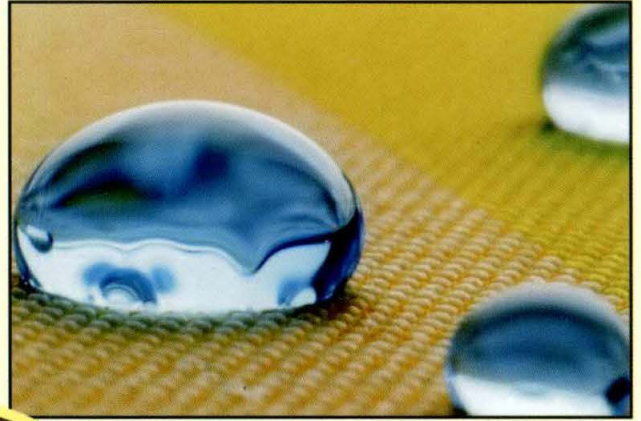




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ICAR

CIRCOT Annual Report 2010-2011

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(Indian Council of Agricultural Research)
Adenwala Road, Matunga
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CIRCOT

ANNUAL REPORT

2010-2011



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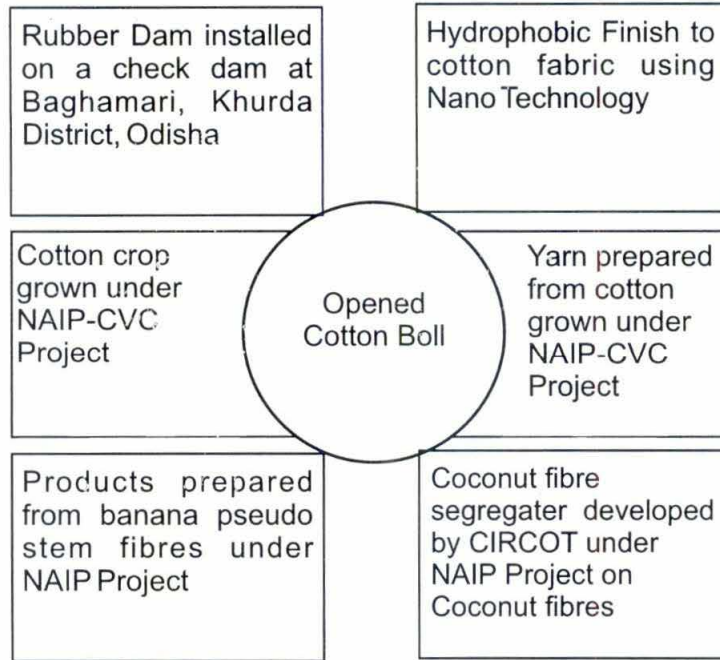
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Preface

I am pleased to present before you the Eighty-seventh annual report of CIRCOT, Mumbai for the year 2010-11. This Annual Report reflects the achievements made by the Institute in various research programmes and other related areas vis-a-vis areas of shortfalls to rededicate ourselves to the cause of cotton and other natural fibres for providing maximum benefits to the farmer and other stakeholders in the value chain.

The area under cotton is gradually increasing year by year and has reached a record 11.1 million hectares with an estimated production of 312 MMT. Almost 90% area is under Bt cotton cultivation under long staple category. The concern of industry about non-availability of medium staple and short staple cottons has been brought to the notice of cotton breeders and hopefully this imbalance may be corrected in the near future.

In order to increase the usage of cotton in non conventional areas like technical textiles, medical textiles, etc., the Institute in collaboration with the Indian Fibre Society organised an one day Seminar on "Non-Conventional Applications of Cotton on December 11, 2010. The Seminar was well attended and

there were very useful presentations highlighting the newer applications of cotton for preparation of value added products.

CIRCOT got an opportunity to showcase the various technologies developed using natural fibres to Dr. Kasturi Rangan, Hon'ble Member, Science, Planning Commission at Yojana Bhavan, New Delhi. Dr. Kasturi Rangan appreciated the efforts being done at ICAR in the field of natural fibres. As a follow up of the meeting, CIRCOT along with 17 other Institutes has proposed a Mega project on Natural Fibres which is under active consideration of the Planning Commission.

The ICAR is seriously looking at the possibility of initiating a network programme on Secondary Agriculture. CIRCOT also has taken an initiative in this direction and proposed a project on Development of Packaging Materials from Crop Residues.

All the NAIP projects in operation at CIRCOT are progressing well. Some of the projects like the Rubber Dam and Value Chain for Banana Pseudostem Fibre have made excellent progress and are being appreciated at all the evaluation

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meetings. The cotton shirts made under the project "A Value Chain on Cotton" and distributed at the AGM of ICAR attracted a lot of appreciation from the members for its comfort property. The project on Nano technology has generated very useful basic information. Being identified as a Centre of Excellence in Nano technology, the Institute has taken an initiative to organise three Workshops in the coming year to popularise the use of nano technology in agriculture.

The ZTMC-BPD unit of CIRCOT is trying its best to create entrepreneurship through various Interactive Meets with potential stakeholders. I am happy to note here that based on a business proposal prepared by CIRCOT, Govt. of Maharashtra has sanctioned a loan of Rs.680 lakhs to an NGO to set up a 10 TPD particle board plant from cotton stalk at Washim, Maharashtra.

CIRCOT was a participating institution as a member of the Government of India delegation to visit C-4 countries and Nigeria and Uganda to undertake an assessment of the cotton situation in these countries and identify areas of cooperation. The Institute also participated in a special study of cotton in Benin as part of two member expert group. CIRCOT also hosted a special study team from Africa under the aegis of International Trade Centre about the achievements on cotton in India and to identify areas of cooperation. It is hoped that CIRCOT is poised to provide a strong leadership in cotton technology in African countries through the Governmental channels in the immediate years to come.

Dr. A. J. Shaikh
Director



Dr. S. Sreenivasan, Outgoing Director, CIRCOT Handing Over Charge to Dr. A. J. Shaikh, Incumbent Director

Executive Summary

This Eighty-seventh Annual Report of the Central Institute for Research on Cotton Technology (CIRCOT) covers the period from April 1, 2010 to March 31, 2011.

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 Cotton Technological Laboratory (CTRL). The laboratory was again rechristened as Central Institute for Research on Cotton Technology (CIRCOT) on April 1, 1991.

The library at the Institute currently houses 7160 books and the library subscribes to four databases and 14 Indian and 27 foreign journals. These facilities are utilized apart from the staff of the institute by all the research institutes and colleges in Mumbai.

The Institute has handled 21 in-house research projects, two inter-institutional projects, two Technology Mission projects and six NAIP projects during the year under report.

During the current period one IMC, one RAC and two IRC meetings were held apart from several internal meetings.

The following Training programmes and Seminars/Workshops were conducted during 2010-2011:

- ✓ Four Hindi Workshops during May 14 and 15, July 1 - 31 and November 26 and 27, 2010 and March 1, 2011.
- ✓ Training in Unicode and Hindi Typing on Computers from July 1 - 31, 2010.
- ✓ ICAR Foundation Day and Biodiversity Day was celebrated on July 16, 2010.
- ✓ Hindi Day Celebration from September 14 - 28, 2010.
- ✓ Three Awareness Meets for the farmers at Sirsa on September 18, October 5 and October 12, 2010.
- ✓ Vigilance Awareness Week from October 25 to November 1, 2010.
- ✓ Qaumi Ekta Week from November 19 to 25, 2010.
- ✓ National Seminar on Non-conventional Applications of Textiles on December 11, 2010.

- ✓ IPR Awareness and Business Planning Meet at Anand, Gujarat on January 6, 2011.
- ✓ Business Development Programme on Cotton Technologies on January 7, 2011 at Ahmedabad.
- ✓ A half-a-day workshop on Patent Search and IP Management on January 25, 2011 for the sixteen western zone institutes at CIRCOT.
- ✓ National Science Day Celebration on February 28, 2011.
- ✓ International Women's Day on March 8, 2011.
- ✓ Industry-Interface Meet to highlight the achievements of the NAIP project on **A Value Chain for Cotton Fibre, Seed and Stalks: An Innovation for Higher Economic Returns to Farmers and Allied Stake Holders** on March 18, 2011 at Guntur, Andhra Pradesh.
- ✓ Ten in-house lectures.
- ✓ The Institute participated in five exhibitions

The Institute conducted training courses for sponsored personnel from cotton trade and industry on the quality evaluation of fibre, yarn and fabric that included statistical interpretation of results and operation of sophisticated High Volume Instrument (HVI) and Advanced Fibre Information System. Forty personnel were trained during the year. Similarly, at the Ginning Training

Centre (GTC), training was imparted to gin fitters and supervisors on the operation, maintenance of various ginning machines and problem solving during ginning process. One hundred and ninety personnel underwent training during the period.

Like earlier years, in the current year also, the Institute won a number of prizes in ICAR sports; 200 m running (Women) – Second, Javelin Throw (Women) – First, Discus Throw (Women) – Second, Table Tennis Team (Men) – Runner up, Table Tennis - Doubles (Women) – Winner, Table Tennis Single (Women) – Winner, Chess (Women) – Runner up, Badminton (Doubles)-Winner, Carrom (Women) – Winner, Carrom (Women) –Runner up, Carrom (Men) – Runner up.

Research Highlights

Designed and fabricated a Pneumatic Loading System for use in Double Roller Gin and a trial was conducted with 30 quintals of cotton on both the conventional as well as the pneumatic loaded ginning machines. Results indicated that the fibre parameter colour, showed improvement while the nep count decreased compared to the traditional D.R. gin. Uniform ginning was also noticed throughout the length of the roller.

Survey for the power requirement, energy consumption and cost of operation for the non-automatic as well as the automatic baling presses,

EXECUTIVE SUMMARY

indicated that the energy consumption for conventional manual press, down packing type press and up-packing type press was 1-1.25, 1.5-1.75 and 2.0-2.5 units/bale respectively.

As a Technology partner in the All Indian Coordinated Cotton improvement Project, CIRCOT evaluated the fibre properties of over 3700 samples during the year both at the headquarters and all its Quality Evaluation Units.

During the reporting period, fibre tests, spinning tests and yarn tests were carried out on 60 samples out of 90 Trade Variety samples received. Also quality parameters of 50 standard cotton samples were tested and reported.

Two hundred and ninety-seven containers of calibration cottons were sold to industry and cotton research institutions earning of Rs.2, 00950.

Under a project to study the **Structure- Property Relationships of Friction Spun Yarns (DREF)**, analysis of the data indicated that the strength and elongation % of DREF yarn do not change significantly with varying carding drum speeds as well as spinning drum speeds. The tensile properties of DREF yarns seem to depend mainly on the amount of core material.

A power driven sliver making machine, called CIRCOT Minicard has been developed for use in the rural areas. The earlier developed model had to be stopped after every 8-10 minutes

machine running which affected the efficiency. Hence, the machine was redesigned with a rotating flat system, with which the machine could be run continuously for eight hours. With this set-up it is possible to get uniform sliver devoid of neps and imperfections. The machine is currently undergoing field trials through *Varhad Vikas Seva Pratishtan*, an NGO agency at Akola.

The institute in collaboration with the NBSS & LUP (ICAR) has undertaken a research project to design and develop a spatial database and mapping module for cotton fibre quality parameters under a GIS environment. This map was also correlated with the soil types in the Wardha district. The aim of this project was primarily to help the traders and ginners to procure cotton of a desirable fibre quality by identifying appropriate cotton growing area. The same map could be used by the planners for their resource planning.

Liquid management property in a fabric is an important attribute for selecting an appropriate wear for high activity levels. This property is important for maintaining a proper microclimate between human skin and fabric for optimal comfort to the wearer. Under this project various parameters like Wetting Time, Absorption Rate, Maximum Wetted Radius, Spreading Speed, Accumulative One-way Transport Index and Overall Moisture Management Capacity were measured for selected fabrics procured from the market. The results indicate that

Moisture management capabilities of fabrics which appear to depend on compressibility of fabrics with the wetting time having a linear negative correlation with compressibility spreading speed depending on compressibility in a nonlinear way.

Woven and knitted fabrics prepared from organic cotton were bioscoured by using pectinase enzyme and subjected to antibacterial finish by using chitosan. An antimicrobial evaluation of the treated fabric showed 100% reduction in the bacterial count for *Staphylococcus aureus*. Washfastness for Chitosan treatment was effective upto 35 washes after which a reduction in the efficacy was noted.

An effort was made to develop a protective clothing for agricultural pesticide operations by applying oil water repellent finish to cotton and cotton polyester blends. A commercially available fluorocarbon based repellent finish Fluorotex FCN along with the crosslinking agent Melamine formaldehyde was used. The results indicated that the fluorocarbon based repellent finish using TG581 along with crosslinking agent was found to impart good pesticide protection to cotton fabrics with adequate washfastness upto 25 wash cycles as required for level 2 protection.

At CIRCOT, banana pseudo-stem sap was used as mordant for dyeing of cotton with natural dyes. Application of sap by padding proved better. It was also found that uniform dyeing with

banana sap by padding could be achieved by changing the pH and subsequent alum application.

To identify the microbes that degrade gossypol in cotton seed meal, an analysis of microorganisms in cotton growing soil was carried out. In all, 131 microbial isolates including 53 bacteria, 62 fungi and 16 actinomycetes were isolated from 88 soil samples. Out of 42 bacterial isolates screened, isolates BN-16-3, BN-46-2 and BN-23-1 showed a reduction of free gossypol in seed meal up to 86%, 75% and 56% respectively in mineral medium.

In the NAIP project on **A Value Chain for Cotton Fibre, Seed and Stalks: An innovation for Higher Economic Returns to Farmers and Allied Stake Holders**, 9000 m fabric from 30s count single yarn was prepared, of which 2005m fabric was converted into 1200 shirts. About 5500 kg yarn of 80s count was prepared from which about 28000 m fabric of 55 to 60 GSM was prepared. Three hundred and fifty metres of fabric was prepared from 77kg of 30s count yarn. Bales segregated based on Micronaire value were converted into yarn and tested for its properties. Yarn uniformity such as U %, thick & thin places and neps were noted to depend significantly on the Micronaire value of the cotton bale. This indicates that uniform yarn could be achieved by bale segregation based on the Micronaire value.

The scale-up trials on enzymatic pre-treatment of kernels for oil

EXECUTIVE SUMMARY

extraction were conducted at an oil mills in Tirupur and results indicated an increased oil extraction upto 2-3% over the control. Trials with Bio enrichment of hulls have been undertaken on 30 cross-bred bulls at Sabarmati Gaushala in Bidaj farm near Ahmedabad in collaboration with NDDDB, Anand to find out its digestibility. The feeding trials indicated ready acceptability of the feed by the animals when fed in 20% supplementation with the NDDDB's cattle ration. There was an enhanced digestibility of 26% in the bioenriched lot as against 17% when fed only with cottonseed hulls. Encouraged with this result, feeding trials on lactating cross-bred cows for two consecutive seasons have been planned.

In a project on **A Value Chain on Banana Pseudostem for Fibres and Other Value Added Products**, the Fibre Extraction Machine (Raspador), which was developed earlier, was modified to get good quality banana fibres. The banana fibres were graded on the basis of tensile parameters of the fibres. All the components of the Spinning System suitable for Banana Fibres have been designed, fabricated and installed at CIRCOT. The yarn prepared on these machines was evaluated for quality parameters. A large scale trial for making yarn from banana fibres was conducted at M/s. Empire Mills, Kolkata. A process was standardised for application of sap extracted from banana pseudostem as

a mordant to cotton fabric for dyeing with natural dyes. Microcrystalline Cellulose (MCC) powder prepared from banana fibres was also evaluated and compared with commercial grade MCC. The properties were *on par* with the commercial product.

In yet another NAIP project entitled **Design and Development of Rubber Dams for Watersheds**, installation of lab core ring frame spinning machine was completed and core yarn spinning methodology was standardised. Three rubber dams prepared with the fabric made from friction spun yarns have been installed in the experimental fields of Directorate of Water Management (DWM), Mandhasal, Odisha, Baghamari D/W-4 watershed, Odisha and also at Badaphokaria, Khurda district, Odisha. CIRCOT helped consortium partners by providing them the technical details about composite anchoring during dam installation. Apart from these, a proto dam has also been installed at the standard water flow channel available at the Civil Engineering Deptt. of IIT, Mumbai for evaluation.

A prototype disintegrator, defibering machine and fibre segregator have been developed based on the results of the tests carried out on the coconut husk under the project 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 of Farmers**. CIRCOT is providing

assistance in standardizing fibre classification method for coconut fibres by preparing a protocol based on its fineness data. Value added diversified ornamental cloth suitable for furnishing applications has been successfully developed at NIRJAFT which is a collaborating Institute. A special handloom has been developed to prepare coconut-jute fabrics for the purpose.

The process for the preparation of nanocellulose by aerobic fermentation using the fungal culture *Trichoderma reesii* and anaerobic fermentation process were standardized during the period under the project on the **Synthesis and Characterization of Nano-Cellulose and its Application in Biodegradable Polymer Composites to Enhance Their Performance**. The aerobic fermentation process yielded 33% nanocellulose while anaerobic process could produce only 11% nanocellulose. The nanocellulose produced by anaerobic process was spherical in shape as against whisker shape of the aerobically prepared nanocellulose. A gas chromatographic analysis revealed the presence of methane producers in the anaerobic microbial consortium. A novel pretreatment process by using zinc chloride has been optimized for chemo-mechanical processing of cellulose nanofibrils that yielded more than 95%

of nano fibrils. The impregnation of nanocellulose in potato starch film improved the mechanical properties of the film significantly. Currently, Carrageenan and cotton seed protein films are being prepared and analyzed for their performance after incorporation of nanocellulose.

Under the project on **Zonal Technology Management and BPD Unit at CIRCOT, Mumbai**, based on the BPD-CIRCOT proposal, a loan of 680 lakhs has been sanctioned by the Ministry of Social Welfare, Govt. of Maharashtra to M/s. Tulsai Magasvargiy Audyogik Sahakari Sanstha, Washim, Maharashtra to set up a 10 TPD capacity plant for the manufacture of particle board from cotton stalks based on CIRCOT technology. The BPD-CIRCOT was also been approved by the Development Commissioner, Micro, Small and Medium Enterprises (MSME), Govt. of India, New Delhi for implementation of one of their schemes - Support for Entrepreneurial and Managerial Development of SMEs through Incubators. Incubation facilities like Computerised sample preparation machine, Advanced Fibre Information system, Research Rotary digester, Lab Model Stenter and Hydraulic press were created by the BPD for use by start-up entrepreneurs who could approach CIRCOT for commercialization of their ideas.

सार संक्षेप

यह केन्द्रीय कपास प्रौद्योगिकी अनुसंधान संस्थान (के.क.प्रौ.अनु.सं.) की सतासिर्वी वार्षिक रिपोर्ट है।

भूमिका :

केन्द्रीय कपास प्रौद्योगिकी अनुसंधान संस्थान की स्थापना भारतीय केन्द्रीय कपास समिति (भा.के.क.स.) के अंतर्गत सन 1924 में प्रौद्योगिक प्रयोगशाला के रूप में हुई। भारतीय केन्द्रीय कपास समिति का अन्य व्यावसायिक समितियों के साथ समापन कर दिया तब भारतीय कृषि अनुसंधान परिषद (भा.कृ.अनु.प.) ने सन् 1966 में इस प्रयोगशाला को अपने प्रशासनिक नियंत्रण में ले लिया और इस प्रयोगशाला का नाम बदलकर कपास प्रौद्योगिकी अनुसंधान प्रयोगशाला रखा गया। 1 अप्रैल, 1991 में इस संस्थान का नाम पुनः बदलकर केन्द्रीय कपास प्रौद्योगिकी अनुसंधान संस्थान रखा गया।

संस्थान के पुस्तकालय में वर्तमान में 7160 पुस्तकें एवं 4 डेटा बेस एवं 14 भारतीय एवं 27 विदेशी जर्नलों की सदस्यता प्राप्त है। संस्थान के कर्मचारी सदस्यों के अलावा मुंबई स्थित सभी कालेजों एवं अनुसंधान संस्थानों द्वारा इन सभी सुविधाओं का लाभ लिया जा रहा है।

संस्थान में रिपोर्ट की अवधि के दौरान कुल 21 संस्थागत परियोजनाएं, दो अंतर संस्थागत परियोजनाएं, 2 टेक्नॉलॉजी मिशन परियोजनाएं एवं 6 राष्ट्रीय कृषि नवोन्मेषी परियोजनाएं का कार्य जारी है।

वर्तमान अवधि के दौरान एक संस्थान प्रबंधन समिति, एक अनुसंधान सलाहकार समिति एवं दो संस्थानीय अनुसंधान समिति की बैठकों का आयोजन किया गया।

वर्ष 2010-11 के दौरान निम्नलिखित कार्यशालाओं/सम्मेलनों का आयोजन हुआ।

- चार हिन्दी कार्यशालाओं का आयोजन वर्ष के दौरान क्रमशः 14-15 मई, 2010, 1 जुलाई से 31 जुलाई, 2010, 26-27 नवंबर, 2010 एवं 1 मार्च, 2010 को किया गया।
- कम्प्यूटर पर यूनिकोड हिन्दी टंकण प्रशिक्षण दिनांक 1 जुलाई से 31 जुलाई, 2010 तक आयोजित किया गया।
- दिनांक 16 जुलाई, 2010 को भा.कृ.अनु.प. स्थापना दिवस एवं जैव - विविधता दिवस का आयोजन किया गया।
- दिनांक 14 से 28 सितंबर, 2010 के दौरान हिन्दी दिवस/पखवाडा मनाया गया।
- दिनांक 18 सितंबर, 5 अक्तुबर एवं 12 अक्तुबर, 2010 को किसानों के लिए जागरुकता बैठकों का आयोजन किया गया।
- दिनांक 25 अक्तुबर से 1 नवंबर, 2010 तक सतर्कता जागरुकता सप्ताह मनाया गया।

- कौमी एकता सप्ताह दिनांक 19 - 25 नवंबर, 2010 के दौरान मनाया गया।
 - दिनांक 11 दिसंबर, 2010 को टेक्सटाईल के गैर पारंपारिक उपयोग पर राष्ट्रीय सम्मेलन आयोजित हुआ।
 - आई.पी.आर. की जागरुकता एवं बिजनेस प्लानिंग बैठक दिनांक 6 जनवरी, 2011 को आनंद, गुजरात में हुई।
 - दिनांक 7 जनवरी, 2011 को कपास प्रौद्योगिकी पर अहमदाबाद में व्यावसायिक विकास कार्यक्रम का आयोजन किया गया।
 - दिनांक 25 जनवरी, 2011 को पश्चिमी क्षेत्र के सोलह संस्थानों के लिए एक अर्ध-दिवसीय कार्यशाला पेटेंट सर्च एवम् आई.पी. प्रबंधन पर के.क.प्रौ.अनु.सं. में आयोजन।
 - दिनांक 28 फरवरी, 2011 को राष्ट्रीय विज्ञान दिवस मनाया गया।
 - दिनांक 8 मार्च, 2011 को अन्तर्राष्ट्रीय महिला दिवस का आयोजन किया गया।
 - एन.ए.आई.पी. परियोजना **ए वैल्यू चेन फॉर कॉटन फाइबर, सीड एण्ड स्टॉक्स: एन इनोवेशन फॉर हायर इकोनॉमिक रिटर्नस टू फारमर्स एण्ड अलाइड स्टैक होल्डर्स** की उपलब्धियों पर प्रकाश डालने हेतु एक इंडस्ट्री-इन्टरफेस बैठक का आयोजन दिनांक 18 मार्च, 2011 को गुन्टुर, आंध्र प्रदेश में किया गया।
 - संस्थान में 10 व्याख्यानों का आयोजन किया गया।
- संस्थान ने पाँच प्रदर्शनियों में भाग लिया।
- संस्थान में कपास उद्योग से जुड़े प्रायोजित प्रशिक्षणार्थियों के लिए वस्त्र, धागों एवं रेशों के गुणवत्ता मूल्यांकन एवम् विकसित यंत्र यथा हाई-वॉल्यूम इन्स्ट्रूमेंट (एचवाआई) एवम् एडवान्स फायबर इन्फॉर्मेशन सिस्टिम (एफीस) के कार्यप्रणाली पर विभिन्न प्रशिक्षण कार्यक्रम आयोजित किए गए। वर्ष के दौरान 40 प्रशिक्षणार्थियों को प्रशिक्षण दिया गया। इसी प्रकार ओटाई प्रशिक्षण केन्द्र, नागपूर में फिटर एवं पर्यवेक्षकों के लिए प्रचालन प्रणाली, विभिन्न जिनिंग मशीन के रख-रखाव एवं जिनिंग प्रक्रिया के दौरान होने वाली समस्याओं का निराकरण आदि विषयों पर विभिन्न प्रशिक्षण दिये गये। वर्ष के दौरान 190 प्रशिक्षणार्थियों ने प्रशिक्षण प्राप्त किया।
- गत वर्ष की तरह इस वर्ष भी संस्थान ने भा.कृ.अनु.प. खेलकूद प्रतियोगिता में विभिन्न पुरस्कार प्राप्त किए जो इस प्रकार हैं: 200 मीटर दौड़ प्रतियोगिता (महिला) - द्वितीय; भाला फेंक (महिला) - प्रथम; डिसकस श्रो (महिला) - द्वितीय; टेबल टेनिस टीम (पुरुष) - रनर अप; टेबल टेनिस डबल (महिला) - विजेता; टेबल टेनिस एकल (महिला) - विजेता; शतरंज (महिला) - रनर अप; बैडमिंटन (डबल्स) - विजेता; कैरम (महिला) - विजेता; कैरम (महिला) - रनर अप; कैरम (पुरुष) - रनर अप।
- विशिष्ट शोधकार्य:**
- डबल रोलर जिन के लिए एक नये न्यूमेटिक लोडिंग सिस्टम का डिजाइन एवं निर्माण किया गया एवम् दोनों पारंपारिक व नये न्यूमेटिक लोडेड ओटाई यंत्र में 30 क्विंटल कपास की ओटाई की गई। नये लोडिंग सिस्टम व पारंपारिक डबल रोलर जिन से प्राप्त परिणामों की

तुलना करने पर पाया गया कि रेशों की गुणवत्ता व रंग में सुधार हुआ जबकि नेप्स की संख्या में कमी हुई। रोलर की पूरी लंबाई के दौरान जिनिंग में एकरूपता पाई गई।

स्वचलित एवम् अ-स्वचलित बेलिंग प्रेस के लिए बिजली व उर्जा की खपत एवम् प्रचालन में खर्च आदि बातों का सर्वेक्षण किया गया। परिणाम से ज्ञात हुआ कि पारंपरिक हस्तचलित प्रेस, डाउन पैकिंग टाईप प्रेस व अप पैकिंग टाईप प्रेस के लिए उर्जा की खपत क्रमशः 1-1.25 यूनिट प्रति बेल, 1.5-1.75 यूनिट प्रति बेल एवम् 2.0 - 2.5 यूनिट प्रति बेल रही।

आखिल भारतीय कपास समन्वित सुधार परियोजना के प्रौद्योगिकी सहभागी के रूप में कार्य करते हुए के.क.प्रौ. अनु. सं. ने मुख्यालय एवं उनके छह गुणता मूल्यांकन क्षेत्रीय इकाईयों में 3700 कपास के नमूनों के रेशा गुणधर्मों का मूल्यांकन किया।

रिपोर्ट की अवधि के दौरान प्राप्त 90 व्यापारिक प्रजातियों में से 60 नमूनों का रेशा परीक्षण, कताई परीक्षण एवं धागा परीक्षण किया गया। साथ ही 50 मानक कपास के नमूनों का गुणवत्ता मूल्यांकन परीक्षण कर रिपोर्ट प्रेषित की गई।

वर्ष के दौरान 297 अंशशोधन कपास के कंटेनर कपास उद्योग व अनुसंधान संस्थानों को बेच कर रु. 2,00,950 के राजस्व की प्राप्ति की गई।

स्ट्रक्चर - प्रॉपर्टी रिलेशनशीप ऑफ क्रिक्शन स्पन यार्नर्स (इफ) परियोजना के अंतर्गत परिणामों के विश्लेषण करने पर पाया गया कि कताई ड्रम गति एवं कार्डिंग ड्रम गति के बदलने पर भी इफ धागों की ताकत

व प्रतिशत दैर्ध्यवृद्धि मान में कोई लक्षणीय परिवर्तन नहीं पाया गया। इफ धागों का तन्यता मान मुख्यतः क्रोड सामग्री की मात्रा पर निर्भर करता है। बिजली से चलनेवाले पूनी निर्माण यंत्र जिसे सिरकॉट मिनि कार्ड कहा जाता है का विकास ग्रामीण क्षेत्र में उपयोग हेतु किया गया। पूर्व विकसित मशीन का मॉडल केवल 8-10 मिनिट पर चल कर रुक जाता था, जिससे कार्यदक्षता प्रभावित होती थी। अतः इस यंत्र को रोटेटिंग फ्लैट सिस्टम के साथ पुनः डिजाइन किया गया जिससे यह यंत्र निरंतर आठ घंटों तक चल सकता है। इस विकसित सेट-अप के द्वारा गांठ रहित व विशुद्ध एकरूप पूनी प्राप्त करना संभव हो पाया है। इस यंत्र का वरहड विकास सेवा प्रतिष्ठान, अकोला की एक गैर सरकारी संस्था के माध्यम से वर्तमान में फिल्ड-ट्रायल जारी है।

संस्थान ने एन.बी.एस.एस. एवं एल.यू.पी. (भा.कृ.अनु.प.) के सहयोग से एक शोध परियोजना **ट्रु डिजाइन एण्ड डेवलप ए स्पेशियल डाटा बेस एण्ड मैपिंग मॉड्यूल फॉर कौटन फायबर क्वॉलिटी पैरामीटर अंडर ए जी.आर.एस. इनवायरमेंट** प्रारंभ की है। यह मानचित्र नागपूर के वर्धा जिले की मिट्टी के प्रकार से संबंधित है। इस परियोजना का मुख्य उद्देश्य ओटाई एवं कपास उद्यमियों की आवश्यकतानुसार कपास उपजानेवाले क्षेत्रों से रेशों की गुणवत्ता के आधार पर कपास प्राप्त करना है। यह मानचित्र योजना बनानेवालों के लिए काफी कारगर सिद्ध होगा।

अत्यधिक कार्य स्तर पर पहने जानेवाले वस्त्रों के उचित चुनाव हेतु वस्त्रों के जल प्रबंधक गुण काफी प्रमुख भूमिका निभाते हैं। वस्त्रों का यह गुणधर्म पहननेवाले की त्वचा व वस्त्रों के बीच समुचित वातावरण बनाये

रखने हेतु काफी महत्वपूर्ण है जिससे पहननेवाले को आरामदेह महसूस हो। इस परियोजना के अंतर्गत बाजार से प्राप्त किये गये विभिन्न वस्त्रों के नमूनों के विभिन्न गुणधर्म यथा, आर्द्रता समय, अवशोषण दर, अधिकतम आर्द्र त्रिज्या, फैलने की गति, एक दिवसीय फैलने व जमा होने का सूचकांक एवं कुल मिलाकर नमी प्रबंधन क्षमता आदि के परीक्षण कर मान प्राप्त किये गये। परिणाम में पाया गया कि वस्त्रों की नमी प्रबंधन क्षमताएं वस्त्रों का संपीड़न आर्द्रता समय के साथ ऋणात्मक रैखिक सहसंबंध है एवं संपीड़न फैलाव गति संपीड़न के अरैखिक मार्ग पर निर्भर है।

जैविक कपास से बुने एवं निटेट वस्त्र तैयार वस्त्रों का पैक्टीनेस एन्जाइम द्वारा जैविक अभिमार्जन किया गया एवं कायटोजेन के उपयोग द्वारा जीवाण्विक परिष्करण किया गया। इन उपचारित वस्त्रों का प्रतिसूक्ष्मजीवाणु परीक्षण करने पर स्टेफिलोकोकस ऑरेस के लिए जीवाणु गणना में 100% की कमी पाई गई। कायटोजेन उपचारित वस्त्रों में 35 बार धुलाई करने के बाद वॉश फास्टनेस क्षमता में कमी पाई गई।

संरक्षक वस्त्रों के विकास हेतु कृषि कीटकनाशी छिड़काव कार्य के लिए कपास एवं कपास - पॉलिएस्टर मिश्रित वस्त्रों पर जल एवं तेल विकर्षण परिष्करण किया गया। इस परीक्षण में व्यावसायिक रूप से उपलब्ध फ्लोरोकार्बन आधारित विकर्षण परिष्कृत फ्लूरोटेक्स (एफसीएन) का मेलामाईन फॉर्मलडिहाइड तिर्यक बंधन कारक के साथ प्रयोग किया गया। परिणाम में पाया गया कि जिन कपास वस्त्रों में फ्लोरोकार्बन आधारित विकर्षण परिष्करण जिनमें टीजी 581 तिर्यक बंधन कारक का उपयोग किया गया उनमें उत्तम कीटनाशी संरक्षक

गुण प्रदर्शित किए गये जो 25 धुलाई क्रम तक अच्छे रहे जो स्तर-2 संरक्षण की जरूरत है।

के.क.प्रौ.अनु.सं. में केले के तनों से निकाले गये रस का प्रयोग उत्प्रेरक के रूप में प्राकृतिक रंजकों के साथ कपास के वस्त्रों के रंजन के लिये किया गया। पैडिंग प्रक्रिया द्वारा प्राप्त केले के तनों से प्राप्त रस उत्तम पाये गये। यह भी पाया गया कि केले के रसों से एकरूप रंजन pH के बदलते एवं एलम के प्रयोग द्वारा प्राप्त किया जा सकता है।

बिनौला चूरे में गॉसिपाल को कम करने के लिए ऐसे सूक्ष्मजीवों की पहचान की गई जिनमें गॉसिपाल कम करने की क्षमता हो। जिसके लिए कपास उपजाने वाले क्षेत्रों की मिट्टी का सूक्ष्मजीव विश्लेषण किया गया। 88 मिट्टी के नमूनों से कुल 131 सूक्ष्मजीव पृथक किये गये जिनमें 53 जीवाणु, 62 कवकी एवं 16 ऐक्टिनोमायसीडस है। 42 पृथक किये गये जीवाणुओंका परीक्षण किया गया जिनमें बी एन-16-3, बी एन-46-2 एवं बी एन-23-1 में फ्री गॉसिपाल की मात्रा में मिनरल माध्यम में क्रमशः 86%, 75% एवं 56% की कमी पाई गई।

राष्ट्रीय कृषि नवोन्मेषी परियोजना की *एवैल्यू चैन फॉर कॉटन फाइबर, सीड एण्ड स्टॉक्स: एन इनोवेशन फॉर हायर इकॉनॉमिक रिटर्नर्स टू फारमर्स एण्ड अलाइड स्टेक होल्डर्स* परियोजना के अन्तर्गत 30 काउन्टवाले एकल सूत के 9000 मीटर वस्त्र तैयार किए गए जिनमें 2005 मीटर वस्त्रों से 1200 शर्ट बनाये गये। 80 काउन्टवाले धागों से लगभग 5500 किलो ग्राम धागे बनाये गये जिनमें से 55 से 60 ग्राम प्रति वर्ग मीटर के

28000 मीटर वस्त्र निर्मित किए गए। 30 काउन्टवाले 77 किलोग्राम धागों से तीन सौ पचास मीटर वस्त्र किए गए। कपास के गाठों को उनके मायक्रोनेयर मान के अनुसार अलग-अलग किया गया एवं उनके गुणधर्मों का परीक्षण कर उनसे धागे निर्मित किए गए। कपास की गाठों के मायक्रोनेयर मान पर धागों की एकरूपता यथा यू-प्रतिशत, धागों में मोटे एवं पतले स्थान एवम् गाँठ आदि विशेष रूप से निर्भर करती है। इससे यह पाया गया कि कपास की गाठों को उनके मायक्रोनेयर मान के अनुसार अलग-अलग करके उत्तम गुणवत्ता वाले धागे निर्मित किए जा सकते हैं।

तेल के निष्कर्षण के लिए बिनौले का एन्जामेटिक पूर्व उपचार तिरुपूर स्थित एक ऑइल मिल में किया गया और परिणाम में पाया गया कि नियंत्रित विधि द्वारा प्राप्त तेल की मात्रा से इस विधि द्वारा 2-3 प्रतिशत तेल की मात्रा में वृद्धि हुई। आनंद के एनडीडीबी के साथ मिलकर अहमदाबाद के पास बिदाज के साबरमती गोशाला में जैव संवर्धित खली का 30 संकरित बैलों पर उनके पाचनशक्ति पर असर देखने के लिए परीक्षण किया गया। एनडीडीबी के पशुचारे के साथ इस जैव संवर्धित खली को 20 प्रतिशत तक मिलाने पर पाया गया कि उसे पशुओं ने खाने हेतु स्वीकार किया। बगैर उपचारित कपास बिनौले की खली की तुलना में जैव संवर्धित खली के द्वारा पाचनशक्ति 17 प्रतिशत से बढकर 26 प्रतिशत हुई। इस उत्साहवर्धक परिणाम के पश्चात अगले लगातार दो वर्षों के लिए संकरित गायों के चारे हेतु उनका परीक्षण करने की योजना है।

एवैल्यू चैन ऑन बनाना सूडोस्टेम फॉर फायबर्स एण्ड अदर वैल्यू ऐडेड प्रॉडक्ट्स नामक परियोजना के अंतर्गत

छद्म तने से रेशा निकालने की मशीन (रास्पाइडोर) में कुछ सुधार किये गये जिससे अच्छी गुणवत्ता के रेशे प्राप्त हुए। रेशों के गुणधर्मों के आधार पर केले की प्रजातियों का वर्गीकरण किया गया। इन रेशों की कटाई के लिये उपयुक्त कटाई मशीन को संस्थान में ही डिजाइन करके संस्थापित किया गया। इस मशीन से कते सूत की गुणवत्ता का परीक्षण किया गया। सूत बनाने के बड़े पैमाने पर परीक्षण में एम्पायर मिल्स, कोलकता में किये गये। रेशे निकालते समय प्राप्त होनेवाले रस का सूती वस्त्रों के प्राकृतिक रंजकों से रंजन के दौरान राबंधक के तौर पर इस्तेमाल करने की प्रक्रिया का मानकीकरण किया गया। केले के रेशों से माइक्रोक्रीस्टलाइन सेलूलोस (एम.सी.सी.) भी बनाया गया जो गुणधर्मों में व्यावसायिक नमूने के समकक्ष पाया गया।

एक अन्य राष्ट्रीय कृषि नवोन्मेषी परियोजना **वाटरशेडों के लिये रबर बाँधों का डिजाइन एवं विकास** के अंतर्गत प्रयोगशाला माडल की कोर रिग फ्रेम कटाई मशीन की संस्थापना का कार्य पूरा किया गया और कोर धागा बनाने की प्रक्रिया का मानकीकरण किया गया। वर्षण कटाई द्वारा कते सूत से वस्त्र बनाकर उसके तीन रबर बाँध जल प्रबंधन निदेशालय के प्रायोगिक खेतों में धसाल, ओड़ीशा, बाघामारी D/W-4 वाटरशेड, ओड़ीशा और बड़ा पोखरिया, जिला खुर्दा, ओड़ीशा में संस्थापित किये गये। संस्थान ने बाँधों की स्थापना के समय कंपोजिट निबंधन के बारे में तकनीकी विवरण देकर कंसोशियम सहभागियों की मदद की। इसके अलावा मूल्यांकन के लिए एक प्रोटोटाइप बाँध आई.आई.टी. मुंबई के सिविल अभियांत्रिकी विभाग में स्थित मानक जल बहाव चैनल पर भी स्थापित किया गया।

ए वैल्यू चेन फॉर कोकोनट फायबर एण्ड इट्स बायप्रॉडक्ट्स: मैनुफैक्चर ऑफ डाइवर्सिफाइड प्रॉडक्ट्स ऑफ हायर वैल्यू एण्ड बेटर मार्केटिबिलिटी टू इन्हान्स द इकॉनॉमिक रिटर्नस ऑफ फारमर्स एण्ड अलाइड स्टेक होल्डर्स नामक परियोजना के अंतर्गत नारियल जटा पर किये परीक्षणों के आधार पर एक प्रोटोटाइप - विघटक, रेशा विलंगन मशीन और रेशा पृथक्करक विकसित किये गये हैं। नारियल रेशों के श्रेणीकरण को मानक बनाने के लिये संस्थान इसकी महीनता पर आधारित एक प्रोटोकॉल बनाने के लिये सहायता कर रहा है। सहयोगी संस्थान निरजाफ्ट द्वारा नारियल रेशों से फर्निशिंग के लिये उपयुक्त मूल्यवर्धित सजावटी कपड़ा सफलतापूर्वक विकसित किया गया है।

रिपोर्ट की अवधि के दौरान **सिन्थेसिस एण्ड कैरेक्टेराइजेशन ऑफ नैनोसेल्यूलोज अण्ड इट्स अप्लीकेशन इन बायोडिग्रेडेबल पॉलीमर कंपोजिट्स टू इन्हान्स देयर परफॉरमन्स** नामक परियोजना में कवक **ट्राइकोडर्मा रीसी** से वायवीय किण्वन तथा अवायवीय किण्वन द्वारा नैनो सेलूलोस के निर्माण की प्रक्रिया का मानकीकरण किया गया। वायवीय किण्वन द्वारा जहाँ 33 प्रतिशत नैनोसेलूलोस की प्राप्ति हुई वहीं अवायवीय किण्वन द्वारा सिर्फ 11 प्रतिशत नैनोसेलूलोस ही प्राप्त हुआ। अवायवीय प्रक्रिया से प्राप्त नैनोसेलूलोस गोलाकार आकृति का था जबकि वायवीय तरीके से बनाया गया नैनोसेलूलोस व्हिस्कर आकृति का था। गैस क्रोमेटोग्राफिक विश्लेषण से अवायवीय सूक्ष्मजीवाण्विक संकाय में मीथेन उत्पादकों की उपस्थिति

का पता चला। सेलूलोस नैनो फाइब्रिलों के निर्माण की रासायनिक - यांत्रिकी प्रक्रिया में जिंक क्लोराइड के साथ एक नवीन पूर्वोपचार को मानकीकृत किया गया जिससे 95 प्रतिशत से भी अधिक नैनो फाइब्रिलों की प्राप्ति हुई। आलू के स्टार्च से बनी फिल्म में नैनोसेलूलोस के इस्तेमाल से उसके यांत्रिक गुणों में उल्लेखनीय सुधार हुआ। इस समय काराजीनान और बिनौले की प्रोटीन में नैनोसेलूलोस को समाहित करके फिल्म बनाने और उसके गुणों के विश्लेषण का कार्य चल रहा है।

संस्थान में क्षेत्रीय प्रौद्योगिकी प्रबंधन एवं बी.पी.डी.

इकाई के प्रस्ताव के आधार पर समाज कल्याण मंत्रालय, महाराष्ट्र सरकार ने मे. तुलसाई मागासवर्गीय औद्योगिक सहकारी संस्था, वाशिम, महाराष्ट्र को कपास इंठलों से पार्टिकल बोर्ड बनाने की संस्थान की प्रौद्योगिकी पर आधारित 10 टन प्रतिदिन क्षमता वाले संयंत्र की स्थापना के लिये 680 लाख रुपये का ऋण स्वीकृत किया है। डेवलपमेंट कमिशनर, सूक्ष्म, लघु एवं मध्यम उद्यम, भारत सरकार, नई दिल्ली ने भी अपनी योजना लघु एवं मध्यम उद्यमों के लिये उद्यमिता एवं प्रबंधन विकास में इन्क्यूबेटरों के माध्यम से सहयोग को लागू करने के लिए संस्थान की बी.पी.डी. को अनुमोदित किया है। प्रारंभिक उद्यमियों के उपयोग के लिए बी.पी.डी. ने उन्नत रेशा सूचना तंत्र, कम्प्यूटरीकृत नमूना निर्माण मशीन, प्रयोगशाला माडल स्टेन्टर और हाइड्रॉलिक प्रेस की सुविधायें स्थापित की हैं जो अपने विचारों के व्यवसायीकरण हेतु इनका इस्तेमाल करने के लिये के.क.प्रौ.अनु.सं. से संपर्क कर सकते हैं।

Salient Achievements at a Glance

Research Achievements

- ✓ A pneumatic loading mechanism for incorporation in a double roller ginning machine has been developed. As a result, decreased machine vibration and uniform ginning of cotton throughout the roller were noted. A marked improvement in lint colour and reduction in nep count compared to those produced by traditional D.R. gin were observed.
- ✓ During the year 2010-11, 3724 cotton samples received under AICCIP were tested for fibre quality and spinnability tests for the promising entries were also conducted.
- ✓ Sixty trade and fifty standard varieties received during the reporting period were evaluated for fibre, yarn and spinnability characteristics.
- ✓ Two hundred and ninety-seven containers of calibration cotton as standard reference material were sold to industry and cotton research institutions.
- ✓ Studies on the liquid management properties of commercially procured cotton and cotton blended fabrics showed that the Moisture management capabilities of fabrics appear to depend on the thickness of fabrics. The wetting time has a linear negative correlation with compressibility ($R^2=0.93$), and the spreading speed is related to compressibility in a nonlinear way. For fabrics with low compressibility (< 0.3) the spreading speed reduced with compressibility. But once compressibility exceeded 0.3, any further increase in compressibility helped positively the spreading speed.
- ✓ A prototype apparatus for measuring the Moisture Vapour Transfer Rate (MVTR) of fabrics based on the Dish method has been fabricated. The evaluation of the new setup is progress.
- ✓ A fluorocarbon based repellent finish using TG581 along with a crosslinking agent was found to impart good pesticide protection to cotton fabrics with adequate washfastness upto 25 wash cycles as required for level 2 protection.
- ✓ Attractive shades could be obtained with improved colourfastness to light and colour strength (k/s), with the blend of different natural dyes such as Manjistha and Turmeric on cotton fabrics.
- ✓ While using the banana pseudo-stem sap as a mordant for dyeing cotton with natural dyes, uniform dyeing could be achieved by changing the pH and subsequent application of alum to make it slightly acidic.
- ✓ TiO_2 nanoparticle has been synthesised by a chemical route by using titanium tetra-isopropoxide (TTIP) as a precursor.
- ✓ Soil bacterial isolates were screened for gossypol detoxification in mineral medium containing 10 ppm of free gossypol. The isolates BN-16-3, BN-46-2 and BN-23-1 showed reduction of free gossypol up to 86%, 75% and 56% respectively.
- ✓ Based on a BPD-CIRCOT proposal, a loan of 680 lakhs has been sanctioned by the Ministry of Social Welfare, Govt. of Maharashtra to M/s. Tulsai Magasvargiy Audyogik Sahakari Sanstha, Washim (MS) to set up a 10 TPD capacity plant for manufacture of particle board from cotton stalks based on CIRCOT technology.

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- ✓ A Prototype disintegrator, defibering machine and a fibre segregator for use in extraction and segregation of coconut fibre have been completed.
- ✓ Three rubber check dams (impounding structure) have been installed at Odisha – in the experimental fields of (a) Directorate of Water Management (DWM), (b) Mandhasal, Odisha; Baghamari D/W-4 watershed, Odisha and (c) Badaphokaria, Khurda district, Odisha. CIRCOT helped as a consortium partner by providing the technical details about the composite anchoring during the installation of the dam.
- ✓ Spinning machines suitable for extraction of banana fibres – fibre softner unit, fibre cutter, carding unit, drawing unit and ring frame have been fabricated and installed successfully at CIRCOT.
- ✓ Microcrystalline cellulose powder was also prepared from banana fibres and evaluated with commercial grade MCC. The properties were *on par* with the commercial product.
- ✓ Zinc chloride pretreatment to microcrystalline cellulose was noted to help in reducing the energy consumption by 1/3rd during the homogenization process for preparation of cellulose nano-fibrils.

Training, Consultancy and Technology Transfer Activities

- ✓ Under the paid test category about, 3400 cotton samples at the headquarters and 11,100 at regional units were tested.
- ✓ At the headquarters, 42 personnel underwent training in four batches on the quality evaluation of fibres and in use of HVI and AFIS including statistical interpretation of data. This includes two Egyptian Scientists deputed under the Bilateral Programme. At the Ginning Training Centre, Nagpur, 210 gin-fitters sponsored from various ginning industry underwent training in the operation of various machines and their maintenance in eight batches. This includes an on-site training programme for 50 personnel in a ginning factory.
- ✓ Two consultancies were undertaken during the period.
- ✓ Four new innovations were patented during the current year.

Awareness Programmes, Participation in Exhibitions and Organising Seminar/ Workshops/Conference

- ✓ One off-farm training programme was conducted for farmers in the villages Neza Delan in Sirsa on September 18, 2010 and another one at Jhonpra in Sirsa on October 5, 2010.
- ✓ A Quality Awareness Programme at the Neza Delan village in Sirsa district was held on October 12, 2010.

Participation in Exhibitions

- ✓ ICAR- Industry Meet 2010 at the NASC complex, New Delhi, July 28-29, 2010.
- ✓ Krishi Mahotsav 2010 at Marathwada Agricultural University Ground, Parbhani, October 8 – 12, 2010.
- ✓ Baramati Agri Expo - Haritkranti 2010 at Baramati, November 1 – 4, 2010.
- ✓ ICAR- Pusa Krishi Mela 2011 at NASC complex, New Delhi, March 3 – 5, 2011.

SALIENT ACHIEVEMENTS AT A GLANCE

Industry-Interface Meet

- ✓ One industry-interface meet was organised by the Institute in association with All India Cotton Seed Crushers' Association (AICOSCA) on Value addition to Cotton Seed and other By-Product on March 18, 2011 at Guntur, Andhra Pradesh.

Accolades

- ✓ The Institute bagged a Shield for promoting Hindi as Official Language from the Rajbhasha Sansthan, New Delhi. Smt. Kiran Joshi, Hindi Translator, Official Language Cell was awarded Commendation Certificate for presenting an article on Unicode.
- ✓ Smt. T.P. Mokal, Hindi Assistant won a Shield and a Certificate from ASHIRWAD, a Literary-Socio-Cultural Organisation, Mumbai for carrying out best work in Hindi at the Institute for the year 2009-10.
- ✓ Shri Chitranayak, Scientist was awarded a memento and a certificate for his article *Prakritik Resha: Paryavaran Ki Suraksha* from Shri Dinsha Patel, Hon'ble Union Minister, Ministry of Micro, Small and Medium Enterprises, Govt. of India at a function organised by the Kendriya Sachivalaya Hindi Parishad, New Delhi on June 14, 2010.
- ✓ Shri R.K. Jadhav, Technical Officer and Dr. S.K. Chattopadhyay, Principal Scientist were awarded a memento and certificate for their article *Gramin Star Ka Liye Kapas Katai Prakriya* from Shri Dinsha Patel, Hon'ble Union Minister, Ministry of Micro, Small and Medium Enterprises, Govt of India, New Delhi at a function organized by the Kendriya Sachivalaya Hindi Parishad, New Delhi on June 14, 2010.
- ✓ At the ICAR Zonal Sports Meet (West Zone) held at the Indian Grassland and Fodder Research Institute, Jhansi from February 15 – 19, 2011, the women team from CIRCOT won the first prizes in 200 m running race, Javelin Throw, Discus Throw, Table Tennis, Badminton (Doubles) and Carrom. Besides, the team was the runner-up in Chess and Carrom. In the event for Men, CIRCOT team was runner-up in Table Tennis and Carrom.

Budget Utilisation and Revenue Generation

- ✓ The Institute utilized the entire plan allocation of Rs. 6.13 crores sanctioned by the Council for 2010-11.
- ✓ The revenue generation during the year was Rs. 66.23 Lakhs as against the Council's target of Rs. 66.00 lakhs for the year 2010-11.

1

Introduction

This Eighty-seventh Annual Report of the Central Institute for Research on Cotton Technology (CIRCOT) covers the period from April 1, 2010 to March 31, 2011.

The Central Institute for Research on Cotton Technology (CIRCOT) was established by the then **Indian Central Cotton Committee (ICCC)** in the name of **Technological Laboratory of ICCC** in the year 1924. During the initial period, the objectives of the Institute were to undertake quality evaluation and spinning tests on various cotton strains received from agricultural departments in the country and to assess their spinning potential. 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 changed to **Cotton Technological Research Laboratory (CTRL)**. Realising the phenomenal increase in the research component, the Quinquennial Review

Team (QRT) recommended changing the name of CTRL to **Central Institute for Research on Cotton Technology (CIRCOT)**. Accordingly, the name was rechristened with effect from April 1, 1991.

CIRCOT is one of the ICAR research Institutes under the Engineering Division of the ICAR. The Institute has six quality evaluation units located at Coimbatore, Dharwad, Guntur, Nagpur, Sirsa and Surat. The Ginning Training Centre at Nagpur under its fold specializes in research on ginning and human resource development for this sector. The institute has four major divisions – Quality Evaluation and Improvement, Mechanical Processing, Chemical and Biochemical Processing and Transfer of Technology.

Mandate

- To develop new technologies and machinery for better utilization of cotton and other textile 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 nodal centre for diversified utilisation of cotton plant by-products and 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 testing.

Achievements Made in the Recent Past

- ✓ CIRCOT has designed and developed a Prototype Variable Speed saw gin with 45 saw cylinders in technical collaboration with M/s. Cottor Plant India Ltd., Mumbai. The machine is run with a variable frequency drive system for controlling both the feed and saw-speeds independently, as per the quality of the seed cotton. The machine was found to preserve the fibre length and produce ginning output equal to traditional saw ginning machines.
- ✓ CIRCOT studies indicated that storage of three varieties of cotton viz., MCU.5, Bunny and LRA.5166 for one year at the room temperature did not affect the fibre quality.
- ✓ Cyclones are popular devices that are used in industries for cleaning air and to prevent air pollution. In the ginning industry, cyclone separators are used for preventing dust pollution inside the ginning area and the current machines are found to be less effective. Various types

of cyclones were designed based on mathematical models developed and assessed for their performance.

- ✓ Cotton bale manager, a software, was developed by CIRCOT to (1) design and generate a bale identification tag and (2) interface this bale tag with a bale database management software so as to generate customized labels for each and every individual bale containing factory's name, the press mark number, year of production, bar-coded bale ID and fibre attributes. Application of **Bale Manager** to generate Bar Code Labels was found to be better than the conventional bale marking system with ink. Another software, for managing a modern ginnery, namely GINERP has been developed by CIRCOT in association with M/s. S.S.P.S., Hyderabad, In this software, the bar-coding has been included as a bale management module. The GINERP software intended to help in management of men, material, machinery and finance in a ginnery and has already been commercialized after signing the MoU signed with the software firm.
- ✓ A single cylinder cotton pre-cleaner based on axial-flow principle for on farm use has been designed and developed. The axial flow pre-cleaner consists of a cylinder assembly, a grid bar assembly, a top cover assembly, a feeder assembly, a mainframe assembly and a power

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- drive assembly. The machine is made portable by providing wheels. The machine has been found to remove effectively the trash particles like leaves, bracts, kawadi, sand and fine dust with improvement in colour and without any adverse effect on the fibre quality. The machine can clean seed cotton at the rate of 5-7 quintals per hour. The trash content in the cleaned seed cotton was as low as 1 – 1.5%.
- ✓ CIRCOT has developed a pneumatic system for Double Roller Gin, wherein the hanging dead loads were replaced by pneumatic loading. The modification decreased vibration level of the machine and enabled uniform ginning of cotton throughout the roller. A marked improvement in the brightness of lint and decrease in nep count by about 15% was observed.
 - ✓ As mandated like every year, this year also CIRCOT has evaluated a large number of cotton samples received from the trials conducted under the AICCIP by agricultural universities. This activity accounts for around 60% of the work in the institute. During the XI plan period, 16,860 samples have been tested and reported in the Annual meetings of the AICCIP. The institute also makes recommendations pertaining to the quality characteristics of the varieties which enables the cotton improvement system in the country to decide on their release.
 - ✓ About 219 Trade variety samples received from different locations of the cotton ginning belts were tested for their fibre characteristics. The spinning potential of these samples was also determined and reported.
 - ✓ In yet another continuous on-going programme, quality parameters of about 152 cottons grown under standard conditions received from various agricultural universities and their regional units have been tested. A comparison on the major fibre properties of these varieties with respect to the values at the time of their release has been made. It was found that most of the varieties maintain their 2.5% span length and micronaire values but the tenacity values for some of the varieties were now lower than the values assigned at the time of their release.
 - ✓ A mini Lap preparation machine for microspinning of cotton samples has been designed and developed by CIRCOT. The machine can produce around 50 laps per day in contrast to a few by manual means. This machine eliminates human drudgery, and does not require skilled worker's intervention to operate.
 - ✓ Calibration cottons are the standard reference materials for calibrating High Volume Instrument (HVI) and Advanced Fibre Information System (AFIS) which are used for testing cotton samples. This reference material was previously being

supplied by USDA. As a result, the testing laboratories and textile industry had to incur huge foreign exchange to import it into the country. To circumvent this, the institute has taken up a Revolving Fund project, and developed this standard testing material for the Indian market. This effort of CIRCOT has been lauded by the textile industry across the country. During the plan period so far around 2400 containers have been marketed, generating a revenue of around 14 lakh for the institute.

- ✓ Multi component industrial yarns for varied end uses have been developed by employing a novel spinning technology, namely, Friction Spinning. CIRCOT has prepared nylon-cotton core-sheath yarns of different counts employing this novel system. It was noted that the cotton component with sheath of the yarn helped in providing a softer feel in the textile, and also aided in bonding with rubber compounds conserving the chemical requirement when composites were prepared.
- ✓ CIRCOT has developed a novel power driven sliver making machine, called CIRCOT Minicard. Initially, the machine was fitted with a stationary flat for functional need. But it was found that heavy stationary flats needed frequent machine stoppages and manual cleaning after 8-10 minutes of running resulting in low machine efficiency and drudgery to the farmer. The machine has been redesigned with a rotating flat system. The machine could now be run at a stretch for 8 hours. The sliver produced was uniform and free from neps and imperfections. 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. The machine is currently undergoing field trials.
- ✓ Fibre quality data on 2.5% Span Length, Micronaire and Tenacity were compiled from the **Annual Cotton Quality Update** for the years 2004 to 2009. The data was then arranged according to variety and state-wise to facilitate the study of locational effects. Analysis showed that there existed positive locational effects on the fibre length and strength for some of the varieties.
- ✓ CIRCOT in collaboration with the National Bureau of Soil Survey and Land Use Planning (NBSS & LUP) undertook a study to design and develop a spatial database and mapping module for cotton fibre quality parameters under a GIS environment. These spatial maps developed are found to provide site specific information on fibre quality characters and are easy to visualize and interpret. This could be used by a trader or ginner to buy cotton with particular quality characteristics. These maps could also be useful to

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policy makers and researchers for systematic resource/research planning for that particular region.

- ✓ In a project to evaluate the moisture management capability of cotton and cotton blended fabrics available in the retail market, it was observed that the majority of fabrics showed moderate Overall Moisture Management Capacity (OMMC) of about 0.4 (good), but no sample had OMMC above 0.8 (excellent). The one way accumulative transport capacity which quantifies the ability of the fabric to remove liquid away from the skin surface was found to be poor for majority of the fabrics.
- ✓ A simple yet an improved apparatus for measurement of Moisture Vapour Transfer Rate (MVTR) has been developed by modifying the sample mounting procedure and drive system in the earlier model. This design has been validated with a set of fabrics having different water vapour transmission rates.
- ✓ Trials on application of ZnO-nanoparticles along with fillers in paper coating were undertaken to impart antimicrobial properties. Nano-zinc oxide coated paper was found superior to normal zinc oxide coated paper in brightness, whiteness, smoothness, print density and print uniformity, picking velocity and oil absorbency. Further, Nano-Zno coated paper samples were found to possess excellent antifungal property. About 55% reduction in material (zinc) consumption could be achieved due to application of zinc oxide in nano-form.
- ✓ An attempt was made to characterize the natural dyes through spectroscopy and chromatography. Absorbance spectra of *Rubia cordifolia* and *Rubia sikkimensis* were studied, and it was found that absorbance of *R.sikkimensis* was higher than the wild samples of *R. cordifolia* but lower than its commercial counterparts. Since, natural dyes are seldom available in pure form this study would help in establishing the purity of the natural dyes available in the market.
- ✓ A novel wet chemical process was developed for the preparation of nano-ZnO using zinc nitrate and sodium hydroxide as precursors. The zinc oxide nanoparticles thus formed were impregnated onto cotton fabrics. A qualitative assessment revealed an 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%). For medical textiles, the use of 1% nano-ZnO coating showing 99.9% reduction in

- the case of both Gram-positive and negative bacteria can be recommended. The nano-ZnO coated cotton fabrics showed efficient blocking of UV radiation in the regions of UV-A (315–400 nm) and UV-B (280–315 nm). Further, the study showed that >99% antibacterial activity was retained until 15 hand washes.
- ✓ Nano-silver particles were produced by two novel methods such as, microbial and biochemical, and were characterized. These nanoparticles were coated onto cotton fabrics with and without a stabilizer under various conditions to impart antibacterial activity. The cotton fabric showed excellent antibacterial activity against two representative bacteria *Staphylococcus aureus* and *Klebsiella pneumoniae*.
 - ✓ In an effort to replace the harmful formaldehyde used in easy care finishing treatment, Polycarboxylic acid was used as a cross-linking agent prior to both dyeing as well as printing of cotton fabrics. DP finished fabrics showed good colour strength, durable-press, breaking strength and comfort properties as compared to their controls. The handle properties of treated fabrics showed better resiliency implying that the fabrics tend to easily return to their original position and hence, are less likely to form wrinkles. The treated fabrics displayed reduced stiffness (koshi) and softness (Fukurami) values. The surface smoothness (Numeri) was seen to be improved with treatments.
 - ✓ Xylanase is an enzyme which hydrolyses xylans, a complex heteropolysaccharides consisting of beta 1,4 linked xylopyranos chains that are usually highly substituted with acetyl. Xylanase is produced by bacteria, fungi and other organisms. Production of xylanase, in fungal cultures is mostly associated with the secretion of cellulase. Most of the cellulase producing fungal cultures secrete xylanase and other enzymes in small quantities. Therefore, there is always a search for the organism that produces xylanase in large quantities, but little of cellulase. Studies to enhance the production of xylanase by *A. niger* sp. revealed that addition of sodium chloride could enhance xylanase upto 13% while sodium citrate could enhance the same up 30 % if added to the medium. Simultaneously, the effect of xylanase on cottonseed hulls was also studied. The results indicated that cottonseed hulls can yield 500 µg/ml of reducing sugars as xylose at 0.5% enzyme concentration in 4 h.
 - ✓ 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 sample powdered and mixed with cassava flour (20:80) was

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subjected to extrusion cooking. It was noted that it is possible to prepare good quality extruded products that could find application as animal feed with enhanced colour grade, puffiness and free gossypol within tolerance limits.

- ✓ In a research study to identify microbes that could degrade gossypol in the cotton seed meal, soil samples were collected from cotton fields of Nagpur, Akola, Parbhani and Rahuri regions. Isolation of microorganisms was done by enrichment culture technique in which a mineral medium containing gossypol as a sole carbon source was used for isolation. 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 up to 90% in mineral medium. Cotton seed cake inoculated with *C. tropicalis* showed 68.75% reduction in free gossypol during solid state fermentation.
- ✓ A recently concluded externally funded project from the Common Fund for Commodities (CFC), Netherlands on the Utilisation of Cotton Stalks for Value added Products provided the following highlights:
 - A cost-effective supply chain mechanism has been developed for collection, cleaning, chipping, storage and transportation of cotton stalk from the field to the particle board factory at an economically affordable price to the industry.
 - Awareness has been created amongst farmers about the utility of cotton plant stalks as an industrial raw material for particle board manufacture.
 - As an R & D exercise a cotton stalk cleaning system has been developed and evaluated.
 - The process of particle board manufacture was standardised on the pilot plant. New eco-friendly resins have been developed and used in board making. Boards having termite resistance, fire retardance and water repellent properties were prepared.
 - Industrial trials were undertaken to work out the techno-economic feasibility of the processes of particle board and hardboard manufacture using cotton stalks. It has been demonstrated that good quality boards suitable for lamination can be manufactured by using cotton stalks without any major modifications in the existing plants.
 - The industry has been convinced

- about the utility of cotton stalk as a raw material for particle board and hardboard manufacture and is ready to use it provided cleaned, chipped cotton stalks are made available at the factory gate at an affordable price.
- Awareness is also created amongst entrepreneurs, NGO's, financial institutions and Governmental agencies about the effectiveness of cotton stalk as an industrial raw material for particle board manufacture.
- ✓ Under the NAIP funded sub-project (Component 2) Value Chain for Cotton Fibre, Seed and Stalks: An Innovation for Higher Economic Returns to Farmers and Allied Stake Holders, the Institute could demonstrate the following benefits to the various stake holders involved in the value chain.
- About 20% higher cotton yield was recorded in the farmers fields due to improved package of practices, which were demonstrated to the farmers by the scientists involved in this project. Besides, certified seeds were also supplied to the farmers through the project.
 - Due to the demonstration of clean-cotton picking methods through various awareness programmes, the trash in the lint was reduced to less than 1-2%, with minimal contaminants. Farmers could get Rs. 200/- as an additional price per quintal for their produce.
 - Since after ginning the bales were tagged based on their Micronaire value, it was possible for the spinning industry to decide on the selection of cottons for preparation of mix so as to produce yarns of the desired characteristics.
 - Cotton fabrics and shirts made out of the above yarn resulted in better feel and appearance. The warp of the fabric was from cotton with Micronaire value 3.1 - 3.2 while weft had yarns of other Micronaire values. As per the market survey, the shirts could be sold for more than Rs. 650, while the production cost was around Rs. 350 per piece.
 - Due to the demonstration of an appropriate methodology for collection of cotton plant stalk from the cotton field, the farmers could get Rs. 500 per tonne for clean plant stalks, and if chipped at the farmers field, they could earn upto Rs. 1200 per tonne.
- ✓ The NAIP (Component 4) sub-project, design and development of a proto-model of flexi (rubber) dam has been successfully completed by the consortium, in which CIRCOT was a partner. Flexi dams, commonly known as rubber dams

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are a special group of geo-system, and made from technical textiles specially prepared from tailor made textile-rubber composites as per the design need. The main advantages of flexible rubber dam are their short construction period, easy maintenance and repair, long span and adaptability to different slopes, earthquake resistance and environment friendliness. They are strong and durable, yet flexible to be rolled up for easy transportation. Due to their structural simplicity and easy inflatable and deflatable mechanisms for control of water levels in the upstream as per the requirement, they are expected to be an effective geo-system for water shed management.

✓ In the Value Chain on Banana Pseudostem for Fibres and other Value Added Products, a NAIP sponsored sub-project in which the Institute is a partner, the following developments have been made:

- The fibre Extraction Machine (Raspador), which was developed earlier, was modified to get good quality banana fibres.
- The grading of varieties was done on the basis of tensile parameters. The catalogue preparation is under way.
- The Spinning Machines (e.g. Yarn Making Machines) suitable for Banana Fibres were designed and fabricated. These machines were

successfully installed at CIRCOT.

- Various trials were conducted for fine-tuning of Yarn Making Machines. Yarn prepared on these machines was evaluated for quality parameters.
 - Large scale trials for making yarn from banana fibres were conducted at M/s. Empire Mills, Kolkata by processing 200 kg banana fibres.
 - A process was standardised for application of sap extracted from banana pseudostem as a mordant to cotton fabric for dyeing with natural dyes.
 - Microcrystalline cellulose powder prepared from banana fibres was evaluated and compared with commercial grade MCC. The properties were *on par* with the commercial product.
- ✓ In the NAIP sub-project on the Synthesis and Characterisation of Nano-cellulose and its Application in Biodegradable Polymer (Component 4), synthesis of nanocellulose using the aerobic fungus, *Trichoderma reesei* was standardized with the maximum yield of 31% in batch fermentation process with microcrystalline cellulose (MCC) as the sole carbon source. Efforts are being made to separate out the different fractions of the enzyme and use them independently to enhance the nano-cellulose yield in powder form.

Nano-cellulose in fibrillar form was also produced by mechanical means by using high pressure homogenizer. A pretreatment of cellulose with Zinc chloride was found to help in producing nano-fibrils. The nano-cellulose powder and nano-fibrils prepared were used as fillers in the production of starch films. The tensile strength of starch film could be improved by 1.5 times the control value due to the incorporation of 5% of nano-cellulose. The oxygen permeability of nano-cellulose impregnated starch film was found to reduce by one-fifth the value of the control sample.

- ✓ The progress made under the NAIP sponsored sub-project on Zonal Technology Management and BPD Unit at CIRCOT is as follows:
 - Based on the BPD-CIRCOT proposal, a loan of 680 lakhs has been sanctioned by the Ministry of social Welfare, Govt. of Maharashtra to M/s. Tulsai Magasvargiv Audyogik Sahakari Sanstha, Washim (MS) to set up a 10 TPD capacity plant for manufacture of particle board from cotton stalks based on CIRCOT technology.
 - The BPD-CIRCOT has been approved by the 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.
- Currently, the BPD has 40 registered members, who have shown interest in availing CIRCOT technologies.
- The BPD has taken various efforts to showcase the technologies, like organization of business development programmes and direct marketing, and has exhibited technologies developed by the ICAR West Zone institutes at an ICAR-Industry Meet, held at New Delhi in July 2010.
- Incubation facilities like Computerised sample preparation machines, Advanced fibre Information System, Research Rotary digester, Lab Model Stenter and Hydraulic Press have been purchased and installed and the facilities created by the BPD. Start-up entrepreneurs can use these facilities and other resources available in the institute to develop their commercialisation ideas.
- ✓ In the 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, a NAIP sub-project under Component 2, proto type machines have been fabricated based on the

INTRODUCTION

data collected from testing cocconut husk and fibres. The Design and development of prototype disintegrator, defibering machine and fibre segregator have been completed. CIRCOT is providing assistance in standardizing fibre classification method for coconut fibres by preparing a protocol based on its fineness data. Value added diversified ornamental cloth suitable for furnishing applications has been successfully developed in hand-weaving machine fitted with jacquard design system. A special handloom has been developed by NIRJAFT to prepare coconut-jute fabrics.

Patents Applied during the Current Year

1. Zinc Chloride Pretreatment of Micro crystalline Cellulose for Preparation of Nano Cellulose by Homogenization Process

2. A Pneumatic Operated Roller Loading System for Double Roller Gin
3. Enzymatic Pretreatment to Cottonseed Kernel for Enhanced Oil Recovery
4. A Novel Coconut Fibre Segregation Machine.

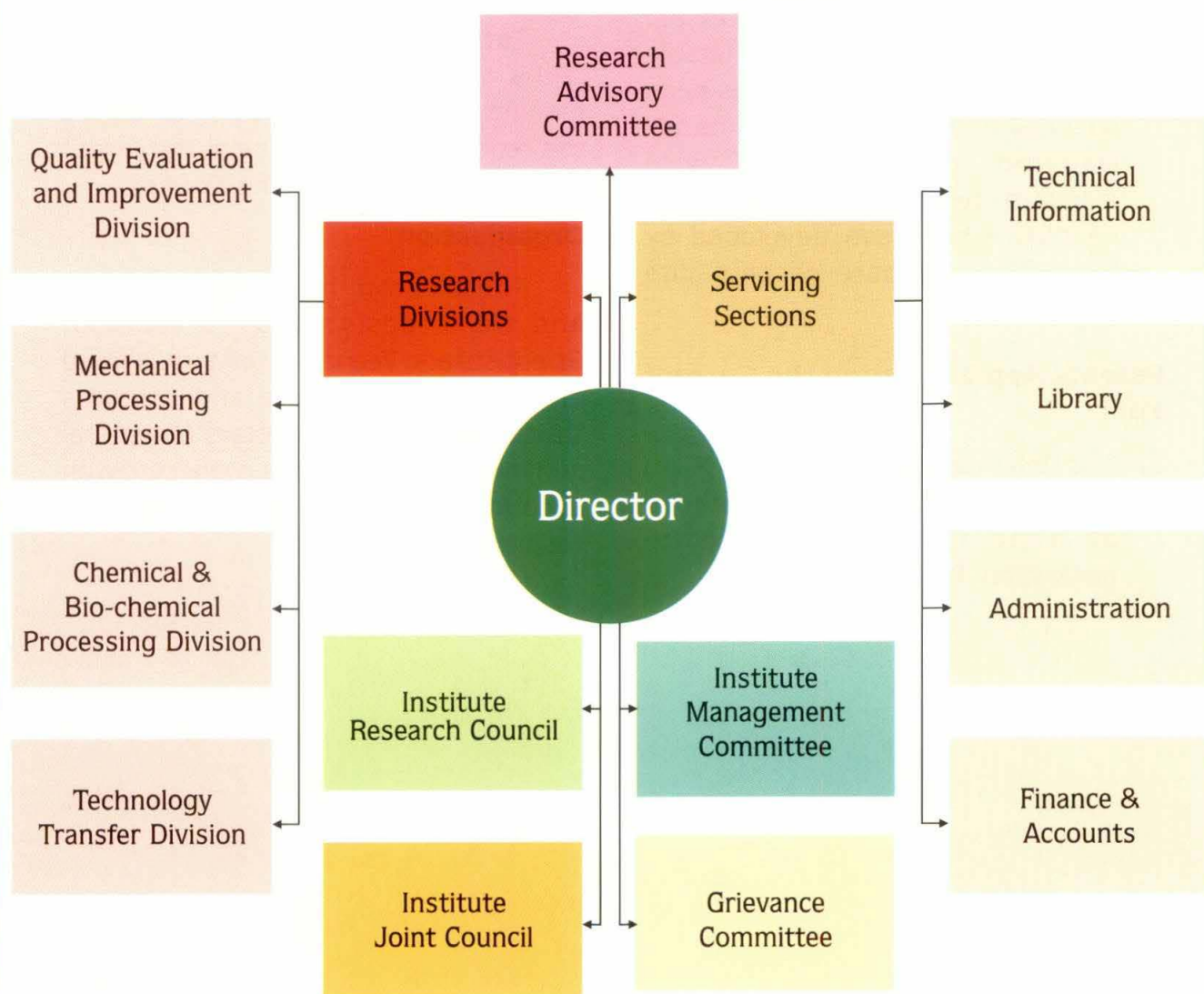
Revenue Generation

The Institute generated Rs. 66.23 lakhs through commercial testing, training and consultancy services during the reported year as against the target of Rs. 66 lakhs set by the Council.

Organisation

The Director heads the institute, and he is assisted by a team of Scientists and Technical Officers. A Head of Office and a Finance and Accounts Officer assist him in matters of general administration and those connected with accounts and audit of the Institute, respectively.

ORGANISATIONAL CHART



INTRODUCTION

Financial Statement

Expenditure and Receipts of the Institute during 2010-2011

A. Expenditure

Sl. No.	Head of Account	Expenditure (Rs. in lakhs)	
		Non-Plan	Plan
1.	Establishment Charges OTA	985.00	-
		10.00	-
2.	Travelling Expenses	7.00	10.00
3.	Works	19.06	225.03
4.	Other Charges including Library	87.58	377.84
	Total	1098.74	612.87

B. Receipts

Sl. No.	Head of Account	Amount (Rs. in lakhs)
1.	Analytical and Testing Fees	24.03
2.	Training	5.97
3.	Interest on TDR & STD	3.57
4.	Other receipts	36.23
	Total	69.80

Staff Position

As on March 31, 2011

Cadre	Sanctioned	In Position
R.M.P. (Director)	1	1
Scientific	50	24
Technical	114	93
Administrative	48	43
Skilled Supporting Staff	60	55
Total	273	216

2

Research Achievements

A brief account of the progress made in the various research projects carried out during 2010–2011 both at the headquarters and at its various quality evaluation units including the Ginning Training Centre, Nagpur is given below:

CORE AREA I : IMPROVEMENT IN GINNING OF COTTON

The Performance Evaluation of Cyclones Used in Modern Ginneries

Cyclones are popular devices that are used in industries for cleaning gas and to prevent air pollution. In the ginning industry, cyclone separators are used for removing particulate matter in the air for preventing air pollution.

During the period, the performance of different numerical schemes for discrete phase modeling of cyclone separators has been investigated by using Reynolds stress turbulence model (RSTM) facility of CFD code Fluent 6.3.26. The simulated results have been compared with experimental results available in literature. An analysis of computed results shows that the high order discretization schemes give satisfactory performance for simulation of dispersed particles of all size.

However the prediction of trapezoidal discretization scheme was found to be marginally better than the Runge-Kutta scheme. The low order schemes and combination of low order and high order schemes failed to predict the accurate collection efficiency of the smaller dispersed particles. The superiority of the CFD method in modeling the grade efficiency curve and cut off size of the cyclone separator was demonstrated by comparing the results of CFD model with experimental data and with the four popular empirical models given in literature. The results suggested that the CFD method using trapezoidal scheme for discretization of equation for motion of dispersed particles is the optimum choice for simulation of the second phase of cyclone separators.

A comparative study of the continuous phase flow modeling of cyclone separator with different turbulence models was conducted. The analysis of results indicated that RSM turbulence model predictions gave satisfactory prediction of velocity profiles and pressure drop inside the cyclone separator, whereas k- ϵ and RNG k- ϵ models failed to predict accurately the velocity profiles and pressure drop inside the cyclone separators.

A numerical simulation of the continuous fluid phase and dispersed phase of 1D3D and 2D2D cyclone separators were carried out by using the Reynolds stress turbulence model (RSTM) facility of CFD code Fluent 6.3.26. The computed results are being validated with experimental values.

It has been proved in the present study that RSM is capable of predicting precession of vortex core (PVC) phenomenon inside the cyclone separator with reasonable accuracy as compared to previous studies. However the prediction of velocity fluctuations near the wall region was found to be negligible. The difficulty in the accurate prediction of velocity fluctuations inside the cyclone separator leads to inaccurate prediction of collection efficiency of small dust particles. It is because collection of small dust particles is mainly governed by the turbulence of the carrying fluid which is not resolved accurately with RSM. The LES modeling approach of CFD code Fluent 6.3.26 was used to improve the predictions of velocity fluctuations of the cyclone separator. The analysis of results showed that the simulation of velocity fluctuations gave better prediction using LES modeling and thus the collection efficiency of small dust particles.

Design and Development of Pneumatic Loading System for Double Roller Gin

During the reporting period, the

fabrication of the pneumatic loading and its incorporation in a double roller ginning machine have been completed (Fig. 1). The required pressure level was maintained. A primary trial was conducted with 30 quintals each of cotton in both the conventional as well as the pneumatic loaded ginning machines. More uniform ginning was observed throughout the roller. The ginned samples are being tested for fibre properties. Some of the fibre parameters like colour, reduction in nep count showed improvement compared to that processed in traditional D.R. gin.

Engineering Intervention for Improving Energy Efficiency in Bale Presses

A study was undertaken combining a survey and an interaction with ginners and manufacturers to assess the power requirement, energy consumption and cost of operation both for the non-automatic as well as automatic baling presses. The design parameters and factors affecting the energy consumption of the baling presses were collected. The power required for different unit operations of different capacities was checked and pooled. The power required for down packing, up packing and conventional baling presses were found out and comparative analysis was carried out.

The power required for fully automatic down packing type baling presses of capacities 15-20 bales/h, 20-25 bales/h and 30-35 bales/h was

70, 80 and 110 HP respectively. The power required for fully automatic up-packing type baling presses of capacities 13-15 bales/h, 20-22 bales/h was 50 and 70 HP respectively. The power required for a double stage manual press for the capacity 30-35 bales/h

was 75-100 HP for different makes and models. The energy consumption for conventional manual, down packing type and up-packing type presses was 1-1.25, 1.5-1.75 and 2.0-2.5 units/bale respectively.

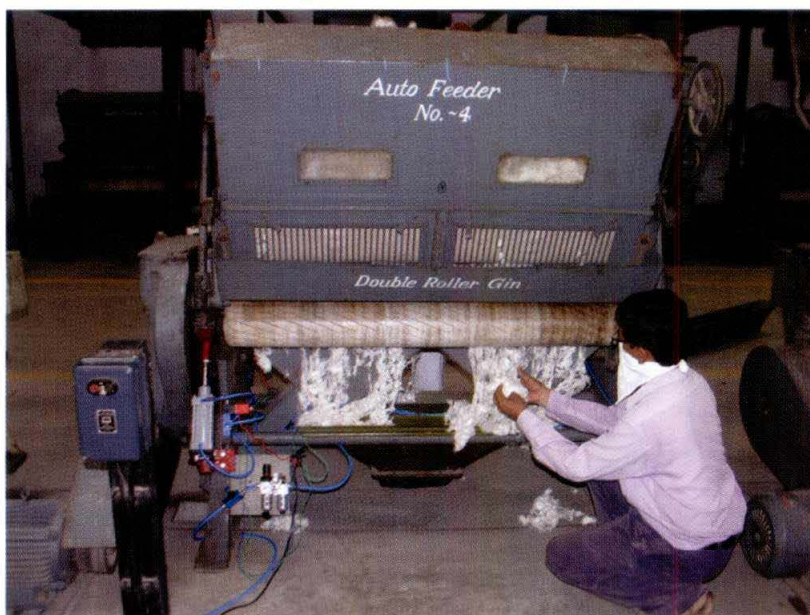


Fig. 1. Pneumatic Loading System for Double Roller Gin designed at CIRCOT

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

This core area encompasses three distinct facets of technological research:

a) Evaluation of the quality of cotton samples received from the All India Co-ordinated Cotton Improvement Project (AICCIIP) and various other agricultural trials.

b) Tests on Standard and Trade varieties of Indian cotton.

c) Research work done on specific agricultural and technological aspects relevant to improvement of cotton attributes.

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

The All India Co-ordinated Cotton

RESEARCH ACHIEVEMENTS

Improvement Project (AICCIP) was launched in April, 1967 with a view to improve productivity of cotton and its quality through coordination of research efforts at various Institutes, Agricultural Universities, State Departments of Agriculture and other related agencies. CIRCOT is primarily involved as a technology partner 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, the screening of initial breeding material and cotton germplasm, for quality parameters are done at the regional units of CIRCOT. Most of the cottons under the National Trials are tested at the QE unit at Nagpur. However, samples pertaining to the advanced trials for testing of microspinning and full spinning and mill processing are being carried out at the Headquarters at 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 the CIRCOT Headquarters, Mumbai.

Breeding materials, Initial Evaluation Trials (IET) and Preliminary Varietal Trials (PVT) constitute the initial stages of

cotton breeding programme of AICCIP. Promising strains amongst these trials are taken under the Coordinated Varietal Trial (CVT) called the Advanced Trials. The samples under the 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, seed coat fragments, trash content and yarn uniformity, etc. 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 farmer's 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 continue to be received every year for quality evaluation from trials conducted under the AICCIP by various Agricultural Universities and private participants. The number of samples received during 2010-2011 season for different tests from agricultural trials at the

CIRCOT ANNUAL REPORT 2010-2011

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 also given in the Table 3.

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

Types of Tests	Average for the last five years (2005-06 to 2009-10)	2010-11
Fibre and full spinning	29	32
Fibre and micro spinning	246	58
Fibre test alone (HVI)	2832	1503
Mill test	3	-
Standard cottons	63	14
Trade varieties	42	18
Germplasm	633	-
Research	137	-
Consultancy project	87	-
Total	4061	1625

TABLE 2 : NUMBER OF COTTON SAMPLES TESTED AT THE REGIONAL QUALITY EVALUATION UNITS DURING 2010-11

Regional Units	No. of Sample Tested
Coimbatore	2712
Dharwad	4072
Guntur	6735
Nagpur	6701
Sirsa	3581
Surat	4689
Total	28490

RESEARCH ACHIEVEMENTS

TABLE 3 : STATE-WISE NUMBER OF COTTON SAMPLES TESTED AT CIRCOT UNDER AICCIP DURING 2010-11 SEASON

State	Fibre and full spinning	HVI alone	Total
Punjab	-	477 (29)	477 (29)
Haryana	1 (1)	436 (17)	437 (18)
Rajasthan	-	193 (11)	193 (11)
Utter Pradesh	-	30 (3)	30 (3)
Gujarat	-	365 (20)	365 (20)
Maharashtra	3 (2)	511 (30)	516 (32)
Madhya Pradesh	-	199 (6)	199 (6)
Orissa	-	164 (8)	164 (8)
Karnataka	7 (3)	1026 (52)	1033 (55)
Andhra Pradesh	11 (2)	89 (4)	100 (6)
Tamil Nadu	-	191 (12)	191 (12)
Total	22 (8)	3681 (190)	3703 (200)

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

The Annual Technological Report contains the data for quality parameters 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). 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 3724 samples have been reported of which 1665 samples belong to zonal trials while 2059 cotton samples correspond to National Trials. Out of the zonal trials, 577 cotton samples belong to North zone, 353 to Central zone and 735 to South zone. The quality data of 3724 cotton samples have been

summarized in a total of 200 tables.

The quality parameters of all cotton fibre samples measured by 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 advanced trials and pre-release varieties. A list of promising strains completely satisfying or close to fibre quality norms and their CSP values are prepared for the benefit of the cotton scientists. Out of the total samples tested, approximately five percent strains were found promising and can be promoted to the next higher stage during 2010-2011.

RESEARCH ACHIEVEMENTS

TABLE 3 : STATE-WISE NUMBER OF COTTON SAMPLES TESTED AT CIRCOT UNDER AICCIP DURING 2010-11 SEASON

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NORTH ZONE

The various trials conducted under Br.03 a (*hirsutam* genotype), Br.04a,

Br.05a and those for the *arboreum* genotype under Br.24a and Br.25a yielded the following fibre quality data as shown in the Table 4.

TABLE 4 : RANGE OF FIBRE PROPERTIES IN NORTH ZONE

S1. No.	Trial	Range of fibre parameters			Spinnability
		2.5 % SL mm	Mic. Value	Tenacity g/tex	
1	Br.03 a	22.7 - 31.2	3.8 - 5.6	17.9 - 26.5	20s, 30s
2	Br.04 a	23.8 - 31.9	3.5 - 5.6	17.6 - 26.0	-
3	Br.05 a	23.0 - 32.4	3.8 - 5.6	18.3 - 26.6	-
4	Br.24 a	18.0 - 27.9	3.8 - 7.4	15.5 - 22.7	-
	Br.25 a				

Some of the cotton varieties from North Zone whose quality parameters have been found to be very good have

been given in Table 5. These are considered as the most promising strains of cotton in the zone.

TABLE 5 : PROMISING STRAINS IN NORTH ZONE

S1. No.	Trial	Place	Variety/ Code No.	2.5% S.L.	MIC	Tenacity
1	Br.03(a)	Kanpur	F 2177	31.0	4.6	26.5 *
2	Br.05(a)	Faridkot	MRC 7365	26.9	3.8	23.0
3	Br.05(a) CH7	Hisar	MRC 7365	29.6	4.4	25.1
4	Br.05(a)	Kanpur	(LC) LHH 144	28.8	4.2	24.8
5	Misscell [Path - 3(T)/10]	Hisar	T 3	30.9	4.1	24.5
6	Misscell (PHY.4)	Ludhiana	2	28.2	4.5	23.9
7	Misscell - (Agro IV A)	Ludhiana	2	30.8	4.0	26.3 *
8	Misscell - (Agro IV A)	Ludhiana	3	30.4	4.2	26.3 *
9	Misscell - (Agro IV A)	Ludhiana	4	30.6	4.6	26.0
10	Misscell - (Agro IV A)	Ludhiana	6	28.9	3.8	24.4
11	Misscell - (Agro IV A)	Ludhiana	9	30.5	4.5	26.3 *
12	Misscell - (NBT.H)	Sirsa	3	30.0	4.4	25.2
13	Misscell (ST)	Sirsa	ST 25	30.4	4.2	25.9
14	Misscell (ST)	Sirsa	ST 26	30.8	4.0	25.5

RESEARCH ACHIEVEMENTS

CENTRAL ZONE

strains pertaining to the central zone are summarised below as a Table 6.

The fibre quality parameters of the

TABLE 6 : FIBRE QUALITY PARAMETERS IN CENTRAL ZONE

Sl. No.	Trial	Range of fibre parameters		
		2.5 % SL mm	Mic. Value	Tenacity g/tex
1	Br.03 a	24.8-35.1	3.4-5.2	19.6-28.8
2	Br.03 b	23.2-31.3	3.7-5.6	18.0-26.6
3	Br.04 a	26.6-35.9	3.7-5.4	19.8-28.4
4	Br.04 b	23.9-35.1	3.8-5.9	17.6-26.6
5	Br.05 a	25.8-35.9	4.0-5.4	19.4-26.6

The promising strains and most identified based on the trials and are promising strains (*) have been reproduced in the Table 7.

TABLE 7 : PROMISING STRAINS IN CENTRAL ZONE

Sl. No.	Trial	Place	Variety/ Code No.	2.5% S.L.	MIC	Tenacity
1	Br.03(a)	Rahuri	LC	27.0	4.2	24.0
2	Br.03(a)	Rahuri	ARBH 2002	27.5	4.0	23.4
3	Br.03(a)	Rahuri	TCH 1732	30.2	4.1	25.8
4	Br.03(a)	Rahuri	GJHV 502	28.7	4.2	24.0
5	Br.03(a)	Rahuri	ZC (LRA 5166)	30.4	4.3	26.3 *
6	Br.03(a)	Rahuri	ARBH 2004	26.6	4.4	23.5
7	Br.03(b)	Bharuch	IH 67	27.3	4.3	24.6 *
8	Br.03(b)	Bharuch	PH 1060	27.2	4.2	24.1
9	Br.03(b)	Bharuch	H 1452	26.4	4.3	24.5 *
10	Br.03(b)	Bharuch	GBHV 164	24.7	4.5	21.5 *
11	Br.03(b)	Bharuch	AKH 0205	28.1	3.8	26.6 *

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Sl. No.	Trial	Place	Variety/	2.5% S.L.	MIC	Tenacity
12	Br.03(b)	Bharuch	CPD 168	28.3	3.7	25.5 *
13	Br.04(a)	Rahuri	ZC (LRA 5166)	30.3	4.1	26.7 *
14	Br.04(a)	Rahuri	CCH 2623	28.9	4.0	25.2 *
15	Br.04(a)	Rahuri	GJHV 460	27.7	3.7	25.0
16	Br.04(b)	Bharuch	GISV 218	26.6	4.3	23.4
17	Br.04(b)	Bharuch	ZC (LRA 5166)	30.6	4.5	26.6 *
18	Br.04(b)	Bharuch	AKH 9916	28.1	4.1	25.9 *
19	Br.05(a)	Rahuri	DHH - 1054	27.2	4.4	23.4
20	Br.05(a)	Rahuri	DHH - 2015	28.4	4.1	24.6
21	Br15(a)	Sabarkantha	RAHB 971	33.7	4.0	29.9 *
22	Br15(a)	Sabarkantha	RAHB 189	34.5	3.6	32.7 *
23	Br15(a)	Sabarkantha	ZC (DCH 132)	37.2	3.5	32.6 *
24	Br15(a)	Sabarkantha	DHB 872	36.2	3.7	30.8 *
25	ICAR Bt.Cotton Br.05	Bharuch	259	29.3	3.8	24.8

SOUTH ZONE

The fibre quality parameters viz. 2.5% S.L, Mic. value and Tenacity for

the strains pertaining to the different trials conducted during 2010-2011 are summarized in the Table 8.

TABLE 8 : FIBRE QUALITY PARAMETERS OF STRAINS IN SOUTH ZONE

Sl. No.	Trial	Range of fibre parameters		
		2.5 % SL mm	Mic. Value	Tenacity g/tex
1	Br.03a	24.7-34.0	3.5-5.1	18.7-24.2
2	Br.04 a	25.0-30.9	3.0-4.8	19.4-24.7
3	Br.05 a	25.4-35.6	2.8-4.4	19.5-26.3
4	Br.25	19.0-27.4	4.5-7.0	13.3-23.2

RESEARCH ACHIEVEMENTS

Some of the cotton varieties from south zone whose quality parameters have been found to be as per norms are included in the Table 9. The '*'

marked samples have even better fibre qualities. These can be regarded as the most promising strains of cotton in the south zone from the current year's trials.

TABLE 9 : PROMISING STRAINS FROM SOUTH ZONE

Sl. No.	Trial	Place	Variety/ Code No.	2.5% S.L.	MIC	Tena- city
1	Br.03 (a)	Adilabad	CPD 2001	25.9	4.3	22.3
2	Br.04 (a)	Adilabad	BS 51	27.2	4.3	23.2
3	Br.04 (a)	Coimbatore	BS 277	27.8	4.3	23.4
4	Br.04 (a)	Raichur	CCH 2623	28.8	4.6	23.9
5	Miscell Bt. Hy R - I	Bheemarayangydi	BGD - T - 106	28.7	4.4	24.1
6			BGD - T - 110	32.8	4.0	26.8
7			BGD - T - 113	26.5	3.8	23.4
8	Miscell Bt. Hy R - II	Bheemarayangydi	BGD - T - 101	28.8	3.9	24.3
9			BGD - T - 104	27.1	3.7	26.1 *
10			BGD - T - 112	30.4	3.8	25.1
11			BGD - T - 116	30.7	4.0	25.7
12			BGD - T - 117	29.1	4.1	25.1
13	Miscell R - II	Bheemarayangydi	BGD - M - 108	30.8	3.9	25.1
14			BGD - M - 117	29.0	3.7	25.2
15			BGD - M - 122	30.5	4.1	24.8
16	Miscell Trial R - II Bt. Hy	Raichur	BGD - M - 104	26.8	3.7	23.4
17			BGD - M - 108	30.8	3.9	25.1
18			BGD - M - 117	29.0	3.7	25.2

NATIONAL TRIALS

In the year 2010 - 2011, 2059 cotton samples were received for fibre quality evaluation under the National Trials. These strains were belonging to various trials as Br.02, Br.05, Br14, Br15, Br22, Br25 and Br34. A large number (37) of cotton varieties (Table

10) under National Trial whose quality parameters have been found satisfying the quality norms has been listed in the table below. The '*' marked samples possess even better fibre parameters than the CIRCOT quality norms. These can be considered as the most promising strains under the National trials of 2010-11 (Table 11).

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TABLE 10 : FIBRE QUALITY PARAMETERS OF VARIETIES IN NATIONAL TRIAL

Sl. No.	Trial	Place	Variety/ Code No.	2.5% S.L.	MIC	Tena- city
1	Initial Evaluation Trial Br.02(a)	Faridkot	L - 770	26.8	4.3	22.9
2	Initial Evaluation Trial Br.02(a)	Faridkot	CPD - 1002	26.3	4.3	22.8
3	Initial Evaluation Trial Br.02(a)	Raichur	P - 2150	27.6	4.7	24.7 *
4	Initial Evaluation Trial Br.02(a)	Raichur	RHC - 0717	27.8	4.4	24.0
5	Initial Evaluation Trial Br.02(a)	Sirsa	GJHV 500	28.9	3.7	24.0
6	Initial Evaluation Trial Br.02(a)	Sirsa	SCS 793	26.4	4.3	23.3
7	Initial Evaluation Trial Br.02(b)	Akola	HAG 805	25.6	4.2	22.1
8	Initial Evaluation Trial Br.02(b)	Akola	H 1435	27.5	3.8	23.2
9	Initial Evaluation Trial Br.02(b)	Surat	CCH 807	29.7	4.3	25.4
10	Initial Evaluation Trial Br.02(b)	Surat	CPD 1011	26.3	3.9	23.4
11	Initial Evaluation Trial Br.02(b)	Surat	TSH 110	27.8	4.5	23.0
12	Initial Evaluation Trial Br.02(b)	Surat	H 1435	29.6	3.7	29.3 *
13	Initial Evaluation Trial Br.02(b)	Surat	CCH 10 - 2	27.5	4.2	24.1
14	Intra - Hirsutum Hy Trial Br.05 (a)	Banswara	ARCHH 7256	27.4	4.5	23.6
15	Intra - Hirsutum Hy Trial Br.05 (a)	Khandwa	GSHH 2729	28.3	3.6	24.1
16	Intra - Hirsutum Hy Trial Br.05 (a)	Khandwa	CSHH 4007	27.5	3.7	23.1
17	Intra - Hirsutum Hy Trial Br.05 (a)	Raichur	GSHH 2729	27.7	4.4	26.7 *
18	Intra - Hirsutum Hy Trial Br.05 (a)	Sabarkantha	FHH 168	32.5	4.2	27.6
19	Intra - Hirsutum Hy Trial Br.05 (a)	Sabarkantha	ARBH 1051	29.0	4.3	25.0
20	Intra - Hirsutum Hy Trial Br.05 (a)	Sabarkantha	GSHH 2729	30.5	4.4	29.2 *
21	Intra - Hirsutum Hy Trial Br.05 (a)	Sabarkantha	RAJHH 787	26.3	4.3	25.6 *
22	Intra - Hirsutum Hy Trial Br.05 (a)	Sabarkantha	DHH 1051	32.4	4.2	27.0
23	Intra - Hirsutum Hy Trial Br.05 (a)	Sabarkantha	RAHH 455	28.4	4.2	25.7 *
24	Intra - Hirsutum Hy Trial Br.05 (a)	Sabarkantha	CSHG 3118	30.0	4.5	25.8
25	Intra - Hirsutum Hy Trial Br.05 (b)	Bharuch	SHH 453	30.3	3.8	26.4 *
26	Intra - Hirsutum Hy Trial Br.05 (b)	Bharuch	LC	27.3	4.2	24.4 *
27	Intra - Hirsutum Hy Trial Br.05 (b)	Bharuch	GTHH 197	30.5	3.8	26.7 *
28	Intra - Hirsutum Hy Trial Br.05 (b)	Bharuch	DHH 1061	26.7	4.3	23.4
29	Intra - Hirsutum Hy Trial Br.05 (b)	Bharuch	ARBHH 1061	27.6	4.3	23.3
30	Br.14(a)	Coimbatore	RHCb 011	30.6	4.4	26.1
31	Intra - Specific Hy.Trial Br.15(a)	Sabarkantha	SHHB 1002	35.3	3.8	34.0 *
32	Intra - Specific Hy.Trial Br.15(a)	Sabarkantha	RHB 0206	37.3	3.7	35.0 *
33	Intra - Specific Hy.Trial Br.15(a)	Sabarkantha	GSHB 922	37.7	3.6	33.7 *
34	Intra - Specific Hy.Trial Br.15(a)	Sabarkantha	CCHB 51	37.0	3.8	33.7 *
35	Intra - Specific Hy.Trial Br.15(a)	Sabarkantha	DHB 1071	36.6	3.8	33.1 *
36	Intra - Specific Hy.Trial Br.15(a)	Sabarkantha	DHB 1072	35.7	3.6	34.7 *
37	Initial - Evaluation Trial Br.22(a/b)	Khandwa	CCA 1010	25.3	4.5	22.1

RESEARCH ACHIEVEMENTS

The CSP values and the count to which each of the pre-release varieties have been spun are noted in the Table 11. A cursory glance at the Table 11 reveals that many of the strains (60%) received for pre-release could be spun to 30s – 60s counts

indicating the trend of cotton varieties /hybrids that are in the pipeline and providing the likely availability of cotton in the years to come. This also points to the likely shortage of cottons for the coarser counts (20s – 30s) and the finer count >60s in future.

TABLE 11 : FULL SPINNING DATA OF PRE - RELEASE VARIETIES

Variety	Place	2.5% SL (mm)	Micro-naire	S (3.2 mm)	CSP (C)
NHH - 59	Dharwad	28.6	4.0	20.2	2054 (30s) 1923 (40s)
CNA - 1003	Dharwad	24.3	5.2	21.1	2030 (20s) 1632 (30s)
AKA - 0110	Dharwad	25.1	5.1	21.2	2300 (20s) 1974 (30s)
AKA - 9703	Akola	24.5	4.7	17.7	2156 (20s) 1935 (30s)
AKA - 0110	Akola	24.8	5.1	19.3	2304 (20s) 2019 (30s)
NHH - 59	Nandyal	28.5	3.7	19.8	2403 (30s) 2204 (40s)
ARBH - 813	Siruguppa	26.7	3.7	20.5	2106 (30s) 2048 (40s)
TCHH - 2322	Coimbatore	30.3	3.8	22.3	2328 (40s) 2200 (50s)
ARBH - 813	Coimbatore	28.6	4.3	21.5	2400 (30s) 2172 (40s)
JKCHB - 216	Coimbatore	33.6	2.8	23.2	2390 (50s) 2310 (60s)
CSHG - 1862	Sirsa	27.5	4.0	22.0	2220 (50s) 2058 (60s)

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NHH - 59	Dharwad	28.6	4.0	20.2	2054 (30s) 1923 (40s)
CNA - 1003	Dharwad	24.3	5.2	21.1	2030 (20s) 1632 (30s)
AKA - 0110	Dharwad	25.1	5.1	21.2	2300 (20s) 1974 (30s)
AKA - 9703	Akola	24.5	4.7	17.7	2156 (20s) 1935 (30s)
AKA - 0110	Akola	24.8	5.1	19.3	2304 (20s) 2019 (30s)
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ARBH - 813	Siruguppa	26.7	3.7	20.5	2106 (30s) 2048 (40s)
TCHH - 2322	Coimbatore	30.3	3.8	22.3	2328 (40s) 2200 (50s)
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Variety	Place	2.5% SL (mm)	Micro-naire	S (3.2 mm)	CSP (C)
CNA - 1003	Raichur	27.1	5.8	20.0	1932 (30s) 1740 (40s)
AKA - 0110	Raichur	27.8	5.5	20.6	2296 (20s) 1980 (30s)
HS - 6	Hisar	25.0	5.0	21.4	1887 (30s) 1724 (40s)
ARBHH - 1052	Hyderabad	27.2	3.7	19.7	2008 (40s) 1865 (50s)
RAHH - 951	Hyderabad	31.1	2.8	21.4	2238 (30s) 2224 (40s)
HAGHH - 2064	Hyderabad	26.7	2.9	19.5	2176 (20s) 1764 (30s)
Bunny	Hyderabad	29.7	2.9	22.4	2331 (30s) 2184 (40s)
RAHH - 138	Hyderabad	28.9	3.3	22.1	2259 (30s) 2144 (40s)
RAHH - 255	Hyderabad	29.4	3.0	20.7	2127 (30s) 2112 (40s)
LC	Hyderabad	25.3	3.2	19.8	2218 (20s) 1944 (30s)
JKCHB - 216	Siruguppa	33.5	2.5	24.1	2730 (60s) 2320 (80s)
NSPL - 423	Hyderabad	31.2	3.0	22.3	Sample Insufficient for Spinning
NHH - 206	Nanded	27.2	4.3	19.4	Maturity =72% Not Spinnable due to Roller Lapping on Draw Frame

(b) Tests on Standard and Trade Varieties of Indian Cottons

Evaluation of Quality of Major Trade Varieties Grown in Different Parts of the Country

During the reporting period, 94 trade variety samples have been received from different states pertaining to specific locations viz., Punjab, Haryana, Rajasthan, Gujarat, Maharashtra, Karnataka and Tamil Nadu pertaining to the 2008 - 09 season. The fibre tests, spinning tests and yarn tests are being carried out on all these samples.

Evaluation of Quality of Standard Varieties of Indian Cottons

During the reporting period, 50 standard cotton varieties grown under ideal conditions were received from different Agricultural Universities and their regional units for 2008 - 09 season. The fibre tests, spinning performance and yarn tests were carried out on all the samples.

(c) Research Work done on specific Agricultural and Technological Aspects Relevant to Improvement of Cotton Attributes

Preparation and Marketing of CIRCOT Calibration Cotton Standards

During the reporting period, 297 containers of calibration cottons were sold to industry and cotton research institutions. Revenue amounting to Rs. 2,00,950 was generated.

Structure - Property Relationships of Friction Spun Yarns (DREF)

In the first part of the project work, 8 DREF friction spun yarns such as 2s Ne and 5s Ne of various carding drum speeds were spun using the DREF - 3000 machine. The carding drum speeds were 3000, 3500, 4000 and 4500 rpm. The core was kept as nylon6 filament of 420/48D and in the sheath cotton sliver of 9.5 ktex was provided. The core and sheath ratios of DREF friction spun yarns were 15:85 and 39:61 respectively.

In the second part of the project work the 10 DREF friction spun yarns of 2s Ne and 4s Ne with various drum speeds were spun by using DREF - 3000 machine. The core-sheath combination was kept the same as the previous year. The ratios of core and sheath of DREF friction yarns were 15:85 and 32:68 for 2s Ne and 4s Ne respectively. During the preparation of the yarns, the sheath sliver input 9.5ktex was kept constant for each yarn count. The spinning drum speeds for each count were kept as 2000, 2500, 3000, 3500 and 4000 rpm. All the DREF friction spun yarns were subjected to tensile measurements such as breaking strength (kgf), elongation (%), tenacity (g/tex) and work of rupture (g x mm).

From the analysis of the data the following conclusions could be drawn:

- (I) The strength and elongation % of DREF yarns do not change significantly with the speeds of both

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In the second part of the project work the 10 DREF friction spun yarns of 2s Ne and 4s Ne with various drum speeds were spun by using DREF - 3000 machine. The core-sheath combination was kept the same as the previous year. The ratios of core and sheath of DREF friction yarns were 15:85 and 32:68 for 2s Ne and 4s Ne respectively. During the preparation of the yarns, the sheath sliver input 9.5ktex was kept constant for each yarn count. The spinning drum speeds for each count were kept as 2000, 2500, 3000, 3500 and 4000 rpm. All the DREF friction spun yarns were subjected to tensile measurements such as breaking strength (kgf), elongation (%), tenacity (g/tex) and work of rupture (g x mm).

From the analysis of the data the following conclusions could be drawn:

- (I) The strength and elongation % of DREF yarns do not change significantly with the speeds of both

the carding drum as well as the spinning drum.

- (II) The tensile properties of DREF yarns depend mainly on the core content.

Design and Development of Rotating Flat for CIRCOT Mini Card

During the year, the following activities were carried out in the project :

- i. Fabrication of wooden roller having size (480mm x 70 mm) mounted with wire cloth, 2 'T' shaped brackets, 'U' shaped brackets and 2 supporting brackets with bearing was completed.
- ii. The fabricated rubberised cotton belt with wire point cloth strips and H.S.S. metal strips (605 x 12.5x2.5mm) was assembled on the mini card. 'T' shaped and 'U' shaped brackets were fixed. The wooden cleaning roller was fixed on the top of the rotating flat system. The drive was given through the doffer. The unit is working satisfactory but efforts are on to improve its performance.
- iii. Another belt assembly with metal strip using rubber (60%) and cotton fabric (40%) (1000 mm x 610 mm x 5 mm) has been fabricated. Its evaluation is under progress.

GIS Based Development of Spatial Fibre Quality Maps for Cotton Grown

in Nagpur District of Vidharbha Region of Maharashtra

A study was carried out to design and develop a spatial database and maps depicting cotton fibre quality parameters in a Geographical Information System (GIS) environment. Seed cotton samples were collected from 300 different spatial locations by using the Geographical Positioning System (GPS) from the cotton growing area of Nagpur district. Ginned samples were tested on HVI for measurement of fibre quality parameters. Spatial database and spatial fibre quality maps for parameters such as 2.5% span length, uniformity ratio, fineness, strength, elongation, ginning percentage, short fibre index (SFI), degree of reflectance (Rd) and degree of yellowness (+b) were prepared. Also, spatial distribution, classification and characterization of the Nagpur district based on the fibre quality were attempted. In addition the spatial fibre quality maps were correlated with the soil maps. The spatial maps of Nagpur district for 2.5% span length, fibre strength, fineness and Rd are shown in Fig. 2.

These maps can provide site specific information for better visualization and interpretation of the data, useful to traders and ginners for sourcing cotton and policy makers, researchers for systematic planning for the particular area.

RESEARCH ACHIEVEMENTS

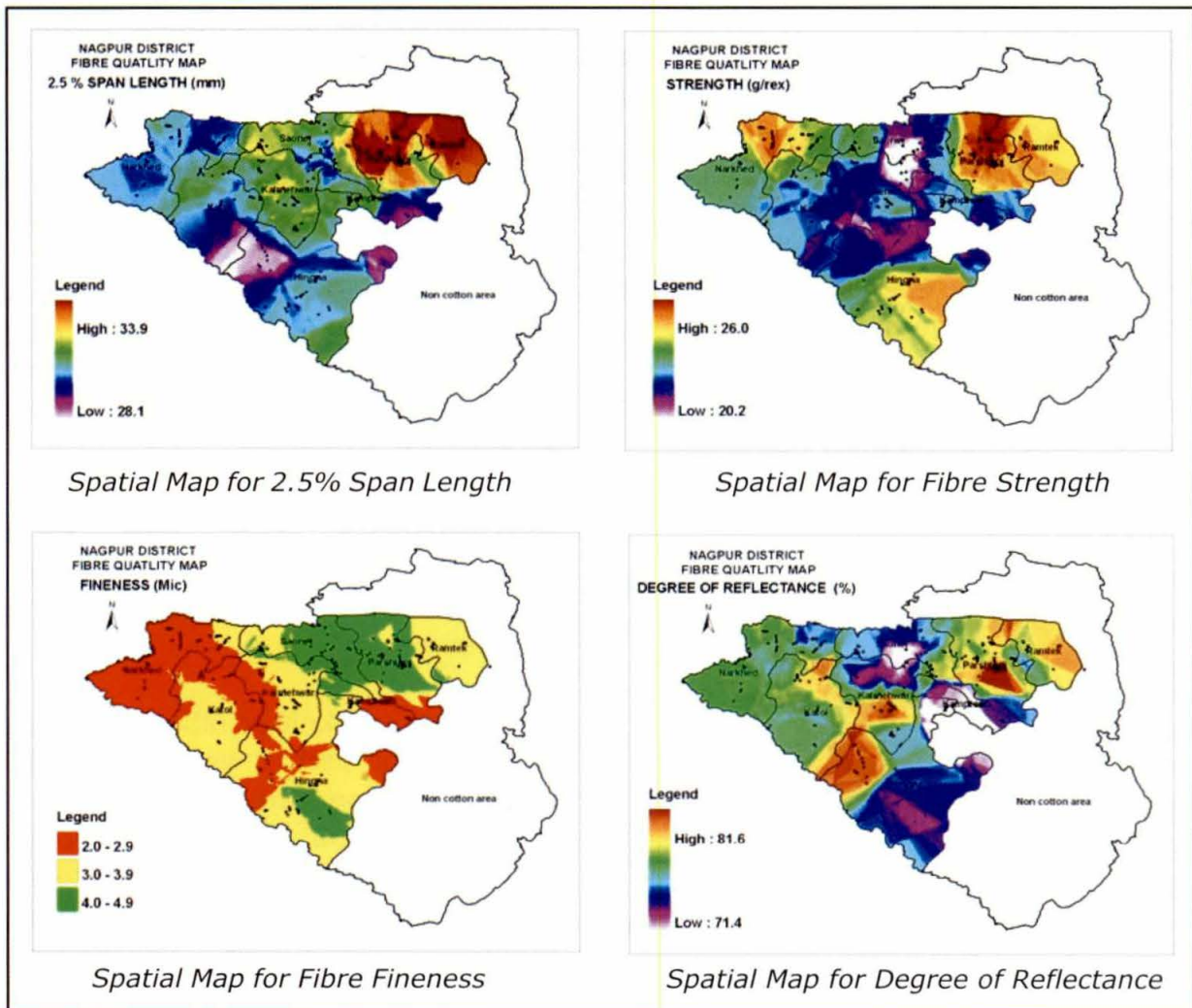


Fig. 2. Spatial Maps of Nagpur District

Evaluation of Liquid Moisture Management Properties of Commercially available Cotton and Cotton Blended Fabrics

Liquid management properties of fabric refer to the ability of a fabric to transport water in liquid phase. These properties are important for maintaining proper microclimate between human skin and fabrics for optimal comfort to the wearer of clothing under high activity

level. Under this project various parameters like Wetting Time, Absorption Rate, Maximum Wetted Radius, Spreading Speed, Accumulative One - way Transport Index and Overall Moisture Management Capacity were measure for selected fabrics.

Thirty woven fabric samples having GSM varying from 83 to 276 were initially selected under the study. These samples were subjected to standard

washing treatment and basic fabric properties like ends per inch, picks per inch, fabric weight, etc. were determined. KES measurements like compression properties and surface properties were also completed for all 30 samples. Fifteen of the total 30 samples were evaluated for their moisture management properties by using the MMT Tester. Procurement of additional 60 fabrics covering a wide spectrum of fabric quality has also been completed.

Analysis of results, obtained so far, reveal that majority of the fabrics have overall Moisture Management Capacity (OMMC) between 0.4 and 0.5 (good). And only two samples have OMMC above 0.6 (very good) and none of the fabrics have OMMC 0.8 (excellent). Analysis also showed that only two samples have One - way Accumulative Transport Capacity in acceptable range (above 100). Moisture management capabilities of fabrics appear to depend on compressibility of fabrics, calculated from results of KES Compression tester. While wetting time has a linear negative correlation with compressibility ($R^2=0.93$), spreading speed is related to compressibility in a nonlinear way. For fabrics with low compressibility (< 0.3) spreading speed reduces with compressibility. But once compressibility exceeds 0.3, any further increase in compressibility leads to better spreading speed.

Design and Development of A Portable Moisture Instrument for

Cotton using Customised Sensor Designed for Fixed Volume and Uniform Packing Density

Under this project a first prototype instrument has been successfully fabricated and tested.

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

Eco-friendly Pre and Post Processing of Fabrics Prepared from Organic Cotton and Finishing with Chitosan

Woven and knitted fabrics prepared from organic cotton were bioscoured by using a pectinase preparation, bleached and subjected to antibacterial finish using chitosan. The fabrics were evaluated for antibacterial activity using *Staphylococcus aureus*. The finished fabric showed 100% reduction in the bacterial count. Durability of the chitosan treatment was evaluated by wash fastness studies. The woven fabric was washed for 50 cycles in a launderometer and the antibacterial property was evaluated after 5,10,15,20,25,30,40 and 50 wash cycles. The results indicated that 100% suppression of *S. aureus* upto 35th wash while after 40 wash cycles it showed 80% reduction in the counts indicating the stability of the treatment. Simultaneously, antibacterial property on knitted fabric indicated 100%

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suppression of *S.aureus* only upto 30 wash cycles.

Development of Protective Clothing for Agricultural Pesticide Spraying Operations

Efforts were made during this period to develop pesticide protective clothing material conforming to level 2 (<5% pesticide penetration) by applying oil water repellent finish to cotton and cotton polyester blends. Conditions for the application of a commercial Fluorocarbon based repellent finish Fluorotex FCN along with crosslinking agent Melamine formaldehyde to cotton and a cotton - polyester blended fabric were standardized. Strength retention of finished fabrics was > 85% and their air permeability values remained almost unchanged.

The finished fabric showed very good water repellency as seen by spray test rating of 90 and high water contact angle. These showed excellent pesticide repellency (~95%) and pesticide penetration through these was <2%. These fabrics thus passed the level 2 criteria for pesticide protective clothing. Another commercial Fluorocarbon based repellent finish TG 581 was also tried on cotton with and without the cross - linking agent. The spray test rating of finished fabric was excellent (100) without cross - linking agent and lower (75) with cross - linking agent. Percent pesticide penetration was almost nil for the first fabric and ~1% for the other.

The washing durability of finish when applied without a crosslinking agent can be low therefore cotton fabric finished with TG581 alone was subjected to accelerated washing test in the launderometer. It was observed that even after 25 wash cycles (equivalent to 125 home launderings), percent pesticide penetration through the fabric increased only to ~2% well within the limit for level 2. The finish is therefore durable to washing.

Study on Dyeing of Cotton Fabric using Blend of Natural Dyes for Innovative Shades

Fabric samples were dyed with different proportion of blends of natural dyes *viz.*, Manjistha and Turmeric. It was observed that attractive shades could be obtained with improved colourfastness to light and also colour strength (k/s).

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

While using banana pseudo - stem sap as mordant for dyeing of cotton with natural dyes, it was observed that the uniformity of dyeing was poor. Application of sap by padding proved better. To remove any non uniformity due to dye, aqueous extract of manjith roots was used as dye in place of crude root powder. Good uniformity was obtained upon dyeing of conventionally mordanted cotton samples with this extract but replacing/supplementing tannic acid with banana sap again

resulted in non uniformity. Uniform dyeing with banana sap could be achieved by changing the pH and subsequent alum application towards acidic side.

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

It is well known that hydrophobicity of a material depends upon its surface roughness. In this project, attempts were made to increase the surface roughness of the cotton material by controlled acid, enzyme hydrolysis and also by deposition of nano materials. Grey cotton fabric (100 %) was kier boiled and bleached and the fabric was analyzed for the physical characteristics. The fabric was found to have 209 GSM, 65 Ends per inch and 65 Picks per inch. To impart more surface roughness and increase surface area of the fibre, preliminary trails were carried out by treating the fabric with 0.6 % w/w H_2SO_4 at 60°C for 60 min using 1:40 ratio in a shaking water bath. Thereafter the fabric was treated with fluoro - polymer to impart the hydrophobicity. Simultaneously a control fabric (without acid hydrolysis) was also given fluoro - polymer treatment. Both the fabric samples were observed under SEM in which no visual difference in the surface could be noticed. However, FM analysis showed that acid treated cotton fabric was having 7.5% more surface area than control sample. Thus, these results indicate that under the given experimental conditions surface area of

the fabric could be increased but roughness could not be imparted. Further studies are on for establishing the hydrophobicity of the acid hydrolysed fabric using contact angle method.

Nano - finishing of Cotton Textile to Impart Flame Retardance and U.V. Protective Functionalities

The synthesis of TiO_2 nanoparticle by chemical route was being carried out by using titanium tetra - isopropoxide (TTIP) as a precursor. First, the nano - sol of TiO_2 was prepared using TTIP, HCl, ethanol and water by hydrolysis and condensation processes at room temperature. This was followed by hydrothermal treatment to convert the TiO_2 nano - sol to TiO_2 nanoparticles. The hydrothermal treatment not only helped to generate TiO_2 nano - particles, but also helped to convert the rutile and brookite phases of TiO_2 to more active anatase phase. The TiO_2 nano - sol was applied on to cotton woven fabric followed by steaming at 120 °C for 1.5 h for *in situ* conversion of nano - sol to nano - particles. The characterization of U.V. transmission using the integrating sphere accessory of UV - vis spectrometer is in progress.

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

Microbial Degradation of Gossypol in Cotton Seed Meal

In an effort to isolate soil

microorganisms for detoxification of gossypol, 131 microbial isolates including 53 bacteria, 62 fungi and 16 actinomycetes were isolated from 88 soil samples. Bacterial isolates were screened for detoxification of free gossypol by growing in mineral medium containing 10 ppm of gossypol. The bacterial isolates BN - 16 - 3, BN - 46 - 2 and BN - 23 - 1 showed 86%, 75% and 56% reduction of free gossypol respectively in mineral medium.

CORE AREA V : TECHNOLOGY MARKETING

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 PROJECTS

Zonal Technology Management and BPD Unit at CIRCOT, Mumbai (NAIP, Component 1)

Based on a BPD - CIRCOT proposal, The Ministry of Social Welfare, Govt. of Maharashtra has sanctioned a loan of Rs. 680 lakhs to M/s. Tulsai Magasvargiy udyogik Sahakari Sanstha, Washim (MS) to set up a 10 TPD capacity plant for manufacture of particle board from cotton stalks based on the CIRCOT technology.

BPD - CIRCOT has been approved by the 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. Currently BPD has 40 registered members who have shown interest in availing CIRCOT technologies. Incubation facilities like computerised sample preparation machine, advanced Fibre Information System, Research Rotary Digester, Lab Model Stenter and Hydraulic press were created by BPD. Start - up entrepreneurs can use these facilities and other institute resources to develop their ideas for commercialisation.

A Value Chain for Cotton Fibre, Seed and Stalks: An innovation for Higher Economic Returns to Farmers and Allied Stake Holders (NAIP: Component 2)

The main objective of the project is to establish the value chain in cotton and bring about value addition to cotton at every stage, so that the farmer and all the stake holders in this chain are benefitted. During the period under report the following activities were carried out.

a. Participation of farmers in the project:

In all 174 farmers participated at Coimbatore, Nagpur and Sirsa.

b. Supply of seed :

Quality seeds of RCHB 708, Bunny Bt and Bt cotton Hybrid bio - seed 6488 were supplied to the project farmers of Coimbatore, Nagpur and Sirsa respectively.

c. Procurement and transportation to ginning mill:

For the season 2009 - 10, 448 qtl *kapas* at Nagpur and 654 qtl *kapas* at Coimbatore were procured and 89 & 123 bales respectively were prepared.

For the season 2010 - 11, a total of 285 qtl. *kapas* was procured at Sirsa, however, in Nagpur and Coimbatore the procurement is under progress.

d. Bale tagging:

Fibre quality parameters were tested for the ginned *kapas* procured at Nagpur and Coimbatore and each bale was characterised and tagged with fibre parameters.

e. Yarn preparation:

a. At Nagpur - 8.2 tonnes of 30s count yarn was made from the *kapas* procured during the year 2008 - 09.

b. At Coimbatore - 5.5 tonnes of 80s count yarn and 7 tonnes of 60s count yarn were prepared from the *kapas* procured during the year 2008 - 09.

f. Conversion of yarn into fabric:

a. 9000 m fabrics from 30s count single yarn were prepared, of which 2005m fabric was converted in to 1200 shirts.

b. About 5500 kg yarn of 80s count was prepared from which about 28000m fabric of 55 to 60 GSM was made.

g. Bio - scouring & Natural dyeing of yarn:

Seventy - seven kg of 30s count yarn bio - scoured and dyed with natural - dyes were converted to 350 m of fabric (Fig. 3).

h. Evaluation of yarn and fabric properties:

Yarn:

131 cones of 30s count yarn tested for physical and mechanical properties. After segregation of bales depending on mic., it was observed that, strength properties did not show statistically significant difference. But yarn uniformity showed statistically significant difference at 5% and in some cases even at 1% level of significance.

i. Chipping of cotton stalk & transportation to board making factory:

- 350 tonnes of chipped cotton stalks were procured from an NGO identified at Nanded in Maharashtra and transported to the identified particle board manufacturer.
- About 30 tonnes of chipped cotton stalks were procured from the project farmers at Nagpur and transported to the GTC, Nagpur for the preparation of three particle boards.

j. Enzymatic pretreatment of kernel and oil extraction

Scale - up trials on enzymatic pre - treatment of kernels for oil extraction



Fig. 3. Banana Pseudo Stem Sap used as Mordant for Dyeing Natural Dyes

was conducted at Tirupur and an increase in % oil extraction upto 2 - 3 over the control (without enzyme) was noted.

k. Bio-enrichment of hull & Cattle feed trials:

Trials were undertaken on 30 cross - bred bulls at Sabarmati Gaushala in Bidaj farm near Ahmedabad in collaboration with NDDDB, Anand to find out the digestibility. The feeding trials indicated that the biochemical hulls employing CIRCOT's patented technology were readily accepted by the animals when fed in 20% supple-

mentation with the NDDDB's cattle ration. The trials undertaken for two reasons indicated an enhanced digestibility of 26% in the bioenriched lot as against 17% in the animals fed with cottonseed hulls without bioenrichment. Encouraged with this result for two consecutive reasons, feeding trials on lactating cross - bred cows have been planned.

A Value Chain on Banana Pseudostem for Fibres and Other Value Added products (NAIP:Component 2)

In this project, the Fibre Extraction

Machine (Raspador), which was developed earlier, was modified to get good quality banana fibres. The grading of varieties was done on the basis of tensile parameters. A catalogue preparation is under way. The Spinning Systems Machines (Yarn Making Machines) suitable for Banana Fibres were designed and fabricated and successfully installed at CIRCOT. Various trials were conducted for fine-tuning of Yarn Making Machines (Fig. 4). Yarn prepared on these machines was evaluated for quality parameters.

Large scale trials for making yarn were conducted at M/s. Empire Mills, Kolkata from banana fibres. The first trial was completed with 200 Kg of banana fibres. A process was standardised for application of sap extracted from banana pseudostem as a mordant to cotton fabric for dyeing with natural dyes. Microcrystalline cellulose powder prepared from banana fibres was also evaluated and compared with commercial grade MCC. The properties were *on par* with the commercial product.

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 (NAIP: Component 2)

Under this project, a prototype disintegrator, a defibering machine and a fibre segregator (Fig. 5) have been fabricated based on the results of the

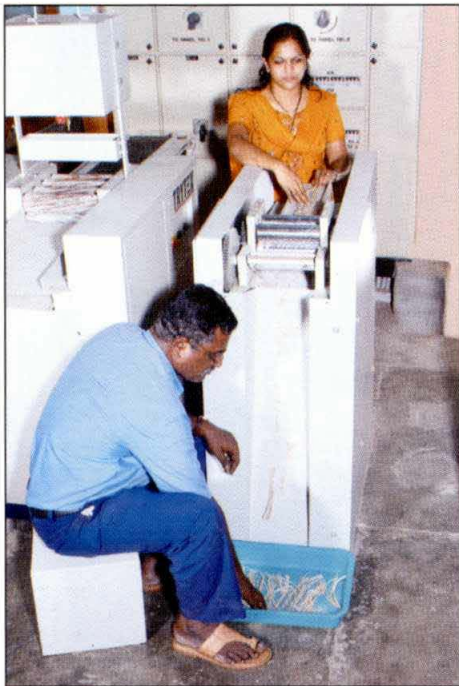
tests carried out on the coconut husk. The disintegrator and the defibering machines still need some refinement. The fabricated machines are ready for experimental run. CIRCOT is providing assistance in standardizing a grading methodology for coconut fibres by preparing a protocol based on its fineness data. Value added diversified ornamental cloth suitable for furnishing applications has been successfully developed in hand - weaving machine fitted with jacquard design system at NIRJAFT. A special handloom has been developed to prepare coconut - jute fabrics for the purpose.

Design and Development of Rubber Dams for watersheds (NAIP: Component 4)

In India, agricultural growth depends on the favourable monsoon since storage of water during this period ensures sustenance of agricultural production during drought. Though this can be achieved by increasing the height of the dams, enormous cost and other problems associated with this operation comes as a setback. The same can be achieved to some extent through the installation of rubber check dams which are put across the river banks. This can be inflated to hold more water. This type of check dams have another advantage in that when they are installed on the rivers which perennially cause floods, they arrest the fury of water and decrease the extent of damage.

A few of these dams are built in

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Banana Fibre Cutting Unit



Banana Fibre Carding Unit



Banana Fibre Drawing Unit



Banana Fibre Spinning Unit

Fig. 4. Different Units of Banana Yarn Making Machine



Fig. 5. Coconut Fibre Seggregator Machine Developed by CIRCOT

India are purely a foreign venture. For the first time in the country, through a NAIP project on **Design and Development of Rubber Dams for Watersheds**, a prototype rubber dam has been fabricated by the Consortium and is being evaluated by the Civil Engineering Department, IIT, Mumbai in association with CIRCOT, Mumbai and Water Technology Centre for Eastern Region (WTCER) and M/s. Kusumgar Corporates. As a consortium partner, CIRCOT was actively involved in evaluating the fabric component of the model prototype dam. During the reporting period, the following activities have been carried out:

- Installation of lab core ring frame spinning machine procured by ICB

method from Pinter S.A Barcelona, Spain was completed.

- Machine standardization for core yarn spinning was carried out.
- 480 Denier nylon filament yarn and two number of cotton roving of 0.142 hanks were used for spinning yarn. During the process, nylon filament was covered with cotton fibres.
- The final yarn count of the core spun yarn produced was 7.5 Ne with a twist of 350 TPM with total draft of 30 and 9000 rpm spindle speed.
- Yarn samples were woven on a sample loom for mockleno weave. All the yarn and fabric samples were

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tested for essential properties.

- SEM analysis was carried out to study the cross section of the core spun yarn.
- The fabric samples were supplied to IRMRA for studies on peel strength using various rubber polymers.
- Further, two rubber - textile composite samples of 4.5 mm and 7 mm thickness were made with single and double layer respectively at a user industry. It may be noted that such fabrics from cotton covered yarn do not require any additional adhesive treatment, like RFL as in the case of fabrics from nylon/polyester yarn.
- Suitable rubber-textile composite for use in the rubber dam was prepared at Indian Rubber Manufacturers Research Association (IRMRA), Thane. It is made up of two layers of fabric each having 6 mm thickness.
- A study conducted for installation, leakage and performance of rubber dam. The results are encouraging.
- A rubber check dam (impounding structure) was installed at the experimental field of Directorate of Water Management (DWM), Mandhasal, Odisha (Fig. 6). CIRCOT helped consortium partners by providing them the technical details about composite anchoring during dam installation.

- The dam dimensions are: crest length - 2 m, width - 1.2 m, height - 1 m.



Fig. 6. Rubber check dam installed at the experimental field of Directorate of Water Management (DWM), Mandhasal, Odisha

- A second rubber dam has been installed at Baghamari D/W - 4 watershed, Odisha (Fig. 7).
- From the Baghamari dam about 20 hectares of land for rice cultivation got direct benefit.
- The rubber dam at Baghamari is 3 m long and 1 m high.



Fig. 7. Rubber dam at Baghamari D/W - 4 Watershed, Odisha

- Another Impounding structure has been installed at Badaphokaria, Khurda district, Odisha. It is having 2 m crest length and 1 m height (Fig. 8).



Fig. 8. Rubber Dam installed at Badaphokaria, Khurda District, Odisha

- Installation of cascade checkdams at Chandeswar 1 and 2, Khurda district, Odisha is in progress. Two check dams will be installed at 300 m distance.
- The dimensions of the proposed Chandeswar dams are: 5 m length X 1.5 m height.
- A proto dam has also been installed at the standard water flow channel available at the Civil Engineering Deptt. of IIT, Mumbai (Fig. 9) for evaluation study under supervision of Prof. Eldho, Member, Consortium Advisory Committee.

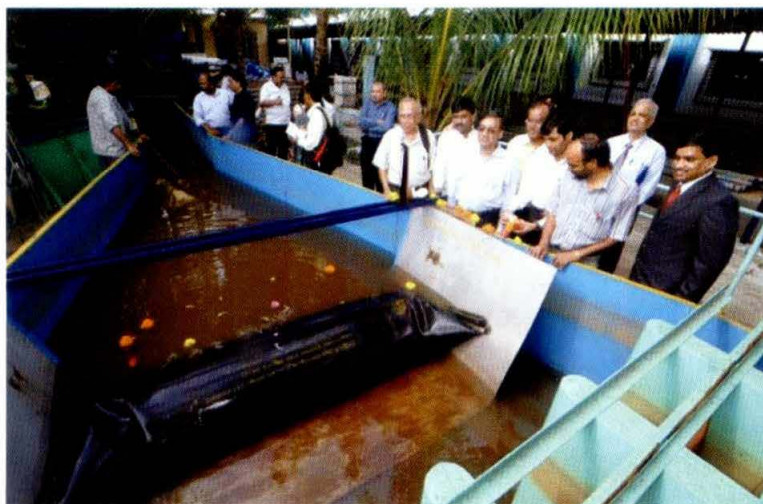


Fig. 9. Protodam Installed at IIT, Mumbai

Synthesis and Characterization of Nano - Cellulose and its Application in Biodegradable Polymer Composites to Enhance Their Performance (NAIP:Component 4)

The preparation of nano cellulose was carried out using 1. Aerobic

fermentation 2, Anaerobic fermentation and 3. Chemi - mechanical process. The process for the preparation of nanocellulose by aerobic fermentation using the fungal culture *Trichoderma reesii* and that by anaerobic fermentation process were attempted during the year. Aerobic fermentation

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yielded 33% nanocellulose while anaerobic process could produce only 11% nanocellulose.

The nanocellulose produced by anaerobic process was spherical in shape (Fig. 10) as against aerobically prepared nanocellulose (whisker shaped). A gas chromatographic analysis revealed the presence of methane producers in the anaerobic microbial consortium.

Super - paramagnetic iron oxide nanoparticles of average particle diameter 180 nm were prepared by co - precipitation method using TritonX - 100 as the surfactant. The product was washed repeatedly with distilled water and separated using a permanent magnet. Then finally they were freeze - dried and used for enzyme immobilization. Two different methods were employed for cellulase enzyme immobilization -

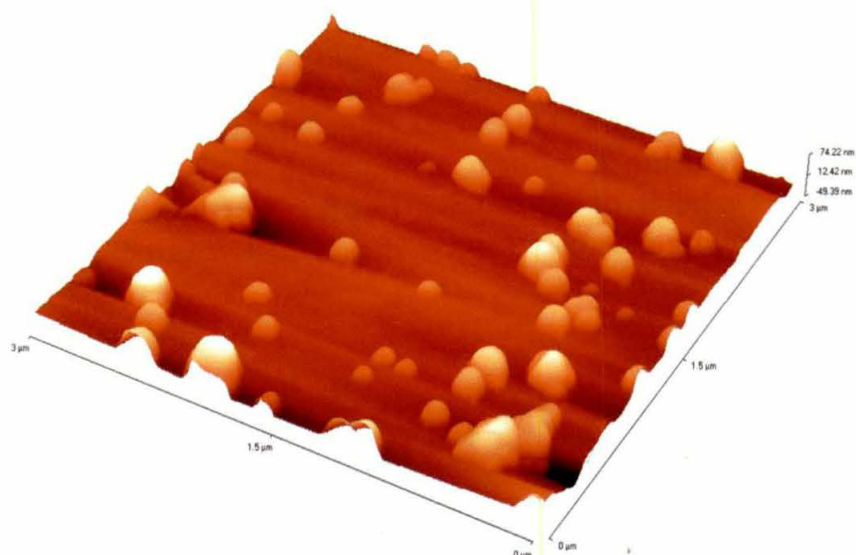


Fig. 10. Atomic Force Micrograph of Nanocellulose Produced by Anaerobic Microbial Hydrolysis

- Surface functionalization by APTES and glutaraldehyde
- Surface functionalization by carbodiimide coupling

Enzyme Hydrolysis

The activity of immobilized cellulase

enzyme was measured against standard substrates like CMC, Avicel and Filter Paper. About 50% of the original activity could be achieved after immobilization. Now the process optimization is being carried out to increase the activity and to study their stability after repeated use. A

membrane reactor has been designed and fabricated for continuous production of nanocellulose on enzyme hydrolysis. During enzyme hydrolysis, the products (sugars) were removed simultaneously to prevent repression of enzyme production. This helps to recycle both enzyme and un-hydrolyzed substrate. The optimization of various process parameters are underway to increase the yield.

Chemical Hydrolysis

A novel pretreatment process using zinc chloride has been optimized for chemo - mechanical processing of cellulose nanofibrils which yielded more than 95% of nano fibrils. This pretreatment process using enzyme / microbial hydrolysis is being optimized. The impregnation of nanocellulose in

potato starch film improved their mechanical properties significantly. Now, Carrageenan and cotton seed protein films are being prepared and analyzed for their performance after incorporation of nanocellulose.

Inter - Institutional Project

Development of Composite Yarns for Technical Textiles from Natural Fibres based on Friction Spinning Technology (collaborative project with NIRJAFT, Kolkatta)

Under this project where CIRCOT is a partner, jute yarns of nominal linear density of 138 tex and 276 tex were spun with two different twist multipliers. Further, the yarn was plied in ring twisting machine with three different (3, 4 and 5) twists per inch (TPI). All the

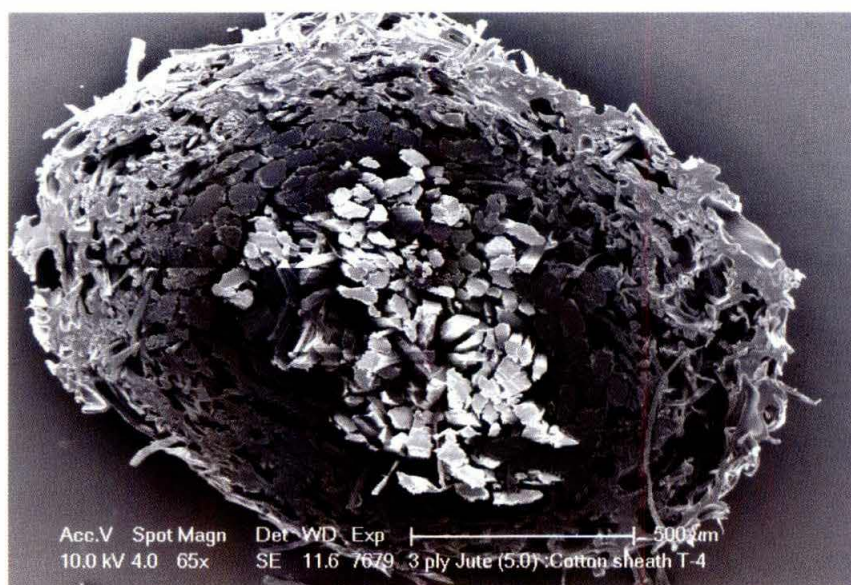


Fig. 11. SEM Photograph of Jute-cotton Composite Yarn

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yarn samples were friction - spun with combed cotton having properties as mentioned below:

Property	Value
2.5% span length	33 mm
Micronaire value	3.5
Uniformity ratio	55 %
Bundle strength (3.2mm)	26 g/tex
Fibre breaking elongation (%)	5.0 %

The Jute-cotton composite yarn was prepared on a DREF - 3000 machine. To achieve good cover of cotton sheath and depending on ply no. of jute yarn, the feed of the cotton fibre

was regulated by the programming unit of the machine. The opening drum speed 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 were found to be adequate to get a good quality of yarn. Image analysis of the composite yarn (Fig. 11) prepared is completed. Images of yarn segments at varying positions were captured with a magnification of 10. The yarn diameters were measured for different TPI values. The average diameter ranges between 1300 to 1500 microns. The samples have been sent to NIRJAFT for further testing and evaluation trials. Further a lot of 10 kg sample is being prepared for weaving trials.

3

Technology Assessed and Transferred

The usefulness of technologies developed as a result of the effort of a researcher can be gauged only if they are transferred to the user group at the appropriate time without any hindrance. The success of this transfer gives a boost to the researcher's morale.

Scientists at CIRCOT devote considerable time and energy in developing newer technologies in the field of cotton ginning, cotton and other natural fibre processing, eco-friendly textile finishing, nano-technology application for functional finishes, and value-addition to cotton crop in the form of by-product utilization.

There is a continuous monitoring of the technologies that are transferred. The regular upgrading of the developed innovations facilitates consistent after-transfer benefit to the users. The Institute maintains constant liaison with private organizations and entrepreneurs so that their needs are met, and at the same time the Institute also generates revenue. This chapter sums up the technologies

developed and consultancies offered by the Institute during the reported year. Constant attempts are being made for popularisation and commercial adoption of viable technologies by conducting Awareness Meets and through participation in various exhibitions at different places in the country.

Consultancies Undertaken :

1. M/s. Bajaj Steel Industries Ltd., Nagpur for R&D in developing various ginning machines
2. M/s. Krishidhan Seeds Ltd. (KSL) Aurangabad, Maharashtra for development of methodology for analyzing the fibre parameters.
3. M/s. Precision Tooling Engineers, Nagpur for consultancy for Ginning machines
4. M/s. Millennium Rubber Ltd., Kerala for Rubber Roller & D.R. Gins
5. M/s. Trytex Machine Works, Coimbatore for CIRCOT Miniature Spinning system

TECHNOLOGY ASSESSED AND TRANSFERRED



Shri Lav Bajaj, Vice President, M/s. Bajaj Steel Industries Ltd., Nagpur signing MoU with Director, CIRCOT for R&D in developing various ginning machines

Commercial Testing:

Nearly 11,100 cotton samples were tested during the reporting period both at the Headquarters and at various

quality evaluation stations. A station-wise break-up of samples tested is given in Table 12. The total revenue generated through commercial testing was Rs. 23.77 lakhs.

TABLE 12 : NUMBER OF SAMPLES TESTED AND REVENUE GENERATED

Name	No. of samples	Amount (Rs.)
Mumbai - HQ	3419	1164912
Coimbatore	1700	188827
Dharwad	922	129612
GTC, Nagpur	655	115209
Guntur	3167	534485
Sirsa	681	130382
Surat	565	113109
Total	11109	2376536

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Total	11109	2376536

Patents Filed :

Date of application in Patent office (Provisional/ Complete)	Application No. allotted by the Patent Office	Title	Innovator(s)
12.04.2010	1193/MUM/2010	Zinc chloride Pre-treatment of Micro crystalline Cellulose for Preparation of Nano-cellulose by Homogenization Process	Dr. N. Vigneshwaran Shri A.K. Bharimalla Shri Vilas Karande
03.09.2010	2465/MUM/2010	A Pneumatic Operated Roller Loading System for Double Roller Gin	Shri A.K. Bharimalla Dr. S.B. Jadhav Shri R.S. Prabhudesai Dr. A.J. Shaikh
07-02-2011	345/MUM/2011	A Novel Coconut Fibre Segregation Machine	Dr. S.K. Chattopadhyay Shri A.K. Bharimalla Shri D.L. Upadhyay Smt. Bindu Venugopal
16-03-2011	750/MUM/2011	Enzymatic Pretreatment to Cottonseed Kernel for Enhanced Oil Recovery	Dr. S.G. Gayal Shri N.D. Kambli Shri R.P. Kadam

4

Education and Training

Education

A permanent recognition has been accorded to the Institute by the University of Mumbai 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 M.Sc. and three for Ph.D.

As of now, four students have registered for Ph.D. in Physics, two for Microbiology, and one student for M.Sc. in Physics. Further, the Institute has been recognised as a guiding centre for M.Sc. and Ph.D. courses in Home Science (Textiles) of the SNTD 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

At the Headquarter in Mumbai, training programmers on cotton quality

evaluation are conducted regularly for the benefit of the personnel from the cotton trade and industry. Training courses are also offered to ginning-industry sponsored personnel on operation and maintenance of various ginning machines at GTC, Nagpur. At every training programme, the importance of clean cotton and assessment of proper fibre quality for ensuring better remuneration to farmers or ginners is emphasized.

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 Headquarter. 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 material in the form of a book containing details of test methods, statistical interpretations of results and other details are provided to the trainees. The Institute also conducts training programmes on specialised topics on cotton

technology on demand for industry sponsored personnel.

(a) Training on Quality Evaluation of Textiles

During the reporting period, forty sponsored-personnel were trained in three different batches on the quality evaluation of cotton fibre, yarn and fabric.

(b) 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. In 2010-11, eight batches comprising of 158 persons were trained in ginning. Besides,

on-site training programmes for 50 trainees were conducted at five modernized ginning and pressing factories.

(c) Training to Egyptian Scientists deputed under Bilateral Programme

A two week training programme on ginning technology and cotton technology including utilization of cotton by products was conducted for the benefit of two ARC, Egypt Scientists at GTC, Nagpur and at Headquarter, respectively from 2-17 January 2011. This programme was as per work plan between the ICAR and ARC, Egypt for the year 2010-11. The participants were Dr. Amal Mohammad, Deputy Director (Research) and Dr. Hosan El Din Elhosony, Head, Ginning, ARC, Egypt.



Dr. Amal Mohammad, Deputy Director (Research) and Dr. Hosan El Din Elhosony, Head, Ginning, ARC, Egypt receiving certificates from Dr. C.D. Mayee, Chairman, ASRB. Dr. A.J. Shaikh, Director, CIRCOT, Dr. R.H. Balasubramanya, HOD, CBPD, Dr. S.B. Jadhav, Head, TOT with Dr. S.J. Guhagarkar, In-charge, Training Section

5

Linkages and Collaboration

CIRCOT does not have an agricultural farm attached to it. However, the institute's Regional Quality Evaluation units are situated in major cotton growing areas. They are located in the premises of either an agricultural university or other ICAR institutes engaged in cotton research. These quality evaluation units serve as extension arms of the Institute. Many CIRCOT scientists participate in the meetings of AICCIP, ensure their interaction with the scientists of agricultural universities and thus help them in updating the requirements of the textile industry. The units are also used as windows to promote CIRCOT developed technologies for efficient utilisation of cotton fibre, crop by-products and other agro-waste materials. The Institute has been providing technological support to breeders for the development of Bt. cottons by providing data on the spinnability, fibre quality and oil content through contract/consultancy research. The Institute has also established linkages with NGOs, for example, *Varhad Vikas Seva Prathisthan*, Akola (MS) for carrying out field trials on the Low-cost sliver making machine developed by the Institute. It has also established collaboration with the 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).

Active participation in various exhibitions, *Kisan melas* and in similar events serve as technology extension and out-reach activities by the Institute. 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 Director and the Scientists of CIRCOT serve as resource persons in various committees constituted by the Bureau of Indian Standards for cotton and textiles. They participate in various seminars, symposia, conferences, workshops, organised within the country that constitute a platform for the exchange of their knowledge and expertise in different fields of research. The Director and many scientists are members of advisory panels of institutions like ATIRA, BTRA, SITRA, CCI, ICMF, CAI. Many of the Scientists also act as experts in several

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.

Many scientists 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 and popular journals apart from participating in seminars, conferences and exhibitions displaying technologies and processes developed or improved by the Institute.

Publications of research findings in national and international journals constitute an important mode of extension activity. Publications in popular journals help to bring research closer to the user community.

The Institute conducts regular training courses on Cotton Quality Evaluation including elementary statistics applicable to textile testing for the sponsored personnel from the cotton trade and industry, while at the Ginning Training Centre of CIRCOT at Nagpur, both theoretical and practical training skills are imparted on different aspects of ginning including maintenance of ginning machines. A hostel with facilities to accommodate about 20 trainees is presently available at the GTC, Nagpur.

Another important extension activity of the institute is to supply information in response to various queries received from stake holders on cotton fibre, yarn and fabric, consultancy services and contract research. The institute regularly publishes pamphlets on various technologies developed and innovations made, for information and use by the different stake holders.

Technical Queries:

Queries from various private organisations, educational institutions, semi- government, state and central government agencies were received and replies were sent promptly. Information on various technologies and devices developed by CIRCOT, instruments designed, methods of tests standardised for cotton fibre, yarn and fabric, quality levels of different cotton varieties, by-products and agro-waste utilisation, were also supplied to many entrepreneurs.

Commercial Testing:

The Institute receives a number of fibre, yarn, fabric and other miscellaneous samples for tests on payment basis from trade, industries, textile and other educational institutes, and state government bodies. The details of commercial samples tested at CIRCOT, Mumbai during the period 2010-11 along with those tested in the recent past, are presented in Table 13.

LINKAGES AND COLLABORATION

TABLE 13 : 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
1.	Ginning, Fibre, Trash Content and Spinning	8438	1961	5253	8965	2860
2.	Yarn	254	160	35	40	35
3.	Fabric	445	418	616	396	146
4.	Miscellaneous	516	332	180	159	378
	Total	9653	2871	6084	9560	3419

Besides routine tests, some special tests were also carried out on samples received from various organisations

against payment of fees. The special tests carried out during 2010-2011 are highlighted below :

No.	Party's Name	Test
1	M/s. Aanjaneya Biotech, Mumbai	X-ray
2	M/s. Aditya Birla Group, Mumbai	Friction test
3	M/s. Amit Cotton, Hyderabad	Linter testing
4	BARC, Mumbai	SEM
5	M/s. Carver Tech. & Equipment, Mumbai	Linter testing
6	CIFE, Mumbai	SEM
7	M/s. Clean Cotton Impex, Tirupur	Cellulose content
8	M/s. Croda Chemicals, Navi Mumbai	SEM
9	M/s. Emichem Pvt. Ltd. Kolkata	Surface tension
10	M/s. G.S.Oils Ltd, Adilabad	Cellulose content
11	M/s. Gill & Co., Mumbai	Moisture content
12	ICT, Mumbai	SEM
13	M/s. Milan G & P, Limbdi	Cellulose content
14	Modern College, Vashi, Navi Mumbai	SEM
15	Mumbai University Press, Mumbai	Paper testing
16	Mumbai University, Kalina, Mumbai	SEM
17	Navi Mumbai Municipal Corporation, Navi Mumbai	Paper testing
18	Ratnagiri Chemicals, Ratnagiri	FTIR
19	Reliance Industries Ltd., Navi Mumbai	X-ray
20	Reliance Life Sciences, Mumbai	SEM
21	RITES, Mumbai	Paper testing
22	M/s. Shraddha Analytical Services, Mumbai	Eco-testing

Exhibition and Publicity:

The Institute participated in a number of exhibitions and arranged video recording of its various activities showcasing the technologies developed and those available for commercialization, for television broadcasts. Large

number of entrepreneurs and farmers evinced interest in the technologies. During the reporting period, the Institute participated in the following activities:

- ICAR- Industry meet 2010 at NASC complex, New Delhi, July 28-29, 2010



CIRCOT Technologies are being explained to Shri Sharad Pawar, Hon. Union Minister of Agriculture at ICAR-Industry Meet-2010

- "Krishi Mahotsav 2010" Exhibition at Marathwada Agricultural University Ground, Parbhani, October 8 – 12, 2010.

Shri G.B. Hadge, Technical Officer explaining the Visitors about the Technologies Developed by CIRCOT



LINKAGES AND COLLABORATION

- Baramati Agri Expo - Haritkranti 2010 organised by Agricultural Market Produce Committee, Baramati, November 1-4, 2010.



Curious Visitors at the CIRCOT Stall: Dr. S.B. Jadhav, Principal Scientist and Shri Sujeet Raj K., in the Stall

- An exhibition was arranged for 40 delegates from African countries (Ethiopia, Kenya, Malawi, Mozambique, Tanzania, Uganda and Zimbabwe) in connection with their visit to CIRCOT on November 19, 2010.
- Recording of GTC activities by Doordarshan on February 5, 2011 at GTC Nagpur.
- ICAR- Pusa Krishi Mela 2011, NASC complex, New Delhi, March 3 - 5, 2011.
Apart from participating in the above exhibitions, the Institute also showcases technologies developed whenever important dignitaries visit the Institute, and during the workshop/conferences/seminars arranged by the Institute at the Headquarters or at the GTC, Nagpur.

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Publications

A. Annual Report

Annual Report of the Central Institute for Research on Cotton Technology for the year 2009-2010.

B. Research Publications:

1. Arude, V.G., Shukla, S. K., Makwana, D. N., Manojkumar, T.S. and Jyoti M. Nath - *Modernization of Indian Roller Gins and the Effect on Cotton Fibre Quality*, published in the Journal of Agricultural Mechanization in Asia, Africa and Latin America (AMA), Vol. 41 (2), pp. 43-47, 2010.
2. Arude, V.G., Shukla, S. K., Makwana, D. N., Manojkumar, T.S. and Jyoti M. Nath - *Evaluation of Cotton Processing Loss in Modernized Indian Roller Ginneries*, published in Journal of Agricultural Mechanization in Asia, Africa and Latin America (AMA), Vol. 41 (4), pp. 24-27, 2010.
3. Arude, V.G., Shukla, S.K. and Manojkumar, T.S. - *Evaluation of Vibrations of Ginning and Pressing Machinery in Cotton Ginneries*, published in the Journal of Agricultural Mechanization in Asia, Africa and Latin America (AMA), Vol. 41(4), pp. 55-59, 2010.
4. Meena Sharma and Nachane, R.P. - *A Novel Method for Scouring Textile Cotton*, published in Indian Journal of Fibre & Textile Research, Vol. 35 (1); pp. 72-74, March 2010.
5. Shaikh, A.J., Gurjar, R.M., Patil, P.G., Paralikar, K.M., Varadarajan, P.V. and Balasubramanya, R.H. - *Cotton Stalk Utilisation*, published in Cotton Research Journal, Vol. 1(1), pp. 89 - 115, Jan - June 2010.
6. Shukla, S.K., Arude, V.G. and Jyoti M. Nath - *Performance Evaluation of Different Seed Cotton Distribution Systems used in Modern Indian Ginneries*, published in Journal of Agricultural Engineering, Vol. 47(2), pp. 43-47, 2010.
7. Shukla, S.K., Arude, V.G., Jyoti M. Nath and Patil, P.G. - *Performance Evaluation of a Cotton Heaping Machine*, published in Journal of Agricultural Engineering, Vol. 47(3), pp. 40-43, 2010.
8. Muralidhara, K.S. and Sreenivasan, S. - *Thermal Degradation and*

PUBLICATIONS

- Burning Behaviour of Jute Upholstery Fabrics, published in *Colouge*, Vol. LVII, No. 5, pp. 65-68, 2010.
9. Muralidhara, K.S. and Sreenivasan, S. – Thermal Degradation and Burning Behaviour of Cellulose Based and Cellulose – Silk Blended Upholstery Fabrics, published in *Journal of Scientific & Industrial Research*, Vol. 69, pp. 879 – 885, 2010.
 10. Muralidhara, K.S. and Sreenivasan, S. – Thermal Degradation and Burning Behaviour of Cotton, Polyester and Polyester/Cotton Blended Upholstery Fabrics published in *World Applied Sciences Journal*, Vol. 9, No. 11, pp. 1272 – 1279, 2010.
 11. Yadav, A., Nachane, R.P. and Ahmed, M. – *Wear Comfort Studies*, published in *Cotton Research Journal*, Vol. 1(2), pp. 233 – 240, July – December 2010.
 12. Matish Chandra and Sreenivasan, S. - Studies on Improved G. arboreum Cotton: Part I – *Fibre*, published in *Indian Journal of Fibre and Textile Research*, Vol. 36 (1), pp. 24 – 34, March 2011.
 13. Meena Sharma and Nachane, R.P. – *Non-conventional Scouring of Cotton Fibres of Different Species*, published in *Indian Journal of Fibre & Textile Research*, Vol. 36 (1), pp. 81-87, March 2011.
 14. Prabhudesai, R.S. and Makwana, D.N. - *Spinning Performance of AICCIP Strains*, published in *The Indian Textile Journal*, Vol. 121 (5), pp. 44 and 46 - 48, February 2011.
 15. Satyamurthy, P., Jain, P., Balasubramanya, R.H. and Vigneshwaran, N. - *Preparation and Characterization of Cellulose Nanowhiskers from Cotton Fibres by Controlled Microbial Hydrolysis*, published in *Carbohydrate Polymers*, Vol. 83(1), pp.122-129, January 2011.
- C. Other Publications from CIRCOT:**
1. CIRCOT News – Vol. 12 (1) April 2009 to September 2009 and October 2009 to March 2010.
 2. CIRCOT Ginning Bulletin – Vol. 11 (1), April – September 2010.
- C. Paper Presented in Seminars / Conferences, etc.**
1. Bhowmick, M. and Chattopadhyay, S.K. - *Recent Developments in Cotton Yarn Spinning System*, presented at the National Conference on Paradigm Shift in Cotton Research & Cultivation, Navsari Agricultural University, October 19-20, 2010.
 2. Chattopadhyay, S.K., Shaikh, A.J., Bindu, V., Jadhav, R.K. and Upadhye,

- D.L. - *CIRCOT Micro & Full Spinning Tests-Tools in Cotton Improvement Research*, presented at the National Conference on Paradigm Shift in Cotton Research & Cultivation, Navsari Agricultural University, October 19-20, 2010.
3. Sreenivasan, S. – Quality Profile of Indian Cotton and its Prospects for Utilisation in Diversified Applications, presented at the National Conference on Paradigm Shift in Cotton Research & Utilisation, Navsari, Agricultural University, October 19-20, 2010.
 4. Chattopadhyay, S.K., Bharimalla, A.K., Bindu, V., Vinod, K. and Upadhye, D.L. – *Development of Novel Machines for Coconut Fibre Extraction and Segregation for Diversified Textile Applications - A NAIP Intervention*, presented at the International Conference on Coconut Biodiversity for Prosperity, CPCRI, Kasaragod, Kerala, October 25-28, 2010.
 5. Chattopadhyay, S.K., Bharimalla, A.K. and Talukdar, M.K. – *Application of Technical Textiles in Fabricating Flexidam for Water Management in Agriculture*, presented at the National Seminar on Non-conventional Applications of Textiles, CIRCOT, Mumbai, Dec. 11, 2010.
 6. Karande, V.S., Mhaske, S.T., Hadge, G. and Vigneshwaran, N. – *Preparation of Cellulose Nanofibrils by Mechanical Process*, presented in the Conference YRC-YICC'10 held at Institute of Chemical Technology (ICT), Matunga, Mumbai, January 15, 2010.
 7. Karande, V.S., Mhaske, S.T., Bharimalla, A.K., Hadge, G. and Vigneshwaran, N. – *Preparation of Cellulose Nanofibrils by Homogenization from Microcrystalline Cellulose*, presented in the International Conference on Advancement in Polymeric Materials APM 2010 held at Bhubaneswar, February 20 – 22, 2010.
 8. Kartick K. Samanta, Manjeet Jassal and Ashwini K. Agrawal - *Nano-scale Surface Engineering of Textile Substrates using Atmospheric Pressure Cold Plasma*, presented in the National Seminar on Non-conventional Applications of Textiles, CIRCOT, Mumbai, December 11, 2010.
 9. Talukdar, M.K., Chattopadhyay, S.K., Roy Choudhary PR, and Sahoo, N. - *Flexible Checkdam for Watershed Management – An Innovative Application for Technical Textile*, presented at the International Conference on Technical Textiles and Nonwovens, IIT Delhi, 11-13th November, 2010.
 10. Arude, V.G., Shukla, S.K. and Manojkumar T.S. - *Effect of*

PUBLICATIONS

- Automation on Cotton Fibre Quality*, presented in the 45th National Convention and Symposium of ISAE held at PDKV, Nagpur, January 17-19, 2011.
11. Manojkumar T.S., Arude, V.G. and Shukla, S.K. - *Design and Development of an Autogroover Machine for Making Helical Grooves on Rollers used in Roller Ginning Machines*, presented in the 45th National Convention and Symposium of ISAE held at PDKV, Nagpur, January 17-19, 2011.
 12. Shukla, S.K., Shukla, P., Ghosh, P., Arude, V.G. and Jyoti Nath - *Experimental and Numerical Study of Pressure Drop Inside 1D3D Cyclone Separators*, presented in the 45th National Convention and Symposium of ISAE held at PDKV, Nagpur, January 17-19, 2011.

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List of On-Going Projects During 2010-2011

CORE AREA I : IMPROVEMENT IN GINNING OF COTTON

Sl. No.	Name of the Project	Principal Investigator	Associates
1.	The Performance Evaluation of Cyclones used in Modern Ginneries	Shri S. K. Shukla	Shri V.G. Arude Dr. T.S. Manojkumar Dr.(Smt.) J.M. Nath
2.	Design and Development of Pneumatic Loading System for Double Roller Gin	Shri A.K. Bharimalla	Dr. S.B. Jadhav Shri R.S. Prabhudesai
3.	Engineering Intervention for improving Energy Efficiency in Bale Presses	Shri V.G. Arude	Dr.(Smt.) J.M. Nath Shri U.D. Devikar

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

Sl. 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 Major Trade Varieties Grown in Different Parts of the Country	Director	Scientists and Technical Personnel
3.	Evaluation of Quality of Standard Varieties of Indian Cotton	Director	Scientists and Technical Personnel
4.	Preparation of Calibration Cotton Standards	Dr. R.P. Nachane	Scientists and Technical Personnel
5.	Structure-Property Relationships in DREF Friction Spun Yarns	Shri Achchhelal Yadav	Dr. S.K. Chattopadhyay Shri R.K. Jadhav
6.	Design and Development of Rotating Flat for CIRCOT Mini Card	Shri P.S. Deshmukh	Dr. S.K. Chattopadhyay Shri R.K. Jadhav Shri D.U. Kamble

LIST OF ON-GOING PROJECTS DURING 2010-11

Sl. No.	Name of the Project	Principal Investigator	Associates
7.	GIS Based Development of Spatial Fibre Quality Maps for Cotton Grown in Nagpur and Wardha Districts of Vidharbha Region of Maharashtra	Shri V. G. Arude	Dr. (Smt.) J.M. Nath Shri U. D. Devikar
8.	Evaluation of Liquid Moisture Management Properties of Commercially available Cotton and Cotton Blended Fabrics	Dr. R.P. Nachane	Shri M.V. Vivekanandan Dr. (Smt.) Sheela Raj
9.	Design and Development of an Apparatus for Measurement of Moisture Vapour Transfer Rate (MVTR) of Fabrics based on Dish Method	Er. A.K. Bharimalla	Shri M.V. Vivekanandan Dr. R. P. Nachane
10.	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 Samanta
11.	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

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

Sl. No.	Name of the Project	Principal Investigator	Associates
1.	Eco friendly Pre and Post Processing of Fabrics Prepared from Organic Cotton and Finishing with Chitosan	Dr. S.G. Gayal	Dr. (Smt.) Sujatha Saxena Dr. R.P. Nachane Kum. C.P. D'Souza
2.	Development of Protective Clothing for Agricultural Pesticide Spraying Operations	Dr. (Smt.) Sujatha Saxena	Dr. R.P. Nachane Dr. P.V. Varadarajan Shri Chitra Nayak
3.	Study on Dyeing of Cotton Fabric using Blend of Natural Dyes for Innovative Shades	Shri R.M. Gurjar	Shri R.R. Chhagani
4.	Use of Banana Pseudo-stem Sap as Mordant for Dyeing of Cotton with Natural Dyes	Dr. (Smt.) Sujatha Saxena	Smt. N.D. Nachane Dr. R.R. Mahangade

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Sl. No.	Name of the Project	Principal Investigator	Associates
5.	Surface Modification of Cotton Textiles using Nano Technology to Impart Super Hydrophobicity	Shri A. Arputharaj	Dr. N. Vigneshwaran Dr. Sujatha Saxena Shri P. K. Mandhyan Shri G.B. Hadge Shri R.R. Chhagani
6.	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

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

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

EXTERNALLY FUNDED PROJECTS

Sl. 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. S.B. Jadhav CIRCOT, Mumbai
3.	Molecular Mapping of Fibre Quality and Lint Yield Traits: Construction of Framework Linkage Map in Desi Cotton (<i>Gossypium</i> spp.)	Dept. of Biotechnology, Govt. of India	Dr. V.N. Waghmare, Sr. Scientist, Division of Crop Improvement, CICR, Nagpur	Dr. A.B. Dongre, CICR, Nagpur Dr. Vinita Gotmaare CICR, Nagpur Dr. S.B. Jadhav CIRCOT, mUMBAI
4.	Development of Composite Yarns for Technical Textiles from Natural Fibres 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

LIST OF ON-GOING PROJECTS DURING 2010-11

Sl. No.	Name of the Project	Funding Agency	Principal Investigator	Associates
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. R.H. Balasubramanya Dr. P.V. Varadarajan Dr. A.J. Shaikh Dr. S.G. Gayal Shri R.M. Gurjar Dr. D.N. Makwana Shri D.V. Mhadgut CIRCOT, Mumbai Dr. S. Venkatakrishnan, Quality Evaluation Unit, CIRCOT, Coimbatore
6.	Design and Development of Rubber Dams for Watersheds	National Agricultural Innovation Project (Component 4)	Dr. S.K. Chattopadhyay, CIRCOT, Mumbai	Dr. C.D. Ravindran Shri A.K. Bharimalla Shri A. Yadav, CIRCOT, Mumbai
7.	A Value Chain on Banana Pseudostem for Fibres and other Value Added Products	National Agricultural Innovation Project (Component 2)	Dr. R.P. Nachane, CIRCOT, Mumbai	Dr. R.H. Balasubramanya Dr. R.P. Nachane Shri R. M. Gurjar CIRCOT, Mumbai
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.H. Balasubramanya 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, CIRCOT, Mumbai Shri V.G. Arude GTC, Nagpur Dr. S. Venkatakrishnan, Quality Evaluation Unit, CIRCOT, Coimbatore

8

IRC, RAC and IMC Meetings

Institute Management Committee Meeting (IMC)

The Sixty-ninth meeting of the Institute Management Committee was held during December 28, 2010. Besides, 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. Issues connected with the purchase of equipment and request for increased allocation for the purchase of certain instruments due to cost escalation was discussed, for which Dr. K.K. Singh, ADG (Engg.) asked the Head of Office to indicate the savings in the budget so that the escalated cost of equipment proposed to be procured on priority could be justified and necessary permission from the Competent Authority be obtained.

Institute Research Council (IRC) Meeting

A Half-yearly IRC meeting was held on October 6 and 7, 2010 to discuss

the progress of research during April – September 2010. The following new projects were approved with suggestions/recommendations in the project proposals.

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

1. Design and Development of Portable Moisture Measuring Instrument for Cotton using Customized Sensor Designed for Fixed Volume and Uniform Packing Density
2. Standardization of Compression Moulding Machine Parameters for Natural Fibre based Reinforced Composites and Study of their Mechanical Properties

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

1. Use of Banana Pseudo-stem Sap as Mordant for Dyeing of Cotton with Natural Dyes
2. Surface Modification of Cotton Textiles using Nano Technology to Impart Super Hydrophobicity
3. Nano-finishing of Cotton Textile to Impart Flame Retardance and U.V. Protective Functionalities

IRC, RAC AND IMC MEETINGS

The One Hundred and Eleventh Institute Research Council (IRC) meeting of CIRCOT was held at the Committee Room on March 29 and 30, 2011 to discuss in detail the progress made in each of the different projects under various research core areas during the period, April 2010 to March 2011. The following new proposals were approved in the core areas mentioned below with suggestions/recommendations on the proposals made in the RPF 1 format.

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

Utilisation of Tender Coconut Husk for Dyeing of Fabric

Core Area IV: Utilisation of Cotton Plant Residues for Production of Value Added Products

An Accelerated Process for Preparation of Bio-enriched Compost from Cotton Plant Residues

Peer Review Meeting

A Peer Review Meeting to discuss

the Research Programmes to be undertaken under various thrust areas for the XII Plan (2012-2017) was held on November 21, 2011 under the Chairmanship of Dr. R.P. Kachru, former ADG (PE) and Chairman, RAC, CIRCOT. Dr. K.R. Krishna Iyer, former Director, CIRCOT and Dr. M.K. Talukdar, Vice President, M/s. Kusumgar Corporates, Mumbai participated in the meeting. The following broad areas have been identified under which projects will be taken in the XII plan.

1. Pre-ginning
2. Ginning
3. Mechanical Processing, Technical Textiles and Composites
4. Characterization - Cotton and other Natural Fibres, Yarns and Textiles
5. Chemical and Biochemical Processing of Cotton
6. Biomass and By-product Utilization
7. Entrepreneurship and Human Resource Development.



Peer Review Meeting

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 Conference on Knowledge Management in the Globalised Era	New Delhi	21-04-2010 to 23-04-2010	Smt. P.R. Mhatre
2.	<i>Rashtriya Krishi Vigyaan Sangoshti</i>	Karnal	22-04-2010 to 24-04-2010	Shri Chitranayak
3.	Web Designing - INDIMIX 2010	Mumbai	28-05-2010	Shri D.R. Murthy
4.	National Seminar on Engineering Interventions to Enhance Income of Small Marginal Farmers	New Delhi	09-07-2010 and 10-07-2010	Shri V.G. Arude
5.	ICAR-Industry Meet 2010	New Delhi	28-07-2010 to 29-07-2010	Dr. S. Sreenivasan Dr. R.P. Nachane Dr. A.J. Shaikh Dr. N. Shanmugam Dr. S.B. Pal Shri G.B. Hadge Shri K. Sujithraj
6.	National Seminar on E-resources & Discovery Solutions	Mumbai	03-08-2010	Smt. P.R. Mhatre
7.	Continuing Education & Quality Improvement Programme on R&D Management	Mumbai	16-09-2010 to 18-09-2010	Shri Chitranayak
8.	National Conference on Paradigm Shift in Cotton Research & Cultivation	Navsari	19-10-2010 to 21-10-2010	Dr. A.J. Shaikh Dr. S. Sreenivasan Dr. R.P. Nachane Shri Chitranayak Shri E.A. Pachpinde Shri A. Yadav Shri Manik Bhowmick Smt. Manisha Kurhadkar
9.	International Conference on Coconut Biodiversity	Kasargod	25-10-2010 to 29-10-2010	Dr. S.K. Chattopadhyay

PARTICIPATION IN CONFERENCES, MEETINGS, WORKSHOPS, SYMPOSIA

Sr. No.	Meetings / Conferences / Seminars / Symposia, etc.	Place	Date	Participants
10.	69 th Workshop on Official Language Policy	Dalhousie	27-10-2010 to 29-10-2010	Smt. K.R. Joshi
11.	19 th Hindi Sammelan Evam Karyashala	Puri	28-10-2010 to 30-10-2010	Shri K.W. Khamkar Smt. T.P. Mokal
12.	Interactive Meet on Information and Communication Technology in ICAR	New Delhi	03-11-2010 and 04-11-2010	Shri D.R. Murthy
13.	IBM SW Universe-2010	Mumbai	09-11-2010	Shri D.R. Murthy
14.	International Conference on ICTN 2010	IIT Delhi	11-11-2010 to 13-11-2010	Dr. S.K. Chattopadhyay Shri Manik Bowmick
15.	National Seminar on Non-Conventional Application of Textiles	CIRCOT Mumbai	11-12-2010	Scientific and Technical Staff of CIRCOT
16.	Innovation in Textiles and Demanding Consumerism	BTRA Mumbai	09-12-2010 to 10-12-2010	Shri Chitranayak
17.	The 39 th Textile Research Symposium	New Delhi	16-12-2010 to 20-12-2010	Shri M.V. Vivekanandan Smt. Sheela Raj
18.	45 th ISAE Convention and Symposium	Nagpur	17-01-2011 to 19-01-2011	Shri V.G. Arude Dr. (Smt.) J.M. Nath Shri P.S. Deshmukh
19.	X Agricultural Science Congress	Lucknow	10-02-2011 to 12-02-2011	Dr. A.J. Shaikh
20.	Evolving Trends in Management for the Textile Industry	Mumbai	18-02-2011	Dr. R.P. Nachane Dr. S.G. Gayal Shri R.M. Gurjar
21.	Workshop on Results Framework Document (RFD)	Cabinet Secretariat, Govt. of India New Delhi	22-02-2011	Dr. S.K. Chattopadhyay
22.	Agricultural Libraries and User Community 2011	New Delhi	24-02-2011 to 25-02-2011	Smt. P.R. Mhatre

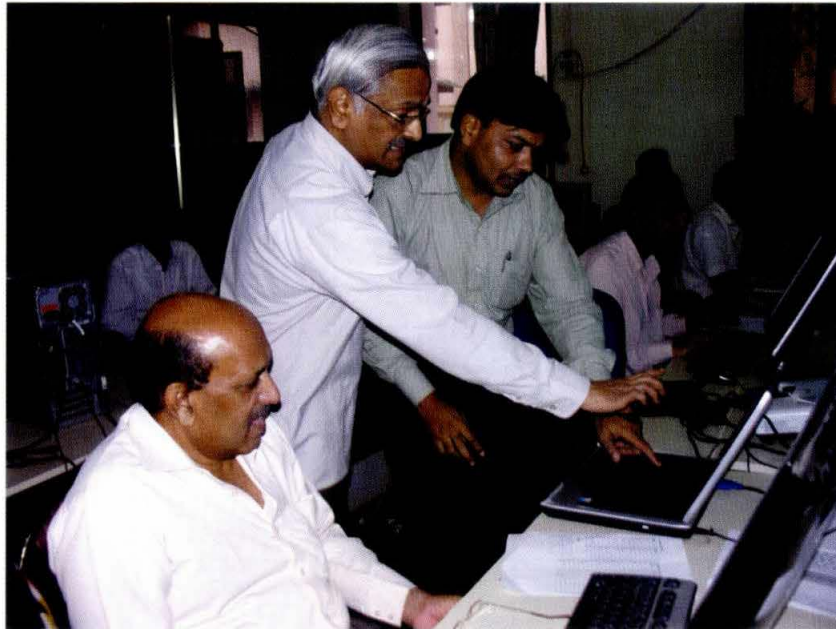
10

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

Training of Staff in Unicode for Hindi Typing on Computer

CIRCOT organised a training programme on Unicode computing for its 97 staff members, comprising scientific, technical and administrative categories for 20 working days, from July 1 to 31, 2010. This has been hailed as the first training of its kind not only in ICAR, but also in any governmental organization in Mumbai. Apart from Unicode, information on MANTRA, a translation software which can be used

to translate around 20 Indian languages to Hindi, conversion of fonts, dictation software and information of on-line examination for Prabodh, Praveen and Pragya were also given. All the three trainers were Assistant Directors in the Hindi Teaching Scheme from Pune and Mumbai. The trainees were motivated to carry out typing in Hindi for their day-to-day work. This training also helped to fulfill the mandatory requirement that the Unicode software be installed in every computer in government offices.



*Dr. S. Sreenivasan, Director, CIRCOT making a point to
Shri Rajendra Prasad Verma, Assistant Director, Hindi Teaching Scheme, Pune*

ICAR Foundation Day and Biodiversity Day

The **ICAR foundation day** was celebrated on the 16th of July as per schedule. During this occasion, various activities like lectures on topics of general interest and exhibition depicting various research activities carried out by the institute were held. As per the directives of the Council, this day was to be celebrated along with the **International Biodiversity Day** which was on July 29. Hence, to mark both the celebrations, a lecture was arranged. Dr. Vibha Gupta, Lecturer, Department of Biology, Guru Nanak Khalsa College of Arts, Science and Commerce, Matunga, Mumbai gave a talk on **Biodiversity**. In her talk she brought out the importance of biodiversity, the need to preserve and methods to conserve biodiversity. The lecture was well attended by the staff of the Institute.

Official Language Hindi Fortnight Celebration

The Hindi Pakhwada (fortnight) was celebrated during September 14 – 28, 2010. Shri Arvind Rahi, Poet and Journalist was the Chief Guest at the inaugural function on September 14, 2010. Various competitions were organised during the period. Besides, a poster presentation was organised on the subject, *Kisan aur udhyog ke madhya CIRCOT ek setu*.

On the concluding day, Dr. Ramakant Sharma, Retired General

Manager, Department of Banking Operation and Development, Mumbai and Shri Anant Shrimali, Assistant Director, Hindi Teaching Scheme, (Stenography & Typing) were the Chief Guests. The programme was well attended by the staff. The Programme was telecast in Sahyadri channel of Doordarshan under the programme *Mumbai amchi Mumbai*. The programme was well attended by the staff. The following were the winners of the poster presentation:

I Prize	Dr. (Smt.) A.A. Kathe Shri N.D. Kambli and Dr. N. Vigneshwaran
II Prize	Smt. Manisha Kurhade
III Prize	Dr. R.D. Nagarkar, Shri K.H. Sawakhande and Shri M.G. Ambare

Vigilance Awareness Week Celebration

The Vigilance Awareness Week was celebrated at the Institute from October 25 to November 1, 2010. Dr. A.J. Shaikh, Director, CIRCOT inaugurated the function, wherein the staff members were administered the oath. There was a debate on the topic, **Use of Right to Information in Vigilance**. Shri S.N. Salve, Asst. Administrative Officer delivered a talk on **Vigilance Awareness**. Shri D.C. Shirsagar, I.P.S., Chief Vigilance Officer, Cotton Corporation of India, CBD, Belapur, Navi Mumbai delivered a talk on "*Samaj Mein*

Satarkata ka Sambandh". The following were the winners of various competitions conducted during the occasion.

Ashu Bhashan

Hindi	I Prize	Shri C.M. More
	II Prize	Shri A.R. Gujar
	III Prize	Smt. S.R. Shirsat

Essay Competition

Hindi	I Prize	Shri D.M. Raje
Marathi	I Prize	Shri C.M. More
	II Prize	Shri S.N. Bandre
English	I Prize	Smt. Binu Sunil
	II Prize	Smt. V.V. Desai

Qaumi Ekta Week Celebration

The Qaumi Ekta Week was

celebrated at the Institute and at various Quality Evaluation Units during November 19 - 25, 2010. The staff members were administered the oath on November 19. The Flag Day was observed on November 25, 2010. The staff members gave monetary contribution towards rehabilitation of physically handicapped children. An essay competition was organised on the topic, *Whether the Feeling of National Integration Exists in Young Generation?* The following are the winners in the essay competition:

Hindi	I Prize	Smt.N.M. Deshmukh
	II Prize	Smt. K.R. Joshi
Marathi	I Prize	Shri S.N. Bandre
	II Prize	Smt. H.R. Pednekar
English	I Prize	Smt. V.V. Desai



Smt. N.M. Deshmukh receiving prize from the Chief Guest Dr. Mithilesh Sharma, Dept. of Hindi

National Seminar on Non-conventional Applications of Textiles

The Central Institute for Research on Cotton Technology (CIRCOT) in collaboration with the Indian Fibre Society (IFS) organized a one day National Seminar on **Non-Conventional Applications of Textiles** on December 11, 2010 at the Jubilee Hall, CIRCOT. Around 150 delegates including the staff participated in the seminar. Dr. A.J. Shaikh, Director, CIRCOT delivered the welcome address. The seminar was inaugurated by Shri Y.K. Kusumgar, Chairman and Managing Director, M/s. Kusumgar Corporates Pvt. Ltd., Mumbai, a well known manufacturer of technical textiles. Shri

Sudhir Bhargava, Hon. Member, Governing Body, ICAR was the Guest of Honour. Dr. S.N. Pandey, Chairman, Indian Fibre Society delivered the keynote address and Dr. R.P. Nachane, Hon Secretary, IFS, proposed the Vote of Thanks.

The inaugural session was followed by three technical sessions wherein 14 papers were presented. Some of the presentations like Application of Technical Textile in Fabricating Flexi-Dam for Water Management in Agriculture, Nano-Scale Surface Engineering of Textile Substrates using Atmospheric Pressure Cold Plasma, Geocell Reinforced Fly Ash Retaining Walls, Slopes and Geotube and Use of Waste



Release of Souvenir by the Chief Guest Shri Y.K. Kusumgar, President and CEO, M/s. Kusumgar Corporates, Mumbai. Also seen in the picture are (L to R) Dr. A.J. Shaikh, Director, CIRCOT, Dr. S.N. Pandey, former Director, CIRCOT and Chairman, IFS, Shri Sudhir Bhargava, Hon. Member, Governing Body, ICAR and Dr. R.P. Nachane, Principal Scientist, QEID, CIRCOT and Secretary, IFS

Cotton in Hygiene Products were well received by the participants.

The main emphasis of the seminar was to stress upon on the need to develop more natural fibre based technical textiles so that the demand for natural fibres could be increased with consequent benefits to farmers. A Souvenir comprising the abstracts of the papers was published, and a CD incorporating all the technical papers was provided to the delegates.

IPR Awareness and Business Planning Meet

The Zonal Technology Management and Business Planning and Development unit of CIRCOT as part of its sensitization of ICAR scientists in the Western Zone organised an awareness meet about IPR and Business Planning

on January 6, 2011 at the Directorate of Medicinal and Aromatic Plants Research, Anand, Gujarat. About 40 participants comprising Scientists, Senior Research Fellows, Research Assistants and BPDU members from Anand Agricultural University attended the programme. Dr. S. Maiti, Director, DMAPR, Anand inaugurated the programme. The programme aimed at creating awareness about the various types of IPR, terminologies relating to IPR, protection of Intellectual Property and general procedures to be followed for IP management in the ICAR system. Dr. R.P. Nachane, Dr. Shanmugam and Dr. Pal from CIRCOT gave lectures on Intellectual Property Rights for Agri-Business Technologies, Business Incubation Concepts and Technology Management.



Dr. Satyabrata Maiti, Director, Directorate of Medicinal and Aromatic Plants Research, Anand, Gujarat with Dr. R.P. Nachane, Principal Scientist and Secretary, ZTMC

Business Development Programme at Ahmedabad Management Association

The Zonal Technology Management and Development unit of CIRCOT, Mumbai in association with Fibre2Fashion, Ahmedabad, organised a Business Development Programme for Cotton Technologies on January 7, 2011 at Ahmedabad Institute of Management. The major theme of this conference was to showcase the new cotton technologies to prospective entrepreneurs for commercial adoption.

Dr. P.R. Roy, Director, Fibre2Fashion and formerly Advisor M/s. Arvind Mills, Ahmedabad and President, Textile Association of India (TAI) inaugurated the meet. The august gathering comprised of delegates from cotton value chain as well as from packaging and particle board manufacturing sectors. Eminent speakers included scientists from CIRCOT, CICR, Nagpur and CIAE, Bhopal. At the end of the programme more than 15 delegates showed keen interest in some of the technologies presented. The meet was a grand success.



Dr. A.J. Shaikh, Director, CIRCOT delivering the inaugural address

Workshop on Patent Search and IP Management

A half-day workshop was organized on January 25, 2011 by the ITMU/ZTMC

units in Mumbai on Patent Search and IP Management for scientists and technical staff of ICAR institutes and their regional stations located in Mumbai, namely, CIRCOT, CIFE, CMFRI and CIFT.

Around 30 participants attended this workshop, which aimed at sensitizing the researchers on patent search, management of different forms of intellectual properties and commercialization of technology. The workshop had two sessions. Session I dealing with Patent Search in which there was a live demonstration about the use of Total patent' software and Session II had three lectures viz 1) How to secure and manage a patent, by Smt. Rohini Wayal, Research Associate, ITMU 2) Management of other forms of IP by Ms. Pallavi Ghogale, RA, ZTMC and 3) Technology Transfer: Commercialization of IP/Technologies by Shri A.K. Bharimalla, Scientist and member, ITMU. There was a very good interaction amongst the speakers and participants.

Meeting-cum-Workshop on Zonal Technology Management Centre & Business Planning and Development Unit (ZTM-BPD)

The Zonal Technology Management Centre & Business Planning and Development Unit (ZTM-BPD), West Zone at CIRCOT, Mumbai, organized a two day Meeting-cum-Workshop on March 11 and 12, 2011. The workshop aimed at promoting intellectual property management and technology transfer in the ICAR institutes. Out of the 18 institutes of West Zone, 16 participated. Total number of participants was 105. The workshop was inaugurated in the presence of Chief Guest Dr. K.G. Narayankhedkar, Director, VJTI Mumbai, Guest of Honour, Prof V.H. Iyer, Dean, Wellingkar Institute of Management,

Mumbai and Dr.Sanjeev Saxena, Principal Scientist, IPR Cell, ICAR. The workshop comprised three Technical Sessions containing presentations about IP and BPD activities of West Zone, IPR perspective-ICAR, Patent search training, presentations from all the institutes of West Zone regarding IPR activities of their institutes and theme talks by IPR experts, etc. A very good interaction was



Shri Ujjwal Misra, Training Manager, LexisNexis making his presentation

observed between all the participants where in they shared their experiences, problems and tried to find solutions for them. Before wrapping up, various

recommendations were made for smooth functioning of the IPR scheme of ICAR in the West Zone.



Prof V.H. Iyer, Dean, Welingkar Institute of Management, Mumbai inaugurating the Workshop. Dr. Sanjeev Saxena, Principal Scientist, IPR Cell, ICAR, Dr. A.J. Shaikh, Director, CIRCOT, Dr. R.P. Nachane and Dr. S.B. Jadhav, Principal Scientists look on

CIRCOT Organises an Industry-Interface Meet

CIRCOT in collaboration with the All India Cotton Seed Crushers' Association (AICOSCA) organised an Industry Interface Meet on Value addition to Cotton Seed and other By-Product on March 18, 2011 at Guntur, Andhra Pradesh. The meet was organised to highlight the research achievements of the NAIP project, **A Value Chain for Cotton Fibre, Seed and Stalks: An Innovation for Higher Economic**

Returns to Farmers and Allied Stake Holders under component II. The meet was attended by about 40 delegates representing cotton seed oil industries. The meet was inaugurated by Shri Maddi Venkateswara Rao, Managing Director, M/s. Coromandel Agro Products & Oils Ltd. Jandrapet (A.P.) and addressed by Dr. R.P. Nachane (P.I), Dr. S.G. Gayal (Head, CBPD) and Shri R.M. Gurjar, (Co.P.I.). The Participants showed lot of interest in the technologies developed by CIRCOT under the NAIP project.



Dr. R.P. Nachane (P.I.) addressing the participants in the meet

Hindi Workshop

The following three workshops were organised during the period:

Sl. No.	Period	Resource Persons	Subject	No. of staff participated
1	May 14 and 15, 2010	Shri K.P Sharma	Official Language Policy for Administrative Personnel	10
2	July 1 - 31, 2010	Shri Rajendra Prasad Verma Shri Anant Shrimali Shri Ramshakal Singh	Unicode	97 participants from various category
3	Nov 26 and 27, 2010	Shri Ramshakal Singh	Unicode	7

National Science Day Celebration

To inculcate scientific temperament among the public and to popularize science, the National Science Day is

celebrated on February 28 every year and to commemorate the discovery of Raman Effect by the Indian Physicist and Nobel Laureate Sir C.V. Raman. On this day at CIRCOT, the following two

WORKSHOPS, SEMINARS, SUMMER INSTITUTES, FARMERS' DAY

lectures were arranged:

1. Stem Cell Therapy by Shri A. Arputhraj, Scientist
2. Obtaining Uniformity in Test Results – Advantage of NABL Accreditation by Shri Chitranayak, Scientist

International Women's Day Celebration

The International Women's Day was celebrated on March 8, 2011.

Eminent Psychiatrist of Mumbai Dr. Harish Shetty was the Chief Guest on the occasion. Dr. Shetty in his address to CIRCOTians, emphasized upon the need to have a balanced mental and physical health for a healthy, active, efficient and stress-free life. A lively interaction between the doctor and the audience followed the exposition. The women staff members who won the prizes in the ICAR Zonal Sports were felicitated during the occasion.



Dr. S.K. Chattopadhyay, Head, MPD receiving Dr. Harish Shetty, Psychiatrist on the Occasion of the International Women's Day

Awareness Meet for Farmers

1. One off-farm training programme for farmers under NAIP-CVC adopted villages-Neza Delan was conducted at CICR Regional Station Sirsa on September 18, 2010.
2. One on-farm training programme of farmers under NAIP-CVC was conducted at Jhonpra village on October 5, 2010. The farmers were

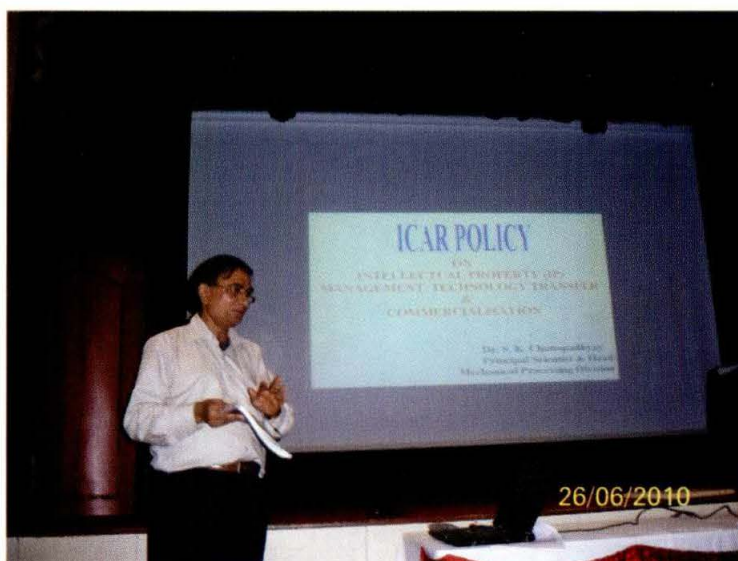
given detailed lectures along with practical demonstration on clean picking of cotton by. Dr. D. Monga, Dr. Rishi Kumar and Dr. Hamid Hasan.

3. A Quality Awareness Programme under NAIP-CVC was organised at the Neza Delan village in Sirsa district on October 12, 2010. Dr. R P Nachane, Shri R.M. Gurjar, Principal Scientists and Dr. Hamid Hasan, Officer in-charge, CIRCOT Unit, Sirsa, Dr. D. Monga and Dr. Rishi Kumar, CICR, Sirsa, Dr. P. P. Jain, Scientist I/c, HAU, Sirsa, Shri R.C. Punia, Joint Director, Agriculture, Haryana, Dr. Sheokand, I/c, KVK, HAU Sirsa participated in the deliberations with the farmers. Around 250 farmers from the adjoining villages participated in the programme.

Lectures:

During the year under report, the following lectures were arranged at the Institute on various occasions.

1. Processing and Utilisation Scenario of Cotton in C-4 Countries: Nigeria and Uganda, by Dr. S. Sreenivasan, Director, CIRCOT on June 25, 2010.
2. Basics of Intellectual Property Rights: Overview of IPR, by Smt. Rohini Wayal on June 26, 2010.
3. Basics of Intellectual Property Rights: How to Draft Patent Specifications? by Shri Ashok Kumar Bharimalla on June 26, 2010.
4. Basics of Intellectual Property Rights: Plant Variety Protection & Farmers Rights, by Kum. Pallavi Ghogale on June 26, 2010.
5. ICAR Guidelines for IPR: Intellectual Property Management & Technology Transfer/Commercialisation Policy by Dr. S.K. Chattopadhyay on June 26, 2010.
6. ICAR Guidelines for IPR: Intellectual Property Generated in ICAR by Smt. Tapasya Kothalkar on June 26, 2010.
7. ICAR Guidelines for IPR: General



WORKSHOPS, SEMINARS, SUMMER INSTITUTES, FARMERS' DAY

- Procedures for IP Management by Shri R.M. Gurjar on June 26, 2010.
8. Biodiversity by Dr. Vibha Gupta, Lecturer, Department of Botany, Guru Nanak Khalsa College on July 16, 2010.
 9. Nanotechnology by Dr. N. Vigneshwaran, Scientist, Sr. Scale after attending training at Rutgers University, USA from April 25 to July 22, 2010.
 10. Cotton Production and Technology by Dr. N. Shanmugam, Sr. Scientist on August 5, 2010 after attending training in Egypt from April 1, 2010 to June 15, 2010.
 11. Impressions about International Visit to attend Conference in Singapore (February 26 – 28, 2011), by Dr. N. Vigneshwaran, Sr. Scientist on March 25, 2011.

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Distinguished Visitors

Mr. Mathias Knappe, Programme Manager, Cotton Textiles and Clothing of the International Trade Centre, Geneva on June 23, 2010



Dr. S.Sreenivasan, Director, CIRCOT explaining Shri Rajiv Mehrishi Secretary (ICAR) & Additional Secretary (DARE) about the Various Technologies Developed by the Institute on 21-07-2010

Inauguration of the Lab Core Spinning Machine by Dr S. Ayyappan, Secretary, DARE and DG, ICAR on August 27, 2010



DISTINGUISHED VISITORS

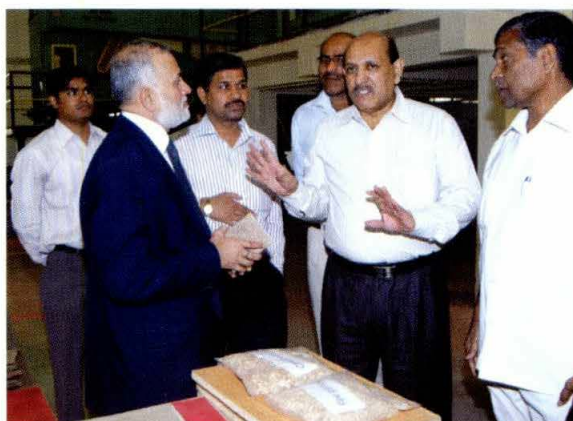


Dr. S.K. Chattopadhyay, Head, MPD explaining the working of Micro Spinning Draw Frame to Dr. K.K. Singh, ADG (Engg.), ICAR, New Delhi on 27-12-2010

Shri V.G. Arude, Scientist demonstrating the working of CLOY Gin to a delegation from African countries Ethiopia, Kenya, Malawi, Mozambique, Tanzania, Uganda, Zimbabwe and UK



Dr. S. Ayyappan, Secretary, DARE and DG, ICAR interacting with Dr. A.J. Shaikh, Director, CIRCOT on the Particle Board Preparation Technology from Cotton Plant Stalks at GTC, Nagpur on January 21, 2011



Dr. M.M. Pandey, DDG (Engg.), ICAR, New Delhi interacting with Dr. S. Sreenivasan, Former Director, CIRCOT after inaugurating the Nanocellulose Laboratory on January 14, 2011



Hon'ble Shri Haribhau Madhav Jawale, M.P, from Jalgaon having a meeting with Director and Heads of Divisions at CIRCOT regarding Banana Fibre Project on 17-2-2011

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Infrastructural Facilities

Library: The institute library procures books pertaining to not only cotton research but also on topics of general interest, management, Information Technology, etc. In 2010-2011, books were purchased by utilizing both Institute and NAIP funds. During the period, 105 new books were added to the library. This consists of 40 books in Hindi and 58 in English. Besides, seven books were purchased through NAIP-CVC sub project funds.

The total number of books at the end of March 2011 stood at 7160. Fourteen Indian and twenty-seven foreign journals were also subscribed. The total financial outlay for the library during 2010-11 was Rs. 23 lakh apart from Rs. 3,92,240/- from ITMU-ZTMC (IPR) and Rs. 1,98,706 from NAIP funding. CDROM Databases of ASTM, TAPPI, AATCC, and World Textile Abstracts were subscribed on annual basis. A total of 194 e-books were added to the library (170 from NAIP-CVC and ITMU-ZTMC funds).

The library facilities are being utilized not only by the staff of the Institute but also by the students and researchers from various colleges affiliated to Mumbai University, sister research institutions and personnel

from the textile industry. Photocopying service is provided to the visitors on request on a prescribed charge. All the database services are available free of cost to any interested end-user.

Purchase of Instruments

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

1. Electronic Precision Balance
2. Digital Thermo Hygrograph for Spinning Lab
3. Lab Model Winding Machine
4. Direct Twist Machine
5. High Volume Instrument (for QEID unit of Guntur)
6. Inverter Controlled Drive System for Ring Spinning Machine
7. Lab Knife Coater
8. Disintegrator
9. Autoclave
10. Planimeter
11. Three Bladed Beater Unit with High Capacity Suction Motor
12. LCD Screen
13. Pneumatic Loading System with Cylinder and fittings

Besides, a TATA SUMO vehicle has been purchased for use at GTC, Nagpur.

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Personnel

Director

Dr. A.J. Shaikh, Principal Scientist & Head, TTD appointed as Director, CIRCOT w.e.f. 19-08-2010 (F.N.)

A. APPOINTMENTS

Sl. No.	Name	Grade to which Appointed	Date of Appointment
Scientists			
1.	Shri Manik Bhowmik	Scientist	21-04-2010
2.	Shri Arputharaj	Scientist	23-04-2010
3.	Shri Kartick Samanta	Scientist	27-08-2010
Technical			
1.	Shri D.G. Gole	Technical – Category T-1	22-12-2010
2.	Shri D.J. Dhodia	Technical – Category T-1	01-03-2011
3.	Shri Umrao Meena	Technical – Category T-1	23-03-2011

B. PROMOTIONS

On the recommendations of the Technical Assessment Committee / Departmental Promotion Committee, the following staff members were promoted to the next higher scale.

Sl. No.	Name	Post to which Promoted	Effective Date of Promotion
Technical			
1.	Shri N.V. Bansode	Technical Officer T (7-8)	01-01-2009
2.	Dr. Hamid Hassan	Technical Officer T (7-8)	01-01-2009
3.	Dr. Matish Chandra	Technical Officer T (7-8)	01-01-2009
4.	Shri M. Mohan	Technical Officer T (7-8)	01-01-2009
5.	Dr. (Smt.) Sheela Raj	Technical Officer T (7-8)	01-01-2009

PERSONNEL

Sl. No.	Name	Post to which Promoted	Effective Date of Promotion
Administrative			
1.	Shri R.G. Matel	Lower Division Clerk	01-06-2010
2.	Shri B.D. Sawant	Assistant Administrative Officer	16 -09-2010
3.	Shri S.V. Kasabe	Assistant Finance & Accounts Officer	17-09-2010
4.	Shri J.R. Mangale	Junior Accounts Officer	17-09-2010
5.	Shri J.I. Parmar	Assistant	25-10-2010
6.	Shri S.A. Telpande	Assistant	25-10-2010
7.	Smt. S.R. Shirsat	Assistant	30-12-2010
8.	Shri N.V. Kambli	Assistant	30-12-2010
9.	Smt. N.M. Deshmukh	Assistant	29-03-2011
10.	Smt.J.R. Chavkute	Upper Division Clerk	31-12-2010
11.	Shri V.M. Sable	Upper Division Clerk	31-12-2010
12.	Smt. B.D. Kherodkar	Upper Division Clerk	29-03-2011

C. TRANSFER ON PROMOTION

Scientist

Dr. T.S. Manojkumar, Scientist (Sr. Scale) to KVK at Central Plantation Crops Research Institute, Kasaragod on 16-04-2010 as Senior Scientist.

Administrative

Shri R.K. Singh, Finance and Accounts Officer to Central Soil and Water Conservation Research and Training Institute, Dehradun w.e.f. 12-01-2011 as Senior Finance and Accounts Officer.

D. ADVANCE INCREMENT

Sl. No.	Name	Grade	No. of Increment/s	Date from which effected
1	Shri S. Mukundan	Technical Officer T - 6	One	01-01-2009
2	Shri S. Vancheswaren	Technical Officer T - 6	One	01-01-2009
3	Shri T. Venugopal	Technical Officer T - 6	One	01-01-2009
4	Shri M.V. Vivekanandan	Technical Officer T - 6	One	01-01-2009

E. RETIREMENT**Scientist**

1. Dr. R.H. Balasubramanya, Principal Scientist & Head, CBPD retired on May 31, 2010.
2. Dr. C.D. Ravindran, Senior Scientist retired on December 31, 2010.

Technical

1. Shri B.H. Umredkar, Technician T-1-3 retired on March 31, 2010
2. Shri B.B. Gaykar, Technical Officer T-5 retired on May 31, 2010

Administrative

1. Smt. M.V. Kamerkar, Head of Office retired on May 31, 2010.

2. Shri B.S. Bhenwal, Assistant retired on May 31, 2010.

Supporting

Shri P.G. Ghogale, Skilled Supporting Staff Gr.III retired on January 31, 2011.

F. OBITUARY

1. Shri S.A. Waghela, Technical, Category T-1-3 expired on 02-04-2010.
2. Shri C.P. Solanki, Skilled Supporting Staff expired on 22-08-2010.
3. Smt. K.R. Khaire (Tea Maker & Dish Cleaner) expired on 05-09-2010.

G. TRAINING

Sl. No.	Name of the Training Programme	Period and Place	Participant(s)
1.	Management Development Programme : Level I	April 26 – 30, 2010 Mumbai	Dr. S. Sreenivasan Dr. R.P. Nachane Dr. A.J. Shaikh Dr. S.K. Chattopadhyay Dr. S.G. Gayal Shri R.M. Gurjar Dr. S.B. Jadhav Dr. C.D. Ravindran Shri K.H. Sawakhande Shri R.K. Singh Smt. M.V. Kamerkar Dr. V. Mageshwaran Shri Manik Bhowmick Shri A. Arputharaj
2.	Reservation in Service	April 26 – 29, 2010 Delhi	Shri K.W. Khamkar Shri D.G. Kulkarni

PERSONNEL

Sl. No.	Name of the Training Programme	Period and Place	Participant(s)
3.	Training Program on Laboratory Management & Internal Audit as per ISO/IEC 17025:05	May 19 - 22, 2010 Hyderabad	Dr. S. Venkatakrishnan
4.	Leave Rules & Maintenance of Service Book	June 10 - 11, 2010 Mumbai	Shri S.V. Kasabe Shri S.D. Ambolkar Shri S.R. Shirsat
5.	Procurement of Goods & Service, Disposal of Goods & Contract Management	June 16 - 17, 2010 Mumbai	Shri S.V. Kasabe Shri S.D. Ambolkar Shri A.P. Natu Shri S.N. Bandre
6.	Course on Reservation in Services for SC/ST & OBC	August 9 - 12, 2010 New Delhi	Shri K.W. Khamkar Shri D.G. Kulkarni
7.	The Management and Leadership Development Training Programme	August 16 - 20, 2010 Mussoorie	Dr. Hamid Hasan
8.	Training on Pensions and other Retirement Benefit	October 18-22, 2010 New Delhi	Shri S.V. Kasabe Smt. V.V. Desai Shri J.R. Mangale
9.	Sensitization <i>cum</i> Training Workshop for Nodal Officers of PIMS-ICAR	November 11, 2010 Bhopal	Shri M. Mohan
10.	Knowledge Management	November 15-16, 2010 New Delhi	Shri M. Mohan Shri D. R. Murthy
11.	Training on CEP Course on Fuel Cell	December 16-17, 2010 Mumbai	Dr. N. Vigneshwaran
12.	General Requirement for the Competence of Testing and Calibration Laboratories and Internal Audit	November 23 - 26, 2010 Mumbai	Dr. R.P. Nachane Shri C.M. More Dr. (Smt.) Sujata Kawlekar



Dr. S. Sreenivasan, Director, CIRCOT interacting with Prof. Savitri Kulkarni, Associate Dean – HR at the Prin. L. N. Welingkar Institute of Management Development & Research during the training

H. DEPUTATION ABROAD

1. Dr. N. Shanmugam, Sr. Scientist was deputed to Egypt from April 1,

2010 to June 15, 2010 for training on Cotton Production and Technology, organised by the Egyptian International Centre for Agriculture.



Dr. N. Shanmugam, Sr. Scientist Receiving Completion Certificate at the Egyptian International Centre for Agriculture (EICA)

PERSONNEL

2. Dr. S. Sreenivasan, Director visited C4 countries (Chad, Burkina Faso, Benin and Mali) Nigeria and Uganda as part of the Indian Delegation from May 3-14, 2010.
3. Dr. R.P. Nachane, Principal Scientist & Head, QEID, visited Michigan State University from July 10 – 24, 2010 to study the IPR related issues.
4. Dr. N. Vigneshwaran, Scientist visited Dept of Food Science, Rutgers University, New Jersey, USA from May 25 to July 25, 2010 for training in Nanotechnology.
5. Dr. S. Sreenivasan, Principal Scientist and former Director, CIRCOT visited Benin during November 20–December 2, 2010,

as part of the Indian delegation to assess the Cotton Production and Processing Scenario in Benin.

I. ACCOLADES

The Rajbhasha Sansthan, New Delhi has awarded CIRCOT for its significant work in implementing and promoting Hindi as official language. This award was given during the 69th Seminar and Hindi workshop organised at Dalhousie. Also, Smt. Kiran Joshi, Hindi Translator, O.L. Cell was awarded for presenting an article on Unicode at the same forum.

ASHIRWAD, a Literary-Socio-Cultural Organisation, Mumbai awarded Smt. T.P. Mokal, Hindi Assistant a Shield and a Certificate for carrying out best work in Hindi at the Institute for the year 2009-10.



Smt. T. P. Mokal, Assistant (Hindi) with the Award



Smt. Kiran Joshi, Hindi Translator receiving the Award

Shri Chitranayak, Scientist was awarded second prize for his article ***Prakritik Resha: Paryavaran Ki Suraksha***. This article was presented at the 27th All India Scientific and Technical article competition organized by the Kendriya Sachivalaya Hindi Parishad, New

Delhi. Shri Dinsha Patel, Hon'ble Union Minister, Ministry of Micro, Small and Medium Enterprises, Govt. of India awarded a memento and a certificate at a function organised at the Teen Murthi Bhavan, New Delhi on June 14, 2010.



Shri Chitranayak receiving a Memento and Certificate from Shri Dinsha Patel, Hon'ble Union Minister, Ministry of Micro, Small and Medium Enterprises (MSME), Govt. of India

J. ICAR Inter-Institutional Sports Meet

The ICAR Zonal Sports Meet (West Zone) was held at the Indian Grassland and Fodder Research Institute, Jhansi from February 15 – 19, 2011. A contingent of 59 sports personnel representing CIRCOT with Shri

Chitranayak, Scientist as *Chief-de-Mission* and Shri N.V. Kambli, as Manager participated in Chess, Carrom, Volleyball, Kabbadi, Table Tennis, Badminton and Athletic events. The winners in various events are as follows. The Institute was also awarded Shield for the Best March Past.

PERSONNEL

Smt. T.T. D'Souza	200 m running (Women) – Second Javelin Throw (Women) - First
Smt. S. D. Dudam	Discus Throw (Women) - Second
Dr. S.J. Guhagarkar, Dr. R.D. Nagarkar, Shri P.V. Jadhav, Shri H.S. Koli and Shri Manoj Ambare	Table Tennis Team (Men) – Runner up
Smt. Smita Paiyala and Smt. V.N. Walzade	Table Tennis - Doubles (Women) - Winner
Smt. Smita Paiyala	Table Tennis Single (Women) - Winner
Smt. H.R. Pednekar	Chess (Women) – Runner up
Smt. Smita Paiyala & Smt. H.R. Pednekar	Badminton (Doubles)-Winner
Smt. Smita Paiyala	Carrom (Women) – Winner
Smt. S.R. Shirsat	Carrom (Women) – Runner up
Shri S.K. Parab	Carrom (Men) – Runner up



CIRCOT Sports Contingent



*Chief-de-Mission receiving Shield for
Best March Poast*

**STAFF WORKING AT THE
CENTRAL INSTITUTE FOR RESEARCH ON COTTON TECHNOLOGY
AS ON 31-03-2011**

(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.

Principal Scientist

1. Dr. S.G. Gayal, M.Sc., Ph.D.
2. Shri R.M. Gurjar, M.Sc.
3. Dr. R.P. Nachane, M.Sc., Ph.D., F.T.A.,
C.Text., F.T.I.
4. Dr. S. Sreenivasan, M.Sc., Ph.D.,
F.T.A., C.Text, F.T.I.

Senior Scientist

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

Scientist (Sr. Scale)

1. Shri K.H. Sawakhande, M.Sc.
2. Shri Ashok Kumar Bharimalla, M.Tech.
3. Shri Chitranayak, AMIETE., M.Tech.
4. Dr. N. Vigneshwaran, M.Sc. (Agri.),
Ph.D.

PERSONNEL

Scientist

1. Shri Achchhelal Yadav, M.Sc.
2. Smt. Acushla Antony, M.C.A.
(on study leave)
3. Shri A. Arputharaj, M.Sc., M.Tech.
4. Shri P. S. Deshmukh, M. Tech.
5. Shri Kartick Kumar Samanta, M.Tech.
6. Dr. V. Mageshwaran, M.Sc., Ph.D.
7. Shri Manik Bhowmik, M.Tech.
8. Shri C. Sundaramoorthy, M.Sc.
(on study leave)
9. Shri Virendra Prasad, M.Sc.
(on study leave)

Technical Personnel

Technical Officer T (7-8)

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

Technical Officer T-6

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

Technical Officer T-5

1. Smt. Bindu Venugopal, B.Sc.
2. Smt. Binu Sunil, M.Sc.
3. Smt. K.K. Kale, B.A.
4. Shri D.U. Kamble, B.Sc.
5. Shri S.V. Kokane, B.A.
6. Dr. R.R. Mahangade, M.Sc., Ph.D.
7. Smt. P.S. Nirali, M.Sc.
8. Smt. C.D. Prabha, M.Sc.
9. Shri P.N. Sahane, D.I.F.T.
10. Smt. N.A. Sonkusle, B.Sc.
11. Shri D.L. Upadhye, SSC (Tech.),
D.M.E., N.C.T.V.T.(I.T.I.& C.T.I.)

Senior Technical Assistant T-4

- | | |
|--|--|
| 1. Shri A.K. Chapekar,
M.Text. (Textile Technology) | 6. Shri R.S. Narkar, B.Sc., D.C.I.A. |
| 2. Smt. K.R. Joshi, M.A. (Hindi Translator) | 7. Shri C.V. Shivgan, H.S.C.,
Cert.Wireman, Cert. Electrician,
Cert.Elec.Supr.(PWD)., Cert. M. &
A.W.(Technician) |
| 3. Shri V.D. Kalsekar, B.Sc. | 8. Kum. C.P. D' Souza, M.Sc. |
| 4. Smt. P.R. Mhatre, B.Sc., M.Lib. | |
| 5. Shri A.P. Modak,
B.Text. (Textile Technology) | |

Technical Assistant T-3

- | | |
|--|-----------------------------------|
| 1. Shri M.G. Ambare, M.Sc. | 3. Shri N.D. Kambli, B.Sc. |
| 2. Shri D.M. Correia, S.S.C., I.T.I.,
N.C.T.V.T. (Mechanic) | 4. Smt. H.R. Pednekar, B.A. |
| | 5. Shri S. N. Patil, B.E. (Civil) |

Category T-I-3

- | | |
|--|-------------------------------------|
| 1. Shri A.R. Bane, Cert. Cot. Spin. | 5. Shri S.K. Parab, Cert. Cot. Spin |
| 2. Shri M.B. Chandanshive,
Cert.Cot.Spin.(Machinist/Fitter) | 6. Shri D.A. Salaskar |
| 3. Shri M.Y. Chandanshive | 7. Shri B.K. Sawant |
| 4. Shri B.R. Jadhav | 8. Shri S.M. Sawant |
| | 9. Shri G.G. Ambare |

Category T-2

- | | |
|-----------------------------------|----------------------|
| 1. Shri R.R. Gosai | 4. Shri D.M. Raje |
| 2. Shri R.P. Kadam, B.Sc. | 5. Shri N. K. Shaikh |
| 3. Smt. M.P. Kamble, B.A., B.Lib. | |

Category T-1

- | | |
|---------------------|-----------------------|
| 1. Shri D.J. Dhodia | 4. Shri S.V. Kokane |
| 2. Shri G. Gole | 5. Shri Mahabir Singh |
| 3. Shri M.M. Kadam | 6. Shri S.G. Phalke |

Administrative Personnel

Head of Office

Shri K.W. Khamkar, B.A.

PERSONNEL

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. Smt. S. Koshy, B.Com.
2. Shri S.N. Salve
3. Shri B.D. Sawant

Assistant

1. Shri A.B. Dalvi
2. Shri D.G. Kulkarni
3. Smt. V.V. Desai
4. Smt. S.D. Ambre
5. Smt. T.P. Mokal, M.A.
6. Smt. S.M. Desai
7. Shri A.P. Natu
8. Smt. J.J. Karanjavkar
9. Shri K. Parleshwar
10. Smt. V.V. Janaskar, B.Com., M.A.
11. Shri R.K. Pallewad, B.A.
12. Smt. S.R. Shirsat, B.A.
13. Shri N.V. Kambli
14. 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.

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

Lower Division Clerk

- | | |
|-------------------------------|----------------------|
| 1. Shri S.S. Angane | 5. Smt. V.N. Walzade |
| 2. Shri A.R. Gujar | (Telephone Operator) |
| 3. Shri T.D. Dhamange, B.Com. | 6. Shri R.G. Matel |
| 4. Shri S.N. Bandre | |

Skilled Supporting Staff

- | | |
|--------------------------|----------------------------|
| 1. Shri M.Z. Rathi | 22. Shri R.G. Tak |
| 2. Shri N.J. Kharat | 23. Shri R.P. Karkate |
| 3. Shri R.B. Jadhav | 24. Shri C.D. Acharekar |
| 4. Shri M.B. Gurve | 25. Shri M.K. Prabhulkar |
| 5. Shri O.T. Thapa | 26. Shri J.D. Sakpal |
| 6. Shri B.R. Satam | 27. Shri V. Murugan |
| 7. Shri D.M. Chougule | 28. Shri S.D. Magar |
| 8. Shri S.D. Gurav | 29. Shri S.B. Worlikar |
| 9. Shri M.K. Ghadge | 30. Shri S.R. Tondse |
| 10. Smt. T.V. Bhowar | 31. Shri V.B. Poojari |
| 11. Smt. B.R. Piwal | 32. Shri M.N. Kamble |
| 12. Shri D.B. Temgire | 33. Shri S.S. Surkule |
| 13. Shri C.S. Salvi | 34. Shri S.P. Naik |
| 14. Shri K.T. Mahida | 35. Smt. Kamala Murugan |
| 15. Shri M.M. Katpara | 36. Shri D.K. Kasar |
| 16. Shri M.A.A. Rashid | 37. Shri S.R. Tondse |
| 17. Shri G.N. Mayawanshi | 38. Shri D.R. Gawde |
| 18. Shri H.B. Vesmiya | 39. Shri S.M. Chandanshive |
| 19. Shri M.J. Sumra | 40. Shri P.E. Gurav |
| 20. Shri S.K. Bobate | 41. Shri Mahesh C. Solanki |
| 21. Shri P.P. Patil | |

PERSONNEL

LIST OF STAFF AT THE QUALITY EVALUATION UNITS

COIMBATORE

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

DHARWAD

<i>Technical Officer T-5</i>	: Shri K. Narayanan, B.Sc.
<i>Technician T-3</i>	: Smt. V.G. Udikeri, B.Sc.
<i>Skilled Supporting Staff Gr. III</i>	: Shri C.J. Bagalkoti
<i>Skilled Supporting Staff Gr. II</i>	: Shri A.F. Gudadur

GUNTUR

<i>Technical Officer T-6</i>	: Shri S. Mukundan, M.Sc.
<i>Skilled Supporting Staff Gr. I</i>	: Shri V. Subbaiah

NAGPUR

<i>Scientist (Sr. Scale)</i>	: Shri Vishnu Govind Arude, M.Tech
	: Shri Sujeet Kumar Shukla, M.Tech (on study leave).
<i>Scientist</i>	: Dr. (Smt.) Jyoti M. Nath, M.Sc., Ph.D.
<i>Technical Officer T(7-8)</i>	: Shri V.M. Kulmethe, B.Sc.
	: Shri N.V. Bansode, B.Sc.
<i>Technical Officer T-6</i>	: Shri U.D. Devikar, B.Sc.
	: Shri V.L. Rangari, B.Sc.
<i>Technical Officer T-5</i>	: Shri S.L. Bhanuse, B.Sc.
	: Shri R. G. Dhakate, B.Sc.
	: Shri S.N. Hedau, B.Sc.
<i>Technician T-3</i>	: Shri B.V. Shirsath, B.A., I.T.I.
<i>Technician T-1-3</i>	: Shri C.L. Mundale
<i>Technician T-2</i>	: Shri P.S. Panchbudhe, B.A.
<i>Technician T-1</i>	: Shri Umrao Meena

CIRCOT ANNUAL REPORT 2010-2011

<i>Stenographer (Gr. III)</i>	: Shri R.D. Shambharkar, M.A.
<i>Assistant</i>	: Shri S.A. Telpande, M.Com.
<i>Senior Clerk</i>	: Shri B.D. Dhengale
<i>Skilled Supporting Staff Gr. III</i>	: Shri M.P. Tohokar
<i>Skilled Supporting Staff Gr. II</i>	: Shri A.R. Chutale : Shri J.P. Patel : Shri R.B. Kautkar : Shri R.C. Rokde
<i>Skilled Supporting Staff Gr. I</i>	: Shri M.G. Bhandakkar : Shri R.S. Umare

SIRSA

<i>Technical Officer T (7-8)</i>	: Dr. Hamid Hasan, M.Sc., Ph.D.
<i>Technical Officer T-6</i>	: Dr. Jal Singh, M.Sc., Ph.D.
<i>Technical Asistant T-1</i>	: Shri Sanwarmal Saini
<i>Skilled Supporting Staff Gr. III</i>	: Shri Satyanarayan Gope

SURAT

<i>Technical Officer T-6</i>	: Shri G.G. Mistry, B.Sc.
<i>Technical Officer T-5</i>	: Shri M.B. Patel, B.Sc., L.L.B.
<i>Assistant</i>	: Shri J.I. Parmar, B.Com.
<i>Skilled Supporting Staff Gr. II</i>	: Shri M.G. Sosa