ICAR-CIRCOT

ISO 9001:2015

ANNUAL REPORT 2017-18

Towards doubling farmer's income through sustainable cotton processing technologies & value addition to by-produce

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ICAR

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CIRCOT

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ICAR-CIRCOT

ANNUAL REPORT 2017-18

ICAR-CENTRAL INSTITUTE FOR RESEARCH ON COTTON TECHNOLOGY

Adenwala Road, Matunga, Mumbai - 400 019

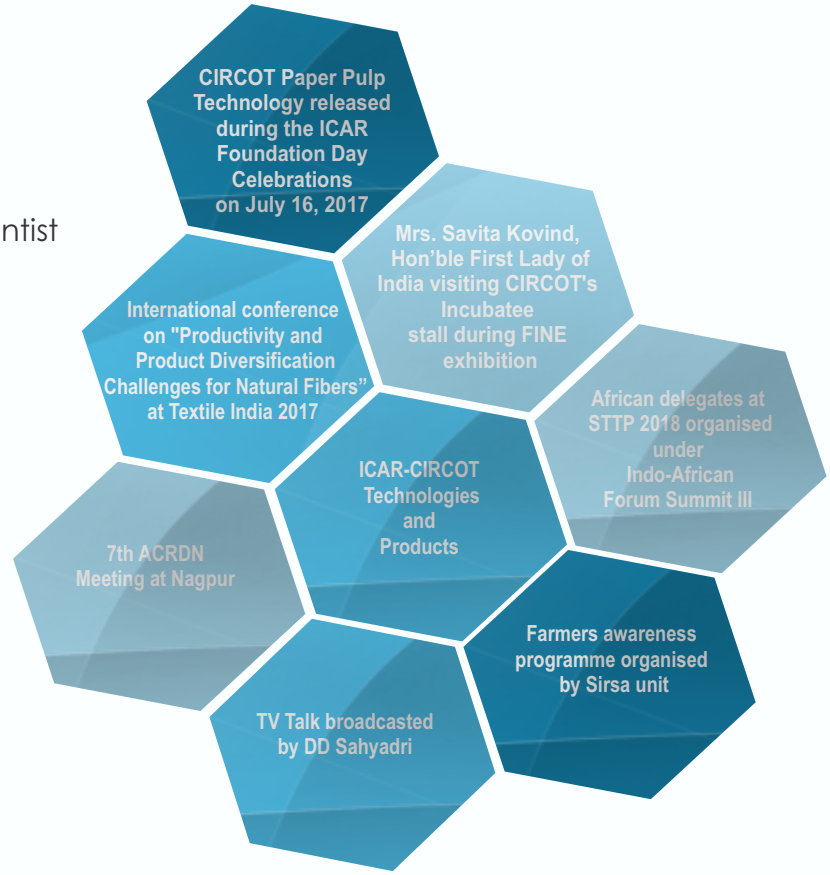
(An ISO 9001:2015 Certified Institute and NABL Accredited Lab)

www.circot.res.in

ICAR-CIRCOT Annual Report 2017-18

Published by

Dr. P. G. Patil, Director



Cover Collage of Institute Activities

Cover page Design Mrs. Laxmi Singh

Printed at A M Printers, Mumbai

Citation: ICAR-CIRCOT Annual Report 2017-18. ICAR-Central Institute for Research on Cotton Technology, Mumbai

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ABBREVIATIONS

ABI Agri-Business Incubation
AFISAdvanced Fibre Information System
AFM Atomic Force Microscopy
AICRP All India Coordinated Research Project
AKMU Agricultural Knowledge Management Unit
ASRB Agricultural Scientists Recruitment Board
ASTM American Society for Testing and Materials International
BIS Bureau of Indian Standards
DBSKKV Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth
CBPDChemical & Biochemical Processing Division
CIRCOT Central Institute for Research on Cotton Technology
CTRL Cotton Technological Research Laboratory
DR Gin Double Roller Gin
FTIR Fourier Transform Infrared Spectroscopy
GTC Ginning Training Centre
HDPS High Density Planting System
HVI High Volume Instrument
ICAR Indian Council of Agricultural Research
ICCC Indian Central Cotton Committee
ICT Institute of Chemical Technology
IFS Indian Fibre Society
IJSC Institute Joint Staff Council
IMC Institute Management Committee
IP Indian Pharmacopoeia
IRC Institute Research Council
ISAE Indian Society of Agricultural Engineers
ISCI Indian Society for Cotton Improvement
ISO International Organization for Standardization
ITMF International Textile Manufacturers Federation
ITMU Institute Technology Management Unit
MFC Micro Fibrillated Cellulose
MGMG Mera Gaon Mera Gaurav
MoU Memorandum of Understanding
MPD Mechanical Processing Division
NABL National Accreditation Board for Testing and Calibration of Laboratories
NAIF National Agriculture Innovation Fund
PMC Project Monitoring and Evaluation Committee
QEID Quality Evaluation and Improvement Division
QRT Quinquennial Review Team
RAC Research Advisory Committee
R&D Research and Development
RPMRevolutions per minute
SEM Scanning Electron Microscopy
SBEE Society of Benin Electrical Engineering
SNDT Shreemati Nathibai Damodar Thackersey (Women's University)
TAP Technical Assistance Programme
TTD Technology Transfer Division
USDA United States Department of Agriculture
VJTI Veermata Jijabai Technological Institute

PREFACE

India has gained the position of the leading producer of cotton in the world. During the 2017-18 season, there was a substantial increase in the area under cotton cultivation, accounting for about 12.3 million hectares of the land but with less than proportionate increase in the output to the tune of 6.2 million tonnes due to pink bollworm outbreak in Central and South India. The pest infestation has resulted in low productivity, poor quality and is expected to lower the area under cultivation in the coming season. The major issue that needs to be addressed is to ensure the sustainability of the cotton farming.

ICAR-CIRCOT is addressing these issues focusing on the post-harvest processing of cotton by carrying out basic and strategic research in processing cotton and its agro-residues, development of value added products and quality assessment. The institute has contributed in development of technology for improving the efficiency of ginning and production of good quality cotton. The institute has developed valued added products viz., cotton rich blends, activated carbon from cotton stalks, process technologies for development of home textiles and apparels with multi-functional finishing so as to enhance the diversified utilization of cotton and value addition to the cotton by-produce to provide additional remuneration to the farmers.

ICAR-CIRCOT is involved in the capacity building of the stakeholders through its skill development initiatives by offering specialized training programmes in the area of Ginning technology, post-harvest processing of cotton, value addition to cotton by-produce, applications of nanotechnology, electrospinning, microscopy, advanced instrumentation techniques in textile characterization etc. Three new training programmes have been initiated in the area of knitting, fibre reinforced composites and instrumental evaluation of clothing comfort. The institute has also trained farmers from Maharashtra, Gujarat and Madhya Pradesh under the ATMA scheme.

The vibrant Agri-business Incubation (ABI) Centre of ICAR-CIRCOT, which had nurtured two new start-ups, has admitted a new entrepreneur for development of enterprise based on value added products from Banana fibres. Institute was keen to improve the linkage with the industry, has organized two industry interface meet on the key issue facing the cotton sector

i.e., the mechanization of the cotton harvesting and processing of the mechanically picked cotton. The stakeholders meet was also organized in the different regional units along with the Quinquennial Review Team to reshape the institute activities to address the concerns of the stakeholders. Efforts were also initiated to promote the technology among the masses through TV talks and Radio programme of the Doordarshan.

The institute has gained international reputation through the Cotton Technical Assistance Programme of Government of India and is still actively involved in the development of the cotton sector in African Nations. During the current year an International Short Term Training Programme has been organized under the India Africa Forum Summit (IAFS) III that pivots on the Human Resource Development for stronger Indo-African Cooperation. The institute has also assisted the United Nations Conference on Trade and Development (UNCTAD), Geneva in National Capacity Building for promotion of Cotton By-produce based development activities in Zimbabwe, Tanzania, Zambia and Uganda.

ICAR-CIRCOT was involved in the development of the strategic plan for doubling of the farmer's income for the state Maharashtra. The institute has adopted 30 villages under the Mera Gaon Mera Gaurav programme and is actively involved in creating awareness among the farmers for promoting technology led growth. Annual Technology and Machinery Demonstration Mela is also organized for the benefit of the farmers. The institute has also shown keen interest in implementation of the different schemes of the Government viz., Swachha Bharat Mission; promotion of renewable source of energy, wealth from waste etc.

The institute, accredited with ISO 9001:2015 certification and NABL accreditation for textile testing, is providing committed service to the stakeholders. The revenue generated during the year is ₹ 160 lakhs which is 78.9% increase over the average revenue generated in last three years.

Mumbai
June 2018

Dr.P.G.Patil
Director

Executive Summary

ICAR-CIRCOT, Mumbai is one of the premier research institutes under the Indian Council of Agricultural Research. The Institute has a mandate to carry out basic and strategic research on processing cotton and its agro-residues, development of value added products and quality assessment besides organising skill development programmes & providing business incubation services and functions as referral laboratory for cotton fibres. It provides technological solutions to farmers and cotton industry stakeholders in the field of post-harvest processing of cotton and value addition to cotton by-produce. The Institute has been accorded permanent recognition by University of Mumbai for guiding students leading to M.Sc. (by research) in Physics, Bio-physics, Microbiology and Organic Chemistry and PhD in Physics and Microbiology.

CIRCOT's dedicated scientific and technical staff is always striving hard towards achieving sustainability & inclusive growth in cotton sector. The Institute undertakes research activities in 5 major core area viz. (i) Pre-ginning and ginning; (ii) Mechanical processing: technical textiles and composites; (iii) Characterization - cotton and other natural fibres, yarns and textiles; (iv) Chemical and biochemical processing and biomass & by-product utilization (v) Entrepreneurship and human resource development.

Some of the salient achievements made by the institute during 2017-18 are:

Research

- ***Single Locking Cotton Feeder developed for Double Roller Gins*** improved the ginning efficiency in terms of ginning output and energy consumption. The new concept of single locking of cotton bolls has resulted in significant improvement in colour grade of cotton while other HVI and AFIS fibre quality parameters were unaffected.
- Process protocol for preparation of ***activated carbon from cotton stalks*** has been optimised. It is very effective as adsorbent due to its highly developed porosity. The colour removal efficiency of cotton stalk based activated carbon is higher than the commercial activated carbon.
- ***Anti-Microbial Cotton Textiles*** were developed by blending cotton with anti-microbial fibres at fibre stage instead of the conventional finishing at wet processing stage.
- ICAR-CIRCOT undertakes the fibre and yarn quality assessment for ***AICRP on Cotton***. The Annual Technological Report contains the quality parameter data generated on the cotton samples received from the cotton breeders pertaining to the Zonal Trials (North Zone, Central Zone and South Zone) and National Trials. In all, the technological data on 2825 samples have been reported of which 1752 samples belong to National trials while 996 cotton samples correspond to Zonal Trials.
- ***Cotton Lint Opener*** has been developed for preparing cotton lint samples for testing the quality parameters of cotton without damaging the fibres. The machine has a capacity of opening about 30 samples/hour.
- Blankets with ***Mosquito Repellent finishing*** having durability of up to 5 washes developed using microencapsulated natural essential oil. An application method has been devised for incorporating microcapsules into the uniform of defence personnel. Mosquito repellent cream with good consistency which contains microencapsulated citronella oil has been prepared.
- ***Low-Gossypol Cottonseed Meal*** for non-ruminant feed and food applications using solvent based process protocol

has been optimized. The gossypol content in the cottonseed meal is up to the level specified by BIS for edible cottonseed flour.

- ***Nano-Cellulose*** as an additive in cement concrete, rubber composites and paper pulp improved mechanical and functional properties. Nanocellulose reinforcement decreases water absorptivity in kraft paper making it suitable for packaging applications.
- ***Scientific Cottonseed processing*** - Surveyed 41 conventional (screw expeller type) cottonseed processing units and 8 scientific cottonseed processing units, to understand the factors influencing the adoption scientific cottonseed processing in the country.
- Surface modification of nanocellulose by silylation process was found very effective in imparting hydrophobicity to the nanocellulose. PVA-NC composite films reinforced with different proportion of nanocellulose (2, 5, 10, 20, and 30%) has been developed.
- ***Paper Pulp Technology*** for security grade paper using cotton linter has been developed. The technology has been released during the ICAR Foundation day ceremony on 16th July 2017. The pulp blending technology using banana fibre pulp & cotton pulp for currency grade paper has been optimized.
- Effective logistics for uprooting, collection, chipping and transportation of cotton stalk from farmers' field to nearby briquetting/pelleting/power generation plants developed.
- Nanocomposites were prepared by blending the NLC from coconut fibres and NLC from cotton stalks in a ratio of 50:50 and added with the epoxy for preparation of composites.
- ***Eco-friendly Process for Preparation of Absorbent Cotton*** using short staple cotton (*G. arboreum*) has been developed. Crude enzymes extracted through solid state fermentation from agro-residues was used for preparation of absorbent cotton.
- ***Large scale trial of Salt-Free Dyeing Technology*** to dye cotton fabric without addition of salt has been carried out. The industrial trial could achieve uniform dyeing with the developed process.

Publications

- Published 34 research papers in peer reviewed journals; 17 conference paper presentation; monthly e-newsletters, 8 training manuals, Booklet "ICAR-CIRCOT - An Insight"; 17 leaflets; 5 success story bulletins; and Hindi Magazine Amber 2016.

Skill Development initiative

- 28 training programmes were organized at Mumbai and Nagpur for capacity building in the areas of ginning, quality evaluation of cotton fibres, yarns and fabrics, textile processing, value addition to cotton and biomass, application of nanotechnology, advances in microscopy, characterisation of materials using x-ray diffractometer, absorbent cotton technology, basic statistical techniques for textile research and electro-spinning techniques and their applications.
- An international Short Term Training Programme (STTP) on 'Post-Harvest Management of Cotton and Value-Addition to Crop Residues' was organized for African nationals at Ginning Training Centre, Nagpur during Feb 19 - Mar 03, 2018 under India-Africa Forum Summit III sponsored by Ministry of External Affairs.

Technology Management & Popularisation

- Three patents were granted, eight consultancies undertaken and two MoUs signed for commercialization of technologies during the year.
- ***Impact of CIRCOT Technologies*** - Technologies developed by ICAR-CIRCOT for preparation of bio-enriched compost and cultivation of oyster

mushroom using cotton stalks restores soil fertility and bring additional remuneration to farmers. Seven awareness and training programs were conducted through which 275 farmers were given training on bio-enriched compost preparation and oyster mushroom cultivation using cotton stalks and their impacts was assessed.

- Organized 20 awareness meets, participated in 11 exhibitions and 07 industry-interface meets as well as participated in meetings, seminars, workshops and conferences for popularizing its technologies among stakeholders.
- Mera Gaon Mera Gaurav activities were conducted in 30 cotton growing villages in Wardha district of Maharashtra where scientists and technical officers demonstrated farmer friendly technologies for enhancing farm income.
- Five television talks on DD Sahyadri and two radio talks on All India Radio were delivered by Institute Scientists

Accreditation, Awards and Recognition

- Accredited with ISO 9001:2015 for Quality Management System by Bureau of Indian Standards.
- Organised 7th ACRDN Meet at Nagpur during September 2017 in collaboration with ICAR-CICR, Nagpur; Indian Society for Cotton Improvement (ISCI), Mumbai and International Cotton Advisory Committee (ICAC) Washington.
- CIRCOT bagged the coveted award for outstanding work in Official Language for 2016-17 from amongst 91 Mumbai based central offices.
- CIRCOT received the third prize (Joint award) for Amber Patrika under Ganesh Shankar Vidyarthi Hindi Patrika Award Scheme (2015-16) amongst institutes/ centres situated in A&B regions.

Extracurricular activities

- Four gold and nine silver medals were won in various events during the west zone sports tournament and three silver medals in the ICAR inter zonal sports tournament.
- Swachh Bharat Abhiyaan in the Institute premises and at the staff quarters regularly throughout the year with active participation of the staff.

Commercial Services

- A total of 20,947 samples were tested at Mumbai headquarters, GTC Nagpur and other regional units generating a total revenue of ₹ 1,06,00,268/- through commercial testing.
- Revenue of ₹ 4,14,947/- was generated from sale of 460 containers of ICAR-CIRCOT calibration cotton, which is an import substitute for USDA standards for calibrating textile testing equipment.
- Eight consultancy projects were carried out during the year.
- Three incubations are currently in progress in the Agri-Business Incubation Centre.

Financial Management

- Implemented 100% cashless transactions.
- The Institute ensured near complete utilization (99.99%) of the sanctioned budget allocation and generated a revenue of ₹ 160 lakhs during the year.

1. Introduction

ICAR-CIRCOT is one of the oldest institutes of the country established in 1924 as the Technological Laboratory under the then Indian Central Cotton Committee (ICCC). The administrative control of the Institute was transferred to ICAR in 1966 and later in 1991, it was given its present name.

The Institute has its headquarters at Mumbai and six regional units in different parts of the country located at Nagpur, Coimbatore, Sirsa, Surat, Guntur and Dharwad.

The Institute is headed by the Director who is assisted by four heads of research divisions, administration and finance & accounts sections.

Various committees like the Institute Management Committee (IMC), Priority-setting and Monitoring Committee (PMC), Research Advisory Committee (RAC), Institute Research Council (IRC), Institute Joint Staff Council (IJSC), Grievance Committee, etc. are formed for helping the Director in concerned areas.

There are a number of service sections like Library, Agricultural Knowledge Management Unit (AKMU) and Test House to facilitate the information services, maintaining research data bank, testing and other activities of the Institute.

Research, Consultancy, Training, Testing and Technology Transfer activities are facilitated and monitored through four research divisions: Quality Evaluation and Improvement Division (QEID), Mechanical Processing Division (MPD), Chemical & Biochemical Processing Division (CBPD) and Technology Transfer Division (TTD).

Research programmes are grouped under five broad core areas as-

i. Pre-ginning and ginning
ii. Mechanical processing: technical textiles and composites
iii. Characterization - cotton and other natural fibres, yarns and textiles
iv. Chemical and biochemical processing and biomass and by-product utilization
v. Entrepreneurship and human resource development

The Institute has made phenomenal contribution to the progress of post-harvest processing of cotton over the past nine decades of its existence. It has been continually providing technological support and skilled manpower to the ginning sector in the country. Significant contributions in the area of ginning machinery research have helped the country not only to be self-reliant but also export oriented in ginning machinery. Ginning equipment is now being exported to the Afro-Asian countries earning precious foreign exchange for the country.

Many new machines and products have been developed and successfully commercialised; some of them worth mentioning are on-board pre-cleaner for cotton stripper, saw band pre-cleaner for mechanically picked cotton, stick removal for mechanically picked cotton, double roller gin with self-grooving rubber roller, miniature spinning system and village level sliver making machine, blended textiles, cotton lint opener, rubberised baton and rubber composites for flexi check dam.

Recently, the Institute has been carrying out research in many new areas like the mosquito repellent finishing for textile materials, colour matching of textiles through indigenously developed software and solvent extraction of gossypol as food for non-ruminants.

Applications of nano-cellulose in cement concrete, rubber composite, pulp and paper to enhance functional properties, development of security grade paper from mixing pulp from different sources are being explored. Apart from carrying out research in the field of nano-coated films for packaging, the Institute has a project on natural fibres too in consortium mode with participation of other related institutes.

ICAR-CIRCOT calibration cotton is an import substitute for the costly USDA reference material used for calibrating testing instruments like the HVI.

The Institute has been playing an important role under the All India Coordinated Research Project on Cotton in developing and screening quality cotton genotypes. Lauding its efforts, the Institute status has been recently elevated to the level of Principal Investigator in the project.

The Institute has been offering innovative tailor made skill development programmes at national and international level in a host of subjects which were not offered before.

Coherent with the government initiative for doubling farmers' income, the Institute has taken up many innovative projects. Value addition to cotton biomass through preparation of compost from cotton biomass, popularisation of mushroom cultivation using cotton biomass and preparation of briquettes and pellets from cotton stalks as an energy source are some of the activities taken up for enhancing farm income.

Efforts are under way on the use of briquettes and pellets made from cotton stalk as fuel in crematoria to replace wooden fuel.

A survey has also been taken up to find out the bottlenecks in the scientific processing of cottonseed in the country, which is recommended for higher remuneration.

The Institute is one of the most recognised laboratories for testing fibres, yarn and textiles made of cotton and blends with other fibres. It is accredited by the National Accreditation Board for Testing and Calibration of Laboratories (NABL) since 1999. The Institutes got its ISO 9001:2008 certification upgraded to ISO 9001:2015 during the current year.

VISION

Global Excellence in Cotton Technology

MISSION

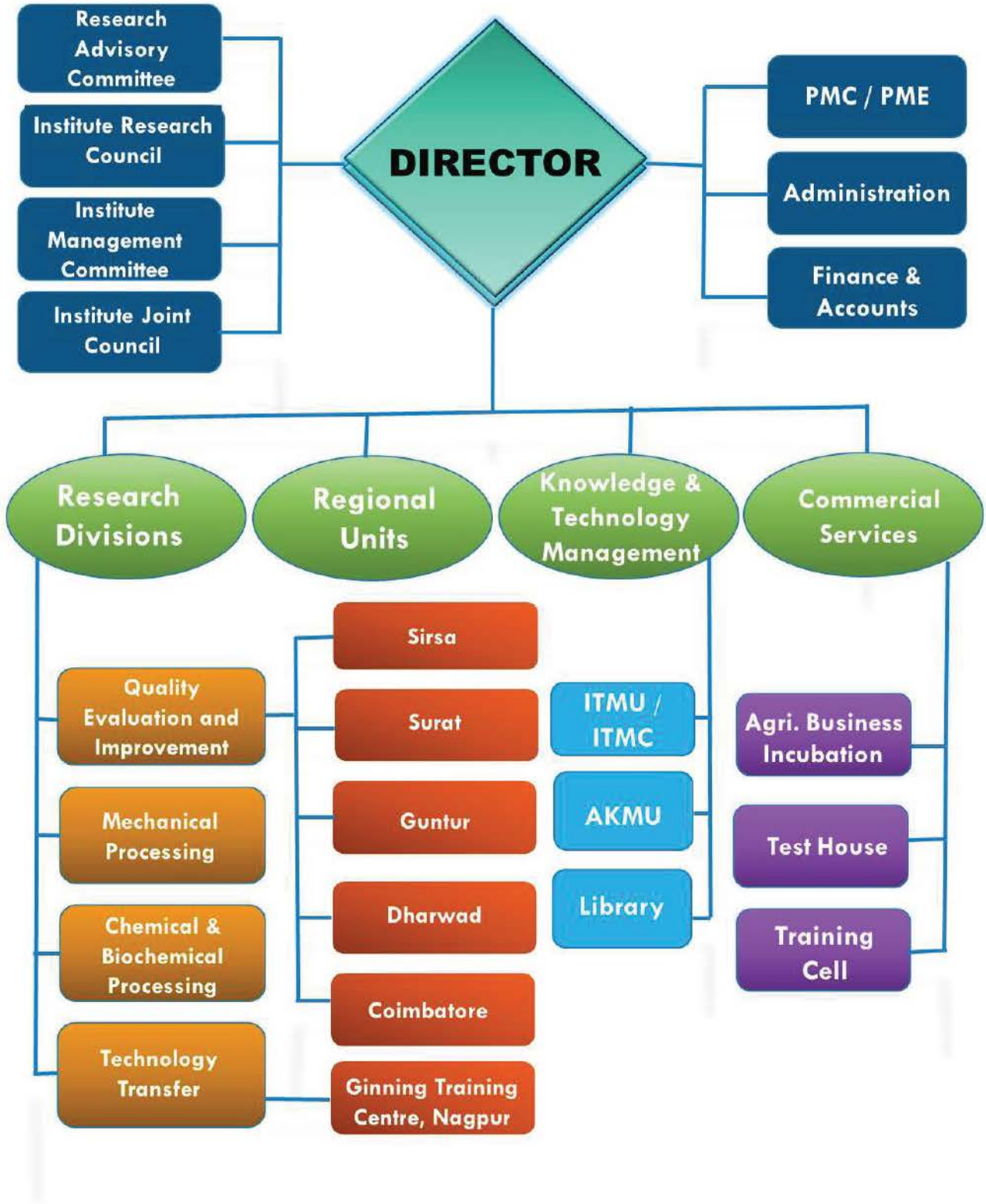
To Provide Scientific and Managerial Interventions to Post-Harvest Processing and Value Addition to Cotton and Other Natural Fibres and Utilization of their By-Products to Maximize Economic, Environmental and Societal Benefits

MANDATE

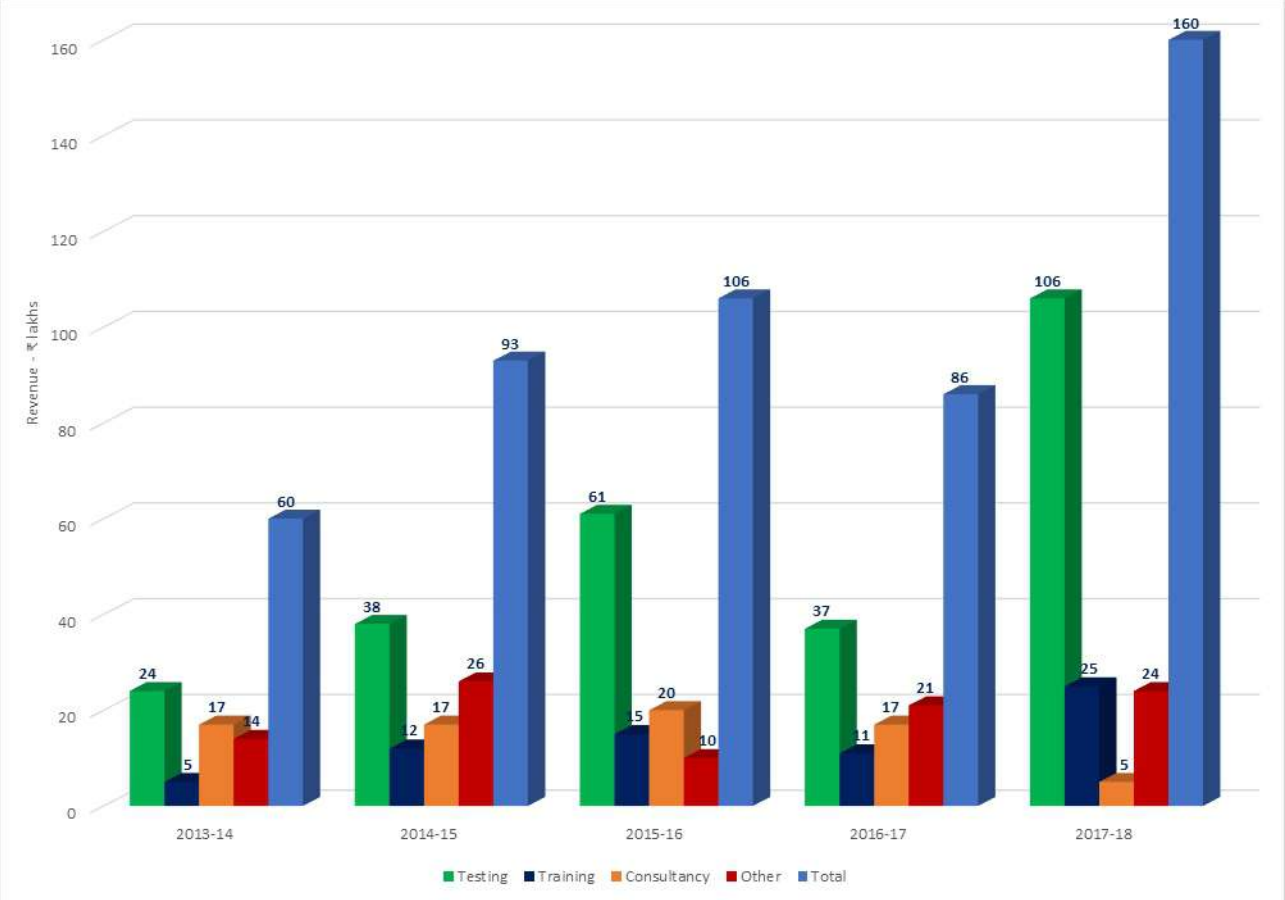
- **Basic and Strategic Research on Processing Cotton and its Agro-Residues, Development of Value Added Products and Quality Assessment**
- **Skill Development and Business Incubation Services and Function as Referral Laboratory for Cotton Fibres**

Table 1.1 Staff Position as on 31.03.2018

Category	Sanctioned	n-Position	Vacant
Scientific	50	27	23
Technical	112	67	45
Administrative	47	31	16
Supporting	57	38	19
Total	**266**	**163**	**103**



Organogram of ICAR-CIRCOT, Mumbai



Revenue Generation (₹ Lakhs)

TABLE 1.2 FUNDS UTILISATION DURING THE YEAR 2017-18

₹ Lakhs

Head of Expenditure		C RCOT		CRP on Natural Fibres	
		Allocation	Expenditure	Allocation	Expenditure
Grant-in-Aid- Capital		50.00	49.98	5.49	5.49
Grant-in-Aid- Salaries		1725.20	1725.18	0.00	0.00
Grant-in-Aid-General	Pension only	2100.00	2100.00	60.00	58.53
	Other than Pension	540.00	539.94		
Tota		**4415.20**	**4415.10**	**65.49**	**64.02**

2. Salient Research Achievements

2.1 CORE AREA - I: PRE-GINNING AND GINNING

2.1.1 Single Locking Cotton Feeder for Double Roller Gins

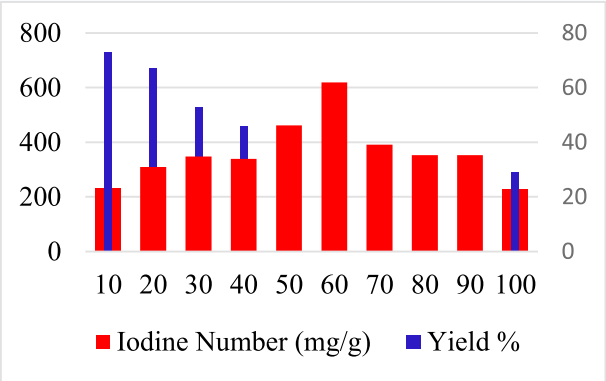
With an aim to improve the efficiency of double roller gin in terms of ginning output and energy consumption, new cotton feeder was developed introducing a concept of single locking of cotton bolls. It comprises of a pair of feed rollers, pair of spiked cylinders and grid bar housed in a feeder hopper and chute for cotton distribution on either side of the beater. Constant feeding rate of individual locules is maintained at the ginning point. The speed of spike cylinder and moisture content were optimized using Response Surface Methodology for long and medium staple cotton. In optimization, ginning output was maximized and specific energy requirement was minimized. Quadratic model was fitted for prediction of ginning output and specific energy. Optimum cotton moisture of 7.38 & 7.15 % and spike cylinder speed of 307 & 297 RPM with desirability of 0.9185 & 0.8923 was arrived using multiple regression analysis for long and medium staple cotton respectively. Use of single locking cotton feeder for long and medium staple cotton resulted in 22 & 25 % increase in ginning output and 12 & 13.5 % reduction in specific energy requirement respectively as compared to conventional system comprising of auto feeder. Single locking feeder showed significant improvement in colour grade of cotton while other HVI and AFIS fibre quality parameters were unaffected. With these advantages the single locking feeder would be highly useful for cotton ginneries.

2.2 CORE AREA - II: MECHANICAL PROCESSING, TECHNICAL TEXTILES AND COMPOSITES

2.2.1 Protective Textiles using Activated Carbon from Cotton Stalks

Activated carbons are known to work as very effective adsorbents due to their highly developed porosity, large surface area, surface active sites and reactivity. An attempt was be made to produce activated carbon from cotton stalk by chemical soaking and thermal degradation method. Sulphuric and phosphoric acids were used as a chemical activating agents. Cotton stalks was sundried and cut into pieces followed by water washing and oven dried at 110˚C for 4 h. Dried cotton stalk pieces soaked with various concentrations of sulphuric acid for 24 h and decant the acids and washed with water until pH got constant and then dried in hot-air oven at 110˚C for 4 h. The yield percentage of charcoal decreased

with increasing concentration of sulphuric acid as the acid degraded the biomass. Maximum micro porosity of 619 mg/g was observed at 60% concentration of sulphuric acid. Soaking further in the acid concentration decreased the iodine number. The amount of sulphuric acid used in the impregnation strongly influenced the micropores. The development of new pores and a widening process of micropores with an increase in concentration was indicated.



Sulphuric acid activation of cotton stalks

Cotton Stalk for Activated Carbon

Activated Carbon from Cotton Stalks

Activated carbon coated Woven Fabrics for Filtration Application

Activated carbon coated Nonwoven Fabrics for Filtration Application

2.2.2 Antimicrobial Cotton Textiles

Antimicrobial finishing is given to cotton textile generally at the final finishing stage, but the fastness properties of such finishing are not durable. So in order to provide permanent antimicrobial finishing, it was attempted to use antimicrobial fibre for blending with cotton at the blow room stage of spinning.

Cotton/Polyester Blending

100% cotton fibres with 2.5% span length of 32 mm and fibre fineness of 3.4 Mic were processed through the sequence of blow room, carding, drawing, roving and compact ring spinning to a count of 40s with TM of 3.6 and its blends with antimicrobial polyester fibre of (cotton/polyester antimicrobial) 50/50, 35/65, 20/80 and 100% antimicrobial polyester were also processed. The blend composition of cotton and polyester yarns were tested using IS: 3416-1988 method and the results conform the blend proportion of cotton and polyester fibre component in the yarns.

Antimicrobial Testing

The blended yarns are knitted into single jersey structure with a fabric GSM of 110, 58 wales per inch and 44 courses per inch and with a loop length of 0.27(cm). The knitted fabrics were processed for single bath scouring and bleaching.

Cotton/antimicrobial polyester blended knitted fabrics were tested for qualitative antibacterial activity by using ASTM E2149 against *S. aureus* and *K. pneumoniae*.

	Polyester / Cotton (20/80)	Polyester / Cotton (35/65)	Polyester / Cotton (50/50)
S. aureus (gram positive) % reduction	15.1	19.8	63.9
K. pneumoniae (gram negative) % reduction	22.2	72.7	89.3

From the results, it can be concluded that 50/50 blend proportion of cotton/antimicrobial fabric shows good antimicrobial activity against both gram positive and gram negative bacteria compared to the other lower blend proportion of antimicrobial polyester fibre. This proportion can be used for production of apparel like active wear, sport wear and home textiles like blankets, bath blankets, bedsheets etc.

2.3 CORE AREA - III: CHARACTERISATION – COTTON AND OTHER NATURAL FIBRES, YARNS AND TEXTILES

2.3.1 Quality Assessment of Indian Cottons

ICAR-CIRCOT undertakes the fibre and yarn quality assessment for ICAR-AICRP on Cotton. The Annual Technological Report contains the quality parameter data generated on the cotton samples received from the cotton breeders pertaining to the Zonal Trials (North Zone, Central Zone and South Zone) and National Trials. In all, the technological data on 2825 samples have been reported of which 1752 samples belong to National trials while 996 cotton samples correspond to Zonal Trials. Out of the zonal trials, 219 samples belong to North zone, 413 to Central zone and 364 to South zone. Under Agronomy trial 212 samples were received out of which 77 samples were tested for spinning performance along with fibre quality assessment. The 77 samples of Agron-VII trials and 58 samples of Agron-VIII trials are reported for fibre

attributes. Thus fibre quality data of 3037 cotton samples and yarn quality data of 77 samples are presented in this report. The quality parameters of all cotton fiber samples were measured by using the High Volume Instrument operated in the HVI Mode.

The Central Variety Identification Committee meeting was held on 8th April, 2017 wherein 33 proposals were screened out of which 15 proposals were identified after considering all aspects viz. area, production, fibre qualities, etc.

- BGDS 1063, CCH 12-2, TCH 1777, GJHV 516, CCH 12-3 (Hirsutum variety): Central Zone
- Phule Suman, NHH 715 (Hybrid): Central and South Zone
- GSB 21 (Barbadense Variety): Central and South Zone
- GN Cot Hy20, NACH 433 (Hybrid): Central Zone
- TSH 04/115, HS 292, LH 2298 compact (Hirsutum Variety): South Zone
- PA 740, JLA 0603 (Arboreum long linted variety): South Zone

Quality Evaluation of Standard Varieties

During the period 13 samples of Standard Varieties of Indian Cottons maintained at different SAUs/Stations were received and tested, which include:

- PDKV Akola; AKA-7, AKA-8, AKA5, AKH-9916, AKH-081, AKH-8828 and PKV Rajat
- Anand Agril. Uni. Viramgam V 797, G Cot13, G Cot 21 and GADC 2
- CICR- Coimbatore Suraj and LRA 5166

Bt Cotton Trials

Programmes were initiated to develop Bt Hybrids and Varieties under AICRP on Cotton and following cultivars were released during the year 2017.

Bt Varieties released (*G. hirsutum*)

Name	State for cultivation	Irri/Rainfed
CICR Bt 6 (RS 2013)	Haryana	Irrigated
PAU Bt1	Punjab & Rajasthan	Irrigated
ICAR-CICR Bt 9	Maharashtra	Rainfed
ICAR-CICR Bt 14 (CPT 2)	Maharashtra	Rainfed
ICAR-CICR GJHV 374 Bt	Maharashtra	Rainfed
ICAR-CICR PKV 081 Bt	Maharashtra	Rainfed
ICAR-CICR Rajat Bt	Maharashtra & South Rajasthan	Irrigated
ICAR-CICR Suraj Bt	Maharashtra, Gujarat, Madhya Pradesh	Irrigated

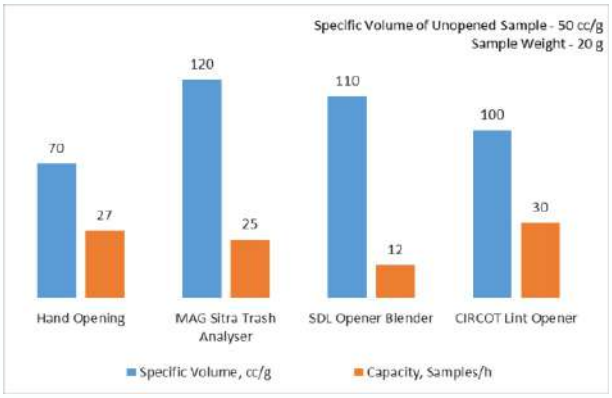
2.3.2 Cotton Lint Opener

Cotton lint samples used for fibre quality evaluation need to be cleaned and opened for correct measurements of quality parameters. Presently, testing laboratories generally employ human labour for hand opening of lint samples or use trash analyser. The extent of lint opening is not uniform and optimum in these methods and also the speed is very slow. Therefore, a new device has been designed and developed in partnership collaboration mode by signing MoU with M/s Precision Tooling Engineers, Nagpur.

The machine consists of Licker-in Cylinder, Feeder Roller and Suction assemblies mounted on MS frame and provided with safety covers on all sides. It works on the carding principle where licker-in wires having sharp profile open up lint fibres by scrubbing action. Specially designed SS sheet of 3mm thickness is provided underneath the main licker-in cylinder for opening of lint by scrubbing action. Feeder roller assembly ensures proper feeding of the sample lap at the desired feeding rate. Both licker-in cylinder and feeder roller obtain drive from electric motor through pulley and belt/chain arrangement. High voltage brushless blower and HDPE piping arrangement make the suction assembly for storing the opened lint over the perforated chamber. A lint collection chamber can accommodate about 20g of opened lint. It has an easy openable air tight door for collection of the opened sample. Observation window is provided for viewing the collection of opened lint in the chamber.

The developed lint opener gave satisfactory performance in terms of specific volume after sample opening- specific volume of the unopened sample (40-60 cc/g) nearly doubled (90-110 cc/g) after opening and the capacity was about 30 samples/h at the feed rate of about 10 g/min.

Cotton Lint Opener



Performance Evaluation of Cotton Lint Opener

2.4 CORE AREA - IV: CHEMICAL & BIOCHEMICAL PROCESSING AND BIOMASS & BY-PRODUCTS UTILISATION

2.4.1 Mosquito Repellent Blankets, Garments and Cream

Mosquito repellent blankets have been developed using microencapsulated natural essential oil with improved durability. Citronella oil was microencapsulated using complex coacervation technique using gum arabic as wall material. Average size of the microcapsules was in the range of 300-600 nm as determined by particle size analyzer using DLS principle. Citronella based

microcapsules along with softener were then applied on cotton blanket using exhaustion technique. SEM analysis showed uniform distribution of capsules on the fabric. Cotton blankets showed 100% mosquito repellence properties with finish durability of up to 5 washes.

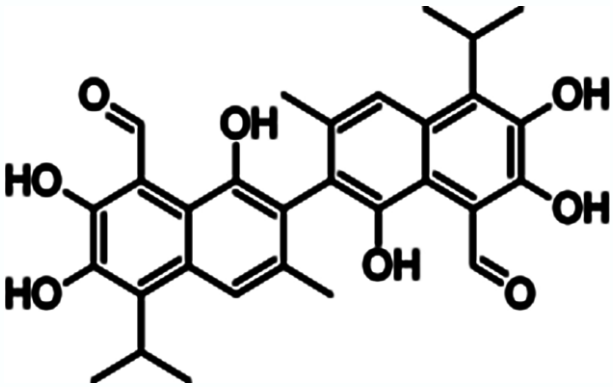
An application method has been devised for incorporating microcapsules onto the uniform for defense people. The microcapsules containing fabric softener/conditioner can be used in the final stage of laundering for protection against mosquitos.

Mosquito repellent cream has been prepared using microcapsules of essential oil. The formulation for the preparation of mosquito repellent cream has been optimized. A cream with good consistency which contains microencapsulated citronella oil has been prepared

Mosquito repellent cream

2.4.2 Low gossypol cottonseed meal for non-ruminant feed and food applications

Cottonseed oil after refining is widely used for edible purposes and is the third largest contributor to domestic production of vegetable oil. The meal/ cake after extraction of oil is rich in good quality protein but is used for ruminant feed only due to the presence of polyphenolic pigment gossypol which is toxic to non-ruminants including humans. Fermentation process for reducing gossypol is not suitable for food purposes due to the dark colour of the fermented meal.

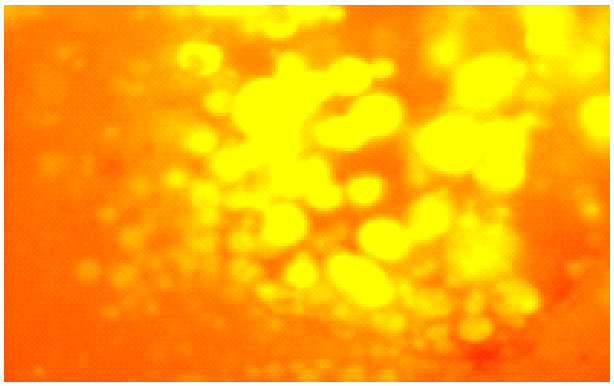


Structure of Gossypol

Experiments conducted last year showed that extraction of cottonseed kernels with acetone or its mixture with water was effective in reducing the gossypol content of cottonseed kernels up to the BIS recommended level for edible cottonseed flour (total and free gossypol levels of 1.2% and 0.06% respectively), whereas alcoholic solvents were not able to satisfactorily reduce the total gossypol content. Prolonged treatment time was however required.

Experiments were conducted on hexane de-oiled kernels of the same Bt variety and attempts were made to reduce the treatment time. As about 30% oil got removed, total and free gossypol contents of de-oiled kernels of the Bt variety used for experiments increased to 2.51% and 1.15% respectively. Flattening of kernels in hydraulic press to improve solvent contact was attempted but it was only partial and therefore results were variable. Powdering the kernels into meal reduced the treatment time but solvent had to be separated by centrifuging as filtration was slow. Ultrasound assisted extraction reduced treatment time to 30 min. Extraction with acetone-water in a sonicator followed with a solvent wash could reduce the total and free gossypol levels of the meal to 1.2% (52% reduction) and 0.14% (88% reduction) respectively. None of the modifiers added to extracting solvents such as acids, salt, glycine, urea etc. was found to have much effect on gossypol removal efficiency. Soxhlet extraction of de-oiled kernels with acetone resulted in a product with total and free gossypol levels of 0.9% and 0.2% respectively. Acetone extracted meal was of light cream colour while acetone –water extracted material was little darker. Acetone used as solvent was recovered by distillation and crude gossypol was also obtained. Acetone water extraction of another Bt cottonseed meal having much higher total and free gossypol contents of 4.4% and 2% respectively led to a product with 2% total and 0.4% free gossypol contents with about 54% removal for total and 80% removal for free gossypol.

The process therefore requires further optimization. This emphasizes the importance of testing cottonseeds for gossypol. Samples of de-gossypolised cottonseed protein collected from a commercial solvent degossypolisation unit in India were found to have total and free gossypol contents of 3.6% and 0.16% respectively which shows incomplete extraction of free gossypol and its conversion into total gossypol which is not occurring in our experiments.



Gossypol gland in Fluorescence Microscope after 45 min solvent exposure-bursting of gland and release of fluorescent yellow gossypol pigment is seen

2.4.3 Extraction of quality proteins from cottonseed meal

Currently, cottonseed meal is mainly used as an ingredient in feed for cattle. Enhanced utilization & value addition of cottonseed meal in industrial & bio-based applications would increase the profitability of cotton growers & processors. This can be achieved by developing scalable & eco-friendly processes to extract protein from cottonseed meal (CSM). For achieving this, the de-oiled CSM was supplied by Clean Cotton Impex, Pitchampalayam Pudur, Tiruppur, Tamil Nadu containing 0.695% and 1.37 % amount of free and total gossypol respectively. Papain treatment reduced the gossypol to the significant levels. The Free gossypol ranged from 0.515-0.678 % and total gossypol ranged from 0.979-1.326 % which showed a significant decrease in the CSM compared to untreated meal (without enzymes). As it was expected, the gossypol levels decreased in the CSM with increasing enzyme dosage and incubation time. The minimum free gossypol (FG) content (0.515%) and total gossypol (TG) content (0.979%) was observed at 1.5 % enzyme dose, incubation time of 180 min and temperature of 50 °C. Enzyme assisted processing (EAP) using papain resulted in significant decrease in the free and total gossypol contents from 0.695 % to 0.515 % and 1.37 % to 0.979 % respectively.

Optimized papain doses for reduced gossypol content in Cotton Seed Meal

Enzyme	Doses	Predicted values		Experimental Values	
		FG (%)	TG (%)	FG (%)	TG (%)
Papain	EC=1.47% Time=169.74 min Temp.=44.67 °C	0.514	0.977	0.521	0.965

Cottonseed meal with minimum free and total gossypol was treated with 80% acetone + ethanol solvent acidified with citric acid and the free and total gossypol was reduced to 0.40% and 0.822%. As the yield of CSM after degossypolization was very less using enzyme, the CSM as such was used for extraction of protein. Further, CSM was employed for the extraction of protein using Alkali (0.1 N KOH) with varying concentration of sodium sulfite and sodium chloride at pH=11. The influence of each parameter i.e. alkali to sample ratio, concentration of sodium sulphite and sodium chloride was investigated at different levels in single-factor experiments.

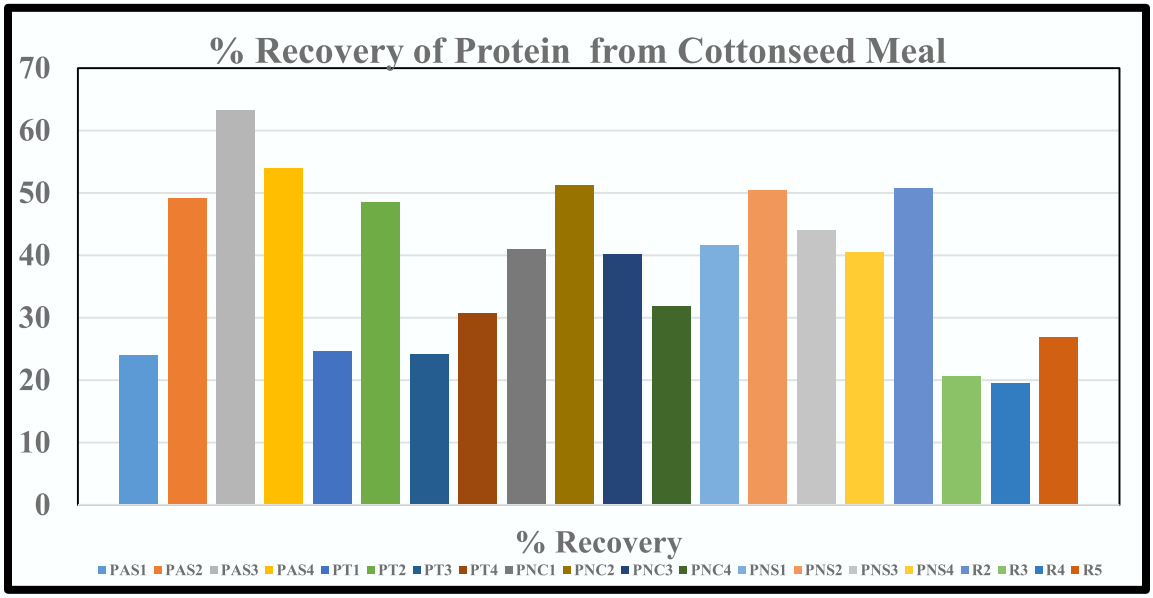
Procedure for the extraction of protein from CSM

CSM ⟶ 0.1N KOH Solution ⟶ Addition of Na_2SO_3 and NaCl (Varying concentration) orbital shaking (2hours) ⟶ Centrifugation (RPM=10000, 10min) ⟶ collection of supernatant (measure volume) ⟶ Ammonium sulfate precipitation (1 hour at 10°C) Centrifugation (RPM=10000, 10min) ⟶ collect protein ⟶ pellet ⟶ Pellet dissolved in Millipore distil water ⟶ Purification of protein (Dialysis) ⟶ Lyophilisation of dialysed protein sample

The lyophilised protein sample was analysed for percent recovery/protein content by Kjeldahl (total protein) and Lowry assay (soluble protein). Further, selected sample were also analysed for the total and free gossypol content. The CSM left after extraction was also analysed for the total protein content and selected sample were analysed for total and free gossypol.

Total 20 experiments for extraction of protein has been carried out till now. The maximum recovery of 53.02% was obtained. This recovery was obtained when protein was extracted with alkali (1:30 sample to alkali ratio with 0.1 N NaCl and 0.2% Na_2SO_3).

Extracted protein was analysed for the total protein by Kjeldahl method and it was found that all the sample have protein content ranging from 85% to 95%. Free gossypol and total gossypol in one of the extracted protein (P_{NS3}) was 0.023% and 0.41% respectively.



Recovery of purified protein from CSM
P_{AS}= Varying Alkali to sample ratio (10:1- 40:1), P_T= Varying time (1-4 hours), P_{NC}= Varying NaCl Concentration (0.05-2N) P_{NS}= varying concentration of Na_2SO_3 (0.1-0.4%), P_R= Re-extracted samples of proteins

2.5 CORE AREA - V: ENTREPRENEURSHIP AND HUMAN RESOURCE DEVELOPMENT

2.5.1 Compost and Oyster Mushroom Production from Cotton Stalks

In India, about 40 million tonnes of cotton stalks are available annually. After harvest of cotton, most of these stalks are burnt in the field which causes emission of greenhouse gases and air pollution. At present, farmers are spending on average of Rs. 700/- for uprooting of stalks and cleaning of the field. Even after uprooting, the stalks are not used for any purpose.

ICAR-CIRCOT has developed technologies for on-farm utilization of cotton stalks to restore soil fertility and bring additional remuneration to farmers by preparation of bio-enriched compost and cultivation of oyster mushroom using cotton stalks.

During the reporting period, 17 awareness and training programs were conducted through which 275 farmers were given training on bio-enriched compost preparation and oyster mushroom cultivation using cotton stalks.

The farmers were provided with samples of compost culture and mushroom spawn to promote on-farm utilization of cotton stalks and to earn additional income through adoption CIRCOT technologies. It was noted that solid formulation of compost culture would be easier for handling, transportation and storage. Accordingly, solid formulation of compost culture was prepared by addition of 50% of liquid culture in solarized powdered compost of 6 mm size. The solid formulation was packed in PP bags and stored in cool place.

Based on extension work taken under the project, Mr. Y. N. Kabra from Asti taluk, Wardha Dist., Maharashtra and Mr. Rajaram from Sirsa, Haryana had successfully adopted this technology of compost preparation from cotton stalks. They also expressed their interest to collaborate with CIRCOT for mass culturing of compost culture for their own use as well as for supply to nearby villages for compost preparation in large scale.

Demonstration of oyster mushroom cultivation in Digras village, Selu taluk, Wardha on 10-08-2017

Preparation of solid formulation of compost culture

Packing of solid compost culture

2.5.2 Nano-Cellulose for Cement Concrete, Rubber Composites and Paper Pulp

Nanocellulose a novel seamless nanomaterial has wide and novel application potential in different industries. In this project, nanocellulose was produced in the ICAR-CIRCOT Nanocellulose Pilot Plant and was used as an additive in cement concrete, rubber composites and paper pulp for improving mechanical and functional properties.

Nano fibrillated Cellulose (NFC) was added in Cement Mortar which resulted in decreased bleeding rate (0.18% for 0.32% NFC addition wrt 0.44% for control 0% NFC) and decreased length of cracks occurred with increasing % of NFC addition (13.4 cm for 1.6wt % of NFC addition wrt to 74.6 cm for 0wt. % of NFC addition).

While nanocellulose reinforcement in rubber composite resulted in increase in mechanical strength of rubber for e.g. Young's Modulus increased from 2.44 to 2.71 MPa for Natural Rubber-Untreated Nanocellulose 5 phr (NR-UT5) and 2.51 for Natural Rubber-Untreated Nanocellulose 10 phr (NR-UT10).

Nanocellulose addition improves strength and other properties of paper for different end use applications. Addition of 20% NC increases the mechanical properties of kraft paper.

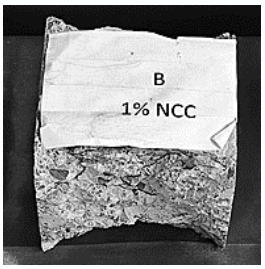
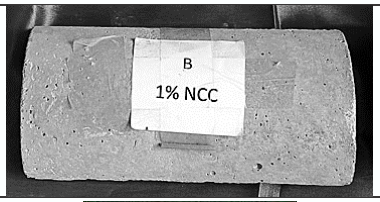
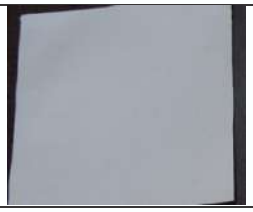
- tensile strength increased 3.5 times [29.7 ± 1.8 N (20% NCC) wrt 8.25 ± 2.1 N of control]
- tearing strength increased 1.56 times [250 ±15.3 mN (20% NCC) wrt 160 ± 12.1 mN of control]
- bursting strength increased 1.2 times [981 ± 6.5 N (20% NCC) wrt 882 ± 4.5 N of control]
- folding endurance increased 6 times [6 (20% NCC) wrt 1 of control]
- Cobb value decreased by 39% [229.59 ± 13.5 (20% NCC) wrt 381.57 ± 11.2 of control]

Nanocellulose when reinforced in kraft paper decreases the water absorptivity and lesser water absorptivity of kraft paper makes it suitable for packaging applications. Also, 100% NC is feasible for high end applications such as flexible electronic devices due to its high conductivity.

Various meetings were conducted to promote nanocellulose technology amongst different stakeholders, entrepreneurs, industries, corporates and R&D laboratories.

Business Interaction Meeting with Hindustan Unilever Limited and ICT, Mumbai on May 23, 2017.

Business Interaction Meeting with Pidilite Industries on May 23, 2017.

Nanocellulose in Cement Concrete	 	 	 
Nanocellulose in Rubber Composites			
Nanocellulose in Kraft Paper			
	Kraft Paper	10% NC	20% NC

2.5.3 Adoption of Scientific Cottonseed Processing in India

India has technology for scientific processing of cottonseed, despite that cottonseed processing industry adopts generally conventional screw press method for oil extraction and cottonseed cake production (un-decoticated cake–UDC).

A study was undertaken to understand the factors influencing the adoption of proven technologies by cottonseed processing

industry. Field survey of conventional screw press oil mills was carried out by visiting 41 conventional screw expeller type cottonseed processing units located in Maharashtra (Aurangabad, Beed, Jalna, Nagpur and Khamgaon), Haryana (Hisar, Hansi and Sirsa) and Punjab (Bathinda).

The units comprised of generally age-old type screw type expeller with at least 2 numbers. Screw press technology was preferred by the owners due to ease in operation and low investment. However, these are economically not viable due to unscientific processing of cottonseed. Also, the functioning of these units depends on the variation in prices of cottonseed, UDC, washed oil and acid alkali soap. With the increasing demand for cottonseed, prices have gone up and that's why local units of screw press were not able to get the raw material at their desired price.

In this study, field survey of scientific cottonseed processing units was accomplished by visiting 8 units involved to investigate current situation and constraints faced by them. Out of which 2 units located in Jalna (Bhoomi Cotex and Abhay Nutrition) have complete four product output production line. Technologies adopted by these units are satisfactory as felt by the owners, except the energy intensive delinting operation. They need technology for value addition to linters, cottonseed meal and hull, domestically. This can augur well in diversifying uses of by-products.

According to owners high capital investment (Machine cost of ` 20 Crore (for Made in India) and ` 25 Crore (for Imported) for 200 MTPD plant), no special incentives (subsidy in export, interest, electricity), no domestic demand for hull and linters, broker and commission agent lobby is in favour of UDC in Indian market, and non-acceptance of formulated cattle feed cake by cattle owners, are some of the factors contributing to the non-adoption of the technology.

Presently linters are exported. Hull are supplied to cattle feed manufacturers. Cottonseed meal (DOC) is used for export or in production of cattle feed. Rest 6 units (in Jalna, Hisar, Hansi and Sirsa) produce only linters. The purpose of units in Haryana is to meet the rising demand of the linterless cottonseed for animal feeding. The linters, resulted as by-produce, are sold/stored. Delinting machines used are indigenously manufactured with saws ranging from 150 - 185. The machines are very efficient as in the first process itself maximum linters are removed. In total 49 industries involved in cottonseed processing were surveyed. To create awareness about scientific cottonseed processing, awareness meets were held in Jalna and Khamgaon. Also a TV talk on benefits of scientific cottonseed processing was broadcasted on DD Sahyadri (in Marathi) on 8th May 2017.

2.5.4 ICAR Flexi-Check Dams in Maharashtra

The impact of ICAR Flexi Check Dam Technology was assessed in different regions of Maharashtra. In the current year, baseline survey was conducted for agricultural data and hydrological parameters using suitable questionnaire keeping in view the socio-economic aspects of the region.

1. Three demonstrations were carried out in Pune district at villages Kanse and Amonde by installations on the selected sites.
2. ICAR- Flexi Check Dam was also installed at Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist. Ratnagiri site.

3. ICAR-Flexi Check Dam base structure was completed at Satara. It will be fixed after the technology licensing to manufacture technical textile reinforced rubber composite sheet.

Request letter has been received from Taluka Atpadi, Dist Sangli regarding installation of ICAR-Flexi Check Dam. Survey was conducted near Sangli and site has been selected for installation of ICAR-Flexi Check Dam and tendering process has been initiated for base structure construction.

ICAR Flexi Check Dam installed at Kanse, Ambegaon, Pune and Mandve, Satara

2.5.5 Applications of Nano Cellulose in Paint Formulations

Conventional solvent based paints are recently being replaced by environmentally friendly formulae due to ecological considerations, specifically reduction of volatile organic compound emission from the former. The water soluble paints are characterized by low toxicity, low VOCs emission and non-inflammability. However, they possess lower viscosity and require more time and heat to dry resulting in poor quality of the resulted films. Nanocellulose affects the rheological property of a suspension due to its thixotropic property and thus may modify the viscosity of paints and coatings. The study has been undertaken to synthesize nanocellulose from cotton linters and apply it as a thixotropic agent in paint formulation.

(1) Synthesis & Characterization

Nanocellulose was synthesized from cotton linters using the standard process developed by ICAR-CIRCOT. Lignin and impurities were removed from raw linter by kier boiling method followed by bleaching. The bleached linter was used to prepare nanocellulose by series of mechanical operations- beating, refining and homogenization. Subsequently, the NC suspension was dried in a freeze dryer. The

dried NC was characterized by studying various properties such as particle size, crystallinity index, surface morphology, enthalpy and FTIR.

(2) Applications in Commercial Paint

Aqueous NC suspension (2% solid) was added to commercial acrylic water based paint. The suspension was mixed and homogenized at 3000 rpm for 5 min. Viscosity of the suspension was measured using Brookfield DV-III Ultra Programmable Rheometer at varying concentration of NC. With increasing shear rate, the viscosity was found to be decreasing, confirming the shear thinning property of NC. The mechanical properties of NC-paint suspension containing 30% NC (w/w basis) were tested following IS methods at National Test House, Andheri (E), Mumbai. The adhesion strength of paint improved after addition of Nanocellulose and there was no negative effect on impact resistance.

Mechanical properties of paint samples

Property	Control	NC 30
Scratch Hardness	1200 gm	800 gm
Pull off Adhesion	1.2 MPa	1.6 MPa
Impact Resistance	800 mm	800 mm
Abrasion Resistance	3000 cycles	1500 cycles

2.5.6 Nanocellulose based composites for packaging applications

The project has been undertaken with an aim of synthesis and characterization of nanocellulose from cotton linters and its subsequent use as a green reinforcement for development of biodegradable composite films with improved properties.

Synthesis and Characterization

The method involving friction grinding followed by homogenization was used to produce nanocellulose from cotton fibers. Friction grinding was done using mass collider provided with two ceramic nonporous grinders. An aqueous solution of microcrystalline cellulose (10%) from cotton linters was prepared using distilled water. The suspension was then processed through friction grinder with a clearance of 100 µm. During subsequent passes, the clearance was reduced down from 50 µm to -150 µm to achieve desired reduction. Highly viscous nanocellulose suspension obtained was diluted and processed through homogenizer to get further reduction.

Production of nanocellulose using mass collider and homogenizer

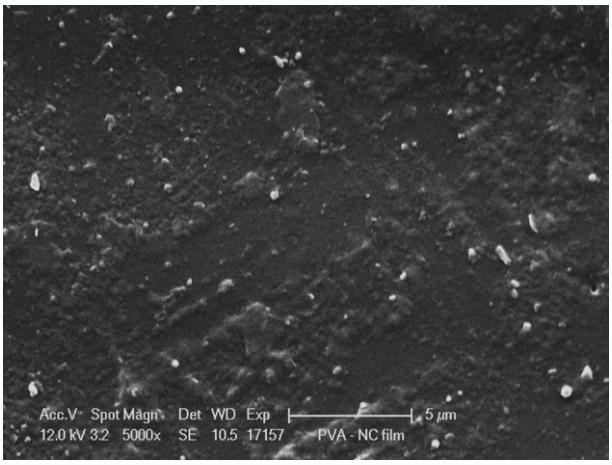
A stable nanocellulose suspension with solid content of 2 %, zeta potential of 29.05 mV and size in the range of 50-70 nm was obtained. The nano size range was further confirmed through Atomic Force Microscopy (AFM) analysis. The nanocellulose was also analysed for its different characteristics such as Scanning Electron Microscopy (SEM), X-ray diffraction analysis (XRD), Fourier-transform infrared spectroscopy (FTIR), Differential scanning Calorimetry (DSC), water contact angle etc.

Surface Modification

Surface modification of nanocellulose is necessary to increase its hydrophobicity and to improve interface with polymer matrix. It was carried by two step procedure- neutralization followed by silylation. Neutralized nanocellulose was reacted with 3-Amino propyl triethoxy silane (3 wt. %) at ambient temperature in aqueous medium under acidic condition for 2 hours. Then the product was washed and dried at 60°C for 6 hrs. The contact angle of nanocellulose increased significantly (139.8°) after silylation. Surface modification by silylation process was found very effective in imparting hydrophobicity to the nanocellulose.

Development of NC-PVA composite films

Nanocellulose reinforced Poly Vinyl Alcohol composite films were prepared by solvent casting method. Nanocellulose was added to PVA solution for improving mechanical and barrier properties of composites. The thickness of films was controlled by pouring uniform volume of solution during casting. The composite films developed were characterized for their surface morphology, tensile strength, FTIR, XRD, opacity etc. SEM image of PVA film reinforced with 5% nanocellulose showed random orientation and good dispersion of NC in PVA matrix, thus indicated excellent compatibility of NC with PVA. This was further corroborated by mixed XRD pattern of composite film showing peaks for both pure NC and pure PVA. FTIR analysis of composite film also revealed the development of new inter-molecular hydrogen bonding between PVA and NC, confirming compatibity of NC with PVA matrix. Reinforcement of 5 wt % nanocellulose in PVA showed significant increase in tensile strength of PVA-NC composite film.



SEM image of PVA-NC 5%

Pure PVA

PVA-NC 5 %

2.6 Externally Aided Projects

2.6.1 Specialty Grade Pulp from Cotton Linters for High End Applications

This Extramural project focusses on the development of high grade blended pulp meeting the requirement of security paper using cotton linter as major component. After the official launch of paper pulp technology at ICAR on 16th July 2017, two industrial trials were taken at M/s SPM, Hoshangabad. Later, a team of scientists visited the Bank Note Paper Mill India Private Limited (BNPM), Mysuru on 27th October 2017 to see the feasibility of carrying out an industrial scale trial using the ICAR-CIRCOT Paper Pulp Technology. As per the requirements of the BNPM, Mysuru, the pulp and paper characteristics in various blend proportions are being evaluated. Also, work is being carried out to introduce machine readable security feature in banana pulp using nano materials. Initial trial for banana fibre pulp production (200 kgs) was carried out at Navsari Agricultural University. And, the possibility of arranging the banana fiber pulp (2 to 3 tonnes) from various banana growing regions of the country, mainly from the Jalgaon region of Maharashtra is being explored.

Results of Industrial Trial at M/s SPM, Hoshangabad

Parameters	First Tria using the pulp from short staple cotton (19-7-2017)	Second tr'a using pulp from comber noil (14-9-2017)	Requirements (for cotton linters as per SPM, Hosangabad)	Requirements (for cotton linters as per BNPM, Mysuru)	Requirements (for BCCP as per SPM, Hosangabad)
Grammage(gsm)	91.7	91.0	90	90	90
Brightness (%)	85.0	83.4	85	84	85
Bursting Strength(kg/cm^2)	2.30	2.47	2.50	> 2.20	--
Tensile Strength (Kgf/ 15 mm)	5.10	6.26	6.00	> 4.0	--
Double Fold (nos.)	3018	5302	1200	> 500	> 5000 (with 2% PVA coating)

2.6.2 Agri Business Incubation (ABI)

ICAR-CIRCOT Agri Business Incubation (ABI) Centre was sanctioned on 1st January 2016 under XIIth Plan Scheme of National Agriculture Innovation Fund (NAIF) (Component II) – Incubation Fund. This centre promotes incubation and business development in cotton and its by-products, conducts techno-entrepreneurial activities in cotton value chain for building prospective clientele and facilitates skill development in selected stakeholders related to cotton sector.

Entrepreneur Mr. Sandeep Nikam from Pune, Maharashtra joined the ICAR-CIRCOT-ABI Centre as an incubatee for Preparation of Value Added Products Using Banana Fibre on 27th March 2018. Two incubatees have graduated from the ABI centre namely M/s Sana Agro Industries, Raichur and M/s The Kadri Mills,

Coimbatore, Tamil Nadu. Both the incubatees have started commercial scale production using different ICAR-CIRCOT technologies namely microbial method for degossypolization of cottonseed meal (M/s Sana Agro Industries) and Nanocellulose application in textile-yarn spinning (M/s TKML, Coimbatore).

Three incubations currently in progress at the ABI centre are :

I. M/s GREYY, Navi Mumbai for **Development of clothing using cotton blend**:

- Completed first phase of Technology Mentoring,
- Resident incubation period in progress,
- Started test marketing through various agencies,

Online portal:

www.greyy.co & www.amazon.com

Retail outlets based in Mumbai:

- Juhu & Lokhandwala;
- Kosha, Bandra;
- Kamdhenu, Napean Sea Road;
- Addventure India, Nerul,

II. M/s Green Globe Mumbai for **Antimicrobial Cotton Textile**

I. Started sensitization in different hospitals across India about the technology namely AIIMS- New Delhi, Bhopal, Patna, Rishikesh; RML & LHMC, New Delhi; AIIPMR, Mumbai; PGIMER, Chandigarh; JIPMER, Puducherry

ii. As per Govt. directives, now hospitals have to purchase medical apparels either through KVIC or GEM hence, incubatee has registered in KVIC and GEM.

iii. Outsourced job of Antimicrobial Finishing to a process house M/s Usha Dyeing, Andheri (E) where around 1000 fabrics have been planned to be treated with antimicrobial finishing.

iv. Mr. Sandeep Nikam, Pune for Preparation of Value Added Products Using Banana Fibre.

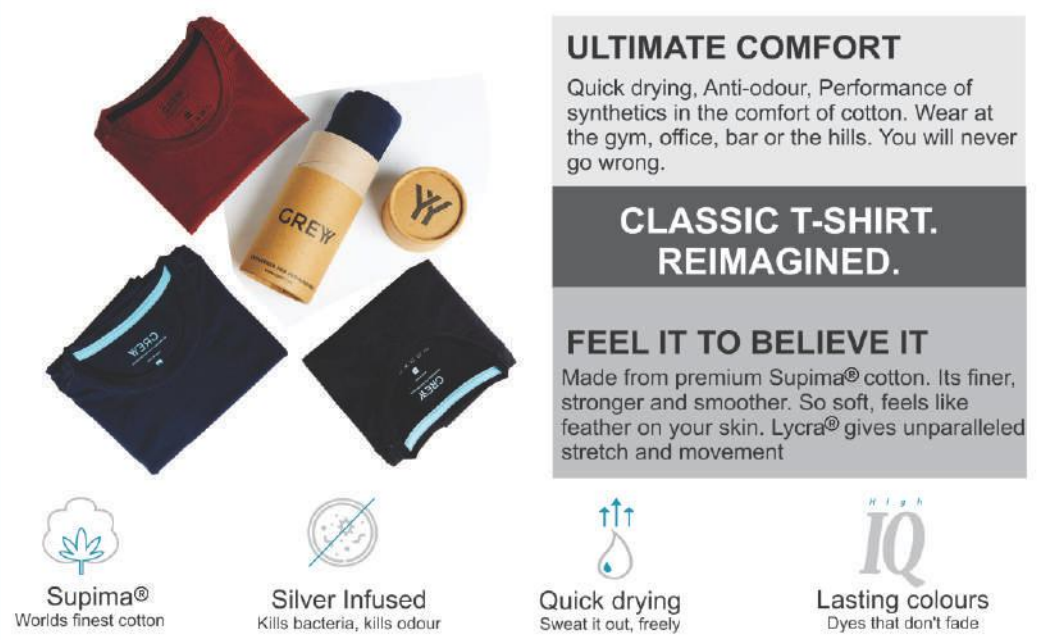
Ten Training Programmes and two workshops have been conducted during 2017-18 to promote ICAR-CIRCOT technologies amongst entrepreneurs, stakeholders and start-ups. ICAR-CIRCOT-ABI Centre abstract titled "Agri Business Incubation Centre of ICAR-CIRCOT: A Platform for Startups in Cotton Sector" was selected for Poster presentation during the 7th Asian Cotton Research & Development Network (ACRDN) Meeting held at Nagpur on 16th September 2017.

An Incubatee M/s GREYY, Navi Mumbai got selected for participation in the Festival of Innovation and Entrepreneurship (FINE) Exhibition held during March 19–23, 2018 at The President of India House, New Delhi. FINE is a unique initiative of the Office of the President of India to recognize, respect and reward grassroots innovations and foster a supportive ecosystem. The five days exhibition had participation from various industry, academic and research organizations. Mrs. Savita Kovind, Hon'ble First Lady of India and Dr. Sanjeev Saxena, ADG (IP&TM Unit) visited their stall and encouraged them.

Mrs. Savita Kovind, Hon'ble First Lady of India visiting Incubatee stall

Dr. Sanjeev Saxena, ADG (IPTM) interacting with Incubatee

New product commercialized: Cotton Blended T-shirt



2.6.3 Consortia Research Project on Natural Fibres

CRP.01: Lignocellulosic Fibre Based Biomass as Renewable Energy for Rural and Industrial Applications

Utilisation of ligno-cellulosic fibre based biomass, specially cotton stalks is being explored for generation of renewable energy. Cotton stalks are abundantly available in India, however, a large quantity of cotton stalks is unused for any value addition purpose. It can be a potential source of increasing farm income and rural entrepreneurship development, if utilized for generation of renewable energy. The major impediment in utilization of cotton stalks is establishment of appropriate logistics for harvesting and transportation of cotton stalks from farmers' fields. This work has developed effective logistics for uprooting, collection, chipping and transportation of cotton stalks from farmers' field to nearby briquetting / pelleting / power generation plants.

Transfer of Technology

In the reported period, a large number of farmers and stakeholders were apprised of technologies generated through organization of Seminars, Technology Demonstration Melas, Awareness Programmes, Workshops, etc. that resulted in transfer of the technology developed for effective harvesting and transportation of cotton stalks. Six groups of farmers belonging to *Patansawangi and Mohopa* villages near Nagpur attended the programmes. Around, 10 farmers were engaged in each group. The scientists provided regular technical input to the framers. Each group of farmers earned about Rs. 5 lakh by supply of about 1000 tonnes chipped cotton stalks to M/s Bhakti Biocoal Energy, Katol. Looking at viability and feasibility of the technology, Mr. Rupesh Babanrao Malvande, a farmer from Dighori, Nagpur adopted this technology by paying an amount of Rs. 15,000/- to ICAR-CIRCOT. Mr. Malvande also earned about Rs. 1 lakh by supply of chipped material to a nearby briquetting plant.

Twelve skill development programmes of 4 days duration were organised for about 400 farmers of Maharashtra for increasing farm income through value addition of cotton stalks and other crop residues. Possibility for use of cotton stalk briquettes as an alternative to wood for burning of dead bodies was explained to Nagpur Municipal Corporation (NMC), Nagpur, which has started using this technology on pilot scale basis at five crematoria in Nagpur.

Skill development programmes at GTC, Nagpur

Evaluation of suitability of cotton stalk pellets

The cotton stalk pellets prepared using optimised conditions were evaluated for their suitability as fuel for firing of boilers and cooking in restaurants. About 3 tonne cotton stalk pellets were given for evaluation of field performance to M/s *Haldiram Foods International*, Nagpur, which is using about 50 tonnes/day biomass pellets for firing its boilers for preparation of sweets and snacks. M/s Haldiram used pellet for firing its boilers for 1h duration and reported that it found cotton stalk pellets on par with other biomass pellets. Moreover, 500 kg pellets prepared in this work were also given to 3 restaurants, which are using biomass pellets for their cooking purposes. These restaurants operated their pellets stoves for three days using our pellets. They reported that cotton stalk pellets were at par with that of other biomass pellets. The cost of pellets has been found as about 1/3rd of the commercial LPG.

Development of Indian Pellet Quality Standards

During the reported period, efforts were made towards development of Indian standards for biomass pellet quality parameters for different applications. The

biomass pellet quality standards of different countries have been studied and a questionnaire prepared for gathering information on requirement of pellet quality parameters from different end users. Data and biomass pellet samples were collected from about 20 stakeholders from Maharashtra, Haryana and Gujarat. The biomass pellet samples were analysed for their quality attributes. The requirement of pellet quality parameters in India can be grouped in 3 major categories.

Quality parameters of pellets being used in India

	Premium	Utility Grade	Industrial Grade
Bulk density (kg/m^3)	625- 750	580-750	580-750
Diameter (mm)	5.75-6.50	5.75-6.50	7.82-8.50
Pellet Durability Index (PDI)	≥ 96.5	≥ 95.0	≥95.0
Fines % (at the mill gate)	≤ 0.5	≤ 1.0	≤ 1.0
Inorganic ash %	≤ 1.0	≤ 3.0	≤ 8.0
Length % greater than 35 mm	≤ 1.0	≤ 1.0	≤ 1.0
Moisture %	≤ 8.0	≤ 10.0	≤ 10.0
Chloride, ppm	≤ 300	≤ 300	≤ 300
Heating Value (kcal/kg)	4000	3900	3800

Cotton Stalk Briquettes for Crematoria

In India, a large amount of wood is used for burning dead bodies in crematoria. About 300 kg wood is needed for burning of a single dead body. A tree which has been wilted and withered is usually used for cremation. However, the consumption rate of the wood is so high that green trees are also cut leading to deforestation and global warming. Studies conducted in this work showed that cotton stalk briquettes can be used an alternative to wood for burning of dead bodies. However, the requirement of a forced draft system for burning of densified briquettes poses serious problem in field trials.

An innovative experimental set up has been designed and developed for burning of dead bodies using cotton stalk pellets/briquettes by incorporating a forced draft system. The experimental setup consists of a M.S. platform and side covers for heaping of briquettes. The forced air draft was provided through MS air ducts provided at bottom and on two sides of the set up using a centrifugal fan. The air draft generated by fan was directed towards pyre through 2 mm perforations provided in the bottom and side ducts. The dead body would be laid on perforated MS plates placed just above the perforated ducts.

Experimental setup for burning of dead bodies using cotton stalk briquettes

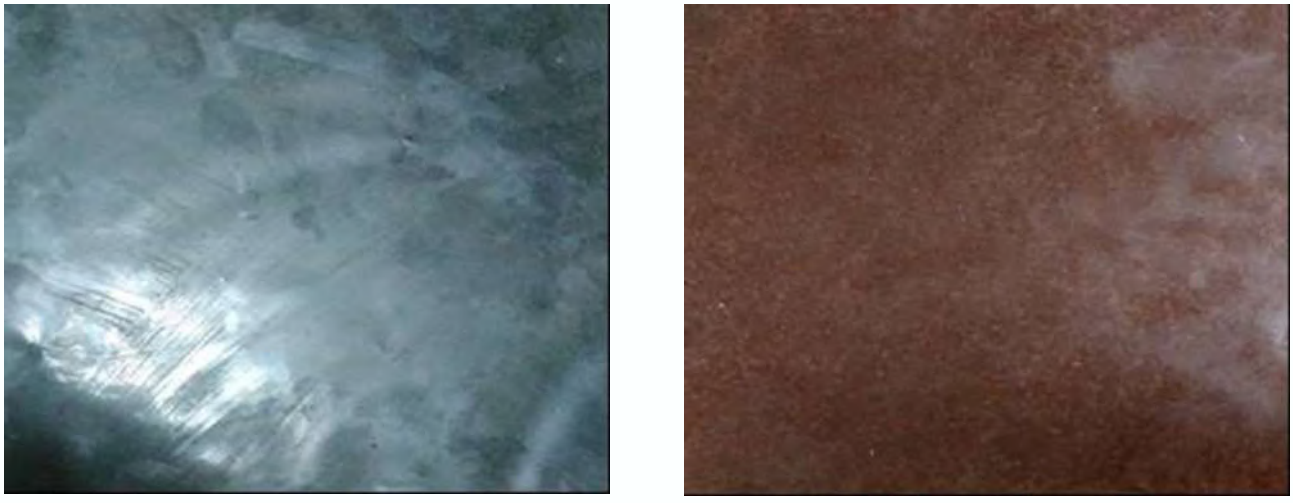
CRP.02 : Nano-Ligno-Cellulose for Polymer Composites

The project focusses on isolation of nano-form of lignocellulose from cotton stalks and coconut fibers by chemo-mechanical and bio-mechanical processes for potential application in composites. Nanocomposites were prepared by blending the NLC from coconut fibres and NLC from cotton stalks in a ratio of 50:50 and added with the epoxy for preparation of composites. The samples were analyzed for their impact strength and tensile strength at IIT Madras. Significant improvement was noted for both the properties in case of 50:50 blended NLC, which can be contributed to the synergistic effect. But, the tensile stress of control epoxy could not be achieved using the composites that can be attributed to the fact that brittleness increased due to the addition of fillers.

Mechanical properties of NLC (coconut fibre blended with cotton stalk) based epoxy composites

Reinforcement material with Epoxy	Izod Impact strength Energy lost per unit thickness (J/cm)	Tensile stress at Max oad (MPa)
Control	1.05 ± 0.35	35.50 ± 0.92
NLC from coconut fibre	1.034 ± 0.02	30.52 ± 0.71
NLC from cotton stalks	0.769 ± 0.01	26.02 ± 3.35
50:50 NLC	1.202 ± 0.07	34.18 ± 3.68

Also, the composites were added with colouring pigments and evaluated for their appearance. Blue and brown pigments were added in the composites and they were found to be uniformly distributed all over the epoxy resin composites. This will help in enhancing the aesthetic value of the composites.



Blue and Brown Coloured composites reinforced with NLC

For the applications of the prepared NLC based nanocomposites, various alternatives were explored. One among them was the use as nursery seedling trays. On discussion with the Scientists from ICAR-DFR (Directorate of Floricultural Research, Pune), it was understood that there is an urgent need to replace the material for nursery seedling trays, that is otherwise prepared from plastics. Based on inputs received, it is planned to make nursery seedling trays using the NLC based composites. For this purpose, a fibre reinforced epoxy mold was prepared.

Plastic seedling trays currently used in nursery (left) and the fibre reinforced epoxy mold prepared for preparation of composite based nursery trays (right).

CRP.03: Eco-Friendly Method of Preparing Absorbent / Surgical Cotton

An ecofriendly process was developed for preparation of absorbent cotton using short staple cotton (*G. arboreum*). The crude enzyme extract of solid state fermentation was employed for absorbent cotton treatments. A combined scouring and bleaching process was developed for absorbent cotton preparation using crude enzyme. The substrate for crude enzyme preparation includes banana pseudo stem dry powder, Cotton seed hulls, Cotton seed meal in the ratio of 60:30:10. The pectinase and laccase activity recorded in the enzyme extract was 25 and 7 Units per ml respectively. Under optimized process conditions such as Cotton fibre and crude enzyme extract in the ratio 1:12, material to liquor ratio was 1:20, temperature (55°C), time (40 min), pH (9.0) and wetting agent (0.1%), the absorbency was 3 seconds under sink test and whiteness index of 31.5 as per CIE standard.

Considering the large availability of cheap agro residue, an Ecofriendly, Economical & Simple scouring and bleaching process was developed for rural entrepreneurship development, especially for unemployed women in villages.

After optimization of all the process parameters, an industrial trial was taken at Centre of Science for Villages, Dattapur, Wardha, Nagpur. In this trial 10kg of cotton fibre was processed in a normal paper pulping beater. The calculated amount of enzyme (120 L) was taken in trough. Total liquor required to process the cotton material was calculated on the liquor material ratio (200 liters). On the weight of cotton fibre (10 Kg), wetting agent 0.1% was added into the liquor for uniform processing and better wettability. About 0.05% NaOH was added to maintain the pH of 9 throughout the process. The temperature was maintained at 60°C for 40 minutes.

Test Report of Industrial Trial

Ana ysis	Treated	Standard
Absorbency (Sink Test)	< 3 seconds	< 10 seconds
Whiteness Index (as per CIE method)	32	60 (for Commercial sample)
Sulphated Ash Content	0.2212	(std: < 0.5)
Residual Wax Content	0.075%	< 0.1%
Water Holding Capacity	26 g/g	(std : >23 g/g)

Eco-friendly method of preparing absorbent cotton

CRP.04: Sustainable Green Technology for Dyeing of Cotton

A bulk trial was undertaken at M/S Ginni Silk Mills Ltd, Boisar using salt-free dyeing technique. 250 meters of fabric was dyed using a jumbo jigger. A light turquoise shade was selected for dyeing to study the uniformity of dyeing. Reactive dyes Yellow SBG- 0.049% and Blue CLG- 0.009% were used for dyeing. Initially, the ready for dyeing cotton fabric was pretreated with cationising chemical followed by dyeing. The result indicated that uniform dyeing was produced on the fabric even with a very light shade of 0.1% using the developed salt-free dyeing technique. The dyed fabric was tested for washing and light fastness properties as per standard methods which showed the rating of 4 and 3-4 respectively.

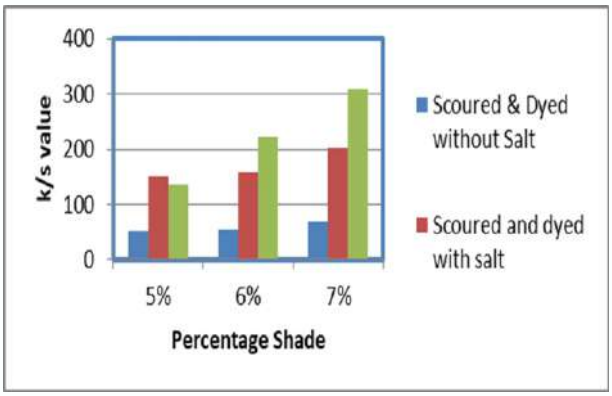
The dyed fabric was then converted into formal shirts about 160 numbers to study the fabric properties and wear trials. From the scale-up trial for the salt-free dyeing technology, it is observed that the technology is scalable and can dye the cotton fabric without the addition of salt. The advantage of the technology is that there is no requirement of additional machines and with the existing machinery sequence, the process can be done. The biggest advantage is the dyeing effluent TDS can be reduced from about 60000-70000 ppm to below 10000 ppm and the effluent treatment can be done without the requirement of costly reverse osmosis process (RO). The developed process is more useful for small-scale dyeing industries which cannot afford to install the costly reverse osmosis plant.

A dyeing study was also conducted to study the suitability of salt-free reactive dyeing using Cibacron dyes Viz. Novocron Pink, Novacron Yellow FN2R, Novacron Navy Blue WB, Novacron Black NN. Four shades were produced as per the salt-free dyeing technique and the color coordinate and fastness values were determined as per standard method.

In all the cases of dyes, the result indicated that salt-free dyeing-3 is comparable with conventional dyeing in terms of color coordinates (L, a, b & k/s). The fastness properties of salt-free dyed fabrics were one grade higher in three dyes and equal in one color.

Development Combined scouring and Cationization Process

For dyeing of cotton with dark shades, normally scoured fabric is taken for dyeing. With this background a combined scouring and captioning process were developed by which scouring and the cationizing can be carried out single bath itself. The result of the experiment indicated that the combine scouring and cationization treated fabric can be dyed without the use of salt with comparable color and fastness properties of conventional dyeing process carried out using a huge amount of salt.



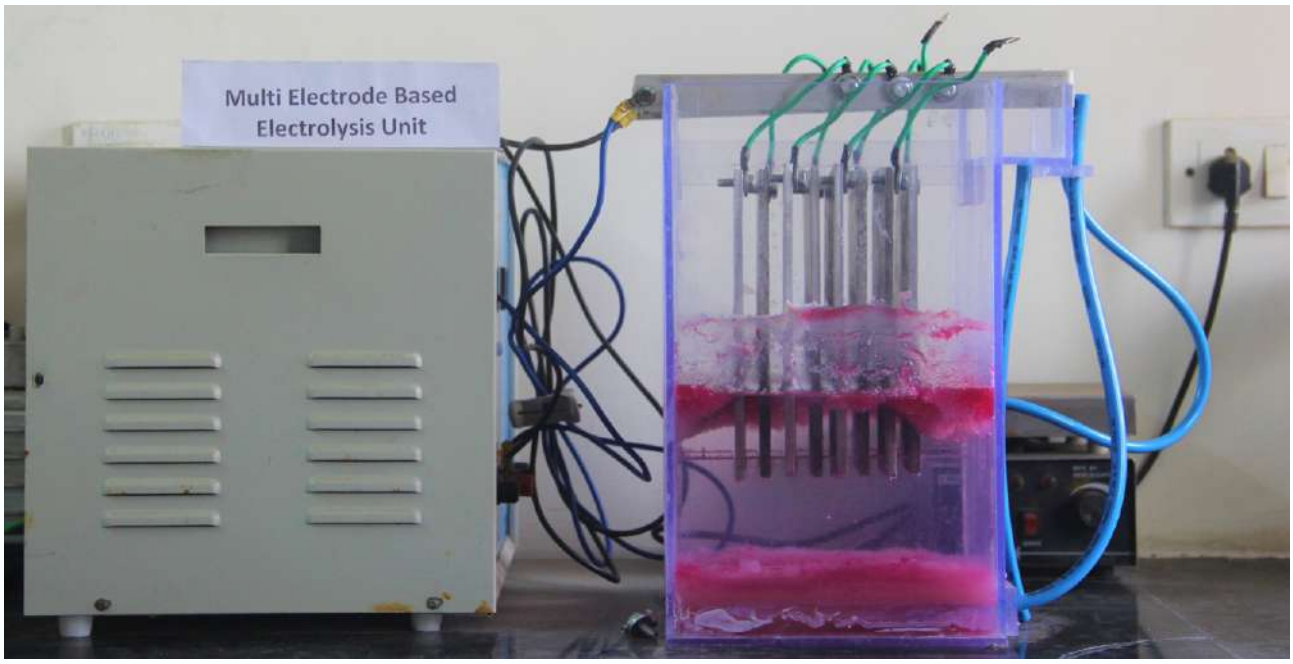
Sea Water Softening

A process for softening of sea water for using it as a medium for dyeing cotton with reactive dyes was developed. This process requires less addition of chemical compared to earlier developed methods. By the developed process, the hardness of seawater has been reduced to below 500ppm. Such treated water can be used as a medium for dyeing.

Exp. No.	Chemical A (g)	Chemical B (g)	Titration reading (ml)	Hardness of water (ppm)
1	0.8	0.40	2.7	1350
2	0.9	0.45	1.5	750
3	1.0	0.50	1.0	500
4	1.1	0.55	0.6	300

Multi-Electrode based Electrolysis Unit

Electrolysis based effluent treatment process has been developed for treating reactive dye effluent. The system was made with single electrode set up. The system was modified into multi-electrode based electrolysis unit having 5 liters capacity with the help of M/s Konark Fixtures Ltd Mumbai for fabrication. The new fabricated unit can be used for experiments on effluent treatment.



3. Institute Technology Management

The Institute is engaged in developing new technologies and refinement of the already developed technologies in the areas of post-harvest processing of cotton, eco-friendly finishing of textiles and utilization of cotton stalks. Technologies developed are protected through management of intellectual property rights. Assessment, popularization and commercial adoption of viable technologies are carried out regularly through demonstrations, industrial trials, awareness meets, exhibitions and seminars. Impact assessment of already commercialized technologies is also taken up for further improvement.

3.1 Intellectual Property Management

Institute Technology Management Unit (ITMU) takes care of the protection of intellectual property rights of the technologies developed in the Institute and is also involved in commercialization of these technologies.

Table 3.1 Patents Granted

Patent Title	Patent Number	Date of Grant	Inventors
A Method for the Production of Cellulose Powder from Crop Residues	276255	07-10-2016	R.H. Balasubramanya A.J. Shaikh S. Sreenivasan
Bio-enrichment of Cattle feed for Better Digestibility	276257	07-10-2016	R.H. Balasubramanya Arati Aravind Kathe
Biological Softenning of Lignocellulosic Material for Preparing Binderless Board	289209	03-11-2017	R. H. Balasubramanya A. J. Shaikh R. M. Gurjar

3.2 Agri-Business Incubation (ABI)

ICAR-CIRCOT has established an Agri-Business Incubation (ABI) Centre for the benefit of prospective entrepreneurs who wish to start their own units using Institute technologies for post-harvest processing of cotton and value addition to its by-products. Three incubations are currently in progress in the Agri-Business Incubation Centre.

3.3 Technology Release

A multi-disciplinary team of scientists has developed a paper pulp technology for preparation of high quality currency grade paper from cotton. The technology has been developed in line with the Prime Ministers "Make in India "programme as our country has to import the pulp for producing the paper. The paper produced by this technology can be used for producing high quality currency grade paper with double the durability of the notes currently being produced. The paper produced by the Institute was tested at the GoI Security Paper Mill, Hoshangabad.

It is proud moment for the Institute as the technology has been released during the ICAR Foundation day ceremony on 16th July 2017 at NASC complex, New Delhi by the Honorable Agricultural and Farmers Welfare Minister Sh. Radhamohan Singh in presence of the Director General and top officials of ICAR.

3.4 Awareness Meets and Demonstrations

The Institute conducts awareness meetings and demonstrations regularly at its Mumbai headquarters and all the regional centres located in various parts of the country for the benefit of the cotton farmers, traders and other stake holders.

GTC Nagpur conducts such programmes throughout the year where farmers from cotton growing areas of Maharashtra and other states come to get the first hand feel of the Institute technologies in ginning and by-products utilization for value addition.

Programs in Maharashtra

a one-day field demonstration on cotton stalks chipping and using it for the preparation of compost was conducted at the farm of a progressive farmer, Mr. Niranjan Manish Gonwade, Amgaon Village, Selu taluk, Wardha Dist on April 29, 2017. Fifteen farmers representing Amgaon and Khadki villages participated in the program.

Demonstration of cotton stalk chipping at Amgaon on April 29, 2017

The farmers were educated about the operation of electrical chipper for chipping of cotton stalks and other biomass. The steps involved in preparation of bio-enriched compost using the chipped cotton stalks was also demonstrated to the farmers. During the program, the team of experts had an opportunity to meet Mahila SHG at Amgaon Village, who showed their interest in mushroom technology developed by CIRCOT as a business model to empower the women in the village

A workshop on Cotton Cultivation and Post-Harvest Technology was conducted in collaboration with M/s Bayers Crop Sciences at Umred, Nagpur on 03-06-2017 and Anji, Wardha on 06-06- 2017.

Dr. V. Mageshwaran, Scientist, GTC addressing the gathering at APMC, Umred, Nagpur on 3rd June 2017

An awareness programme on selection of cottonseed and cultivation method was organised for the cotton growers of Vijayanagar, Karmala taluka of Solapur in association with Dhansmruti group of Industries on 18-06-2017.

Dr. S.V. Ghadge & Dr. P.S. Deshmukh, Senior Scientists represented the Institute. The stakeholders present included representatives from seed, fertilizer, soil testing and services sectors. The farmers were made aware of the importance of cotton quality in the value chain, optimum

utilization of resources during cultivation, clean cotton picking practices, utilization of by-products of cotton plant. On this occasion, ICAR-CIRCOT had arranged an exhibition stall highlighting oil processing technologies and provided guidance to the participating farmers. Sale of seeds and soil testing services were also organized for the benefit of cotton farmers.

A one-day awareness-cum-demonstration program on production and processing of cotton was conducted at Majra Village, Dist. Wardha on June 29, 2017. Dr. R. Guruprasad highlighted the importance of clean and quality fibers in spinning and textile industries. He emphasized on the selling of trash free cotton to the market to fetch better prices. Dr. M.S. Kairon, Former Director ICAR-CICR, Nagpur detailed about the best management practices in cotton production to improve the productivity, minimizing the cost of production, improving the fibre quality. Shri G.H. Wairale, GM, Maharashtra cotton federation discussed about the cotton marketing and fibre properties to the farmers. He informed to farmers that ginners are ready to pay Rs. 100/- extra for every, one percent increase in ginning percentage of more than 34%. Dr. V. Mageshwaran, Scientist, GTC briefed about the use of biological inputs in cotton cultivation for sustainable agriculture and elaborated the technique of compost preparation from cotton stalks. He highlighted that by adoption of compost preparation using cotton stalks, a farmer can earn additional income of Rs. 2000/- per acre. Er. Varsha Satankar briefed demonstrated mushroom production technology and insisted to the farmers for mushroom production using cotton stalks for getting additional income of Rs 12000 per tonne of cotton stalks.

Scientists interacting with the farmers at Majara Village

Kishan Goshti cum demonstration programme was organized on September 18, 2017 at Ratnapur village in Deoli Taluk of Wardha District, Maharashtra under "Mera Gaon Mera Gaurav" programme.

A team of scientists from GTC, Nagpur consisting of Dr. V. Mageshwaran and Er. Varsha Satankar, visited Amgaon, Kadki, Palasgaon and Digras villages of Selu Taluka, Wardha Dist., Maharashtra on March 13, 2018 and conducted a survey among 60 farmers on adoption of ICAR-CIRCOT technologies on "Preparation of bio-enriched compost from cotton stalks and cultivation of oyster mushroom using cotton stalks". The analysis revealed that ICAR-CIRCOT initiatives on transfer of these farmer-friendly technologies through various awareness programs and demonstrations had positively impacted on knowledge of use of these technologies in increasing farmers' income.

Development of Farmers Cluster

Programme on "Development of Farmers Cluster/Cooperative society for Processing of Banana Pseudo stem and value addition to the banana fiber" was organised at

Satod Village of Jalgaon District on September 26, 2017.

Scientists Dr. P.K. Mandhayan and Dr. G. Krishna Prasad visited banana fibre extraction units installed by farmers in that region and gave suggestions to the farmer for improving the banana fibre quality. On the same day they had a meeting with Honorable Shri Haribhau Madhav Jawale, Member of the Maharashtra Legislative Assembly and explained him about the different procedure for developing value added products from banana fiber.

Awareness Programs in Haryana

An Awareness Program on "Preparation of bio-enriched compost from cotton plant residue" and "clean cotton picking" was organized in association with CICR Regional Station, Sirsa on October 17, 2017. A select group of 35 progressive farmers and 25 scouts mentored by Bharat Cotton Factory, Giddarbaha (Pb) under the aegis of Better Cotton Initiative (BCI). Dr. D. Monga, Head, CICR Regional Station, Sirsa and Dr. Rishi Kumar, Principal Scientist participated in the program. Dr. Hamid Hasan, Officer In-charge, delivered a lecture on "Preparation of bio enriched compost from cotton plant residues" and deliberated detailed methodology of preparation of compost and its application to field.

Farmers were also made aware of menace of trash and contamination in cotton and its impact on the quality of yarn and fabric. They were elaborated upon clean cotton picking practices, storage and transportation and how to minimize contamination in cotton during harvest and post-harvest operations. They were also demonstrated of functioning of HVI and Trash Analyser. Printed materials on compost preparation and clean cotton picking were also distributed.

An awareness-cum-demonstration programme on "Preparation of Bio-enriched Compost from Cotton Plant Residue" was organized by Sirsa unit, at Shahpur Begu village of Sirsa district on January 28, 2018. The programme aimed at popularization and adoption of composting technology among the progressive farmers. Farmers were briefed about preparation of compost, its nutritional aspects, field applications and possible impact on soil health improvement. The farmers were given a hands-on demonstration of compost preparation on a heap of 5 tons.

3.5 Exhibitions and Agri-Fairs

The Institute participated in and arranged various exhibitions and agricultural fairs organized in different parts of the country and displayed its technologies benefiting a large number of farmers and stakeholders.

Textile India 2017

ICAR-CIRCOT Participated in mega international event "Textile India 2017" organised by Ministry of Textiles, Govt. of India at Mahatma Mandir, Gandhinagar, Gujarat from 30th June to 2nd July, 2017 showcasing its technologies as well as products and related exhibits.

Round table discussions were also held with participation from global and national leaders of industry, technical experts and senior policy makers from the Union and State Governments. ICAR-CIRCOT pavilion at Textiles India attracted many industrialists, political leaders and people from academia.

The event was inaugurated by Shri. Narendra Modi, Hon'ble Prime Minister, Govt. of India on 30th June 2017.

An international conference on "Productivity and Product Diversification challenges for Natural Fibers" was organized in presence of Shri. Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Smt. Smriti Irani on 2nd July 2017 in which Dr. P.G. Patil, Director, ICAR-CIRCOT delivered a lecture.

Indo-Global Education and Skill Expo-2017

ICAR-CIRCOT participated and showcased its technologies, Skill Development programmes and Agri-Business Incubation Facilities in the one day Indo-Global Education and Skill Expo-2017 organised by the Indus Foundation on 17th July 2017, at The LALIT Hotel, Santacruz, Mumbai.

AGRI INTEX 2017

Regional Quality Evaluation Unit of ICAR-CIRCOT, Coimbatore participated in exhibition named "AGRI INTEX 2017", an agricultural trade fair held at CODISSIA Trade Fair Complex, Coimbatore from July 14-17, 2017.

7th Asian Cotton Research & Development Network meet exhibition

ICAR-CIRCOT participated in the exhibition arranged with the 7th Asian Cotton Research & Development Network meet at Nagpur during September 15-17, 2018.

9th Agro Vision - 2017

GTC, Nagpur actively participated in the 9th Agro Vision - 2017 held at Reshimbhag, Nagpur during November 10-13, 2017. ICAR-CIRCOT exhibited a stall during the entire period of programme and was keenly involved in showcasing ICAR-CIRCOT technologies to the visitors and farmers. Hon. Shri Venkaiah Naidu, Vice President of India, Hon. Shri. Nitin Gadkari, Union Minister of Road Transport and Highways and Hon. Shri. Devendra Fadnavis, Chief Minister of Maharashtra graced the inaugural function. The programme witnessed huge gathering and enthusiasm among the farmers and youngsters.

Exhibition in Technology and Machinery Demonstration Mela - 2018

An exhibition was arranged during the Technology and Machinery Demonstration Mela 2018 at Nagpur on February 15, 2018 to display the technology and machinery on cotton processing and by-products utilization for the farmers. Live demonstration on chipping of cotton stalks, preparation of bio-enriched compost preparation, oyster mushroom cultivation, preparation of pellets and ginning output was conducted for the benefit of farmers.

Exhibition on Cotton Stalk Composting Technology

The Sirsa regional unit guided a young progressive farmer Shri Karan Nehra in adopting the cotton stalk composting technology to prepare compost from 2.5 tons of cotton plant residues at his field in Abubshahar village of Sirsa district in Haryana on February 17, 2018 and exhibited the same to other farmers. Also, the benefits of compost preparation were enumerated and they were encouraged to adopt the technology as an alternate to Farm Yard Manure (FYM) which is scarcely available nowadays.

Exhibition on Cotton Stalk Composting Technology at Abubshahar village, Sirsa on February 17, 2018

Krishi Unnati Mela 2018

Dr. Manoj Kumar and Mr. D.U. Kamble from ICAR-CIRCOT Participated in exhibition of Krishi Unnati Mela 2018, held at IARI, New Delhi.

Union Minister of Agriculture and Farmers Welfare, Shri Radha Mohan Singh inaugurated the Krishi Unnati Mela at Pusa Institute on 16th March 2018. The main objective of the fair was to expand the potential of agriculture and also "double the income of farmers by 2022".

Honorable Prime Minister, Shri Narendra Modi, addressed the krishi unnati mela on 17th March, 2018.

Large number of farmers from across the country visited the fair and gained useful knowledge and information. Minister complimented organizers for the success of event and also appreciated farmers for their keen involvement.

Visitors in ICAR-CIRCOT stall in Krishi Unnati Mela exhibition

Live webcast of the inaugural function of Krishi Unnati Mela - 2018

Webcast of Krishi Unnati Mela

ICAR-CIRCOT enthusiastically participated in the live webcast of the inaugural function and Honorable Prime Minister's speech at Krishi Unnati Mela-2018 on March 17, 2018. The Director along with scientists and technical officers assembled in the Conference Hall to witness the event live. The Director also spoke on the occasion reiterating some of the points from Honourable PM's speech and urged the staff to work harder to help achieve the goal of doubling farmers income.

Kisan Mela

Ginning Training Centre, Nagpur participated in Kisan Mela organized by ICAR-CCRI, Nagpur and ICAR-NBSS & LUP, Nagpur on March 17, 2018 at the premises of ICAR-CCRI, Nagpur in connection with the Krishi Unnati Mela at New Delhi. The stall setup by ICAR-CIRCOT was visited by over 1100 farmers and over 100 officials.

Festival of Innovation and Entrepreneurship (FINE)

ICAR-CIRCOT's ABI Centre Incubatee M/s GREYY, Navi Mumbai got selected for participation in the Festival of Innovation and Entrepreneurship (FINE) held during March 19–23, 2018 at The President of India House, New Delhi. FINE is a unique initiative of the Office of the President of India to recognize, respect and reward grassroots innovations and foster a supportive ecosystem. The five days exhibition had participation from various industry, academic and research organizations.

3.6 Television Talks

Director Dr. P.G. Patil, and Scientist Er. V.G. Arude participated in a TV talk show *Amachi Mati Amachi Mansa (DD Sahyadri) on* Modern Cotton Ginning Process. The experts highlighted the role played by ICAR-CIRCOT in modernization of cotton ginning industry in India as well as research work being carried out in this area.

The talk covered the importance of better management practices to be followed during cotton picking, storage and transportation, importance of cotton grading, gin setting for preserving fibre and seed quality, economic of cotton ginning, challenges faced and need for skill development in cotton ginning sector. This programme was telecasted on April 17 and 18, 2017 on Sahyadri Channel of Doordarshan.

Senior Scientist Dr. P.S. Deshmukh participated in a TV talk show Krishi Darshan of DD Sahyadri (Marathi), which was broadcasted on 29.06.2017 at 6.10 pm. The topic of discussion was Scientific Cottonseed Processing. The expert discussed about the present conventional processing, potential, method, products derived and benefits of scientific cottonseed processing and misconceptions about un-decorticated cake. Further the economic benefits from the cottonseed processing to the nation was also discussed.

Dr. P. G. Patil, Director participated in a TV talk show 'Krishi Darshan' hosted by DD Sahyadri, The topic of discussion on the talk show was "कापसा पासून नॅनोसेल्युलोज निर्मिति व त्याचे उपयोग" (Nanocellulose Production from Cotton and its Uses)". The show was broadcasted on September 25, 2017 at 6.10 p.m. The deliberations covered the importance of nanotechnology, nanocellulose and its unique properties, production of nanocellulose from cotton linters and its uses, first nanocellulose pilot plant at ICAR-CIRCOT, contribution of ICAR-CIRCOT in developing cost efficient chemo-mechanical process for nanocellulose production and its impact on farmers' income and future of agriculture in India.

Er. V.G. Arude, Scientist, delivered a TV talk programme under Krishi Darshan in Marathi on Sahyadri Channel of Doordarshan. The topic of discussion on the talk show was 'Value Addition to Cotton Stalk'. The programme highlighted the status of utilization of cotton stalk for various application and problems encountered thereupon, method adopted for its uprooting, cotton stalk supply chain and its potential industrial applications at rural level. Er. Arude briefed about the economic feasibility of establishment of briquetting and pelleting plant and preparation of compost from cotton stalk and its benefits to farmers and other stakeholders. The talk was stressed on to increase the farmer's income and to create the wealth from the waste. The talk also covered the role played by ICARCIRCOT in creating awareness and training for utilization of cotton stalks for preparation of various value added products. This programme was broadcasted on November, 24 and 27, 2017 on Sahyadri Channel of Doordarshan.

Dr. P. G. Patil, Director, participated in a TV talk show "Aamchi Mati Aamchi Manasa" (आमची माती आमची माणसं) hosted by DD Sahyadri. The topic of discussion on the talk show was "Absorbent Cotton Production Technology" (कापसापासून अवशोषक कापूस निर्मिति). The programme highlighted cotton scenario of India and current status of absorbent cotton sector in India. The deliberations also covered topics such as absorbent cotton and its applications, absorbent cotton technology developed by ICAR-CIRCOT, raw materials and machineries used for production of absorbent cotton, quality parameters for absorbent cotton, packaging and storage of absorbent cotton and environmental issues in the

absorbent cotton industry. He briefed about the role of ICAR-CIRCOT in entrepreneurship development by offering regular trainings and consultancy services in absorbent cotton technology. The programme was broadcasted on March 26, 2018 at 6.30p.m. and on March 27 at 6:30 a.m. on Sahyadri Channel of Doordarshan.

3.7 Radio Talks

Senior Scientist Dr. P.S. Deshmukh participated in Radio Talk on All India Radio (Akashvani), Asmita Vahini, Mumbai. The topic of talk was "सुपारी च्या सालीपासून तंतु उत्पादन आणि त्याचे उपयोग" (Arecanut Husk Fibre Production and its Uses). The show was conducted by Dr. Santosh Jadhav, Programme Executive, All India Radio and broadcast on September 9, 2017 at 7.30 p.m.

Scientist Dr. Sharmila Patil delivered a Radio Talk on All India Radio (Akashvani), Asmita Vahini, Mumbai. The topic of talk was "Annual fruit crops of Konkan region and their processing". The talk covered the topics such as importance and need of fruit processing, unit operations involved and machineries used in fruit processing, site selection for processing plant, role of processing and value addition in doubling farmers' income etc. The programme was conducted by Dr. Santosh Jadhav, Programme Executive of All India Radio and broadcasted on January 15, 2018.

International Conference During Textile India 2017, Mahatma Mandir, Gandhinagar, Gujarat.

4. Training and Capacity Building

The Institute, in pursuit of excellence in the field of post-harvest processing of cotton and its biomass, is regularly conducting skill development programmes and capacity building activities throughout the year. Training programmes are organised, for the stakeholders including farmers and personnel from cotton trade and industry as well as its own employees, covering diverse areas right from clean cotton picking, ginning to cotton quality evaluation. Ginning Training Centre, Nagpur conducts training courses for gin fitters and other workers in ginning industry on technologies for production of clean quality cotton, maintenance of various ginning and allied machines apart from solving technical problems arising in the ginning industry. The Institute also organises customized specialised training programmes on spinning, quality evaluation and chemical characterisation to personnel from the industry on specific topics. Also it nominates institute employees for various training programmes outside the institute for improving their skill in their respective fields.

4.1 Participation in Trainings

It is very important for the Institute employees to keep abreast of the new developments in their respective fields of work and update their skills. So, trainings constitute a continuous education process at the Institute to upgrade knowledge, skills and abilities of both the employees and stakeholders at national and international level. Different research areas identified for possible foreign collaboration were received through inputs collected from experts in different fields. Subject areas finalized for foreign collaboration include processing of mechanical harvesting of cotton, industrial application of microbial degossypolization and biopolymer based nanocomposites.

Table 4.1 Trainings Attended During 2017-18

Programme Title	Duration	Venue	Name(s)
Scientific Staff			
Research Excellence in Organisations	August 6-9, 2017	Administrative Staff College of India (ASCI), Hyderabad	Dr. P.G. Patil
Design and Manufacturing of Agro-Processing Machines	August 1-21, 2017	CIAE, Bhopal	Er. Varsha Satankar
Value addition to Cottonseed	July 20-22,2017	CIRCOT, Mumbai	Dr. Manoj Kumar
Profesional attachment Training	June 30 - October 13, 2017	IIT, Delhi	Er. Jyoti Dhakane

Programme Title	Duration	Venue	Name(s)
Instrumental Evaluation of Clothing Comfort	May 15-19, 2017	CIRCOT, Mumbai	Dr. Sharmila Patil Er. Archana Mahapatra Er. Jyoti Dhakane
Nano and Biotechnology: Innovation and Revolution	July 14-15, 2017	Ramnarain Ruia College, Matunga, Mumbai	Dr. Manoj Kumar Dr. Sharmila Patil Er. Archana Mahapatra
Training on Textile Preocessing	March 20, 2018	CIRCOT, Mumbai	Er. A.K. Bharimalla Dr. P.S. Deshmukh Dr. C. Sundermoorthy Dr. G. Krishna Prasad Dr. P. Jagjanantha

Technical Staff

Training on Textile Preocessing	March 20, 2018	CIRCOT, Mumbai	Shri. S. Banerjee Smt. Medha Kamble Shri. R.R. Chhagani Shri. Rajesh Narkar Shri. Manoj Ambare Dr. N.M. Ashtraputre Shri. R.P. Kadam Dr. Sujata Kawlekar Shri. R.S. Prabhudesai Shri. H.S. Koli
Spinning Machine Operation and Maintenance	August 7-9, 2017	SITRA, Coimbatore	Shri. Krishna Bara Shri. S.K. Parab Shri. R.R. Gosai Shri. Mahavir Singh Shri. S.G. Phalke Shri. D.J. Dhodia
Automobile maintenance road safety and behavioural skill for regular division in technical grade	September 18-22, 2017	CIAE, Bhopal	Shri. S.D. Salaskar
Training for Technical and Admin Personnel on "ICAR-ERP"	December 22-27, 2017	IASRI, New Delhi	Shri.Yogesh Nagpure
J-Gate@CeRA for Western Region	December 23, 2017	CIFE, Mumbai	Smt. Prachi Mhatre Smt. Medha Kamble

Programme Title	Duration	Venue	Name(s)
Administrative Staff			
Enhancing Efficiency and Behavioral Skills (for stenogrphers, PA, PS and PPS organized by NAARM, Hyderabad)	August 3-9, 2017	CIFE, Mumbai	Smt. Tereza Theofilo D'Souza
Training Programme on MS-Excel	September 13-15, 2017	ISTM, New Delhi	Shri. S.S. Angane
Procurement & PFMS,	November 9-10, 2017	CPCRI, Shimla	Shri. S.V. Kasabe
Income tax rules calculation of e-filing	November 9-10, 2017	INGAF, Mumbai	Shri. R.K. Pallewad Smt. S.G. Parab
Noting & Drafting, File & Records	November 16-17, 2017	INGAF, Mumbai	Shri.Y. R. Pathare Shri. P.V. Jadhav Shri. V.M. Sable
Leave rules and maintenance of service book	November 27-28, 2017	INGAF, Mumbai	Ms. Nikki Shokeen Shri. S.P. Paiyala
Pension & Other retirement benefits	December 14-15, 2017	INGAF, Mumbai	Shri. N.V. Kambli Shri. T.D. Dhamange
Public procurement process, GEM	December 21-22, 2017	INGAF, Mumbai	Ms. Pooja Tiwari
Training for Technical and Admin Personnel on "ICAR-ERP"	December 22-27, 2017	IASRI, New Delhi	Shri. S.N. Bandre Shri. T.D. Dhamange
Skilled Support staff			
Industrial Safety and First Aid	March 24, 2018	CIRCOT, Mumbai	Shri K.T.Mahida Shri M.M.Katpara Shri M.J.Sumra Shri R.P.Karkate Shri M.K.Prabhulkar Shri J.D.Sakpal Shri M.G.Sosa Shri S.D.Magar Shri S.B.Worlikar Shri Sunil R.Tondse Shri M.N.Kamble Shri.M.C.Solanki

4.2 Trainings Imparted

4.2.1 National Trainings

The Institute has been conducting regular training programmes for students, farmers, entrepreneurs and personnel employed in cotton and ginning sectors. Training programmes related to advances in cotton technology in the field of chemical processing, nano-technology, spinning, quality evaluation and use of advanced instrumentation are conducted at Mumbai headquarters wheras programmes exclusively on ginning technology are conducted at Ginning Training Centre, Nagpur.

Table 4.2 Trainings Imparted During 2017-18

Programme Title	Duration	No. of Participants	Participants' Profi e
ICAR-CIRCOT, Mumbai			
An Introductory course on Instrumental Evaluation of Clothing Comfort	May 15-19, 2017	11	Industry, Academicians, scientists
Value Addition to Cottonseed	July 20-22, 2017	10	Students, Industry
Quality Evaluation of Cotton	July 24-28, 2017	12	CCI, Ginner, Trader
Absorbent Cotton Technology	August 02-04, 2017	10	Industry, Entrepreneur
Advances in Applications of Nanotechnology	September 11-15, 2017	19	ICAR & SAU staff, Academia
Quality Evaluation of Cotton	September 11-15, 2017	07	Industry, Farmer
Workshop on Absorbent Cotton Technology	September 22-23, 2017	05	Enterpreneurs
Basic & Advanced Statistical Techniques for Research	November 07-10, 2017	10	Academia, students
Knitting and knit garments	January 10-12, 2018	16	Academia, students, Textile committee
Advances in Microscopy	January 17-19, 2018	10	ICAR, Academia and Industry

Programme Title	Duration	No. of Participants	Participants' Profile
Electrospinning for Nanofibre production & its Applications	January 23-25, 2018	9	ICAR staff, SAU staff, Academia, students
Fibre Reinforced Composite	February 07-09, 2018	8	Academia, students

GTC, Nagpur

Double Roller Ginning Technology and Basics of Cotton Grading	May 01-06, 2017	03	Industry Personnel
Double Roller Ginning Technology and Basics of Cotton Grading	July 10-15, 2017	09	Industry Personnel
Production and post-harvest processing of cotton	July 17-20, 2017	38	Farmers
Production and post-harvest processing of cotton(ATMA, Jalna and Buldhana)	July 24-27, 2017	55	Farmers
Production and post-harvest processing of cotton(ATMA, Buldhana & Yawatmal)	August 01-04, 2017	59	Farmers
Production and post-harvest processing of cotton(ATMA, Jalgoan)	August 08-11, 2017	27	Farmers
Production and post-harvest processing of cotton(ATMA Jalgoan)	August 28-31, 2017	28	Farmers
Production and post-harvest processing of cotton(ATMA Jalgoan)	September 04-07, 2017	26	Farmers
Production and post-harvest processing of cotton(ATMA Jalgoan)	September 18-21, 2017	30	Farmers
Production and post-harvest processing of cotton(ATMA Jalna)	October 03-06, 2017	22	Farmers
Production and post-harvest processing of cotton(ATMA Jalna)	October 09-12, 2017	26	Farmers

Programme Title	Duration	No. of Participants	Participants' Profi e
Analysis of seedcotton(Bhuvaneswar)	October 13-14, 2017	24	State Govt. officials of Odisha
Double Roller Ginning Technology and Cotton Quality Evaluation	October 25-30, 2017	04	Industry Personnel
Production and post-harvest processing of cotton(ATMA Jalna)	November 06-09, 2017	39	Farmers
Production and post-harvest processing of cotton	November 20-23, 2017	30	Farmers
Tranning on Cotton Quality	March 07-09, 2018	10	State Govt. officials of UP

4.2.2 International Short-Term Training Programme (STTP-2018)

The Government of India has offered various short term agricultural training programmes in coordination with Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare, Govt. of India to a number of African countries in accordance with the commitment made under the 3rd India-Africa Forum Summit with the objective to increase the critical mass of government R&D, production and extension professionals with enhanced capacity for management of different crop production, processing and utilization of crop residues.

Inaugural Session of STTP-2018

Under this scheme, ICAR-CIRCOT organised an International Short Term Training Programme (STTP–2018) on 'Post-Harvest Management of Cotton and Value-Addition to Crop Residues' at Ginning Training Centre, Nagpur during Feb 19 - Mar 03, 2018. The programme was inaugurated by Director Dr. P.G. Patil in the presence of Dr. V.N. Waghmare, Director, CICR, Nagpur, Shri. G.H. Wairale, Agroplus Foundation, Nagpur, Dr. M.K. Sharma, CEO M/s Bajaj Steel Industries, Nagpur and Shri. K.G. Bhatt, Precision Tooling Engineers, Nagpur. There were 15 delegates representing Egypt, Ethiopia, Nigeria and Sudan who participated in the training programme.

Participants in STTP-2018

4.3 Education

The Institute has been accorded permanent recognition by University of Mumbai for guiding students leading to ***MSc*** (by research) in Physics, Bio-physics, Microbiology and Organic Chemistry and ***PhD*** in Physics and Microbiology.

ICAR-CIRCOT has signed MoU with educational institutions (VJTI Mumbai, DBSKKV Dapoli, UAS Dharwad, SNDT Mumbai and ICT Mumbai) to promote research and teaching in the sphere of cotton science and technology and carry out joint research work creating opportunity for persuing post graduate & doctoral degree programmes.

In addition, to promote the quality post graduate research and training in cutting edge areas, the Institute facilitates students from NARS and other organizations to access specialized guidance and facilities as per the **ICAR *guidelines for the students to conduct research for their degree programmes as trainees at ICAR institutions.***

PhD Students on Roll

Name of Student (Research Guide)	Year of Admission	Research Topic
Mrs. Soniya Shetty (Dr. R.H. Balasubramanya)	2008	Anaerobic retting of coconut fibres to produce textile grade fibres.
Mrs. Sangeeta M. Chavan (Dr. N. Vigneshwaran)	2012	Effect of silver, zinc oxide and titania nanoparticles on nitrogen fixing, phosphate solubilizing and biofilm forming bacteria found in soil ecosystems.

Name of Student (Research Guide)	Year of Admission	Research Topic
Ms. Komal Saraf (Dr. N. Vigneshwaran)	2012	Preparation of nanofibre mats of alginate and pullulan by electro spinning and its application as nanosensor for detection of food spoilage
Ms. Siddhi Juikar (Dr. N. Vigneshwaran)	2012	Microbial production and Characterization of Nano-Lignin and its application onto cotton and linen fabrics for functional properties
Ms. Priyanka Bagde (Dr. N. Vigneshwaran)	2014	Immobilization of antimicrobial peptides on nanocellulose for potential use in active food packaging

4.4 HRD Achievements

Based on the training needs assessment plan for 2017-18, employees were trained to hone their skills and keep pace with the latest technological advancements in their relevant fields. Employees underwent training and skill development programmes in premier institutions like IITs and IIMs and other international organizations to learn the cutting-edge technologies & project management methodologies.

Routine training impact assessment is carried out after a period of one year to analyze the outcome of the training programmes. The percent realization of trainings planned during the financial year 2017-18 was 115%. More than 99% of the fund allotted for HRD has been utilized for the training programmes.

Areas of training for scientists included diversified fields like textile processing, value addition to cottonseed, design and manufacturing of agro-processing machines and research excellence in various organizations.

Technical staff has undergone training in spinning machine operation & maintenance, ICAR-ERP system and textile processing.

Administrative staff were trained in Procurement & PFMS, Income tax calculation, noting & drafting, MS-Excel, Leave rules & maintenance of service book, ICAR-ERP system, Officer Procedure establishment & administration manuals, and pension & retirement benefits.

Skilled supporting staff were trained in industrial safety and first aid. In addition, 12 training programmes were organized to training Scientists & Technical staff from both ICAR and non-ICAR organizations in various specialized topics.

5. Linkages and Collaboration

CIRCOT maintains linkages with various organizations at national and international level to develop newer technologies and processes in the areas of post-harvest processing of cotton, eco-friendly finishing of textiles and utilization of cotton biomass and by-products. Linkages with stakeholders help enhance technology assessment for refinement and technology transfer.

Quality Evaluation (QE) units of the Institute are located within the premises of other institutes and agricultural universities in the country. Other than functioning as extension wings, these units also facilitate linkages and collaboration with host institutes. The five such units together with Ginning Training Centre (GTC), Nagpur and Agri-Business Incubation (ABI) Centre at the headquarters promote the technologies developed by the Institute amongst various stakeholders. Private players like M/s Bajaj Steel Industries and M/s Precision Tooling Engineers from Nagpur have already taken up few of the Institute technologies for commercial production.

Some of the prominent areas of collaboration with national and international institutes in the field of cotton science and technology are – AICRP on Cotton, Technology Mission on Cotton, Nano Technology, Natural Fibre Research and Cotton Technology Assistance Programme.

Collaborating institutes include premier research organizations like CICR Nagpur and NIRJAFT Kolkata, universities like ICT Mumbai, VJTI Mumbai and DBSKKV Dapoli, as well as private companies like Lafarge India.

Memoranda of Understanding (MoUs) were signed with different industries and with individuals for development of and commercialization of Institute technologies for cotton processing and value addition to by-products.

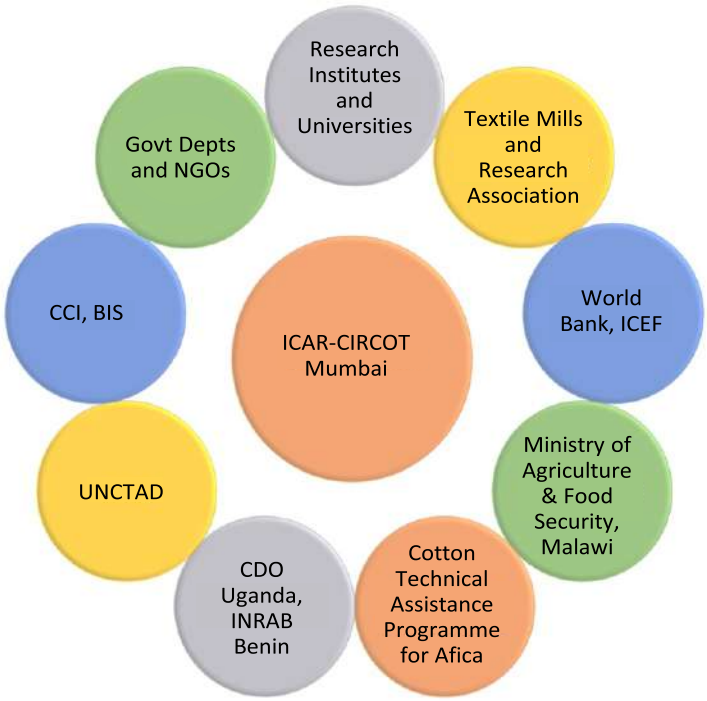


Fig. 5.1 National and International Linkages of ICAR-CIRCOT Mumbai

- AICRP on Cotton
  - CICR, Nagpur
  - State Agricultural Universities
- Technology Mission on Cotton
  - CICR, Nagpur
- Nano Technology
  - CPRI, Shimla
  - CIFE, Mumbai
  - NIFT, Mumbai
  - RCF, Mumbai
  - Lafarge India
  - Ramcharan Company, Chennai
  - Parksons Dyestuff, Nagpur
  - Nice Papers, Nagpur
- Natural Fibre Research
  - CICR, Nagpur
  - CRIJAF, Barrackpore
  - CSWRI, Avikanagar
  - NIRJAFT, Kolkata
- Cotton Technology Assistance Programme
  - CICR, Nagpur
  - IL&FS
  - Directorate of Cotton Development
- Research & Education
  - ICT, Mumbai
  - DBSKKV, Dapoli
  - VJTI, Mumbai
  - SNDT University, Mumbai
  - UAS, Dharwad

Fig. 5.2 Areas of Collaboration and Partnering Institutes

5.1 MoU Signed

MoU with M/s Forech Mining & Construction International LLP, New Delhi for technology license to manufacture Technical Textile Reinforced Rubber Composite Sheet for ICAR Flexi-Check Dam (March 27, 2018)

MoU with Mr. Sandeep Nikam, an entrepreneur from Pune, Maharashtra for "Preparation of Value Added Products Using Banana Fibre" (March 27, 2018)

5.2 Commercial Testing and Consultancy Services

CIRCOT is one of the acclaimed NABL accredited cotton testing laboratories in India. The Institute has facilities for conducting more than 160 tests on different textile materials and cotton by-products. These facilities are extended open to all the textiles mills, government departments and private sector parties.

During the year under report, a total of 20,947 samples were tested at different test centres including headquarters at Mumbai, GTC Nagpur and quality evaluation units at Coimbatore, Dharwad, Surat and Sirsa. Total revenue generated through commercial testing was Rs. 1,06,00,268/-.

Besides regular tests, special tests were also carried out as per demand on samples received from various government/ private organisations and universities. The Institute maintains liaison with different institutions including private organizations and entrepreneurs and strives to meet their technological needs by offering various other need based services generating additional revenue through the activity.

Table 5.1 Number Of Paid Samples Tested And Revenue Generated

Test Centre	No. of Samples Tested	Revenue Generated (₹)
Mumbai	5601	54,51,099
Nagpur	9068	36,50,403
Coimbatore	3430	8,13,205
Dharwad	281	13,340
Guntur	372	*
Sirsa	2195	6,62,235
Surat	*	9,986
Total	**20947**	**1,06,00,268**

* Deferred payment

Table 5.2 Tests Conducted And Clientele

Test	Party Name
AFM	Somaiya, Vidyavihar, Mumbai Vignan's Lara Institute of Technology & Science, Vadlamudi ICAR-NIRJAFT Kolkata
Antibacterial	Vignan's Lara Institute of Technology & Science, Vadlamudi SNDT, Juhu, Mumbai.
Antifungal	Ipsa Tex chem pvt ltd, Mumbai
ASH content	Thaklerji Solevt pvt ltd, Jalna
BET	Parvati Global Ind Pvt ltd, Rajasthan
BET surface area analysis	HEG Ltd , Bhopal
Compressive strength	HEG Ltd , Bhopal
Contact angle	Grasim Industries ltd , Mumbai
DSC test	Khalsa College, Matunga, Mumbai.
Elemental analysis	K. C. College, Mumbai Assam Agri. University
FTIR	Punjab Agri. University, Ludhiana College of Community Science, Dharwad ICAR-DMAPR, Boriavi, Anand (Guj.) ICAR-CIFE, Mumbai Pillai HOC College of Rasayani, Panvel
Paper GSM testing	Shivaji University, Kolhapur.
Iodine Number	HEG Ltd ,Bhopal
Linear density	Grasim Industries ltd, Mumbai. Sengathali bio fiber, Tuticorin
Linter	Bhumi cottex Industry Pvt ltd, Jalna. Kaliam Agro Products (p) ltd, Guntur Kowa India Pvt ltd, Mumbai. Shree Ram Protond ltd, Rajkot. Asahi kasei India Pvt Ltd, Mumbai India Impex, Noida
LOI &UPF	ICAR-NIRJAFT, Kolkata

Test	Party Name
Lyophilishtion	Ajitha S. Nair, Mumbai.
Paper testing	Pune Mahanagarpalika, Pune Mumbai University, Mumbai.
Physics	Indorama Synthethics (I) Ltd, Mumbai.
Resistance to airflow	Garware Wall Ropes ltd, Satara.
SEM	ICT Matunga ICAR-NIRJAFT Kolkata Bombay College of Pharmacy ICAR-DMAPR, Boriavi, Anand (Guj.) Camphor & Allied Products Ltd Croda India Company Ltd, Mumbai. Government College of Pharmacy, Aurangabad Hindustan Unilever, Mumbai. Indico Remedies, Mumbai Reliance Industies, Navi Mumbai. Ruia College, Matunga, Mumbai. Unisource Pharma, Mahape, Navi Mumbai. VJTI, Matunga, Mumbai. Bombay College of Pharmacy, Mumbai. Birla college, Kalyan Kalina, Santacruz, Mumbai. Dept. of Clothing & Textile, Baroda Sandos, Navi Mumbai ICAR-CIFE, Mumbai
Tensile strength & Elongation	SNDT, Juhu, Mumbai.
Total Bactical fungal	Ecosense Labs, Mumbai Abhay Nutrition, Jalna Ajeet Seeds, Aurangabad Animal Husbandry, Dharwad
UPF	JDIET, Yavatmal
Wax content	Vardhaman Textiles, Mumbai
X-Ray	Anek Prayog, Mumbai. D.G. Ruparel College, Mumbai Digichem Industies, Ambernath Pillai HOC College, Rasayani, Panvel
XRD	CKT College, Panvel ICAR-DMAPR, Boriavi, Anand (Guj.)

Table 5.3 Consultancy Projects Carried Out During 2017-18

Consultancy Project No.	Title of the Project	Name of the Organization to which consultancy offered
CP 2 / 16-17	Nanocellulose application in textile yarn spinning	M/s TKML, Coimbatore
CP 8 / 16-17	Development of cotton & cotton blend and application of functional finishes to impart antibacterial and moisture management properties	M/s Greyy, Navi Mumbai
CP 1 / 17-18	Fibre identification in inside core of sanitary napkin	M/s Amal Ghosh, Regional R&D - WH, Johnson & Johnson Consumer India, Mumbai
CP 2 / 17-18	Mechanical properties of polyester yarn immobilized with carbon nanotubes	Dr. C. Subramaniam, Dept. of Chemistry, IIT Mumbai
CP 3 / 17-18	Design and Manufacturing of Pre-cleaner, Double Roller Gin, Baling Presses and Feeding Systems	M/s Bajaj Steel Industries Limited, Nagpur
CP 4 / 17-18	Comparative evaluation of colour stability of marillofacial silicone elastomer samples	Dr. Heiennaa Mahale, Dental College & Research Centre, Digdoh hill, Hingna Road, Nagpur 19
CP 5 / 17-18	Nano-ZnO finishing of textile material and its characterization	Prof. Geeta Mahale, Dept. of Textile and Apparel Designing, College of Community Science, UAS Dharwad
CP 6 / 17-18	Design & development of natural product based formulation (nano fibrous mats) using electrospinning instrument	Ms. Namrata Bhattacharjee, Dr. L.H. Hiranandani College of Pharmacy, Ulhasnagar

6. Awards and Recognition

6.1. Award for Outstanding Work in Official Language 2016-17

CIRCOT bagged the coveted award for outstanding work in Official Language for 2016-17 from amongst 91 Mumbai based central offices. The award in the form of *Rajbhasha* Shield and Certificate was received by Director Dr. P.G. Patil on May 31, 2017 from the President, Town Official Language Implementation Committee (TOLIC), Mumbai and GM, Western Railway Shri. A.K. Gupta on the occasion of the six-monthly meeting of the TOLIC, which is constituted by Ministry of Home Affairs, Govt. of India and oversees the implementation of Official Language Hindi in all central government offices, autonomous bodies, banks and undertakings.

6.2. Ganesh Shankar Vidyarthi Hindi Patrika Award 2015-16

CIRCOT received the third prize (Joint award) for Amber Patrika under Ganesh Shankar Vidyarthi Hindi Patrika Award Scheme (2015-16) amongst institutes/ centres situated in A & B region. The award was conferred on the occasion of the ICAR foundation day on 16th July, 2017 by Hon'ble Union Minister of Agriculture & Farmer Welfare Shri. Radha Mohan Singh and Union Minister of State for Agriculture & Farmer Welfare Shri Sudarshan Bhagat. The award was received by Dr. P.G. Patil, Director, Smt. Trupti Mokal, AAO & Rajbhasha Cell in-charge and Mrs. Prachi Mhatre, Librarian.

6.3. Ashirvad Official Language Award (Individual)

Mrs. Trupti Mokal, Assistant Administrative Officer and In-charge, Official Language Cell bagged the Ashirvad Official Language Award Trophy for her valuable contribution towards the implementation of Official Language in day to day office work at ICAR-CIRCOT for the year 2017 from Ashirvad – a cultural and literary institution based at Mumbai.

6.4. Lead / Invited Presentations

PRESENTATIONS/ LECTURES DELIVERED DURING 2017– 18

NATIONAL

Topic	Event / Organizer / Venue	Delivered by
Cotton Scenario, Post-Harvest Processing and Value Addition to Cotton By-products	Yashwantrao Chavan Academy of Development Administration (YASHADA), Pune, Maharashtra August 01, 2017	Er. V.G. Arude
Rapid composting of cotton stalks: A strategy towards nutrient cycling in the rhizosphere of cotton fields	Training Programme on "Rhizophere Microbiology: Classical to Omic Approaches" ICAR-NBAIM, Mau, UP March 16, 2018	Dr. V. Mageshwaran
Guest lecture on "Organic Cotton and its Processing"	National seminar on "Recent Trends in Eco-friendly Textiles and Sustainable Fashion J. D. Birla Institute, Kolkata, March 27- 28, 2018	Dr. Sujata Saxena

INTERNATIONAL

Topic	Event / Organizer / Venue	Delivered by
Expert presentation on "Cotton By-product activities for Development"	National workshop on Promoting Cotton by-products United Nations Centre for Trade and Development (UNCTAD) Dar es salaam, Tanzania November 15-17, 2017	Dr. P.G. Patil
Expert presentation on "Priority Cotton By-product Activities for Development"	National Capacity Building Workshop United Nations Conference on Trade and Development (UNCTAD) under the UN Development Account project „Promoting cotton by-products in Eastern and Southern Africa"Lusaka, Zambia December 06-08, 2017	Dr. C. Sundaramoorthy
Expert speech on "Priority cotton by-products activities for development"	National Capacity Building Workshop United Nations Conference on Trade and Development (UNCTAD), Geneva Kampala, Uganda, March 14-16, 2018	Dr. P.G. Patil

Sports

CIRCOT sports contingent participated in the ICAR Sports Zonal Tournament (West Zone) – 2017 held at CAZRI, Jodhpur during January 16-20, 2018. A team of 51 participants consisting of 43 men and 8 women players participated in various events - Volley Ball, Table Tennis, Badminton, Carrom, Chess, Kabaddi, Basket Ball and Athletics including high jump, long jump, shot put, javelin throw, discus throw, races (100, 200, 400, 800 & 1500 m) and relay race. With 4 gold and 9 silver medals, the Institute stood 5th amongst 16 participating institutes.

Gold Medal

1. Carrom (W) – Smita Paiyala
2. Badminton (W) – Jyoti Dhakane
3. Chess (W) – Hemangi Pednekar
4. Table Tennis (W) - Smita Paiyala

Silver Medal

1. Shotput (W) – Nikki Shokeen
2. High Jump (W) – Nikki Shokeen
3. Disc throw (W) – Nikki Shokeen
4. Long Jump (W) – Nikki Shokeen
5. 200m (W) – Nikki Shokeen
6. Table Tennis Doubles (W) – Sandhya Parab, Smita Paiyala
7. Table Tennis Doubles (M) – R.D. Nagarkar, Manoj Ambare, P.V. Jadhav, Manoj Kumar, M.M. Kadam
8. Carrom (M) – Parab S. K.
9. Chess (W) – Varsha Satankar

Medal Winners of ICAR Sports Tournament (West Zone) – 2017

A team of six winners from the zonal tournament participated in the ICAR inter zonal sports tournament held at NAARM, Hyderabad from 21-25 February 2018 and won 3 silver medals.

1. Table Tennis (W) – Smita Paiyala
2. Chess (W) – Varsha Satankar
3. High Jump (W) – Nikki Shokeen

7. Publications

7.1 Research papers

1. M.K. Mahawar, K. Jalgaonkar, D.M. Kadam, P. Chavan (2017). Entrepreneurial Skill Development through Aonla Processing in Punjab, India. Food Science and Nutrition Studies 1 (1), 23-30. DOI: 10.22158/fsns.v1n1p23
2. V.G. Arude, P.G. Patil, S.K. Shukla and S.P. Deshmukh (2017). "Evaluation of Strength of Attachment of Cotton Fibre to Seed", *Multilogic in Science, Vol. 6 (XIX), pp.* 168-171. (NAAS Rating 5.2)
3. Mandhyan, P.K., Nachane, R.P., Banerjee, S., Pawar, B.R. and Koli, H.S. Nonlinear Maxwell modelling of inverse relaxation in yarns and fabrics, Indian Journal of Fibre & Textile Research Vol. 42, June 2017, pp. 168-174. (NAAS rating 6.420) Impact Factor 0.420
4. Raja, A.S.M., Arputraj, A., Saxena, S. and Patil, P.G. - Single bath enzymatic scouring and bleaching process for preparation of absorbent cotton, Indian Journal of Fibre & Textile Research Vol. 42, June 2017, pp. 202-208. (NAAS rating 6.430) (Impact Factor 0.430)
5. Kadam, Dattatreya M., Thunga, Mahendra, Srinivasan, Gowrishanker, Wang, Sheng, Kessler, Michael R., Grewell, David, Yu, Chenxu and Lamsal, Buddhi (2017) - Effect of TiO2 nanoparticles on thermo-mechanical properties of cast zein protein films, Food Packaging and Shelf Life, 13: 35-43. DOI: 10.1016/j.fpsl.2017.06.001
6. Basak, S., Samanta, K.K., Chattopadhyay, S.K., Saxena, S. and Parmar, M.S. (2017) - Self - extinguishable cellulosic textile from *Spinacia oleracea*, Indian Journal of Fibre and Textile Research, Vol.42, June 2017, pp. 215-222 (NAAS rating 6.43) Impact Factor 0.430
7. Mageshwaran Vellaichamy and Parnavi Vijay Gaonkar. (2017). Biological treatment of Banana pseudostem fibre: Effect on softening and mechanical properties. International Journal of Current Microbiology and Applied Sciences 6(5), pp. 1268-1274. (NAAS rating 5.38) Impact Factor 4.119. doi: https://doi.org/10.20546/ijcmas.2017.605.137
8. Mageshwaran Vellaichamy, Sharmila B. Majee and Kuppusamy Pandiyan (2017) -Isolation and Identification of Potential Gossypol Degrading Fungal Strains from Cotton Growing Soil, Microbiology Research Journal International, 21(1): 1-6, 2017; Article No.MRJI.35364. (NAAS rating 4.65)
9. Veda Krishnan and Mageshwaran Vellaichamy (2017) - A Simple and Accurate Reverse Phase HPLC-UV Method for Determination of Gossypol and its Degradation Products, Indian Journal of Agricultural Biochemistry, Volume 30 Issue 1, pp. 27-32. doi: 10.5958/0974-4479.2017.0004.1 (NAAS rating 4.69)
10. Dhakane, Jyoti P., Kar, Abhijit, Patel, Avinash Singh and Khan, Islam (2017) - Effect of soy proteins and emulsification-evaporation process on physical stability of lycopene emulsions, Int. J. Chem. Stud., 2017; 5(5): 1354-1358 (NAAS rating : 5.31)
11. Kambli, Nishant D., Vellaichamy, Mageshwaran, Patil, P.G., Saxena, Sujata and Deshmukh, R.R. (2017) -

Synthesis and characterization of microcrystalline cellulose powder from corn husk fibres using bio-chemical route, Cellulose, 24 (12) DOI: 10.1007/s10570-017-1522-4. (NAAS rating : 9.42) (Impact factor 3.417)

12. Mageshwaran, V., Shaikh, A and Kathe, A. A. (2017) - "Optimization of process parameters for gossypol detoxification in chemical disinfected cottonseed cake by mixed fungal culture during solid state fermentation." Journal of Scientific and Industrial Research. 76: 714-719. (NAAS rating: 6.39)
13. Patil, Sharmila, Kaur, Charanjit and Varghese, Eldho. (2017) - "Optimization of extrusion process for development of antioxidant rich extrudates from finger-millet and horse-gram in rice matrix, International Journal of Chemical Studies. 5(6): 981-990. (NAAS rating: 5.31)
14. Jagatheesan Krishnaswamy, Senthilkumar, T. and Neelakandan R., - Development of breathable and liquid / microbes barrier woven surgical gowns for hospital usage, Indian Journal of Fibre & Textile Research, Vol.42, December 2017, pp.453-464 (Impact Factor 0.430 [JCR 2016]) (NAAS rating: 6.42)
15. Sharmila Patil, Jyoti Dhakane, Archana Mahapatra and Charanjit Kaur. (2018). - Hydration properties and viscosity of sorghum (Sorghum bicolor L.) as affected by extrusion processing, International Journal of Chemical Studies 2018; 6(1): 185-189 (NAAS rating: 5.31)
16. Arputharaj, A.; Vigneshwaran, N; Shukla, Sanjeev R.; A simple and efficient protocol to develop durable multifunctional property to cellulosic materials using in situ generated nano-ZnO, Cellulose, 24(8), August, 2017, 3399–3410. (Impact factor 3.417) (NAAS rating: 9.20).
17. Bharimalla, Ashok Kumar; Vigneshwaran, N; Patil, P.G; Deshmukh, S.P.; Energy efficient production of nano-fibrillated cellulose (NFC) from cotton linters by tri-disc refining and its characterization, Cellulose Chemistry and Technology, 50, 6-May, 395-401, 2017, (NAAS rating: 6.76) (Impact factor 0.833).
18. Bharimalla, Ashok K.; Deshmukh, Suresh P.; Patil, Prashant G.; Vigneshwaran, Nadanathangam; Micro/ Nano - fibrillated Cellulose from Cotton Linters as Strength Additive in Unbleached Kraft Paper: Experimental, Semi - empirical, and Mechanistic Studies, BioResources, 12,3, 5682 – 5696, 2017 (NAAS rating: 7.32) (Impact factor 1.334).
19. Juikar, Siddhi J; Vigneshwaran, N; Extraction of nanolignin from coconut fibers by controlled microbial hydrolysis, Industrial Crops and Products, 109, 420-425, 2017 (NAAS rating: 9.18) (Impact factor 3.181).
20. Juikar, Siddhi J; Vigneshwaran, N; Microbial production of coconut fiber nanolignin for application onto cotton and linen fabrics to impart multifunctional properties, Surfaces and Interfaces, 9, 147-153, December, 2017.
21. M.Murugesan, T.Senthilkumar, and R.C.Nayar, 'Prediction of the Spinning Triangle Height in Ring Frame using Artificial Neutral Networks', Journal of Polymer and Textile Engineering, vol.4 (3), May-June 2017, PP.01-07 (Impact factor 2.86).
22. Mlalila N. G. Swai H, Hilonga A, and Kadam D.M. (2017). Antimicrobial dependence of silver nanoparticles on

surface plasmon resonance bands against Escherichia coli, Nanotechnology, Science and Applications, 2017 (10); 1—9 DOI https://doi.org/10.2147/NSA.S123681

23. Siddhan Periyasamy, Krishna Prasad, G., Raja A.S.M., and Prashant G. Patil - Submicron surface roughening of aliphatic polyamide 6,6 fabric through low temperature plasma and its effect on interfacial bonding in rubber composite, Journal of Industrial Textiles, July 12, 2017, DOI: 10.1177/1528083717720202, (NAAS rating 7.75) (Impact factor 1.75)
24. A. Shukla, S. Basak, S.W. Ali & R. Chattopadhyay. Development of fire retardant sisal yarn. Cellulose, 24 (1) January (2017) 423-434, (NAAS rating: 9.20). (citations 3)
25. M. Seshama, H. Khatri, M. Suther, S. Basak & S.W. Ali, Bulk Vs nano ZnO: Influence of fire retardant behaviour on sisal fibre yarn. Carbohydrate Polymers, 175 November (2017) 257-264 (NAAS rating 10.22) (Impact factor 4.811).
26. S. Basak, S.W. Ali. Leveraging flame retardant efficacy of the pomegranate rind extract: a novel biomolecule on the lingo-cellulosic material, Polymer Degradation and Stability, 144 October (2017) 83-92 (NAAS rating 9.12) (Impact factor 3.386).
27. Dey S.K, "Future Prospect for Sustainable Luxury Textiles from Pineapple Leaf Fibre – An Agro Waste", Trends in Textile and Fashion Designing, Design 1(2)-2018. LTTFD. MS.ID.000108.
28. Dey, SK, Ghadge, SV, Banerjee, S and Narkar, R, "An Infrared Technique for Rapid Analysis of Pineapple leaf fibre-Acrylic Blends", Trends in Textile & Fash Design 1(1)-2018. LTTED. MS.ID.000103, Volume 1- Issue 1: 2018.
29. Dey SK, S.V. Ghadge, Jagajanantha, P. and Banerjee, S. - Influence of Component Fibre Properties on the Tensile Properties of Ramie Blended Yarn, Journal of Textile Science & Engineering, J Textile Sci Eng 2017, 7:5, DOI: 10.4172/2165-8064.1000315
30. Dey, S. K., Exploration of Indigenous Pineapple-Acrylic Blend: A Future Prospect for Sustainable Luxury Textiles, J Archit Eng Tech 2017, 6:2 DOI: 10.4172/2168-9717.1000195
31. Patil, Sharmila and Kaur, Charanjit. (2018). Current trends in Extrusion: Development of Functional Foods and Novel Ingredients. Food Science and Technology Research. 24(1), doi: 10.3136/fstr.24. (NAAS rating 6.36) (Impact factor 0.36).
32. Saxena, Sujata, Iyer. V., Chaggani, R.R., Ambare, M.G. and Shaikh, A.J. - Effect of mordants on Colour and Colourfastness properties of Cotton Fabrics Dyed with Natural Dye Berberine, Cotton Research Journal, 7 (2), July-Dec 2016 Published February 2018 (NAAS rating 3.45)
33. Mageshwaran, V., Satankar, Varsha, Hasan, Hamid, Shukla, S. K. and Patil, P.G. –Compost Production and Oyster mushroom cultivation– A potential entrepreneurship for cotton growing farmers, International Journal of Forestry and Crop Improvement, 8 (2), 149-156, December (2017). DOI: 10.15740/HAS/IJFCI/8.2/149-156. (NAAS rating 4.04).
34. Mandhyan, P.K., Nachane, R.P., Patil, P.G., Pawar, B.R., Hamid Hasan and Venkatkrishnan, S. - Influence of segregation of cotton bales based on its fiber attributes in yarn properties, Journal of Natural Fibers, Published online March 2018, (NAAS rating 7.0)(Impact Factor: 0.974) DOI: 10.1080/15440478.2018.1453429.

7.2 Book Chapters

1. Patil, P.G., Arude, V.G. and Shukla, S.K., Ginning and Post-Harvest Technologies: Status and Issues, Cotton Technology Exchange Program in SAARC Region, SAARC Agriculture Centre, Dhaka, Bangladesh (December 2016)
2. Kartick K Samanta, S Basak, SK Chattopadhyay, Sustainable dyeing and finishing of textiles using natural ingredients and water-free technologies in book 'Textiles and Clothing Sustainability', 2017 (June), pp. 99-131 (Springer, Singapore)
3. Samanta KK, Basak S, Chattopadhyay SK, Sustainable Denim Processing using Water-free Technologies, in book 'Sustainability in Denim', 2017, pp. 319-348, Woodhead (UK)
4. S Basak, SK Chattopadhyay, SW Ali, K Samanta, Flame Retardant Textile Material using Bio-products in 'Rise in New Generation Textiles' (Vol 2), 2017, pp.49-53, The Institution of Engineers (India).
5. O.L. Shanmugasundaram and R. Guruprasad. Low water-consumption technologies for textile production, In: Sustainable fibres and textiles, Textile Institute, 243-266, 2017, ISBN: 978-0- 08-102041-8.

7.3 Bulletin

ICAR Flexi-Check Dam (Rubber Dam) – Frequently Asked Questions, Susanta Kumar Jena, Ashwani Kumar, PS Brahmanand, SK Chattopadhyay, AK Bharimalla, K Rajkumar, P Thavamani, MK Talukdar, A Mishra, N Sahoo, DU Patil, 2017, Directorate of Water Management (ICAR), Bhubaneswar (India).

7.4 Paper/Poster Presentations

1. Ghadge SV. Performance Evaluation of Trash Analyzer and Opener Blender for Opening Cotton Lint Samples used in Fibre Quality Testing. IEEE International Conference on Technological Innovations in ICT for Agriculture and Rural Development (TIAR 2017) organized by Eswari Engineering College, Chennai. April 7–8, 2017.
2. Patil PG. Enhancing Productivity of fibres: Key Issues & Solutions. International Conference on "Productivity and Product Diversification Challenges for Natural Fibres". Textile India 2017. Ahmedabad. July 2, 2017.
3. Mageshwaran, V. – "A bio-refinery approach for increase value-addition to cotton wastes" 52nd Annual convention of Indian Society of Agricultural Engineers and National Symposium on Doubling the farmers' income through technological interventions held during 08-10 January, 2018 at Anand Agricultural University, Anand, Gujarat
4. Varsha Satankar – "Value addition to cotton stalks: Additional income for farmers' livelihood." 52nd Annual convention of Indian Society of Agricultural Engineers and National Symposium on Doubling the farmers' income through technological interventions held during 08-10 January, 2018 at Anand Agricultural University, Anand, Gujarat

5. Arude, V.G. – "Development and optimization of spike cylinder cotton feeder to enhance ginning efficiency of double roller gin by using Response Surface Methodology" in 52nd Annual convention of Indian Society of Agricultural Engineers and National Symposium on Doubling the farmers' income through technological interventions held during 08-10 January, 2018 at Anand Agricultural University, Anand, Gujarat
6. Senthilkumar, T. – "Electrospun fibre mat – an effective adsorbent for metal ions removal from effluent", National Seminar on Recent Trends in Nanobiosensors (NBS 2018) held during 22-23 February, 2018 at Department of Organic Chemistry, University of Madras, Chennai.
7. Sujata Saxena "Organic cotton and its Processing" in National seminar on Recent Trends in Eco-friendly Textiles and Sustainable Fashion held during 27 - 28 March, 2018 at J D Birla Institute, Kolkata.

Papers presented during the 7th ACRDN Meet at Nagpur during September 15-17 2017

8. Shukla, S.K., Arude, V.G., Patil, P.G. and Deshmukh, S.M. - Effect of Various Ginning Technologies on Fibre Properties of Machine Harvested Cotton
9. Vigneshwaran, N., Prasad, V., Arputhraj, A., Sundaramoorthy, C., and Patil, P.G. - Application of Nanotechnology in Cotton
10. Arputhraj, A., Prasad, V., Vigneshwaran, N., Patil, P.G. and Shukla, S.K. - Development of Functional Cotton textiles Using Nano-Zno
11. Bharimalla, A.K., Deshmukh, S. P., Patil, P.G. and Vigneshwaran, N. - Application of Nanocellulose in Pulp & Paper and Composites
12. Mageshwaran, V., Varsha Satankar, Shukla, S.K. and Patil, P.G. - Recent Advances in Fermentation Technology for Value-Addition to Cotton Stalks and Cottonseed
13. Arude, V.G., Deshmukh, S.P., Patil, P.G. and Shukla, S.K. - Integrated single locking cotton feeder cum cleaner for double roller gin
14. Mandhyan, P. K. - Industrial Quality Requirement of Cotton Vis-à-vis its availability – Indian Scenario
15. Sundaramoorthy, C., Mandhyan, P. K. and Patil, P.G. - Contamination Status of India Cottons
16. Ghadge, S.V., Shukla, S.K., Arude, V.G., Bharimalla, A.K., Sundaramoorthy. C., Patil, P.G., Mandhyan, P. K., Deshmukh, P.S. and Patil, D.U. - Design and development of cotton lint opener for preparation of samples in fibre quality testing
17. Varsha Satankar, Shukla, S.K., Arude, V.G., Patil, P.G., Mageshwaran, V. and Deshmukh, P.S. - Force variation on beater shaft of double roller gin under different working conditions
18. Guruprasad, R., and Vigneshwaran, N. - Electrospun nanomaterials: Basic & Application

Posters presented during the 7th ACRDN Meet at Nagpur during September 15-17 2017

1. Palve, S.M., Mandhyan, P.K. and Kate, N. - Genetic Variability Studies for Quantitative Traits Between Gossypium hirsutum and Gossypium barbadense Population Developed by a Three-Way Cross
2. Vigneshwaran, N., Bharimalla, A.K. and Patil, P.G. - Nanocellulose from Cotton Linters

3. Saravanan, M., Mohan, P., Waghmare, V.N., Manivannan, A. and Shukla, S.K. – Development of Eco-friendly Naturally Coloured Desi Cotton G. *arboretum*.
4. Deshmukh, P.S, Bharimalla, A.K., Patil, P.G., Arude, V.G., Mandhyan, P.K., Sundaramoorthy, C., Kamble, D.U. and Jadhav, A.R. - ICAR-CIRCOT's Training on Quality Evaluation of Cotton: An Analysis for 2014-17
5. Sujata Saxena, Punit Mohan, Nagarkar, R.D., Prabhudesai, R.S. and Senthil Kumar - Technological Performance of Naturally Coloured desi (G.arboreum) Cotton Genotypes
6. Manoj Kumar, Arputhraj. A., Sujata Saxena & Sanjeev R. Shukla - Biopolishing of Cellulosic Fabrics
7. Kadam, D. M., Supriya Rattan and Deshmukh, P.S. - Synthesis and Physico-Morphological Characterization of Bio-Cellulose Extracted from Selected Agricultural Residues
8. Sharmila S. Patil, Archana Mahapatra, Gotmare, V.D., Patil, P.G. and Arputhraj, A. - Effect of Different Mercerization Techniques on Tactile Comfort of Cotton Fabric
9. Archana Mahapatra, Sharmila S. Patil, Gotmare, V.D., Patil, P.G. and Arputhraj, A. - Effect of Textile Softeners on BTCA Treated Cotton Fabric

7.5 Conference Proceedings/ Souvenirs

1. Sujata Saxena, P.G. Patil, Sudha Tiwari & Charlene D'Souza. "Cottonseed Oil: Present Status and Future Prospects" (in English and Gujarati). Book of Background Papers of the SEA-AICOSCA Cottonseed Conclave 2017 organized at Ahmedabad on 16th Dec. 2017.
2. Senthilkumar. T, G. Krishna Prasad and C. Sundaramoorthy. 'Scenario of Indian cotton textile industries' published in Souvenir of the 7th Asian Cotton Research & Development Network (ACRDN) Meet at Nagpur organized by ISCI, ICAC,CICR & CIRCOT on September 15-17, 2017.

7.6 Popular Articles

1. Guruprasad, R., Krishna Prasad, G., Prabhu, G.T.V., and Senthilkumar, T (2017) Development of cotton-rich / poly (lactic acid) fibre blended yarns, fbre2fashion.com, May 2017, 7913.
2. Sharmila Patil, Archana Mahapatra and A.K. Bharimalla (2017) - "Nanocellulose: A green reinforcement for packaging", Processed Food Industry (Issue: November-2017)

7.7 Other Publications

1. Annual Report 2016-17 (English)
2. Annual Report 2016-17 (Hindi)
3. E-Newsletters (12 issues during March 2017 – February 2018)
4. Training Calendar 2017-18
5. Amber 2016 (Hindi)
6. "ICAR-CIRCOT - An Insight" released during the 7th ACRDN Meet at Nagpur during September 15-17, 2017.
7. Training Leaflets
   i. Value addition to Cottonseed
   ii. Absorbent cotton Technology
   iii. Advances in Applications of Nanotechnology

iv. Basic and Advanced Techniques for Evaluation of Textile Materials

v. Spinning of Technical Yarns & Quality Management

vi. Basic & Advanced Statistical Techniques for Research

vii. Characterization of Materials using X-Ray Diffractometer (XRD)

viii. Advances in Microscopy

ix. Electospinning for Nanofibre Production & its Applications

x. Fibre Reinforced Composites

xi. Spectroscopic & Chromatographic Techniques for Material Characterization

xii. Quality Evaluation of Cotton

xiii. Double Roller Ginning Technology & Basics of Cotton Grading

xiv. Quality Evaluation & Spinning Performance of Indian Cottons using Advanced Techniques

xv. Instrumental Evaluation of Clothing Comfort

xvi. Knitting & Knit Garments

8. Training Manuals

i. Instrumental Evaluation of Clothing Comfort, Training organized during May 15-19, 2017.

ii. Value Addition to Cottonseed, Training organized during July 20-22, 2017.

iii. Absorbent Cotton Technology, Training organized during August 02-04, 2017.

iv. Advances in Applications of Nanotechnology, Training organized during September 11-15, 2017.

v. Basic & Advanced Statistical Techniques for Research, Training organized during November 7-11, 2017.

vi. Advances in Microscopy, Training organized during January 17-19, 2017.

vii. Knitting & Knit Garments, Training organized during January 10-12, 2018.

viii. Electrospinning for Nanofiber Production and its Applications, Training organized during January 23-25, 2018.

ix. Fibre Reinforced Composites, Training organized during February 07-09, 2018.

9. Success Story Bullettins

i. ICAR-CIRCOT – Portable Laboratory Model Gins

ii. ICAR-CIRCOT – Nanocellulose

iii. ICAR-CIRCOT – Calibration Cotton

iv. ICAR-CIRCOT – Bajaj Cotton Pre-cleaner

v. ICAR-CIRCOT – Antimicrobial Cotton Bed Sheets

10. Training Calendar 2018-19

11. Leaflet "Cotton Blended T-Shirt – A product of ICAR-CIRCOT ABI centre Incubatee".

8. QRT, RAC and IRC Meetings

8.1 Quinquennial Review Team (QRT)

The planning meeting of the Quinquennial Review Team (QRT), which was constituted to assess the performance of ICAR-CIRCOT for the period 2012-17 was held on June 28, 2017. Dr. N.C. Patel, Vice Chancellor, Anand Agricultural University and Chairman, QRT presided over the meeting. The other QRT members present in the meeting were Dr. G.R. Anap, Dr. V.D. Gotmare, Dr. N.J. Thakur and Dr. M.K. Sharma. The meeting was attended by Dr. S.N. Jha, ADG(PE), ICAR, New Delhi, Dr. P.G. Patil, Director, Heads of Divisions, SAO and AF&AO. Dr. Patil presented overall achievements of the Institute for the review period. After discussion, planning of various activities of QRT were chalked out. Dr. Sujata Saxena, Member Secretary QRT, coordinated the meeting.

ICAR-CIRCOT Quinquennial Review Team (QRT) for 2012-17

- Dr. N. C. Patel, Chairman
  Vice Chancellor, Anand Agricultural University, Anand
- Dr. G. R. Anap, Member
  Former International Cotton Ginning Consultant
- Dr. N. J. Thakor, Member
  Former Head, Department of Agricultural Process Engineering, DBSKKV, Dapoli
- Prof. V. D. Gotmare, Member
  Head, Department of Textile Manufacture, VJTI, Mumbai
- Dr. M. K. Sharma, Member
  President, M/s Bajaj Steel Industries, Nagpur
- Dr. Sujata Saxena, Member Secretary
  Principal Scientist, CIRCOT, Mumbai

GTC, Nagpur

The QRT visited GTC, Nagpur on July 25, 2017. Dr. S.K. Shukla, Sr. Scientist & Officer In-charge, GTC made a presentation on the achievements, research activities and infrastructure facilities at the centre. The QRT members interacted with scientists and staff. They visited ginning plant, scientific cottonseed processing plant, fibre testing laboratory, particle board plant and microbiology lab. The QRT also visited M/s Precision Tooling Engineers, Nagpur and M/s Bajaj Steel Industries Limited, Nagpur.

A stakeholder meet was organized during the visit of QRT, to gather inputs to devise future roadmap for GTC. The stakeholders representing diverse fields like cotton growers, cotton procurement, ginneries, textile mills, cottonseed processors, surgical cotton manufacturers, biomass based industries and entrepreneurs participated. Dr. N.C. Patel, Chairman QRT in his address suggested that scientists should work for development of small machinery integrated with efficient sensor technology to process even small quantity raw material with highest efficiency.

Regional Unit, Coimbatore,

The QRT under the chairmanship of Dr. N. C. Patel and members Dr. N.J. Thakur and Dr. V.D. Gotmare along with Dr. P.G. Patil, Director and Dr. Sujata Saxena, member secretary visited the regional quality evaluation unit of the Institute located at Coimbatore on August 29-30, 2017 to review its performance and to examine the facilities available there. The QRT interacted with various stake holders including representatives of cotton testing and processing machinery manufacturers.

Dr. S. Venkatkrishnan, ACTO and I/c of the unit presented the activities and achievements of the center during the past five years. The QRT visited the laboratory and interacted with the staff about the problems faced by the unit and possible solutions. They also visited the weaving center of Appachi Eco-logic Cotton Pvt. Ltd. at Pollachi.

QRT Meeting at Regional Unit, Coimbatore

Regional Unit, Sirsa

The Quinquennial Review Team (2012-17) of CIRCOT held its meeting at Sirsa Regional Unit on October 7, 2017 under the chairmanship of Dr. N.C. Patel, along with other members who visited and inspected the facilities available and activities being performed at the unit. On this occasion, a stakeholders meeting was also organized for interaction with entrepreneurs, ginners, progressive farmers, seed producers and cotton scientists.

The stakeholders raised various issues being faced by them and requested the chairman to provide need based solutions to problems faced by them. Officer-in-charge of the regional unit presented a report of the work done during 2012-17 and apprised about problems, prospects and scope for further expansion of unit. The QRT visited M/s Sharda Cotton Factory, a TMC modernized ginning unit, and interacted with its Director and technical staff while keenly observing the functioning of various units of the factory especially pre-cleaning, roller ginning, saw ginning, pressing, seed crushing and oil extraction.

QRT Meeting at Regional Unit, Coimbatore

HQ, Mumbai

The fifth meeting of the Quinquennial Review Team (2012-17) was held at Mumbai HQs on November 20-21, 2017. It started with an interactive meet with stake holders consisting of representatives from cotton trade, textile and cottonseed machinery manufacturers, textile processing auxiliary suppliers, textile processors and garment exporters who expressed their views on performance of the Institute and how its impact can be further enhanced in their respective sectors.

It emerged that granting of exclusive rights for the usage to an industry for a limited time at the initial stage can help in refinement and industry adoption of the technologies. Contribution of CIRCOT calibration cotton as an alternative to import from USDA was appreciated. Domestic availability of cotton needed for fine yarn production is low and that issue should be addressed through AICCIP. Attempts should also be made for the development of technologies for better utilization of cottonseed and cotton stalks in collaboration with industry. Eco-friendly technologies for cotton wet processing and dyeing are needed and mechanism for monitoring and certification protocols for the eco-friendly nature of the products need to be worked out.

QRT Meeting at ICAR-CIRCOT, Mumbai

Regional Unit, Guntur

The QRT visited Quality Evaluation Unit located in the premises of Acharya NG Ranga Agricultural University, Guntur, (AP) on November 22, 2017. QRT member Dr. M.K. Sharma, President and whole time Director of Bajaj Steel Industries, Nagpur also joined the team there where all members were present for this visit. Team reviewed the available facilities and the work carried out by the unit for the past five years.

An interactive meet was held in the university meeting room with various stakeholders including representatives from AP Cotton Association, M/s Rasi Seeds, Monsanto Seeds and university scientists working on cotton. The QRT also visited M/s Kallam Agro Oil Products at Guntur. Shri. Mohan Reddy, Chairman and MD offered a warm welcome to the QRT members and explained in detail about the scientific processing of cottonseed for extraction of oil and other by products being followed at the mill. He took the team to different sections of the factory and discussed about the problems currently faced by this industry.

Regional Unit, Surat

The QRT visited the quality evaluation unit at Surat on February 16, 2018 under the chairmanship of Dr. N.C. Patel, along with members Dr. G.R. Anap, Dr. V.D. Gotmare, and Dr. Sujata Saxena, Member Secretary. Dr. P.G. Patil, Director; Dr. C.J. Dangariya, Vice Chancellor, Navsari Agricultural University; Dr. B.G. Solanki, Research Scientist, MCRS, Surat; Dr. P.K. Mandhyan, In charge QEID and Shri. G.G. Mistry, In charge, Surat unit were also present for the meeting.

The team inspected the facilities at the Quality Evaluation Unit, Surat and went round the Cotton Museum maintained at the MCRS. Performance of the unit for the period 2012-17 was presented by Dr. P.K. Mandhyan followed by presentation of Dr. Solanki about the cotton scenario in Gujarat and contributions of MCRS and support provided by CIRCOT unit therein. The QRT reviewed the performance of the unit and held discussions with CIRCOT and NAU officials about its future role and ways to strengthen it.

Smt. Vijaylaxmi Udikeri, In charge, QEU, Dharwad also attended the meeting and apprised the QRT members and CIRCOT officials about the performance and future outlook of QE Unit at Dharwad.

QRT along with NAU and CIRCOT officials at QEU, Surat

8.2 Research Advisory Committee (RAC)

The RAC has been reconstituted for a period of three years with effect from November 24, 2016. The 24th meeting of the RAC was held in the Conference Room on February 27-28, 2018.

Dr. Nawab Ali, Chairman, RAC presided over the meeting in presence of members Dr. G.S. Nadiger, Former Director of Laboratories (Textile Committee), Mumbai; Dr. Anup Rakshit, Executive Director, Indian Technical Textile Association; Dr. Narendra G. Shah, Professor, Centre for Technology Alternatives for rural Areas (CTARS), IIT, Mumbai; Dr. B.K. Behera, Head,

Department of Textile Technology, IIT, New Delhi; Dr. Debashis Nag, Former Director, NIRJAFT, Kolkata and Dr. S.N. Jha, ADG (Process Engineering), ICAR, New Delhi.

Two new members of the Institute Management Committee Shri Dhrupatrao Bhagwan Sawale and Smt. Kranti Sandeep Somvanshi representing the agriculture/rural interests were also present in the meeting. All the scientists of the Institute also attended the meeting.

Director Dr. P.G. Patil, presented the salient achievements of the research projects under different core areas and activities of the Institute followed by the Action Taken Report on the recommendations of the previous RAC. The committee deliberated on the progress of the research being carried out in the Institute and provided valuable inputs and direction for future course of research.

Publications on five success stories of the Institute technologies and an annual training calendar for 2018-19 were also released on the occasion.

24th RAC meeting in progress

Publication of Success Stories and Training Calendar 2018-19 by RAC members

8.3 Institute Research Council (IRC)

The half-yearly IRC meeting was held on October 30-31, 2017 where progress of 16 Institute funded research projects, two externally funded projects and four Consortia Research Projects (CRP) on Natural Fibers, was presented and discussed. The ATR on the proceedings of the 23rd Research Advisory Committee (RAC) was also presented and discussed for immediate action on the part of the concerned scientists. Director Dr. P.G. Patil, in his remarks emphasized on the need for development of technologies to meet the stakeholders requirement and the ways and means to increase the linkage with the stakeholders. He also stressed that scientists should put more efforts to get industry sponsored projects and urged them to focus on projects of national importance in cotton processing sector.

Half-yearly IRC meeting

The 118th IRC meeting was held on March 26-27, 2018 to review the progress of the on-going research projects, final reports of the completing projects and new project proposals. It was insisted that scientists should strengthen the research consultancy and bring in industry partners to collaborate in their research projects for the ease of technology commercialization. The achievement of the Institute in revenue generation (> ₹ 1.5 crore) and the efforts of GTC, Nagpur for its contributions (> ₹ 50 Lakhs) were acknowledged in the meeting.

118th IRC meeting in progress

9. Seminars/Conferences/Meetings/ Workshops

The Institute provides support to scientists and technical staff for attending seminars / symposia / training programmes / workshops / conferences at national as well as international level to keep them abreast of the latest developments in their specific areas. The support is generally given for encouraging participation of young scientists and research workers in such events and publication of proceedings / abstracts for wider dissemination. After attending the conference, the staff member presents his/her work and shares experience and knowledge gained during the visit with fellow colleagues through a formal presentation.

Table 9.1 Conferences Attended During 2017-18

Name of the Conference	Organizer / Venue	Participants
International Conference on Technological Innovations in ICT for Agriculture and Rural Development (TIAR 2017)	Eswari Engineering College, Chennai April 7–8, 2017	Dr. S.V. Ghadge
International Conference on "Productivity and Product Diversification Challenges for Natural Fibers" Textile India-2017	Gandhinagar, Gujarat June 30 – July 02, 2017 Ministry of Textiles, Govt of India	Dr. P.G. Patil Dr. A.S.M. Raja Er. V.G. Arude Dr. C. Sundaramoorthy Shri A. Arputharaj Dr. Manoj Kumar
Directors Conference	ICAR New Delhi July 16, 2017 and March 8-10, 2018	Dr. P.G. Patil
7th ACRDN Meet	Nagpur September 15-17, 2017	Dr. P.G. Patil Dr. C. Sundaramoorthy Dr. Manoj Kumar Puniya Dr. N. Vigneshwaran Dr. P.K. Mandhyan Dr. P.S. Deshmukh Dr. R. Guruprasad Dr. S.K. Shukla Dr. S.V. Ghadge Dr. Sharmila Patil Dr. V. Mageshwaran Er. Archana Mahapatra Er. V.G. Arude Er. Varsha Satankar Shri. A. Arputharaj Shri. Manoj Ambare Smt. Prachi R. Mhatre

Name of the Conference	Organizer / Venue	Participants
SEA – AICOSCA Cottonseed Conclave 2017	Ahmedabad December 16, 2017	Dr. Sujata Saxena
International Textile Conference on Global and Indian Perspective (textile 4.0)	The Textile Association of India (TAI), Mumbai Unit Hotel Lalit, Mumbai March 22-23, 2018	Dr. P.K. Mandhyan Dr. Krishna Prasad Dr. P,S. Deshmukh Dr. C. Sundaramoorthy

Table 9.2 Seminars / Symposia Attended During 2017–18

Title	Organizer / Venue	Participants
Color Fastness to Light & the importance of Standards in Textiles'	Q Lab, C-Therm, Texan Lab & Venture Technologies June 16, 2017	Dr. A.S.M. Raja Shri. R.R. Chhagani
Nano technology for Evergreen Revolution	Department of Nano Science & Technology, Tamil Nadu Agricultural University, Coimbatore October 5-6, 2017	Shri. A. Arputharaj Dr. Sharmila Patil
Women Safety and Empowerment	RI District 3141 Dr. BMN College of Home Science, Mumbai November 25, 2017	Er. Archana Mahapatra Smt. Sujata Koshy Smt. P.S. Nirali Smt. Prachi R. Mhatre Smt. Bindu Venugopal
The 52nd ISAE convention and National Symposium on Doubling Farmers Income through Technological Interventions	Anand Agricultural University, Anand, Gujarat January 8-10, 2018	Dr. P.G. Patil Er. V.G. Arude Dr. V. Mageshwaran Er. Varsha Satankar
Post-Harvest Handling, Ambient Controlled Storage and Supply Chain Management	All India Food Processors Association at ICAR-CIRCOT, Mumbai, 2-2-2018	Dr. Sujata Saxena Dr. D.M. Kadam Dr. S.V. Ghadge Dr. Sharmila Patil Dr. Manoj Kumar Er. Archana Mahapatra Er. Jyoti Dhakane
Microfluidics Technology for Pharma & Biotech Applications	IDEX Material Processing Technologies, USA JW Marriott Hotel, Sahar, Mumbai. 20-2-2018	Dr. N. Vigneshwaran
National Seminar on Recent Trends in Eco friendly Textiles and Sustainable Fashion	J D Birla Institute, Kolkata March 27-28, 2018	Dr. Sujata Saxena

TABLE 9.3 MEETINGS / WORKSHOPS ATTENDED DURING 2017–18

Title	Organizer / Venue	Participants
State Coordination Committee Meeting for Doubling Farmers Income	College of Agriculture, Shivajinagar, Pune April 3, 2017	Dr. P.G. Patil
State Coordination Committee Meeting for Doubling Farmers Income	NRC Grapes, Pune April 27, 2017	Dr. P.G. Patil, Dr. S.V. Ghadge
Annual Group Meeting of AICRP on Cotton	TNAU, Coimbatore April 08 – 10, 2017	Dr. P.G. Patil Dr. P.K. Mandhyan Dr. Hamid Hasan Shri R.S. Prabhudesai Shri B.R. Pawar Shri R.K. Jadhav Shri C.M. More Shri V.L. Rangari
Workshop on "*Creating an Ecosystem for Innovation and Technology Development & B2B Catalogue Display Show*"	The Textile Association of India (TAI) Nagpur April 26, 2017	Dr. S. K. Shukla Dr. V. Mageshwaran Er. Varsha Satankar Shri U.D. Devikar
Meeting on planning for next phase of technology mission on cotton and tele-conference on best management practices for cotton value chain with Prof. Spangenberg, Victorian Government, Australia	Textile Commissioners' Office, Mumbai May 11, 2017	Dr. Sujata Saxena Er. V.G. Arude
45th Joint AGRESCO Meet	Vasantrao Naik Marathwada Agriculture University, Parbhani May 29, 2017	Dr. A.S.M. Raja
Meeting on "Cotton Mechanization in India"	John Deere India Pvt. Ltd. Hotel Leela, Mumbai June 8, 2017	Er. V.G. Arude Dr. P.S. Deshmukh

Title	Organizer / Venue	Participants
Workshop on Nano and Biotechnology: Innovation and Revolution	Ramnarain Ruia College, Matunga, Mumbai July 14-15, 2017	Dr. N. Vigneshwaran Dr. Sharmila Patil Er. Archana Mahapatra
Meeting with regard to release of Bt cotton hybrids/varieties	Shastri Bhavan, New Delhi July 17, 2017	Dr. P. G. Patil
National workshop on promoting cotton by-products	United Nations Centre for Trade and Development (UNCTAD) Dar es salaam, Tanzania November 15-17, 2017	Dr. P.G. Patil
National Capacity Building Workshop	United Nations Conference on Trade and Development (UNCTAD) Lusaka, Zambia December 06-08, 2017	Dr. C. Sundaramoorthy
Mid-Term Review Meeting on the follow up of Action Taken Report of the 24th Meeting of the ICAR Regional Committee No. V	ICAR-CSSRI, Karnal December 12, 2017	Dr. Hamid Hasan
Training-cum-awareness workshop on J-Gate@CeRA for Western region (Gujarat, Madhya Pradesh, Maharashtra, Goa, Chhattisgarh)	Central Institute of Fisheries Education, Mumbai December 23, 2017	Smt. Prachi Mhatre Smt. Medha Kamble
Academia-Industry Interaction Meet on Agricultural Mechanization	Nagpur January 11, 2018	Dr. P.G. Patil,
31st National Convention of Agriculture Engineers	New Delhi February 2-3, 2018	Dr. P.S. Deshmukh
Annual Review Workshop on Consortia Research Projects on Natural Fibres, Secondary Agriculture and Health Foods	NASC Complex, New Delhi March 4-6, 2018	Dr. P.G. Patil

Title	Organizer / Venue	Participants
Annual Review meeting of Consortia Research Project	NASC Complex, New Delhi March 5, 2018	Dr. P.G. Patil Dr. A.S.M. Raja
National Capacity Building Workshop	UNCTAD, Geneva Kampala, Uganda March 14-16, 2018	Dr. P.G. Patil
Expert meeting on "The role of the textile and fashion industry in the creation of corporate benchmarks for the UN sustainable Development Goals"	The Netherlands consulate, Mumbai and World Benchmarking Alliance Hotel Oberoi, Mumbai March 15, 2018	Dr. Sujata Saxena

Director's participation in meetings / events

- ICAR Review Committee (interactive) meeting for Horticulture and Agricultural Engineering Divisions chaired by Dr. Mruthyunjaya, Member of ICAR-Review Committee regarding discussion on various issues relating to the terms of reference, including scientific and social impacts, resources, and consolidation held at NIAP, New Delhi on April 20, 2017.
- TANTU exhibition organized at NIFT, Navi Mumbai on 26th May, 2017. The exhibition displayed graduation project work of Textile Design students.
- Stakeholder meeting to discuss the way forward for refining and commercializing the technology for manufacturing pulp to make currency grade paper at NASC Complex on June 8, 2017.
- Exploratory Visit to Security Paper Mill (SPM), Hoshangabad on June 29, 2017 for taking trials on preparation of pulp using CIRCOT Technology.
- Directors Conference and 89th ICAR Foundation Day & Award Ceremony at New Delhi on July 16, 2017.
- Presentation of the SFC document in respect of thematic area "Fibre Processing and Value Addition" and meeting with IFAD authorities at SMD on July 30-31, 2017.
- Stakeholder meet at Quality Evaluation Unit, Coimbatore along with the QRT on August 29-30, 2017.
- ASRB, New Delhi as a member of the committee for promotion of Senior Scientists to Principal Scientists on September 6 and October 11, 2017.
- NRC for Grapes, Pune on October 17-18, 2017 regarding smart packaging of grapes by using nano-sensor technology.
- Selection of site for installation of ICAR flexi check dam at Atpadi, Sangli, Maharashtra on December 27-29, 2017.

- Divisional Meeting with the Directors / Project Coordinators in respect of the Institutes / AIRCPs / Network Projects / CRPs under the Agricultural Engineering Division at New Delhi during February 1-2, 2018.

- Screening – cum - Evaluation Committee meeting for Career Advancement as an Expert Member nominated by the Vice Chancellor, DBSKKV, Dapoli during February 13-15, 2018. He also visited rubber dam constructed at Wakavali Farm.

- Stakeholder visit to Quality Evaluation Unit at Surat along with the QRT during February 16-17, 2018. He also visited MANTRA there.

- International Short-Term Training Programme (STTP-2018) on 'Post-Harvest Management of Cotton and Value Addition to Crop Residue' approved by organised at GTC Nagpur on February 19-21, 2018.

- Directors Conference at AP Shinde Auditorium, Pusa, New Delhi during March 8-10, 2018.

- Scrutiny committee meeting for Selection of Vice Chancellor for Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola at ICAR-CIRCOT on August 05, 2017 as Nodal Officer.

- Personal interaction for Selection of Vice Chancellor for Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola at ICAR-CIRCOT on September 07, 2017 as Nodal Officer.

- Scrutiny committee meeting for Selection of Vice Chancellor for Maharashtra Animal and Fishery Sciences University, Nagpur at ICAR-CIRCOT on October 12, 2017 as Nodal Officer.

- Personal interaction for Selection of Vice Chancellor for Maharashtra Animal and Fishery Sciences University, Nagpur at ICAR-CIRCOT on December 24, 2017 as Nodal Officer.

10. Events Organized

Stakeholder Workshops

Workshop on Mechanization of Cotton Cultivation, Harvesting and Ginning: Challenges, Opportunities and Way Forward

A workshop on "Mechanization of Cotton Cultivation, Harvesting and Ginning: Challenges, Opportunities and Way Forward" was organized at Mumbai on 5th May 2017. Deliberations focussed on overcoming the challenges faced in the mechanization process that of developing varieties amenable for cotton harvesting, development of suitable defoliants & growth regulators, adoption of technology for cleaning and market acceptance of mechanically harvested cotton.

In his presidential address, DDG Dr. K. Alagusundaram urged the stakeholders to provide complete solution for mechanisation in cotton covering sowing, intercultural operations, harvesting, ginning and spinning along with the extension services so that farmers can adopt it. He opined that the potential technologies developed by the private sector should be tested at large scale through multi-location trials under the AICRP trials.

CIRCOT Director Dr. P.G. Patil stressed upon the need for formulation of mission mode programme encompassing all stakeholders in public and private sector for successful implementation of mechanisation in cotton that will benefit farmers by way of reducing production cost.

Publications of skill development initiatives in the Institute were released on this occasion also graced by Dr. K.K. Singh, Director CIAE Bhopal and Shri. Chokalingam, Chairman-cum-Managing Director of Cotton Corporation of India.

The stakeholders representing the cotton value chain including researchers, seed companies, tractor manufacturers, ginning machinery manufactures, traders, ginners, spinners and policy makers from public and private sector organisations also participated in the workshop.

Academia-Industry Interaction Meet

ICAR-CIRCOT, Mumbai and ICAR-CIAE, Bhopal jointly organized an Academia-Industry Interaction Meet at Ginning Training Centre, Nagpur on January 11, 2018 under Consortia Research Platform on Farm Mechanization and Precision Farming (CRP on FM & PF) to provide a common platform for one-one interaction between researchers, industries, policy makers and other stake holders.

GTC In-charge Dr. S.K. Shukla coordinated the programme participated by a large number of machinery manufacturers' representatives, researchers and policy makers from state and central govt organizations.

Director Dr. P.G. Patil delivered welcome address and emphasized the vital role of manufacturers in country's mechanization goal.

Dr. K.K. Singh, Director, ICAR-CIAE, Bhopal urged the manufacturers to join hands with CIAE, Bhopal in disseminating the developed technologies to end users. He also requested manufacturers to provide their valuable feedback so that, need based research programmes can be initiated and test protocols can be developed.

Dr. S.K. Singh, Director, ICAR-NBSS&LUP, Nagpur, Dr. M.S. Ladaniya, Director, ICAR-CCRI, Nagpur and Dr. V.N. Waghmare, Director (Actg), ICAR-CICR, Nagpur also graced the occasion.

Industry representatives participating in the programme included M/s Bajaj Steel Industries, Nagpur; M/s Ankur Seeds, Nagpur; M/s Vidarbha Sales, Nagpur; M/s Swastik Renewable Energy Solutions, Nagpur; M/s Tirth Agro Technology, Nagpur; M/s Shaktiman Rajkot, Mr. Deepak Kalbhor, M/s John Deer India, Pune; Mahindra & Mahindra (M&M), Mumbai and M/s VST Tillers.

Representatives from research organizations, machine manufacturers, industries and financial institutions shared their views on farm mechanization and precision farming in improving crop productivity and uplifting farmers' income. The meet ended with vote of thanks proposed by Dr. K.N. Agrawal, ICAR-CIAE, Bhopal.

Director Dr. P.G. Patil addressing the Academia-Industry Meet at Nagpur on January 11, 2018

Smt. Maithali Kowe, District Manager, NABARD, Nagpur during the Academia-Industry Meet

The 7th ACRDN Meet

ICAR-CIRCOT, Mumbai in collaboration with ICAR-CICR, Nagpur; Indian Society for Cotton Improvement (ISCI), Mumbai and International Cotton Advisory Committee (ICAC) Washington, organized the 7th Asian Cotton Research and Development Network (ACRDN) Meet at Nagpur during September 15-17, 2017.

The theme of this international event was "Production of Quality Fibres and Doubling of Cotton Farmers Income".

Dr. Terry Townsend, Former Director, ICAC was the Chief Guest of the meeting attended by more than 215 registered delegates including participants from USA, Australia, Bangladesh, Egypt and India.

In all, 18 Technical Sessions were conducted covering various aspects of cotton cultivation, genetics, biotechnology, plant protection, mechanization and post-harvest technology.

Dr. P.G. Patil, Director delivering the welcome address at the 7th ACRDN Meet at Nagpur

Workshop on Cotton Cultivation and Post-Harvest Technology

Ginning Training Center, Nagpur in collaboration with M/s Bayers Crop Sciences conducted a workshop on 'Cotton Cultivation and Post-Harvest Technology' at Umred, Nagpur and Anji, Wardha on June 3 and 6, 2017 respectively. GTC Scientist Dr. V. Mageshwaran participated in the workshop and stressed upon the importance of quality based marketing of cotton and suggested the farmers to choose cotton variety for sowing, after assessing its quality and yield. He disseminated the information on utilization of cotton stalk for preparation of value-added products like pellets, briquettes and compost for generating additional income.

A large group of farmers, representatives from ginning industries, ATMA and APMC attended the program. Mr. Sharad Ramekar from M/s Bayers Crop Sciences helped in successful conduct of the program.

Awareness Workshop on Cotton Contamination

CIRCOT technical guidance helped organize an awareness workshop on "how to control contamination in cotton during picking, storage & transportation along with ginning" by ICAL and Mahyco Monsanto Biotech (India) Ltd., under Project Sankalp on August 22, 2017 at DCM Textiles, Hisar.

Dr. Hamid Hasan, Officer-in-Charge of Sirsa Unit of CIRCOT was delivered a lecture on the subject and elaborated on how this menace could be controlled at various stages of contamination and suggested various measures and steps that need to be taken for clean cotton production.

Shri Rakesh Goel, CEO, DCM Textiles, Hisar presided over the workshop. Shri Rakesh Rathi, President, ICAL thanked all the participants for adoption of a resolution for clean cotton production. In the initial phase, 750 farmers from 15 villages were selected for imparting training in the clean cotton picking practices.

Workshop on "Applications of Cotton Production and Processing Technologies"

GTC, Nagpur in collaboration with Bayer Crop Science, Thane and Confederation of Indian Textile Industries-Cotton Development Research Association (CITI-CDRA), Nagpur on November 15, 2017 organized a one-day workshop on "applications of latest cotton production and processing technologies for maximizing benefits of all stakeholders".

Dr. S. Nimbalkar, former VC, Dr. PDKV, Akola and Chief Guest of the function spoke about remedial measures to curtail the menace of pink bollworm attacks on cotton crops, particularly in Maharashtra as well as safety measures to be followed during pesticide application.

Dr. M.K. Sharma, CEO, Bajaj Steel Industries, Nagpur expressed the need to revise the Indian cotton bale standards to increase its demand and price in global market.

Dr. V.S. Nagarare, Principal Scientist presented the do's and don'ts to arrest pink bollworm attacks on cotton.

Er. D.U. Patil, CTO, GTC, explained about impact of pink boll worm on cotton quality parameters.

Shri. G.H. Wairale, Project Coordinator, CITI-CDRA and Shri Sharad Ramekar, Regional Manager, Bayer Crop Sciences deliberated on the cotton scenario and status of cotton mechanization in India.

Live demonstrations were conducted by GTC experts on measurement of cotton moisture and ginning outturn.

Workshop on "applications of latest cotton production and processing technologies

Workshop on Cotton Dyeing

Two one-day workshops on "Dyeing of Cotton with Natural Dyes" were organized for second year students of Dress Design and Garment Manufacturing Department of Sophia Polytechnic, Mumbai in two batches on December 7 & 8, 2017. Thirty three students along with the Head of the Department, Dr. Jignasa Shah participated in the workshop.

Dr. Sujata Saxena, Principal Scientist & Head-I/c CBPD and Workshop Director delivered a lecture on natural dyes, chemical composition of dyes, application techniques on textiles, principles of dyeing and color fastness properties.

Hands-on training on applications of natural dyes viz. turmeric, berberin and manjishtha by using various mordanting and dyeing techniques was given to the students. Students expressed their desire to make portfolio garments from natural dyed textiles with support from ICAR- CIRCOT.

Workshop on dyeing of cotton using natural dyes

Technology and Machinery Demonstration Mela – 2018

Ginning Training Centre, Nagpur organized a 'Technology and Machinery Demonstration Mela- 2018' on February 15, 2018 as a part of ICAR initiatives on doubling farmers income through increasing productivity and adoption of recent farm technologies. A large number of cotton growing farmers from Wardha and Nagpur and stakeholders from industries and research organizations participated in this programme. The program was aimed to demonstrate recent technology and machinery on Cotton Processing and By-Products Utilization for doubling the farm income.

Dr. V. Mageshwaran, Scientist, GTC and Shri Hemant Sonare, Chairman, Textile Association of India appealed the farmers to adopt latest technologies and machinery developed by the institute in the area of cotton processing and by-products utilization and to reap additional income.

Shri. G.H. Wairale, President, Agro-plus Foundation, Nagpur informed about importance of cotton quality for fetching better market price.

Shri. Manish Kadu, Entrepreneur, M/s Bhakti Coal Industries, Katol detailed about the opportunities for farmers to earn additional

income by selling chipped cotton stalks to briquettes and pellet industries.

Shri Y.N. Kabra, a progressive farmer from Ashti, Wardha shared his success story on adoption of ICAR-CIRCOT technology on composting of cotton stalks under large scale in his farm.

Dr. M.S. Kairon, Former Director, ICAR-CICR, Nagpur chaired the technical session in which importance of trash and contamination free quality of Indian cotton for getting high value at International market, rural based entrepreneurship in absorbent cotton technology and value-addition to cotton stalks for briquettes, pellets, compost and oyster mushroom cultivation for additional income generation by the farmers were discussed.

An exhibition was also arranged to display the technology and machinery on cotton processing and by-products utilization. Live demonstration on chipping of cotton stalks, preparation of bio-enriched compost preparation, oyster mushroom cultivation, preparation of pellets and ginning output was conducted for the benefit of farmers.

Lectures

National Science Day

The 28th national science day was celebrated on February 28, 2018 by arranging a lecture on '3D Fabrics and Their Applications' delivered by Dr. B.K. Behera, Professor and Head, Department of Textile Technology, IIT Delhi.

IFS Lecture Series

ICAR-CIRCOT and Indian Fibre Society jointly organized lecture series. Lectures were attended by the stakeholders as well as scientific & technical staff of the Institute.

Lecture on "Global Cotton Scenario"

A lecture on "Global Scenario of Cotton" by Mr. Manish Daga, MD, Cotton Guru was organized by Indian Fibre Society on September 25, 2017 which was attended by scientists and technical officers of the Institute.

Lecture on "Pink Bollworm Management"

Lecture on "Pink Bollworm Management in Cotton - A Multi-Stakeholder Approach" by Shri. Sudhir P on December 19, 2017

Lecture on "Effect of GST on Cotton Value Chain and Textiles"

Lecture on "Effect of GST on Cotton Value Chain and Textiles" by Shri. Jayesh Gogri on December 19, 2017.

Review Meetings

Currency Grade Pulp - Project Review

Dr. T. Mohapatra, Secretary DARE & DG, ICAR, New Delhi reviewed the progress on commercialization of "Technology for Currency Grade Pulp" at Mumbai on December 24, 2017. The progress of the work was presented by Dr. N. Vigneshwaran, PI with inputs from all the Co-PIs. The outcome of the visit made by the ICAR-CIRCOT team to the Bank Note Paper Mill India Private Limited (BNPM), Mysuru was discussed in detail. The DG appreciated efforts being made by the Institute for commercialization of the technology and insisted for faster delivery of the results.

CRP on Natural Fibres – Review

ICAR-CIRCOT, the lead centre of CRP on Natural Fibres, organized an internal review workshop at Mumbai on January 5 & 6, 2018 to discuss the progress of individual projects running at the lead centre and cooperating centers ICAR-NIRJAFT, Kolkata; ICAR-CICR, Nagpur; Assam Agricultural University, Jorhat and Tamilnadu Agricultural University, Coimbatore.

The meeting was inaugurated and chaired by Dr. P.G. Patil, Director, ICAR-CIRCOT and Consortia PI of the project. Dr. S. Sreenivasan and Dr. A. J. Shaikh, former directors of the Institute attended the meeting as expert members.

The meeting started with a brief presentation about CRP on Natural Fibres by Dr. A.S.M. Raja, Principal Scientist & Project Coordinator. Dr. P.G. Patil during his address emphasized the need to fast track

the progress of the projects to achieve tangible results. He informed the house that new proposals would be screened based on their national importance and ability to address the problems of masses.

Dr. A.N. Roy, Director (Actg), ICAR-NIRJAFT, Kolkata also participated in the meeting and deliberated about the various issues of the project. Principal Investigators (PIs) of all projects or their representatives presented the progress of their research. The experts urged all PIs to work hard to produce the desirable outcome so that attempts can be made for further extension of the project beyond 2020. All scientists of ICAR-CIRCOT also participated in the meeting.

Review of the Institute at SMD

The performance of the institute as well as the progress of research achievements of CRP on Natural fibres in respect of ICAR-CIRCOT was reviewed in the Divisional Meeting with the Directors / Project Coordinators in respect of the Institutes / AIRCPs / Network Projects / CRPs under the Agricultural Engineering Division at New Delhi on February 1, 2018 at NASC complex, New Delhi. The meeting was chaired by the Deputy Director General (Engg.). The work being carried out in the Institute was presented by Dr. P.G. Patil, Director and the progress of CRP on NF was presented by Dr. A.S.M. Raja.

ERP Implementation

On September 8, 2017, a meeting was held in the presence of Shri Devendra Kumar, Director (Finance), ICAR, New Delhi to review the progress of ERP implementation and other financial issues of CIRCOT and CIFE Mumbai. Various matters regarding PFMS, ERP System, GEM, E-Procurement and other financial issues were discussed during the meeting attended by the concerned staff from both the institutes. The Chairman instructed to take steps for implementation of the system in the Institutes.

Vigilance Inspection

Shri. Rajan Agarwal, Director (International Cooperation) & Chief Vigilance Officer (DARE & ICAR), visited the Institute on 19th May 2017 for Vigilance Inspection and to discuss matters related to international cooperation and vigilance with stakeholders about the requirements to strictly follow the GFR provisions in procurement of stores to avoid vigilance cases.

Accreditation

ISO Management Review

Review meeting for ISO 9001:2008 Quality Management System (QMS) was conducted on April 12, 2017. Outcome of the internal audit carried out in the month of February 2017 was presented during the meeting where all the internal auditors briefed about the audit observations. Director Dr. P.G. Patil reviewed the quality policy & objectives and overall implementation of the QMS. He urged the staff members to work with dedication to achieve the targets in stipulated time frame. The ISO implementation cell was directed to take necessary steps for the quick implementation of the ISO 9001:2015

ISO Internal Audit

An internal auditing was conducted by the BIS trained auditors for different divisions of the Institute during May 11-12, 2017. The auditors communicated the observations to the ISO implementation cell, which then prepared a new check list on the basis of the requirements of ISO 9001:2015 standards.

BIS External Audit for ISO 9001:2015

Bureau of Indian Standards (BIS) conducted external audit for renewal of the Quality Management System (QMS) license under IS/ISO 9001: 2015 on September 07 & 08, 2017.

Auditors, Mr. M. Chilakward, Mr. N.P. Kawale and Mr. S.S. Meena carried out the audit in all the Divisions and Sections under the scope of the audit. Renewal of Institute QMS license as per IS/ISO 9001:2015 was recommended.

Director Dr. P.G. Patil acknowledged that the QMS accreditation was helpful for overall development of the Institute and also apprised of all requisite changes made for accreditation as per new standard IS/ISO 9001:2015.

BIS External Audit for ISO 9001:2015

ISO 9001:2015 Certification

Bureau of Indian Standards has renewed the license of ICAR-CIRCOT for its Quality Management System as per ISO 9001:2015 for three years up to June 11, 2020 based on the external audit conducted on September 7-8, 2017.

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
गुणता प्रबंध पद्धति प्रमाणन लाइसेंस
LICENCE FOR THE QUALITY MANAGEMENT SYSTEMS CERTIFICATION

लाइसेंस सं. क्यूएम /एल -7004111.1
Licence No. QM/L- 7004111.1

1.भारतीय मानक ब्यूरो अधिनियम, 1986 (1986 का 63) द्वारा प्रदान की गई शक्तियों के आधार पर, ब्यूरो
By virtue of the power conferred on it by the Bureau of Indian Standards Act 1986 (63 of 1986), the Bureau hereby renews to:

आयसीएआर - सेंट्रल इन्स्टिटयूटट फोर
रिसर्च ऑन कॉटन टेक्नोलॉजी
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Adenwala Road, Matunga
Mumbai – 400 019

को (जिन्हें इसके बाद लाइसेंसधारी कहा गया है) इसके साथ लगी अनुसूची में विशेष रुप से वर्णित उत्पादों और/या सेवाओं या प्रक्रमों के संबंध में ब्यूरो के गुणता प्रबंध पद्धति प्रमाणन के लाइसेंसधारियों के रजिस्टर (रों) में उसी संख्या से सूचीबद्ध होने का अधिकार और लाइसेंस **नवीकरण** करता है, जो इस लाइसेंस की है । इस प्रकार के उत्पाद और/या सेवाएं या प्रक्रम लाइसेंसधारी द्वारा ***आई एस/ आई एस ओ 9001:2015*** के अनुरुप गुणता प्रबंध पद्धति के अनुसार केवल ऊपर बताए गए पते (पतों) पर निर्मित/प्रदत/प्रचालित किए जाएंगे ।
(hereinafter called the Licensee) the right and licence to be listed in the Bureau's register(s) of Licensees of Quality Management Systems Certification in respect of the products and/or services or processes particularly described in the schedule hereto, bearing the same number as this licence. Such products and/or services or processes shall be manufactured/provided/carried out by the Licensee at only the address (es) given above, and under the Quality Management Systems in accordance with ***IS/ISO 9001:2015.***

2.यह लाइसेंस इस लाइसेंस का विनियम करने वाले उपरोक्त अधिनियम और उसके अधीन बनाए गए नियमों और विनियमों के संबद्ध प्रावधानों के अंतर्गत **नवीकृत** किया गया है और लाइसेंसधारी एतद द्वारा ब्यूरो को उपरोक्त नियमों और विनियमों का विधिवत पालन करने का वचन देता है ।
The licence is **renewed** subject to the relevant provisions of the above Act and the rules and regulations made thereunder governing the licences referred to above, and the Licensee hereby covenants with the Bureau duly to observe with the said Rules and Regulations.

3.यह लाइसेंस **20 सितंबर 2017 से 11 जून 2020** तक वैध होगा और इसका विनियमों के अनुसार **नवीकरण** किया जा सकेगा।
This licence shall be valid from **20 September 2017 to 11 June 2020** and may be renewed as prescribed in the Regulations

सन् दो हजार सत्रह के दिसम्बर माह के आठवे दिन हस्ताक्षरित एवं मुहराकिंत ।
Signed, Sealed and dated this **Eighth day of December Two Thousand Seventeen**

20/12/08

वी वी एस एन राव, उपमहानिदेशक (प.)
B V S N Rao, DDGW
भारतीय मानक ब्यूरो के लिए
for BUREAU OF INDIAN STANDARDS

NOTE: Last operative period of the licence was from 12/06/2014 to 11/06/2017.

भारतीय मानक ब्यूरो IS / ISO 9001 BUREAU OF INDIAN STANDARDS QMS

फार्म III { विनियम 7 (1) D (d) देखें}
Form III { *see* Regulation 7 (1) D (d)}
MSC-F6.4-12

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BIS Certification issued to ICAR-CIRCOT

NABL Audit ISO/IEC17025:2005

The National Accreditation Board for Testing and Calibration of Laboratories (NABL) conducted the NABL reassessment audit for ISO/IEC17025:2005 accreditation of ICAR-CIRCOT on December 23-24, 2017. Dr. G.S. Nadiger, Lead & Technical Assessor for chemical testing and Mrs. Ashwini Anil Sudam, Technical Assessor for mechanical testing, conducted audit in Quality

Evaluation and Improvement, Mechanical Processing, Chemical & Biochemical Processing Divisions and Test House, which come under the scope of NABL.

The assessors expressed satisfaction over reliability of testing and recommended the renewal of accreditation as per ISO/IEC 17025:2005.

BIS Sectional Committee

The 17th meeting of BIS Sectional Committee on Physical Methods of Tests (TX01) held on June 2, 2017 was attended by the members representing industry and research institutes. The committee scrutinized the Indian Standards due for revision as well as adopted some ISO standards. Scientists Dr. P.K. Mandhyan as the principal member and Dr. T. Senthil Kumar as an alternate member represented the Institute during the meeting.

Other Events

The 94th Foundation Day / Krishi Shiksha Divas

The 94th Foundation Day of the Institute was celebrated on December 3, 2017 along with *Krishi Shiksha Diwas* coinciding with the birth anniversary of the first President of India Dr. Rajendra Prasad.

Many dignitaries from other ICAR institutes, State Agricultural Universities, former directors and retired employees along with their families attended the programme. Contributions of ex-employees of the Institute including former directors and heads of divisions who also participated in the celebrations of the 94th foundation day were acknowledged by the Director Dr. P. G. Patil in his welcome address narrating the saga of development over the past 94 years highlighting the importance of the Institute in the cotton sector, which provides jobs to millions of people in the country.

Inauguration of the 94th Foundation Day Celebrations

This special occasion was graced by the presence of Dr. Shankarrao Magar, Hon'ble Ex Vice Chancellor of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli; as a chief guest. Dr. Tapas Bhattacharyya, Hon'ble Vice Chancellor, Dr.BSKKV, Dapoli, Dr. Gopal Krishna, Director, ICAR-CIFE, Mumbai and Dr. V.V. Singh, Head, CMFRI, Mumbai were the guests of honour for the function.

While sharing his experience with audience, Dr. Magar emphasized on the importance of group farming in doubling the farmers' income. He also highlighted the need of value addition in agriculture.

In his address, Dr. Bhattacharya pointed out the necessity to heighten the standard of agricultural education in the country.

Cultural Program on the 94th Foundation Day

94th Foundation Day and Krishi Shiksha Diwas

Sankalp Se Siddhi

To commemorate and mark the spirit of the completion of 75 years of the Quit India Movement, 'Sankalp-Se-Siddhi' pledge was administered to the staff of the Institute on August 09, 2017.

Mahila Kisan Divas

Mahila Kisan Divas was celebrated on 16th Oct, 2017 as per the directives from ICAR, New Delhi. Government of India has decided to celebrate 15th October every year as an awareness campaign to sensitize women agriculturists about their health, education, equality rights and adoption of modern farming to empower them in the mainstream agriculture.

Dr. P.G. Patil, Director of the Institute, in his address emphasized the role played by women in the agriculture sector of our country. He pointed out that women actively participate in home-grown agri-businesses. He appreciated that this is a great initiative and hopefully this campaign will bring about fulfilment of the government's goal of doubling the farmers' income by 2022 with the help of competent women farmers and it will lead the country towards second Green Revolution.

The senior administrative officer, scientists and the staff members also expressed their views towards upliftment of women farmers through innovative ways.

Vigilance Awareness Week

Vigilance Awareness Week was observed in the Institute during October 30 and November 4, 2017. An Integrity Pledge was administered to all the employees of the Institute. An e-integrity pledge was also undertaken through CVC website.

on 06th November 2017, a half-day seminar was organised by inviting Shri Rajesh Kumar, Deputy Superintendent of Police, Anti-Corruption Branch, Central Bureau of Investigation, Mumbai as the chief guest and the main speaker on the theme "My Vision: Corruption Free India".

Communal Harmony Week/ Flag Day

The Institute observed the Flag Day and took राष्ट्रीय एकता शपथ on Sadbhavna Divas on November 24 as part of celebrations of the Communal Harmony Week during November 19–25, 2017. Donations were collected from the staff for physical and psychological support of the orphan and destitute children affected by violence and to promote fraternity among people, maintain peace, communal harmony and national integration.

Constitution Day

Constitution Day was celebrated in the Institute on November 27, 2017. The Preamble to the Constitution of India was displayed on the screen and read out by Dr. P.G. Patil, Director and repeated behind by the staff of the Institute. Further, few staff members also enlightened the audience by expressing their views and thoughts on the Constitution.

International Yoga Day

On the occasion of International Yoga Day, a yoga workshop was organized in the Institute where all the staff members participated and practiced various yogasanas demonstrated by teachers and instructors from Shri Ambika Yoga Kutir, Ghatkopar on 21st June 2017.

The workshop started with welcome address by Director Dr. P.G. Patil and Shri Sudhir Sawant, Sanchalak of Shri Ambika Yoga Kutir who briefed about the importance of Yoga and thereafter yogasanas were performed by all the staff members under the guidance of instructors as per the protocol from Government of India.

Along with Sanchalak, twelve instructors were present to guide all the staff members while performing yogasanas. The workshop concluded with vote of thanks proposed by AAO Smt. Trupti Mokal.

Bharat Ratna Dr. Ambedkar Jayanti

The 126th birth anniversary of Bharat Ratna Dr. Babasaheb Ambedkar was celebrated in the Institute on April 13, 2017. Renowned speaker and social worker Dr. Damodar More delivered informative lecture on regarding social justice, equality and harmony, which was attended by all the staff members of the institute.

Bharat Ratna Dr. Ambedkar Jayanti Celebrations at Mumbai HQs

The Institute also paid tributes to Dr. Ambedkar on the occasion of his death anniversary on 6th December 2017.

Chatrapati Shivaji Maharaj Jayanti

Chatrapati Shivaji Maharaj Jayanti was celebrated in the Institute for the first time on February 19, 2018. All the staff members participated with enthusiasm in the celebrations. On this occasion, a portrait of Chatrapati Shivaji Maharaj was unveiled by Director Dr. P.G. Patil who along with other staff members spoke about the great achievements and visionary leadership of Chatrapati Shivaji Maharaj.

Chatrapati Shivaji Maharaj Jayanti Celebrations at Mumbai Hqs

Fire Fighting Demonstrations

Firefighting demonstrations were arranged in the Institute twice during the year on September 05, 2017 and again on March 17, 2018.

The demonstrations were conducted by M/s Nishant Enterprises, Thane.

The Institute staff were given opportunity to acquaint themselves in handling various firefighting equipment.

Firefighting demonstrations at ICAR-CIRCOT, Mumbai

11. Hindi Implementation

11.1 Hindi Workshops

A number of workshops and programs were organized to promote use of the official language Hindi throughout the year in the Institute as mentioned below;

1. A workshop on "Use of official language in working and correspondence" conducted by Mr. Mahendra Jain, Professor, Hindi Shiksha Yojana on June 17, 2017 for 77 scientific, technical and administrative staff members.
2. A Workshop on "Unicode Typing for Administrative Officials" conducted under the guidance of Shri. Mahendra Jain, Professor, Hindi Shiksha Yojana on September 28, 2017 for 18 staff members.
3. A Workshop on "Use of Official Hindi in Subject Correspondence" for all the scientific, technical and administrative staff members on December 16, 2017. Shri. Prince Grover, Hindi Translator Nuclear Power Corporation of India Limited and renowned writer was the guest speaker who guided total 78 staff members.

11.2 Hindi Week / Hindi Day

ICAR-CIRCOT headquarters at Mumbai celebrated Hindi week during 14-23 September, 2017. The inauguration ceremony commenced with prescribed Hindi Day Oath given to all present employees by Mrs. Trupti Mokal, A.A.O. and In-Charge, Official Language cell. Competition for Hindi Dictation was held on the day of opening ceremony followed by various competitions during the week. Around 133 staff members participated in different events held to promote Hindi language and its diversified use as official language in noting, drafting and correspondence. The various events were organized on this occasion included; Hindi Dictation, Crosswords, Technical writing, General Knowledge and Poetry Recitation. The concluding ceremony was held on September २३, २०१७. As a special guest Dr. Rajeshwar Uniyal, Deputy Director (Official Language), Central Institute of Fisheries Education, who has now been given additional charge of this Institute along with the Chief Guest, Dr. Mrigendra Rai, Associate Professor, Guru Nanak Khalsa College graced the occasion. While highlighting the achievements of the year, Dr. P. G. Patil, Director, appreciated the progress of the Hindi Implementation in the Institute and the different awards to the Institutes by City official language implementation committee (NaRaKaS), Mumbai and Ganesh Shankar Vidyarthi Award from ICAR, headquarters. Dr. (Mrs.) Sujata Saxena, Incharge Head, CBPD and Chairman of Hindi Week Organizing Committee, summarized about various events and competitions organized during the Hindi Week. On this occasion in house Hindi publications viz. Amber (Issue - ३ year 2016) and Annual Report (Hindi) for the year 2016-17 were released. Certificates and trophies were distributed to the winners of various competitions as well as staff members who passed Hindi Language Examinations held during the year by Hindi Shikshan Yojana. The program was compared by Mr. Bharat Pawar A.C.T.O and Smt. Prachi Mhatre, S.T.O.

Competitions	Winners	Rank
Hindi Dictation	Miss. Nikki Shokeen Mrs. Rajashri Tawade Mrs. Ujjwala Bhandari Mrs. Snehal Shirsat	FIRST SECOND THIRD CONSOLATION
Crossword	Mr. Raviprakash Chhagani Mr. S. N. Bandre Mr. Anand Jadhav Miss. Puja Tiwari	FIRST SECOND THIRD CONSOLATION
Technical Writing	Mr. C. M. More Mrs. Viniya Naik Mr. Anand Jadhav Mr. D.U.Kamble	FIRST SECOND THIRD CONSOLATION
General Knowledge	Mr. Minol Gaikwad Mr. C. M. More Mr. Manoj Kumar Mrs. Prachi Mhatre Mr. Nishant Kambli	FIRST SECOND THIRD CONSOLATION CONSOLATION
Poetry Recitation	Miss. Nikki Shokeen Mrs. Laxmi Singh Miss. Himani Singh Mrs. Snehal Shirsat Miss. Puja Tiwari	FIRST SECOND THIRD CONSOLATION CONSOLATION

Hindi Day / week celebrations at ICAR-CIRCOT, Mumbai

Hindi Week was also observed during 14-20 September, 2017 at **Ginning Training Centre, Nagpur**. Different competitions such as Elocution, Noting-Drafting, Essay writing, Extempore speech were conducted successfully. The Director Dr. P. G. Patil and Er. Ashok Bharimalla, in charge, Head, TTD from Mumbai graced the occasion as Chief Guest and Special guest respectively along with Dr. S. K. Shukla, Senior Scientist Officer in-charge, GTC, Nagpur. The closing ceremony was chaired by Chief Guest Dr. Om Prakash Shiva, eminent Litterateur from Nagpur on 20th September 2017 by whom the competition Prizes and merit certificates were given away to successful winners of the Hindi week.

Competition	Winners details	Rank
Elocution	Mr. R.D. Shambharkar Mr. S.N. Hedau Er. D. U. Patil Mr. U. G. Meena	FIRST SECOND THIRD CONSOLATION
Noting-Drafting	Mr. R. D. Shambharkar Mr. U. D. Devikar Er. D.U. Patil Mr. S. N. Hedau	FIRST SECOND THIRD CONSOLATION
Essay Writing	Mr. B.V. Shirsath Mr. R. D. Shambharkar Mr. S. N. Hedau Er. D.U. Patil	FIRST SECOND THIRD CONSOLATION
Guess Words	Mr. S. L. Bhanuse Mr. R. D. Shambharkar Mr. R.G. Dhakate Mr. S.N. Hedau	FIRST SECOND THIRD CONSOLATION
Extempore Speech	Er. D.U. Patil Miss. Varsha Satankar Mr. S. N. Hedau Mr. B. V. Shirsath	FIRST SECOND THIRD CONSOLATION

11.3 Awards & Recognitions

1. Ganesh Shankar Vidyarthi Hindi Magazine Award 2015-16

Under Ganesh Shankar Vidyarthi Hindi Patrika Award Scheme (2015-2016), ICAR-CIRCOT, Matunga, Mumbai got third prize (Joint award) for Amber Patrika amongst institutes/Centres situated in A & B region. This award was granted on the occasion of ICAR foundation day i.e. 16th July, 2017 by Hon'ble Shri Radha Mohan Singh, Union Minister of Agriculture & Farmer Welfare and Shri Sudarshan Bhagat, Union Minister of State for Agriculture & Farmer Welfare and received by Dr. P.G. Patil, Director of this institute. Smt. Trupti Mokal, AAO & In Charge, Official Language Cell and Mrs. Prachi Mhatre, STO In Charge, Library and Officer Assisting In Charge Official Language Cell were present on the occasion.

2. Award from Town Official Language Implementation Committee (NARAKAS), Mumbai

AS per the guidelines of the Government of India, Ministry of Home Affairs, Town Regional Official Language Implementation Committee for Central Government Offices situated at Mumbai has awarded ICAR-CIRCOT amongst its 91 member offices with ***Official Language Shield and Citation Paper*** for doing excellent and remarkable Official Language Implementation work during the year 2016 -17. Dr. P.G. Patil, Director of the Institute received the honour from Mr. Anil Kumar Gupta, President, NARAKAS and General Manager (P.R.).

On this occasion, Shri. Sunil Kumar, Senior Administrative Officer, Mrs. Trupti Mokal,

Incharge, Official Language Cell and Assistant Administrative Officer and Mrs Prachi Mhatre, STO In-charge, Library and Officer assisting in charge, Official Language Cell also attended the award function.

3. Ashirvad Official Language Award (Individual)

Mrs. Trupti Mokal, Assistant Administrative Officer and In-charge, Official Language Cell bagged the ***Ashirvad Official Language Award Trophy*** for her valuable contribution towards the implementation of Official Language in day to day office work at ICAR-CIRCOT for the year 2017 from ***Ashirvad*** – a cultural and literary institution based at Mumbai.

11.4 Hindi Competition

To promote use of Official Language, ICAR-CIRCOT, Mumbai in collaboaration with Town official Language Implementation Committee conducted a competition of Story writing in Hindi in the conference room of the Institute on 24th January, 2018. Twenty six participants from member offices participated in this event.

Staff members of ICAR-CIRCOT also participated in the "Antakshari" competition organized by Town Official Language Implementation committee on 14-02-2018. The following staff members got awards.

1.	Smt. R. R. Tawade Smt. V. R. Naik	First prize
2.	Ms. Nikki Shokeen Ms. Himani Singh Parmar	Second price
3.	Smt. S.R. Shirsat	Third prize

11.5 Hindi Publications

- Annual in-house publication ***Amber*** 2016 which incorporates popular research & technology and general articles along with poems written by staff members.
- Annual Report (Hindi) 2016-17

Story writing competition in Hindi

12. Distinguished Visitors

Dr. Trilochan Mohapatra, Secretary, DARE and DG, ICAR

Dr. Trilochan Mohapatra, Secretary, DARE and DG, ICAR visited the Institute on 24th July, 2017. He inaugurated the training programme on Quality Evaluation of Cotton and interacted with the participants of the training programme and scientists of the Institute.

The DG, ICAR with participants of the training program

The DG also inaugurated the newly refurbished PME Cell at the Institute. Dr. Gopal Krishna, Director, ICAR-CIFE Mumbai was also present on the occasion.

The DG, ICAR inaugurating the new PME Cell

Dr. K. Alagusundaram, DDG (Engg), ICAR, New Delhi

Dr. K. Alagusundaram, DDG (Engg), ICAR visited the Institute on 5th May, 2017 and presided over the workshop on "Mechanization of Cotton Cultivation, Harvesting and Ginning: Challenges, Opportunities and Way Forward".

DDG (Engg), ICAR in CIRCOT

Dr. S.N. Jha, ADG (Engg), ICAR, New Delhi

Dr. S.N. Jha, ADG (PE), ICAR with Dr. Nawab Ali, RAC Chairman

Shri. Chhabilendra Roul, Additional Secretary (DARE) & Secretary (ICAR)

Shri. Chhabilendra Roul, Additional Secretary (DARE) & Secretary (ICAR) visited the regional unit of ICAR-CIRCOT, Surat on July 22, 2017 and interacted with the staff on fibre quality analysis and related activities of the unit.

Shri Sudhir Bhargava, member of the ICAR Governing Body

Shri Sudhir Bhargava, member of the ICAR Governing Body along with Dr. Trilochan Mohapatra, Secretary, DARE and DG, ICAR; Dr. P.G. Patil, Director and Mr. S.V. Kasabe, AFAO, ICAR-CIRCOT Mumbai inaugurating the newly renovated Audit & Accounts Section on October 12, 2017

Shri Rataneshwari Prasad Singh, ICAR GB Member

Shri Rataneshwari Prasad Singh, Member, ICAR Governing Body visited GTC, Nagpur on August 28, 2017 and was apprised about the various activities of the centre. He also inaugurated the farmers training programme during the visit.

ICAR GB Member Dr. R.P. Singh at GTC, Nagpur

Shri B. Sudarshan Reddy, Former Judge, Supreme Court

Shri B. Sudarshan Reddy, Former Judge, Supreme Court along with Dr. Trilochan Mohaptra, Secretary DARE & DG ICAR and Dr. PG Patil, Director inaugurating the newly created Gymnasium

Dr. K.K. Singh, Director, CIAE Bhopal

Dr. K.K. Singh, Director, CIAE Bhopal, interacting with CIRCOT scientists

Dr. K.K. Singh, Director, CIAE, Bhopal visited the Institute on November 18, 2017 and interacted with the scientists on the proceedings of the workshop on "Mechanization of Cotton Cultivation, Harvesting and Ginning: Challenges, Opportunities and Way Forward", which was held at the Institute on November 5, 2017 and suggested that CIRCOT, CIAE and CICR should work together to find out the solution for various issues such as the failure of pneumatic planters in wet black soils. Dr. Singh elaborated on the work done by CIAE in farm mechanization and informed that the inclined plate planter developed by CIAE, Bhopal has been widely adopted by farmers for Bt cotton in Haryana.

Prof. Seshadri Ramkumar

Professor Seshadri Ramkumar from Nonwovens and Advanced Materials Laboratory, Department of Environmental Toxicology, Texas Tech University, Lubbock, Texas, USA visited the Institute on 20th February 2018 and had a discussion about the on-going research programmes of the Institute with senior level scientists.

Ethiopian Delegation

The Ethiopian Delegation comprising of officials from the Ministries, Government Departments, Research Institutions and Cotton Producers, Ginners and Exporters Association visited the Institute on April 29, 2017. The purpose of the delegation was to study the Indian experience in development of modern cotton marketing system so as to develop the National Cotton Roadmap in their country. The delegation was appraised of the research activities of the Institute and had an interactive meeting with the Director and Heads of Divisions on different aspects of processing, marketing and pricing of Cotton in India.

Nine Ethiopian delegates representing Ministry of Industry, Ministry of Agriculture, Ginning Industries and Cotton Trading Houses, visited GTC, Nagpur on May 2, 2017. Dr. S.K. Shukla, GTC incharge, convened a meeting and held discussions on a range of topics from ginning to value-addition of cotton biomass. The delegates were shown various facilities at the centre including cotton quality testing, particle board making and cottonseed processing plants and composting and mushroom production units. The delegates expressed their interest in collaboration with Govt. of India in the areas of cotton processing and quality evaluation and value-addition to cotton by-products and biomass.

Ethiopian delegates at Nagpur

Ethiopian delegates at Mumbai

13. Swachh Bharat Abhiyan

The Prime Minister of India launched the ***Swachh Bharat Abhiyan*** *a nation-wide campaign on 2nd October, 2014* to achieve Mahatma Gandhi`s vision of "Clean India" by his 150th birth anniversary, which is approaching on 2nd October, 2019. As citizens of India, it is our solemn responsibility to help achieve vision of "Clean India" by then.

Various activities conducted during the year 2017-18 are as follows:

Swachh Bharat Abhiyan Pakhwara (Clean India Campaign Fortnight) was observed in the Institute during **May 17-31, 2017**. All the staff was administrated the oath to maintain cleanliness of their working places and residential premises. During this period, a special cleanliness drive was arranged in the basement as well as in Institute premises.

As per the instructions received from the council, a campaign called **"Swachhta Hi Seva"** was launched in ICAR-CIRCOT, Mumbai and its regional stations from **15th September to 2nd October, 2017.** During the programme activities were carried out on 14 days, which included Shapath Grahan programme, Director's speech and cleanliness drives in the institute premises, CBPD, QEID, Admn sections, library, SEM lab, MPD, Nano Cellulose Pilot Plant, etc.

Samagra Swachhta Diwas and Sarvatra Swachhta drive were arranged by the institute inside and outside at a tourist spot near institute premises.

Cleanliness drive was arranged by regional quality evaluation units at Coimbatore and Sirsa.

A major cleanliness drive was arranged **at GTC, Nagpur**. The GTC staff carried out cleaning work inside and in front area of Children Park, a famous tourist spot situated at Japanese Garden, Nagpur on **Oct 01, 2017**. All garbage was gathered, especially polypropylene materials from inside and outside the park. Thereafter, the entire park area was thoroughly swept and washed.

A campaign "Swachhta Hi Seva" was also observed at CIRCOT regional stations Coimbatore, Sirsa and GTC, Nagpur during 15th September – 2nd October, 2017 by conducting cleanliness drives at the respective centers. In total, 17 cleanliness drives were covered. All the staff members of ICAR-CIRCOT, Mumbai participated enthusiastically in all the cleaning programmes.

In addition to all these activities, the committee conducted 11 cleanliness programme in the various divisions of the institute.

Display of Swachhata Banner

Forming human chain for cleanliness drive

Cleaning programme inside the office premises

Cleaning programme conducted at tourist place near office premises

Cleaning programme outside the office premises

Cleaning programme at GTC, Nagpur

Director administered the oath to maintain cleanliness

Cleaning of wash rooms in the office premises

Cleaning programme conducted by Regional Unit at Sirsa

Cleaning programme at Coimbatore Unit

14. Mera Gaon Mera Gaurav

The '*Mera Gaon Mera Gaurav*' (My Village My Pride) programme launched by the Prime Minister of India in 2015, is one of major initiatives of Govt. of India, towards doubling farmers income by way of strengthening farmers-scientists interface speeding up the "lab-to-land" process.

Under the MGMG initiative, ICAR-CIRCOT has identified and adopted 30 villages in Wardha district of Vidarbha region in Maharashtra to assist cotton growing farmers in increasing farm income. Six teams comprising of four multidisciplinary scientists in each group were formed and each team was allotted five villages for the programme implementation.

Initially, scientists of each group conducted a baseline study, mainly to assess the strength and weaknesses of each adopted village. Based on this information, a detailed action plan was drawn up by CIRCOT experts for sustainable cotton production in the adopted villages. Each group of the scientists was assigned exclusive tasks to achieve the desired targets to implement the formulated action plan in 2017-18 through regular interaction with farmers, organization of awareness programmes, field and technology demonstrations, kisan gosthis/meets, skill development and knowledge enhancement programmes, etc. in their respective villages.

In addition, the interaction of experts of other research institutes and organizations were also arranged by each group of scientists for providing crop specific package of advices to the farmers. Thus, a linkage was created between farmers and research institutes, NGOs, state departments and Industries through the implementation of MGMG programme.

Deliberations by experts in MGMG programme

In 2017-18, over 50 awareness programmes/ demonstrations/ farmers meets were organized in the adopted villages, where the experts from CIRCOT and other organizations showcased latest technologies and products and assessed and provided on-spot solutions to the farmers.

Farmers were appraised about various biological inputs like bio-fertilizers, bio-pesticides, organic manures, *panchakavya*, etc. for management of soil fertility and pests and diseases. In addition, farmers were apprised about various govt. schemes such as Crop Insurance, Clean India Mission, Pradhan Mantri Ujjwala Yojana, Right to Education, etc. and educated about current relevant issues such as *global warming, impact of crop burning, climate change, water conservation, soil fertility,* etc.

Assessment-based on-field guidance to farmers

Cotton farmers in most of the adopted villages faced severe Pink Bollworm (PBW) infestation problem in 2017-18. CIRCOT scientists organized special awareness programmes along with PBW experts to manage the PBW and minimize its damage. Farmers were also explained about various strategies to quarantine the PBW pests in the field in order to avoid the risk of the spread of this pest in the next cotton crop.

Field Visit and Inspection
at village Rehaki, district Wardha

In addition, special hands-on training-cum-demonstration programmes were also organized at GTC, Nagpur for preparation of bio-enriched compost from cotton stalks and cultivation of oyster mushroom. Over 100 farmers from Amgaon, Kadki, Digras, Parsodi and Majra villages of Wardha district participated in these programmes.

Hands-on training for mushroom cultivation at village Digras, district Wardha

A *Technology and Machinery Demonstration Mela - 2018* was organized at GTC, Nagpur to showcase latest technologies, machinery and products on cotton processing & by-products utilization, specially for MGMG farmers.

Live demonstrations on preparation of bio-enriched compost, pellets, particle board and oyster mushroom cultivation using cotton stalks and assessment of ginning out turn, moisture content and fibre attributes, etc. were also arranged for the benefit of farmers. On this occasion, an exhibition was also organised, in which the latest technologies and processes for value addition of cotton stalks were prominently exhibited by various stakeholders.

Gathering response from farmers

Demonstration of cotton stalks chipping during Technology and Machinery Demonstration Mela 2018 at GTC, Nagpur

15. Infrastructural Facilities

The Institute is well equipped with state-of-art research and testing facilities for conducting research in post-harvest processing of cotton and allied fibres.

Some of the facilities available in the Institute include

- Modern ginning & associated machinery
- High Volume Instrument (HVI)
- Advanced Fibre Information System (AFIS)
- Scanning Electron Microscope (SEM)
- X-Ray Diffraction (XRD)
- Universal Tensile Tester
- Evenness and Hairiness Tester
- Miniature & Full Scale Spinning Machines
- DREF Spinning System
- Core & Compact Spinning Systems
- Banana Fibre Spinning Machines
- Circular Knitting Machines
- Computerised Sample Weaving Machine
- Compression Moulding Machine
- Kawabata Evaluation System (KESF)
- Contact Angle Tensiometer
- Gas Chromatography with Mass Spectrometer (GC-MS)
- High Performance Liquid Chromatography (HPLC)
- Fast Protein Liquid Chromatography (FPLC)
- Atomic Force Microscope (AFM)
- Thermo Gravimetric Analyser & Differential Scanning Calorimeter
- Fourier Transform Infrared Spectrometer (FTIR)
- Atomic Absorption Spectrometer (AAS)
- Plasma Reactor for Textile Materials
- UPF Analyser
- Ultra High Pressure Homogenizer
- Nano Particle Size Analyser
- Pulp, Paper and Board Making and Testing Facilities
- Scientific Cotton Seed Processing Pilot Plant
- Data analysis software (SAS & MATLAB

Inauguration of Facilities

Dr. Trilochan Mohapatra, Secretary (DARE) & Director General (ICAR) inaugurated the video conferencing facility at ICAR-CIRCOT, Mumbai by interacting with senior officers at ICAR-CIFE, Mumbai on September 07, 2017

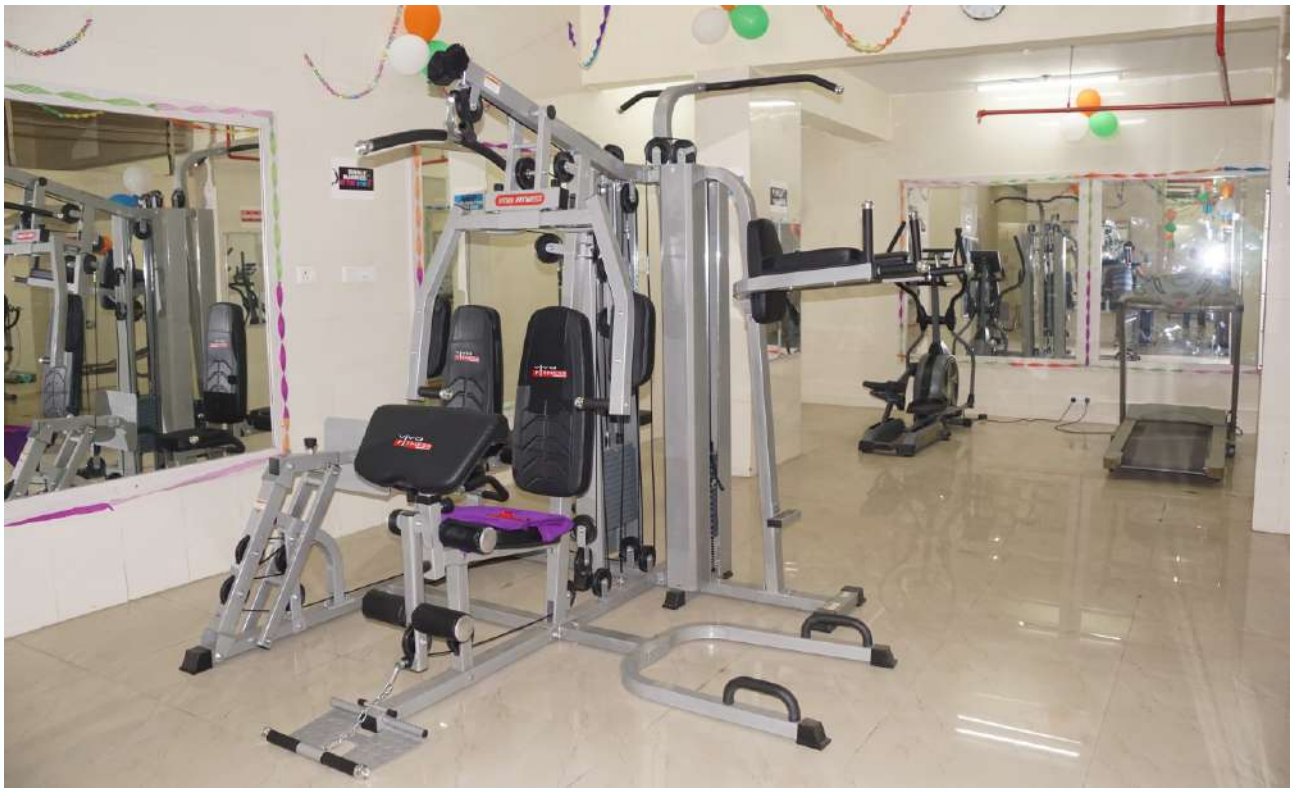
Renovated Admin-I Section was inaugurated by Dr. Trilochan Mohapatra, Secretary (DARE) & Director General (ICAR) on Oct 12, 2017.

Renovated Finance & Accounts section was inaugurated by Mr. Sudhir Bhargava, ICAR Governing Body Member and Dr. Trilochan Mohapatra, Secretary (DARE) & Director General (ICAR) on Oct 12, 2017

The Record room was inaugurated by Dr. Trilochan Mohapatra, Secretary (DARE) & Director General (ICAR) on Oct 12, 2017.

The New PME Cell was inaugurated by Dr. Trilochan Mohapatra, Secretary, DARE & DG, ICAR in the presence of Dr. Gopal Krishna, Director, ICAR-CIFE, Mumbai.

ICAR-CIRCOT Sports Centre and Gymnasium was inaugurated by Shri. B. Sudarshan Reddy, Former Judge, Supreme Court of India in the presence of Dr. Trilochan Mohapatra, Secretary, DARE & DG, ICAR and Shri Vikas Deshmukh, Secretary, Agriculture and ADF Department, Govt of Maharashtra, Mumbai on December 24, 2017



Annexure I

LIST OF ONGOING PROJECTS

S. No.	Title	Investigators	Duration
	INSTITUTE FUNDED PROJECTS		
Core Area I: Pre-Ginning and Ginning			
1	Design and Development of Single Locking Cotton Feeder for Enhancing Ginning Efficiency of Double Roller Gin	V. G. Arude S. K. Shukla P. S. Deshmukh	2016-18
Core Area II: Mechanical Processing, Technical Textiles and Composites			
2	Development of Activated Carbon from Cotton Stalk for Use in Protective Textiles	T. Senthilkumar S. K. Chattopadhyay Sujata Saxena R. Guruprasad	2016-18
3	Development of Durable Antimicrobial Cotton Textile through Fibre Blending Process	G. Krishna Prasad S. K. Chattopadhyay R. Guruprasad T. Senthilkumar A. S. M. Raja	2016-18
Core Area III: Characterisation of Cotton and other Natural Fibres, Yarns and Textiles			
4	AICRP on Cotton (Quality Evaluation)	P.K. Mandhyan S. K. Dey A. Arputharaj P. Jagajanantha	2017-20
5	Design and Development of Lint Opener for Preparation of Samples for Micronaire Testing	S. V. Ghadge S.K. Shukla V.G. Arude A.K. Bharimalla C. Sundaramoorthy P.G. Patil	2015-18
Core Area IV: Chemical and Biological Processing, Biomass and By-products Utilisation			
6	Development of Innovative Finishing Process for Cotton Garments	A. S. M. Raja Virendra Prasad A. Arputharaj Sujata Saxena	2015-18

S. No.	Title	Investigators	Duration
7	Development of Suitable Solvent Extraction Process for Obtaining Low Gossypol Cottonseed Meal for Non- Ruminant Feed and Food Applications	Sujata Saxena Virendra Prasad	2016-18
8	Development of protocol for extraction of quality Protein from Cottonseed Meal	Manoj Kumar Virendra Prasad V. Mageshwaran Sharmila Patil	2017-19
Core Area V: Entrepreneurship and Human Resource Development			
9	Popularisation of CIRCOT Technologies on Compost and Oyster Mushroom Production using Cotton Stalks among the Cotton growing Farmers of Vidarbha Region	V. Mageshwaran S. K. Shukla C. Sundaramoorthy Varsha Satankar	2016-18
10	Application of Nano Cellulose in Cement Concrete, Rubber Composites, Pulp and Paper for Enhancement of Functional and Mechanical Properties	A. K. Bharimalla N. Vigneshwaran P. G. Patil	Jan 2016 - Dec 17
11	Assessment of Factors Influencing Adoption of Scientific Cottonseed Processing in India	P. S. Deshmukh C. Sundaramoorthy Varsha Satankar	2016-18
12	Impact Assessment of ICAR Flexi-check Dam in different hydrological regions of Maharashtra	A. K. Bharimalla P. S. Deshmukh C. Sundaramoorthy T. Senthilkumar	2017-19
13	Application of Nanocellulose in Paint Formulation	Archana Mahapatra A. K. Bharimalla P. S. Deshmukh Manoj Kumar	2017-19
14	Design and Development of Nanocellulose based Composites for Packaging Application	Sharmila S. Patil N. Vigneshwaran Virendra Prasad C. Sundaramoorthy Archana Mahapatra	2017-19

EXTERNALLY FUNDED PROJECTS

S. No.	Title	Investigators	Duration
1	Preparation of Specialty Grade Pulp from Cotton Linters by Blending with Pulps from other Cellulosic materials for high end applications (Extra Mural Fund)	N. Vigneshwaran Virendra Prasad Sujata Saxena A. S. M. Raja A. K. Bharimalla P. K. Mandhyan P. S. Deshmukh C. Sundaramoorthy A. Arputharaj	2016-18
2	Agri Business Incubation Centre at ICAR – CIRCOT, Mumbai (NAIF -Incubation Fund)	A. K. Bharimalla S. K. Shukla N. Vigneshwaran P. K. Mandhyan V. G. Arude C. Sundaramoorthy V. Mageshwaran S. Venkatakrishnan Hamid Hasan Bharat Pawar	2015-20
Consortia Research Project (CRP) on Natural Fibres			
3	Utilisation of Lignocellulosic Fibre based Biomass as Renewable Energy for Rural and Industrial Application	S. K. Shukla V. Mageshwaran Varsha Satankar A. K. Bharimalla C. Sundaramoorthy S. V. Ghadge P. G. Patil A. S. M. Raja V. G. Arude	2015-20
4	Preparation of Nanolignocellulose and its Incorporation in Polymer Composites for Improved Performance	N. Vigneshwaran A. K. Bharimalla Virendra Prasad C. Sundaramoorthy T. Senthilkumar	2015-20

S. No.	Title	Investigators	Duration
5	Eco-friendly method of preparing absorbent/surgical cotton from non-spinnable cotton	P. Jagajanantha A. K. Bharimalla P. K. Mandhyan S. K. Shukla V. Mageshwaran Varsha Satankar	2015-20
6	Sustainable Green Technology for Dyeing of Cotton Textile	A. S. M. Raja Virendra Prasad A. Arputharaj T. Senthilkumar	2015-20

Annexure II

PERSONNEL

(As on March 31, 2018)

DIRECTOR

Dr. P. G. Patil
M. Tech. (P.H.E.), Ph.D. (Engg.), F.T.A., F. ISAE.

SCIENTIFIC STAFF

HQ, MUMBAI

PRINCIPAL SCIENTIST

1. Dr. S. K. Chattopadhyay, M. Tech. (Text. Engg.), Ph.D. (Tech.), F.T.A., C. Engg., F.I.E., C. Text., F.T.I. (Manchester)
2. Dr. (Smt.) Sujata Saxena, M.Sc., Ph.D. (Organic Chemistry) Head I/C, Chemical and Biochemical Processing Division
3. Dr. Dattatreya M. Kadam, M.Tech (ASPE), Ph.D
4. Dr. A. S. M. Raja, M. Sc., Ph.D. (Textile Chemistry)
5. Dr. N. Vigneshwaran, M.Sc. (Agri.), M.B.A., Ph.D. (Agricultural Microbiology)

SENIOR SCIENTIST

1. Dr. S. V. Ghadge, M.E. (Ag.) F.M.P., M.B.A.,Ph.D. (Farm Machinery & Power)
2. Er. A. K. Bharimalla, M. Tech. (F.M.P.) (Composite) Head I/C, Technology Transfer Division
3. Dr. P. K. Mandhyan, M.Sc., Ph.D., A.T.A (Technical Textiles) Head I/C, Quality Evaluation and Improvement Division
4. Dr. P. S. Deshmukh, M. Tech., Ph.D. (Agril. Engg.) (Farm Machinery & Power)
5. Dr. C. Sundaramoorthy, M.Sc., Ph.D. (Agricultural Economics)

SCIENTIST

1. Er. V. G. Arude, M. Tech. (F.M.P.) (Farm Machinery & Power)
2. Shri. A. Arputharaj, M.Sc., M. Tech. (Textile Chemistry)
3. Dr. R. Guruprasad, M. Tech., Ph.D. (Textile Manufacture)
4. Dr. T. Senthilkumar, M. Tech., Ph.D. (Textile Manufacture)
5. Dr. G. Krishna Prasad, M. Tech. (Textile Manufacture)
6. Shri. G. T. V. Prabu, M. Tech. (Textile Manufacture) (On study leave)
7. Shri. Santanu Basak, M. Tech. (Textile Chemistry) (On study leave)
8. Dr. P. Jagajanantha, M. Tech., Ph.D. (Textile Chemistry)

9. Dr. (Smt.) Sharmila Patil, M.Sc. (P.H.T.), Ph.D. (Agricultural Process Engineering)
10. Er. (Smt.) Archana Mahapatra, M.Tech. (Agricultural Process Engineering)
11. Dr. Manoj Kumar, M.Sc. (Plant Biochemistry)
12. Er. (Smt.) Jyoti Prabhakar Dhakane, M.Sc. (P.E.) (PHT)

GTC, NAGPUR

PRINCIPAL SCIENTIST

1. Dr. S. K. Shukla, M. Tech., Ph.D. (Agricultural Process Engineering) Officer-In-Charge, GTC

SENIOR SCIENTIST

1. Dr. (Mrs.) Jyoti M. Nath, M.Sc., Ph.D. (Electronics & Instrumentation)

SCIENTIST

1. Dr. V. Mageshwaran, M.Sc. (Agril), Ph.D. (Agricultural Microbiology)
2. Er. (Ms.) Varsha Satankar, M.Tech. (Agricultural Structures and Process Engineering)

TECHNICAL STAFF

HQ, MUMBAI

CHIEF TECHNICAL OFFICER

1. Dr. R. D. Nagarkar, M.Sc., Ph.D.
2. Dr. (Smt.) Sheela Raj, M.Sc., Ph.D.

ASSISTANT CHIEF TECHNICAL OFFICER

1. Dr. (Smt.) Sudha Tiwari, B.Sc., Ph.D.
2. Shri. T. Venugopal, B.E.
3. Dr. (Smt.). N. M. Ashtaputre, M.Sc., Ph. D.
4. Shri. R. S. Prabhudesai, M.Sc., D.C.M.
5. Shri. G. B. Hadge, M.Sc.
6. Dr. M. V. Vivekanandan, M.Sc., Ph.D.
7. Shri. S. Banerjee, M.Sc.
8. Shri. B. R. Pawar, M. Sc., LL.M.
9. Shri. R. K. Jadhav, M.Sc.
10. Shri. C. M. More, M.Sc.
11. Shri. R. R. Chhagani, M.Sc.
12. Shri. H. S. Koli, M.Sc., LL.B.
13. Dr. (Smt.) S. R. Kawlekar, M.Sc., P.I.M.R., Ph.D.
14. Shri. P. N. Sahane, D.I.F.T.
15. Smt. P. S. Nirhali, M.Sc.
16. Shri. S. V. Kokane, M.A.

SENIOR TECHNICAL OFFICER

1. Shri. K. Narayanan, B.Sc.
2. Shri. M. B. Patel, B.Sc., L.L.B
3. Smt. Binu Sunil, M.Sc.
4. Shri. D. U. Kamble, B.Sc.
5. Smt. Bindu Venugopal, M.Sc.
6. Dr. (Ms.) C. P. D' Souza, M.Sc., Ph.D.
7. Shri. R. S. Narkar, M.Sc., D.C.I.A.
8. Smt. P. R. Mhatre, B.Sc., M.Lib.
9. Smt. C. D. Prabha, M.Sc.
10. Er. Chandrika Ram, M. Tech. (APFE)

TECHNICAL OFFICER

1. Shri. V. D. Kalsekar, B.Sc.
2. Shri. C. V. Shivgan, Cert. Elec. Supr. PWD, Cert. M. & A.W. Technician
3. Shri. M. G. Ambare, M.Sc.
4. Shri. S. N. Patil, B.E. (Civil)
5. Shri. N. D. Kambli, M.Sc.

SENIOR TECHNICAL ASSISTANT

1. Shri. D. M. Correia, I.T.I., N.C.T.V.T. (Mechanic)
2. Smt. H. R. Pednekar, B.A., B.Lib.
3. Shri. R. P. Kadam, M.Sc.
4. Smt. M. P. Kamble, B.A., M.Lib.
5. Shri. A. R. Jadhav, B.Sc.

TECHNICAL ASSISTANT

1. Shri. Krishna Bara, D.H.T.
2. Shri. S. K. Parab, Cert. Cot. Spin.
3. Shri. D. A. Salaskar, Driver

SENIOR TECHNICIAN

1. Shri. D. M. Raje
2. Shri. R. R. Gosai
3. Shri. N. K. Shaikh
4. Shri. Mahabir Singh
5. Shri. S. V. Kokane
6. Shri. M. M. Kadam
7. Shri. S. G. Phalke
8. Shri. D. J. Dhodia
9. Shri. Yogesh Nagpure

TECHNICIAN

1. Shri. D. G. Gole

GTC, NAGPUR

CHIEF TECHNICAL OFFICER

1. Er. D. U. Patil, B. Tech. (Agril. Engg.)

ASSISTANT CHIEF TECHNICAL OFFICER

1. Shri. U. D. Devikar, M.Sc.
2. Shri. S. L. Bhanuse, B.Sc.

SENIOR TECHNICAL OFFICER

1. Shri. R. G. Dhakate, B.Sc.
2. Shri. S. N. Hedau, B.Sc.

SENIOR TECHNICAL ASSISTANT

1. Shri. B.V. Shirsath, B.A., I.T.I

SENIOR TECHNICIAN

1. Shri. Umrao Meena

QE UNIT, COIMBATORE

1. Dr. S. Venkatakrishnan, M.Sc., Ph.D., A.T.A., F.T.A, Chief Technical Officer
2. Shri. S. Mukundan, M.Sc., Assistant Chief Technical Officer
3. Shri. M. Bhaskar, Dip. Ref. & Air-Cond., Technical Officer

QE UNIT, DHARWAD

1. Smt. V. G. Udikeri, M.Sc., Technical Officer

QE UNIT, GUNTUR

1. Shri. K. Thiagarajan, M.Sc., Assistant Chief Technical Officer

QE UNIT, SIRSA

1. Dr. Hamid Hasan, M.Sc., Ph.D. Chief Technical Officer
2. Dr. Jal Singh, M.Sc., Ph.D. Senior Technical Officer

QE UNIT, SURAT

1. Shri. G. G. Mistry, B.Sc., Senior Technical Officer

ADMINISTRATIVE STAFF

HQ, MUMBAI

SR. ADMINISTRATIVE OFFICER

Shri Sunil Kumar, B.A. (Hons.)

ASSISTANT ADMINISTRATIVE OFFICER

1. Smt. Sujata Koshy, B.Com.
2. Shri. Y. R. Pathare, B.Sc., M.B.A.
3. Smt. T. P. Mokal, M.A.(Hindi)
4. Shri. R. K. Pallewad, B.A.
5. Shri. S. A. Telpande, M.Com.

ASSISTANT FINANCE & ACCOUNTS OFFICER

1. Shri. S. V. Kasabe, B.Com, L.L.B.

ASSISTANT

1. Smt. V. V. Janaskar, B.Com., M.A.(Hindi)
2. Smt. S. R. Shirsat, B.A.
3. Shri. N. V. Kambli
4. Smt. N. M. Deshmukh, M.A., LL.B.
5. Shri. S. D. Ambolkar
6. Shri. P. V. Jadhav
7. Kum. Pooja Tiwari, B.Sc.
8. Kum. Nikky Shokeen, B.Tech.
9. Kum. Singh Himani Parmar, B.E.

UPPER DIVISION CLERK

1. Smt. S. G. Parab, B.A. (Sociology), B.A. (Hindi)
2. Smt. S. P. Paiyala
3. Smt. J. R. Chavkute
4. Shri. V. M. Sable
5. Smt. B. D. Kherodkar
6. Shri. S. S. Angane
7. Shri. T. D. Dhamange, B.Com.
8. Shri. S. N. Bandre

LOWER DIVISION CLERK

1. Smt. V. N. Walzade, B.A

PRIVATE SECRETARY

1. Smt. S. D. Dudam, M.A

PERSONAL ASSISTANT

1. Smt. T. T. D'Souza
2. Smt. U. N. Bhandari

STENOGRAPHER

1. Smt. R. R. Tawde, B.Com.
2. Smt. V. R. Naik, B.A.

GTC, NAGPUR

1. Shri. K. Parleswar
   Assistant Administrative Officer
2. Shri. R. D. Shambharkar, M.A.
   Stenographer (Gr. III)

QE UNIT, GUNTUR

1. Shri. R. G. Matel, Lower Division Clerk

SKILLED SUPPORT STAFF

HQ, MUMBAI

1. Shri. M. Z. Rathi
2. Shri. D. B. Temgire
3. Shri. K. T. Mahida
4. Shri. M. M. Katpara
5. Shri. M. A. A. Rashid
6. Shri. G. N. Mayawanshi
7. Shri. H. B. Vesmiya
8. Shri. M. J. Sumra
9. Shri. S. K. Bobate
10. Shri. P. P. Patil
11. Shri. R. G. Tak
12. Shri. R. P. Karkate
13. Shri. A. F. Gudadur
14. Shri. M. K. Prabhulkar
15. Shri. J. D. Sakpal
16. Shri. V. Murugan
17. Shri. M. G. Sosa
18. Shri. S. D. Magar
19. Shri. S. B. Worlikar
20. Shri. Sunil R. Tondse
21. Shri. V. B. Poojari
22. Shri. M. N. Kamble
23. Shri. S. S. Surkule
24. Shri. S. P. Naik
25. Smt. Kamala Murugan
26. Shri. D. K. Kasar
27. Shri. Suhas R. Tondse
28. Shri. D. R. Gawde
29. Shri. S. M. Chandanshive
30. Shri. P. E. Gurav
31. Shri. Mahesh C. Solanki

GTC, NAGPUR

1. Shri. M. P. Tohokar
2. Shri. J. P. Patel
3. Shri. R. B. Kautkar
4. Shri. R. S. Umare
5. Smt. M. M. Bhandakkar

QE UNIT, COIMBATORE

1. Shri. V. Subbaiah

QE UNIT, DHARWAD

1. Shri. C. J. Bagalkoti

APPOINTMENTS

Scientific Appointments

Kum. Jyoti Prabhakar Dhakane, M.Sc. (P.E.) joined as Scientist w.e.f. April 15, 2017

Administrative Staff

Ku. Pooja Tiwari joined as Assistant w.e.f. August 17, 2017

Ku. Nikky Shokeen joined as Assistant w.e.f. August 07, 2017

Ku. Singh Himani Parmar joined as Assistant w.e.f. August 03, 2017

PROBATION CLEARANCE

Scientific Probation Clearance w.e.f. 11-08-20017

1. Dr. S. K. Dey, Sr. Scientist
2. Dr. P. K. Mandhyan, Sr. Scientist

PROMOTIONS

Sr. No.	Name of Staff	Grade to which Promoted	Effective Date of Promotion
1.	Dr. A. S. M. Raja	Principal Scientist	15-06-2016
2.	Dr. S.K. Shukla	Principal Scientist	25-07-2016
3.	Dr. N. Vigneshwaran	Principal Scientist	10-09-2017
4.	Dr. R.D. Nagarkar	Chief Technical Officer	01-01-2015
5.	Dr. Hamid Hassan	Chief Technical Officer	01-07-2015
6.	Shri V.L. Rangari	Assistant Chief Technical Officer	01-01-2015
7.	Shri U.D. Devikar	Assistant Chief Technical Officer	01-01-2015
8.	Shri S.L. Bhanuse	Assistant Chief Technical Officer	01-01-2015
9.	Shri S. Vancheswaran	Assistant Chief Technical Officer	01-01-2012
10.	Dr. E.A. Pachpinde	Assistant Chief Technical Officer	09-04-2010
11.	Shri T. Venugopal	Assistant Chief Technical Officer	05-11-2009
12.	Shri P.N. Sahane	Assistant Chief Technical Officer	26-02-2015

DEPUTATIONS ABROAD

Names of Scientists	Name of the Programme	Place	Period
Dr. P.G. Patil, Director	National Capacity Building Workshop" organised by UNCTAD, Geneva under UN Development account project entitled "Promoting cotton by-products in eastern and southern Africa"	Dar es salam, Tanzania Kampala, Uganda	November 15-17, 2017 March 14-16, 2018

Names of Scientists	Name of the Programme	Place	Period
Dr. P.S. Deshmukh, Sr. Scientist	To assess the condition of the Regional Knowledge Cluster cum- Training Centre on post-harvest and ginning technology established in the premises of CRA-CF INRAB at Bohican, Benin under Cotton Technical Assistance Programme (TAP) for Africa as an initiative of Government of India under the aegis of India-Africa Forum Summit (IAFS-II).	Benin, Africa	December 17-23, 2017
Dr. C. Sundaramoorthy, Sr. Scientist	National Capacity Building Workshop organized by United Nations Conference on Trade and Development (UNCTAD) under the UN Development Account project „Promoting cotton by-products in Eastern and Southern Africa	Lusaka, Zambia	December 06-08, 2017

On LIEN

Dr. Virendra Prasad, Senior scientist w.e.f 07-12-2017

Dr. Deepak Meena, Technical Assistant w.e.f. May 09, 2016

TRANSFERS

Dr. D.M. Kadam, Principal Scientist transferred from ICAR-CIPHET, Ludhiana to ICAR-CIRCOT, Mumbai with effect from 20-06-2017

Shri Sunil Kumar, Sr. Administrative Officer transferred from ICAR-DOGR, Pune to ICAR-CIRCOT on April 12, 2017.

Shri M.B. Patel, Sr. Technical Officer transferred from ICAR-CIRCOT Regional unit, Surat to ICAR-CIRCOT, Mumbai with effect from 30-05-2017

Shri M.G. Sosa, Skilled Supporting Staff transferred from ICAR-CIRCOT Regional unit, Surat to ICAR-CIRCOT, Mumbai with effect from 30-05-2017

Shri A.F. Gudadur, Skilled Supporting Staff transferred from ICAR-CIRCOT Regional unit, Dharwad to ICAR-CIRCOT, Mumbai with effect from 05-06-2017

Shri R.G. Matel, Lower Division Clerk transferred from GTC of ICAR-CIRCOT to Regional unit, Guntur with effect from 16-05-2017

Er. Chandrika Ram, Senior Technical Officer transferred from ICAR-CIARI, Port Blair to ICAR-CIRCOT, Mumbai on November 10, 2017 on Deputation Basis for three years

RETIREMENTS

Shri D. N. Moon, Sr. Technical Officer retired on April 30, 2017.

Shri M. Mohan, Chief Technical Officer Retired on May 31, 2017.

Shri V.L. Rangari, Assistant Chief Technical Officer at GTC, Nagpur retired on August 31, 2017.

Shri S. M. Gogate, Sr. Technical Officer retired on October 31, 2017.

Shri. C. S. Salvi, Skilled Support Staff retired on November 30, 2017.

Dr. S. K. Dey, Senior Scientist, QEID, retired on January 31, 2018.

Dismissal from Services of ICAR-CIRCOT

Smt. N. M. Sonkusle, Senior Technical Officer, dismissed from service with effect from 30-10-2017

OBITUARY

Shri. M. K. Ghadge, Skilled Support Staff expired while in service on June 15, 2017.

Shri. C. D. Acharekar, Skilled Support Staff expired while in service on February 27, 2018.

Shri G. Moosad, ex-employee of ICAR CIRCOT expired on July 6, 2017. He had joined ICAR as Jr. Clerk at CIFT, Cochin in 1976 and worked as Superintendent at CIRCOT during 1999 to 2001.

Shri B. R. Satam, ex-employee of ICAR-CIRCOT expired on December 12, 2017. He had joined ICAR on April 4, 1979 and worked as Skilled Supporting Staff in the institute.

Annexure III

LIST OF COMMITTEES

Institute Management Committee (IMC)

Dr. P. G. Patil, Director, Chairman

Dr. S. N. Jha, ADG (PE), ICAR, New Delhi

Dr. (Smt.) Sandhya Kranthi, Head, Crop Protection Division, ICAR-CICR, Nagpur

Dr. S. N. Chattopadhyay, Principal Scientist, ICAR-NIRJAFT, Kolkata

Dr. A. L. Kamble, Scientist, ICAR-NIASM, Baramati

Dr. Vilas Kharche, Associate Dean, Govt. Agriculture College, Dr. PDKV, Akola

Shri D. B. Sable Patil, Buldana, Maharashtra

Smt. K. S. Somvanshi, Pune, Maharashtra

Research Advisory Committee (RAC)

Dr. Nawab Ali, Former DDG (Agril. Engg.), ICAR, Chairman

Dr. G. S. Nadiger, Research Advisor (SASMIRA) & Former Director of Laboratories (Textile Committee), Mumbai

Dr. Anup Rakshit, Executive Director, Indian Technical Textiles Association, Mumbai

Dr. Narendra G. Shah, Professor, Centre for Technology Alternatives for Rural Areas, IIT, Mumbai

Dr. Bijay K. Behera, Profesor & Head, Department of Textile Technology, IIT, Delhi

Dr. Debasis Nag, Former Director, NIRJAFT, Kolkata

Dr. P. G. Patil, Director, ICAR-CIRCOT, Mumbai

Dr. S. N. Jha, ADG (PE), ICAR, New Delhi

Er. V. G. Arude, In-charge, PME Cell, Member-Secretary

Shri D. B. Sable Patil, Buldana, Maharashtra

Smt. K. S. Somvanshi, Pune, Maharashtra

Project Monitoring and Evaluation Committee (PMC)

Dr. P. G. Patil, Director, Chairman

Dr. (Smt.) Sujata Saxena, In-charge Head, CBPD

Dr. P. K. Mandhyan, In-charge Head, QEID

Er. A. K. Bharimalla, In-charge, TTD

Er. V. G. Arude, In-charge PME Cell, Member secretary

Priority-setting, Monitoring & Evaluation (PME) Cell

Er. V. G. Arude, Scientist, In-charge

Er. A. K. Bharimalla, Sr. Scientist

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VISION

Global Excellence in Cotton Technology

MISSION

To provide scientific and managerial interventions to post-harvest processing and value addition to cotton and other natural fibres and utilization of their by-products to maximize economic, environmental and societal benefits.

MAIN SERVICES/TRANSACTIONS

Sr. No.	Services/Transactions	Responsible Persons
1.	Commercial Testing: Fibre, Yarn, Fabric, Garment, Spinnability, Non-Lint Content, Linter, Seed, Paper, Chemical and Biochemical Tests of Textile Materials, ECO, SEM, XRD, etc.	Mrs. P.S. Nirhali Assistant Chief Technical Officer Incharge, Test House Phone Ext 456 / 457 circottest@gmail.com, cottontest@rediff.com
2.	Imparting Training to Stakeholders	Er. A.K. Bharimalla Technology Transfer Division Phone Ext 467 ashokbhari72@gmail.com and Dr. S.K. Shukla Ginning Training Centre, Nagpur Phone (0712) 2500592 , 2500289 skshukla2000@gmail.com
3.	Supply of Calibration Cotton	Dr. P.K. Mandhyan Quality Evaluation and Improvement Division Phone Ext 447 pkmandhyan@gmail.com
4.	Consultancy and Technology Transfer	Er. A.K. Bharimalla Technology Transfer Division Phone Ext 467 ashokbhari72@gmail.com

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For Further Information, Contact

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सूचना का अधिकार
RIGHT TO INFORMATION

हमारा उद्देश्य
OUR MOTIVE

पारदर्शिता को बढ़ावा देने के लिए
To Promote Transparency

जवाबदेही को बढ़ावा देने के लिए
To Promote Accountability

सूचना का अधिकार अधिनियम, 2005 की घोषणा के अनुसरण में निम्नलिखित अधिकारियों को इस संस्थान में जनसूचना अधिकारी, सहायक जनसूचना अधिकारी और अपीलीय प्राधिकारी के रूप में नामित किया गया है।

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Agrisearch with a human touch

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एक कदम स्वच्छता की ओर