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CIRCOT
Annual Report
2011-12

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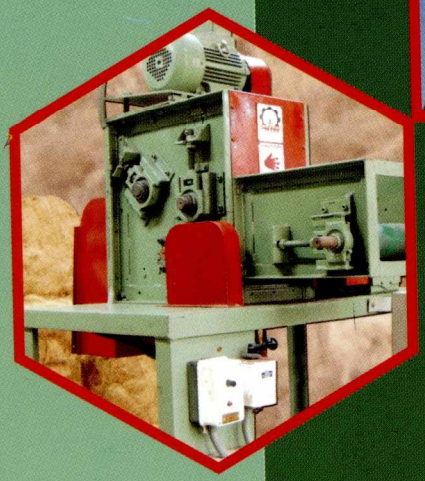


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CIRCOT

ANNUAL REPORT
2011-2012

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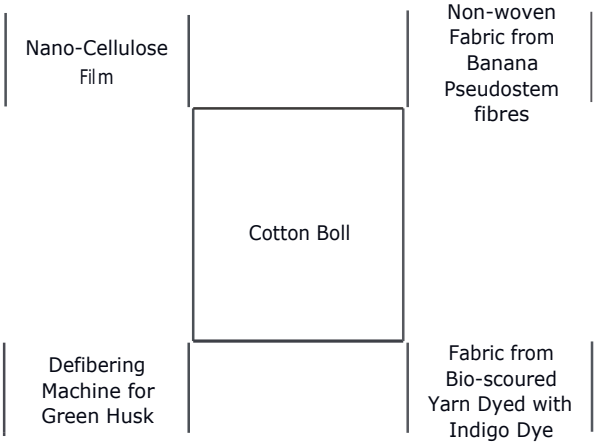
COVER THEME : ACHIEVEMENTS OF NAIP PROJECTS AT CIRCOT



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Preface

The 88th year of CIRCOT's existence (2011-12) has been a momentous one. CIRCOT got the privilege of jointly organizing the World Cotton Research Conference-5 (WCRC 5) in Mumbai, the first ever in the Asian subcontinent. The WCRC-5 proved to be an important platform for all the stakeholders associated with cotton; to participate, deliberate, exchange R&D information, devise strategies and policies and initiate affirmative action plan for improvement of cotton crop and industry. CIRCOT too benefitted from this dissemination and assimilation of technologies and research expounded from world over. The Institute also proudly celebrated the Silver Jubilee of its Ginning Training Center at Nagpur. We are grateful to the Honourable DG, ICAR, DDG (Engg.) and a host of dignitaries from the industry for attending the event, thus acknowledging the work done by CIRCOT for the ginning industry.

Cotton production in the country is again on a high in 2011-12, with the area under cultivation reaching 122 lakh hectare, producing 347 lakh bales against the cultivated area of 111 lakh hectare with production of 339 lakh bales in the year 2010-11. This has offered CIRCOT with new challenges and opportunities for innovative and sustainable R&D in the cotton sector. The institute has encompassed its activities into four core areas viz: (i) Ginning of cotton (ii) Quality evaluation of fibre, yarn and fabric (iii) Finishing and dyeing of cotton with natural and environment friendly agents and (iv) Utilization of cotton plant residues for production of value added products. It gives me immense satisfaction to put on record that, presently, about 15 projects covering a wide array of relevant research problems under the four core areas are being successfully executed in CIRCOT. Research in CIRCOT is holistically aimed at devising and propagating efficient, economic and ergonomic technology intervention for extraction and maximum use of natural fibres, including cotton. Likewise, the output from the externally funded projects is also immensely satisfying. Of these, two NAIP World Bank funded projects under the component 4 theme of Basic and Strategic Research in Agriculture, have been completed in the stipulated time with all targets achieved. The projects are (i) Design and Development of Rubber Dam for Watersheds and (ii) Synthesis and Characterization of Nanocellulose and its Application in Biodegradable Polymer Composites to enhance their Performance. Other NAIP projects under Component 2, viz. Value chain on Cotton Fibres, Seed and Stalks, Value Chain on Coconut Fibre and Value Chain on Banana Pseudostem have also shown significant progress. The BPDU under NAIP Component 1, functioning at CIRCOT is striving to encourage entrepreneurs to innovate and incubate their technologies using its assistance. I am proud that the Institute has also been entrusted with a project in the emerging field of finishing of textiles using Plasma technology under the National fund for Basic, Strategic & Frontier Application Research in Agriculture. Besides the popular training programmes on quality evaluation of fibres and ginning of cotton, this year CIRCOT

organized two workshops and one short course in the field of Nanotechnology. The programmes conducted were Nano cellulose and its composites in Agriculture, Synthesis and characterization of Nanomaterials and their Application in Agriculture and Application of Nanotechnology in Agriculture. More than 40 scientists from NARS were benefitted from these programmes.

CIRCOT is glad to be participating in the Technical Assistance Programme to strengthen Cotton Value Chain in the C-4 countries of Benin, Burkina Faso, Chad, Mali and the countries of Malawi, Nigeria and Uganda. The Institute is the consortium partner and the Lead Implementation Agency is the Deptt. of Commerce, Government of India. The total budget for the programme is Rs. 384.5 lakhs.

The Institute technologies were exhibited, presented and discussed at various national forums like TECHNOTEX 2011, organized by FICCI, Ministry of Textiles with Dept. of Chemical and Petrochemicals, KVK conference at JNKVV, Jabalpur, MKV at Parbhani, Science Expo at Raman Science Center, Nagpur, VIGYAN YAGNYA 2012 at Somaiya College, Mumbai, Agro-Vision at Nagpur, 1st International Science Congress at Indore and at an International platform in a conference titled Managing Innovations 2011, held at The Textile Institute, Manchester, U.K. It is noteworthy that during the year many scientists got international exposure under various schemes and programmes.

CIRCOT was honoured by distinguished visitors representing diverse disciplines from India and abroad. We were also privileged to host the visit of fourty WCRC-5 delegates and a delegation of four senior officials from the Republic of Mozambique.

I am proud to say that the CIRCOT Library is being continuously updated and is well appreciated by researchers, academicians and students, This year the library acquired the Annual Institutional membership of ASTM, AATCC and TAPPI associations, enabling users to have 24X7 accesses to journal's archives and other technical literature. Besides, the library is a member of CeRA consortia of ICAR. The Library Books holding has reached to an encouraging figure of 7422, along with online/CD Rom databases of various standards and patents.

CIRCOT showed its commitment to the official Language Implementation Policy of the Government of India by successfully organizing a National Seminar in Hindi on the relevant topic of "Recent Developments in Natural fibres". The seminar was elaborately conducted in three technical sessions with 12 scientific papers presented.

It is said that, the best vision is insight and big thinking precedes great achievement. Keeping this in view, the Institute has published its VISION 2030 document. In this document, CIRCOT has critically focused its perspective for the coming two decades and prepared the strategies to attain its vision of Cotton Technology for Prosperity, Environment and Security. CIRCOT hopes to sincerely make its work to be in keeping with its purpose and reaffirm itself as a one-stop solution provider for issues on cotton technology.

Dr. A. J. Shaikh
Director

Executive Summary

This Eighty-eighth Annual Report of the Central Institute for Research on Cotton Technology (CIRCOT) covers the period from April 1, 2011 to March 31, 2012.

Introduction: CIRCOT was established by the then **Indian Central Cotton Committee (ICCC)** as **a Technological Laboratory of ICCC** in the year 1924. After the abolition of ICCC along with other commodity committees, the administrative control of the laboratory was taken over by the Indian Council of Agricultural Research (ICAR) in 1966 and the laboratory was named as CTRL. The laboratory was rechristened as Central Institute for Research on Cotton Technology (CIRCOT) on April 1, 1991.

The library at the Institute currently holds 7422 books and subscribes to four databases along with 17 Indian and 19 foreign journals. These facilities are utilized not only by the staff of CIRCOT but also by all research institutes and colleges in Mumbai.

During the reported year, the Institute has handled 15 in-house research projects, two inter-institutional, two Technology Mission on cotton (TMC), six NAIP projects, and one under the National Fund for Basic, Strategic & Frontier Application Research in Agriculture (NFBSFARA). Two Institute Management Committee, one Research Advisory Committee, and two Institute Research Committee meetings were held apart from several internal meetings. The review of the institute's research work for the period 2007 - 2012 by the Quinquennial Review Team (QRT) constituted by the Council was in progress.

Events

The following Seminars/ Workshops, Training programmes and celebration functions were organised:

A National Seminar in Hindi on April 25, 2011

Hindi Day Celebration from September 14 - 27, 2011

Vigilance Awareness Week from October 31 to November 5, 2011

World Cotton Research Conference (WCRC - 5) first time in India and in Mumbai from November 7-11, 2011

Qaumi Ekta Week from November 19-25, 2011

CIRCOT Foundation Day on December 3, 2011

Ginning Training Centre's (GTC) Silver Jubilee on December 11, 2011.

Workshop on Zonal Technology Management (ZTM) & Business Planning and Development (BPD) on January 13 and 14, 2012

National Science Day Celebration on February 28, 2012

International Women's Day on March 14, 2012

A workshop on A Value Chain for Coconut Fibre and its Byproducts: Manufacture of Diversified Products of Higher Value and Better Marketability to Enhance the Economic Returns to Farmers on March 17, 2012

Three in-house lectures and two by external experts on current topics on cotton technology

The Institute participated in five exhibitions; organized three stake-holders meetings and one Industry-interface meet.

The Institute conducted training for 57 personnel in six batches on the quality aspects of yarns and fabrics. Eighty-four persons were trained in 11 batches on Ginning and Baling aspects at GTC, Nagpur. There were three National level training in Nanotechnology.

CIRCOT team bagged first place in 1500 m and 800 m. race, first and second prizes in Chess, second in Badminton Singles, second in TT and Consolation prize in Cycle Race-5000 m, at the ICAR Inter Zonal sports held at CRIJAF, Barrackpore from January 16 - 19, 2012.

Research Highlights

Experimental trials were conducted on different makes of Up and Down packing type bale presses in commercial ginneries to find out the power requirement and energy consumption. The energy consumption for up-packing type bale press was found to be lower than the down-packing type bale press.

As the Technology Partner in the All India Coordinated Cotton Improvement Project, CIRCOT evaluated fibre properties of over 2000 samples received from the zonal trials, and around 1400 samples pertaining to the National trials during the year both at the Headquarters and all its Quality Evaluation Units.

During the reporting period, fibre, spinning and yarn tests were carried out on 48 samples of Standard Cotton Varieties received from the breeders.

Four hundred and sixty-five containers of calibration cottons were sold to the industry as a Standard Reference Materials for calibrating cotton testing instruments, generating Rs. 3,11,750/- as revenue for the institute.

In a study on the preparation of composite from natural fibres, 47% PLA sheath at 200°C for five minutes was found to be the best for thremomoulding.

EXECUTIVE SUMMARY

A digital moisture meter based on the capacitive microcontroller has been designed and fabricated. The instrument is working satisfactorily for measurement of moisture content in cotton.

Studies on the dyeing of cotton with a blend of two natural dyes, *viz.* manjistha and turmeric yielded innovative shades in cotton fabric.

The colour strength of turmeric dyed cotton fabric was improved by using banana pseudostem sap as a post mordant. However, in the case of annatto dyeing, some loss in yellowness was noted, but the colourfastness properties were found to be unaffected.

In the R&D on functional finishing of textiles Flourocarbon treatment on cotton fabric was found to improve its hydrophobicity significantly. Similarly, silicone finishing along with ZnO nanoparticals was also found to increase hydrohobicity of the textile substrates. This could be further improved when the fabric was subjected to organic fatty acid treatment. Titanium and Silicon dioxide treatment to cotton fabric improved the UV-protective functionality. Further, it was observed that a treatment with TiO_2 improved the UPF value of the fabric to 50+ signifying an excellent UV-protection by the fabric.

Extract of tender coconut husk in water when used to dye cotton fabric under an alkaline pH, gave best results. The K/S value which is a measure of dyeability was found to be more, and so also the UV-protection factor, when the fabric was premordanted with commercial tannic acid.

Detoxification of gossypol in cotton seed meal was attempted with microbes. Bacterial isolates BP-16-3, BP-46-2, BR-17-2, BR-82-1 and BR-83-2 showed gossypol detoxification of 91, 83, 88, 87 and 85 percentages respectively in the mineral medium. Fungal cultures FP-63-1, FN-8-2 and *Pleurotus flabellatus* showed better detoxification of gossypol upto 60% and 50% percentages respectively.

Two large scale trials for the preparation of bioenriched compost from cotton stalks were undertaken at GTC, Nagpur and at Sirsa. Dry chips were used in Nagpur and wet chips in Sirsa. Results indicated that a stabilized compost was ready at 90 days and 45 days respectively with a C:N ratio of 20:1.

Under the NAIP subproject **on Value Chain for Coconut Fibre and its byproducts: Manufacture of Diversified Products of Higher Value and Better Marketability to Enhance the Economic Returns of Farmers,** for extraction of fibres from the brown coconut husk, a new prototype has been developed. The beater units have been arranged in such a way to save both the machine's down-time and component replacement cost. The beater runs at 900 rpm with a 15 HP,

3-phase motor. For improving the working environment, provision for attachment of a dust collector has been made. The output of the machine is 12,000 husks / day. Under the same project, a novel prototype has been developed for extraction of fibres from green coconut husk working on the fibre-combing principle.

In an another NAIP subproject on **Value Chain for Cotton Fibre, Seed and Stalk : An Innovation for Higher Economic Returns to Farmers and Allied Stake Holder,** turkish towels were prepared from 4250 kg of 24s/2 Ne yarn. From 3700 m of cotton fabric thus produced was dyed and finished. Two five tone scale-up trials on cottonseed kernals pretreated with microbial consortium and commercial at M/s. Star Oil Mills, Tirupur indicated an additional 2 - 3% oil recovery. However, consortium pretreatment was found to be economical to that of commercial enzyme (Rs. 100/- per tone in case of consortium as against Rs. 1000/- with commercial enzyme.

Two patent applications *viz.,* A Novel Adhesive Activated Polyester Fabric Substrate for Rubber Composites and the Process for Producing the Adhesion and A Novel Flexi Check Dam for Efficient Use of Water in Agriculture were filed under a NAIP subproject, **Design and Development of Rubber Dams for Watersheds.** The cost of the composite manufacturing and installation for the rubber dam works out to 7 36,900 for 5 sq. metres excluding the cost of base concrete structure. It is anticipated that the cost will come down when this becomes a venture.

In the NAIP sub project on **A Value Chain on Banana Pseudostem for Fibres and other Value Added products,** trials were conducted on yarn making machines to produce yarn of is Ne count. About five tonnes of banana fibres were processed at M/s. Empire Mills, Kolkata to prepare yarn. In addition to yarn making trials, non-woven fabrics of 450, 750 and 900 GSM were prepared from banana pseudostem fibres at M/s. Gloster Jute Mills, Kolkata,bBy the conventional needle punch method. The product was found to be very good and performance evaluation trials are underway.

In the NAIP subproject on **Synthesis and characterization of Nano-cellulose and its Application in Biodegradable Polymer Composites to Enhance their Properties,** the aerobic microbial process of nanocellulose production in the fermentor was optimized under Fed-Batch process with 31% yield. The maximum yield was achieved within two days of fermentation. In case of enzymatic preparation of nanocellulose, optimization of process conditions in membrane reactor helped to improve the yield to 11%. This was achieved by repeatedly feeding the un-hydrolyzed

substrate back into the reactor. In chemo-mechanical preparation (by refining process) of cellulose nanofibrils, enzyme and zinc chloride pretreatments resulted in 50% and 40% reduction in energy consumption, respectively; while in case of homogenization process, 15% energy reduction was achieved in both the cases. Nanocellulose, when used as fillers in starch film, improved the tensile strength by 3.5 times while reducing the water vapour transmission rate by two folds. The biodegradability of starch nanocellulose composite film was found to be degraded within 21 days by native microbial population of garden soil.

Salient Achievements at a Glance

Research Achievements

4705 cotton samples received under AICCIP for the season 2010-2011, were tested for fibre quality parameters and the promising entries identified.

Forty-eight standard cotton varieties were evaluated for fibre, yarn and spinnability characteristics.

For a good composite sample to be made using PLA covered jute yarn, 47% PLA sheath was found to be the best.

Conditions for extraction of dye from annatto seeds and its application to banana pseudo stem sap mordanted cotton were optimized. Simultaneous mordanting of cotton with sap while dyeing with turmeric improved its yellowness and so also its colour strength.

Fabric with very good water repellency was accomplished using non-fluro chemicals such as silicone and fatty acid.

Tender coconut husk extract was found to colour cotton textiles best at an alkaline pH.

Native fungal isolates FP-63-1 and FN-8-2 and standard cultures, *Pleurotus flabellatus, Candida tropicalis* showed maximum reduction of free gossypol in cottonseed meal.

The costing for Rubber check Dam has been worked out - total cost of composite manufacturing and installation is Rs. 36,900 for 5 sq. metres excluding the cost of base concrete structure.

Designed and developed improved coconut brown husk disintegrator machine and defibreing machine for green husk. Trials using the brown husk disintegrator machine have been completed.

Large scale trials on pretreatment of cottonseeds with microbial consortium enhanced 1% linter recovery whereas, pretreated kernals enhanced oil recovery by 2-3 %.

Non-woven fabrics of 450, 750 and 900 GSM were prepared from banana pseudostem fibres at M/s. Gloster Jute Mills, Kolkata.

The yield of Nanocellulose through aerobic, anaerobic and enzymatic process was found to be 31%, 12% and 11% respectively. A pilot scale trial for the preparation of Nanocomposite films has been carried out.

Four hundred and sixty-five containers of calibration cottons were sold to the industry generating Rs. 3,11,750 as revenue.

A survey of ginning and baling industries to estimate the energy consumption for different unit operations of up-packing type of baling press has been carried out.

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Training, Consultancy and Technology Transfer Activities

Around 5000 cotton samples were tested under the paid test category at headquarter and at regional quality evaluation units.

Fifty-seven personnel, underwent training at Headquarter on quality evaluation of fibres and in using HVI and AFIS including basic statistical interpretation of data; eighty-four personnel in seven batches underwent training on the operation and maintenance of various ginning machines apart from training on quality evaluation of cotton.

Three training courses, *viz.,* Nano cellulose and its Composites in Agriculture, Synthesis and Characterisation of Nanomaterials and their Application in Agriculture and Application of Nanotechnology in Agriculture were organized from October 10 - 24, 2011, November 16 - 29, 2011 and January 2 - 12, 2012, respectively.

During the reported period four consultancies were undertaken.

Two patents were filed.

Stake Holders Meet

Three Stake holders meets were organized - one at Headquarter in Mumbai on January 13 and 14, 2012 and two at GTC, Nagpur on December 11, 2011 and February 28, 2012.

Publicity for CIRCOT Technologies

Exhibition of CIRCOT Technologies at GTC, Nagpur during the Press Meet on August 8, 2011.

6th National Conference on KVKs at JNKVV, Jabalpur, M.P. from December 3 - 5, 2011.

TECHNOTEX 2011, organised by FICCI and Ministry of Textiles in Mumbai from August 25 - 27, 2011.

Participated in the exhibition at MKV, Parbhani, Maharashtra on January 3, 2012.

First Science Expo at Raman Science Centre, Nagpur on January 19-21, 2012.

Participated in the VIGYAN YAGNYA 2012 at K.J. Somaiya College of Science & Commerce, Vidyavihar on January 27 and 28, 2012.

Agro-Vision at Reshimbagh, Nagpur on January 27-30, 2012.

Deputation Abroad

1. Dr. S. B. Jadhav, Sr. Scientist visited C4 countries (Chad, Burkina Faso, Benin and Mali) as a part of the Technical Assistance Programme (TAP) for Creating Sustainable Textile and Apparel Value Chain in Cotton in C4 Countries from May 2-14, 2011.
2. Dr. P.G. Patil, Head, Transfer of Technology Division visited Cornell University, Ithaca, New York to attend the Food &Agri. Business Management Programme from July 6 - 14, 2011.

3. Dr. N. Shanmugam, Sr. Scientist visited Johannesburg, South Africa to attend the EMRC Agribusiness Forum 2011 from October 16 - 20, 2011.

4. Dr. S.K. Chattopadhyay, Head, Mechanical Processing Division visited Textile Institute, International Headquarter, Manchester, United Kingdom to attend and present a paper on Rubber Flexi Dam at the International conference on Managing Innovation in Textiles on November 30, 2011.

Accolades

Dr. A.J. Shaikh, Director, CIRCOT was awarded the 20th Ashirwad Rajbasha Gourav Puraskar Award for improving the use of Hindi in the Institute by ASHIRWAD, a Literary-Socio-Cultural Organisation.

Dr. (Smt.) Sujata Saxena, Sr. Scientist, CIRCOT was given a Shield and a Certificate for carrying out best work in Hindi at the Institute for the year 2010-11 by ASHIRWAD, a Literary-Socio-Cultural Organisation.

Dr. Sudha Tiwari, Technical Officer was awarded Satyen Bose first prize for her article *Kisano Ki Aas: Jihansh Kapas.*

The institute participated in the ICAR Inter Zonal Tournament held at CRIJAF, Barrackpore from January 16 - 19, 2012 and in the ICAR Zonal sports for the West Zone held at CAZRI, Jodhpur during February 13 - 17, 2012. At the ICAR Inter Zonal sports for the West Zone, the men's team bagged the first place in 1500 m and 800 m race, first and second prizes in Chess and second prize in Table Tennis apart from consolation prize in Cycle Race (5000 m), while the women bagged second prize in Chess and Badminton Singles.

Budget Utilisation and Revenue Generation

The Institute utilized Rs. 734.98 lakhs sanctioned by the Council under the Plan for the year 2011-12 (100%).

The revenue generation during the year stood at Rs. 53.66 lakhs as against the Council's target of Rs. 68.47 lakhs for the year 2011-12.

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Introduction

This Eighty-eighth Annual Report of the Central Institute for Research on Cotton Technology (CIRCOT) covers the period from April 1, 2011 to March 31, 2012.

CIRCOT was established in the year 1924 by the then **Indian Central Cotton Committee (ICCC)** under the name of **Technological Laboratory of ICCC.** At that juncture, the objectives were to undertake spinning tests on various cotton strains received from agricultural departments in the country and to assess their spinning value. These activities were carried out by the Institute in close co-ordination with both the Departments of Agriculture and Agricultural Universities located in major cotton producing tracts in the country. After the abolition of commodity committees including the ICCC, the administrative control was transferred to the Indian Council of Agricultural Research (ICAR) and the name of the Institute was charrged to **Cotton Technological Research Laboratory (CTRL).** Since then the research activities have been reoriented and strengthened towards increasing the production of quality cotton in the country. Research on better utilisation of cotton and cotton agro-wastes were recently accorded higher priority with a view to provide avenues for additional income to the grower by developing technologies to promote self-employment opportunities for rural people involved in cotton cultivation.

The name of CTRL was changed to **Central Institute for Research on Cotton Technology (CIRCOT)** with effect from 1st April 1991, as per recommendation by the Quinquennial Review Team (QRT).

Mandate

To develop new technologies and machinery for better utilization of cotton and other fibres by carrying out basic, applied, strategic and anticipatory research in post-harvest technology

To extend effective technological support for improvement of quality of Indian cottons and cotton products

- To act as a nodal centre for diversified utilisation of cotton plant by-products & processing waste and other crop residues

To provide services like training,

education and consultancy to textile industry, Government and private agencies and to function as a referral laboratory for textile testina

Achievements Made in the Recent Past

- Different lengths of cotton being grown in India has posed a challenge since there is no single saw ginning machine, which can uniformly gin various length categories of cotton. It has been established that different saw speeds are to be provided to get a good quality lint. To address this, a project was undertaken by CIRCOT in collaboration with M/s. Cottor Plant India Ltd., Mumbai for which the design and specifications were provided by the CIRCOT Scientists for fabrication of a prototype Saw gin machine having 45 saw cylinders fitted with a variable frequency drive that controls both the feeder and the gear motor to achieve different saw speeds. This machine produces the same ginning out-turn comparable to existing saw gin without any reduction in fibre length.

- The ginning industry uses cyclone separators for preventing air pollution. Periodica feed-back information from the ginning industry that these are not so effective. To address the issue, various models of cyclone separators were developed in CIRCOT and evaluated to arrive at the most suitable one for Indian ginneries. Presently, an experimental set up, on an improved cyclone separator suitable for use in ginneries has been designed and developed at GTC, Nagpur.

CIRCOT has developed a software to generate bale identification tag and interfaced with a bale database management software. The Bale Database Management Software, also called Bale Manager, can generate customized label for each and every individual bale bearing the factory's name, the press mark number, year of production, bar-coded bale ID and fibre attributes. Application of **Bale Manager** to generate the Bar Code Labels was noted to be a better alternative to the conventional bale marking system with ink. It was found to aid in record keeping at ginnery and for efficient marketing of bales in domestic and export markets apart from maintaining cleanliness in bales. A second software for managing a modern ginnery. named GINERP, has been also developed by CIRCOT in association with M/s. SSPS., Hyderabad, wherein, bar-coding has been included as a bale management module. This software which help in management of man, material machinery and finance in a ginnery, has already been commercialized.

The trash content in the cotton is one of the dominant parameters in

deciding the value of the cotton. A single cylinder cotton pre-cleaner based on axial flow principle and intended for farm use has been developed. The machine has been found to remove trash particles like leaves, bracts, kawadi, sand and fine dust effectively with improvement in colour of lint and without any adverse effect on the fibre quality. The cleaning efficiency of the machine has been found to be 25-30%. This precleaning is expected to bring down the trash content in the cotton by about 1-1.5%.

The hanging dead weights in traditional DR Gins have been replaced by a pneumatic loading system developed by CIRCOT. Fifteen quintals of seed cotton was processed using the new system, and the results indicated that there is a decrease in the vibration level of machine, uniform ginning throughout the roller, marked brightness in the lint appearance and decrease in the nep count/gram by about 15% could be achieved by incorporating the pneumatic loading system.

The quality evaluation of cotton samples under the All India Coordinated Cotton Improvement Project constitutes 50% of the work of the institute. During the XI plan period 16860 samples have been tested and reported in the Annual meetings of AICCIP. The institute makes recommendations pertaining to the quality characteristics of the cotton varieties which enable the breeders to decide on their release.

The institute tests the quality parameters of cottons grown under standard conditions received from various agricultural universities and their regional units. A comparison of the major fibre properties of these varieties with respect to the values at the time of release is made to the stakeholder to aid them in betterment of the produce. One hundred and fifty-two standard varieties have been tested and analysed in the reported period.

The institute has designed and developed a Lap Preparation Machine For Microspining of cotton samples. Sample quantity as low as 60 - 100 g only is required to make a lap in the process. Eearlier lap preparation was manually done and was time consuming with few people available to do this skilled job. Also, output was low with only six laps done per day. In this machine about 50 laps can be produced per day thus increasing efficiency and elimating human drudgery.

Calibration cottons are the standard reference materials for calibrating High Volume Instrument (HVI) and Advanced Fibre Information System (AFIS) used for testing cotton samples. To circumvent the huge foreign exchange spent by the industry for importing calibration cotton from USDA, the institute has taken up a Revolving Fund project and developed a standard testing material for the Indian market.

This effort is quite well lauded by the textile industry across the country. This is the only indigenous reference cotton material available for the textile industry. During the XI plan period, 2895 containers have been sold earning a revenue of 17,43,628 lakhs to the institute.

CIRCOT has developed a novel power driven sliver making machine, called CIRCOT Minicard. The machine has a sliver production capacity of 1-2 kg/h. To make the machine more efficient, economical and easy to operate, a project was undertaken to develop a rotating flat system for the CIRCOT Minicard. The machine was tested at a stretch for 8 hours with a ginned cotton of Parbhani-516 variety (2.5% span length (SL), 26.5 mm; 50% SL, 12.6 mm and micronaire value 3.7 pg/inch). The sliver was found to be uniform, and free from neps and imperfections. The initial and final trash content in the cotton was found to be 2.9% and 1.2%, respectively. The corrected CSP value of the yarn (20s count) made from the slivers of the minicard was found to be 1962, and is suitable for use by the related village industries.

A simple moisture transport apparatus has been developed to test water vapour transmission rate of fabric. This instrument is being perfected.

A research project has been undertaken to prepare, stabilize and characterize Zinc oxide nanoparticles. Trials are also on for application of Zn0-nanoparticles along with fillers in paper coating and to impart antimicrobial properties. Results have revealed that the nano zinc oxide is a good material for paper coating. Nano zinc oxide coated paper was found to be better than the ordinary zinc oxide coated paper in terms of brightness, whiteness, paper smoothness, print density and print uniformity, picking velocity and oil absorbency. Further, it was found to possess excellent antifungal property. Besides, 55% reduction in material (zinc) consumption could be achieved due to its use in nano form.

A project on characterization of natural dyes through spectroscopy and chromatographic techniques has been attempted. The absorbance spectra ofcultivated *Rubia cordifolia* and *Rubia sikkinensis* were found to be higher than the wild samples of *R. cordifolia,* but lower than its commercial samples. HPTLC fingerprints of these and a few other natural dyes were also developed. Since, natural dyes are seldom available in pure forms, this type of study would help in establishing purity of the natural dyes available in market.

A novel wet chemical process has been developed for the preparation of nano-ZnO using zinc nitrate and sodium hydroxide as precursors. Soluble starch has been used as the stabilizing agent. The concentration of soluble starch is a

major factor that decides the size of the nanoparticles. The zinc oxide nanoparticles thus produced were impregnated onto cotton fabrics by pad-dry-cure method using an acrylic binder. Qualitative assessment revealed the excellent antibacterial activity against two representative bacteria, *Staphylococcus aureus* (Gram positive) and *Klebsiella pneumoniae* (Gram negative). Quantitative analysis of antibacterial activity of nano-ZnO coated cotton fabrics with 1% nano-ZnO coating showed excellent antibacterial activity (reduction > 99.9%), even better than bulk ZnO. For medical textiles, the use of 1.0% nano-ZnO coating can be recommended, which showed 99.9% reduction in case of both Gram-positive and Gram-negative bacteria. The nano-ZnO coated cotton fabrics showed efficient blocking of UV-radiation in both the regions, i.e. UV-A (315-400 nm) and UV-B (280-315 nm). The quantitative antibacterial study showed that >99% activity was retained till 15 hand washes, after which there was a significant reduction in its activity.

Nano-silver particles produced by two novel methods (microbial & biochemical) were characterized. These nanoparticles were coated onto cotton fabrics with and without stabilizer under various conditions to impart antibacterial activity. The cotton fabric showed excellent antibacterial activity against two representative bacteria *Staphylococcus aureus* and *Klebsiella pneumoniae.* Low concentration of nano-silver (1.0 mM in dye bath) resulted in uniform coloured (yellowish) coating on cotton fabrics, with very little antibacterial activity. This may be due to the presence of organic stabilizer (starch/protein). High concentration of nano-silver (> 1.0 mM) resulted in patchy appearance of yellow colour on the fabrics.

There has always been a search for the organisms those produce xylanase in large quantities, but little of cellulase. To enhance the production of xylanase by *A. niger* sp. various sodium salts and nitrogen sources were added into the medium at 0.5% level separately and xylanase production was estimated after four days of incubation. The results indicated that the sodium chloride could produce 13% more xylanase while sodium citrate could enhance xylanase to the level of 30%. Simultaneously, effect of xylanase on cottonseed hulls was also studied. Effects of incubation period and enzyme concentration on the hydrolysis of cottonseed hulls were studied. The results indicated that cottonseed hulls can yield 500 fag/ml of reducing sugars as xylose at 0.5% enzyme concentration in a 4 h treatment period.

In a project undertaken at CIRCOT for the preparation of value added products from a combination of cottonseed meal and cassava flour, delinted and dehulled cottonseed meal powdered and mixed with cassava flour

(20:80) was subjected to extrusion cooking. It is possible to prepare good quality extruded products that could find application as animal feed with enhanced colour grade, puffiness and with free gossypol in tolerance limits

In a project, an attempt is being made to isolate, screen and identify microorganisms detoxifying gossypol from various sources. Soil samples were collected from cotton fields of Nagpur, Akola, Parbhani and Rahuri regions. Totally 88 soil samples were collected from these regions. The cotton crop was in seedling stage when soil samples were taken. Isolation of microorganisms was done by enrichment culture technique in which mineral medium containing gossypol is the sole carbon source. Totally 123 microorganisms (53 bacteria, 54 fungi and 16 actinomycetes) were isolated from 88 samples. The free gossypol content was estimated by AOCS official method Ba7-58. *Pleurotus Florida* and *Candida tropicalis* showed maximum reduction of gossypol, upto 90% in mineral medium. Cotton seed cake inoculated with *C. tropicalis* showed 69% reduction of free gossypol in solid state fermentation.

Patents filed during the Current Year

1, A Novel Flexi Check Dam for Efficient Use of Water in Agriculture

2. A Novel Machine for Extracting Fibre from Banana Pseudostem

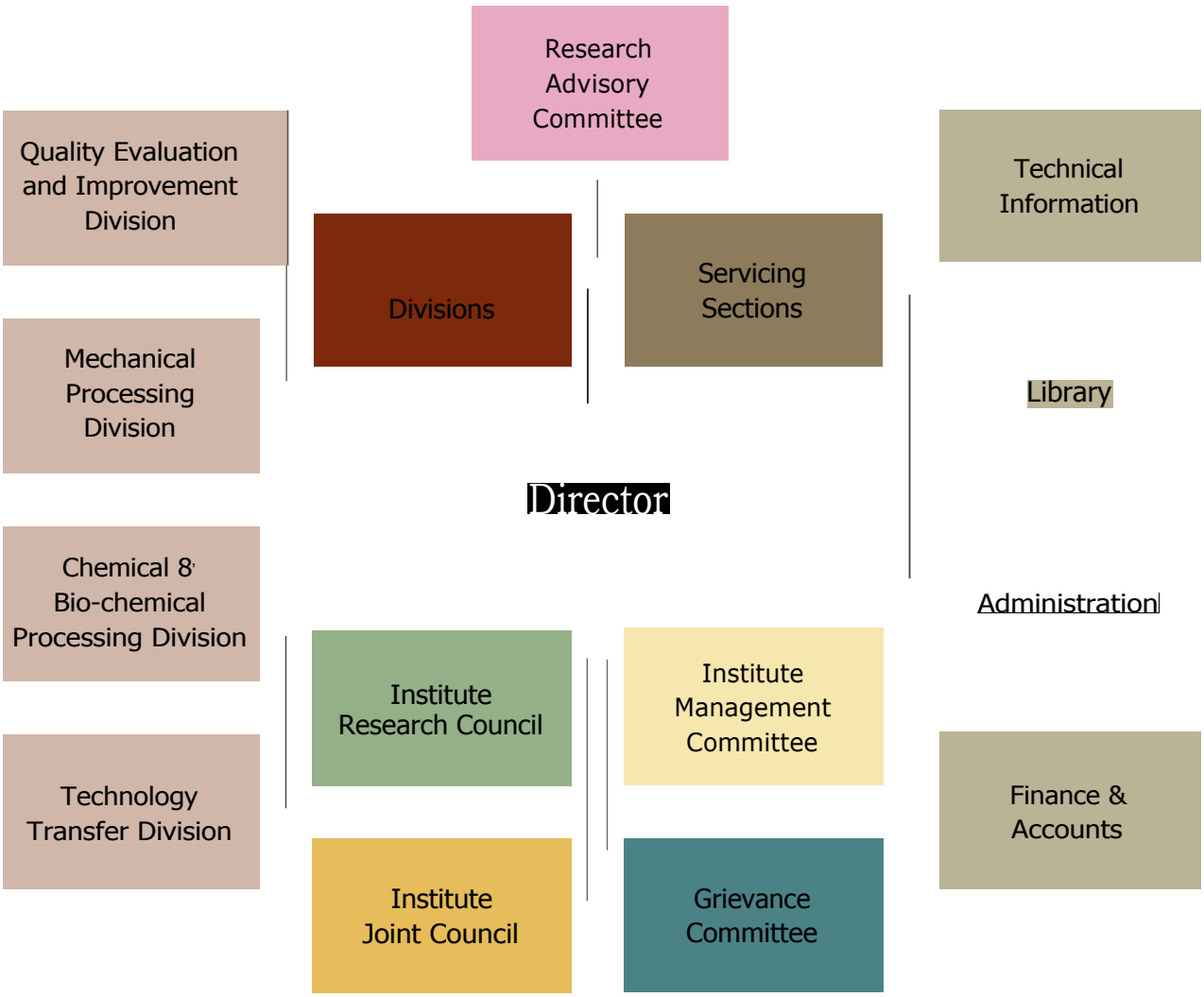
Revenue Generation

The Institute generated Rs. 53.66 iakhs through commercial testing, training and consultancy during the current year as against the target of Ps. 68.47 lakhs set by the Council.

Organization

Director heads the institute assisted by Heads of Divisions. Scientists and Technical staff are responsible for the R & D activities. An Administrative Officer and on Assistant Finance and Accounts Officer assist the Director in matters of general administration and with accounts and audit of the Institute respectively.

ORGANISATIONAL CHART



Financial Statement

Expenditure and Receipts of the Institute during 2011-2012

A. Expenditure

SI. No.	Head of Account	Expenditure (Rs. in Iakhs)	
		Non-Plan	Plan
1.	Establishment Charges OTA	1073.96 0.10	-
2.	Travelling Expenses	6.00	9.00
3.	Works	44.74	255.49
4.	Other Charges including Library	96.73	470.49
	Total	**1221.53**	**734.98**

B. Receipts

SI. No.	Head of Account	Amount (Rs. in lakhs)
1.	Analytical and Testing Fees	23.45
2.	Training	2.75
3.	Interest on TDR & STD	15.24
4.	Other receipts	42.91
	Total	**84.35**

Staff Position

As on March 31, 2012

Cadre	Sanctioned	In Position
R.M.P. (Director)	1	1
Scientific	50	29
Technical	114	95
Administrative	50	42
Skilled Supporting Staff	60	51
Total	**275**	**218**

2

Research Achievements

A brief account of the progress of research carried out in various projects during 2011-2012 at the Headquarters and at the various Quality Evaluation Units are presented below:

CORE AREA I : IMPROVEMENT IN GINNING OF COTTON

Engineering Intervention for Improving Energy Efficiency in Bale Presses

A survey was undertaken in the ginning and baling industries to find out the energy consumption in different unit operations of up and down bale presses, to suggest suitable methods to conserve power and reduce the cost of overall ginning operation.

In the final year of the project in 2011-12, trials were conducted to find out the energy consumption for each unit operation such as pressing, tramping, tying, pneumatic conveying and feeding of lint to the press box. The power requirement, energy consumption per bale, power factor, current and voltage of different electric motors were recorded. The time motion study of pressing operation was also carried out and the data on cost of operation was collected.

Experimental trials were carried out on three models of Up packing type of bale presses, *viz.,* UB1, UB2 and UB3 with pressing capacity of 15, 12 and 14 bales/hr respectively. Average time required for pressing a bale was found to be 240, 315 and 265 seconds respectively. The power required for pressing was found to be 84, 69 and 57 HP respectively. Energy consumption was found to be 1.90, 1.20 and 0.95 Kwh/bale for UB1, UB2 and UB3 respectively.

Experimental trials were also carried out on two models of Down packing type of bale presses, viz, DB1 and DB2 with pressing capacity of 15 bales/h. Average time required for pressing a bale was found to be 260 and 240 seconds respectively. The power required for pressing was found to be 75 and 74 HP respectively. Energy consumption was found to be 1.75 and 2.80 Kwh/bale for DB1 and DB2 respectively.

The bale density was found to be in between 600-625 kg/m^3. The moisture content of the cotton was found to vary from 7.5 to 8.5%. Energy consumption for up packing type of bale press was found to be lower than the down packing type of bale.

CORE AREA II : IMPROVEMENT AND QUALITY EVALUATION OF FIBRE, YARN AND FABRIC

This core area encompasses three distinct aspects of technological research:

a) Evaluation of the quality of cotton from samples received the All India Co-ordinated Cotton Improvement Project (AICCIP)

b) Tests on Standard Varieties of Indian Cotton

c) Research Work on Institute Projects

a) Evaluation of Quality of Cotton Samples under All India Co-ordinated Cotton Improvement Project (AICCIP)

The All India Co-ordinated Cotton Improvement Project (AICCIP) was launched in April, 1967 with a view to improve cotton productivity and quality through coordination of research efforts at various Institutes, Agricultural Universities, State Departments of Agriculture and other related agencies. CIRCOT is primarily involved in research pertaining to quality evaluation of cotton lint, its mechanical behaviour at various stages of processing upto spinning of yarn and evaluation of its characteristics.

The regional stations of CIRCOT in the cotton growing areas participate in quality evaluation of cotton strains developed and tested under the AICCIP. In general, initial breeding materials and cotton germplasms, are tested for quality parameters at the regional units of CIRCOT. Most of the cotton samples under National Trials are tested at regional unit, Nagpur. Advanced trials for testing of microspinning and full spinning and mill processing are being carried out at Headquarters, Mumbai. For the last five years, fibre samples pertaining to ICAR Bt - cotton trials conducted under AICCIP are tested at Headquarters, Mumbai. Further, monitoring of various. quality parameters, collection of data and finalization of reports are exclusively carried out at CIRCOT Headquarters, Mumbai.

Breeding materials, Initial Evaluation Trials (IET) and Preliminary Varietal Trials (PVT) constitutes the initial stages of cotton breeding programme of AICCIP. Promising strains amongst these trials are taken under Coordinated Varietal Trial (CVT) called Advanced Trials. The samples under IET or PVT are tested only for fibre quality parameters by using the High Volume Instrument (HVI), whereas samples of CVT are evaluated for spinning tests and seed coat fragments, trash content, yarn uniformity besides fibre parameters. Finally, before releasing the cotton variety/hybrid for commercial cultivation, its full spinning potential is checked. This is to ensure its acceptance by textile industry, once it is released and cultivated on a large-scale in the field.

Cotton cultivation in India is carried out under three prominent zones. These are as follows:

Zone	States
North	Punjab, Haryana, Rajasthan, Uttar Pradesh and New Delhi
Central	Madhya Pradesh, Maharashtra, Gujarat and Orissa
South	Andhra Pradesh, Karnataka and Tamil Nadu

A large number of cotton samples are received every year for quality evaluation from trials conducted under AICCIP by Agricultural Universities and private participants. The number of samples received during 2011-2012 season for different tests from agricultural trials at the Headquarters, Mumbai is given in Table 1, and those tested at each of the regional units of CIRCOT are presented in Table 2. The number of cotton samples received from different states and tested at CIRCOT under AICCIP for various quality parameters is given in the Table 3.

TABLE 1 : NUMBER OF COTTON SAMPLES RECEIVED AT CIRCOT HEADQUARTERS FROM AGRICULTURAL TRIALS

Type of Tests	2007-08	2008-09	2009-10	2010-11	2011-12
Fibre and full spinning	16	6	12	32	59
Fibre and micro spinning	308	68	141	58	70
Fibre test alone (HVI)	2138	2132	1080	1503	2970
Mill test	0	1	0	0	0
Standard cottons	40	57	43	14	25
Trade varieties	20	92	9	18	47
Total	2522	2356	1285	1625	3171

TABLE 2 : NUMBER OF COTTON SAMPLES TESTED AT THE REGIONAL QUALITY EVALUATION UNITS (2011-12 SEASON)

Regional Unit	No. of Samples tested
Coimbatore	503
Dharwad	1910
Guntur	2050
Nagpur	4464
Sirsa	3222
Surat	11200
Total	23349

TABLE 3 STATE-WISE NUMBER OF COTTON SAMPLES TESTED AT CIRCOT UNDER AICCIP DURING 2011-12 SEASON

State	Fibre and full spinning	HVI alone	Total
Punjab	12 (2)	3 (1)	15
Haryana		39 (1)	39
Maharashtra	9 (4)	287 (7)	296
Orissa	2 (1)		2
Karnataka	1	1372 (5)	1373
Andhra Pradesh	2 (1)		2
Total	26 (8)	1701 (14)	1727

Note The numbers in bracket shows the number of reports issued.

This Annual Technological Report contains the quality parameter data generated on the cotton samples received from the cotton breeders throughout the country at CIRCOT (HQ Mumbai and its regional units at Sirsa, Surat, Nagpur, Coimbatore, Dharwad & Guntur), and pertaining to the zonal and National Trials. The cotton samples of the breeders pertain to the AICCIP Zonal Trials (North zone, Central zone and South zone) and National Trials. In all, technological data on 3544 samples have been reported comprising 2124 samples of zonal trials and 1420 cotton samples to National Trials. Out of the zonal trials, 941 cotton samples belong to North zone, 377 cotton samples belong to Central zone and 806 belong to South zone.

The quality parameters of all cotton fibre samples measured using the High Volume Instrument (HVI) operated in the ICC-Mode were compared with the standard CIRCOT Fibre Quality Norms. Assessment of spinning potential was carried out as an additional parameter for samples pertaining to both advance trials and pre-release varieties. Out of the total samples tested, approximately five percent strains were found to be promising and can be promoted to the next higher stage. Zone-wise promising strains are presented in Table 4 and fibre properties of Full spinning are presented in Table 5.

TABLE 4 : ZONE-WISE PROMISING STRAINS

Trial	Location	Variety	2.5% SL	UR	MIC	S (3.2mm)
North Zone						
Br.04 (a)	Sriganganagar	CSH.3129	30.8	50	3.9	25.9
Br.04 (a)	Ludhiana	F.2228	30.3	51	4.4	24.9
Br.05 (a)	Ludhiana	CSHH.3008	31.3	52	4.6	25.1
Br.05 (a)	Ludhiana	LHH.1424	29.9	53	4.6	24.4
Br.05 (a)	Bhatinda	MRC.7365	31.4	50	4.3	25.8
Br.05 (a)	Kanpur	Local Check	29.9	51	4.3	24.9
Miscellaneous	Sirsa		30.0	51	4.3	24.2
Miscellaneous	Sirsa		30.0	52	4.6	24.8
Miscellaneous	Sirsa		29.7	52	4.0	24.4
Miscellaneous	Sirsa		31.0	51	4.7	25.4
Miscellaneous	Sirsa		29.1	52	4.4	23.6
Miscellaneous	Sirsa		29.0	52	4.6	25.1
Miscellaneous	Sriganganagar	-	31.6	49	3.9	26.9
Miscellaneous	Sriganganagar	-	30.2	53	4.4	25.7
Central Zone						
Br.03 (a)	Junagadh	LH.2170	27.3	52	4.5	24.0
Br.03 (b)	Bharuch	GBHV.170	25.1	49	4.6	21.9
Br.03 (b)	Bharuch	SCS.793	26.8	48	3.8	24.2
Br.03 (b)	Khandawa	BS.40	24.5	50	3.6	26.0
Br.03 (b)	Khandawa	GBHV.17	24.8	52	3.7	22.5
Br.03 (b)	Khandawa	SCS.793	24.6	51	4.0	22.9
Br.04 (b)	Bharuch	PH.1060	25.8	47	4.3	23.0
Br.04 (b)	Bharuch	H.1452	25.6	51	4.0	25.8
Br.04 (b)	Bharuch	H.1353	25.8	50	4.2	23.6
Br.04 (b)	Bharuch	GBHV.164	24.9	49	4.6	22.9
Br.04 (b)	Bharuch	H.1455	25.9	47	4.0	22.4

Trial	Location	Variety	2.5% SL	UR	MIC	S (3.2mm)
Br.04 (b)	Bharuch	GBHV.164 (D)	24.8	50	4.2	23.8
Br.04 (b)	Khandawa	PH.1060	23.2	54	4.0	24.5
Br.04 (b)	Khandawa	H.1452	24.5	49	3.7	23.1
Br.04 (b)	Khandawa	CPD.168	24.6	51	3.7	22.8
Br.04 (b)	Khandawa	NDLH.19	24.8	53	4.1	23.2
Br.04 (b)	Khandawa	BS.79	24.2	53	4.0	24.6
Br.05 (a)	Khandawa	GSHH.26	27.7	53	3.8	25.3
Br.05 (a)	Khandawa	RHH.062	28.1	48	3.9	24.1
Br.05 (b)	Bharuch	ARBHH.10	27.9	48	3.8	27.7
Br.05 (b)	Bharuch	MRC.7385	30.7	48	3.9	27.5
Br.05 (b)	Bharuch	NHH.250	28.1	50	4.2	26.4
Br.05 (b)	Bharuch	MRC.7387	30.2	46	3.6	25.8
Br.05 (b)	Akola	GSHH.272	27.4	53	4.2	22.7
Br.05 (b)	Akola	RAHH.455	26.6	52	4.0	22.2
Br.6 (b)	Khandawa	NH.545	24.6	52	3.6	24.2
Br.6 (b)	Khandawa	GSHV.01	25.3	48	3.9	22.8
Br.6 (b)	Khandawa	AKH.2000	25.3	51	4.0	22.9
Br.06 (b)	Adilabad	AKH.2006	29.4	54	3.7	23.0
Br.24 (b)	Khandawa	ARBAS.1	24.7	54	4.6	23.4
Br.25 (b)	Khandawa	AKDH.92	26.9	50	4.3	25.3
South Zone						
Br.02 (a)	Guntur	Pusa 5760	29.9	47	3.8	23.7
Br.06 (a)	Guntur	TCH.1608	29.6	49	4.0	23.0
Br.14(a) CVT of *G.barbadense*	*Coimbatore*	RHCb.011	31.5	47	4.2	26.9
Br.14(a) CVT of *G.barbadense*	*Coimbatore*	GSB.40	32.0	46	3.7	27.4
B5.04 (a)	Coimbatore	ARBH.2000	26.6	47	3.4	23.6

RESEARCH ACHIEVEMENTS

Trial	Location	Variety	2.5⁰/0 SL	UR	MIC	S (3.2mm)
BR.04 (a)	Coimbatore	MR.786	27.5	47	3.6	23.4
Br.14 (a)	Coimbatore	DB.12	34.3	45	3.4	28.0
Br.14 (a)	Guntur	GSB.40	32.5	46	3.4	26.6
National Trial						
Br.02 (a)	Faridkot	CSH.2838	24.9	51	4.3	21.2
Br.02 (a)	Faridkot	TCH.1740	31.2	48	4.2	26.8
Br.02 (a)	Faridkot	Pusa 5760	26.9	52	4.3	22.9
Br.02 (a)	Faridkot	RAH.1003	29.4	48	4.5	24.3
Br.02 (a)	Faridkot	GJHV.440	25.8	50	3.9	22.0
Br.02 (a)	Faridkot	BS.47	29.5	49	4.5	25.0
Br.02 (a)	Faridkot	SHS.2-4	25.2	51	4.0	22.5
Br.02 (a)	Sriganganagar	RAH.1003	30.3	53	4.1	24.8
Br.02 (a)	Sirsa	Pusa 5760	27.6	52	4.2	23.1
Br.02 (a)	Surat	LH.2220	26.5	48	4.0	22.3
Br.02 (a)	Surat	CCH.11-1	27.0	50	4.4	23.4
Br.02 (a)	Surat	SHS.2-4	26.3	50	3.7	25.6
Br.02 (a) KH-11	Junagadh	CSH.2838	25.9	52	4,1	22.5
Br.02 (a) KH-11	Junagadh	CA.105	26.4	54	4.4	24.4
Br.02 (a) KH-11	Junagadh	TCH.1740	28.2	47	3.6	24.8
Br.02 (a) KH-11	Junagadh	F.1861	27.1	50	4.5	23.7
Br.02 (a) KH-11	Junagadh	CNH.44	27.9	52	4.4	24.3
Br.02 (a) KH-11	Junagadh	KH.1101	28.8	49	4.2	24.8
Br.02 (a) KH-11	Junagadh	SCS.1002	28.9	51	4.5	24.8
Br.02 (a) KH-11	Junagadh	CCH.11-1	27.8	52	4.2	24.7
Br.02 (a) KH-11	Junagadh	RAH.1004	26.2	51	4.5	24.9
Br.02 (a) KH-11	Junagadh	GTHV.09	25.7	52	3.7	24.3
Br.02 (a) KH-11	Junagadh	CPD.867	27.6	50	4.5	23.7
Br,02 (b)	Akola	AKH.08-3	27.6	53	3.9	23.2

Trial	Location	Variety	2.5% SL	UR	MIC	S (3.2mm)
Br.02 (b)	Akola	NH.615	26.7	56	3.7	22.4
Br.02 (b)	Akola	SCS.1002	29.4	52	4.3	24.7
Br.02 (b)	Akola	CNH.1107	28.9	52	4.2	24.3
Br.02 (b)	Surat	RAH.1003	28.1	45	3.9	24.9
Br.02 (b)	Surat	AKH.08-3	27.7	48	3.6	26.1
Br.02 (b)	Surat	RS.2622	25.9	51	4.5	22.6
Br.02 (b)	Surat	GBHV.177	26.5	49	3.7	24.0
Br.02 (b)	Surat	H.1451	27.4	46	3.8	24.8
Br.02 (b)	Surat	PH.1075	27.9	46	3.6	23.6
Br.02 (b)	Surat	CPD.870	26.3	51	3.5	26.1
Br.02 (b)	Surat	CPD.871	25.2	50	3.8	23.2
Br.02 (b)	Surat	LC	26.7	47	3.8	24.5
Br.05 (a)	Faridkot	GTHH.197	28.8	51	4.2	24.4
Br.05 (b)	Akola	CAHH.201	29.3	52	3.8	24.0
Br.05 (b)	Akola	DHH.1012	27.5	53	3.7	23.4
Br.05 (b)	Bharuch	GTHH.191	28.2	47	3.7	23.5
Br.05 (b)	Bharuch	SHH.1003	28.3	44	4.5	23.4
Br.05 (b)	Bharuch	GSHH.264	30.2	45	4.0	25.0
Br.14 (a)	Coimbatore	GSB.21	31 8	45	4.1	25.6
Br.15 (a)	Anand	GSHB.978	36.1	48	3.6	33.8
Br.15 (a)	Anand	ARBHB.105	31.9	47	3.8	28.5
Br.15 (a)	Anand	RHB.0713	35.1	48	3.9	30.3
Br.15 (a)	Anand	CCHB.4	33.9	44	3.9	28.3
Br.15 (a)	Anand	TCHB.119	35.6	46	3.7	32.2
Br.15 (a)	Anand	RHB.0707	34.8	49	3.6	30.5
Br.15 (a) •	Anand	DHB.1010	33.2	49	3.9	29.0
Br.15 (a)	Anand	RHB.0711	33.0	44	3.6	29.0

FULL SPINNING DATA OF PRE-RELEASE VARIETIES: 2011-2012

120001	F.2164	Faridkot	Z9.I					OZL				
Z0 00ZT	LH.2107	Faridkot	Z8.6					069				
								8SOT				
								8LT T				
								17E6				
								9E9T				
120705		Ludhiana	Z9.6					1768				
90LOZT	80T Z'1-11	Ludhiana	O'LZ					1798				
120707	F.2164	Ludhiana	Z8.0					S9ZT				

												km	
120715	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
121313	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
121314	AKA.9703	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
121315	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	Raichur	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
112525	Ankur 651	Surat	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
112526	GSHH.2603	Surat	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
112527	G.Cot Hy.12	Surat	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

b) Tests on Standard Varieties of Indian Cottons

During the reported period, 48 standard cotton samples for the season 2009-10 were analysed for fibre properties. The fibre traits, such as 2.5% Span Length, Micronaire, Uniformity Ratio and Tenacity did not change significantly in comparison to fibre traits of cotton fibres at the time of release of variety. The spinning performance for lower spun count of yarn was better for some standard cotton varieties. The spinning performance of some of the standard varieties are presented in Table 6.

TABLE 6: SPINNING PERFORMANCE OF STANDARD VARIETIES

Name of the Standard Cotton Variety	Count Ne	CSP	CSP obtained for the lower spun count	Change in CSP	Increase in C.S.P. (%)
KC.2 Kovilpatti	40	2208	2368	160	7.3
KC.3 Kovilpatti	30	2166	2331	165	7.6
G. Cot.10 Surat	30	2166	2358	192	8.9
DHY286 Akola	40	2208	2340	136	6.1
AKA.081 Akola	20	2024	2450	426	21.0
PKV Rajat Akola	20	2024	2420	396	19.6

c) Research Work on Institute Projects

Preparation and Marketing of CIRCOT Calibration Cotton Standards

During the reported period, Jaydhar cotton was procured and processed for preparing the standard. One high micronaire value cotton was introduced by mixing two different varieties of cotton, i.e, Jayadhar and Desi cotton. The values of the processed cottons were determined and fixed. Four hundred and sixty-five containers of calibration cottons were sold and revenue of Rs 3,11,750/- was generated.

Standardization of Compression Molding Machine Parameters for Natural Fibre Reinforced Composites for use in Construction Purposes as Wood Substitutes

A status report on the subject has been prepared and published. Jute yarns of 165 tex was sourced from a jute mill and tested for mechanical properties. The tensile value of the yarn is as follows:

Yarn tex	Tensile strength (g)	Elongation (%)
165	1819 (CV%= 24%)	1.49% (CV%=18%)

PLA fibres of 38 mm length was sourced and were converted into drawn slivers using cotton spinning machines. The fibres were first processed through the blowroom and converted into a lap. Then they were processed on the carding and drawing machines to produce a good quality drawn sliver that can be used to supply sheath fibres during spinning. Two passages of drawing were used. The DREF-3000 Friction Spinning Machine was used to produce PLA wrapped Jute core spun yarns. The jute yarn was fed to the machine in such a way that it forms the core of the produced yarn. The PLA slivers were fed to the carding drum of the machine, so that it gets opened and deposited in-between the friction drums and form the sheath on the jute core. Three percentages, namely 30, 40 and 47 of PLA wrapping by weight were used to produce three different yarns. Composite samples were prepared from all the three yarns. But it was seen that 30 weight% of PLA wrapping was not enough to make a good composite. The PLA wrapping of 47% (wt/ut) produced the best result. The yarn properties of the Jute core PLA wrapped friction spun yarns with 47% (wt/ut) PLA is as follows:

Yarn tex	Tensile strength (g)	Elongation ($^0/0$)
310	1422 (CV%= 20%)	1.55% (CV%=23%)

Hence, the friction spun yarn with 47% (wt/ut) PLA was used to make natural fibre reinforced composite material by thermo-moulding. Temperatures ranging from 170 to 200°C with processing time of 3 to 5 min were used in the trials. From visual inspection, it was found that temperature of 200°C with 5 min processing time of thermo-moulding yielded the best result. Further trials with higher temperature will be tried once a new laboratory model compression moulding machine is installed.

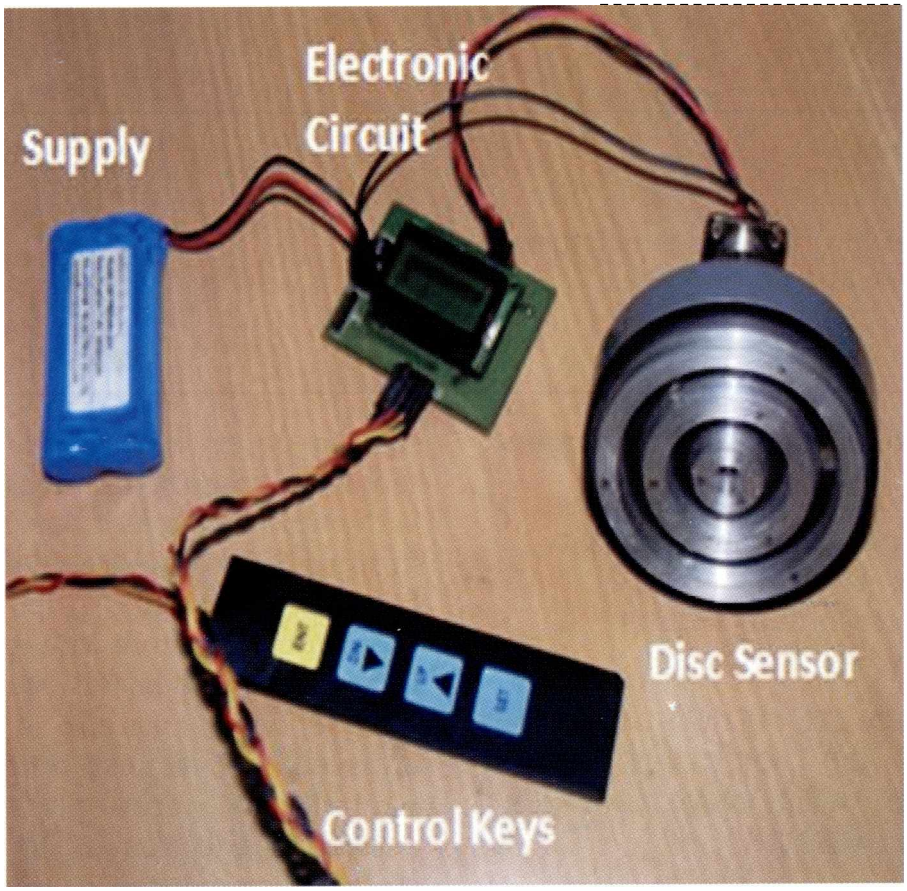
Design and Development of Portable Moisture Instrument for Cotton using Customized Sensor Designed for Fixed Volume and Uniform Packing Density

Moisture measurement and its control are very important throughout the cotton processing. Cotton ginned at the optimum level of moisture produces the longest and strongest fibres. Present moisture meters available uses different types of probes to sense moisture in cotton lint. It is observed that as the packing density of cotton sample changes around the probes, moisture reading varies. Conductivity of meters changes not only with moisture levels but also with the volume of test sample and its placement, i.e.; the packing density around the sensor.

At CIRCOT, a digital prototype type instrument has been designed and developed. This is a capacitive type microcontroller based moisture instrument which can record capacitance proportional to moisture present in a

cotton sample. Within the range of 4 to 20%. The following are the various components of the instrument:

- Disk type sensor for measuring moisture in seed cotton and in cotton lint
- Fork type sensor for measuring moisture in cotton bales
- A customized cup sensor with lid for moisture measurement in fixed volume and uniform packing density
- Customized sensors to suit the desired application.
- Thorough experimentation and calibration procedures were followed as per ASTM D 1348 test method to standardise the instrument.10 - 50g of cotton sample was dried for two hour in a oven at 105± 3° C temperature at normal atmospheric pressure and weighed. The steps were repeated at 30 min intervals, until the loss in successive weighing i <0.005g.



Microcontroller based Moisture Instrument for Cotton

Various Sensors

Disk type: for measuring moisture in cotton lint	
Needle type: 9 1/2" insulated pins with 8 1/4" penetration depth eliminate the effect of surface moisture. Suitable for use in measuring moisture in cotton bales	
Cup type: for measuring moisture in seed cotton and cotton lint	

The Specification of the Instrument:

- Microcontroller-based circuit for greater accuracy and reliability
- Range: 4 - 20 %
- Built in calibration check
- Battery: 9/V Alkaline

CORE AREA III : FINISHING AND DYEING OF COTTON WITH NATURAL AND ENVIRONMENT FRIENDLY AGENTS

Use of Banana Pseudo-stem Sap as Mordant for Dyeing of Cotton with Natural Dyes

Mordants like metal salts and tannins are required for dyeing of cotton with natural dyes as it has poor affinity for most of the natural dyes. Even for substantive dyes like turmeric, mordants improve the colour and fastness properties. Besides being non-eco friendly, Tannic acid is costly, and adds up to the cost of dyeing and handling of metal salts of copper, chromium and iron. Banana pseudo-stem sap is produced in large quantities as a by-product during extraction of fibres from pseudo stem. This sap is

rich in poly-phenols and minerals, hence an attempt was made to utilise this as a cheap and eco-friendly mordant for dyeing of cotton with natural dyes.

During the reported period, banana pseudo-stem sap was analysed for total tannins by AOAC method. Total tannins were low with a value of 36 and 67 ppm for samples from two lots. Fruit bunch peduncle sap had higher total tannins (210 ppm). Mineral composition of banana pseudo-stem sap determined on AAS showed it to be rich in manganese with some amounts of copper and iron. As both copper and iron improve lightfastness, it was used for simultaneous and post-mordanting of cotton during dyeing with berberin and turmeric dyes which have poor lightfastness. Simultaneously mordanted and berberin dyed samples were found to be darker and less yellow as compared to the control sample. Their colourfastness to washing, rubbing and perspiration remained good to excellent like the control sample. Post-mordanting of berberin dyed samples with sap reduced the colour strength slightly and made the samples darker and less yellow. Colourfastness to washing, rubbing and perspiration remained unaffected.

Simultaneous mordanting of cotton with sap while dyeing with turmeric was found to improve its yellowness and colour strength. Colourfastness to washing and acidic perspiration of these samples was slightly lower than the unmordanted control samples. Post mordanting of turmeric dyed samples with sap did not affect the colour co-ordinates, but colour strength of these samples was reduced. An improvement in respect of fastness to alkaline perspiration was observed for these samples.

Annatto dyed cotton after post mordanting with banana pseudo-stem sap showed some loss in yellowness, but its colourfastness properties remained same.

Surface Modification of Cotton Textiles using Nano Technology to Impart Super Hydrophobicity

Under a project, to impart super hydrophobic property to cotton fabric, the surface property of the cotton textile was modified through the application of nano zinc oxide. As a first step, nano zinc oxide flowers of average particle size 172 nm and crystallite size of 22-24 nm was synthesized in a methanol suspension without using a stabilizer and using 0.3M zinc nitrate and 3M NaOH by solution synthesis method. This suspension was used for the treatment of cotton woven material to increase the surface roughness. When 40/m1/1 nano zinc oxide methanol suspension was applied to the fabric using pad-dry-cure method, the co-efficient of friction (MIU) using Kawabata method was found to increase by 2.5 times over the control sample (Table 7). The same was also confirmed by Instron testing using a method developed at CIRCOT.

TABLE 7: COMPARISON OF CO-EFFICIENT OF FRICTION OF CONTROL AND ZnO-TREATED SAMPLE

Control fabric	***Co-efficient of friction***			***ZnO Treated fabric***	***Co-efficient of friction***		
	Front	*Back*	*Mean*		*Front*	*Back*	*Mean*
Warp	1.9	1.8	0.2	Warp	4.8	4.4	0.5
Weft	2.0	1.8	0.2	Weft	5.7	5.7	0.6
Mean	2.0	1.8	**0. 2**	Mean	5.2	5.0	**0.5**

AAS analysis of the sample confirmed the zinc content in the sample (0.6%W/W). A reduction of 5% Whiteness Index was noted using CCM (Table 8).

TABLE 8: COMPARISON OF UPF AND CONCENTRATION OF ZINC IN THE SAMPLE

Concentration of Zinc oxide (Percentage on the Weight of the Material)	UPF	**Concentration of Zinc in the fabric (w/w%)**
0	12	Not detected
1	27	0.12
3	35	0.24
5	54	0.43
7*	*72*	*0.60*

The treated sample had 50+ UV protection and good antibacterial property. To improve the hydrophobicity, the nano zinc oxide was applied in one bath and two bath methods either with silicone, fluorocarbon, or with organic fatty acid alone and also in combination using pad -dry-cure method. Combinations of zinc oxide and silicone in one bath method and two bath method, there was little improvement of water repellency of treated material. But organic fatty acid (0.5%) treatment after zinc oxide and silicone treatment has produced good hydrophobicity (spray rating70-80).

A method was developed to produce hydrophobic cotton material with other functionalities such as UV-protection, anti bacterial property using nano zinc oxide and other hydrophobic substances. Nanocellulose has been synthesized using high pressure homogenizer and is being applied to cotton fabric to change the surface topography for more surface

roughness. Chemical modification of cellulose is also being tried to make the nanocellulose into a hydrophobic substance.

Nano-finishing of Cotton Textile to Impart Flame Retardence and UV-Protective Functionalities

Cotton based apparel and home textiles hardly show any protection from UV-light. Therefore, in this study an attempt was made to improve the UV- protective functionality of cotton textile using TiO_2 nanoparticles.

To synthesize the TiO_2 nanoparticles, sol-gel method was selected due to its advantages of *in-situ* synthesis and uniformity in application. TiO_2 nano-sol, which is an intermediate state of TiO_2 nanoparticles was first prepared using titanium tetra-isopropoxide (TTIP) precursor. The average particle size of TiO_2 nano-sol was 12 nm. The nano-sol was applied on desized, scoured and bleached cotton fabric by pad-dry method followed by hydrothermal treatment to generate nanoparticles on the fabric. The UV protective performance of textile was measured using the ultra violet protection factor (UPF) according to AATCC 183: 2000 method on Labsphere UV-transmittance analyzer (Fig. 1 and Table 9). After the application of TiO_2 nano-finish on to cotton textile, the UPF value significantly increased to 50+ (maximum UPF rating) from the UPF value of 10 in the untreated sample (control). Any textile material having the UPF value of 50 or 50+ is commonly considered to be an excellent UV protective textile. Figure shows the UVA and UVB transmittance percentage in the untreated and TiO_2 nanoparticles treated samples. It was observed that the UVA (315-400 nm) transmittance percentage reduced from 15% for the untreated (control) sample to 5.5% for the one (1) dip in TiO_2 nano-sol followed by hydrothermal treatment and washed sample. Similar result was observed for UVB (290-315 nm), where it reduced from 8% to 0.2%. With increasing the number of dipping to four (4), there was small improvement in UVB transmittance percentage. As expected, the unwashed sample showed further improvement in UVA transmittance percentage as shown in the Table-10. This indicates that in the TiO_2 treated sample most of the incident UV light gets absorbed by the fabric and it does not allow to pass through the fabric. It was observed that when the nano-sol was subjected to hydrothermal treatment to generate TiO_2 nanoparticles followed by application in textile, the UPF value and UV transmittance percentage was similar to four (4) dips hydrothermal and washed sample. TiO_2 nanoparticle was characterized using X-ray diffraction (XRD) to study the crystallographic phase of TiO_2 nanoparticles. The peak position at different values such as 25.3, 38.2, 47.9, 54.1 and 62.9 confirm the formation of anatase phase of TiO_2 nanoparticles.

In an another study, SiO_2 nanoparticle has been synthesized using

TABLE 9 : UPF, UVA AND UVB TRANSMITTANCE IN DIFFERENT SAMPLES

Different Samples	**UPF rating**	**UVA Trans-mittance %**	**UVB Trans-mittance %**
Untreated (Control)	10	15.0	8.0
1 dip hydrothermal & washed	50+	5.5	0.2
4 dip hydrothermal & washed	50+	5.9	0.1
4 dip hydrothermal and not washed	50+	2.6	0.2
Nano-sol first hydrothermal treated followed by application in cotton	50+	6.3	0.1

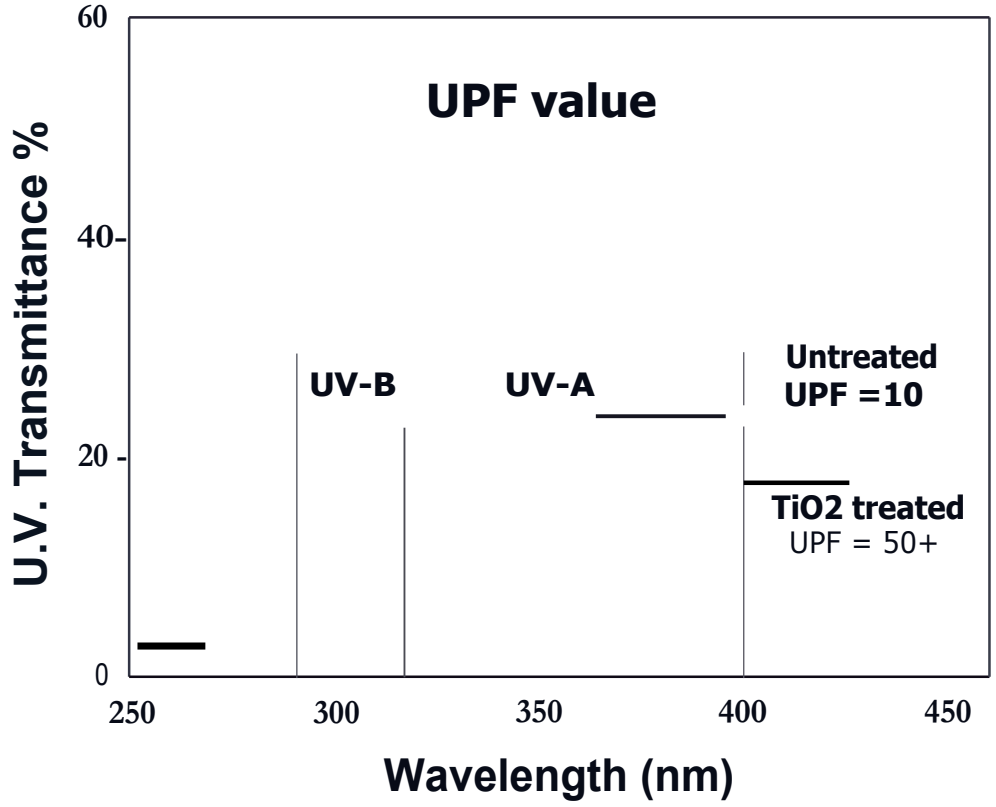


Fig. 1: YUV Protective Performance of Textile

sodium silicate precursor and hydrochloric acid. The colloidal solution prepared in the laboratory was initially dried at 100°C and followed by calcination at 500°C for 3 hours. It was observed that the average particles size of the $Si0_2$ nanoparticle was 200 nm. Optimization of different process parameters to synthesise desired nanoparticles and its application in cotton textile is under progress.

CORE AREA IV : UTILISATION OF COTTON PLANT RESIDUES FOR PRODUCTION OF VALUE ADDED PRODUCTS

Microbial Detoxification of Gossypol in Cottonseed Meal

Cottonseed is one of the important sources of animal feed which normally contains about 0.4 - 1.5% of free gossypol. Feeding diet containing free gossypol is highly toxic to non- ruminant animals since they cause adverse effect such as growth suppression, reproductive disease and other internal organ abnormalities. Although number of studies has been reported on physical and chemical removal of free gossypol, microbial fermentation may be the best alternative of gossypol removal from the cottonseed meal without affecting the quality of protein and its nutritive value.

This study was aimed at exploration of native microbial isolates on detoxification of free gossypol in cottonseed meal. Soil samples were collected from cotton fields of Nagpur, Akola, Parbhani and Rahuri regions. Totally 88 soil samples were collected from these regions. The cotton crop was in seedling stage at the time of collecting the soil samples. Isolation of microorganisms was done by enrichment culture technique. In enrichment culture technique, mineral medium containing gossypol as a sole carbon source was used for isolation. Totally 131 microorganisms (53 bacteria, 62 fungi and 16 actinomycetes) were isolated from 88 samples.

Screening of bacterial isolate was done in mineral medium containing free gossypol © 10 ppm as well as cottonseed meal during solid state fermentation. Fungal and actinomycete isolates were screened for gossypol detoxification in cottonseed meal during solid state fermentation. The free gossypol content was estimated by AOCS official method Ba7-58. Bacterial isolates BP-16-3, BP-46-2, BR-17-2, BR-82-1 and BR-83-2 showed gossypol detoxification of 91, 83, 88, 87 and 85% respectively in mineral medium. However, these bacterial isolates failed to reduce gossypol in cottonseed meal. Fungal isolates FR-65-2 and FR-67-3 showed gossypol detoxification of 80% and FP-63-1 and FP-61-1 showed 89% respectively in cottonseed meal (Table 10). The preliminary identification of fungal isolates FP-63-1 and FN-8-2 based on morphological and microscopic characterization revealed that these isolates belonged to Basidiomycetes. Actinomycetes did not show significant reduction of free gossypol in cottonseed meal. Standard cultures *Pleurotus flabellatus* and *Candida tropicalis* showed

TABLE 10: DETOXIFICATION OF FREE GOSSYPOL IN COTTONSEED MEAL BY NATIVE SOIL FUNGAL ISOLATES

Fungal Isolates	Free gossypol (mg/ml)	Free Gossypol (%)	Free Gossypol Reduction (%)
FR-65-2	0.019	0.16	80
FR-67-3	0.022	0.16	80
FP-63-1	0.014	0.09	89
FN-8-2	0.017	0.09	89
Control	0.080	0.8	-

maximum reduction of gossypol (up to 90%) in mineral medium. When *C. tropicalis* was inoculated in medium containing cotton seed cake, it showed 69% reduction of free gossypol during solid state fermentation.

Optimization of substrate for solid state fermentation was done using combination of cottonseed meal (CSM), Corn Flour (CF) and Wheat Bran (WB). These three substrates *viz.,* CSM, CF and WB were taken in different proportions such as 100:0:0; 90:6:4; 80:12:8; 70: 20:10; 60:25:15; 50: 30: 20. The fungal cultures FP-63-1, FN-8-2 and *Pleurotus flabellatus* were tested for detoxification of cottonseed meal. The results indicated that only cottonseed meal (100:0:0) inoculated with *Pleurotus flabellatus* followed by FP-63-1 showed better reduction of total gossypol, up to 60 and 50 % respectively (Table 11). However, the inoculation of cultures did not show significant reduction in combinations of substrates. Bench scale studies for maximum detoxification of gossypol in cottonseed meal using fungal strains FP-63-1, FN-8-2 along with standard culture *P. flabellatus,* are underway.

TABLE 11: EFFECT OF CULTURES ON TOTAL GOSSYPOL REDUCTION

Substrate Composition (CSM:CF:WB)	TG Control (0/0)	FP-63-1		FN-8-2		*P. flabellatus*	
		TG (%)	TGR (%)	TG (%)	TGR (%)	TG (%)	• TGR (%)
100:0:0	2.5	1.25	50	2.0	20	1.0	60
90:6:4	2.33	1.98	15	2.25	4	2.31	-
80:12:8	2.19	2.10	4	2.20		2.20	-
70:20:10	2.15	2.15	-	2.13	-	2.15	-
60:25:15	2.03	2.00		2.00		1.7	16
50:30:20	1.90	1.48	22	1.45	23	1.17	38

Note: *TG: Total Gossypol; TGR: Total Gossypol Reduction; CSM: Cottonseed meal; CF: Corn Flour; WB: Wheat Bran*

CORE AREA V: DEVELOPMENT OF ENTREPRENEURSHIP FOR UTILISATION OF CIRCOT TECHNOLOGIES

Training, Commercial Testing, Transfer of technology and Consultancy are dealt under this core area. These activities are discussed in detail in Chapters 3, 4, and 5.

EXTERNALLY FUNDED PROJECT

Zonal Technology Management and BPD Unit at CIRCOT, Mumbai

The following activities were carried out under the project :

Showcasing of ICAR developed technologies of farm implements and machinery: ZTM-BPD Unit of CIRCOT participated at the ICAR-CII Industry Meet 2011 held at National Agriculture Science Centre (NASC), New Delhi on May 23, 2011 and exhibited technologies in the theme area of farm implements and machinery. BPD shortlisted 25 technologies in the areas of farm implements/tools, farm machinery, postharvest processing-horti-cultural crops, agricultural crops, harvesting implements, food products and animal feed. Private R&D houses, companies and food processing industries numbering more than 120 visited the BPD-CIRCOT stall and shown keen interest on the exhibited technologies. Around 20 business leads were generated in the ICAR-CII Industry Meet 2011.

Support for Entrepreneurial and Managerial Development of SMEs through Incubators: BPD-CIRCOT has been approved by Development Commissioner, Micro, Small and Medium Enterprises (MSME), Govt of India, New Delhi for implementation of the scheme -*"Support for Entrepreneurial and Managerial Development of SMEs through Incubators".* Under this scheme BPD-CIRCOT is expected to help the incubation of 10 new ideas and for this MSME is providing an assistance of Rs 62.5 lakhs. A screening committee meeting conducted on September 26, 2011 shortlisted 15 proposals in the initial screening and presented to Managing Committee (MC) consists of expertise from NABARD, ICRISAT/MSME and CIRCOT. Out of the 15 proposals, 13 proposals were recommended for incubation and funding support from MSME.

Press Meet to give publicity to CIRCOT technologies and services: Central Institute for Research on Cotton Technology (CIRCOT) in association with India News Communications Ltd, Noida organized a press meet on August 8, 2011 on CIRCOT technologies and services for farmers and industry at Ginning Training Centre of CIRCOT, Nagpur. The major

theme of the press meet was to create awareness among the farmers and attract entrepreneurs. Seventy participants attended the press meet of which about 10 participants showed keen interest or CIRCOT technologies and services.

Participation in Krishi-Dhan 2011 to promote Agri-business technologies of west zone institutes: ZTM-BPD Unit & ABI-ICRISAT jointly participated in Krishi-Dhan 2011 held at Bombay Exhibition Centre, Goregaon, Mumbai from April 28 - 30, 2011. The event was organized by TER,: to create public awareness about the existing and untapped opportunities in the sunrise sectors of agribusiness that make the agrarian sector vibrant. ZTM-BPD Unit displayed agribusiness technologies of west zone at the stall under the theme "Promoting Sustainable Agriculture Practices in India".

+ **Preparation of Detailed Project Reports(DPR) for technologies:** A DPR was prepared for establishing commercial plant to produce kraft pulp, paper and corrugated fibre board boxes from cotton stalks. The total project cost for setting up of 30TPD plant for production of pulp, paper and CFB boxes is 21.00 crores with RO1 of 30%.

- **ZTM-BPD annual workshop 2012 :** An annual workshop was conducted on January 13-14, 2012. West Zone institutes numbering 14 out of 18 participated in the workshop. There was a poster session to display the technologies to public and prospective entrepreneurs. A special session was arranged for benefit of ITMU staff for best incubation practices and technology management with experts from IIT NAARM and Manipur University.

Business development programme for CIRCOT technologies: Zonal Technology Management and Business Planning Development unit of CIRCOT in association with Textile Association(India) Ichalkaranji-Mira Unit and DKTE Technology Business Incubator (TBI) organised a Business Development Programme at DKTE Society's Textile & Engineering Institute, Ichalkaranji on 21st Jan 2012. The major theme of the programme was to showcase the new cotton technologies to prospective entrepreneurs for commercial adoption and to promote entrepreneurship in textile sector. The august gathering comprised of 105 delegates from spinning, weaving and processing industry. Eminent speakers included scientists from CIRCOT and faculty of DKTE. Many entrepreneurs have shown interest in availing two of the technologies of CIRCOT namely particle board manufacturing from

cotton stalks and production of bio-gas from willow dust.

EXTERNALLY FUNDED PROJECTS

Technology Mission on Cotton

Quality Evaluation of Cotton Fibres

In this project, 1,716 cotton samples received under different sub-projects during 2010-2011 for quality evaluation were tested. Ninety-eight samples were found promising having good fibre quality satisfying the CIRCOT fibre quality norms. For the year 2011-1012, 937 samples have been received so far and tested for their quality parameters, out of which 68 samples have shown good fibre attributes.

Sub-projects under National Agricultural Innovation Projects (NAIP)

A Value Chain for Cotton Fibre, Seed and Stalk : An Innovation For Higher Economic Returns to Farmers and Allied Stake Holder

The project aims to establish a value-chain in cotton right from its cultivation and value addition at every stage till fabric production. During 2011-12, ginning of cotton samples were completed and 63, 62, 110 bales were prepared at Sirsa, Coimbatore and Nagpur respectively. Each bale was tagged for fibre attributes. 8.5 tonnes of yarn of 24s count was made from Sirsa Cotton of which 4250 kg yarn was doubled. 1200 kg doubled yarn was converted into turkish towels. The spinning of cotton from Coimbatore and Nagpur is under process. Evaluation of yarn and fabric properties was done. Dye uptake of 12 cotton fabric samples of Sirsa and Coimbatore cotton was assessed. Effect of Micronaire value on the colour of fabric shows no change. Bio-scouring and dyeing of yarn with natural dye was completed at Solapur and BOD, COD &TOC from the effluents were evaluated. The conversion of the yarn into fabric is in progress. The Bio-enrichment of hull and cattle feed trials on bulls and milking cows were completed at Sabarmati Asharam Gaushala, Paidad near Ahmedabad. A marked difference on digestibility was noticed. However, in milking cows, no difference in milk yield was noticed.

A patent was filed on **Enzymatic Pretreatment to Cotton Seed Kernel for Enhanced Oil Recovery.** A leaflet was published related to bale tagging of fibre attributes.

Major outcome of the project

Before the start of the project, farmers in and around Vadapudur village were cultivating cotton under an area of around 7 to 8 acres. After the implementation of this project, about 100 farmers participated in this scheme and the area under the cotton went up to more than 300 acres. Also the farmers could get the good quality seeds, fertilizers and insecticides on a timely basis with the co-operation from CICR scientists. The number of sprays came down to 2 from 8 reducing the

cost of inputs. The yield of cotton per acre went up to 10 to 12 quintals under irrigated conditions compared to the earlier yield of 4 to 6 quintals per acre. Another 30 farmers who were not directly connected with the project have also adopted this new technology of cotton farming and were benefitted. There was increase in farmer's income upto 10-20% due to adoption of technology led cultivation. Similar success was noticed at Sirsa and Nagpur regions also.

Quality of yarn prepared from the cotton, cultivated with technology intervention is *on par* with 20% level o' Uster statistics for most of the parameters. High speed rapier looms were used to weave the fabric and the product had almost zero defects. The garments were made out of this fabric and the companies identified for makinc garments did not find any kind of defects. Mill trials (150 tonnes) on mechanical delinting of microbial consortium pre treated cotton seeds yielded an additional recovery of linters (1°/0) apart from saving in energy consumption.

Large scale trials of microbic! consortium and commercial enzyme pre-treatment of seeds were taken up and the results showed that pre-treatment enhanced oil recovery by 3-4°/0. The oil industry is the major beneficiary of this experiment.

The effluent load of bio-scoured hank yarn's dyeing with natural dye had shown marked reduction in harmful chemicals when compared with conventional dyeing. A 500 kg yarn trial was undertaken in a commercial dyeing unit. The BOD, COD and TOC values were determined.

A Value Chain on Banana Pseudo-stem for Fibres and Other Value Added products

In this NAIP funded project for value addition to banana pseudostem fibres, Microcrystalline Cellulose (MCC) was prepared from scutching waste generated during banana fibre extraction. This is 99% pure and was *on par* with the commercial MCC product. Standardisation of grades for banana fibres and preparation of catalogue for banana varieties have been carried out by studying different quality parameters. Trials were conducted on yarn making machines and some modifications have been suggested so as to make the yarn finer than 1s count with better uniformity and less hairiness. DREF yarn prepared at CIRCOT on FRICTION-3000 machine using banana yarn in core and cotton on surface. (Banana Cotton : 76 24). Nine Paper samples received from Naysari Agricultural University, Naysari were evaluated for quality. Two and a half tonnes of yarns were spun in a mill at Kolkata. Also, about 2.5 tonnes of non-woven fabrics were made.

A Value Chain for Coconut Fibre and its byproducts: Manufacture of Diversified Products of Higher Value and Better Marketability to Enhance the Economic Returns of Farmers

Various activities carried out under

this NAIP funded project are summarized below

i) Design and Development of Improved Coconut Brown Husk Disintegrator Machine

For extraction of fibres from the brown husk, a new prototype has been developed. It has optimum five units of beaters arranged in a criss-cross manner. Each beater has two lags, the base lag is secured to the revolving shaft and the top is attached to it. The top lag has V-notched tip for easy tearing of epi-carp and intensified beating, which is replaceable, if needed, due to wear and tear. This will save both machine down-time and component replacement cost. The beater runs at 900 rpm by a 15 HP, 3-phase motor. For improving the working environment, provision for attachment of a dust collector has been made. The output of the machine is 12,000 husks/ day.

ii) Preparation of protocol for fibre gradation based on fibre fineness

Image analysis of 85 varieties from states of Karnataka, Kerala, Tamil Nadu and Gujarat has been completed. The following observations are made based on the result so far obtained.

a) The fineness of coconut fibres was found to vary from 175 to 364 micron. Kerala produces the finest fibre.

b) The variability (CV) in fibre fineness in a particular variety ranges from 17 to 30%.

iii) Design and Development of a Novel Defibring Machine

A novel prototype has been developed for extraction of fibres from green coconut husk. It works in fibre-combing principle. Combing bars with optimum teeth are fitted over a revolving cylinder, which runs at 700 rpm powered by a 5-HP, 3-phase motor. Green husks are gently crushed and punctured avoiding much fibre breakage.

In the machine, first the husks are fed to a puncher and crusher system before delivery to the combing cylinder *via.* a conveyor belt. The outturn of the machine is 500 to 600 husks/8 h/slot-cylinder. Ideally, 3 slots can be accommodated in one machine,

iv) Evaluation of Tensile Properties of Cotton Covered (Jute-Coir) Blended Yarn

Development at NIRJAFT has shown that treatment of unretted coconut fibre with Sulphur based chemicals at an elevated temperature can soften the fibre significantly. The fibre fineness as well as the flexural rigidity were found to reduce by 50%, with marginal improvement in mechanical properties.

Both untreated jute-coir (70:30) and treated jute-coir (50:50) yarns

were spun using the jute spinning system at NIRJAFT. The same was received at CIRCOT for further value addition. The yarns were used as core in a DREF-3000 Friction spinning machine, and cotton covered jute-coir blended yarns were produced. The core yarn with chemically treated coir fibres was found to run smoothly on the machine and produced cotton covered yarn with better mechanical properties, such as work of rupture and breaking elongation. Cross-sections of the above yarns were also observed through the Scanning Electron Microscopy.

Design and Development of Rubber Dams for Watersheds

Under this project, a patent **A Novel Flexi Check Dam for Efficient Use of Water in Agriculture** (Application No.1461/MUM/2011) was filed. Estimate showed that the cost of composite manufacturing and installation was z 36,900 for 5 sq. metre (Rs. 7380 per sq.m) without the cost of base concrete structure. It is expected that the Cost will come down when commercial scale production and installation will be taken up. Due to assured availability of water, crop production showed improvement.

Synthesis and Characterization of Nano-Cellulose and its Application in Biodegradable Polymer Composites to Enhance their Properties

In this project, the following was the progress during the period 2011-12.

- The aerobic microbial process of nanocellulose production in the fermentor was optimized under Fed-Batch process to have the yield of 31%. The maximum yield was achieved in two days of fermentation.
- In anaerobic process of nanocellulose production, use of enriched microbial consortium resulted in 12% yield. The dominant organisms were isolated and identified as the *Clostridum cellobioparum* and *Clostridium cellovorans.* The maximum yield was achieved in seven days of incubation.
- In case of enzymatic preparation of nanocellulose, optimization of process conditions in membrane reactor helped to improve the yield to 11%. This was achieved by repeatedly feeding the un-hydrolyzed substrate back into the reactor.
- In chemo-mechanical preparation of cellulose nanofibrils, enzyme / zinc chloride pretreatments resulted in reduction in energy consumption to the tune of 50 and 40%, respectively; while in case of homogenization process, 15% energy reduction was achieved in both the cases.
- The nanocellulose prepared by enzymatic process was used as fillers in polyvinyl alcohol film that helped to improve the tensile

strength by twice, while reducing the water vapor transmission rate by three times.

- The nanocellulose, when used as fillers in starch film, improved the tensile strength by 3.5 times, while reducing the water vapour transmission rate by twice. The biodegradability of starch nanocellulose composite film was less than 21 days by the native microbial population of garden soil. Fig.2 shows the starch-nanocellulose composite film prepared by solution casting process.

now slowly moving towards the less-water or water-less dry technologies

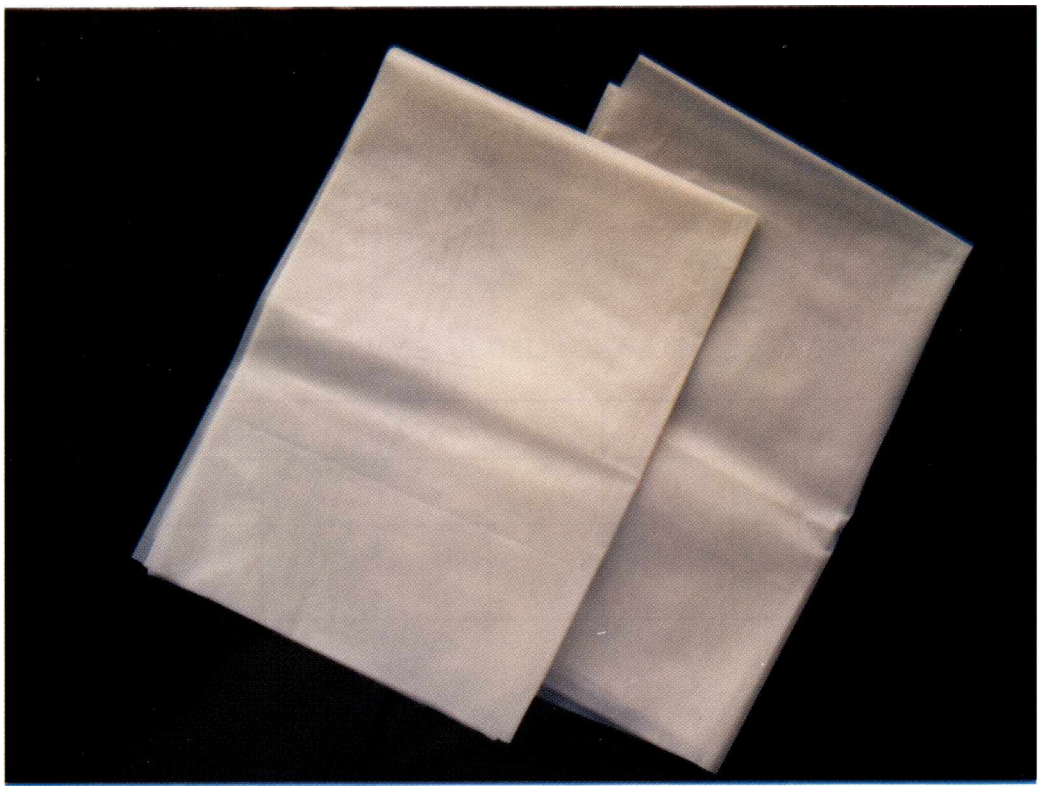


Fig. 2 : Starch Nanocellulose Composite Film

Improvement in Cotton Fabric Quality by Plasma Nano-technology: An Eco-Friendly Approach

Chemical processing of textile is important because it imparts the highest value to the apparel, home and export grade textile. It is well known that textile chemical processing creates significant amount of water pollution and increase the cost of production towards the multiple number of drying. To reduce the pollution load, textile industries are

such as digital printing, spray and foam finishing or use of eco-friendly chemicals and agents. Recently, cold plasma has shown to be a promising environment friendly technology for textile chemical processing in comparison to wet chemical processing of textile.

INTER-INSTITUTIONAL PROJECT

Development of Composite Yarns for Technical Textiles from Natural Fibres based on Friction Spinning Technology

This is a collaborative project between NIRJAFT, Kolkata (Lead Institute) and CIRCOT. CIRCOT's role is production of cotton covered Jute composite yarn with varying ply no. and twist, characterisation of the cotton covered jute composite yarns produced in the experiment, their weaving and dyeing trials.

During the reporting period, jute yarns were produced from jute fibres with fineness of 1.89 tex and bundle strength of 26.6 g/tex using conventional jute spinning process at NIRJAFT, Kolkata. The single yarn was of 138 tex, from which double and triple plied yarns were produced varying their different ply twist. The properties of single and plied jute yarn properties are given in Table 12.

TABLE 12 : SINGLE AND PLIED JUTE YARN PROPERTIES

Core yarn Tex	**138**	**138*2**			**138*3**		
No. of plies in core yarn	1	2			3		
Core yarn Twist at doubling stage (tpi)		3.0	4.0	5.0	3.0	4.0	5.0

All the above yarns were used as core on the friction spinning machine and covered with cotton. The cotton fibres used as the sheath material was extracted from a combed sliver, which had average fibre length of 27 mm and short fibre content of 5.3% (weight average, AFIS). The HVI bundle strength (3.2 mm) was 25.5 g/tex with breaking elongation of 5%.

To get a good cover of cotton sheath with the increase in ply no. of jute yarn, the feed of the fibre was regulated by the programming unit of the machine. The opening drum speed of the friction machine was kept at 5000 m/min for all the samples. The spinning drum speed of 3000 m/min and delivery speed of 150 m/min was needed to get the required quality of the yarn. Eight different composite yarn samples were developed. The yarn samples were tested for their physical parameters and diameter. The results are given in Table 13.

TABLE 13 PHYSICAL PROPERTIES OF COTTON COVERED JUTE COMPSITE YARNS

Nominal linear density of core yarn (tex)	**138/1 Ply**	**138/2 Ply**			**138/3 Ply**		
Core yarn twist during plying (tpi)		3.0	3.9	5.0	3.0	3.9	5.0
Actual linear density of core yarn (tex)	138	276	280	285	414	418	420
Average linear density of core yarn (tex)	138		280			417	
Actual linear density of Cotton Jute Composite yarns (tex)	231	455	478	432	647	644	627
Average linear density of Cotton Jute Composite yarns (tex)	231		455			639	
Yarn diameter of core yarn (mm)	0.64	0.99	1.002	0.91	1.14	1.24	1.16
Yarn diameter of Cotton Jute composite yarns (mm)	1.14	1.36	1.35	1.32	1.50	1.58	1.49
Increase in diameter (%)	78.1	37.4	34.7	45.1	31.6	27.4	28.5
Average increase in diameter (%)	78.1		39.1			29.2	
Sheath material in Cotton Jute composite yarns (%)	40.3	39.3	41.4	34.0	36.0	35.1	33.0
Average ply-wise sheath material (%)	40.3		38.2			34.7	

It was found that 33 to 40% of cotton sheath material was needed for good covering of the jute yarns. The comparisons of percentage increase in diameter and sheath material in cotton-jute composite yarns are shown in Fig.3.

From Fig.3, it can be seen that with the increase in the number of yarn ply in jute core yarn, the percentage change in cotton jute composite yarn diameter and sheath content decreased for covering the yarn. The increase in ply no. in the core yarn results in increase in evenness and reduction in hairiness. This made it possible to cover them with less quantity of sheath fibre by adjusting the fibre feed in the programming unit of the machine.

The mechanical properties of the friction spun cotton-jute composite yarns are given in Fig. 4.

From Fig. 3 and 4 it can be observed that at 3.9 plying twist both the normal core jute yarn and the cotton-jute composite yarn yielded maximum tenacity. The friction spinning process reduced the tenacity of the composite yarn. It may be due to partial untwisting of the yarns. Due to the

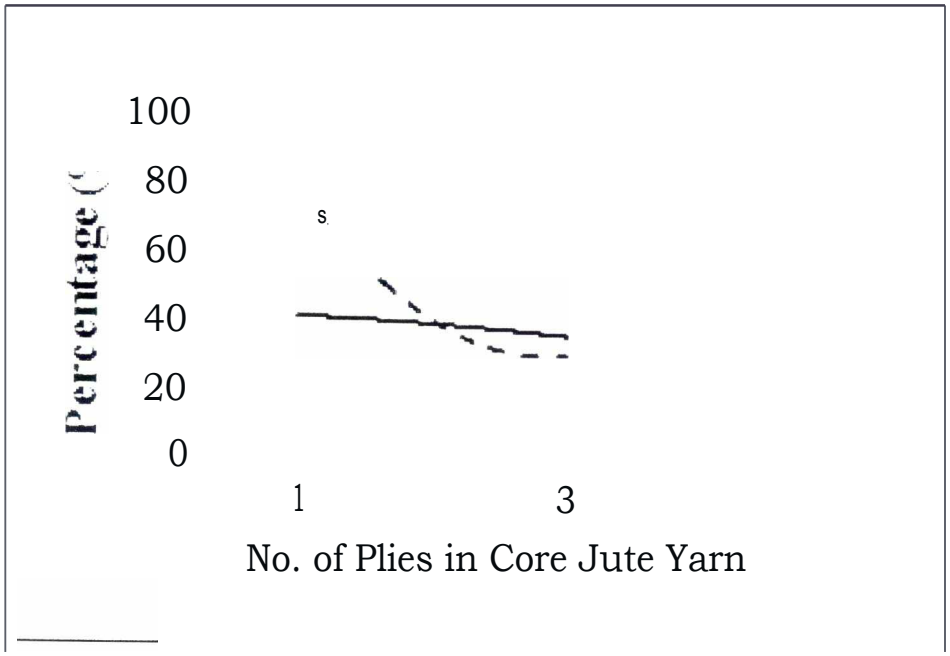


Fig. 3: Change in Diameter and Sheath Content of Cotton-Jute Composite Yarns

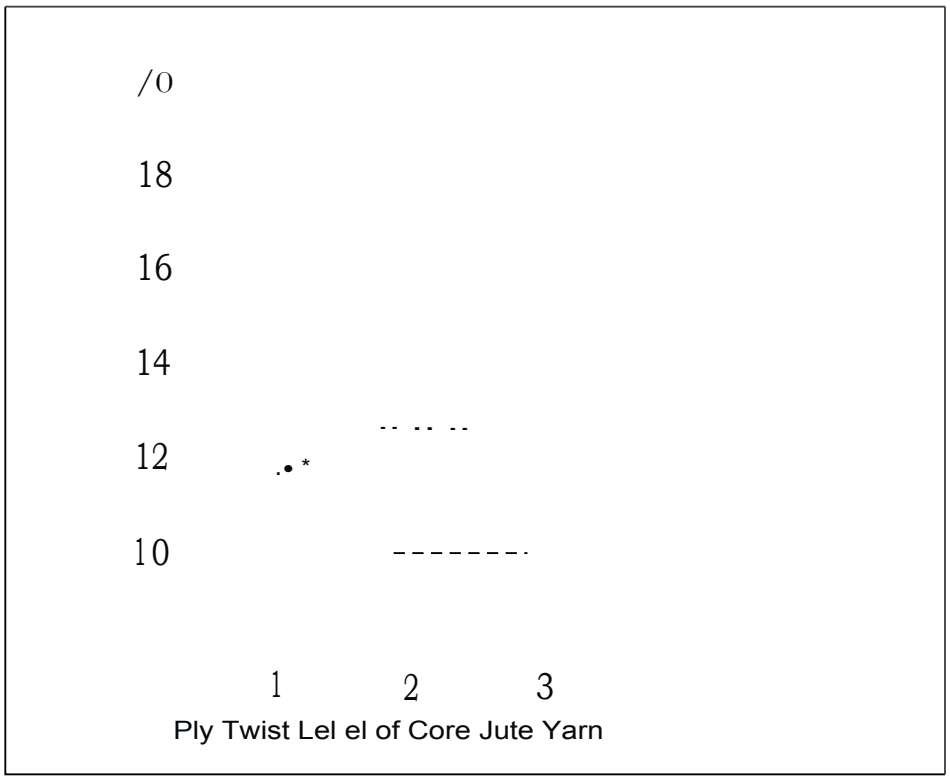


Fig. 4: Yarn Tenacity (c4V/tex) of Core Jute Yarn and Cotton Yute Composite Yarns for Different Twist Levels

partial untwisting effect, the breaking extension increased in the friction spinning process in all the yarns (Fig.5). The breaking extension of the friction spun yarns followed the same trend as the original jute yarns used in the core.

The strength, breaking elongation and specific work of rupture realization of the core jute yarn in cotton-covered jute composite yarns are given in Fig 6.

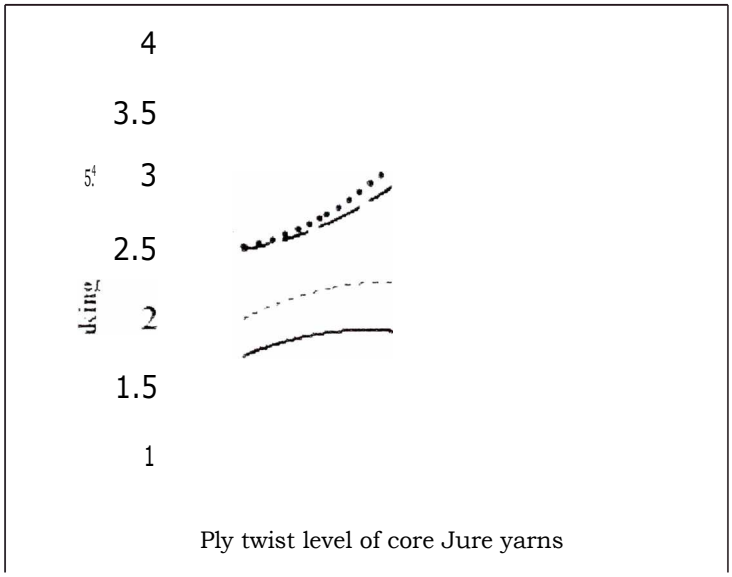


Fig. 5: Breaking Elongation of Core Jute and Cotton-Jute Composite Yarns for Different Twist Levels

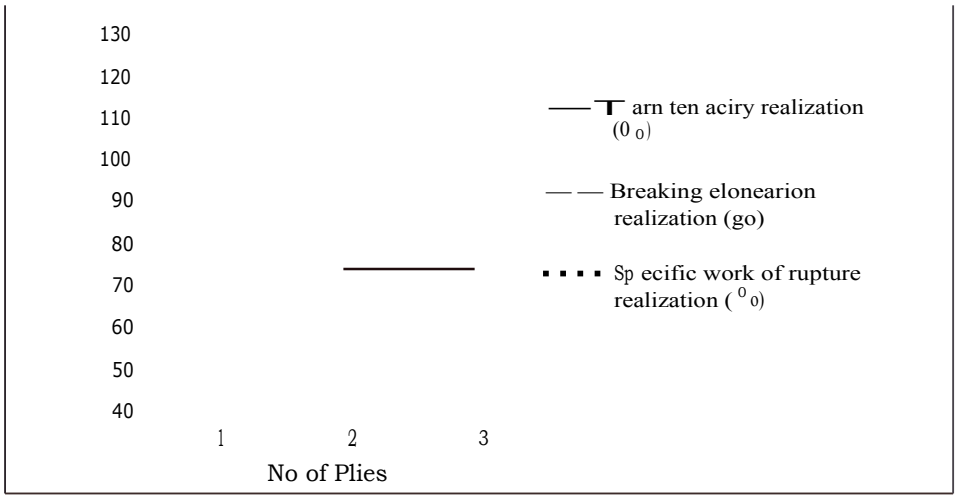


Fig. 6: Yarn Tenacity, Breking Elongation and Specific Work of Rupture Realization in Cotton-Jute Composite Yarns

From Fig 6, it can be visualized that the strength as well as specific work of rupture realization was better in case of plied yarn than in single ply yarn when used as core. This may be attributed to the fact that in the friction spinning process, plied yarns are less prone to damage by untwisting effect of the friction drums. Single yarns are more prone to the untwisting effect. The breaking elongation realization followed opposite trend. Clearly the two-plied yarn had better mechanical property realization.

The composite yarn made from jute single core yarns were also woven into a furnishing fabric and dyeing trials were under taken. The yarns were sized before weaving. The fabric thus made was scoured and bleached in single bath process using hydrogen peroxide bleaching (3%). The fabric was then dyed with reactive dye (Turquoise blue-21, Orange-3R and Red-5B mixture) with a 2% depth of shade. It was found that dyeing was uniform. The fabrics were much easier to dye due to the presence of cotton cover.

An Accelerated Process for Preparation of Bioenriched Compost from Cotton Plant Residues

Cotton stalk is one of the important crop residues produced during cotton cultivation. This biomass is mostly used as fuel apart from particle board preparation. However, the potential of this raw material has not been studied much for compost preparation due to high level of lignin content and slow degradation of cotton stalks.

This project aims at preparation of bioenriched compost from cotton plant residues through accelerated process. The acceleration of compost process is controlled by factors such as type of microorganisms, aeration, moisture, nutrient supplements, etc. apart from the nature of raw material.

In the process, keeping the other parameters at optimum level, the acceleration of the process was targeted by using faster decomposing microbial inoculums. For this purpose, microbial consortia both aerobic and CIRCOT anaerobic consortium were used. Aerobic consortium was prepared by combination of three organisms, *viz.*, *Phanerocheate chrysosporium, Pleurotus flabellatus* and *Bacillus stearothermophilus. Phanerocheate chrysoporium* and *Pleurotus flabellatus* are well known lignin degraders, Since there was no antagonism between aerobic and anaerobic organisms, both were used in the preparation of compost.

A large scale trail was taken up at GTC, Nagpur to prepare compost from 3.5 tonnes of dry chipped cotton stalks through accelerated process. At 30 days after initiation of composting process, the temperature recorded was 60°C, which indicates the increased activity of microorganisms in compost. At 90 days, it was observed that there is decrease in CN ratio to 20 and increase in NPK level.

A second large scale trial was taken up at Sirsa, QE Unit of CIRCOT, for the preparation of bioenriched compost from ten tonnes of chipped fresh (wet) cotton stalks through accelerated process. One set was inoculated with the cultures and the uninoculated lot served as control. The compost was ready in 45 days since the fresh stalks decomposed faster.

3

Technology Assessed and Transferred

The key aim of any research organization is to transfer the benefits of the research findings to the interested stake holders.

CIRCOT Scientists are primarily involved in developing newer technologies in the area of post harvest processing of cotton, eco-friendly finishing of textiles, better utilization of by-product of cotton cultivation and refinement of the already developed technologies. There has been a continuous monitoring of the transferred technologies and processes and a regular upgrading of the developed innovations so as to provide enhanced benefit to the users. The Institute maintains a constant liaison with private organizations and entrepreneurs to meet their needs and to generate revenue. This chapter summarises the technologies developed and consultancies offered by the Institute during the current year. Attempts were made for popularisation and commercial adoption of viable technologies through Awareness Meets conducted periodically at various places.

Consultancies Undertaken

1. M/s. Bajaj Steel Industries Ltd., Nagpur for R&D for developing various ginning machines
2. M/s. Konark Cotton Growers Co. Op., Kesinga (Odisha)
3. M/s. ION Exchange (I) Ltd., Mumbai for development of ultra-pure water maker for laboratories
4. M/s. Hanjer Bio-Tech Energies (P) Ltd., for characterization of anaerobic microorganism.

Commercial Testing

More than 7000 samples were tested during the year under report at the Headquarters Mumbai, and other regional quality evaluation stations at Coimbatore, Guntur, Sirsa, Surat, Dharwad, and the Ginning Training Centre at Nagpur. The total revenue generated through commercial testing was around Rs. 23.39 lakh as shown in Table 14.

TECHNOLOGY ASSESSED AND TRANSFERRED

TABLE 14: NUMBER OF SAMPLES TESTED AND REVENUE GENERATED

Name	No. of samples	Amount (Rs.)
Mumbai - HQ	1672	1051932
Coimbatore	1455	374091
Guntur	1845	353031
Dharwad	708	145740
Surat	263	56920
GTC, Nagpur	611	154922
Sirsa	634	202849
Total	7188	2339485

Patents Filed :

Date of Application in Patent Office	Application Number allotted by the Patent Office	Title	Innovator(s)
12.05.2011	1461/MUM/2011	A Novel Flexi Check Dam for Efficient Use of Water in Agriculture	Shri P.R. Choudhury Shri S.K. Chhakraborty Dr. S.K. Chattopadhyay Shri A.K. Bharimalla Shri Narayan Sahoo Shri S.K. Jena Shri Y.K. Kusumgar Dr. M.K. Talukdar
30.05.2011	1590/MUM /2011	A Novel Machine for Extracting Fibre from Banana Pseudostem	Dr. R.P. Nachane Shri N.G. Savani Dr. R.G. Patil Dr. B. N. Kolambe

4

Education and Training

Education

The University of Mumbai has accorded permanent recognition to CIRCOT for conducting Master degree studies in Physics, Physical Chemistry, Organic Chemistry, Bio-Physics and Microbiology and Ph.D. studies in Physics, Textile Technology, Bio-physics and Microbiology under Section 88 of the Maharashtra Universities Act 1994, as amended by the Maharashtra Universities (amendment and continuance) Act 2000. The Institute currently has two guides for Ph.D.

As of now, five students have registered for Ph.D. in Physics and three for Microbiology, and one student for M.Sc. in Chemistry. Further, the Institute has been recognised as a guiding centre for M.Sc. and Ph.D. courses in Home Science (Textiles) of the SNDT Womens' University (Mumbai), for M.Tech. and Ph.D. courses in Agricultural Engineering by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (MS), and for Textile Technology by IIT, Delhi and VJTI, Mumbai.

Training

Training programmes on cotton quality evaluation are provided to personnel employed in cotton trade and industry. The Institute also organises special training courses on the operation of High Volume Instrument (HVI) and Advanced Fibre Information System (AFIS), and interpretation of their test results at the Headquarters. All the training courses include informative lectures on the subjects and their operational demonstrations at the labs, followed by visits to the Textile/Ginning and Pressing industries to acquaint the trainees with the practical knowledge in the respective field. Course materials in the form of a book containing details of test methods, statistical interpretations of results and other details are provided to the trainees.

At the Ginning Training Centre at Nagpur, training is imparted to the personnel employed in the ginning industry on the operation and maintenance of various ginning machines, problem solving in the ginning machines and process. Importance of clean cotton picking in ginning for fetching premium prices on farmer's commodity and assessment of proper fibre quality for ensuring better remuneration to farmers or ginners are also emphasized. The duration of the

training programme is also tailored to suit the needs of the trainees.

a) Training on Quality Evaluation of Textiles

During the repored period, fifty-seven personnel sponsored by the industry were trained in six different batches on the quality evaluation of cotton fibre, yarn and fabric.

(a) Training on Ginning and Baling

At the Ginning Training Centre at Nagpur, regular training programmes are conducted for the benefit of gin operators and middle level managerial staffs on various aspects of ginning including maintenance of various ginning machines and trouble shooting.

During 2011-12, eleven batches comprising of 84 persons were trained in ginning.

National Training on Nano-technology :

During the period under report, the following National level training courses were organised. The training course included both lectures and practical demonstrations. The major objectives of the training programme were as follows:

- To acquaint the participants with basics of nanotechnology
- To impart training on preparation and characterization of nanornaterials
- To demonstrate the application of nanomaterials in agriculture and allied sectors

Date	Topic	Number and Nature of Participants
October 10 - 24, 2011	Nanocellulose and its Composites in Agriculture	Eleven participants from various ICAR institutes
November 16 - 29, 2011	Synthesis and Characterisation of Nanomaterials and their Application in Agriculture	Fifteen participants from ICAR institutes and various universities
January 2 - 12, 2012	Application of Nanotechnology in Agriculture	Sixteen participants from ICAR institutes and various universities

5

Linkages and Collaboration

The Quality Evaluation Units of the institute located in major cotton growing areas of the country within the premises of agricultural universities and other ICAR institutes serve as extension wings of the institute. The scientists participate in the AICCIP meetings and provide feedback to the breeders for improvement of cotton variety. The quality evaluation units and the Ginning Training Centre (GTC) at Nagpur promote the technologies developed by the Institute for efficient utilization of cotton fibre, crop by-products and other agro-waste materials and serve as a window for technology transfer activities. The Institute provides technological support in the development of Bt. cottons by providing data on the spinnability, fibre quality and oil content through contract/ consultancy research. Besides, there are also linkages with NGOs like *Varhad Vikas Seva Prathisthan,* Akola (MS) for carrying out field trials on the Low-cost sliver making machine developed by the Institute, Indian Rubber Manufacturers' Research Association (IRMRA), Directorate of Water Management (DWM), (ICAR) and a reputed private manufacturer of technical textiles *viz.*, M/s. Kusumgar Corporates, under the National Agricultural Innovation Project (NAIP) and The Mahila Kathya Kaamgar Sangathan, Vengurla (MS), an NGO.

The institute actively participates in various exhibitions, *Kisan melas* and in similar events, which serve as a mode of technology extension and out-reach. Besides, the Institute also undertakes collaborative research programmes with other research bodies in post-harvest technology and value-addition to cotton and other natural fibres.

The scientific community of CIRCOT officiate as resource persons in committees and advisory panels of academics and other research institutions, such as SITRA, CCI, ICMF and CAI. They participate in various seminars, symposia, conferences, workshops organised within and outside the country. This provides a platform for the exchange of their knowledge and expertise in different fields of research and to exhibit technologies and process developed by the Institute. Few Scientists are experts in committees like the Technology Development Board (TDB) under the Department of Science and Technology (DST), for assessment of proposals for setting up/expanding cotton processing industry.

Scientists and technical personnel are invited to give lectures and to participate in discussions related to cotton in particular, and natural fibres in general, organised by other institutions and academic colleges. They also publish their research findings both in scientific (national and international) and popular journals.

Regular training courses are conducted by the institute on Cotton Quality Evaluation including elementary statistics applicable to textile testing for personnel from the cotton trade and industry. At the Ginning Training Centre at Nagpur, theoretical and practical training skills are imparted on different aspects of ginning like maintenance of ginning machines, problem solving during the ginning operations, effect of clean cotton picking for better remuneration and utilization of biomass of cotton cultivation for preparing particle boards.

The technical expertise of the Institute is sought by stakeholders for queries related to cotton fibre, yarn and fabric. The Institute undertakes consultancy services and contract research for specific problem areas and troubleshooting. The institute regularly publishes pamphlets on various technologies developed and innovations made for dissemination of information.

Commercial Testing: The Institute undertakes testing of fibre, yarn, fabric and other miscellaneous samples on payment basis for samples from trade and industries, textile and other educational institutes and state government bodies. The details of commercial samples tested at CIRCOT, Mumbai during the period 2011-12 along with those of the recent past are presented in Table 15.

TABLE 15 DETAILS ON SAMPLES TESTED AT CIRCOT

Sr. No.	Type of Tests	Average during X Plan (2002-03 to 2006-07)	XI Plan				
			2007-08	2008-09	2009-10	2010-11	2011-12
1.	Ginning,Fibre,Trash Content andSpinning	8438	1961	5253	8965	2860	6534
2.	Yarn	254	160	35	40	35	71
3.	Fabric	445	418	616	396	146	306
4.	Miscellaneous	516	332	180	159	378	277
	Total	9653	2871	6084	9560	3419	7188

Besides routine tests, some special tests were also undertaken on samples received against payment of fees during 2011-12 as listed below:

No.	Party's Name	Test
1	M/s. Franco-Indian Pharmaceutical Pvt. Ltd., Mumbai	TOC
2	M/s. ACME Intl. Ltd. Ahmedabad	Linter
3	M/s. Grip Polymers, Mumbai	SEM
4	Piramal Life Sciences, Mumbai	SEM
5	M/s. Hanjer -Biotech Engergies Pvt. Ltd. Mumbai	AAS
6	ICT, Matunga, Mumbai	SEM
7	Mumbai University Press, Mumbai	Paper
8	M/s. Ratnagiri Chemicals Pvt. Ltd., Navi Mumbai	FTIR
9	M/s. Shree Ram Proteins Pvt. Ltd., Rajkot	Linter
10	Bombay Textile Research Association, Mumbai	XRD
11	ICT, Mumbai	TGA, XRD
12	M/s. G.S. Oils Ltd, Adilabad	Linter
13	M/s. SSD oil Mills Co. Ltd., Chennai	Linter
14	M/s. Subham Industries, Sumerpur (Raj)	Cotton Cake
15	M/s. Bajaj steel Industries Ltd. Nagpur	Linter
16	Nirmala Niketan College, Mumbai	Antimicrobial Activity, UP
17	PSG College of Technology,Coimbatore	Kawabata
18	Govt. S.K.S.J. Technological Institute, Bangalore	Kawabata
19	Municipal corporation of Greater Mumbai	Weave
20	Aditya Birla Science and Technology Company, Taloja	Kawabata
21	Jawaharlal Darda Institute of Engg. & Tech., Yavatmal	Eco Testing
22	DKTE, Ichalkaranji	Kawabata
23	SNDT, Women's University, Mumbai	Antibacterial Activity
24	Angel College of Engg. &Tech. Tirupur, Tamilnadu	Kawabata
25	BMC, Byculla	Paper
26	CIFE, Mumbai	SEM
27	M/s. Croda Chemical, Navi Mumbai	SEM
28	M/s. Janak Enterprise, Mumbai	Surface Tension
29	M/s. L.N. Oils, Dharwad	Linter
30	M/s. Rajiv Plastic Ltd., Mumbai	XRD
31	M/s. Sandeep Textiles, Mumbai	Paper

Exhibition and Publicity

The Institute has participated in a number of exhibitions, kisan mela showcasing the technologies and processes developed for commercialization. Newspaper articles written on various CIRCOT technologies, Press Meet arranged by the Institute and documentary film made on the Institute also served as publicity for the institute R & D activities. During the reporting period, the Institute participated in the following activities:

1. Participated in the Industry Interface Meet - 2011 at ICAR, New Delhi on 23rd May 2011.

2. A documentary titled *"Subra Sone* (White Gold)" was shot and telecast on July 16 and 18, 2011 on Sahyadri Channel of Doordarshan.

3. A press meet was arranged at GTC, Nagpur on August 8, 2011 in collaboration with M/s. India News Communication Ltd., Noida to give wide publicity to CIRCOT Technologies & Services to the end-users. Around 50-60 participants including press representatives had participated.

4. International Conference & Exhibition on Technical Textiles (TECHNOTEX 2011), organized by The Federation of Indian Chamber of Commerce and Industry (FICCI) and Ministry of Textiles jointly with Department of Chemicals and Petro Chemicals at Bombay Exhibition Centre, Mumbai from August 25-27, 2011. A paper titled Rubber Dams for Watershed-A Case Study of Application of Technical Textile in Agriculture was also presented by Dr. S.K. Chattopadhyay.

5. 6th National Conference on KVKs during 3-5 December, 2011 at JNKVV, Jabalpur, M.P.

6. Exhibition in connection with the Jyotibhabai Phule Birth Centenary on January 3, 2012 at MKV, Parbhani, MS.

7. First Science Expo during January 19-21, 2012 at Raman Science Centre, Nagpur.

8. Participated in the exhibition at VIGYAN YAGNYA 2012 on January 27-29, 2011 at K.J. Somaiya College of Science & Commerce, Vidyavihar, Mumbai.

9. Agro-vision during January 27-30, 2012 at Reshimbagh, Nagpur.

10. Three Stake holders meet were organized :-- one at the headquarters at Mumbai on January 13 and 14, 2012 and two at GTC, Nagpur on December 11, 2011 and February 28, 2012.

6

Publications

A. Annual Report

Annual report of the Central Institute for Research on Cotton Technology for the year 2010 -2011.

B. Research Publications

Nagarkar, R.D., Nachane, R.P., Guhagarkar, S.J. - *Effect of Single Stage Processing on Physical and Mechanical Properties of Cotton Fabrics,* Cotton Research Journal, Vol. 2 (1), pp. 70 - 78, Jan - June 2011.

2. Nagarkar, R.D., Ashtaputre, N.M., Tiwari, S., Ambare, M.G., Kumar, V. and Katageri, I.S. - *Exploratory Studies on Oil and Protein Content and Fatty Acid Profiles in Commercial Bt. Cotton Hybrids of Different Transgenic Versions,* Cotton Research Journal, Vol. 2 (1), pp. 79 - 88, Jan - June 2011.

3. Jyoti M. Nath, Patil, P.G., Balasubramanya, R.H. - *Utilisation of Low Free-Gossypol Containing Cottonseed Meal in Broiler Feeding,* Cotton Research Journal, Vol. 2 (1), pp. 89 - 95, Jan - June 2011.

4. Jyoti M. Nath, Patil, P.G., Arude, V.G. and Shukla, S.G. - *Cotton Bale Tagging and Management Software for Indian Ginneries,* Cotton Research Journal, Vol. 2 (2), pp. 98 - 107, July - December 2011.

5. Vivekanandan, S., Sheela Raj, Sreenivasan, S. and Nachane, R.P. - *Parameters Affecting Warm - Cool Feeling in Cotton Denim Fabrics,* Indian Journal of Fibre and Textile Research, Vol. 36, pp. 117-121, June 2011.

6. Matish Chandra, Sreenivasan, S. - *Studies on Improved G. arboreum Cotton Part I I - Yarn and Fabric Quality Parameters,* Indian Journal of Fibre and Textile Research., Vol. 36, pp. 158-167, June 2011,

7. Matish Chandra, Sreenivasan, S. - *Past, Present and Future of Cotton Species Gossypium arboreum L - A Qualitative Perspective,* Journal of Cotton Research and Development, Vol.25 (2), pp. 124-136, July 2011.

8. Chitranayak, Shanmugam, N., Yadav, A. and Moon, D.N. - *Fibre Quality for Trade Variety,* Journal Cotton Research and Development, Vol. 25 (2), pp. 152-158, July

2011.

9. Chattopadhyay, S.K. - *Rubber Dams: Unique Blend of Technical Textiles, Rubber Technology & Water Management,* Technical Textile & Nonwoven Excellence Magazine, Vol.2(4), pp. 8-10, July-September 2011.

10. Chaubal, A.B., Ambare, M.G., Nagarkar, R.D. and Balasubramanya, R.H. - *Biological Softening of Cotton Plant Stalks for the Preparation of Binderless Boards,* Cotton Research Journal, Vol. 2 (2), pp. 108 - 114, July - December 2011.

11. Karande, V.S., Bharimalla, A.K., Hadge, G.B., Mhaske, S.T. and Vigneshwaran, N. - *Nanofibrillation of Cotton Fibers by Disc Refiner and its Characterization,* Fibers and Polymers, Vol. 12(3), pp. 399-404, 2011.

12. Meena Sharma, Nachane, R.P. - A *Unified Processs of Non-Conventional Scouring and Dyeing for Cotton Textiles,* published in Colourage, Vol. LVIII, No. 10, pp. 47-50, October 2011.

13. Vivekanandan, M.V. and Sreenivasan, S. - *Dynamic Transport of Water Vapour through Cotton and Polyester-cotton Blends Indices Charaterising Moisture Buffering and their Interrelationships,* Journal of Engineered Fibres and Fabrics - Accepted for publication on November 28, 2011.

14. Yadav, A. and Chitranayak - *Mechanical Properties of Yarns of Various Micronaire Cottons,* Cotton Research Journal, Vol. 2(2), July pp. 93-97, December 2011.

15. Nagarkar, R.D., Nachane, R.P., Guhagarkar, S.J. and Ambare, M.G. - *Effect of Single Stage Processing on Chemical Properties of Cotton Fabrics,* Asian Textile Journal, Vol. 21 (1), pp. 66-70, January 2012.

16. Gayal, S. G., Nagarkar, R.D. and Khetarpal, D. - *Enzymatic Processing of Khadi Fabric using Pectinase and Cellulase,* Asian Textile Journal, Vol. 21 (2), pp. 59-63, February 2012.

17. Yadav,A., and Chattopadhyay, S.K., - *Structure-Property Relationship of DREF-3000 Friction Spun Yarn, Journal of Polymer Materials, 29 (1), 2012:115-126.*

C. Publication in Popular Journals

1. Jadhav, R.K., Chattopadhyay, S.K. *Gramin Star Ke Liye Soot Ki Katai Prakriya,* Vigyan Ganga, Vol. 24 (2), pp. 2 - 5, April - June 2011.

2. Chitranayak - *Prakrutik Resha Paryavaran Ki Suraksha,* Vigyan Ganga, Vol. 24(3), pp. 2 - 14, July - September 2011.

3. Chitranayak - *Viksit Taknik Dwara*

Kapas Evam Samavrgi Prakritick Rashon ka Gunavatta Mulyankan published in ICAR Rajbhasha Alok, Vol. 14, pp. 16 - 19, 2011.

4. Chitranayak - *Kapas Evam Kapas ke Samavrgi Prakritick Reshe Evam Vibhinna Utpad,* published in Krishi Prabandhan ke Naye Aayan, NAARM, Vol. 6, pp. 42-49, 2011.

5. Shaikh, A.J., Tiwari, S. - *Prakruti ki Anmol Den Bahu Upayogi Kela Tana,* Vigyan Ganga, Vol. 24 (2), pp. 6 - 18, April - June 2011.

6. Nagarkar, R.D., Ambare, M.G., Gurjar, R.M. - *Kapas Danthal Paryavaran Santulan Tatha Kisano Ke Liya Atirikt Amadani ka Jariya* published in ICAR Rajbhasha Alok, Vol. 14, pp. 25 - 27, 2011.

D. Paper presented in Conferences / Seminar

1. Jadhav, R.K., Deshmukh, P.S. and Chattopadhyay, S.K., 2011. *Grameen Sthar ke Liye Kifaayati Daamon mein Kapas Dhunaayi Yantra* (In Hindi). (in) Book of papers of Seminar (in Hindi) - Naisargik Reshhon mein Aadhunik Unnatiya, held on 25 April, 2011 at Mumbai : 26-35.

2. Upadhye, D.L., Bindu Venugopal, Chattopadhyay, S.K., Dey, S.K. and Satapathy, K.K., 2011. Ramie - *Tantu se Vastra Aakruti tak-Bunaayi our Suchigrathan ke Liye Ek Honhaar Resha* (in Hindi). (in) Book of papers of Seminar (in Hindi) - Naisargik Reshhon mein Aadhunik Unnatiya held on 25 April, 2011 at Mumbai : 36-37

3. Yadav, A., Chattopadhyay, S.K. and Jadhav, R.K., 2011. *DREF Ghharshan se Nirrmit Suton ki Saonrachana-Gunnadharma Sambhandhon ka Adhyaayan* (in Hindi). (in) Book of papers of Seminar (in Hindi) - Naisargik Reshhon mein Aadhunik Unnatiya held on 25 April, 2011 at Mumbai 63.

4. Jadhav, R.K., Manik Bhowmick and Chattopadhyay, S.K., 2011. *Gharshan Kataayi Dwaara Takneeki Vastron ke Liye Kapaas ke Saath Naisargik Reshhon se Samaagra Dhagaon ka Uthpaadan* (In Hindi). (in) Book of papers of Seminar (in Hindi) - Naisargik Reshhon mein Aadhunik Unnatiya held on 25 April, 2011 at Mumbai : 55-62.

5. Chattopadhyay, S.K., - *Rubber Dams for Watershed-A Case Study of Application of Technical Textile in Agriculture* presented in the International Conference & Exhibition on Technical Textiles (TECHNOTEX 2011) organized by The Federation of Indian Chamber of Commerce and Industry (FICCI) and Ministry of Textiles jointly with Department of Chemicals and Petro chemicals at Bombay Exhibition Centre, Mumbai from August 25-27, 2011.

6. Talukdar, M.K. and Chattopadhyay, S.K. - *Flexible Check Dam for Watershed Management-An Innovative Application of Geosynthetics* presented at the seminar on "GEOSYNTHETICS INDIA' 11, organized by the Indian Chapter of International Geosynthetics Society and the Central Board of Irrigation & Power (CBIP), New Delhi at IIT, Chennai on September 23 and 24, 2011.

7. Chattopadhyay, S.K., Talukdar, M.K., Choudhury, P.R. and Jena, S.K., 2011. *A Novel Flex! Check Dam Made Using Technical Textile for Efficient Use of Water in Agriculture.* (in) International Conference on Managing Innovation in Textiles 2011 organized by The Textile Institute, Manchester held on 30 November, 2011 at Manchester, U.K. : 1-10.

8. Chattopadhyay, S.K., Bharimalla, A.K., Bindu Venugopal, Upadhye, D.L. and Kadam, V. V. - *Intervention for Sustainable Developments in Coconut Fibre Processing* presented at the 1st International Science Congress held at Maharaja Ranjitsinghji College of Professional Sciences, Indore from December 24 and 25, 2011.

9. Chattopadhyay, S.K., Talukdar, M.K., Roy Choudhary, P. and Jena, S.K., 2012. A Novel Flexi Check Dam Made Using Technical Textile for Efficient Use of Water in Agriculture *(in) Book of papers of Emerging Trends in Developing Eco-Friendly and Energy Efficient Elastomeric Material and Processing Technology organized by Indian Rubber Manufacturers Research Association, Thane* held during 20-21 Jan., 2012 at Mumbai : 43-50.

10. Chattopadhyay, S.K., 2012. *Technology Intervention to Segregate Fine Coconut Fibres and Spin into Finer Yarn and its Use in Innovative Products - A NAIP Development.* (in) National Seminar on Coir and Natural Fibres (Coir Kerala 2012) held during 8 February, 2012 at EMS Stadium, Alappuzha, Kerala.

11. Talukdar, M.K., Chattopadhyay, S.K., Choudhury, P.R. and Jena, S.K., 2012. *Flexible Check Dam - An Innovative application of Technical Textiles for Watershed Management* (in) All India Seminar on Innovation and Emerging Trends of Jute, Textile and Garment Products held during 17-18 February, 2012 at Textile Engineering Division West Bengal State Centre, Kolkata.

12. Chattopadhyay, S.K., Talukdar, M.K., Choudhury, P.R. and Jena, S.K., 2012. *An Innovation Flexi-checkdam for Watershed Management, Farmers' participation and results of Field Trials.* (in) NRDC Seminar on Leveraging Inventions and

Innovations for Enhancing Productivity, held during 23-24 March, 2012 at Bombay Convention Exhibition Centre, Mumbai.

13. Gayal, S.G., Nachane, R.P., Kambli, N.D. and Kadam, R.P. - *An Eco-friendly Process Development for Enhanced Oil Extraction from Cottonseed Meal* presented at the XXI Indian Convention of Food Scientists and Technologists held at Yashwantrao Mukta Vidyapeeth, Pune on January 20 and 21, 2012.

14. Deshmukh, P.S., Nachane, R.P., Shahare, RU., Jadhav, R.K. and Chattopadhyay, S.K. - *.Banana (Musa.spp) Pseudostem Fibre Extraction - A Review* presented at the 46th Annual Convention of ISAE and International Symposium on Grain Storage held at G.B. Pant University of Agriculture and Technology, Pantnagar from February 27-29, 2012.

15. Guruprasad, R. and Chattopadhyay, S.K., 2012. *Unconventional Blends of Cotton for Added Apparel and Application.* Souvenir of National Seminar on Value Added Apparel and Home Textile from Natural Fibre : March 2012 : 1-3.

16. Nachane, R.P., Shanmugam, N., Vivekanandan, M. V. - *Banana Pseudostem Staple Fibre Spinning: Various Approaches* presented at the National Seminar on Value Added Apparel & Home Textiles from Natural Fibres held at SNDT Campus, SVT College, Mumbai on March 2 and 3, 2012.

17. Kathe, A.A., Kadam, R.P., Ragini, K.S. and Vigneshwaran, N. - *Antibacterial Finishing of Cotton Fabrics using Nano-chitosan* presented at the National Seminar on Value Added Apparel & Home Textiles from Natural Fibres held at SNDT Campus, SVT College, Mumbai on March 2 and 3, 2012.

18. Hamid Hasan, Cotton Harvest Management - *An Effective Tool to Quality Control presented at the National Seminar on Value Added Apparel & Home Textiles from Natural Fibres* held at SNDT Campus, SVT College , Mumbai on March 2 and 3, 2012.

19. Matish Chandra and Sreenivasan, S. - *Estimation of Compressibility of Cotton fibre Assembly (Lint) using Kawabata Evaluation System (KES-FB3)* presented at the National Seminar on Value Added Apparel & Home Textiles from Natural Fibres held at SNDT Campus, SVT College, Mumbai on March 2 and 3, 2012.

The following papers are presented at the World Cotton Research Conference - 5 held at Renaissance Convention Centre, Mumbai on November 7 - 11, 2011,

1. Chattopadhyay, S.K., 2011. *Growth*

of Indian Cotton Textile Industry, Souvenir of World Cotton Research Conference 5: November 2011: 114-125.

2. Chattopadhyay, S.K., Yadav, A., Kadam, V.V., Bindu, V., Upadhye, D.L., Gotmare, V.D. and Jeengar, A.K. - *Optimal Cotton Covered Jute, Nylon and Metal Core Spun Yarns for Functional Textiles - Production and Characterization.*

3. Gurjar, R.M., Patil, P.G., Shaikh, A.J. and Balasubramanya, R.H. - *Cotton Stalk: An Additional Raw Material to Board Industry.*

4. Jadhav, S.B. and Iyer, K.R.K. - *Differential Speed Setting Facility for Roller and Beater in Gins for Higher Ginning Rates.*

5. Manojkumar, T.S., Arude, V.G. and Shukla, S.K. - *Development of an Automatic Roller Grooving Machine for Making Helical Grooves on Rollers Used in Roller Ginning Machines.*

6. Nachane, R.P. - *Influence of Quality Attributes of Individual Bales on Yarn Quality.*

7. Varadarajan, P.V., Balsubramanya, R.H., Nachane, N.D., Sheela Raj and Mahangade, R.R. - *An Innovative Bio-chemical Approach for Low Energy and Less Polluting Scouring of Cotton Textiles.*

8. Venkatakrishnan, S. and Nachane, R.P. - *The Impact of Cotton Fibre Maturity on Dye Uptake & Low Stress Mechanical Properties of the Fabric.*

9. Vigneshwaran, N., Vilas Karande, Hadge, G.B., Mhaske, S.K., and Bharimalla, A.K. - *Enzyme/Zinc Chloride Pretreatment of Short-Staple Cotton Fibres for Energy Reduction during Nano-Fibrillation by Refining Process.*

The following are the abstracts of papers published in the Book of Abstracts

1. Bharimalla, A.K., Chattopadhyay, S.K. and Jadhav, R.K. - *Design and Development of Mini-Lap Preparation Machine for Micro-spinning*

2. Chattopadhyay, S.K., Yadav, A., Kadam, V.V., Bindu, V., Upadhye, D.L., Gotmare, V.D. and Jeengar, A.K. - *Optimal Cotton Covered Jute, Nylon and Metal Core Spun Yarns for Functional Textiles - Production and Characterization*

3. Gurjar, R.M., Patil, P.G., Shaikh, A.J. and Balasubramanya, R.H. - *Cotton Stalk: An Additional Raw Material to Board Industry*

4. Jadhav, S.B. and Iyer, K.R.K. - *Differential Speed Setting Facility for Roller and Beater in Gins for Higher Ginning Rates*

5. Jyoti Nath, Patil, P.G., Arude, V.G.,

Shukla, S.K. and M. Nath - *Non-Destructive Volume Prediction of Unopened Cotton Bolls by 2D-Image Analysis*

6. Mageshwaran, V., Vigneshwaran, N., Kathe, A.A. and Gayal, S.G. - *Fungal Detoxification of Free Gossypol in Cottonseed Meal under Solid State Fermentation*

7. Mahangade, R.R., Varadarajan, P.V. and Hadge, G.B. - *New Eco-Friendly Processing Technique to Modify Dye-Mordant Complex to Enhance the Colour Strength of Cotton Dyed with Natural Dyes*

8. Manojkumar, T.S., Arude, V.G. and Shukla, S.K. - *Development of an Automatic Roller Grooving Machine for Making Helical Grooves on Rollers Used in Roller Ginning Machines*

9. Matish Chandra, Nachane, R.P. - *Studies on Moisture Content in Cotton Fibre Assembly (Lint) in Relation to Variations in Temperature and Relative Humidity*

10. Meena Sharma and Nachane, R.P. - *A Simple Non-Conventional Method of Scouring Cotton Fabrics*

11. Samanta, K.K., Jassal, M., Agarwal, A.K. – *Mechanism of Plasma Reaction of 1,3 - Butadiene on Cellulosic Textile*

12. Shanmugam, N., Patil, P.G., Nachane, R.P., Pal, S.B. and Sujithraj, K. - *Business Planning and Development for Cotton Technologies : An Entrepreneurship Development Initiative*

13. Sreenivasan, S., Nachane, R.P. and Shaikh, A.J. - *CIRCOT Calibration Cotton : Standard Reference Material for Fibre Testing*

14. Sujata Saxena, Nachane, N.D. and Rajesh Narkar, R. - *Pesticide Protective Performance of Cotton Fabrics*

15. Venkatakrishnan, S. and Nachane, R.P. - *The Impact of Cotton Fibre Maturity on Dye Uptake & Low Stress Mechanical Properties of the Fabric*

16. Vijayalaxmi Udikeri, Kulkarni, V.N., Patil, S.S. and Nachane, R.P. - *A Scrutiny Fibre Properties Improvement in Indian Cotton Hybrids*

E. Other Publications

1. CIRCOT News - Vol. 13 (1) April 2010 to September 2010 and October 2010 to March 2011.

2. A Training Course on Evaluation of Cotton Quality

3. An Integrated Training Course on Double Roller Ginning Technology & Cotton Quality Evaluation

4. Booklet on Schedule of Fees for Test

5. 25 Years' of Glorious Service to the

Development of Indian Ginning Industry on the occasion of the Silver Jubilee celebration of GTC, Nagpur

6. A Souvenir released on occasion of Silver Jubilee celebration of GTC, Nagpur titled on 25 Years' of Glorious Service to the Development of Indian Ginning Industry

7. Coconut Fibre Segregator - A Novel Machine developed for Value Addition to Coconut Fibres. (Leaflet No. 66)

8. Vision 2030 - CIRCOT

9. Training Manual - National Training Course on "Nanocellulose & its Composites in Agriculture", October 10-24, 2011, published by Director, CIRCOT, ISBN:978-93-5067-060-6

10. Training Manual - National Training Course on "Synthesis and Characterization of Nanomaterials and their Application in Agriculture", Nov. 16-29, 2011.

11. Training Manual - ICAR Short Course on Application of Nanotechnology in Agriculture, January 2-12, 2012.

12. A Status Report on Natural Fibre Composites - R & D Trends in Improving Compatibility between Fibre and Matrix

13. GIS and GPS Based Spatial Cotton Fibre Quality Maps (Leaflet No. 67)

14. Plasma Processing of Textiles (in English and Hindi) (Leaflet No. 68 and 69)

15. A Flexi Check Dam Made Using Geocomposite for Efficient Use of Water. (in) Handbook of Geotextile 2012. Case Study No. 4, p 122, ISBN 978-81-7674-132-3, Bombay Textile Research Association.

16. Book of papers, National Seminar in Hindi *Naisargik Reshom mein Aadhunik Unnatiyan* held on 25th April 2011.

17. Glossary on Cotton Technology.

18. Hindi Karyanvayan ki Garimamay Uplabdhiyan.

7

List of On-Going Projects During 2011-2012

CORE AREA I : IMPROVEMENT IN GINNING OF COTTON

SI. No.	Name of the Project	Principal Investigator	Associates
1.	Engineering Intervention for Improving Energy Efficiency in Bale Presses	Shri V.G. Arude	Dr.(Smt.)J.M. Nath Shri U.D. Devikar
2.	Design and Development of Pollution Abatement System for Collection of Flying Dusts from Ginning and Pressing Halls	Shri S. K. Shukla	Dr. P.G. Patil Dr.(Smt.) J.M. Nath Shri B.V. Sirsath

CORE AREA II : IMPROVEMENT AND QUALITY EVALUATION OF FIBRE, YARN AND FABRIC

SI. No.	Name of the Project	Principal Investigator	Associates
1.	Evaluation of the Quality of Cotton Samples under the All India Co-ordinated Cotton Improvement Project	Director	Scientists and Technical Personnel
2.	Evaluation of Quality of Standard Varieties of Indian Cotton	Director	Scientists and Technical Personnel
3.	Preparation of Calibration Cotton Standards	Dr. R.P. Nachane	Scientists and Technical Personnel
4.	Standardization of Compression Molding Machine Parameters for Natural Fibre Reinforced Composite and Study of their Mechanical Properties	Shri Manik Bhowmick	Dr. S.K. Chattopadhyay Shri A. Yadav Dr. Kartick Kumar Samanta
5.	Design and Development of Portable Moisture Instrument for Cotton using Customized Sensor Designed for Fixed Volume and Uniform Packing Density	Dr. (Smt.) J.M. Nath	Shri V. G. Arude Shri S. K. Shukla Dr. S. B. Jadhav
6.	RFID Bale Tagging in Indian Ginneries	Dr. (Smt.) J.M. Nath	Shri S.K. Shukla

LIST OF ON-GOING PROJECTS DURING 2011-12

CORE AREA III : FINISHING AND DYEING OF COTTON WITH NATURAL AND ENVIRONMENT FRIENDLY AGENTS

SI. No.	Name of the Project	Principal Investigator	Associates
1.	Study on Dyeing of Cotton Fabric using Blend of Natural Dyes for Innovative Shades	Shri R.M. Gurjar	Shri R.R. Chhagani
2.	Use of Banana Pseudo-stem Sap as Mordant for Dyeing of Cotton with Natural Dyes	Dr. (Smt.) Sujata Saxena	Smt. N.D. Nachane Dr. R.R. Mahangade
3.	Surface Modification of Cotton Textiles using Nano Technology to Impart Super Hydrophobicity	Shri A. Arputharaj	Dr. N. Vigneshwaran Dr. Sujata Saxena Shri P. K. Mandhyan Shri G.B. Hadge Shri R.R. Chhagani
4.	Nano-finishing of Cotton Textile to Impart Flame Retardence and U.V. Protective Functionalities	Dr. Kartick Kumar Samanta	Dr. N. Vigneshwaran Dr. (Smt.) Sujata Saxena Dr. (Smt.) Sujata R. Kawlekar Shri Rajesh S. Narkar
5.	Utilisation of Tender Coconut Husk for Dyeing of Natural Fibre Fabric	Shri R.M. Gurjar	Dr. Sujata R. Kawlekar

CORE AREA IV : UTILISATION OF COTTON PLANT RESIDUES FOR PRODUCTION OF VALUE ADDED PRODUCTS

SI. No.	Name of the Project	Principal Investigator	Associates
1.	Microbial Degradation of Gossypol in Cotton Seed Meal	Dr. V. Mageshwaran	Dr. S.G. Gayal Dr. N. Vigneshwaran Dr. A.A. Kathe

EXTERNALLY FUNDED PROJECTS

SI. No.	Name of the Project	Funding Agency	Principal Investigator	Associates
1.	Quality Evaluation of Cotton Fibre	MM 1.1.3 (TMC)	Shri Chitranayak	Technical Officers of the QEI Division
2.	Development and Evaluation of Cleaning Machinery for Mechanically Picked Seed Cotton	(MM 2.3) (TMC)	Shri Gautam Majumdar, CICR, Nagpur	Dr. P.G. Patil

SI. No	Name of the Project	Funding Agency	Principal Investigator	Associates
3.	Development of Composite Yarns for Technical Textiles from Natural Fibre based on Friction Spinning	Inter-institutional Project with NIRJAFT, Kolkata	Dr. Syamal Kumar Dey, NIRJAFT, Kolkata	Dr. S.K. Chattopadhyay Shri Manik Bhowmick CIRCOT, Mumbai
4.	An Accelerated Process for Preparation of Bioenriched Compost from Cotton Plant Residues	Inter-institutional Project with CICR, Nagpur	Dr. Mageshwaran, V., CIRCOT, Mumbai	Dr. P.G. Patil, Principal Scientist & Head, TTD, CIRCOT Dr. Monga, Principal Scientist and Head, Sirsa Unit, CICR Shri K. Velmourgane, CICR, Nagpur Dr. P. Nalayini, Senior CICR Regional Station, Coimbatore Dr. A.A. Kathe Dr. R.D. Nagarkar Dr. Hamid Hasan Mrs. N.M. Ashtaputre, Technical Officer, CIRCOT, Mumbai Dr. S. Venkatakrishnan, Technical Officer, QEID Unit, Coimbatore Shri Shirsat, Technical Officer, GTC, Nagpur
5.	A Value Chain for Cotton Fibres, Seed, Stalks: An Innovation for Higher Economic Returns to Farmers and Allied Stake Holders	National Agricultural Innovation Project (Component 2)	Dr. R.P. Nachane, CIRCOT, Mumbai	Dr. A.J. Shaikh Shri R.M. Gurjar, CIRCOT, Mumbai Dr. Hamid Hasan, QEID Unit, Sirsa Dr. S. Venkatakrishnan, QEID Unit, Coimbatore
6.	Design and Development of Rubber Dams for Watersheds	National Agricultural Innovation Project (Component 4)	Dr. S.K. Chattopadhyay CIRCOT, Mumbai	Shri Ashok Kumar Bharimalla Shri Achchhelal Yadav, CIRCOT, Mumbai
7.	A Value Chain on Banana Pseudostem for Fibres and other Value Added Products	National Agricultural Innovation Project (Corn-ponent 2)	Dr. R.P. Nachane, CIRCOT, Mumbai	Dr. N. Shanmugam, CIRCOT, Mumbai

LIST OF ON-GOING PROJECTS DURING 2011-12

SI. No.	Name of the Project	Funding Agency	Principal Investigator	Associates
8.	A Value Chain for Coconut Fibre and its By-products: Manufacture of Diversified Products of Higher value and Better Marketability to enhance the Economic Returns of Farmers	National Agricultural Innovation Project (Component 2)	Dr. S.K. Chattopadhyay, CIRCOT, Mumbai	Shri Ashok Kumar Bharimalla Shri D.L. Upadhye Smt. Bindu Venugopal, CIRCOT, Mumbai
9.	Synthesis and Characterisation of Nano-cellulose and its Application in Biodegradable Polymer Composites to Enhance their Performance	National Agricultural Innovation Project (Component 4)	Dr. N. Vigneshwaran, CIRCOT, Mumbai	Dr. R.P. Nachane Dr. A.J. Shaikh Dr. S.G. Gayal Shri Ashok Kumar Bharimalla Shri Achchhelal Yadav, CIRCOT, Mumbai
10.	Zonal Technology Management and Business Planning & Development Unit at CIRCOT, Mumbai	National Agricultural Innovation Project (Component 1)	Dr. N. Shanmugam, CIRCOT, Mumbai	Dr. R.P. Nachane, Shri V.G. Arude, CIRCOT, Mumbai Dr. S. Venkatakrishnan, QEID Unit, Coimbatore
11.	Improvement in Cotton Quality by Plasma Nanotechnology: An Eco-friendly Approach	National Fund for Basic, Strategic & Frontier Application Research in Agriculture, ICAR	Dr. Kartick Kumar Samanta, CIRCOT, Mumbai	Dr. (Smt.) Sujata Saxena Shri A. Arputharaj Shri Manik Bhowmick, CIRCOT, Mumbai

8

IRC, RAC, IMC and QRT Meetings

Institute Management Committee Meeting (IMC)

The Seventieth and Seventy-first meeting of the Institute Management Committee were held on September 21, 2011 and February 25, 2012 respectively. Apart from, regular agenda items like confirmation of the minutes of the previous meeting and action taken on the recommendations of the previous meeting, the Heads of Divisions presented the progress of research made in the various core areas. The progress of works, and report on the Official Language Implementation were discussed in the meeting. The Seventy-first meeting was held jointly with the Members of the QRT and RAC.

Shri Suresh Chandra, Member IMC examining the fabric prepared from banana fibres along with Dr. K. K. Singh, ADG (PE)

Dr. K.K. Singh, ADG (PE) releasing the book on Glossary on Cotton Technology in Hindi

Institute Research Council (IRC) Meeting

A Half-yearly IRC meeting was held on November 17 and 18, 2011 to discuss the progress of research during April - September 2011. The following two new projects were approved with suggestions/recommendations in the project proposals.

Core Area I: Improvement in Ginning of Cotton

Design and Development of Pollution Abatement System for Collection of Flying Dusts from Ginning and Pressing Halls.

Core Area II: Improvement and Quality Evaluation of Fibre, Yarn and Fabric

Design and Development of RFID Bale Tagging and Software System for Centralised Bale Trading and Tracking Application

Annual IRC Meeting

The One Hundred and Twelfth Institute Research Council Meeting to discuss the progress made in each of the different projects under five core areas during April 2011 to March 2012 was held on March 26 and 27, 2012 at the Dr. V. Sundaram Committee Room. The following research projects were approved in different core areas.

Core Area III : Improvement and Quality Evaluation of Fibres, Yarn and Fabric

Development of Objective Fabric Handle Model for Indian Market

Core Area IV : Finishing and Dyeing of Cotton with Natural and Environment Friendly Agents

1. Use of Plant Extracts for Dyeing and Imparting Ultraviolet Protective and Antibacterial Properties to Cotton Textiles
2. Improving Interfacial Interaction of Nanocellulose with Commodity Polymers to Enhance their Performance

Core Area V: Technology Marketing

1. Impact Assessment of CIRCOT-Bajaj Cotton Pre-cleaner

Research Advisory Committee (RAC) Meeting

The Eighteenth meeting of the Research Advisory Committee (RAC) of CIRCOT was held on February 23 & 24, 2012. Besides, a combined meeting of RAC with the Chairman, QRT and Members of IMC was held on 25 February, 2012. The following were the recommendations of the RAC meeting:

Policy Issues:

1. Quality monitoring of seeds and varieties is a matter of concern

The RAC recommends that the Bt hybrid cottons developed by private seed companies should also be released through ICAR-AICCIP channel, and there should be a check-mechanism on the long term performance of already released Bt. varieties. Director, CIRCOT may take up this issue with ICAR.

2. Installation of Demo-Flexi Rubber Check dam in Maharashtra State

One of the NAIP subprojects on design and development of flexi-rubber check dam has produced a significant result in terms of saving and harvesting of rain-water, which could be used by farmers for improving the crop productivity.

While the RAC is very much appreciative of the development, it recommends that such installations should be made for demonstration in Maharashtra State, where only 13-14% of cultivated area is under irrigation.

The RAC recommends that a few demo installations be made in Maharashtra State for the benefit of farmers.

Management Issues:

1. Director, CIRCOT should depute scientists along with Dr. M.K. Talukdar, RAC Member and an expert on Technical Textiles to Dhulia and with the help of Dr. Y.S. Nerkar, another RAC member explore the option of canal lining with new film/composite materials.

If required, a research project including a demonstration canal may be taken up.

2. The RAC recommends that a suitable gin machinery manufacturer may be approached for manufacturing and marketing the rubber roller gin machine. The RAC feels that M/s. Bajaj Steel Industries, Nagpur, being the collaborator of CIRCOT and the largest gin machinery manufacturer, may be persuaded to take up commercialization of the technology. The Committee further recommends that a combined meeting of CIRCOT, M/s. Millennium Rubber Technology Pvt. Ltd., Kerala and M/s. Bajaj Steel Industries, Nagpur should be held in presence of a representative from the Engg. Division (HQ) to sort out the issues in the larger interest of the ginning industry.

3. CIRCOT should continue to act as a bridge between the cotton breeders and the textile industry. The interface needs to be strengthened further through periodic interaction between the breeders, CIRCOT and industry in matters of cotton quality. The important role played by CIRCOT in AICCIP is appreciated. The need for testing additional parameters in fibre quality in terms of end uses should be stressed in AICCIP trials.

4. Functions / Mandate specific to each Division of CIRCOT needs to be formulated.

5. Monitoring system for the activities of each Division must be put in place and the Heads of the Divisions should exercise check and control of the activities at regular intervals for increasing efficiency.

6. The technical assistance programme for the cotton sector in African countries proposed by Ministry of Commerce and Industry, Govt. of India, is to be sent to SMD, Engg. with a request to appoint a Nodal Officer from ICAR.

Research Issues:

1. Spinning of good quality yarn from coconut fibres is still a challenge. CIRCOT should continue to work on the development of a suitable spinning system for coconut fibre.

2. Production of polylactic acid from sugar beets particularly cultivated in salt affected lands, apart from corn, as a source for PLA-fibres may be attempted through an appropriate research programme.

3. In the project on the evaluation of standard varieties of cotton, feed-back from the breeders who have grown and supplied those standard varieties should be sought and monitored for effectiveness of the project.

4. In CIRCOT calibration cotton

project, there is a need for its popularization in the industry. Attempts should be made to make it a National Standard material with recognition from DST. The collaboration and interaction with the private fibre testing instrument makers should be strengthened in this matter.

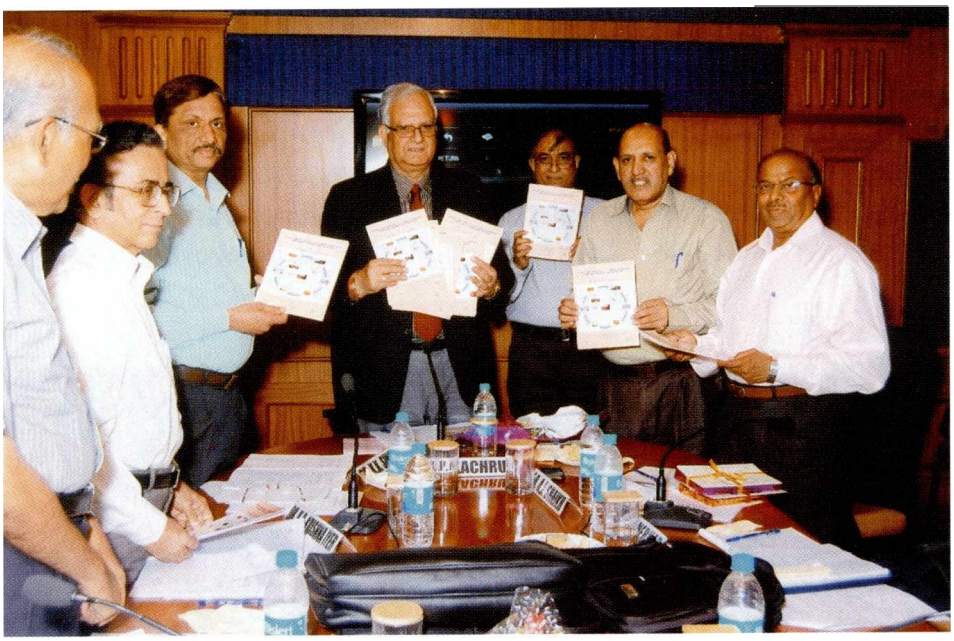
5. In the NAIP-CVC project, there is a need to create an exemplary value-chain inclusive of main and all the byproducts, so that a complete package can be established and evaluated, avoiding any segmentation. Objective-specific achievements need to be highlighted.

6. In NAIP Banana Value Chain project, the RAC appreciated the successful development of entrepreneurship by Naysari Agricultural University and CIRCOT. RAC recommends evaluation of thermal insulation and sound absorption characteristics of Non-Woven mats developed from banana fibre.

7. In all the on-going CBPD projects, the scientists should prepare complete technology profile of new processes and products including viability of newer ones, cost and scale of economy and compare them with conventional processes.

8. CIRCOT should also get regular feed-back from entrepreneurs, farmers and other stake-holders for effective monitoring of the

Dr. R.P. Kachru, former ADG (Process Engg.), ICAR and Chairman, RAC conducting the 18th RAC meeting



Dr. R.P. Kachru, former ADG (Process Engg.), ICAR and Chairman, RAC releasing the publication, ***A Status Report on Natural Fibre Composites - R & D Trends in Improving Compatibility between Fibre and Matrix***

Dr. M.K. Talukdar, Vice-President, M/s. Kusumgar Corporates and a member of RAC delivering a lecture on Technical Textiles - An Overview

transferred technologies. Impact analysis must be done by the TTD periodically.

9. R & D intervention is required to render particle board manufacture from cotton stalk more economical, commercially viable and sustainable.

10. Economics of microbial/enzyme pretreatment for additional oil recovery from Cottonseed kernel should be worked out.

Combined Meeting of IMC, RAC with Members of QRT

Quinquennial Review Team (QRT)

A Quinquennial Review Team to review the work of the Institute for the period 01-01-2007 to 31-03-2012 has been constituted by the Council with the following Members:

SI. No.	Name	Designation
1	Dr. V.M. Mayande Vice-Chancellor Dr. Panjabrao Deshmukh Krishi Vidyapeeth Krishi Nagar, Akola 444104 Maharashtra	Chairman

SI. No.	Name	Designation
2	Dr. K.R.K.Iyer Retd. Director, CIRCOT 20 "Sarini" Co-op Housing Society Sector-16-A, Plot No.17, Vashi, Navi Mumbai 400703	Member
3	Dr. V. Kumar Chief Scientist (Cotton) Naysari Agricultural University Athwa Farm Surat 395007	Member
4	Dr. S.R Shukla Professor, Textile Chemistry Institute of Chemical Technology, Matunga Mumbai 400019	Member
5	Dr. A.K Rakshit Head, Textile Manufacture Department V.J.T.I, Matunga Mumbai 400019	Member
6	Dr. P.0 Bargale Head, TTD Central Institute of Agricultural Engineering Nabi Bagh, Berasia Road, Bhopal 462038	Member
7	Dr. P.G Patil Head, TTD Central Institute for Research on Cotton Technology Matunga Mumbai 400019	Member

The following are the details of the various meeting held to finalise the report:

Meeting No.	Place and Date of Meeting	Remarks
1	New Delhi June 24, 2011	Finalising the QRT Members
2	Mumbai August 24, 2011	Planning Meeting
3	Mumbai September 28 & 29, 2011	-
4	GTC, Nagpur October 3, 2011	-
5	Surat January 10 & 11, 2012	For reviewing the work of Surat Quality Evaluation Station
6	Mumbai January 18, 2012	To finalise the structure and content of the report and to plan for the next programme
7	Mumbai February 9, 2012	Meeting of QRT Members with the Stake Holders
8	Mumbai February 25, 2012	Interactive Meet of the QRT with IMC & RAC
9	Coimbatore March 4 & 5, 2012	Reviewing the work of Coimbatore Quality Evaluation Station
10	ANGRAU, Hyderabad March 12, 2012	Reviewing the work of Guntur Quality Evaluation Station

9

Participation of Scientists/Technical Personnel in Conferences, Meetings, Workshops, Symposia, etc.

Director, Scientists and Technical Personnel of CIRCOT participated in the following scientific and technical conferences besides meetings connected with the work of this Institute.

Sr. No.	Meetings / Conferences / Seminars /Symposia, etc.	Place	Date	Participants
1.	National Seminar on All India Co-Ordinated Cotton Improvement	Hisar	06-04-2011 to 08-04-2011	Dr. R.P. Nachane Shri Chitranayak Dr. Hamid Hasan Shri P.K. Mandhayan Dr. A. Pachpinde
2.	The World Textile Conference on "Vision Textile 2020"	Mumbai	06-05-2011 to 07-05-2011	Dr. S.K. Chattopadhyay
3.	20th Hindi Seminar & Workshop	Mysore	24-05-2011 to 26-05-2011	Dr. (Smt.) Sujata Saxena
4.	Seminar on Pesticide Residue Monitoring, Studies in Agricultural Commodities	Hyderabad	18-06-2011	Dr. (Smt.) Sujata Saxena
5.	National Workshop on Nanomaterials for Energy Devices and Environment	Mumbai	17-08-2011 and 18-08-2011	Shri Achchelal Yadav
6.	National Conference on Beyond Librarianship: Creativity, Innovation and Discovery	Mumbai	16-09-2011 and 17-09-2011	Shri Deepak Meena
7.	Introductory Course on Geosynthetics	Chennai	22-09-2011	Shri Ashok Kumar Bharimalla Smt. Bindu Venugopal Shri D.L. Upadhyay
8.	Geosynthetics India '11	Chennai	23-09-2011 to 24-09-2011	Dr. S.K. Chattopadhyay
9.	E - Resources: Enhancing Learning and Research	Mumbai	23-09-2011	Shri Deepak Meena
10.	International Conference organi-sed by Federation of Indian Plywood and Panel Industry	New Delhi	23-09-2011	Shri R.M. Gurjar

Sr. No.	Meetings / Conferences / Seminars /Symposia, etc.	Place	Date	Participants
11.	IBM Software Universal 2011	Mumbai	20-10-2011	Dr. A.J. Shaikh Shri D. Radhakrishna Murthy
12.	Ashirwad Rajbhasha Seminar	Mumbai	16-11-2011	Dr. A.J. Shaikh Smt. K.R. Joshi Smt. T.P. Mokal
13.	International Conference on Plasma Processing of Organic Materials and Polymers	Kottayam	25-11-2011 to 27-11-2011	Dr. Kartick Kumar Samanta
14.	1st International Science Congress	Indore	24-12-2011 and 25-12-2011	Dr. S.K. Chattopadhyay Shri Ashok Kumar Bharimalla Smt. Bindu Venugopal Shri D.L. Upadhyay
15.	International Seminar on Value Addition in Home Textiles & Apparels	Mumbai	20-01-2012	Shri R.M. Gurjar
16.	XXI Indian Convention of Food Scientists and Technologists	Pune	20-01-2012 and 21-01-2012	Shri N.D. Kambli Shri R.P. Kadam
17.	4th Meeting of the Task Force for Special Tests	New Delhi	13-02-2012	Dr. A.J. Shaikh
18.	53rd Joint Technological Conference	Mumbai	17-02-2012 and 18-02-2012	Dr. R. Guruprasad Shri Manik Bhowmick
19.	Healthcare India 2012	Mumbai	20-02-2012 to 23-02-2012	Dr. Kartick.Kumar Samanta
20.	46th Annual Convention of ISAE and International Symposium on Grain Storage	Pantnagar	27-02-2012 to 29-02-2012	Shri P.S. Deshmukh
21.	National Seminar on Value Added Apparel & Home Textiles from Natural Fibres	Mumbai	02-03-2012 and 03-03-2012	Scientific and Technical Staff, CIRCOT
22.	Rajbhasha Seminar	Auranga bad	16-03-2012	Smt. K.R. Joshi

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Workshops, Seminars, Summer Institutes, Farmers' Day, etc. Organised by CIRCOT

National Seminar in Hindi: A National Seminar in Hindi titled ***Naisargik Reshon Mein Aadhunik Unnatiyan*** was held at CIRCOT on April 25, 2011. This was organized jointly by CIRCOT and Directorate of Cotton Development, Ministry of Agriculture. The seminar was inaugurated by Shri Suresh Kotak, Chairman, M/s. Kotak & Co. There were three technical sessions in which 12 papers were presented.

Shri Suresh Kotak, Chairman, M/s. Kotak & Co. during the inaugural speech. Dr. Sujata Saxena, Sr. Scientist, CBPD, Dr. S.M. Kolhatkar, Deputy Director, Cotton Development Board, Dr. A.J. Shaikh, Director, CIRCOT and Dr. R.P. Nachane, Head, QEID, CIRCOT

Official Language Celebration

The Hindi Pakhwada (Fortnight) was celebrated during September 14-27, 2011. Dr. Vishnu Sarvade, Head of Hindi Department, Mumbai University was the Chief Guest at the inaugural function on Sept 14, 2011. Various competitions

were organised during the period. A poster presentation was also organised on the subject, Fiber 2 Fashion.

On the concluding day, Dr S.S. Magar, former Vice Chancellor, Dr Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli was the Chief Guest. The concluding day programme was telecast on Sahyadri channel of Doordarshan under the segment, "Mumbai Amchi Mumbai".

The following were the winners of the poster presentation:

I Prize	Shri Manoj Ambare
II Prize	Smt. Manisha Kurhade
III Prize	Shri Anand Jadhav

Dr. S. Sreenivasan, Former Director, CIRCOT addressing the audience. Dr. P.G. Patil, Head, TTD, Dr. A.J. Shaikh, Director, CIRCOT, Dr S.S. Magar, former Vice Chancellor, Dr Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dr. Vishnu Sarvade, Head of Hindi Department, Mumbai University and Dr. R.P. Nachane, Head, QEID, CIRCOT

Vigilance Awareness Week Celebration

The Vigilance Awareness Week was celebrated at the Institute from October 31 to November 5, 2011. Dr. A.J. Shaikh, Director, CIRCOT inaugurated the function by administering an oath on vigilance to all staff members. Shri S. Govardhan Rao, Head, Personnel Department, BARC, Mumbai delivered a talk on, **Spreading of Corruption in India.** An essay competition was organised on the topic, **Participative Vigilance** in three languages. The following are the winners of the essay competition:

Hindi	I Prize	Smt K.R. Joshi
	II Prize	Shri Chitranayak Sinha
Marathi	I Prize	Shri S.N. Bandre
	II Prize	Smt H.R. Pednekar
English	I Prize	Smt Bindu Venugopal
	II Prize	Smt. V.V. Desai

World Cotton Research Conference (WCRC - 5)

Central Institute for Research on Cotton Technology (CIRCOT) in collaboration with the International Cotton Advisory Committee, Washington, DC, USA, Indian Society for Cotton Improvement (ISCI), and Indian Council of Agricultural Research (ICAR) organized the World Cotton Research Conference at the Renaissance Convention Centre, Powai, Mumbai from November 7 - 11, 2011. The theme of the conference was **Technologies for Prosperity.**

Shri Sharad Pawar, Hon'ble Union Minister of Agriculture and Food Processing Industries was the Chief Guest at the inaugural function. Shri Vilasrao Deshmukh, Hon'ble Minister of Science and Technology & Earth Sciences was the Special Guest, Dr Terry Townsend, Executive Director, ICAC, Dr. S Ayyappan, Secretary, DARE and Director General, Indian Council of Agricultural Research and Shri A B Joshi, Textile Commissioner were the Guests of Honour.

Shri Sharad Pawar, reviewed the progress of cotton research and development in India aligning it with the perspectives on global status of cotton. He drew the attention of audience towards the sustainability issues of new technologies and offered full support of the government for cause of cotton research in the country.

Shri Vilasrao Deshmukh, reiterated full cooperation from the Department of Biotech in regulatory process of biotech crops. He emphasized the need to use the latest technologies for growth of cotton and stated the commitment of Government of India for promotion of biotechnology.

Dr. Terry Townsend, Executive Director, ICAC, welcomed the guests and explained the purpose of organizing WCRC since 1994, and its beneficial effects on dissipation and knowledge sharing about cotton research world over. He briefed about the previous four conferences held at an interval of four years starting from 1994 in Australia, Greece (1998), South Africa (2003) and USA (2007).

Dr. S Ayyappan, Secretary, DARE and Director General, Indian Council of Agricultural Research, New Delhi, the main organization collaborating in the WCRC-5 welcomed the guests on behalf of the apex agricultural research organization. He complemented the

Shri Sharad Pawar, Hon'ble Union Minister of Agriculture and Food Processing Industries lighting the lamp to mark the inauguration of the World Cotton Research Conference. Shri Vilasrao Deshmukh, Hon'ble Minister of Science and Technology & Earth Sciences, Dr. Terry Townsend, Executive Director, ICAC and Dr. C.D. Mayee, Chairman, National Organizing Committee (from left to right) are also seen

national organizing committee for their massive efforts, and briefed about the current focus of ICAR in cotton research.

Shri A.B. Joshi, Textile Commissioner, who represented Textile Ministry, explained the role of textile sector in the Indian economy and emphasised about the current areas of post harvest research which needs more focus.

Dr C.D. Mayee, Chairman, National Organizing Committee, welcomed all the guests and pointed out the significance of holding WCRC-5 in Mumbai for the first time. During the inauguration, a book of abstracts, Souvenir and a CD containing the full papers were released.

The poster session was inaugurated by Dr S. Ayyappan on the inaugural day, i. e., 7th November 2011. A total of 175 posters were displayed. A wide range of topics on cotton biotechnology, improvement, production and protection, social issues and economics of cotton, post harvest fibre processing, value addition and textile production were covered in the poster sessions.

Four different technical sessions covering a wide array of topics were organized in WCRC-5. They were,

1. Panel Discussions - Three
    a. GM Cotton (Seven panelists)
    b. °Insecticides: What next?' (One lead speaker and six panelists)
    c. 'Fiber quality: Textile needs' (One lead speaker and seven panelists)
2. Plenary Lectures - Eleven plenary speakers presented on varied topics.
3. Concurrent Sessions (five sessions each in six technical theme areas were organised concurrently thus totaling 30 concurrent sessions with 150 speakers)
4. Special session -Two
    a. International Cotton Genome Initiative (three speakers)
    b. Cotton Mechanization (three speakers)

A total of 146 speakers presented their work. There was active participation and healthy discussion in each session. The books and CDs brought out during the occasion were:

1. The Abstracts Book: 322 abstracts (150 oral presentation abstracts and 172 poster presentations).
2. Proceedings, Book of full papers: 92 full papers of the 150 oral presentations
3. Souvenir: 17 articles by Indian scientists describing Indian cotton scenario
4. CD of abstracts and papers
5. CD of conference photographs
6. DVD of Inaugural session, plenary presentations, special sessions and panel discussions.

Recommendations

1. The important and emerging areas of scientific cottonseed processing for extraction of oil, linters and hulls have to be included in the future World Cotton Research Conferences for discussion at the global level.
2. For international trade and effective utilization of cotton, it is essential that all fibre parameters be determined in such a way that they are universally accepted. This requires uniformity in testing among all laboratories / institutions / test houses engaged in cotton testing across the globe. Use of calibration cotton standards for instrument calibration is an absolute requirement for this purpose. Besides USDA calibration cotton, CIRCOT is also producing calibration standards which are *on par* with USDA standards and can be utilized by all testing laboratories.
3. Technologies developed for utilization of cotton by-products

like particle boards, bio-degradable products for packaging and other uses, must be refined and commercialized and should reach to the prospective entrepreneurs. This will not only provide additional income to cotton farmers, but will also help in generation of employment.

4. Mechanization of cotton harvesting needs to be taken up on priority.

5. Double roller ginning technology with appropriate material handling is suitable to gin cottons having varied staple lengths in a gentle way which preserves the fibre quality. This technology is economically viable and highly suitable for Afro-Asian countries and also suitable for other countries. Hence, efforts should be made to popularise the same.

6. Environment friendly technologies like collection of dust in ginning, bio chemical approach for scouring of cotton and blended textiles needs to be popularized to prevent health hazards to workers and to protect the environment.

7. Creation of trained man power in cotton quality evaluation, ginning technology and by-product utilization is required particularly in Afro-Asian countries through establishing training centres/ schools and organizing awareness programs in these countries.

8. A committee to be constituted to form uniform norms for bale standards throughout the world as it will help in preserving the lint quality, economy in processing, handling and transportation to long distance.

9. Efforts should be taken to enhance the share of cotton in textiles for sustainable growth of cotton.

Qaumi Ekta Week Celebration

The Qaumi Ekta Week was celebrated at the Institute and at various Quality Evaluation Units during November 19 - 25, 2011, The staff members were administrated an oath on Quami Ekta as part of the celebration. The Flag Day was observed on November 25, 2011. The staff members contributed towards rehabilitation of physically handicapped children. An essay competition was organised on the topic, **Unity in Diversity — India's Identification** in Hindi, Marathi and English. The following are the winners of the essay competition:

Hindi	I Prize	Shri Chitranayak Sinha
	II Prize	Smt K.R. Joshi
Marathi	I Prize	Shri S.N. Bandre
	II Prize	Shri D.M. Raje
English	I Prize	Smt. Bindu Venugopal
	II Prize	Smt V.V. Desai

CIRCOT Foundation Day

As per the Directives from the Council, the foundation day of CIRCOT was celebrated on December 3, 2011. It was recalled that the foundation stone for the Indian Central Cotton Committee Technological Laboratory which was later known as Cotton Technological Research Laboratory (CTRL), and then as CIRCOT was laid by His Excellency Rt. Hon. Rufus Daniel Isaacs, Earl of Reading, Viceroy and Governor General of India on December 9, 1924. A plaque commemorating the above was put up then, in the present day Mechanical Processing Division. Today this Institute is named as CIRCOT. A traditional puja was performed at this location on the foundation day.

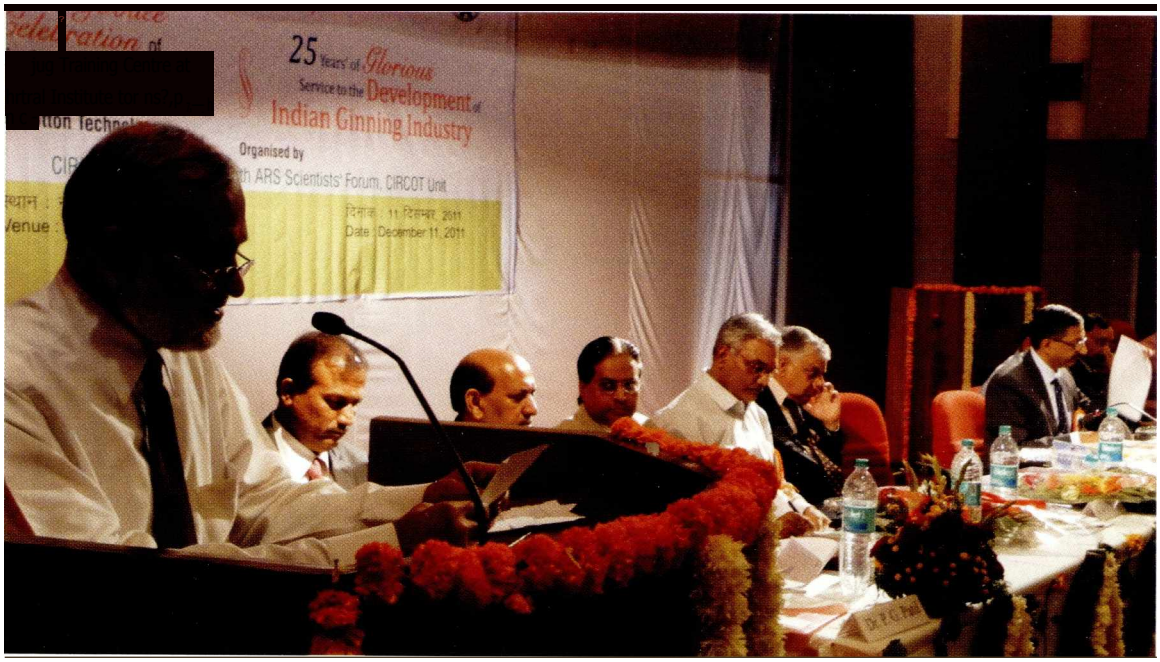
Shri H.R. Laxmivenkatesh, retired Technical Officer of MPD gave a presentation on the history of CIRCOT, highlighting the significant changes that have taken place over the years. Interesting aspects of CIRCOT were revealed to the present generation of staff members by Shri Laxmivenkatesh through his talk. Shri S.N. Salve, Assistant Administrative Officer delivered a talk on History of CIRCOT and ICAR in which he highlighted the research activities of the institute. The lectures were followed by cultural programmes.

Dr. A.J. Shaikh, Director, CIRCOT performing traditional Puja at the Mechanical Processing Division

Silver Jubilee Celebration of Ginning Training Centre, Nagpur

The Ginning Training Centre (GTC), Nagpur celebrated its Silver Jubilee on December 11, 2011. Dr. S Ayyappan, Secretary, DARE and Director General, Indian Council of Agricultural Research, New Delhi was the Chief Guest during the occasion. During his speech, he emphasized that GTC should be business oriented and must work on the three Ps (Prestige, Profit, and Partnership). Dr. Ayyappan stressed on having better R&D in ginning industry with increase in ginning efficiency. He expressed his vision on converting the Ginning Training Centre into an International organisation of repute.

Dr. M.M. Pandey, DDG (Engg.), ICAR presided over the function which was attended by around 125 participants from R&D Institutes, Trade & Industry. Shri A.B. Joshi, Textile Commissioner, in his address, expressed satisfaction that India is leading in ginning technology, but opined that an improvement in weaving technology is needed. He was appreciative of the bale tagging technology developed by GTC and promised to use it to trace every single cotton bale. Dr. C.D. Mayee, former Chairman, ASRB urged the particle board industry to adopt the technology of particle board manufacturing from cotton plant stalks. Shri M.K. Sharma, President, BSI, Dr. C.S. Prasad, Vice Chancellor, MAFSU and Dr. V.M. Mayande, Vice Chancellor, PDKV also addressed the gathering.



Dr. S Ayyappan, Secretary, DARE and Director General, Indian Council of Agricultural Research, New Delhi during the key note address

Workshop on Zonal Technology Management (ZTM) & Business Planning and Development (BPD)

ZTM-BPD conducted a workshop on January 13 and 14, 2012 for the ITMU members of the west zone institutes. Twenty nine participants from 14 institutes of west zone attended the workshop. All scientists and senior technical officers of CIRCOT also attended the workshop. Industry representatives from various fields were also invited to take a glimpse of the ICAR technologies exhibited in the workshop.

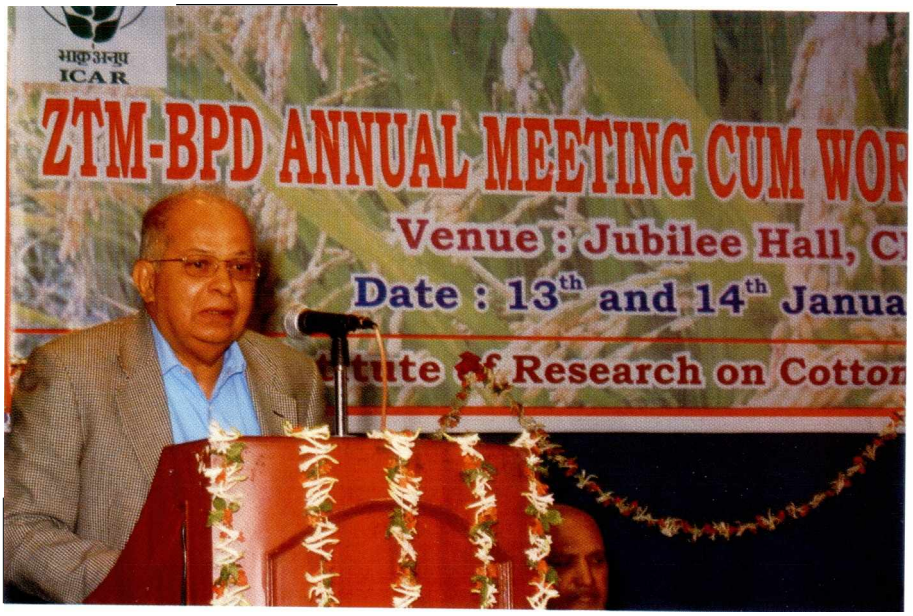
The Chief Guest of the Inaugural session was Dr. Dilip Nachane, Chancellor, Central University of Manipur and Professor Emeritus, Indira Gandhi Institute of Development & Research, and the Guests of Honor were Dr. S. Mauria, ADG. (IP &TM), ICAR and Dr. (Mrs.) R. Kalpana Sastry, Head, ARSMP Division, NAARM, Hyderabad. Dr. Dilip Nachane in his inaugural address shared his thoughts and experiences on IP issues in general. Dr. *S. Mauria gave an account of* steps taken for introducing intellectual property rights (IPR) regime in ICAR system and emphasized on the need to introduce professionalism and transparency in the technology management strategy to be adopted in future.

Dr. A. J. Shaikh, Director, CIRCOT welcomed the participants and appreciated the efforts put by Dr. S. Mauria, for creating awareness about Intellectual Property and Technology Management amongst ICAR institutes.

On January 14, 2912, Prof. C. Amarnath, P.I., Society for Innovation and Entrepreneurship, IIT, Mumbai gave a talk on the work carried out by the society and his experiences.

The workshop had three Technical Sessions. The following recommend-ations emerged from the discussions in the three sessions:

- There is need for professional approach in commercialization of technologies.
- Extensive efforts for reaching the industries should be made by organising Specific Industry Meets and Regional Industry Meets.
- Clear differentiation between incubation and commercialization should be maintained.
- Since there is no specific way to go about incubation, it should be in the institute's domain to decide the course of action in terms of timeline and financial matters.
- A patent should be applied to claim the ownership of a technology, regardless of its commercial potential.
- ITMUs are given the right to judge a technology and decide the further course of fees and royalty.



Dr. Dilip Nachane, Chancellor, Central University of Manipur and Professor Emeritus, Indira Gandhi Institute of Development & Research and Chief Guest during his address

- ITMU presentations in the workshop should be strictly restricted to related activities only.
- Model formats for MoAs and MoUs should be considered as guidelines only and should be modified as per the need.

The workshop ended with a Vote of Thanks by Shri R. M. Gurjar, Principal Scientist, CIRCOT. The workshop was covered by the Doordarshan team, and a two minute clip was broadcasted in the Mumbai Vrutant segment.

National Science Day Celebration

The National Science Day was celebrated on February 28, 2012. This day signifies the discovery of Raman Effect by the Indian Physicist and Nobel Laureate Sir C.V. Raman. A talk, **Nano-technology for Human Welfare,** was delivered by Dr. Kartick Samanta, Scientist, CBPD Division at CIRCOT Jubilee Hall.

International Women's Day

CIRCOT celebrated the International Women's Day on March 14, 2012. On this occasion, Dr. Kavita Anand from the Department of Preventive Oncology, Tata Memorial Hospital, Mumbai was the chief guest. She gave a talk on the various type of cancer affecting women. She laid emphasis on periodic medical checkups for preventing the occurrence of cancer. Women staff members who won the prizes in the ICAR Zonal Sports were also felicitated during the occasion.

Dr. Kavita Anand delivering a lecture on the occasion of the International Women's Day

Coconut Fibre Workshop

A workshop under the Component II NAIP subproject, **A Value Chain for Coconut Fibre and its Byproducts: Manufacture of Diversified Products of Higher Value and Better Marketability to Enhance the Economic Returns of Farmers** was held at CIRCOT on March 17, 2012. The workshop was attended by all the consortium partners and the CAC Members.

Lectures

During the year under report, the following lectures were delivered by outside experts and staff members of CIRCOT.

1. IPR As Practiced in Michigan State University, USA by Dr. R.P. Nachane, Principal Scientist on May 19, 2011.
2. Application of Nanotechnology in Agriculture by Prof. K.S. Subramanian, Head, Department of Nanoscience and Technology, Tamil Nadu Agricultural University, Coimbatore on November 19, 2011.
3. Presentation in connection with the visit to attend the EMRC Agribusiness Forum 2011 at Johannesburg, South Africa by Dr. N. Shanmugam, Sr. Scientist, CIRCOT on November 23, 2011.
4. Education and Research Activities in Department of Food Science at Rutgers University by Dr. Qingrong

Shri N. Venugopal, Director and Advisor, M/s. Allepy Co. Ltd., and Kerala Balers Ltd. and Member, CIC examining the Coconut Fibres

Huang, Associate Professor, Department of Food Science, Rutgers University, NY, USA on November 24, 2011.

5. Sharing Experiences - About Managing Innovations in Textiles, gleaned from International conference at Textile Institute, Manchester U.K, by Dr. S.K. Chattopadhyay, Principal Scientist on January18, 2012.

6. Technical Textiles- An Overview, by Dr. M.K. Talukdar, Vice-President, M/s. Kusumgar Corporates and Member, CIRCOT-RAC, on February 23, 2012.

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Distinguished Visitors

1. Shri S.K.G. Rahate (IAS), Joint Secretary (M&T), Ministry of Agriculture, Govt. of India on April 29 & 30, 2011.

2. Shri S.M. Kolhatkar, Jt. Director, Directorate of Cotton Development, Mumbai on April 25, 2011.

3. Delegation from Mozambique comprising of Mr. Calisto A.L.F. Bias, National Director of National Institute of Agricultural Research; Mr. Norberto Mahalambe, Director of Institute of Wheat; Mr. Jose Gasoar, National Director of Agraria Extension; Ms. Olga Mulima, Member of Cabinet of Minister of Agriculture on July 7, 2011.

4. Dr. K.P. Gore, Vice-Chancellor, MAU, Parbhani on August 9, 2011.

5. Shri Atanu Purkayastha, Joint Secretary, Department of Agriculture and Cooperation (DAC), Govt. of India, Krishi Bhavan, New Delhi on September 22, 2011.

6. Dr. S. Ayyappan, Secretary, DARE and DG, ICAR for an interaction with the Scientists regarding the preparation of the XII Plan on October 30, 2011.

7. Dr. Greg Holt, USDA, USA to GTC Nagpur on November 13, 2011.

8. A group of 40 WCRC-5 delegates from 12 countries visited GTC, Nagpur on November 13, 2011.

9. Dr. M. M. Pandey, DDG, ICAR, Dr. R. P. Kachru, Former ADG and Former Directors of CIRCOT, Mumbai visited GTC, Nagpur on Dec 11, 2011 on the occasion of Silver Jubilee function.

10. Dr. R. Ramani, Director, Indian Institute of Natural Resins & Gums, Namkum, Ranchi visited GTC, Nagpur on December 21, 2011.

11. Mr. Fermon Joseph, Chairman of the Board of Chief Executive Office, USA visited GTC, Nagpur on January 9, 2012.

12. Dr. V.M. Mayande, Vice-Chancellor, PDKV, Akola on February 25, 2012.

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Infrastructural Facilities

Library: The CIRCOT Library has been continuously upgrading its holdings of books, journals and electronic resources to provide state-of-the-art information related to research work undertaken by this institute.

CIRCOT Library is the source of up-to-date coverage on Cotton, Fibre Testing, Cellulose & Composites, Cotton Technology, Textile Finishing, Patents & Intellectual Property and Entrepreneurship.

During the year 2011-12, CIRCOT Library subscribed to 19 Foreign and 17 Indian journals with print and online access. One hundred and sixty-one books have been purchased utilizing the Institute and project funds. The Library books holding has reached to 7424 as on March 31, 2012. The Library renewed its annual subscription to Online / CDROM databases such as BIS standards (Textiles), ASTM standards (Textiles), AATCC Test Methods, TAPPI Paper & Pulp Standards, WORLD TEXTILES, TEXTILE TECHNOLOGY COMPLETE, INDIA PATENTS, TOTAL PATENTS along with PATENT OPTIMIZER.

The Library has acquired Annual Institutional membership of ASTM, AATCC and TAPPI associations. This has enabled library users to have 24x7 accesses to journals' archives and other technical literatures. Being a member of CeRA consortia of ICAR, the library can access full text research articles of more than 2000 international journals and annual reviews at http://www.cera.jccc.in . The Library has received and delivered 151 CeRA-Document Delivery Requests spontaneously, either online or by emailing scanned copies of the required articles.

An amount of Rs. 30,75,485/- has been utilized from the Institute Plan funds and funds from diferent externally aided projects operating in the Institute. CIRCOT library caters not only to the needs of its staff members but also to other researchers and students.

In the reporting period, the following major instruments were also procured:

1. Low stress mechanical properties-tensile and shear tester KES-FB-1

2. Low stress mechanical properties-compression tester KES-FB-3

3. Temperature controlled Orbital Shaker
4. Laboratory model Compact Ring Spinning Machine
5. Non-contact digital thermometer
6. Digital Moisture Meter
7. Cryo crusher
8. Audio Video arrangement
9. AATCC Chromatic transparent Scale
10. Analytical balance
11. Projection microscope
12. Conditioning unit (Controller)
13. BOD and COD Analyser
14. Horizontal tensile strength tester
15. Test tube sonicator
16. pH meter

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Personnel

Major events during 2011 - 2012 relating to CIRCOT personnel are listed below:

A. APPOINTMENTS

Scientist

1. Dr. P.G. Patil, M.Tech. (Post Harvest Engg.), Ph.D. as Head, TTD, w.e.f. 29-04-2011 (FN).
2. Kum. Leena Kumari, M.Sc. (Electronics & Instrumentation), Scientist, w.e.f. 05-09-2011.
3. Shri Krishna Prasad Guru Swami, Scientist, w.e.f. 23-12-2011.
4. Shri Prabu G.T.V., Scientist, w.e.f. 23-12-2011.
5. Shri T. Sentil Kumar, Scientist, w.e.f. 23-12-2011.
6. Smt. Veda Krishnan, Scientist, w.e.f. 24-12-2011.
7. Shri Santanu Basak, Scientist, w.e.f. 27-12-2011.
8. Shri Shekhar Das, Scientist, w.e.f. 27-12-2011.
9. Dr. Debasis Banerjee, Scientist, w.e.f. 09-01-2012.

Technical

1. Shri Yogesh Nagpure, Technical Assistant (T-1), w.e.f. 05-04-2011.
2. Shri Anand Jadhav, Technical Assistant (T-3), w.e.f. 19-04-2011.
3. Shri Deepak Meena, Technical Assistant (T-3), w.e.f. 09-05-2011.
4. Shri Krishna Bara, Technical Assistant (T-3), w.e.f. 11-05-2011.

Administrative

1. Shri Yogesh Ram Pathare, Assistant Administrative Officer, w.e.f. 09-03-2012 (FN).

B. PROMOTIONS

On the recommendations of the Departmental Promotion Committee, the following personnel were promoted to the next higher grade pay.

SI. No.	Name	Post to which Promoted	Effective Date of Promotion
Technical			
1.	Shri S.L. Bhanuse	Technical Officer T-6	18-07-2009
2.	Shri K. Narayanan	,,	17-05-2010
3.	Shri S.V. Kokane	,,	07-08-2010
4.	Dr. R.R. Mahangade	,,	17-08-2010
5.	Smt. P.S. Nirali	,,	20-11-2010
6.	Shri P.N. Sahane	,,	26-02-2010
7.	Kum. C.P. D' Souza	Technical Officer T-5	30-06-2009
8.	Shri R.S. Narkar		29-07-2009
9.	Smt. P.R. Mhatre	,,	,,
10.	Shri N.D. Kambli	Senior Technical Assistant T-4	28-12-2010
11.	Shri M.G. Ambare	,,	01-08-2010
12.	Smt. V.G. Udikeri	,,	04-08-2010
13.	Shri B.V. Shirsath	,,	10-09-2011
14.	Shri S. N. Patil	,,	07-07-2010
15.	Shri R.P. Kadam	Technical Assistant T-3	29-06-2009
16.	Smt. M.P. Kamble	,,	16-10-2009
17.	Shri M.B. Chandanshive	,,	01-01-2007
18.	Shri G.S. Deorukhkar	,,	23-11-2009
19.	Shri B.R. Jadhav		23-11-2009
20.	Shri A.R. Bane	,,	23-11-2009
21.	Shri G.G. Ambare		23-11-2009
22.	Shri Sanwarlal Saini	Technical Assistant T-2	02-06-2010
23.	Shri S.V. Kokane		02-06-2010
24.	ShriMahabir Singh	,,	22-02-2010
Administrative Staff			
1.	Shri A.B. Dalvi	Assistant Administrative Officer	15-03-2012
2.	Shri D.G. Kulkarni	,,	15-03-2012
3.	Smt. V.V. Desai	,,	15-03-2012

C. TRANSFER

Scientist

1. Shri Vishnu Govind Arude, Scientist (Sr. Scale) transferred from GTC, Nagpur to CIRCOT, H.Q. w.e.f. 20-11-2011.
2. Dr. R. Guruprasad, B.E., M.Tech. (Textile Manufacture), Ph.D., Scientist transferred from NIRJAFT, Kolkatta to CIRCOT HQ. w.e.f. 02-12-2011.
3. Kum. Leena Kumari, M.Sc. (Electronics & Instrumentation), Scientist, from CIRCOT, Mumbai to Central Institute of Post-Harvest Engineering and Technology (CIPHET), Ludhiana w.e.f.17-12-2011.

Technical

Shri U.D. Devikar, Technical Officer T-6 transferred from GTC, Nagpur to CIRCOT, H.Q. w.e.f. 17-11-2011.

Administrative

Smt. T. Padmavathi, Administrative Officer from Regional Station, CIFE (Kakinada) to CIRCOT, Mumbai w.e.f. 06-04-2011.

D. RETIREMENT

Scientific

1. Dr. S.G. Gayal, Principal Scientist and 1-.-lead, CBPD retired on April 30, 2011.
2. Shri K.H. Sawakhande, Scientist (Sr. Scale) retired on April 30, 2011.
3. Dr. S.B. Jadhav, Scientist (S.G.) retired on July 31, 2011.
4. Dr. S. Sreenivasan, Principal Scientist retired on September 30, 2011.

Technical

1. Shri G.G. Ambare, Technical Assistant T-2 retired on May 31, 2011.
2. Dr. E.A. Pachpinde, Technical Officer T-6 retired on August 31, 2011.
3. Shri Sanwarmal Saini, Technical Assistant T-2 retired on August 31, 2011.

Administrative

1. Smt. S.D. Ambre, Assistant retired on July 31, 2011.
2. Shri B.D. Sawant, Assistant Administrative Officer retired on August 31, 2011.
3. Shri K.W. Khamkar Assistant Administrative Officer retired on February 29, 2012.

Skilled Supporting

1. Shri R.B. Jadhav, Skilled Supporting Staff retired on June 30, 2011.
2. Smt. T.V. Bhowar, Skilled Supporting Staff retired on February 29, 2012.

E. RESIGNATION

1. Shri A.P. Modak, Sr. Technical Assistant, w.e.f. 01-07-2011.
2. Shri A.K. Chaphekar, Sr. Technical Assistant, w.e.f. 01-08-2011.

F. OBITUARY

Shri M. G. Bhandakkar, Skilled supporting staff Gr.I expired on 15-02-2012.

G. TRAINING

SI. No.	Name of the Training Programme	Period and Place	Participant(s)
1.	Record Management for ITI	April 18 - 21, 2011 New Delhi	Shri K.W. Khamkar
2.	Technical Assistance Programme for Creating Sustainable Textile & Apparel Value chain in Cotton	April 28, 2011 New Delhi	Dr. S.B. Jadhav
3.	MDI on Policy & General Management	Sept. 5 - 16, 2011 Gurgaon	Dr. Hamid Hasan
4.	Computer Training (Microsoft Office Access)	Sept. 28 - 30, 2011 New Delhi	Shri S.V. Kasabe Shri R.K. Pallewad SmtJ.R. Chavkute Shri S.N. Bandre
5.	Effective Enhancement Programme for Women Technologists and Scientists	January 16 - 20, 2012 Goa	Smt. Bindu Venugopal
6.	NABL Training Programme on Accreditation of Laboratories	March 26 - 29, 2012 Jaipur	Dr. Hamid Hasan

H. DEPUTATION ABROAD

1. Dr. S. B. Jadhav, Sr. Scientist visited C4 countries (Chad, Burkina Faso, Benin and Mali) as part of the Technical Assistance Programme for Creating Sustainable Textile and Apparel Value Chain in Cotton in C - 4 Countries, May 2-14, 2011.

2. Dr. P.G. Patil, Head, Transfer of Technology visited Cornell University, Ithaca, New York to attend the Food & Agri. Business Management Programme, July 6 - 14, 2011.

3. Dr. A.J. Shaikh, Director, CIRCOT attended the 70th Plenary Meeting of the International Cotton Advisory Committee at Argentina, September 4 - 10, 2011.

4. Dr. N. Shanmugam, Sr. Scientist visited Johannesburg, South Africa to attend the EMRC Agribusiness Forum 2011, October 16 - 20, 2011.

5. Dr. S.K. Chattopadhyay was deputed to present a paper titled **A Novel Flexi-Check Dam Made using Technical Textile for Efficient use of Water in Agriculture** at the International Conference on Managing

Innovation in Textiles held on 30-11-2011, organized by the Textile Institute, International Head-quarters, Manchester, United Kingdom.

I. ACCOLADES

ASHIRWAD, a Literary-Socio-Cultural Organisation, Mumbai awarded the 20th Ashirwad Rajbasha Gourav Puraskar to Dr. A.J. Shaikh, Director, CIRCOT for improving the use of Hindi in the Institute. Dr. (Smt.) Sujata Saxena, Sr. Scientist, CIRCOT was awarded by ASHIRWAD for carrying out best work in Hindi at the Institute for the year 2010-11. Both the awards were presented on November 16, 2011.

Dr. Sudha Tiwari, Technical Officer was awarded Satyen Bose first prize for her article *Kisano Ki Aas: Jinvansh Kapas.* This article was presented at the 28th All India Scientific and Technical article competition organized by the Kendriya Sachivalaya Hindi Parishad, New Delhi. Shri Prakash Jaiswal, Hon'ble Union Minister, Ministry of Coal, Govt. of India awarded a memento and a certificate at a function organised at the Teen Murthi Bhavan, New Delhi on September 8, 2011.

ICAR Inter-Institutional Sports Tournament

The ICAR Inter Zonal Tournament was held at CRIJAF, Barrackpore from January 16 - 19, 2012. Shri Chitranayak Sinha was the *Chief-de-Mission.* The institute was represented by Shri S.K. Parab (Carrom), Smt. S.D. Dudam (Discuss Throw), Smt. T.T. D'Souza (200 m) Race & Javelin Throw) and Smt. H.R. Pednekar (Chess).

The ICAR Inter Zonal sports for the west zone was held at CAZRI, Jodhpur during February 13 - 17, 2012. A sports contingent of 44 personnei participated in the event along with Shri K.W. Khamkar, *Chief-de-Mission,* Dr. R.D. Nagarkar and Shri Chitranayak Sinha as the Managers. The following were the winners in various events.

Shri Yogesh Nagpure	First in 1500 m, 800 m
Shri R. S. Prabhudesai	First in Chess
Shri D.N. Moon	Second in Chess
Smt. Kiran Joshi	Second in Chess
Smt. Prachi Mhatre	Second in Badminton Singles (Women)
Dr. R. D. Nagarkar	Second in TT (Men)
Dr. S.J. Guhagarkar	Second in TT (Men)
Shri Manoj Ambare	Second in TT (Men)
Shri H.S. Koli	Second in TT (Men)
Shri P. V. Jadhav	Second in TT (Men)
Shri D.M. Raje	Consolation Prize (Cycle Race-5000 m)

STAFF WORKING AT THE CENTRAL INSTITUTE FOR RESEARCH ON COTTON TECHNOLOGY AS ON 31-03-2012

(List does not include vacant posts)

LIST OF STAFF AT THE HEADQUARTERS

Scientific Personnel

Director

Dr. A.J. Shaikh, M.Sc., Ph.D.

Principal Scientist & Head of Division

1. Dr. S.K. Chattopadhyay, B.Sc.Tech.(Text.), M.Tech.(Text.Engg.), Ph.D.(Tech.), F.T.A., C.Engg., F.I.E.
2. Dr. P.G. Patil, M.Tech. (Post Harvest Engg.), Ph.D.

Principal Scientist & Head of Division (Acting)

1. Dr. R.P. Nachane, M.Sc., Ph.D., F.T.A., C.Text., F.T.I.
2. Shri R.M. Gurjar, M.Sc.

Senior Scientist

1. Dr. (Smt.) Sujatha Saxena, M.Sc., Ph.D.
2. Dr. N. Shanmugham, M.Tech., MIE, D.T.T., C.Eng., Ph.D. (Tech.)

Scientist (Sr. Scale)

1. Shri Vishnu Govind Arude, M.Tech. (Agril. Engg.)
2. Dr. N. Vigneshwaran, M.Sc. (Agri.), M.B.A., Ph.D.
3. Shri Chitranayak, AMIETE., M.Tech. (Electronics)
4. Shri Ashok Kumar Bharimalla, M.Tech. (Agril. Engg.)

Scientist

1. Shri Achchhelal Yadav, M.Sc.
2. Shri Virendra Prasad, M.Sc.
3. Shri C. Sundaramoorthy, M.Sc. (on study leave)
4. Shri P. S, Deshmukh M. Tech. (Agril. Engg.) (Farm Machinery and Power)
5. Dr. V. Mageshwaran, M.Sc., Ph.D.
6. Shri Manik Bhownnik, M.Tech.
7. Shri A. Arputharaj, M.Sc., M.Tech.
8. Dr. Kartick Kumar Samanta, M.Tech., Ph.D.
9. Dr. R. Guruprasad, B.E., M.Tech. (Textile Manufacture), Ph.D.

10. Shri G.T.V. Prabu, B.E., M.Tech. (Textile Technology)
11. Shri G. Krishna Prasad, M.Tech. (Textile Technology)
12. Shri T. Senthilkumar, M.Tech. (Textile Technology)
13. Smt. Veda Krishnan, M.Sc. (Biotechnology)
14. Shri Shekhar Das, M.Tech. (Textile Technology)
15. Shri Santanu Basak, M.Tech. (Textile Chemistry)
16. Dr. Debasis Banerjee, M.Tech., Ph.D. (Textile Manufacture)

Technical Personnel

Technical Officer T (7-8)

1. Smt. N.D. Nachane, B.Sc.
2. Dr. (Smt.) A.A. Kathe, M.Sc., Ph.D.
3. Shri S. Sekar, B.Sc.
4. Dr. Si. Guhagarkar, M.Sc., Ph.D.
5. Shri D. Radhakrishnamurthy, M.Sc., M.Phil.
6. Shri P.K. Mandhyan, M.Sc., A.T.A.
7. Dr. R.D. Nagarkar, M.Sc., Ph.D.
8. Dr. (Smt.) Sheela Raj, M.Sc., Ph.D.
9. Dr. Matish Chandra, M.Sc., Ph.D.
10. Shri M. Mohan, M.Sc., Dip.J.

Technical Officer T-6

1. Shri R.S. Pathare, B.Sc.
2. Dr. (Smt.) Sudha Tiwari, B.Sc., Ph.D.
3. Shri S. Vancheswaran, B.Sc.
4. Shri T. Venugopal, B.E.(Civil)
5. Shri M.V. Vivekanandan, M.Sc.
6. Smt. N.M. Ashtaputre, M.Sc.
7. Shri S.M. Gogate, B.Sc.
8. Shri S. Banerjee, M.Sc.
9. Shri R.S. Prabhudesai, M.Sc., D.C.M.
10. Shri G.B. Hadge, M.Sc.
11. Shri B.R. Pawar, M. Sc., LL.M.
12. Shri C.M. More, M.Sc.
13. Shri P.N. Sahane, D.I.F.T.
14. Shri H.S. Koli, M.Sc., LL.B.
15. Shri D.N. Moon, B.Sc.
16. Dr. (Smt). S.R. Kawlekar, M.Sc., P.I.M.R., Ph.D.
17. Shri R.K. Jadhav, M.Sc.
18. Shri U.D. Devikar, M.Sc.
19. Dr. R.R. Mahangade, M.Sc., Ph.D.
20. Smt. P.S. Nirali, M.Sc.
21. Shri S.V. Kokane, B.A.
22. Shri R.R. Chhagani, M.Sc.

Technical Officer T-5

1. Shri D.L. Upadhye, SSC (Tech.), D.M.E., N.C.T.V.T. (I.T.I.& C.T.I.)
2. Smt. K.K. Kale, B.A.
3. Shri D.U. Kamble, B.Sc.
4. Smt. Bindu Venugopal, B.Sc.
5. Smt. N.A. Sonkusle, B.Sc.
6. Smt. Binu Sunil, M.Sc.
7. Smt. C.D. Prabha, M.Sc.
8. Kum. C.P. D' Souza, M.Sc.
9. Shri R.S. Narkar, B.Sc., D.C.I.A.
10. Smt. P.R. Mhatre, B.Sc., M.Lib.

Senior Technical Assistant T-4

1. Smt. K.R. Joshi, M.A. (Hindi Translator)
2. Shri V.D. Kalsekar, B.Sc.
3. Shri C.V. Shivgan, H.S.C., Cert.Wireman, Cert. Electrician, Cert.Elec.Supr. (PWD)., Cert. M. & A.W.(Technician)
4. Shri N.D. Kambli, B.Sc.
5. Shri M.G. Ambare, M.Sc.
6. Shri S. N. Patil, B.E. (Civil)

Technical Assistant T-3

1. Smt. H.R. Pednekar, B.A.
2. Shri D.M. Correia, S.S.C., N.C.T.V.T. (Mechanic)
3. Shri A.R. Jadhav, B.Sc.
4. Shri Deepak Meena, B.A., M.Lib., M. Phil., PGDCA
5. Shri Krishna Bara
6. Shri R.P. Kadam, B.Sc.
7. Smt. M.P. Kamble, B.A., M.Lib.
8. Shri M.B. Chandanshive, Cert.Cot.Spin. (Machinist/Fitter)
9. Shri B.R. Jadhav
10. Shri A.R. Bane, Cert. Cot. Spin

Category T-I-3

1. Shri B.K. Sawant
2. Shri M.Y. Chandanshive
3. Shri S.M. Sawant
4. Shri D.A. Salaskar
5. Shri S.K. Parab, Cert. Cot. Spin

Category T-2

1. Shri D.M. Raje
2. Shri R.R. Gosai
3. Shri N.K. Shaikh
4. Shri Mahabir Singh
5. Shri S.V. Kokane

Category T-1

1. Shri M.M. Kadam
2. Shri S.G. Phalke
3. Shri D.G. Gale
4. Shri D.J. Dhodia
5. Shri Yogesh Nagpure

Administrative Personnel

Administrative Officer

Smt. T. Padmavathi

Assistant Finance and Accounts Officer

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

Jr. Accounts Officer

Shri J.R. Mangale, B.Com .

Assistant Administrative Officer

1. Shri S.N. Salve
2. Smt. S. Koshy, B.Com .
3. Shri A.B. Dalvi
4. Shri D.G. Kulkarni
5. Smt. V.V. Desai

Assistant

1. Smt. T.P. Mokal, M.A.
2. Smt. S.M. Desai
3. Shri A.P. Natu
4. Smt. J.J. Karanjavkar
5. Shri K. Parleshwar
6. Smt. V.V. Janaskar, B.Com ., M.A.
7. Shri R.K. Pallewad, B.A.
8. Smt. S.R. Shirsat, B.A.
9. Shri N.V. Kambli
10. Smt. N.M. Deshmukh, M.A., LL.B.

Private Secretary

Shri Venu Thanikal

Personal Assistant

1. Smt. S.D. Dudam, M.A.
2. Smt. T.T. D'souza

Stenographer Gr. III

1. Smt. U.N. Bhandari
2. Smt. R.R. Tawde, B.Com .
3. Smt. Viniya Rajesh Naik, B.A.

PERSONNEL

Upper Division Clerk

1. Shri S.D. Ambolkar
2. Shri P.V. Jadhav
3. Smt. S.G. Parab, B.A.
4. Smt. S.P. Paiyala
5. Smt.J.R. Chavkute
6. Shri V.M. Sable
7. Smt. B.D. Kherodkar
8. Shri S.S. Angane

Lower Division Clerk

1. Shri A.R. Gujar
2. Shri T.D. Dhamange, B.Com
3. Shri S.N. Bandre
4. Smt. V.N. Walzade, B.A. (Telephone Operator)

Skilled Supporting Staff

1. Shri M.Z. Rathi
2. Shri N.J. Kharat
3. Shri M.B. Gurve
4. Shri O.T. Thapa
5. Shri B.R. Satam
6. Shri D.M. Chougule
7. Shri S.D. Gurav
8. Shri M.K. Ghadge
9. Smt. B.R. Piwal
10. Shri D.B. Temgire
11. Shri C.S. Salvi
12. Shri K.T. Mahida
13. Shri M.M. Katpara
14. Shri M.A.A. Rashid
15. Shri G.N. Mayawanshi
16. Shri H.B. Vesmiya
17. Shri M.J. Sumra
18. Shri S.K. Bobate
19. Shri P.P. Patil
20. Shri R.G. Tak
21. Shri R.P. Karkate
22. Shri C.D. Acharekar
23. Shri M.K. Prabhulkar
24. Shri J.D. Sakpal
25. Shri V. Murugan
26. Shri S.D. Magar
27. Shri S.B. Worlikar
28. Shri S.R. Tondse
29. Shri V.B. Poojari
30. Shri M.N. Kamble
31. Shri S.S. Surkule
32. Shri S.P. Naik
33. Smt. Kamala Murugan
34. Shri D.K. Kasar
35. Shri S.R. Tondse
36. Shri D.R. Gawde
37. Shri S.M. Chandanshive
38. Shri P.E. Gurav
39. Shri Mahesh C. Solanki

LIST OF STAFF AT THE QUALITY EVALUATION UNITS

COIM BATORE

Technical Officer T-(7-8)	: Dr. S. Venkatakrishnan, MSc., Ph.D., A.T.A., F.T.A.
Technical Officer T-6	: Shri K. Thiagarajan, M.Sc.
Sr. Technical Assistant T-4	Shri M. Bhaskar, Dip. Ref. &Air-Cond.

DHARWAD

Technical Officer T-6	Shri K. Narayanan, B.Sc.
Technician T-4	: Smt. V.G. Udikeri, B.Sc.
Skilled Supporting Staff	: Shri C.J. Bagalkoti
	Shri A.F. Gudadur

GUNTUR

Technical Officer T-6	: Shri S. Mukundan, M.Sc.
Skilled Supporting Staff	: Shri V. Subbaiah

NAGPUR

Scientist (Sr. Scale)	Shri Sujeet Kumar Shukla, M.Tech (on study leave).
	: Dr. (Smt.) Jyoti M. Nath, M.Sc., Ph.D.
Technical Officer T(7-8)	: Shri V.M. Kulmethe, B.Sc.
	: Shri N.V. Bansode, B.Sc.
Technical Officer T-6	: Shri S.L. Bhanuse, B.Sc.
	: Shri V.L. Rangari, M.Sc.
Technical Officer T-5	: Shri R. G. Dhakate, B.Sc.
	: Shri S.N. Hedau, B.Sc.
Technician T-4	: Shri B.V. Shirsath, B.A., I.T.I.
Technician T-3	: Shri C.L. Mundale
Technician T-2	: Shri P.S. Panchbudhe, B.A.
Technician T-1	: Shri Umrao Meena
Assistant Administrative Officer	Shri Yogesh Ram Pathare, M.B.A.

Stenographer (Gr. III)	Shri R.D. Shambharkar, M.A.
Assistant	: Shri S.A. Telpande, M.Com .
Upper Division Clerk	Shri B.D. Dhengale
ULower Division Clerk	Shri R.G. Matel
Skilled Supporting Staff	: Shri M.P. Tohokar
	Shri A.R. Chutale
	Shri J.P. Patel
	: Shri R.B. Kautkar
	Shri R.C. Rokde
	Shri R.S. Umare

SIRSA

Technical Officer T (7-8)	: Dr. Hamid Hasan, M.Sc., Ph.D.
Technical Officer T-6	: Dr. Jal Singh, M.Sc., Ph.D.
Skilled Supporting Staff	Shri Satyanarayan Gope

SURAT

Technical Officer T-6	Shri G.G. Mistry, B.Sc.
Technical Officer T-5	: Shri M.B. Patel, B.Sc., L.L.B.
Assistant	*: Shri J.I.* Parmar, B.Com .
Skilled Supporting Staff	Shri M.G. Sosa