Relieved on 31.03.2017)

Agriculture Extension

Nagpur

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Coimbatore

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C Karpagam, Senior Scientist, karpiscar@gmail.com

Agricultural Economics

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Coimbatore

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KVK

Nagpur

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Administration

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10.9 : Other Information

Library

In the period from 2016-17, the Library purchased 122 new books and 46 Hindi books. The Library subscribed to 11 Foreign Journals and 17 Indian Journals.

Documentation Services

- Library has developed computerized bibliographic database on Cotton to provide comprehensive and updated information on cotton. About 4775 bibliographic references along with abstracts have been stored in it. Based on this bibliographic database the Library publishes a current awareness bulletin namely "COTTON RESEARCH ABSTRACTS". The Bulletin is circulated to all the scientists of the Institute and to all AICCIIP Centers in India. In the reported period, four issues of COTTON RESEARCH ABSTRACTS (V30, (No. 1-4), January - December 2016) were published and circulated.
- The Library is actively participating in the E-Journal Consortium by responding regularly through E-mails and thus also receiving updates. More than 2000 on-line journals on agriculture and crop science are made available over the network through this consortium.
- Four User Terminals installed in the Library have facilitated the library users to access the databases uploaded in the Library Server. Users can also access the Internet on these terminals. Similarly the entire catalog of the library has been downloaded on these terminals for ease of use.
- The WebOPAC version of the Library software SLIM21 was updated and by using this Library Application Software, the entire catalogue of holdings of the Library (books and bound volumes) is available on all terminals within the Institute. By its virtue, the entire holdings and the catalogue of the Library are visible on the LAN terminals within the Institute by clicking on the following link. Library Catalogue Web-OPACLink <http://10.0.0.52/w20/>

Progressive Use of Hindi

हिन्दी प्रशिक्षण योजना : मई-2016 के प्रबोध, प्रवीण, प्राज्ञ तथा पारंगत परीक्षा के लिए संस्थान में ही हिन्दी प्रशिक्षण योजना के अंतर्गत पाठ्यक्रम की कार्यशाला आयोजित की गई। इसके अंतर्गत प्रवीण में 1, प्रबोध में 1, प्राज्ञ में 6 तथा पारंगत में 34 कर्मचारियों ने सफलता प्राप्त की।

नगर राजभाषा कार्यान्वयन समिति की ओर से प्राप्त पुरस्कार : केन्द्रीय कपास अनुसंधान संस्थान को नगर राजभाषा कार्यान्वयन समिति, नागपुर कार्यालय-2 के अंतर्गत 22 जून, 2016 को उत्कृष्ट कार्यालय कार्यान्वयन प्रथम पुरस्कार तथा संस्थान द्वारा प्रकाशित गृह पत्रिका 'श्वेत स्वर्णिमा' को विशेष प्रोत्साहन पुरस्कार दिया गया।

हिन्दी पखवाड़ा : साल 2016-17 में 14 सितंबर, 2016 में संस्थान में हिन्दी दिवस तथा हिन्दी पखवाड़ा का आयोजन किया गया। 14 सितंबर से 1 अक्टूबर के अंतर्गत विभिन्न प्रतियोगिताएं आयोजित की गईं। 1 अक्टूबर, 2016 को पखवाड़े का समापन समारोह किया गया। इस समारोह में आर.के.दास, सचिव, नगर राजभाषा कार्यान्वयन समिति-2, मुख्य अतिथि रूप में तथा डा. केशव राज क्रांति, प्रमुख अतिथि के रूप में उपस्थित थे। विजेताओं को अतिथियों द्वारा संस्थान की ओर से निर्धारित धनराशी एवं स्मृतिचिन्ह प्रदान किए गए।

राजभाषा कार्यान्वयन समिति की बैठकों का आयोजन : राजभाषा के प्रगामी प्रयोग तथा प्रसार के लिए इस बैठक का आयोजन हर तिमाही के समापन के पूर्व किया जाता है। इस के अंतर्गत कार्यवृत्त सूचना अनुपालन तथा आवश्यक कार्रवाई हेतु विभाग प्रमुख तथा सभी विभागों को दिया जाता है।

ई-साप्ताहिक परामर्शी किसानों के लिए : इस ई-साप्ताहिक परामर्शी में हर सप्ताह किसान भाइयों को सलाह तथा मार्गदर्शन किया जाता है। यह परामर्शी ऑन लाईन प्रणाली द्वारा प्रकाशित की जाती है।

ICAR - CICR - KVK, Nagpur Organizes Pradhan Mantri 'Fasal Bima Yojana': Farmers Awareness Programme

ICAR- Central Institute for Cotton Research (CICR), Krishi Vigyan Kendra, Nagpur launched 'Pradhan Mantri Fasal Bima Yojana' (PMFBY) farmers awareness programme during a farmers' meet organized on 16.04.2016 at CICR, Nagpur. Hon'ble Union Minister for Road Transport, Highways & Shipping Shri Nitin Gadkari ji inaugurated the programme while Sh. Krupal

Balaji Tumane, Member of Parliament, Ramtek constituency was the guests of honour. Shri Nitin Gadkari ji also inaugurated an AgriExhibition on technologies and varieties developed by various agricultural institutions and ICAR-CICR, Nagpur. ICAR Institutes, i.e. ICAR-CCRI, ICAR-NBSS & LUP, GTC (ICAR-CIRCOT), Animal and Fisheries Science University (MAFSU) & Agriculture Department participated in the Agri-exhibition.



Chief Guest Shri Nitin Gadkari ji informed the audience about the various schemes of Govt of India for the benefits of the farmers and added that there is a budgetary provision of Rs. 9 lakh crore for crop loans. He specially mentioned the benefits of soil health analysis in crop productivity. He also advocated the need of making check dams at village level which will give quantum jump to crop

productivity. Sh. Krupalji Tumane spoke about benefits of new crop insurance scheme and asked the farmers to take advantage of this new crop insurance scheme. Earlier, Dr. K.R. Kranthi, Director, ICARCICR in his welcome address apprised about various technologies developed by CICR. Inaugural session was followed by technical session in which farmers - scientist's interaction was held. Sh. Ramesh Rajurkar, Branch Manager,



Universal Sampko General Insurance Com. Ltd. explained in detail about PMFBY. Dr. Y.S. Jumde, TAO, Dept. of Agriculture, Nagpur gave information about different agriculture related schemes being operated in Nagpur division. More than 500 farmers participated in day long programme.

Swachh Bharat Abhiyan

Nagpur

ICAR-CICR Nagpur joins hands for 'SWACHH BHARAT ABHIYAN'. The employees took pledge on 'Swachhta Shapath' on 2nd October 2016 on the



auspicious day 'Mahatma Gandhi's Jayanti'. Thereafter voluntary cleaning was done by all employees outside of office building. The Director urged to every employee to make this Abhiyan a great success.



Coimbatore

As per the directives of Hon'ble Union Minister for Agriculture & Farmer's Welfare Special 'Swachhta Pakwara' was celebrated during May 16-31, 2016 at Central Institute for Cotton Research, Regional Station, Coimbatore. As a part of this celebration and to create awareness among the staff members the implementation committee under the chairmanship of Dr. K. Rathinavel, Principal Scientist, an easy writing competition in vernacular language was organized on 23/05/2016 on the title "Clean India 2025-contribution of Individual citizens". Three scientists and eight technical staff participated. Under the chairmanship of Dr. N. Gopalakrishnan, I/C Project Coordinator Elocution competition was conducted on 24/05/2016. Six staff members enthusiastically spoke on "Environmental pollution-causes and remedies". Dr. S. Manickam and Dr. K. Rathinavel Principal Scientists acted as jury

Sirsa

Under "Swachh Bharat Mission" was initiated on 2 October 2016, Mahatma Gandhi's 147th birth anniversary. On this occasion the "Cleanliness Oath" (Swachhta Shapath) was administered by Dr. Dilip Monga, Head CICR Regional Station to all the staff members. The activities were discussed and planned for the "Swachhta Abhiyan" including cleaning within and around the CICR campus, farmers awareness towards clean and green agriculture in MGMG, promotion of clean and green technologies, weed management for

cotton pest management, promoting compost making, whitewashing of the gate and boundary walls, plantation of new tree etc.

The "Swachhta Pakhawara" beginning on 16 to 31 October 2016 was celebrated by CICR Regional Station, Sirsa. All officials and staff member came forward and joined this mass movement of Swachhta Pakhawara activities at CICR-RS campus, surrounding areas and in MGMG villages under the leadership of Dr. D. Monga, Head.

"Maha Agro 2016" Exhibition

ICAR-CICR coordinated ICAR stall during 4-day long State-level Agriculture Exhibition "Maha Agro 2016" held from 24-27 December, 2016 at Ayodhya Nagari Ground, Station Road, Aurangabad, Maharashtra. The event was organized by Marathwada Sheti Sahayya Mandal (MSSM) in Association with Maharashtra Chamber of Commerce, Industry and Agriculture (MACCIA), Agriculture Department of Central and State Governments. CICR Nagpur displayed the cotton technologies like color cotton, Bt express kit, e-Kapas, management of cotton reddening and the farm implements developed by the institute. More than 20,000 farmers and other stake holders visited the ICAR - CICR stalls from Marathwada region and other parts. During the event, more than 1,000 farmers registered for CICR 'e-Kapas' dissemination. Hon'ble Minister Shri Radha Mohan Singhji, Union Minister for Agriculture and Farmers Welfare, GoI attended the exhibition on the concluding ceremony on 27 December along with other leaders. Dr S. M. Wasnik, Principal Scientist; Extension, CICR, Nagpur coordinated the activities. Other team members included Dr Vivek Shah, Sh. Bhuneshwar Fande & Sh Ratnadeep Ramteke.

International Yoga Day

Nagpur

ICAR-Central Institute for Cotton Research (CICR), Nagpur celebrated 'International Yoga Day' on 21 June, 2016 at Community Hall, ICAR residential complex (Krishi Kunj), Bajaj Nagar, Nagpur. Dr. K. R. Kranthi, Director, ICAR-CICR chaired the session. Dr. S. Kranthi, Head of





Department (Crop Protection) welcomed yoga experts, all the staff of CICR and family members of the staff. Dr. K.R. Kranthi mentioned the importance of yoga and asked all staff to continue to practice every day. Dr. Vithalrao Jibhakate, Yogacharya and Mrs. Meenatai Deshmukh demonstrated and conducted various yoga asanas. Mr. Sachin Agnihotri, Senior Administrative Officer proposed vote of thanks. Mr. M. V. Dhande and Mr. Rajnikant Chaturvedi coordinated the programme.

Sirsa

International yoga day celebrations were also organised at the regional station, Sirsa on 21 June 2016. Shri Suresh Tayal, Yoga expert carried out a yoga session of two hours and demonstrated Pranayam, Yog Asanas and Accupressure techniques to the participants. All the staff members including TSL and contractual staff participated in the event. On this occasion he also talked about the importance of yoga in uniting the body, mind and soul and also elaborated on the cure of various diseases.



Visit of Secretary, DARE & Director General, ICAR

Dr Trilochan Mohapatra, Secretary, DARE & Director General, ICAR visited ICAR-CICR, Nagpur on 27th October 2016 and inaugurated Farmers Training Hostel of KVK, CICR, Nagpur. Director CICR felicitated Hon'ble Director General on the occasion.



On the occasion CICR research activities were showcased and explained to Hon DG. He was taken to polyhouses, wild germplasm conservatory, experimental fields, and laboratories. He discussed various research activities with individual scientists. Addressing to all the staff members Hon DG urged for proper maintenance of the campus, generation of 20% revenue, implementation of Govt. schemes like MGMG in right spirit, development of mobile app in local languages. He urged everybody to cultivate and promote science. He emphasized capitalizing strength and helping farmers to minimize the sorrow. He advocated the feeling of working for the country. Earlier,



Dr T Mohapatra Secretary, DARE and DG, ICAR visit to ICAR-CICR, Nagpur:

Dr Trilochan Mohapatra, Secretary, DARE and Director General, ICAR visited ICAR- Central Institute for Cotton Research, Nagpur on 9th March 2017. All the scientists of the ICAR institutes (CICR, CCRI, NBSS & LUP and GTC of CIRCOT) located in Nagpur attended the interactive meeting with Director General. Prior to the meeting the Cotton harvester with pre cleaner developed recently was demonstrated. The DG complimented the Director Dr K R Kranthi and the engineer Er. Majumdar for developing the cotton picker.



During his interaction with the scientists he appreciated the research achievements of the ICAR institutes. He however urged all Directors of Nagpur based ICAR institutes to have focused research program to bring novel technologies to solve the problems faced by the farmers of Vidarbha. He opined that good work and research publications need to be concentrated to assess the output of any research based institution.



Further, he congratulated Dr Kranthi for his

outstanding contributions notably the Bt cotton testing kits, insecticide resistance management techniques and HDPS technology. He honored Dr Kranthi for his selection as Head, Technical Information Section, ICAC, and Washington DC, USA.



Farewell to Dr. K. R. Kranthi, Director ICAR-CICR, Nagpur:

Dr. K.R. Kranthi, Director, ICAR-CICR, was given warm farewell by all the staff members of ICAR-CICR, former directors of CICR, Dr A.K. Basu, Dr. M.S. Kairon, Dr. N.D. Mannikar, Dr. K.D. Koranne, Dr. P. Singh, Dr Sheo Raj and various cotton stackholders on 15th March 2017. Initially Dr. Kranthi presented his life time research achievements and his contribution to cotton science. He joined ICAR-CICR, Nagpur in 1991 and served the institute in different capabilities including as Head, Division of Crop Protection and entries Director from May 2008 to March 2017. He has been honored with many awards for his hard work and dedication. He created research facilities and inspired many young scientists with his vision and incredible job on research. Dr. Kranthi was congratulated by all the former directors on his selection as Head, Technical Information Section, ICAC, and Washington DC, USA and they blessed him to achieve more heights and revolutionize cotton world.





10.10: Weather

Nagpur

| Month | Temperature (°C) | | Relative Humidity (%) | | Rain fall (mm) | No. of Rainy Days |
|-----------------|------------------|-------|-----------------------|-------|----------------|-------------------|
| | Max | Min | Max | Min | | |
| June, 2016 | 37.96 | 27.58 | 67.78 | 49.90 | 126 | 7 |
| July, 2016 | 30.39 | 24.34 | 86.89 | 78.63 | 424 | 23 |
| August, 2016 | 31.03 | 24.41 | 85.86 | 71.38 | 92 | 7 |
| September, 2016 | 31.95 | 24.14 | 84.51 | 63.17 | 92 | 10 |
| October, 2016 | 32.22 | 22.57 | 81.29 | 48.77 | 47 | 4 |
| November, 2016 | 30.60 | 12.01 | 78.14 | 35.62 | 0 | 0 |
| December, 2016 | 29.07 | 9.76 | 63.40 | 31.82 | 0 | 0 |
| January, 2017 | 29.09 | 10.32 | 79.35 | 39.94 | 0 | 0 |
| February, 2017 | 33.21 | 13.91 | 60.81 | 32.67 | 0 | 0 |
| Total | | | | | 781 | 51 |

Coimbatore

| Month | Temperature (°C) | | Relative Humidity (%) | Rain fall (mm) |
|--------------|------------------|------|-----------------------|----------------|
| | Max | Min | | |
| July, 2016 | 31.1 | 23.7 | 67.0 | 21.5 |
| Aug. 2016 | 32.3 | 23.0 | 66.9 | 5.0 |
| Sept. 2016 | 32.4 | 22.9 | 68.0 | 4.5 |
| Oct. 2016 | 32.5 | 22.2 | 69.5 | 22.0 |
| Nov. 2016 | 31.4 | 22.1 | 67.0 | 71.5 |
| Dec. 2016 | 30.0 | 21.2 | 67.8 | 28.0 |
| Jan. 2017 | 31.3 | 20.1 | 55.7 | 7.0 |
| Feb. 2017 | 32.5 | 19.8 | 51.6 | 20.5 |
| Total | | | | 180 |

Sirsa

| Month | Temperature (°C) | | Rain Fall (mm) | Rainy days |
|-----------------------|------------------|---------|----------------|------------|
| | Maximum | Minimum | | |
| April 2016 | 38.8 | 20.7 | 0.0 | 0 |
| May 2016 | 41.7 | 25.8 | 0.0 | 0 |
| June 2016 | 40.9 | 28.5 | 13.6 | 2 |
| July 2016 | 36.7 | 27.5 | 133.4 | 4 |
| August 2016 | 34.9 | 27.5 | 85.2 | 1 |
| September 2016 | 36.5 | 24.0 | 0.0 | 0 |
| October 2016 | 35.8 | 12.0 | 0.0 | 0 |
| November 2016 | 32.8 | 7.2 | 0.0 | 0 |
| Total Rainfall | | | 232.2 | 7 |

10.11 : Cotton Scenario

State-Wise Cotton Area, Production and Productivity

| Zone/State | 2015-2016 | | |
|---------------------|-------------------|----------------------------|-------------------------|
| | Area (Lakh ha) | Production (Lakh bales) | Productivity (kg/ha) |
| Punjab | 3.39 | 7.50 | 376 |
| Haryana | 6.03 | 15.00 | 423 |
| Rajasthan | 4.48 | 15.00 | 569 |
| North Zone | 13.90 | 37.50 | 459 |
| Gujarat | 27.19 | 94.00 | 588 |
| Maharashtra | 38.27 | 75.00 | 333 |
| Madhya Pradesh | 5.47 | 18.00 | 559 |
| Central Zone | 70.93 | 187.00 | 448 |
| Telangana | 17.78 | 59.50 | 569 |
| Andhra Pradesh | 6.66 | 24.00 | 613 |
| Karnataka | 6.33 | 20.00 | 537 |
| Tamil Nadu | 1.42 | 5.00 | 599 |
| South Zone | 32.19 | 108.50 | 573 |
| Others | 1.75 | 5.00 | 486 |
| Grand Total | 118.77 | 338.00 | 484 |

1 bale= 170 kg.

Source : Cotton Advisory Board, Ministry of Textile, Govt. of India by CAB in its meeting held on 24.10.2016

