

Indian Council of Agricultural Research  
**ICAR-NINFET**  
वार्षिक प्रतिवेदन  
**ANNUAL REPORT - 2019**



**ICAR-National Institute of Natural Fibre Engineering and Technology**

भाकृअनुप-राष्ट्रीय प्राकृतिक रेशा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान

(Erstwhile ICAR-NIRJFT)

12, Regent Park, Kolkata - 700040

(An ISO 9001: 2015 certified institute)



*Felicitation  
to a chief guest*

*Award for  
official language*

*Trainees  
under SCSP*

*Field trial  
on Agro textiles*

*Contingents with  
TEZ 2019 trophy*

*Swachhta  
Pledge*

*Training  
under SCSP*

*NFSM  
Training*

INDIAN COUNCIL OF AGRICULTURAL RESEARCH



# ICAR-NINFET

(Erstwhile ICAR-NIRJAF)



## ANNUAL REPORT

# 2019

## **ICAR - NATIONAL INSTITUTE OF NATURAL FIBRE ENGINEERING AND TECHNOLOGY (ERSTWHILE ICAR-NIRJAFT)**

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# FOREWORD



Plant fibres are wonderful sources for the development of diversified products ranging from high value clothing to high performance technical textiles. The consumption of synthetic fibres in textiles sectors has been gradually increased and it enlarged the physical dumping as well as generated micro-plastic pollutants across the globe and it obviously is a disaster to the mankind in the coming years if it would not controlled.

Even today, in textile sectors, the impact of natural fibres and its biomasses will probably be even greater. Researchers are now focusing on the integral utilization of plant fibres in clothing sector and its residual biomass in certain industries which obviously may lead to a sustainable way of producing materials.

In 19<sup>th</sup> century mankind needs mainly based on the renewable sources and it depleted due to invention of synthetic materials and now it is time to rethink about natural fibres. However, it is also a challenge for the future researchers to develop in sustainable ways. This challenge can only be dealt with a single goal by an inter-disciplinary approach so that consumers recognize the fate of renewable resources in a number of sustainable products.

Since inception, Institute is mainly focusing on multi-disciplinary research works in the area of natural fibres starting from extraction of textile grade fibres to high value added products followed by their promotion towards different stake holders.

During this period, institute have successfully conducted twenty nine filed level demonstration on jute power ribboner and accelerated retting on jute & mesta plant in the eastern regions of our country; four national level training programs sponsored by National Food Security Mission (NFSM); three self-sponsored training programs; five training programs on jute handicraft under Agri-Business Incubation project, twelve self-sponsored training programs, one technology demonstration & two workshops under SCSP; ICAR sponsored 21 days winter school; six MGMG programs and participated in one exhibition in Kolkata to display institute products & technologies for the benefit of natural fibers' stakeholders.

I also congratulate our staff members for their association to get first prize in “*Ganesh Shankar Vidyarthi Hindi Patrika Puraskar award for the year 2017-18*” in the category of Home Hindi Magazine ‘Debanjali’ as well as second prize in “*Rajashree Tandan Rajbhasha Puraskar award for the year 2017-18*” on promoting all official works in Hindi. These awards surely motivate our staff members to use Hindi language regularly in their official works and to provide different technical articles for Devanjali journal in future. I also congratulate Dr. Avijit Das, Principal Scientist (Biochemistry) for his contribution to get Nanaji Deshmukh ICAR Award for “*Outstanding Interdisciplinary Team Research in Agricultural and Allied Sciences 2018- Crop*”

& Horticultural Sciences”. I also congratulate our institute’s sports team to win the champion in Table Tennis (Team event) during ICAR Sports Tournament of Eastern Zone 2019 at CRRI, Cuttack.

Progressing towards the next phase of the natural fibers’ research and development activities and to uphold the importance of natural fibres in favour of farmers, industry, academia and society by keeping view of fast changing global scenario towards sustainable products, we have planned to carry basic and strategic research in multidisciplinary mode on extraction of textile grade fibres, their characterization using automated testing instruments, sustainable processing of natural fibres and their residual biomass, development of new products, technologies and high value addition by innovative techniques in the coming years.

We have formulated and proposed multidisciplinary research programs in the forthcoming five year plan 2020-2025 in the thrust area of (a) Instrumentation and value addition in natural fibres; (b) Quality improvement, specialty textiles and value chain; (c) Environmental sustainability with special reference to natural fibres, and (d) Capacity building and dissemination of technologies.

Institute has multidisciplinary research team and is constantly disseminating the knowledge and know-how for the benefit of stakeholders in the natural fibre sectors. I am grateful for the efforts taken by the editorial team for bringing out this annual report.

*Nimai Chandra Pan*

**DIRECTOR**



# GLIMPSES OF 2019

National Institute of Natural Fibre Engineering and Technology is a premier research institute under the Indian Council of Agricultural Research, New Delhi to execute research and developmental activities in engineering and post harvest technologies on natural fibres. Institute has successfully developed the need-based technologies, products or processes for its stakeholders and simultaneously disseminated the potential technologies which could enhance the remuneration of entrepreneurs, industries and farmers through commercialization of developed technologies.

Improved fibre extractors, natural fibre and their fabric quality evaluations through automated instrumentation, development of value-added products from lesser known fibres, eco-friendly chemical processing and functional finishing, and high value added products from of agro-residuals have been addressed by the institute.

## New Products / Processes / Machines / Instruments / Technologies Developed

- Digital drape meter for ligno-cellulosic fabrics
- Portable water tank with provision of water circulation for fast retting of jute ribbons and barky jute
- Prototype of improved & high capacity power ribboner with incorporation of diesel engine, transportation wheel and increased number of plant feeding chute
- Retting accelerator “NINFET-Sathi” powder formulation with two modifiers in an effective and farmer friendly approach
- An automatic strength testing instrument and integrated grading instrument for banana fibre
- An innovative and sustainable bleaching process for jute and banana fibres with satisfactory whiteness and high retention of tenacity
- Decorative woven jute-cotton blended fabrics for multiple uses carry bags
- Jute yarn diameter measurement using computer vision and artificial neural network
- Mapping of jute fibre grading in relation to macronutrients from selected blocks of Murshidabad district of West Bengal
- Premium quality fancy bags, upholstery and outer garments from ternary blended yarn based handloom fabric
- Semi-synthetic and synthetic coating formulations for semi-rigid jute based packing material
- Value added apparel products like long coat, jacket, and blazer from the fabric made from jute fibre /coarser yak blended yarns



## INSTITUTE ACTIVITIES

- ❑ Independence Day was celebrated on August 15, 2019 in the institute premises.
- ❑ Twenty six (26) FLDs on accelerated retting technology and seven FLDs on power ribboner under National Food Security Mission were conducted.
- ❑ Institute has celebrated International Yoga day on June 21, 2019.
- ❑ Four NFSM sponsored Training programs on “*Production and retting technology of Jute/Mesta/Ramie/Sunnhemp include other related aspects*” have been conducted on July 11-13, July 17-19, July 23-25, and August 1-3, 2019 respectively.
- ❑ One NITI-IRC meeting (September 21&23, 2019), one IMC Meeting (July 02, 2019) and one PMC meeting (September 16, 2019) were conducted.
- ❑ Institute re-certified for ISO 9001: 2015 for 3 years from January 06, 2020 to January 05, 2023.
- ❑ ITMU conducted two ITMC meetings on April 29, 2019 and September 18, 2019 respectively.
- ❑ Two patents were filed ; one trade mark was registered and one MoA signed for commercialisation of Electronic Fibre Bundle Strength Tester.
- ❑ Swachhta Hi Sewa Pakwada was organized at the institute during September 11 to October 02, 2019.
- ❑ 150<sup>th</sup> Birth Anniversary of Mahatma Gandhi was celebrated on October 02, 2019.
- ❑ Institute observed the *Vigilance Awareness Week* during October 28, 2019 to November 02, 2019.
- ❑ Exposure-visit-cum training program for progressive farmers on two aspects i.e. “Jute Grading with Digital Instruments” and “Preparation of NINFET-Sathi” under Scheduled Caste Sub-Plan was conducted on November 29, 2019.
- ❑ First constitution day was celebrated on November 26, 2019 in the Institute premises as well as in Satyapol Village, Nadia District on November 26, 2019 in collaboration with MGMG and Swachh Bharat Abhiyan.
- ❑ Farmers’ Day under Swachhta Pakhwada and Constitution Day on Fundamental Duties was celebrated at Mathura, Bodai, Amtala, 24 Parganas North, West Bengal on December 23, 2019.

- 6<sup>th</sup> Dr. P.B. Sarkar Memorial Lecture was held on December 02, 2019.
- Official Language (Hindi) Implementation Committee meeting for the four quarters were held on respectively.
- ICAR sponsored 21 days winter school on “*Advances in product diversification and waste utilization of natural fibres*” was organised during December 03 to 23, 2019 with 28 trainee participants.
- Three self-sponsored training programs, six programs under MGMG schemes, five training programs under ABI project , twelve training program & two workshops under SCSP schemes were conducted.
- Institute participated & displayed the products in one exhibition.
- Institute has observed Swachhta Pakhwada week during December 16-31, 2019.

## INTELLECTUAL PROPERTY RIGHTS

- Trademark = 01
- Patents filed = 02
- MoU signed = 01

## AWARDS

- Institute got second prize on June 12, 2019 at ICAR, New Delhi in “Rajashree Tandan Rajbhasha Puraskar award for the year 2017-18” for our works on promoting Hindi Languages in all official works.
- Institute got first prize on May 13, 2019 at ICAR, New Delhi in “Ganesh Shankar Vidyarthi Hindi Patrika Puraskar award for the year 2017-18” for the category of Home Hindi Magazine ‘DEBANJALI’ for effective utilisation of Hindi language.
- Dr. Avijit Das, Principal Scientist (Biochemistry) got Nanaji Deshmukh ICAR Award for Outstanding Interdisciplinary Team Research in Agricultural and Allied Sciences 2018- Crop & Horticultural Sciences as an Associate Team Member during 91<sup>st</sup> ICAR Foundation Day and Award Ceremony on July 16, 2019.

## INSTITUTE'S PUBLICATIONS

- |                          |      |                       |      |
|--------------------------|------|-----------------------|------|
| □ Research Papers        | = 25 | □ Training manuals    | = 04 |
| □ Popular articles       | = 14 | □ Technical bulletins | = 02 |
| □ Books edited / E-books | = 04 | □ Other compilations  | = 06 |
| □ Book Chapters          | = 38 | □ Paper presentations | = 09 |
| □ Seminar papers         | = 02 | □ Invited papers      | = 05 |

## PROJECT DETAILS AS ON 01.01.2020

Division	Number of projects			
	Ongoing	Completed on 31.03.2019	Extended up to 31.03.2020	Started Duration : From 01.04.2019
Quality Evaluation and Improvement (QEI) Division	03	04	--	--
Mechanical Processing (MP) Division	05	01	--	01
Chemical and Biochemical Processing (CBP) Division	01	04	01	02
Transfer of Technology (TOT) Division	02	01	--	01
External funded projects*	06	--	--	01
<b>Total</b>	<b>17</b>	<b>10</b>	<b>01</b>	<b>04</b>

\* The projects are sponsored by Consortium Research Project (Natural Fibre) ICAR; National Agricultural Science Fund (NASF), ICAR; National Agricultural Innovation Fund (NAIF), ICAR and Ministry of Textiles, Govt. of India.

## A GLANCE ON TRAINING / WORKSHOP/ EXTENSION ACTIVITIES

Exposure visits to institute	= 03
Field level demonstrations	= 33
In-house seminars	= 08
NFSM sponsored training programs	= 04
Participation in exhibition	= 01
Self-sponsored training programs	= 03
Training programs under SCSP	= 13
Workshop programs under SCSP	= 02
Technology demo under SCSP	= 01
ICAR sponsored winter school	= 01



# ICAR - NATIONAL INSTITUTE OF NATURAL FIBRE ENGINEERING AND TECHNOLOGY

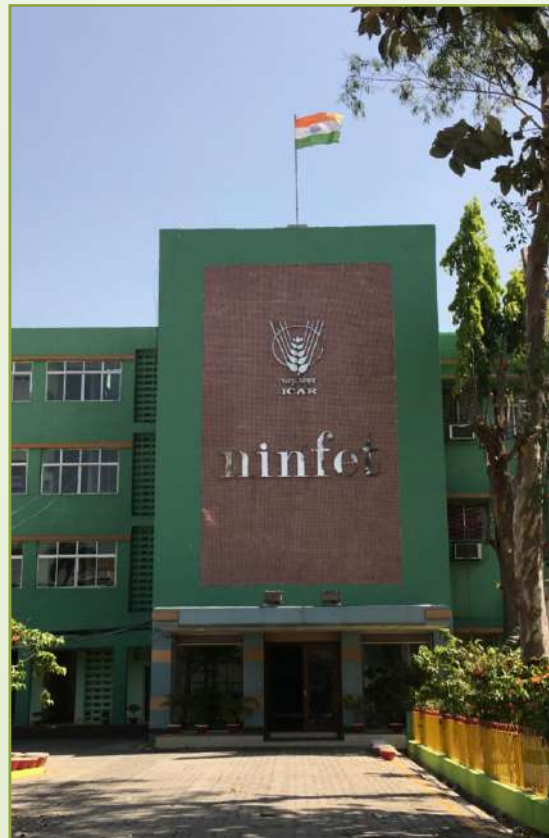
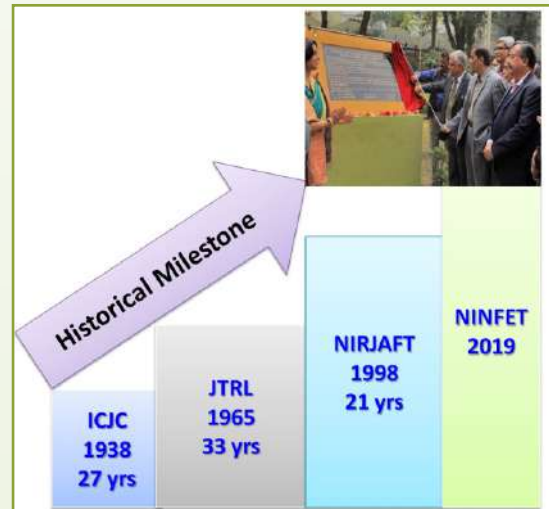
ICAR-NINFET was initially set up as **Indian Central Jute Committee**, Government of India on the recommendation of the Royal Commission on Agriculture in 1936 at Calcutta. Then it was officially established as a research institute on January 3, 1938 by Lord Linlithgow, the then Viceroy and Governor-General of India.

In 1965, the institute became a constituent unit under the centralized administrative control of the Indian Council of Agricultural Research (ICAR), New Delhi and named as **Jute Technological Research Laboratory (JTRL)**. JTRL had prospered with multifarious dimensions and developed many indigenous technologies for jute as well as for allied fibres. In reorganization of R&D activities, ICAR had renamed the institute as “**National Institute of Research on Jute and Allied Fibre Technology (NIRJAFT)**” in 1998.

Being a lead research institute associated with knowledge transfer and economic development activities for all natural fibres, the council promoted the institute to work continuously in the area of various natural fibres and accordingly institute renamed as **ICAR-National Institute of Natural Fibre Engineering and Technology (ICAR-NINFET)** in 2019.

Institute is carrying basic and applied researches related to post harvest processes of natural fibres such as Jute, mesta, linseed/flax, sisal, ramie, banana, sunnhemp, pineapple leaf, dhaincha, coconut, yak hair, wool, silk and other lesser known plant fibres. Institute have formulated and proposed multidisciplinary research programs in the forthcoming five year plan 2020-2025 in the thrust areas

- a. Instrumentation and value addition in natural fibres
- b. Quality improvement, specialty textiles and value chain
- c. Environmental sustainability with special reference to natural fibres
- d. Capacity building and dissemination of technologies



## MANDATE

- Basic and strategic research on processing of natural fibres and their agro-residues, development of value added products and quality assessment
- Skill development and business incubation service on jute and allied fibre technologies

The institute is located on the southern fringe of Kolkata, known as Tollygunge, with a total plot area around 17,628 square meters. During last seven decades, the institute was flourished with multifarious disciplines and carved a niche as a centre of excellence for research on jute and allied fibres catering to the entrepreneurs and industry.

The institute is adequately equipped with the state of the art laboratories having sophisticated tools, instruments and processing machinery. Institute is also recently certified for ISO 9001:2015 QMS for a period up to January 5, 2023.

The administration is headed by the Director and he manages the system with the help of Management Committee, Joint Council and Grievance Cell. The R & D is being managed by Research Advisory Committee and Institute Research Council. The R&D programs of the institute are implemented through the following four divisions.

## DIVISIONS

### □ **Quality Evaluation and Improvement (QEI) Division**

QEI division engages in the area of fibre extraction, evaluation, quality assurance and grading of fibres extracted from natural fibre yielding plants. Up gradation of quality, evaluation of physiochemical properties of natural fibres are the major contributions of this division including extraction of useful chemicals from agricultural by-products of fibre crops.

### □ **Mechanical Processing (MP) Division**

MP division carries out basic and applied research on mechanical processing, quality control and product development from long vegetable fibres and their blends. Improvement of process, productivity & product quality; design & development of product, machinery & instrument; quality assessment on geo-textile, agro-textile, apparel, packaging, automotive and industrial textiles are the main areas of research of this division.

### □ **Chemical and Biochemical Processing (CBP) Division**

CBP division works in the area of chemical/ biochemical processing, quality control and product development from all natural fibres. It has major contributions on pulp & paper; bleaching, dyeing & finishing; particle & fibre board; composites from natural fibres, advanced textile processing and biomass utilization as well as high value products development is also important areas.

### □ **Transfer of Technology (TOT) Division**

ToT division disseminates the institute's technologies, develops entrepreneurship through providing the necessary technical training and capacity building, arranges the front line demonstrations and participates in different exhibitions, fairs and mela for promoting the developed technologies. It is also developing the project profile of viable technologies and rendering technical assistance for incubators.

## SECTIONS & OTHERS

### □ Design, Development and Maintenance (DDM) Section

DDM section assists in design and development or modification of machinery/prototype, equipment, and instruments for institutional purposes. It is also engaged in customary maintenance of machines and instruments; civil & electrical infrastructure of campus; security aspects, new infrastructure building activities and monitoring of car.

### □ Priority setting, Monitoring & Evaluation (PME) Cell

PME cell helps to monitor the R&D programs of the institute and responsible for convening Institute Research Council, Research Advisory Committee meetings, and compiling the monthly, quarterly and half-yearly reports of the institute. This unit also coordinates in technical inquiries from the council as well as Parliament questions from time to time.

### □ Quality Assurance (QA) Section

QAS section deals with evaluation of fibre quality and grading of different natural fibres. It is also associated with All India Network Project (AINP) for Jute and Mesta fibres. The section coordinates the system for acquiring and maintenance of ISO certification of the institute.

### □ Library

Library acts as a centre of repository for scientific and technological information of natural fibres including other ancillary disciplines by maintaining a large number of books, journals, reports, reprints, pamphlets. The library has developed suitable infrastructure for computerized operation.

### □ Administration

The institute has efficient administrative sections to support the research and dissemination activities. It also contains well managed guest house called scientists' home, scientists' home Annexure, trainees' hostel, and farmers' hostel. Institute has an auditorium (100 seats), BPD conference hall (60 seats), conference room (30 seats) and meeting room (20 seats) with well equipped air-conditioner and seating arrangements in order to organize seminar, meetings and other programmes regularly.

## Staff position as on January 01, 2020

Category	Sanctioned Posts	Post filled	Posts Vacant
RMP	01	00	01
Scientific	44	22	22
Technical	60	46	14
Administrative	35	22	13
Skilled Support Staff	41	16	25
Auxiliary(Canteen Staff)	04	02	02
<b>Total</b>	<b>185</b>	<b>108</b>	<b>77</b>

# INSTITUTE'S ORGANOGRAM







# RESEARCH HIGHLIGHTS



# INSTITUTE PROJECTS

## QEI 22: Development of Accelerated Retting Technology for Jute and Mesta Plants

**Dr. D.P. Ray, Dr. R.K.Ghosh, Dr. A. Singha and Sh. A. Sarkar**

The retting formulation developed under this project was optimized and evaluated through laboratory screening and field trial. The formulation was branded as NINFET-SATHI POWDER™ and an application for trade mark registration has been applied. During last year the production capacity of NINFET-SATHI has been increased to 4 quintal per day through development of infrastructure. Three new equipments have been procured to prepare the formulation in larger scale. The formulation showed very promising results and has been protected through filing a patent (Indian Patent file No. TEMP/E-1/21892/2019-KOL dated 25.05.2019).

Twenty six field trials were undertaken to exhibit the efficiency of the formulation. The fibre analysis results revealed that the NINFET-SATHI based retting accelerator yielded better quality of fibre with improvement in around 1-2 grades over the control trials. Lowering of root content, diminishing of defects in fibres, improvement in strength, fineness and colour has contributed to the production of quality fibre over the control trials. The formulation has been distributed to the interested farmers belongs to scheduled caste community under Scheduled Caste Sub-Plan in the area of Malda, Murshidabad and Hooghly Districts.



*Awareness on accelerated retting among farmers*



*FLD on accelerated retting at farmers' field*

The environmental study of gas emission of retting field has been conducted with the help of ICAR-NRRI Cuttack. A specialized retting chamber has been developed as per instruction given by ICAR-NRRI and were utilized for collection of gases. Three chambers were installed at Balagarh in Hooghly district and the samples were collected on daily basis and analysed in Gas chromatographic (GC) at ICAR-NRRI using FID detector. Water testing reports revealed that the contribution of retting formulation was similar to the conventional retting system; however the retting process enriches the soil and water with nutrient inputs like major nutrients N, P, K and micronutrients, Fe, Mn and Zn.

## QEI-23: Jute Mapping and Estimation of Fibre Quality

**Dr. B. Saha, Dr. N. Mridha, Sh. S. Das and Sh. K. Manna**

Available macronutrients like nitrogen, potassium and phosphorus from selected blocks of Murshidabad district were analyzed and mapped. Geo-referenced fibre samples collected from respective blocks were tested in respect of fibre quality parameters like strength, fineness, colour, root content, defect

and bulk density. Fibre samples were graded on the basis of BIS grading system. Thematic maps of the available macro-nutrients, fibre quality parameters and jute grades were developed. A relationship between available nutrients and fibre quality parameters was established. Fibre fineness was found to be dependent on organic carbon and available phosphorous content of soil.

Available potassium showed positive correlation with the fibre strength. It was found that Soil micro-nutrients like Al, Fe and Mn greatly influenced the fibre density. In most of the cases soil containing Fe in the range of 23-33 ppm produced heavy bodied fibre. Concerted efforts were also made to estimate the status of jute growing areas of the Murshidabad district on the basis of analysis of four years' (2016-2019) open source Sentinel satellite data using synthetic aperture radar sensor. It was observed that area remaining almost stagnant during 2016 to 2018. However, the area decreased drastically in the year 2019.

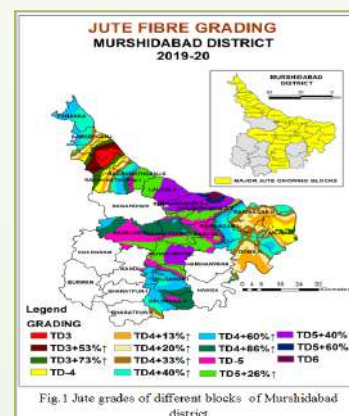


Fig.1 Jute grades of different blocks of Murshidabad district

## QEI-24: Microbial Treatment of Barky Root Portion of Jute Fibre for Improvement of Spinnability

**Dr. A. Singha, Dr. A. Das, Sh.R. Das and Smt. R. Das**

Three pectinolytic bacterial strains (AS11, AS20, AS21) were studied alone and in combinations (AS11+AS20, AS11+AS21, AS20+AS21 & AS11+AS20+AS21) for treatment of barky root cuttings with a spray method. Conventional process showed 50% barky portion with 10.7 g/Tex while the AS11+ AS20 combination (1:1, 5% culture), 1:2 liquor ratio in 4 days had reduced the barky roots (90%) higher than other process (52-81%) with a good retention of bundle strength of 10.1 g/tex than other process (8.3-10.8 g/Tex). This combination was selected as a spray method for further study. Further experiments revealed that three days treatment has removed 76% barky portion with 13.1 g/tex bundle strength and it has been selected for up-scaling process.

The effectiveness of microbial consortium in presence of emulsifying oil (castor oil) for the reduction of barky roots was studied with 5% microbial culture, 0.5% of media supplements and 2.75% emulsifying oil in a 1:1 liquor ratio. Results showed that a better reduction of 78% removal of barky roots with bundle strength of 14.4 g/Tex within 3 days of treatment than control (53% reduction & 15.3 g/Tex) respectively. Similarly, the effectiveness of microbial consortium in presence of JBO with 5% microbial culture, 0.5% of media supplements and 2.75% emulsifying oil in a 1:1 liquor ratio was studied and the same process was up-scaled to 50 kg root cuttings.

Bulky trial showed better reduction (69%) of barky roots with bundle strength of 13.2 g/tex than control process (14% & 16.5g/Tex) respectively. The production of bacterial consortium (AS11+AS20) required for treatment of barky root cuttings was optimized and up-scaled (120-130 lit/month equivalent to process of 2-2.5 tons barky root cuttings/month), through grown in a nutrient broth medium with a table top rotary shaker and with optimum temperature of  $32 \pm 2^\circ \text{C}$  for 3-5 days.

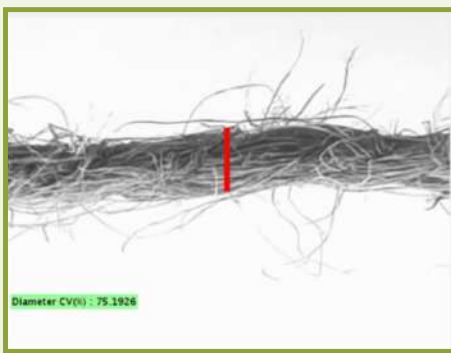
## MP-17: Development of Jute Yarn Diameter Irregularity Tester

**Sh. S. Das and Sh. T. K. Kundu**

A machine vision method, which uses a cost-effective image capture device and image processing algorithms to process the captured images, generates a diameter variation plot and analyzes the same to count the number of thick and thin places in the yarn. Deep learning ANN algorithm of Artificial

intelligence technique helped to exactly identify the edge of yarn for diameter measurement. Sixty different type of jute yarn edge has been used to trained the ANN model for exact detect the edge of yarn. Jute yarn edges are very haze which is very difficult to identify the yarn edge in normal. An embedded digital camera with 200x zooming capability and a frame capture rate of 30 frames/second was used.

The device used was portable and could be interfaced through a USB port to the computer. Histogram equalization and the use of different threshold levels were tried out in order to correct the image and extract its contours. Then a program was used to convert the image taken to binary image. The number of pixels was counted and plotted to a graph. Finally, the average number of pixels was calculated in order to obtain an accurate result. Measured diameter was used to identify the range for acceptable thickness of a yarn; the thick and thin places were identified accordingly. The results were found to tally with the results, obtained from a projection microscope.



Real time measuring CV(%) of jute yarn



Software for yarn diameter irregularity tester

### MP-18: Development of Digital Drape Meter

**Sh. M. Bhowmick, Dr. G. Bose and Dr. N. Mridha**

Drape is the fabric quality used to describe the way a fabric hangs under its own weight and it can be measured by BIS standard IS: 8357-1977. In the digital drape meter, the drape co-efficient can be measured digitally and it contains sensor assembly, motor, power supply, microprocessor circuit etc. The LCD screen displays the progress of test and the drape coefficient directly after each measurement. The results are comparable to the conventional drape meter.



Digital Drape Meter

### MP-19: Application of Jute based Agro-Textiles as Mulching Material for Wide-Scale Awareness of Farmers.

**Sh. M. Bhowmick, Dr. S. Debnath, Dr. A. Singha, Dr. N. Mridha, Er. H. Baite and Mr. S. Karmakar**

A jute mulch trial was carried out at ICAR-Vivekananda Parvati Krishi Anushandhan Shansthan, Almora, Uttarakhand at experimental farm at Hawalbag (altitude 1250 m). Four different treatments (control, jute mulch, black plastic, straw/local material) using Randomized Block Design were used in the experimental plots for cultivation of tomato (Pant-3 variety).



Jute mulch trial at Hawalbag (altitude 1250 m)

Drip irrigation was used in all the experimental plots to maintain the flow rate of 2 liter per hour per plant. Crop to crop spacing and row-to-row spacing is 0.5 m and drip irrigation was adjusted accordingly. The range of soil moisture content under different mulch system was as follows: no mulch < straw < plastic < jute. The ranges of soil temperature under different mulch system such as, straw, jute, plastic and no mulch were 24.9-31 °C, 22.4-30.5 °C, 24.3-32.5 °C and 22.4-31.2 °C, respectively. The tomato crop yields under different mulch system were like: Plastic < no mulch < straw mulch, and jute (highest yield). Among the different mulch systems, jute mulch was found to be most effective in enhancing the tomato crop yield, conserving soil moisture and maintaining soil temperature.

### MP-20: Development of Natural Fibre based Moulded/Laminated Products

**Dr. S. Debnath, Dr. P.C. Sarkar, Sh. M. Bhowmick, Sh. I. Mustafa and Er.T.K.Kundu**

Jute cotton blended union fabric of plain weave structured was used as a base material for coated/moulded/laminated material. Water insoluble synthetic polymer resin dissolved in suitable solvent was applied in the fabric by two methods (pad-batch-dry and hand spray). Both methods of coated/laminated fabric further cured for 30 minutes at 120 °C. The required rigidity of the fabric was obtained after curing the material.

The add-on due to coating/ calendaring is around 12% and 25% in case of pad-batch-dry and hand spray method, respectively. Uneven distribution of chemicals is observed in hand spray method over pad-dry-method so that only pad-batch-dry method was adopted. Results inferred that the developed coated/laminated material has found to suitable for window blind material. Two different window blind materials were procured from the market and compared with developed material. Total six different samples were prepared to make window blind.



*Commercial blind material used for comparison*



*Developed coated/laminated and commercial blind materials*

It was observed that developed jute-based window blinds materials are significantly heavier, i.e., around 58% heavier and 46% thicker, than the commercial blind fabrics. The thermal insulation values of these developed materials were evaluated and observed that after coating/laminating, the thermal insulation value of the developed material reduced about 5 to 9% in comparison with control material.

### MP-21: Development of Laminated Needle Punched Nonwoven for Impermeable Light Weight Packaging

**Dr. S. Sengupta, Dr. N. Mridha, Sh. I. Mustafa and Mrs. P. Ghosh**

Needle punched pre-needle /needled nonwoven of 86, 160 g/m<sup>2</sup> were manually laminated (single side and both sides) with 40 gsm poly-sheet and their tenacity, total energy, bending modulus, seam strength, tear strength, water absorbency, thermal insulation and air & water permeability were evaluated.



*One face laminated fabric*



*Two face laminated fabrics*

It was observed that moisture content in the fabric played a vital role in delaminating force since entrapped moisture of the fabric reduced the adhesion. Higher area density of nonwoven showed better property than lower area density for single side lamination and it is not so prominent for both side laminations. Results showed that addition of poly-sheet increased tenacity, total energy, bending modulus, seam strength, tear strength and water absorbency, but reduced thermal insulation, and made the air & water permeability to zero. Machine lamination with hot rollers under pressure have been conducted in 160 gsm nonwoven and found considerable improvement in delaminating force with thickness loss.

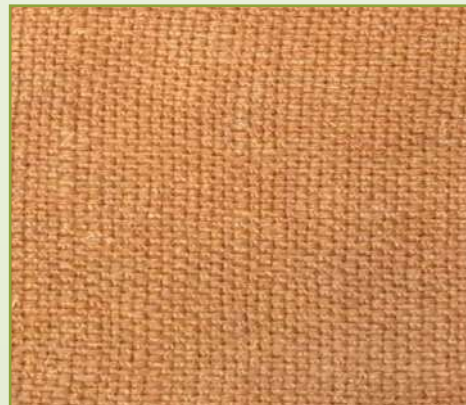
## MP-22: Development of Value-Added Products from Banana Plant Waste

***Dr. K. K. Samanta, Dr. S. N. Chattopadhyay, Dr. P. C. Sarkar, Sh. S. Bhowmick and Dr. L. Mishra***

Banana ranks first in India in production and third in area among the fruit crops. After harvesting fruits, the whole plant biomass consists of pseudo stem; suckers etc. are discarded as a waste that causes environmental pollution. Indeed much attention is required for effective utilization of banana plant biomass. Banana pseudo stem could be for collection of sap and the residual biomass for different applications. Approximately, 70-80% liquid sap can be extracted from the pseudo stem. The residual semi-solid biomass was collected for further processing. The density of banana liquid sap was 1.012 g/cm<sup>3</sup>.



*Bleached jute fabric*



*Natural dyed jute fabric*

Banana sap (BS) was used in colouration of jute fabric using natural dye and it showed deep orange colour with very good uniformity. The colour value of the untreated and BS treated jute fabrics were inferred that L\* value reduced from 82 to 77 due to colouration. It was also seen that after application

of BS in jute fabric, the ultraviolet protection factor rating increased from 95 in the untreated sample to 130 in the treated sample. Semi-solid banana plant biomass was used for making value added product, like sheet with high areal density.

### CBP-18: Development of Universal Bleaching Process of Jute for Textile and Non-Textile Applications

**Dr. S.N. Chattopadhyay, Dr N. C. Pan, Sh. A. Khan and Sh. S. Bhowmick**

Development of bleaching process of jute pulp with superior whiteness and retention of strength following eco-friendly per acetic acid bleaching process has been evaluated during this period. Pulping of jute was carried out by different pulping methods i.e. ASAM process, Sulphite-Anthraquinone process, Sulphite process, Kraft process and Alkali process. Results of yield performance of various pulping processes indicated that the yield of the pulp decreases with increase in alkalinity in pulp liquor and the severity of the treatment as the yield is lesser in Kraft (57%) and alkali process (52%) than other pulping (63-68%) processes. These pulps were used to make paper using semi-automatic sheet former. All the papers were evaluated for optical & physical properties.

Comparison of paper properties					
Pulping Process	WI	Tensile strength (kN/M)	Folding (Number)	Burst Index (KPam <sup>2</sup> /g)	Tear index (mNm <sup>2</sup> /g)
ASAM	67.6	3.84	300	4.77	11.33
Sulphite-Anthro	69.0	2.94	132	4.87	11.33
Sulphite	66.7	3.32	228	4.46	10.2
Kraft	64.8	3.15	163	4.31	9.64
Alkali	79.6	1.09	2	1.10	3.85

In order to compare the bleaching of the pulp using two oxidizing bleaching agents, all these pulps were bleached separately by conventional H<sub>2</sub>O<sub>2</sub> and developed PAA bleaching process. After bleaching, the yield of pulp is higher in PAA bleaching (95-98%) than peroxide bleaching (91-93%). These bleached pulps were used for making paper and all the papers were evaluated for optical & physical properties.

Comparison of peroxide & peracetic acid bleached paper properties								
Pulping	Whiteness index		Tensile strength (kN/M)		Folding (Number)		Burst Index (KPam <sup>2</sup> /g)	
	H <sub>2</sub> O <sub>2</sub>	PAA	H <sub>2</sub> O <sub>2</sub>	PAA	H <sub>2</sub> O <sub>2</sub>	PAA	H <sub>2</sub> O <sub>2</sub>	PAA
Bleaching								
ASAM	79.5	81.1	1.94	2.55	16	71	3.20	3.44
Sul-Ant	76.2	80.2	0.94	1.98	-	12	1.32	2.03
Sulphite	82.6	78.8	1.36	2.46	3	28	1.51	2.66
Kraft	88.9	84.4	0.40	1.99	-	9	-	2.00
Alkali	85.8	83.4	0.50	0.97	-	1	-	0.81

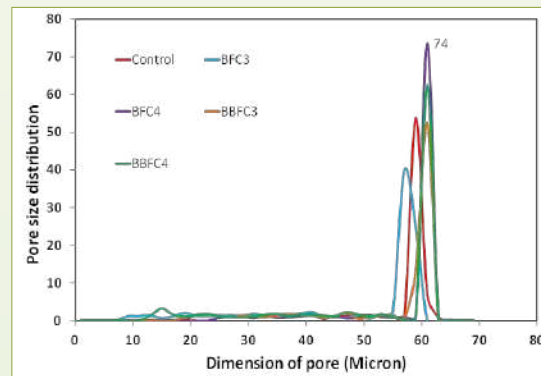
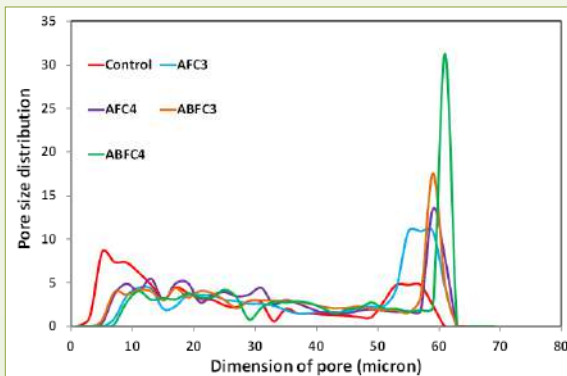
Physical properties of papers produced by hot soda process were poor. The physical and optical properties of the paper produced by peracetic acid bleaching were found to be better than that produced by hydrogen peroxide bleaching. Papers produced from bleaching-ASAM jute pulp are best followed by bleaching-Sulphite jute pulp.



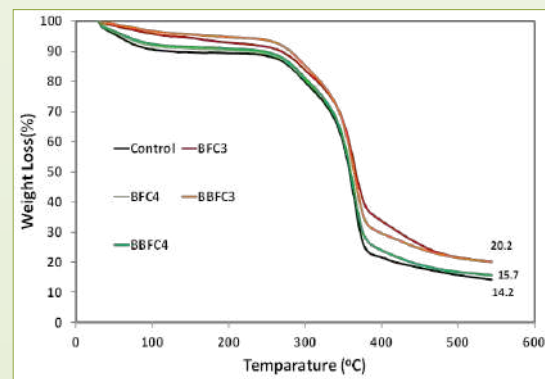
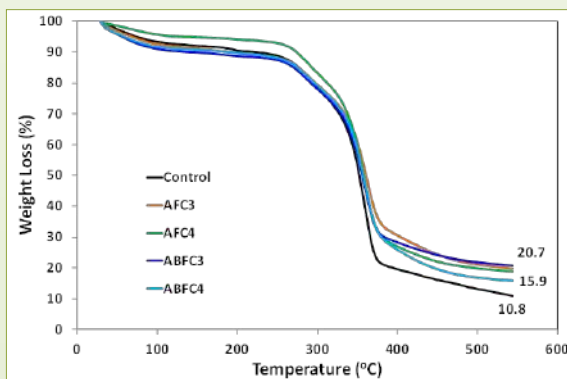
## CBP-19: Coating Jute Fabric to Improve its Functional Properties for use as Rigid / Semi Rigid Packing Material

**Dr P.C. Sarkar, Dr L.Ammayappan, Sh. A. Khan and Sh. I. Mustafa**

Two semi-synthetic coating formulations based on natural resin lac and synthetic resins: polyvinyl butyral and butylated melamine formaldehyde were developed in solvent medium. These were designated as Fabric Coat (FC) and its combination with commercial silica nano-particle were formulated as FC-3, FC-3S, FC-4 and FC-4S. Two different GSM jute plain weave fabrics were also selected and designated as A (heavy, 1.25 mm thickness, GSM = 618) and B (medium heavy, 1.0 mm thickness, GSM = 476). The above four formulations were applied to the fabrics, using pad-dry-cure method. The coated fabrics were air dried and cured in an oven at 120 °C for 20 mins. The treated fabrics were then subject to tests for bending, flexural rigidity, pore size, tensile strength, microscopic analysis, air permeability, wettability test, sinking test, GSM, add-on % and fabric thickness. Life cycle studies were carried out. Samples were also analysed by SEM, DTA, capillary flow porosity and XRD.

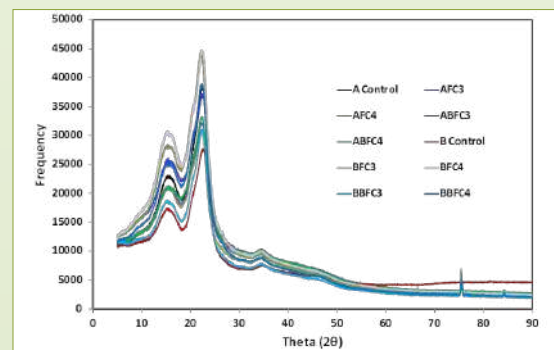


*Pore size distribution of Fabrics (A & B) before and after coating*



*DTA spectra of jute fabrics (A & B) before and after coating*

Physical properties of jute fabrics (A & B) inferred that the pore space between the interlaced yarns have been slightly decreased in fabric B and increased in fabric A, so that accordingly there is change in the air permeability of the coated fabrics; while there is no significant difference in fine structure of the fibre i.e. change in the crystalline nature. Due to the deposition of the polymers, the residual charred mass of the coated jute fibre is higher (15.7-20.7%) than control jute fibre (14.2-14.4%).



*XRD spectra of jute fabrics (A & B) before and after coating*

Treatment of fabric resulted in greater thickness and rigidity, less elasticity, higher GSM, less wettability and increased pore size, the latter being probably due to shrinkage of individual fibres after heat treatment. Percentage add-on was dependent on solid content of the formulations. Initial modulus of the fabrics, which was 47.4 and 7.2 N/mm<sup>2</sup> for A and B fabrics respectively, increased up to 299 and 184 N/mm<sup>2</sup>. Extent of rigidity introduced to the fabrics after coating can be gauged from the fact that control Fabric A with a bending modulus cN/tex of  $6.5 \times 10^{-5}$  increased to  $39.5 \times 10^{-5}$  cN/tex after coating.

Similarly, control Fabric B, with a bending modulus of  $2.2 \times 10^{-5}$  cN/tex acquired a maximum of  $22.0 \times 10^{-5}$  cN/tex after coating. Both formulations suppressed the hairiness of the fabric. As expected, the treatment decreased the wettability of the fabrics, due to presence of resin layer on the surface of the material. Soil burial test (21 days) further indicated that there was an improvement in life cycle as regards to weight loss and tensile strength i.e. a weight loss of 19.3 and 28.6% respectively, due to biodegradation, which could be reduced to 10.9 and 23.5% in treated samples of Fabrics A and B, respectively.

### **CBP-20: Development of Fire Retardant and Termite Proof Particle Board from Whole Jute Plant**

***Dr. L.Ammayappan, Dr. B.S. Manjunatha and Sh. S.Bhowmick***

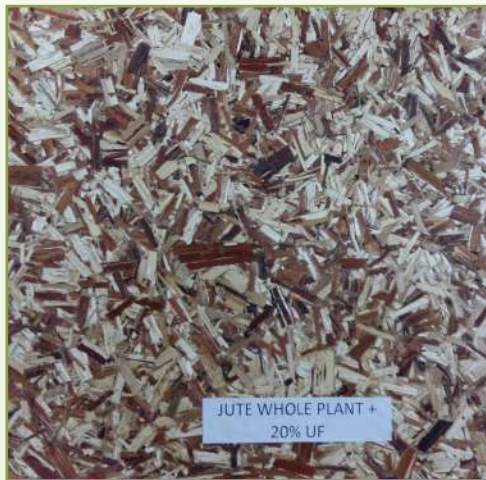
The utilisation of formaldehyde based resin in the particle board has emitted un-reacted formaldehyde during storage. It creates havoc for its utilisation in the furniture industry and its time to replace with suitable HCHO-free natural adhesives. In this work, natural as well as synthetic adhesives were taken and studied their suitability. Guar gum, Chitosan, Gum Arabic, Rosin, PF resin and UF Resin were selected for the development of particle board with dried whole jute plant. The properties such pH, viscosity, density, solid content, moisture content and solubility in water were evaluated. It is found that all natural adhesives have higher viscosity (>1000cP) than synthetic adhesives due to high solid content and all have slightly acidic pH.

Dried whole jute plant was taken and the particles were prepared by chopping the whole jute plant with cutter of 1 to 2inch length, dried in a hot air oven at 80°C for 1 hour and mixed thoroughly with 20 wt% adhesive in an electric U-Trough mixer fitted with a sigma-type blade. After proper mixing, the particle boards of dimension 60 cm x 60 cm x 0.5 cm were prepared on a hot press at 150-160°C at a pressure of 40 kg/cm<sup>2</sup> for 15 minutes. In order to reduce the consumption of the synthetic resin, a combination of natural and synthetic adhesive (like rosin and phenol formaldehyde) has been used to develop the particle board.

The particle board prepared from whole jute plant and different adhesives shown density of above 0.450 which is in lower range of medium density particle board. It is also found that the density and flexural properties of the particle board prepared from guar gum and gum Arabic are lower than other particle boards and it may be due to less bonding efficacy with the particles; while chitosan and rosin have shown good physical and mechanical properties in comparison with UF and PF resin. Among all, PF resin based particle board shown (5.8 MPa) higher flexural properties than other particle boards. In order to make cost effective particle boards, the rosin and phenol formaldehyde combination was selected for further optimization study.

The major factors influencing the mechanical properties of the particle boards are particle size, particle shape, amount of mat, pressing time, pressing temperature, type of resin, amount of resin and amount of moisture in the particle. However, particle size (12.5, 25.0 & 50.0mm) amount of mat i.e.

particles after mixing with required amount of adhesive (900, 1000 & 1100 g), amount of resin (15, 20 & 25%owp) and the resin combination (70/30; 80/20 & 90/10 Rosin/Phenol formaldehyde) are selected as variables in three levels.



*Whole jute plant: Synthetic/natural resin based particle boards*

Particle boards from the dried whole jute plant and Rosin/Phenol formaldehyde adhesive combination in 40 cm x 40 cm x 1 cm dimension as per experimental plan were prepared by conventional method by keeping other processing parameters constant like moisture regain of particle, drying of particle, pressing time, pressing temperature and blending time. All particle boards have density in the range between 0.420 and 0.500, which is in lower range of medium density particle board. It is also found that the density of the particle board is increased with an increase in the amount of particles as well as adhesives and it leads to increase the overall bonding efficacy. Other parameters of the particle board for the optimization are in progress.

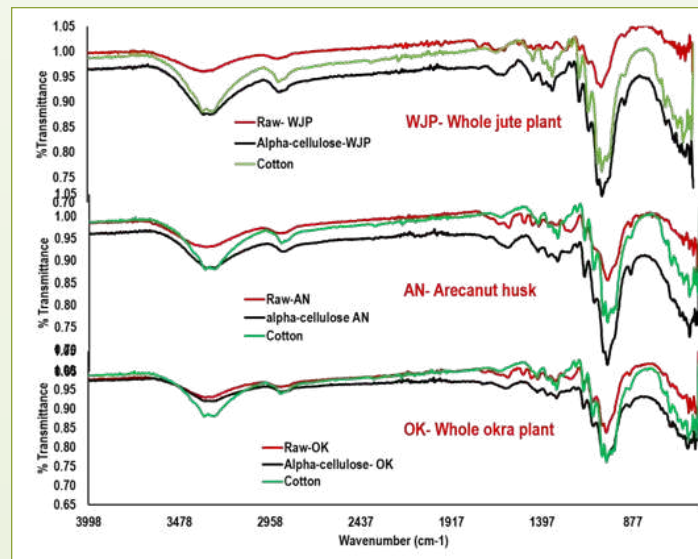
### **CBP 21: Production of High-Value Crystalline Cellulose Micro Particle from Fibre Yielding Plants**

***Dr. R.K.Ghosh, Dr. S.N.Chattopadhyay and Dr. B.S. Manjunatha***

Cellulose biomass is a raw material to prepare a number of excipients like crystalline cellulose microparticle, purified, partially depolymerized cellulose for food and pharmaceutical industries. The conventional sources, wood (facing severe challenges of deforestation) and cotton (high-cost)

are struggling with some serious issues which led investigation for cheap raw material especially non-wood source. In this context, the fibrous biomass of whole plant of okra, Indian flax and jute, and fruit husk of Arecanut (*Areca catechu*) may serve as an under-explored, abundant, non-wood source of cellulose and they may provide alternative options to farmers for better profit.

Kraft pulping was selected over ASAM process for digestion of fibrous biomasses under study. The results indicated that cellulose content in the fibrous biomass varied from 40 to 69%. The extracted alpha-cellulose were analysed by FTIR for purity checking with reference to pure cellulose (cotton). The figures indicated that removal of lignin and hemicellulose peaks and enrichment of alpha-cellulose. These alpha-celluloses were kept for further experiments.



*FTIR analysis of raw biomasses and derived alpha-celluloses*

## TOT-11: Improvement, Up-Scaling and Popularization of Power-Ribboner

**Dr. V. B. Shambhu, Dr. A. K. Thakur, Dr. L.K. Nayak and Sh. B. Das**

Fibres from jute and mesta plants are extracted from the plants after conventional retting process and require about 500 litres of water to obtain a one kg of dry fibre. In the present scenario, scarcity of water is the major constraints being faced by the farmers for retting of jute in the conventional method. To overcome this problem ICAR-NINFET has developed a Power ribboning machine to extracts the outer barks/ ribbons from jute/ mesta plants without breaking the sticks in pieces.

Improvement was made upon the earlier designed power ribboner with improved frame structure to increase the space between fluted rollers and rubber rollers. For relocation of the diesel engine, outside the main frame a new frame with extended based for fitting the machine was fabricated. The developed prototype of improved power ribboner was tested in laboratory and field condition and worked satisfactory.



However, wrapping of peeled ribbons on conveyor belt and shaft was occurred occasionally. For smooth and easy collection of peeled ribbons a collection system was made so that the shortcomings have been rectified for its better performance. The improved ribboner has demonstrated at seven different places covering three jute growing districts of West Bengal for its popularity among the jute farmers.

The capacity of improved power ribboner is found to be 200 kg/hour biomass. The retting time for ribbons was reduced to about 6-8 days as compared to 18-20 days in conventional retting with whole plants.

### **TOT-12: Development and Performance Evaluation of Portable Water Tank for Retting of Jute Ribbons and Root Cuttings**

***Dr. A.K. Thakur, Dr. A. Singha and Dr. V.B. Shambhu***

Experimental trials were conducted for retting of jute ribbons and root-cuttings in portable water tank which was developed during previous year. Ribbons were extracted from whole jute plant by using power ribboner machine. 50 kg of ribbons were suitably placed by hanging into the tank and the tank was filled with fresh water for accomplishing the retting process. The retting process was observed in every day and it was completed on 7<sup>th</sup> day. After retting, the retted jute ribbons were taken out, washed using fresh water, dried by hanging. The dried jute fibre was evaluated for their characteristics and the grade was found to be TD-3+ 20% (with total Score of 73)



*Jute fibre retted in portable water tank*



*Barky jute retting in tank*



*Barky jute after completion of retting*

The performance of portable tank was also evaluated for retting of barky root cuttings. 25 kg barky jute was placed in the tank with fresh water in the ratio of 1:15; 3% bacterial culture was added to water and it was stirred thoroughly with the help of a stick and submerged well the barky jute. The retting of barky jute was completed on 4<sup>th</sup> and the retted barky jute was taken out, spread over for drying and tested for spinning. Yarn quality was found satisfactory with quality index of 70%.

### **TOT-13: Branding of ICAR-NINFET Innovations for Technology Transfer and Startup Creations**

***Dr. S.B. Roy, Dr. D.P. Ray and Sh. K. Mitra***

Branding holds the key to success of today's startup creation arena in the world. The Transfer of Technology Division assumes its established responsibility as dissemination of proven technologies in natural fibre processing, value addition and value-chain development.



ICAR-NINFET, a pioneer institute on natural fibre has developed many promising technologies over the years. During this period, information was collected for technology buildup on “Accelerated Retting Innovations for Jute and Allied Fibre” for stakeholder’s opinion and techno-economic feasibility study of the technology. Bankable Project Profile prepared to study the techno-economic feasibility of the technology. Institute has designed a brand for identified technology as “NINFET-Sathi” for registration with logo and a tagline in order to make the brand “NINFET-Sathi” is different, unique and distinctive to stand apart from its competitors. The brand registration has been carried through NINFET-ITMU and registered under two class i.e. TM application no. 4259315 applied under class 1 and TM application no. 4259316 under class 42 on August 07, 2019. The same trade mark applications have been published in Indian Trademarks Journal on September 16, 2019 and were remaining open for third party opposition for four months i.e. January 16, 2020. No third party opposition recorded for Two Trade Mark applications published in Indian Trademarks Journal for “NINFET-Sathi”.

# EXTERNALLY FUNDED PROJECTS

## CRP-NIRJAFT- 01: Development of Machineries for Extraction of Fibre from Sisal, Flax and Pineapple

**Dr. L.K. Nayak; Dr. S. Debnath and Dr. V.B. Shambhu**

Extensive trial runs on the first prototype flax fibre extractor was carried out and based on those trial runs, an improved extractor was developed with the provision of separate outlets for the extracted fibre and the broken sticks.



*Improved flax fibre extractor*



*Dried flax stalk, Extracted fibre & broken stalks*



*Demonstration of flax fibre extractor*

In the improved extractor, as shown in figures above, dry stalks are fed manually into the machine which passes through a set of five revolving rollers. The stalks are broken at multiple contact points after coming in contact with the rollers. The extracted fibre and the broken stalks are collected at separate outlets. The extractor runs by a 1 H.P. motor with output capacity of 7.5 Kg dry fibre/hr.

All the developed extractors viz. *pineapple leaf fibre extractor, sisal leaf fibre extractor & flax fibre extractor* were demonstrated to the participants of Winter School organized during December 03-23, 2019 & National Level Training programs sponsored under NFSM during July 09-11, 2019, July 17-19, July 24-26 & August 1-3, 2019.

## CRP-NIRJAFT-02: Development of Grading System and Electronic Instrumentation for Fibres Allied to Jute

**Dr. D.P. Ray and Sh. M. Bhowmick**

The main objective of the work is to develop a grading system for Ramie, Sunnhemp, flax and sisal fibres. All over world have adopted different types of grading system for these fibres, however, there are no instruments and standard methodologies available for grading allied fibres. Under this project, ramie and flax fibre grading system has been tested and prepared as draft specification for submission to BIS. In addition to these grading systems, an effort has been made to develop the banana grading system as well as instruments for the same.



*Banana fibre grading instrument*

A technical bulletin on ‘*Technological Innovations under Consortia Research Platform on Natural Fibres*’ has been published; also developed an automatic banana fibre strength testing instrument; prepared a draft specifications on grading for Banana fibre as per BIS format ; developed an automatic integrated banana fibre grading instrument and collected different banana fibres (Indian variety) for their statistical validation in the automated bundle strength tester and digital fibre fineness tester.

## CRP-NIRJAFT-03: Eco-friendly Chemical Processing of Lingo-Cellulosic Fibres for the Preparation of Home Textiles

**Dr. S.N.Chattopadhyay, Dr. N.C. Pan, Dr. A.N. Roy and Dr. K.K. Samanta**

The main objective of the project is to develop different sustainable home textiles by blending different lingo-cellulosic fibres with and without an eco-friendly chemical processing. To develop jute/banana blended yarn with lesser hair, smooth and soft feel, viscose rayon fibre has been used as a component fibre in the blend to produce ternary blended yarn. Both jute and banana fibres were cut into 1 feet length , bleached with peracetic acid and ternary blended yarn of 4lb, 6lb and 8lb were produced in the jute spinning system using the blend ratio as jute /banana/ viscose in 35:35:30. The optical characteristics of the individual fibres and the blended yarn (35/35/30 as jute/ banana/viscose; 4lb, 6lb & 8lb yarn) inferred that the whiteness indices of the yarns are lower (62.8-67.3) than that of the individual bleached fibres (75.1-81.9) and it might be due to the effect of spinning.

The yarn thus produced is soft and smooth with high tensile properties. In a second set of experiment jute and banana fibres were blended in full length without cutting after bleaching with peracetic acid and blended with staple viscose rayon in 35:35:30 blend ratio. Fine cotton yarn was used as a wrapper to reduce hairs. Three different count of yarns (4 lb/spy, 6 lb/spy and 8 lb/spy Jute/Banana/ viscose- 35:35:30) were produced. The optical and physical properties of the blended yarn inferred



that blending of uncut jute and banana fibres produced higher tenacity and 4 lb/spy yarn shows good tenacity with high initial modulus. Hence, finer ternary blended yarn can be produced with uncut jute/banana/viscose fibres combination which can be utilized for making finer fabric.

In order to produce 4 lb/spy ternary blended yarn, jute and banana fibres were bleached with peracetic acid and these bleached fibres were blended with viscose in 35:35:30 ratios in jute spinning system. A part of the yarn was used to produce union fabric using cotton yarn as warp and ternary blended yarn as weft. Another part of the yarns were used for dyeing with natural, reactive and direct dyes. All the yarns and fabrics were evaluated for optical and physical properties. The optical properties are found that reactive dye produced higher colour yield ( $K/S=27.3$ ) than natural dye (3.9) and direct dye (13.7) with very good washing fastness (4). So, these yarns were dyed with three different reactive dyes (4% shade).

The physical properties were evaluated and inferred that the tensile strength retention (9-16%) after dyeing is also good. The initial modulus of the bleached yarn (482 g/tex) and dyed yarns (324-342 g/tex) shows that they can withstand the shedding action during weaving to form plain fabric with stripe effect and fabric has been produced in handloom using cotton yarn as warp and ternary blended yarn as weft.



Table Runner



Bed Cover



The plain weave union fabrics were dyed with direct, reactive and natural dyes. The results found that reactive dyed fabrics shows very good wash fastness (3-4) than other dyed fabrics (2) and the tensile strength retention is also good. All dyed union fabrics have attained better softness (0.39-0.47 kg/cm<sup>2</sup> bending modulus) than grey union fabric (0.58 Kg/Cm<sup>2</sup>) due to dyeing process.

So these dyed ternary blended yarns can woven into fabric in handloom for a stripe effect and it could be utilised for making fine table cover, bed cover and jackets. Similarly, printed fabric produced on white ternary blended fabric and those fabrics utilised for making premium quality fancy bags, upholstery and outer garments.

## CRP-NIRJAFT- 4: Surface Modification of Coarser Yak Fibre for Development of Jute/Yak Fibres Blended Textile Product

**Dr. A. N. Roy, Dr. K. K. Samanta, Dr. S. Debnath and Er. H. Baite**

Presently, the availability of yak fibre in India is 200 tonnes of coarser and 20 tonnes of fine and hair fibre. Due to the good textile potentiality of this fibre, an effort has been made to develop different jute/yak fibres blended textile products under this project. Yak hair contains lot of surface impurities and it was removed by scouring treatment. The scouring loss was 4.1% and 12% for the coarser and finer yak fibres, respectively.

Coarser yak fibre was used for the production of jute/yak (50/50) fibres blended yarn and dyed in different shades followed by its utilisation to produce plain woven fabrics (30 meter) in hand loom by utilising black colour polyester yarn as a warp yarn and the jute-yak fibres blended yarn as a weft yarn. A black colour coarser yak fibre was chemically modified to produce jute/yak (25/75) blended yarn and the respective yarn was used to prepare a fabric of 400 g/m<sup>2</sup> GSM in a handloom. Yarn was made from jute/coarser yak (modified and unmodified) blends and un-dyed yarns was used to prepare half jacket and coat.



*Natural black coloured coarse yak hair*



*Chemically modified coarse yak hair*



*Un-dyed and dyed of jute/yak (50:50) fibres blended yarn in different colours*



*Jute/Fine yak fibres blended jacket*



*Jute/coarser yak fibres blended long coat*

The jute/coarser yak blend fabric has thermal insulation value of 0.96 clo, which is equivalent to 100% woolen fabric for similar end use. We also developed a suiting fabric and high value jackets from fine yak fibre. The thermal insulation value of the suiting fabric of 200 g/m<sup>2</sup> is 0.64 clo, which is comparable to commercial woolen fabric of similar areal density (0.51 clo). To improve the feel of jute/yak blended fabric, it was finished with softening chemical and the total-hand-value (THV) of the fabric increased from 2.38 (unfinished fabric) to 3.28 in treated fabric (1 means poor and 5 means excellent).

### **CRP-NIRJAFT-05: Design and Development of Disposable Carry Bag from Natural Fibre-Based Material**

***Dr. S. Debnath, Dr. A. N. Roy and Sh. M. Bhowmick***

The objective of this project is to design and develop technology for durable/semi-durable jute-based light weight hand bag considering environmental safeguard protocol. Most of the jute hand bags are made either by 100% jute or jute fabric laminated with PE/PP. We have tried to explore the possibilities of environmental friendly jute-based hand/carry bags by means of woven/knitted/knotted structures or composite structures.

Jute yarn was been developed and further used to make plain-weave fabric for the preparation of disposable carry bag. Prior to weaving, the jute yarns were bleached and dyed in different colours with reactive dyes (cold brand) for ornamental carry bag. Different sizes (17 × 23 cm, 30 × 40 cm, 33 × 43 cm, 35 × 32 cm, 30 × 33 cm) carry bag was fabricated. Commercial jute fabric and cotton lace were utilized for bag handle in disposable carry bag. It is found that the developed carry bag has carrying capacity of 20 kg -50 kg and it is depending on the yarn used and the construction of the fabric. The soil burial test as per IS 1623: 1992 standard (21 days under standard soil condition) of the developed carry bag inferred that, the strength loss is over 80% after degradation.

### **NJB-JLT: Jute Leaf Tea and Some Value Added Products**

***Dr. D.P.Ray, Dr. B.Saha and Dr. R.K.Ghosh***

Jute leaves (approx. yield 8-10t /ha, on green weight basis) during jute cultivation are shedded in the field before retting of the plants. Moreover, jute leaves remain available during April to December month in jute seed producing states like Andhra Pradesh and Maharashtra. The nutraceutical enriched leaf biomass is under explored and remained under utilized.



*Preparation of 'Jute drink' at laboratory*



*Subject assessment by Dr. B.Saha, Co-PI*

Hence the present project aims to utilize this naturally occurring nutrient enriched bio-resource for the extraction of health supplement beverages and natural personal care products. Jute leaf samples

were collected from jute field from three districts viz., Hooghly, North 24 Parganas and Nadia in three different portions i.e. twig, middle portion and lower portion of the plants. These samples were tagged and stored in a collection bag. Initially, these samples were washed in flowing water, dried under shade followed by drying in a hot air oven at 50°C for 4 hrs; kept in a moisture free desiccators and packed in a sealed packet for further processing. The proximate analysis of jute leaf, the total sugar, reducing and non-reducing sugars, protein, fat, energy, carbohydrate, vitamins of jute leaf have been determined.



*NINFET Jute drink*

The Jute leaf water extract was subjected to chromatographic analysis through LC-MS. The compound present in the leaf has been evaluated with their uses and chemical formula. To prepare the jute leaf drink, dried jute leaf were preheated to 100°C and then placed in the processing chamber to optimise the roasting condition by varying the parameter through Response Surface Methodology using Design Expert software.

After roasting the samples became friable and brown in colour which was packed in dipping tea bag for final use.

## Agri-Business Incubation

**Dr. A.N. Roy, Dr. S.B. Roy, Dr. S. Debnath and Dr. L.K. Nayak**

Ten (10) days skill development training program on “Manufacture of jute Handicrafts” under Agri-Business Incubation (ABI) project, ICAR-NINFET, Kolkata have been organized in different parts of the eastern region to have more entrepreneurs in the field of jute based handicrafts as well as to make awareness on natural fibres. The project staff members along with the respective officers of the training place have coordinated the program. After successful completion of the program, Dr. A.N.Roy, PI-ABI have distributed the certificates and briefed the trainees about the market demand of jute goods & entrepreneurship opportunities in this sector.

Area of training	Place	Period	No of participants
Manufacture of jute Handicrafts	Bagdogra, Siliguri, West Bengal	June 26 to July 7, 2019	20
Manufacture of jute Handicrafts	Shibmandir, Siliguri, West Bengal	June 26 to July 7, 2019	20
Manufacture of Jute Handicrafts	KVK Nadia, Gayeshpur, Nadia, West Bengal	September 2-18, 2019	20
Manufacture of Jute Handicrafts	KVK-Sambalpur, Odisha	November 27 to December 7, 2019	20
Manufacture of Jute Handicrafts	KVK-Bargarh, Odisha	November 28 to December 7, 2019	20



*Training at Siliguri*



*Dr. S. Debnath stressed on the importance of ABI*



*Successful completion of training*



*ABI team with trainees at Sambalpur*



*Interaction of Dr. A.N. Roy, PI, ABI with trainee*



*In-charge, KVK-Bargarh addressed the gathering*

# RESEARCH & DEVELOPMENT PROGRAMS (AS ON 01.01.2020)

## Quality Evaluation and Improvement Division

1. **Project No.** : **QEI-22**  
**Title** : ***Development of Accelerated Retting Technology for Jute And Mesta Plants***  
Principal Investigator : Dr. D.P. Ray, Principal Scientist  
Co-Principal Investigator(s) : Dr. R.K. Ghosh, Scientist  
Dr. A. Singha, Scientist  
Sh. A. Sarkar, Technical Officer  
Date of start : 1<sup>st</sup> April 2017  
Date of completion : 31<sup>st</sup> March 2020  
Objective(s) :
  - i. To develop a suitable retting accelerator for effective retting of jute & mesta
  - ii. To evaluate the efficacy of the retting accelerator through on-field application
  
2. **Project No.** : **QEI-23**  
**Title** : ***Jute Mapping and Estimation of Fibre Quality***  
Principal Investigator : Dr. B. Saha, Principal Scientist  
Co-Principal Investigator(s) : Dr. N.Mridha, Scientist  
Sh. S. Das, Scientist  
Sh. K. Manna, Technical Officer  
Date of start : 1<sup>st</sup> April 2017  
Date of completion : 31<sup>st</sup> March 2020  
Objective(s) :
  - i. Development of digital thematic maps of jute clusters of jute growing districts of West Bengal
  - ii. Establishment of relations between different bio-physical parameters with quality of jute fibre
  - iii. Development of Decision Support System for predicting jute grade to help jute growers and jute industries.

3. **Project No.** : **QEI-24**  
**Title** : ***Microbial Treatment of Barky Root Portion of Jute Fibre for Improvement its Spinnability***
- Pri. Investigator : Dr. A. Singha  
 Co-Principal Investigator(s) : Dr. A. Das, Principal Scientist  
 Sh. R. Das, Technical Assistant  
 Smt. R. Das, Technical Assistant
- Date of start : 1<sup>st</sup> April 2018  
 Date of completion : 31<sup>st</sup> March 2021
- Objective(s) : i. Selection and characterization of bacterial strains having pectinolytic activity  
 ii. Modification of barky root portion of jute fibre by selected bacterial strains for improvement of spinnability  
 iii. Demonstration and refinement of technology for modification of barky root portion of jute fibre

### Mechanical Processing Division

4. **Project No.** : **MP-17**  
**Title** : ***Development of Jute Yarn Diameter Irregularity Tester***
- Principal Investigator : Sh. S. Das, Scientist  
 Co-Principal Investigator(s) : Sh. T. K. Kundu, Technical Assistant
- Date of start : 1<sup>st</sup> April 2017  
 Date of completion : 30<sup>th</sup> September 2019
- Objective(s) : i. Fabrication of instrument for measuring the yarn diameter  
 ii. Develop the decision support system for yarn irregularity
5. **Project No.** : **MP-18**  
**Title** : ***Development of Digital Drape Meter***
- Principal Investigator : Sh. M. Bhowmick, Scientist  
 Co-PI (s) : Dr. G. Bose, Principal Scientist (*up to 30<sup>th</sup> November 2019*)  
 Dr. N.Mridha, Scientist

- Date of start : 1<sup>st</sup> April 2017  
 Date of completion : 31<sup>st</sup> March 2020  
 Objective(s) : i. Design and development of digital drape meter  
 ii. Standardization of the digital drape meter developed
6. **Project No.** : **MP-19**  
**Title** : ***Application of Jute Based Agro-Textiles as Mulching Material for Wide-Scale Awareness of Farmers***  
 Principal Investigator : Sh. M. Bhowmick, Scientist  
 Co-Principal Investigator(s) : Dr. S. Debnath, Principal Scientist  
 Dr. A. Singha, Scientist  
 Dr. N. Mridha, Scientist  
 Sh. H. Baite, Scientist  
 Sh. S.Karmaker, Technical Assistant  
 Date of start : 1<sup>st</sup> April 2018  
 Date of completion : 31<sup>st</sup> March 2021  
 Objective(s) : i. Large scale production of natural fibre based agro-textile  
 ii. Field trials of natural fibre based agro-textile material in different agro-climatic zones  
 iii. Performance evaluation of crop specific natural fibre based agro-textile materials
7. **Project No.** : **MP-20**  
**Title** : ***Development of Natural Fibre based Moulded/Laminated Products***  
 Principal Investigator : Dr. S. Debnath, Principal Scientist  
 Co-Principal Investigator(s) : Dr. P.C. Sarkar, Principal Scientist  
 Sh. M. Bhowmick, Scientist  
 Sh. H. Baite, Scientist  
 Sh. I. Mustafa, Technical Assistant  
 Sh. T.K. Kundu, Technical Assistant  
 Date of start : 1<sup>st</sup> April 2018



Date of completion : 31<sup>st</sup> March 2021

Objective(s) : i. Design and development of natural fibre-based moulded/ laminated products

8. **Project No.** : **MP-21**

**Title** : ***Development of Laminated Needle Punched Nonwoven for Impermeable Light Weight Packaging***

Principal Investigator : Dr. S. Sengupta, Principal Scientist

Co-Principal Investigator(s) : Dr. N.Mridha, Scientist  
Sh. I. Mustafa, Technical Assistant

Smt. P. Ghosh, Technical Assistant

Date of start : 1<sup>st</sup> October 2018

Date of completion : 30<sup>th</sup> September 2019 (*extended up to 30<sup>th</sup> September 2020*)

Objective(s) : i. To explore the possibilities of low cost low GSM impermeable fabric from needle punched nonwoven fabric

9. **Project No.** : **MP-22**

**Title** : ***Development of Value-Added Products from Banana Plant Waste***

Principal Investigator : Dr K.K. Samanata, Scientist

Co-Principal Investigator(s) : Dr. S. N. Chattopadhyay, Principal Scientist;

Dr. P. C. Sarkar, Principal Scientist

Sh. S. Bhowmick, Technical Officer

Dr. L. Mishra, Technical Assistant.

Date of start : 1<sup>st</sup> April 2019

Date of completion : 31<sup>st</sup> March 2022

Objective(s) : i. Collection and utilisation of semi-solid biomass during extraction of banana fibre / sap making value –added products  
ii. Application of banana sap for fire-retardant value addition of textile / paper board with improved durability  
iii. Application of banana sap in colouration of textile  
iv. Development of fire retardant jute fabric with softening attribute

## Chemical & Biochemical Processing Division

- 10. Project No.** : **CBP-18**  
**Title** : ***Development of Universal Bleaching Process of Jute for Textile and Non-Textile Applications***  
Principal Investigator : Dr. S.N. Chattopadhyay, Principal Scientist  
Co-Principal Investigator(s) : Dr. N.C. Pan, Principal Scientist  
Sh. A. Khan, Senior Technical Officer  
Sh. S. Bhowmick, Technical Officer  
Date of start : 01<sup>st</sup> April 2017  
Date of completion : 31<sup>st</sup> March 2020  
Objective(s) : i. Bleaching of jute superior whiteness, feel and retention of strength following eco-friendly per-acetic acid bleaching process  
ii. Bleaching of different jute pulps following eco-friendly process for making writing paper, tissue paper, etc  
iii. Evaluation of bleached fibre, pulps and papers for optimization of bleaching process
- 11. Project No.** : **CBP-19**  
**Title** : ***Coating Jute Fabric to Improve its Functional Properties for Use as Rigid/Semi Rigid Packing Material***  
Principal Investigator : Dr. P.C. Sarkar, Principal Scientist  
Co-Principal Investigator(s) : Dr. L. Ammayappan, Principal Scientist  
Sh. A. Khan, Senior Technical Officer  
Sh. I. Mustafa, Senior Technical Assistant  
Date of start : 1<sup>st</sup> April 2018  
Date of completion : 31<sup>st</sup> March 2020  
Objective(s) : i. To generate a synthetic/semi-synthetic coating technology for treating jute fabric, thereby improving upon its functional properties and possible end use as high performance packaging material
- 12. Project No.** : **CBP-20**  
**Title** : ***Development of Fire Retardant and Termite Proof Particle Board from Whole Jute Plant***

Principal Investigator : Dr. L. Ammayappan, Principal Scientist

Co-Principal Investigator(s) : Dr. B.S. Manjunatha, Scientist  
Sh. S. Bhowmick, Technical Officer

Date of start : 1<sup>st</sup> April 2019

Date of completion : 31<sup>st</sup> March 2022

Objective(s) : i. To develop a particle board using bio-adhesives  
ii. To optimize the processing condition for development of particle board from whole jute plant  
iii. To improve the functional properties of the particle board  
iv. To develop a suitable product

13. **Project No.** : **CBP-21**

**Title** : **Extraction of micro-crystalline cellulose from whole jute plant**

Principal Investigator : Dr R.K. Ghosh, Scientist

Co-Principal Investigator(s) : Dr. S. N. Chattopadhyay, Principal Scientist  
Dr B. S. Manjunatha, Scientist

Date of start : 1<sup>st</sup> April 2019

Date of completion : 31<sup>st</sup> March 2022

Objective(s) : i. To optimise the process conditions for maximum extraction of alpha cellulose from fibre yielding plants  
ii. To synthesize, characterize and evaluate crystalline cellulose micro particle prepared from the extracted alpha cellulose

## Transfer of Technology Division

14. **Project No.** : **TOT-11**

**Title** : **Improvement, Up-scaling and Popularization of Power Ribboner**

Principal Investigator : Dr. V.B. Shambhu, Senior Scientist

Co-Principal Investigator(s) : Dr. A.K Thakur, Principal Scientist  
Dr. L.K Nayak, Principal Scientist  
Sh. B. Das, Technical Assistant

Date of start : 1<sup>st</sup> April 2017  
 Date of completion : 31<sup>st</sup> March 2020  
 Objective(s) : i. Improvements in the existing power ribboner for better portability, transportability and ribboning capacity  
 ii. To develop a system/mechanism for mechanical collection of peeled ribbons  
 iii. To demonstrate the improved power ribboner machine for extraction of ribbons/barks from jute/mesta plants

**15. Project No. :** *TOT-12*  
**Title :** *Developments and Performance Evaluation of Portable Water Tank for Retting of Jute Ribbons and Root Cuttings*

Principal Investigator : Dr. A.K.Thakur, Principal Scientist

Co-Principal Investigator(s) : Dr. A.Singha, Scientist  
 Dr. V. B. Shambhu, Senior Scientist

Date of start : 1<sup>st</sup> October 2018

Date of completion : 31<sup>st</sup> March 2020

Objective(s) : i. To develop a functional design and to fabricate a portable retting tank with the arrangement of water circulating mechanism  
 ii. To analyze the working performance of portable water tank for retting of jute ribbons and root cuttings  
 iii. To suggest a package for improvement in retting quality in short duration with minimum water

**16. Project No. :** *TOT-13*  
**Title :** *Branding of ICAR-NINFET Innovations for Technology Transfer and Startup Creations*

Principal Investigator : Dr. S.B.Roy, Principal Scientist

Co-Principal Investigator(s) : Dr. D.P.Ray, Principal Scientist  
 Sh. K. Mitra, Technical Officer

Date of start : 1<sup>st</sup> April 2019

Date of completion : 31<sup>st</sup> March 2022

Objective(s) : i. Identification of innovations with assured ROI (Return on Investment) based on techno-economic feasibility analysis.  
 ii. Stakeholders' survey on innovations identified for branding.  
 iii. Branding of innovations, brand registration and brand integration.

## Externally funded projects

- 17. Project No** : **CRP-NIRJAFT-01**  
**Title** : ***Development of Machinery for Extraction of Fibre from Sisal, Flax and Pineapple Leaf***  
 Sponsored by : CRP-Project, ICAR  
 Lead Centre : ICAR-NINFET  
 PI: Dr. L.K. Nayak, Principal Scientist  
 Co- PI: Dr. V.B. Shambhu, Senior Scientist  
 Co-PI: Dr. S. Debnath, Principal Scientist  
 Date of start : 1<sup>st</sup> August 2015  
 Date of completion : 31<sup>st</sup> March 2020  
 Objective(s) : i. Design, development and demonstration of high capacity extractors for pineapple leaf, sisal and flax fibre
- 19. Project No** : **CRP-NIRJAFT-02**  
**Title** : ***Development of Grading System and Instruments for Jute and Allied Fibres***  
 Sponsored by : CRP-Project, ICAR  
 Lead Centre : ICAR-NINFET  
 PI: Dr. D.P.Ray, Principal Scientist  
 Co-PI: Dr. M. Bhowmick, Scientist  
 Date of start : 1<sup>st</sup> August 2015  
 Date of Completion : 31<sup>st</sup> March 2020  
 Objective(s) : i. To develop standardize methods of grading of Sisal, Sunnhemp, Flax and Ramie fibres  
 ii. To develop new electronic instruments to measure their grading parameters
- 20. Project No** : **CRP-NIRJAFT-03**  
**Title** : ***Eco-friendly Chemical Processing of Ligno-Cellulosic Fibres for the Preparation of Home Textiles***  
 Sponsored by : CRP-Project, ICAR  
 Lead Centre : ICAR-NINFET  
 PI: Dr. S.N. Chattopadhyay, Principal Scientist  
 Co-PI: Dr. N.C. Pan, Principal Scientist  
 Co-PI: Dr. A.N. Roy, Principal Scientist  
 Co-PI: Dr. K.K. Samanta, Scientist

- Date of start : 1<sup>st</sup> August 2015
- Date of Completion : 31<sup>st</sup> March 2020
- Objective(s) :
- i. Development of eco-friendly preparatory processing technology for jute and banana fibres and their blends
  - ii. Colouration of home textiles by innovative dyeing and printing process using natural and reactive dyes for development of attractive shades
  - iii. Imparting functional properties to lingo-cellulosic textiles using eco-friendly chemicals for fire resistance, UV-resistance, etc with improved handle properties
  - iv. Development of contemporary fashion home textiles like curtains, upholstery, appliances cover, etc

**21. Project No** : **CRP-NIRJAFT-04**

**Title** : ***Surface Modification of Coarser Yak Fibre for Development of Jute/Yak Fibres Blended Textile Product***

Sponsored by : CRP-Project, ICAR

Lead Centre : ICAR-NINFET

PI: Dr. A.N. Roy, Principal Scientist

Co-PI: Dr. K. K. Samanta, Scientist

Co-PI: Dr. S. Debnath, Principal Scientist

Co-PI: Sh. H. Baite, Scientist

Date of start : 01<sup>st</sup> April 2018

Date of Completion : 31<sup>st</sup> March 2020

- Objective(s) :
- i. Physical, chemical and thermal properties evaluation of different under-utilized yak fibres for blending with jute fibre
  - ii. Spinning trial and process optimization for production of jute/yak fibres blended yarns with different blend ratios
  - iii. Surface modification of yak fibre (physical/chemical) to enhance the jute/yak fibres spinnability and dyeing of jute/yak fibre blended yarn/fabric
  - iv. Weaving, product development and selective chemical finishing of jute/yak fibres blended textile for application in apparel and technical textile

22. **Project No** : **CRP-NIRJAFT-05**  
**Title** : ***Design and Development of Disposable Carry Bag from Natural Fibre based Material***  
Sponsored by : CRP-Project, ICAR  
Lead Centre : ICAR-NINFET  
PI: Dr. S. Debnath, Principal Scientist  
Co-PI: Dr. A.N. Roy, Principal Scientist  
Co-PI: Sh. M. Bhowmick, Scientist  
Date of start : 01<sup>st</sup> April 2018  
Date of Completion : 31<sup>st</sup> March 2020  
Objective(s) : i. To explore the potential utilization of natural fibre for making durable/semi-durable carry bag  
ii. Designing of bag for different load bearing capacity
23. **Project No** : **NAIF**  
**Title** : ***Agri Business Incubation***  
Sponsored by : National Agriculture Innovation Fund, ICAR  
Lead Centre : ICAR-NINFET  
P I : Dr. A.N. Roy, Principal Scientist  
Co-PI: Dr. S.B. Roy, Principal Scientist  
Co-PI: Dr. S. Debnath, Principal Scientist  
Co-PI: Dr. L.K. Nayak, Senior Scientist  
Date of start : 1<sup>st</sup> January 2016  
Date of Completion : 31<sup>st</sup> March 2020  
Objective(s) : i. To impart consultancy & training for creating prospective entrepreneurs  
ii. To act as a centre of excellence in providing technological services on natural fibres  
iii. To organize promotion programme viz. Investor's Meet, Industry Interface, etc  
iv. To facilitate prospective entrepreneurs for setting up new business

## The following research works were carried as Adhoc work during this period

1. Title: ***Extraction of Quality Keratin from Wool Waste***

P.I. : Dr. Avijit Das, Pr. Scientist

Duration : From 01.04.2019 to 31.03.2020

Objective/(s):

- Standardization of a protocol for extraction of quality keratin from wool waste.

2. Title: ***Prospects of Bacteria from Gut of Wood Eating Insect's (Termite) for Utilization in Retting of Flax and Jute***

P.I. : Dr. B S Manjunatha, Scientist

Duration : From 01.04.2019 to 31.03.2020

Objective/(s):

- Isolation and functional characterization of bacteria from gut of wood eating termite.
- Evaluation of promising bacteria for retting of flax/jute.

3. Title: ***Study of Soil Hydro-Thermal Environment Under Natural vs Synthetic Mulch***

P.I. : Dr. Nilimesh Mridha, Scientist

Duration : From 01.04.2019 to 31.03.2020

Objective/(s):

- To study different effects of natural and synthetic agro-textile mulches on soil hydro-thermal regime in field conditions.

4. Title: ***Development of Carpet Underlay from Sunhemmp Fibre***

P.I. : Dr. Surajit Sengupta, Principal Scientist

Duration : From 01.04.2019 to 31.03.2020

Objective/(s):

- To explore the possibility of carpet underlay from sunhemmp fibre.

5. Title: ***Sustainable Innovative Bleaching of Lignocellulosic Fibres and its Effect on Dyeing Behaviour***

P. I. : Dr. Sambhu Nath Chattopadhyay, Principal Scientist

Duration : From 01.10.2019 to 31.03.2020

Objective/(s):

- Comprehensive value addition to natural lignocellulosic fibres for development of value added products



6. Title: ***Development of High Value Apparel/Home Textiles by Jute, Banana and Wool Blending***

P. I. : Dr. Kartick Kumar Samanta, Scientist

Duration : From 01.10.2019 to 31.03.2020

Objective/(s):

- To reduce the jute fabric's hairiness and shredding.
- Development of ultra-soft jute/banana fibre, yarn, fabric through physic-chemical intervention.
- Incorporation of smart look to jute and banana fabric by engineering the surface texture/design.
- Development of high value apparel and home textile products with smart feel/look (Jacket, Blazer, Sofa cover, Carpet, etc.)

7. Title: ***Development of Blended Textiles from Indian Flax Fibre for Technical Applications***

P. I. : Dr. Sanjoy Debnath, Principal Scientist

Duration : From 01.10.2019 to 31.03.2020

Objective/(s):

- To study the major textile related fibre properties of Indian flax fibre related to technical textile
- To develop Indian flax-blended yarns

8. Title: ***Development of Instrument for Measuring Liquid Transmission Kinetics of Textiles by Digital Image Analysis Technique***

P. I. : Dr. Surajit Sengupta, Principal Scientist

Duration : From 01.10.2019 to 31.03.2020

Objective/(s):

- Development of an instrument for measuring liquid transmission kinetics of yarn and fabric by image analysis technique.

## Summary of R&D Programs for the Year 2019-2020 (as on April 01, 2019)

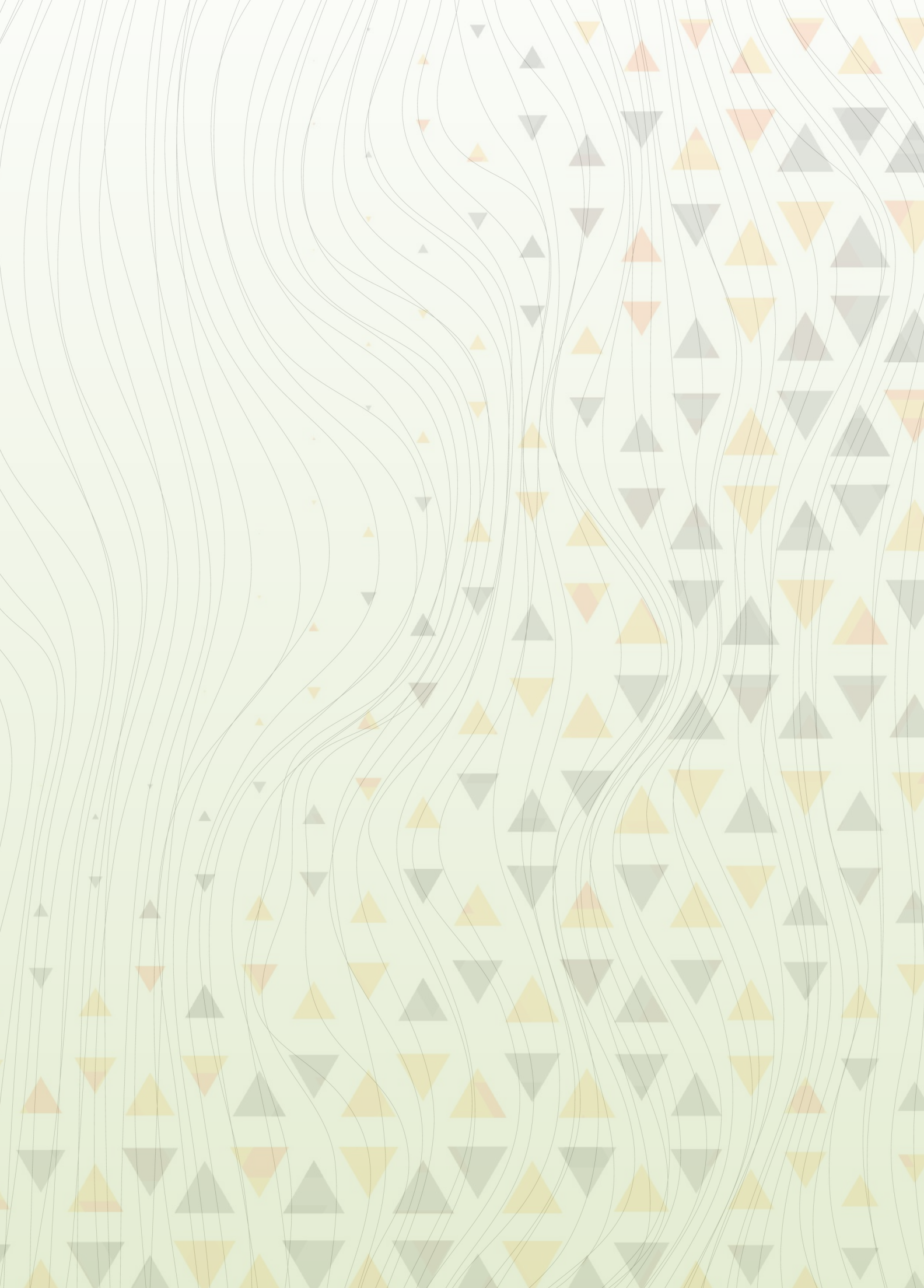
Continuing Projects for 2019-20	Projects extended	Projects completed on March 31, 2019	Projects initiated from April 01, 2019
QEI-22 ; QEI-23		QEI-17	
QEI-24; MP-17		QEI-19	
MP-18; MP-19		QEI-20	
MP-20 ; MP-21		QEI-21	MP-22
CBP-19; TOT-11	CBP-18	MP-16	CBP-20
TOT-12; ABI	<i>(extended upto March 31, 2020)</i>	CBP-12	CBP-21
CRP-NIRJAFT-01		CBP-14	TOT-13
CRP-NIRJAFT-02		CBP-16	
CRP-NIRJAFT-03		CBP-17	
CRP-NIRJAFT-04		TOT-10	
CRP-NIRJAFT-05			
<b>Total: 11 + 6 = 17</b>	<b>01</b>	<b>10</b>	<b>04</b>

*Total Continuing Projects= 22 & Ongoing Adhoc works =04*



## INSTITUTIONAL ACTIVITIES





## International Yoga Day

Institute has celebrated **International Yoga day** on June 21, 2019 in its premises and staff members have participated in a yoga session conducted by invited yoga trainers. They have taught and demonstrated different Asans, Mudra, Pranayam and Meditation to reduce the working stress and made awareness among staff members.



*Director addressed the gathering*



*Instruction by Yoga trainer*



*Yoga practices by institute staff*



*Demonstration of various asanas*

## Institute Management Committee Meeting

The 71<sup>st</sup> meeting of the Institute Management Committee was held on July 02, 2019 with chairmanship of Director. Dr. Ratan Tiwari, Principal Scientist, IIWBR, Karnal, Dr. S.Satpathy Principal Scientist, CRIJAF, Sh. Soumik De Sarkar, Sh. Sanatan Sarkar, Dr. G.Bose, Head, MP Division, Dr. A.N.Roy, Head, ToT Division, Dr.B. Saha, Head QE & I Division, Dr. S. N. Chattopadhyay, Principal Scientist, Sh. Amitabh Singh FAO, and Sh. Navin Kumar Jha SAO have attended the meeting. Dr.S.N.Chattopadhyay had a scientific presentation on Home textile from Jute/banana blended fabric which was appreciated by all the members. All members expressed satisfaction over the action taken by the Institute over recommendations of the 70<sup>th</sup> IMC Meeting, settlement of the audit paras and on budget utilisation in the current financial year. IMC Chairman also briefed the achievements in R&D activities, training programs, extension activities, on-going SCSP programs, MGMG programs, patent details, consultancy works and the research publications by the Institute. Sh. Navin Kumar Jha, SAO & member secretary has coordinated the meeting.



*Chairman addressed the gathering*



*Gathering of IMC members*

## NFSM Sponsored training programs

Four (04) national level training on “Production and retting technology of Jute/Mesta/Ramie/ Sunnhemp including other related aspects” sponsored by National Food Security Mission (NFSM) - Commercial Crops have been successfully conducted in July 9-11, 2019; July 17-19, 2019; July 24-26 2019; and August 1-3, 2019 respectively. In each training program, twenty-five trainees from different jute growing districts of West Bengal, Bihar, Tripura & Uttar Pradesh have participated.



*Director addressed the gathering*



*Demonstration during training*



*Participants with resource persons in a training program*

Lectures with suitable demonstrations have been delivered in each training program. In one program, Dr. S.K. Biswas, Ex-Director, Directorate of Jute Development graced the occasions as chief guest and highlighted upon the production scenario of jute & allied fibres in India. Sh. Jintu Das, Deputy

Director, Directorate of Jute Development graced the occasions as guest of honour and spoken about the importance of quality jute fibre for getting better price in the market. Dr.N.C. Pan, Director praised the participants after completion of the training program and stressed to implement the technologies to the field for the betterment of natural fibre farmers.

### Front line demonstration on power ribboner

Front line demonstration of improved power ribboner under National Food Security Mission (2019-20) for dissemination of the technology through extraction of barks/ ribbons from jute/mesta plants were conducted at seven different places covering three jute growing districts of West Bengal in collaboration with KVKs, and Farmers clubs of West Bengal. About 390 jute/mesta growing farmers have participated in the FLDs during deliberation and they have operated the machine for extraction of ribbons from green jute/ mesta plant.

After extraction, jute/mesta ribbons were retted in vertical hanging condition on bamboo in open ditch and pond. It is observed that the retting was completed within 6-8 days whereas in conventional method, the whole plant was retted in 15-18 days. Their queries on ribboning capacity, fibre quality, cost of machine, labour requirement, power consumption and weight of the machine were answered satisfactorily. The details of the FLD are given below.

<i>Date</i>	<i>Village</i>	<i>Block</i>	<i>District</i>	<i>No of Participants</i>
August 14, 2019	Darapur	Haringhata	Nadia	50
August 16, 2019	Ruppur	Ranaghat	Nadia	45
August 19, 2019	Gosaichor	Ranaghat -I	Nadia	75
August 24, 2019	Bhabanipur	Haringhata	Nadia	60
August 26, 2019	Ranigachi	Bhangur - I	24 Parganas(S)	45
September 07, 2019	Purbo Bishnupur	Chakdah	Nadia	55
September 12, 2019	Panpur Keutia	Barrackpore - I	24 Parganas(N)	60



*Demonstration at Darapur*



*Demonstration at Ruppur*



*Demonstration at Gosaichor*



*Demonstration at Bhabanipur*

## Frontline Demonstration of Accelerated Retting of Jute

Twenty six (26) frontline demonstrations were conducted for NINFET-Sathi under the National Food Security Mission-Commercial Crops (Jute). The formulation contains nutrients without any microbial consortia and it can enhance the microbial growth at a suitable pH so that it accelerates the rate of retting. Different organizations like universities, KVKs, NGOs and Govt. of India institutes have collaborated to organize the FLD programs. All programs were conducted as per the specified guidelines and carried out under the direct supervision of respective scientist of the institute. The FLDs were conducted in farmers' field, Krishi Vigyan Kendra (KVKs) and NGOs at Hooghly, North 24 Parganas, Burdwan, Murshidabad and Malda districts of West Bengal. The farmers were selected by the collaborative agencies that are mainly either jute growers or associated with jute. The FLDs conducted at remote villages of Malda and Murshidabad have received an overwhelming response and large numbers of local people along with farmers were gathered in the demonstration sites.

S.No	Place	District	Date	No of Participants
1	Barrackpore	North 24 Parganas	August 2, 2019	50
2	Tona	Balagarh, Hooghly	August 13, 2019	120
3	Hamjanpur	Hooghly		125
4	Inchura	Hooghly		90
5	Tilaipara	Malda	August 16, 2019	55
6	Rajdole	Malda		65
7	Mangalpura Kharikadanga	Malda	August 17, 2019	125
8	Hukabhanga	Malda		75
9	Niroil	Malda	August 18, 2019	65
10	Narsinghabati	Malda		120
11	Dahar Tiornoil	Hooghly	August 20, 2019	116
12	Beleswar	Hooghly		102
13	Kalyanpur	Purba Bardhaman		65
14	Dyamorgachha	Hooghly	August 24, 2019	85
15	New Inchhura	Hooghly		85
16	Badshanagar-1	Murshidabad	September 2, 2019	65
17	Badshanagar-2	Murshidabad		60



S.No	Place	District	Date	No of Participants
18	Purbapara	Murshidabad	September 3, 2019	85
19	Sonatikuri-1	Murshidabad		75
20	Sonatikuri-2	Murshidabad		120
21	Pareshnathpur-1	Murshidabad	September 4, 2019	92
22	Pareshnathpur-2	Murshidabad		105
23	Pareshnathpur-3	Murshidabad	September 5, 2019	85
24	Sarbangapur	Murshidabad		65
25	Dubtala	Murshidabad	September 15, 2019	120
26	Rajpur	Murshidabad		95

## FLD on Accelerated Retting using NINFET-SATHI



*Awareness on NINFET-Sathi*



*FLD site*



*Conventional whole jute plant retting during FLD on accelerated retting*



*Lecture on NINFET-Sathi*



*Successful retting using NINFET-Sathi*



*Successful completion of FLD*



*Inventor vision towards doubling farmers' income*

In each FLD programme, 0.25 hectare crop area was covered; in which half portion of the harvested whole jute plants (2-3 quintals) were used for Accelerated Retting Technology, while the remaining half portion was retted simultaneously by conventional retting for comparison. The retting process was conducted in open ditch, cemented tanks and road side nullah. The plants were arranged in tank in reverse direction and dusted with retting accelerator @ 0.2 kg/ per quintal of green jute plant (per bigha green jute yield 50 quintal). It is observed that the accelerated retting has completed within 8-12 days with better fibre quality (1-2 grade improvement).

## Vigilance Awareness Week

The Vigilance Awareness Week has been observed from October 28, 2019 to November 2, 2019 with the theme of “Integrity-A way of Life”. To spread awareness on vigilance among the staff members as well as among school students various activities like lectures, speech, debate, essay writing and quiz on vigilance have been conducted during the period. It was commenced with the pledge taken by staffs on October 28, 2019 followed by a lecture and power point presentation on integrity in our life by Dr. Biplab Saha, Vigilance Officer.

Mr. Bishwa Bandhu Chakravarty, DSP of CBI, Kolkata has graced the chair as chief guest in the valedictory program on November 2, 2019. He has enlightened the audience by his speech and followed by an open interaction with the audience. He has mentioned that honesty is telling the truth to other people and integrity is telling the truth to oneself. While corruption has become the global phenomenon affecting all strata of society, it is imperative that the public must be sensitized and motivated towards efforts at weeding out corruption through practice of integrity and honesty.



*Pledge taken by staff on vigilance week*



*Quiz competition on vigilance*



*Essay competition on vigilance*



*Prize distribution by chief guest*

## Swachhta Hi Sewa Pakhwada

Institute has organized Swachhta Hi Sewa Pakhwada from September 11, 2019 to October 02, 2019. During the period, essay competition, debate, painting competition for school students and quiz competition for institute staff members were conducted. To follow the philosophy of Mahatma Gandhiji's life and importance of cleanliness, institute staffs have conducted a cleanliness drive nearby market place by posting the importance of Swachhta scheme, made cleaning of the market place and also distributed a jute based hand bag to local people for the awareness to avoid "Single use plastic". Staff members are also took pledge to maintain a cleanliness in the office area as well as to communicate the important of the cleanliness among the public people.



*Awareness on cleanliness by staff*



*Cleaning drive by staff at public place*



*Distribution of jute bag*



*Pledge on cleanliness among staff*

The concluding session of Swachhta Hi Sewa Pakhwada was celebrated in this institute along with 150<sup>th</sup> Birth Anniversary of Mahatma Gandhi. Staff members of the institute, local school students along with teachers have attended the program. Dr.N.C.Pan, Director highlighted upon the teaching of Mahatma Gandhiji on cleanliness. All activities taken up by the institute during the Pakhwada was presented by Dr. R.Naiya.

Chief guest Sh.Chandra Gopal Sharma, Ex Deputy General Manager of Eastern Railway, Kolkata in his address emphasized upon the Vision of Mahatma Gandhi for a clean India. He also stressed to avoid single use plastic. He also expressed that, NINFET has the capacity to popularize technologies, which can minimize of use of plastic in daily livelihood. There was an open quiz competition on Life of Mahatma Gandhi and Swachh Bharat Abhiyaan followed by distribution of prizes to the winners who participated in different competitions.



*Director addressing in the closing ceremony*



*Chief guest' address*



*Essay competition*



*Open quiz competition*

## Exposure-visit-cum training program under SCSP

Institute has organized Exposure-visit-cum training programs on “Jute Grading with Digital Instruments” and “Preparation of NINFET-Sathi” under Scheduled Caste Sub-Plan (SCSP) on November 29, 2019. Thirty (30) farmers of scheduled caste community from Balagarh Block, Hooghly District, West Bengal has attended these programs. Dr. N.C. Pan, Director addressed the gathering and emphasized on the utilization of natural fibres in the context of banning of single use plastics by the Government of India. He also stressed upon the scope of institute developed new grading instruments and NINFET-Sathi retting technology for the better management of jute and Mesta crops.



*Mr. S. Karmakar spoke on the occasion*



*Dr. D.P. Ray demonstrated the grading system*

Dr. Laxmikanta Nayak, Principal Scientist and Chairman, SCSP has explained about the feature of SCSP for the upliftment of scheduled caste farmers. Mr. Subrata Karmakar, a progressive farmer applauded the activities of the institute and expressed his satisfaction over use of NINFET-Sathi for retting of Jute. He also opined that use of NINFET-Sathi technology has earned around Rs.700-800 extra income per quintal during this jute growing season. The detailed activities of the Institute was presented in a video presentation followed by demonstration and training with Jute grading Instruments followed by visits to NINFET-Sathi Preparation unit. Dr. D.P. Ray, Principal Scientist & Member-SCSP program has coordinated the program.

### First program on Constitution Day

On the occasion of the “Constitution Day”, various programs were arranged by the institute. On November 26, 2019, in the first program Dr. N.C. Pan, Director addressed the gathering and focused the importance of our constitution and read the preamble of the constitution in English followed by Dr. A K Thakur, Principal Scientist, in Hindi. A lecture on Awareness of Constitution Day has been delivered by Mr. R D Sharma, Asst. Director (OL) to make homage to the maker of the constitution.



*Dr. N.C. Pan addressed the gathering*



*Sh. R.D. Sharma delivered the presentation*



*An panoramic view of the gathering*

On the same day, a parallel celebration of the “Constitution Day” has undertaken in Satyapol Village, Nadia District where a total 101 progressive farmers (8 women and 93 men), Gram Panchayat members, Secretary of Co-operative Society have attended the program. Dr. S. Debnath, welcomed all the farmers and highlighted the importance of the constitution day. Ms. Swarnali Mukherjee, Asst. Administrative Officer read out the Preamble of the Constitution in Hindi followed by Dr. Rina Niya, Asst. Chief Tech Officer in Bengali.



*Dr. S. Debnath addressed the gathering*



*Dr. R. Naiya read the preamble*



*Ms. S. Mukerjee stressed on constitution day*



*Dr. R.K. Ghosh focused the Indian agriculture*

Dr. R. Naiya,, ACTO discussed about the importance of Swachh Bharat Abhiyan and Dr. R K Ghosh, Scientist spoken on the Indian agriculture, agricultural pollution and marketing aspects. A quiz competition was organized by Dr. R. K. Ghosh in the area of Indian Constitution and Agriculture. Dr. S. Debnath, Principal Scientist and Nodal Officer-Constitutional Day Celebration Committee has coordinated the program.

## Second program on Constitution Day

On the occasion of *Farmers' Day Celebration*, under *Swachhta Pakhwada* and *Constitution Day*, Institute has organized a program on Fundamental Duties at one of the adopted village Mathura, Bodai, Amtala, ganas North, West Bengal under Mera Gaon Mera Gaurav program on December 23, 2019. Dr. Sanjoy Debnath, Principal Scientist and Nodal Officer, Constitution Day Celebration committee and MGMG, Dr. Biplab Saha, Head QE&I Division, Dr. Avijit Das, Principal Scientist and Dr. Rina Niya, ACTO and Nodal Officer, Swachh Bharat Mission have participated. Dr. B. Saha

addressed the farmers and briefed about the different institute activities, importance of Constitution Day and discussed the Fundamental Duties under the Article 51A of the Indian Constitution. Discussion was also made about the technologies developed by the institute, importance of farmers' cooperation towards organic farming, action to be taken to control the global warming for sustainable agriculture. A quiz on agricultural fibre crops, Constitution of India, Global warming, organic farming was conducted for farmers followed by prize distribution to the winners. Dr. S. Debnath has organized and coordinated the program.



*Dr. B.Saha addressed the gathering*



*Aerial view of farmers*



*Dr. Rina Naiya addressed the gathering*



*Prize distribution to winners*

Dr. B. Saha addressed the farmers and briefed about the different institute activities, importance of Constitution Day and discussed the Fundamental Duties under the Article 51A of the Indian Constitution. Farmers were discussed about the technologies developed by the institute, importance of farmers' cooperation towards organic farming, action to be taken to control Global Warming for sustainable agriculture, Activities to be taken under Swachh Bharat Mission on the occasion of Farmers Day Celebration, Constitution Day celebration and Swachhta Pakhwada. A quiz competition among the 130 farmers on agricultural fibre crops, Constitution of India, Global warming, organic farming was conducted followed by prize distribution to the winners. Dr. S. Debnath has organized and coordinated the whole program.

### **6<sup>th</sup> Dr. P.B. Sarkar Memorial Lecture**

6<sup>th</sup> Dr. P.B. Sarkar memorial lecture was held on December 02, 2019 in the institute and institute staff members, ex-employees of the institute, academic persons and industry personnel have attended the program. Dr. N.C. Pan, Director welcomed all the delegates and highlighted the important contribution

of Dr. P.B.Sarkar for the growth of the institute and research works on jute. Dr.S.N.Chattopadhyay, Principal Scientist has read the life sketch of Dr. P.B. Sarkar and important milestones of his illustrious career. Dr.Ashim Kumar Roy Chowdhury, Ex-Professor and Head of Department, Government College of Engineering and Textile Technology, Serampur, West Bengal and presently Principal of KPS Institute of Polytechnic, Belmuri, has graced the occasion as chief guest and delivered a lecture on *Greener approaches in the textile industry*. Dr. Choudhury has elaborately discussed on the sources of pollution from textile industry and how to combat it with advanced technologies using safe chemicals and effective effluent treatment protocols. Dr. L. Ammayappan, Principal Scientist has coordinated the program.



*Welcome address by Director*



*Tribute to Dr. P.B.Sarkar by the chief guest*



*Interaction of chief guest with audience*



*Felicitation to Dr. A.K. R. Chowdhury*

## Capacity Building Program

ICAR sponsored 21 days winter school on “*Advances in product diversification and waste utilization of natural fibres*” was inaugurated on December 03, 2019. Prof. (Dr.) Purnendu Biswas, Honourable Vice Chancellor, West Bengal University of Animal & Fishery Sciences, Kolkata has graced the inaugural session as Chief Guest and urged the participants for more interactions with experts during the course program and disseminating the knowledge gained for the benefit of stakeholders. Dr.N.C. Pan, Director has briefed about the various R & D initiatives taken at the institute for value addition and product diversification in natural fibres.

Dr. L.K. Nayak, Course Director has welcomed the participants and highlighted upon the objectives of the winter school. A book with the compilation of lectures to be delivered by the experts during the winter school has been released by the dignitaries. Twenty eight participants (17 Male and 11 Female) from different parts of the country have participated in this Winter School. They belonged to thirteen



(13) disciplines like Textile Manufacture, Textile Chemistry, Textile Clothing, Agricultural Engineering, Agronomy, Plant Genetics & Breeding, Plant Physiology, Soil Science, Soil Chemistry, Agricultural Structure & Process Engineering, Forestry, Agricultural Microbiology and Plant Pathology.



*Address by the chief guest*



*Release of winter school' compilation*

All participants have learnt about the recent advances in product diversification and waste utilization of natural fibres through lectures and demonstrations by the experts. Participants also presented the research activities that involved in their parent organization through PowerPoint presentation. This sharing of knowledge has helped all participants to know the specialized research area each one working which helped each other for future collaborations.



*Winter school participants with staff members*



*Dr. S.R.Kalbande, outside expert delivered a lecture*



*Demonstration of a fibre extractor*



*Group presentation by a trainee*

In total thirty two (32) lectures were delivered by the experts from the institute and four (04) outside experts; followed by twenty two (22) practical demonstrations on extraction of textile grade fibre, extractors and diversified products. During the exposure visits, the trainees have visited ICAR-CRIJAF, Barrackpore; Jute Handicraft Units and an Industrial visit to Hasting Jute Mill, Rishra,

Hooghly. An examination with 64 objective type questions was conducted to evaluate course. All the 28 participants were divided into six groups and respective group presentations was made on various areas related to the main topic of the winter school. All the participants have given good feedback to the overall organization of the winter school including accommodation and food. Dr. K.K.Satapathy, Former Director of the institute graced the valedictory occasion and distributed the certificates to all participants. He also wished them for their successful completion and stressed them to implement the knowledge gained during the program to their parent institutes as well as to make inter-disciplinary projects for sustaining the natural fibres. Dr. L.Ammayappan, Principal Scientist & Course Co-Director, Winter School has coordinated the program.

## Self-sponsored training programs

During this period, institute conducted three numbers of self-sponsored basic and advanced training on Jute Handbags/ Shopping Bags and Handmade Paper from Jute.

<i>Area of training</i>	<i>Period</i>	<i>Male participant</i>	<i>Female participant</i>
Hand-made paper from Jute	May 27-31, 2019	07	02
Hand-made paper from Jute	June 17-21, 2019	06	02
Jute Hand/ Shopping Bags	June 17-29, 2019	05	06



*Demonstration on pulp preparation*



*Demonstration on testing of paper*



*Jute bag training*



*Successful completion of training*

## Participated in an Exhibition



Institute developed R&D products & Technologies were displayed in Exhibition Aspiration 2019 at Aurobindo Institute of Culture, Kolkata during December 12-23, 2019. Visitors enquired the various products & different technologies. Information on different institute technologies / products and training programs has been distributed through brochures and flyers.

## Mera Gaon Mera Gaurav programs

Under MGMG, Institute has adopted 25 villages at five different districts i.e. Howrah, Hooghly, 24 Parganas North, 24 Paraganas South and Nadia) to carry out the different demonstration and training programs on developed technologies. Each district has five different villages and respectively monitored by one coordinator and the overall function was monitored by Dr. Sanjoy Debnath, Nodal Officer.

Awareness program/interactive meet	Village	Staff participated	Number of farmers
Prospects of Jute mulch on June 20, 2019	Satyapole, Srikrishnapur, Haringhata, Nadia.	Dr. S. Debnath Dr. M. Bhowmick Dr. N. Mridha Dr. D. Das	90
Jute mulch for weed control and moisture conservation on June 20, 2019	Ariala, Mirhati, Barasat 1, 24 Parganas (North).	Dr. S. Debnath Dr. M. Bhowmick Dr. N. Mridha Dr. D. Das	50
Jute-based product diversification on August 13, 2019	Aida, Guptipara, Balagarh, Hooghly	Dr. Biplab Saha Dr. D.P.Ray Dr. R.K.Ghosh	100
Demonstration of accelerated retting of jute on August 20, 2019	Ichhapur and Balagarh, Hooghly	Dr. R. K. Ghosh	120
Demonstration of Jute ribboning machine cum awareness programme on use of jute carry bag on August 24, 2019	Bhawanipur, Srikrishnapur, Haringhata, Nadia.	Dr. S. Debnath Dr. A.K. Thakur Dr.V.B. Shambhu Er. H. Baite.	75
Use of jute carry bag instead of plastic bags & Use of jute mulch in cultivation of horticultural crops instead of plastic mulch' on September 19, 2019	Adopted villages of Nadia	Dr. A.N. Roy Dr. S. Debnath Mrs. A. Majumdar	55

# Glimpses of MGMG Programs



*Interaction with farmers at Satyapole*



*Lecture by Sh. M.Bhowmick on agro textiles*



*Interaction with farmers at Ariala*



*Interaction with farmers at Aida*



*Demonstration on jute retting*



*Awareness on jute carry bag*



*Distribution of jute carry bag at Bhawanipur*



*Awareness on jute mulch & carry bag*

## Swachhta Pakhwada

Institute has observed “**Swachhta Pakhwada**” week during December 16-31, 2019 and different activities were organised like banner display on cleanliness, Swachhta Pledge, cleanliness drive in the institute campus, digitization of office records, tree plantation, awareness campaigning at MGMG adopted village, celebration of Farmer’s Day at village, awareness campaigning regarding avoid of single use plastic and cleanliness drive at local market place, drawing competition among local school students and essay writing competition on cleanliness among staff members.



*Pledge on Swachhta by staff*



*Road show on Swachhta Pakhwada by staff*



*Cleanliness activities at institute' campus*

On the occasion of the closing ceremony on December 31, 2019, Director welcomed the dignitaries and stressed upon cleanliness drive to be taken for our institute and towards society. Dr. R.Naiya, Nodal Officer, Swachh Bharat Abhiyaan had delivered a presentation on “Swachhta Pakwada at a glance at NINFET” in which she highlighted the different activities undertaken. Sh. Ujjal Pal, a worldwide solo campaigner to promote tree plantation by bicycle, has graced the function as Guest of Honour. He presented a message on tree plantation to fulfill requirements of basic need that to eat food and fresh air to breath and emphasized the importance of tree plantation for contributing climate and biodiversity.



*Awareness rally by school students*



*Essay competition for school children*

Dr. Anjana Guha Thakurta, Associate Professor of Netajinagar, Day College, Bengali Department has graced the program as Chief Guest. She addressed the audience about the clean environment and stressed the responsibility of each citizen to keep our globe clean and green. She also highlighted the impact of single use plastic on our environment. The students of local schools have participated in the drawing competition in which theme was “Swachhta Abhiyaan”. The winners from school students and staff members have been appreciated by awards. Dr. R. Naiya, Nodal officer has coordinated the program.



*Director' address during closing ceremony*



*Prize distribution to winners*

## Training Program under Scheduled Caste Sub-Plan (SCSP)

Skill development training programs for ten and twelve day's duration on “Manufacture of Jute Handicrafts” and “Manufacture of Jute Bags” under Scheduled Caste Sub-Plan (SCSP) have been organized successfully in different parts of West Bengal during the period. Twenty (20) scheduled caste category farmers in each training program associated with agro-based craft works have participated and benefited.

<i>Training Place</i>	<i>Duration</i>	<i>Area</i>
Sargachi Ramakrishna Mission, Murshidabab	June 1-12, 2019	<i>Manufacture of Jute Handicrafts</i>
CISH, Malda	June 3-14, 2019	
Bidhannagar-I, Siliguri	June13-24, 2019	
Bidhannagar-II, Siliguri	June13-24, 2019	
Kharibari-I, Siliguri	June13-24, 2019	
Kharibari-II, Siliguri	June13-24, 2019	
Bagdogra, Siliguri	June 26 - July 7, 2019	
Shibmandir, Siliguri	June 26 - July 7, 2019	<i>Manufacture of Jute Bags</i>
Ram Krishna Mission (RKM), Sargachi	June 1-12, 2019	
ICAR-CISH, Regional Station, Malda	June 3-14, 2019	
ICAR-NINFET, Kolkata	September 16-26, 2019	
ICAR-NINFET, Kolkata	November 15-26, 2019	
Saya Syamal KVK, Arapanch, Sonarpur	November 19, 2019	
Nadia KVK, Gayeshpur	November 21, 2019	<i>Agro textiles</i>

## A quick look on SCSP programs



*Felicitation to trainee*



*Chairman, SCSP distributed certificate*



*Certificate distribution at Sargachi Ramakrishna Mission*



*Group photo of trainees*



*Developed products from training*



*Jute bag training at ICAR-NINFET*



*Training at Bagdogra*



*Future entrepreneurs with their products*

## Participation in TEZ-2019



Institute nominated twenty three contingents for participating in the eastern zone tournament held at ICAR-National Rice Research Institute, Cuttack during, November 18-22, 2019. Contingents have participated in the team event as well as single even i.e., Volley ball (Smashing), Volley ball (Shooting), Football, Kabaddi, Badminton, Table tennis, Carrom (single), Chess (Single), 800 M running, 1500 M running, Cycling, 4X100 relay, Long Jump, Shot put, Javelin and Discuss throw. All players were performed well and they reached semi-final in Kabaddi, Quarter final in Football and Fourth position in Chess and

proudly to inform that institute got the champion in the Table Tennis (Team event) with the following team members Sh. Amit Das, Sh. Sudipta Bhowmick, Sh. Shyco Manna, Sh. Robin Das and Sh. Sourav Pal. All contingents were appraised by the competent authority for their active involvement and the team spirit. Sh. Sudipta Bhowmick, Chief-De-Mission and Sh. Robin Das, Team Manager has coordinated the program for Tournament of Eastern Zone 2019.



*Release of institute flag for TEZ2019*



*NINFET players in a foot ball match*





*Successful contingents with trophy*

## Exposure Visit & Outreach Programs

Participants from	Date of visit	Participants
B.Tech., (Agri Engg) students of BCKV, Kalyani & Matma Phule Krishi Vidyapeeth, Rahuri, Maharashtra	June 1-30, 2019	17
Students from Mansur Habibulla High School and delivered a lecture to around 100 students	November 11, 2019	100
Students from College of Community Sciences, University of Agricultural Sciences, Bengaluru	November 16, 2019	100
Progressive farmers from adopted villages under SCSP	November 29, 2019	30



*Demonstration for school students*



*Interaction between director and students*

# INSTITUTE PUBLICATIONS

## RESEARCH PAPERS

1. Ammayappan, L., Chakraborty, S., and Pan, N.C., 2018. Effect of resin property on performance of biocomposites, *Indian Journal of Natural Fibres*, 5(1): 45-54.
2. Banerjee P, and Ray D.P, 2019. Functional Food: A Brief Overview, *International Journal of Bioresource Sciences*, 6(2):57-60.
3. Basu G, Mishra L, and Samanta A.K, 2019. Appropriate bleaching technique for coconut fibre, *Journal of Natural Fibres*, 16(3): 442-452.
4. Basu G, Roy A.N, Sanyal P, Mitra K, Mishra L, and Ghosh S.K, 2019. Bioengineering of earth river embankment using jute-synthetic composite structured geo-textiles, *Geotextiles and Geomembranes*, 47(4):493-501.
5. Bhowmick M, Rakshit A.K, and Chattopadhyay S.K, 2020. Structure-property of DREF-3 friction spun yarn made using twisted staple fibrous core, *Journal of Natural Fibres*, 17(2): 235-245.
6. Binsi P.K, Nayak N, Sarkar P.C, Sahu U, Lalitha K.V, Ninan G, and Ravishankar C.N, 2019. Conversion of Carp Roe Mass to Caviar Substitutes: Stabilization with Oregano Extract, *LWT-J. Food Science & Technology*, 108:446-455.
7. Chattopadhyay S.N, and Pan N.C, 2019. Eco-friendly printing of jute fabric with natural dyes and thickener, *Journal of Natural Fibres*, 16(8), 1077-1088.
8. Das A, Biswas D.R, Das D, Sharma V.K, Das R, Ray P, Ghosh A, Mridha N, And Biswas S.S, 2019. Assessment of potassium status in soils under different land use systems of Assam, *Indian Journal of Agricultural Sciences*, 89 (7): 1077-81.
9. Debnath S, Basu G, Mustafa I, Mishra L, Das R & Karmakar S, 2018. Flax Fibre Extraction to Spinning – A Holistic Approach, *Indian Journal of Natural Fibres*, 5(1): 69-75.
10. Debnath S, Bhowmick M, Roy A.N, Mustafa I, Kundu T, and Ghosh S, 2018. Natural Fibre Based Disposable Carry Bag, *Indian Journal of Natural Fibres*, 5(1): 55-58.
11. Ghosh R.K, Chattopadhyay S.N, Ray D.P, and Bhandari K, Chemi Bio Conversion of jute stick to microcrystalline cellulose ; A green pathway for high value product, *Indian Journal of Natural Fibres*, 5 (1), July, 2018, 31-36.
12. Ghosh R.K, Ray D.P, Debnath S, Tewari A, and Das I, 2019. Optimization of process parameters for methylene blue removal by jute stick using response surface methodology, *Environmental Progress and Sustainable Energy*, 38(5): 1-10.
13. Ghosh R.K, Ray D.P, Tiwari A, and Das I, 2019. Natural pigment removal capability of carbon derived from the 'Golden Fibre', *International Journal of Bioresource Science*, 6(1): 1-4.
14. Jose S, Das R, Mustafa I, Karmakar S, and Basu G, 2019. Potentiality of Indian pineapple leaf fibre for apparels, *Journal of Natural Fibres*, 16(4):536-544.
15. Maitra S, and Ray D.P, 2019. Enrichment of biodiversity, influence in microbial population dynamics of soil and nutrient utilization in cereal-legume intercropping systems: A Review, *International Journal of Bioresource Science*, 6(1): 15-24.
16. Manjunatha B.S, Paul S, Aggarwal C, Bandeppa S, Govindasamy V, Dukare A.S, Rathi M.S, Satyavathi C.T, and Annapurna K, 2019. Diversity and tissue preference of osmotolerant bacterial

- endophytes associated with pearl millet genotypes having differential drought susceptibilities, *Microbial Ecology*, 77: 676–688.
17. Nayak L.K, and Baite H, 2018. Value addition to sisal leaf through extraction of fibre, *Indian Journal of Natural Fibres*, 5 (1): 77-82.
  18. Ram R.A, Singha A, and Kumar A, 2019. Microbial Characterization of cow pat pit and biodynamic preparations used in biodynamic agriculture. *Indian Journal of Agricultural Sciences*, 89 (2): 210-214.
  19. Ram R.A, Singha A, and Singh V.K, 2019. Improvement in yield and fruit quality of mango (*Mangifera indica*) with organic amendments. *Indian Journal of Agricultural Sciences*, 89 (9): 1429-1433.
  20. Ray D.P, and Kulshrestha G, 2019. Pesticides residues from sequential and mixture applications and their impact on soil microbial population of tomato field, *International Journal of Bioresource Sciences*, 6(1):35-41
  21. Ray D.P, Bhowmick M, Saha B, Sardar G, Mondal J, Sarkar A and Ray G, 2019. Instrumental Grading Systems of Natural Fibres for Harnessing Farmers Income, *International Journal of Bioresource Sciences*, 6(1):43-50.
  22. Sengupta S, and Debnath S, 2019. Study on needle-punched jute nonwoven as an artificial medium for germination of seed: Effect of bulk density, *Journal of Natural Fibres*, 16 (4), 494-502.
  23. Thakur, A.K., Singh, I.S, and Shambhu V.B, 2019. Drying characteristics of plum tomato under different physical treatments for producing powder. *Journal of Agricultural Engineering*, 56(4): 258-268
  24. Thakur, J.K., Paul, S., Manjunatha, B.S., and Rathi, M.S., 2019. Influence of aromatic hydrocarbons on growth, plant growth promoting activities and survival in soil of *Azotobacter chroococcum* strain JL104. *Bioremediation Journal*, 23(2): 94-106.
  25. Vivek, K. S. Singh S, Ritesh W, Soberly M, Baby Z, Baite H, Mishra S, and Pradhan R.C, 2019. A review on postharvest management and advances in the minimal processing of fresh-cut fruits and vegetables, *Journal of Microbiology, Biotechnology and Food Sciences*, 8(5): 1178-1187.

## POPULAR ARTICLES

1. Ammayappan L, and Bhowmick S, 2019. Luxury Fibres (*in Hindi*), *Devanjali*, 5: 47-49
2. Ammayappan, L, Manjunatha B.S, and Bhowmick S, 2019. An overview on particle boards (*in Hindi*), *Devanjali*, 5: 44-46
3. Baite H, Samanta, A.K, Bhaumik N.S., Mallick P, Samanta K.K, and Nayak L.K., 2019. Jute Kapde Ki Rang Kshyamata Badhane Ke Soyabean Ke Arka Se Iska Rupantarana, *Devanjali*, 5:41-43.
4. Chattopadhyay S.N, and Pan N.C, and Sarkar P.C, 2019. P.B.Sarkar: JTRL ke bastukar ebong ek mohan duradarshi, *Debanjali*, , 5:79.
5. Das S, and Sharma R.D, 2019. Internet ke madad se gamin mahila ne kashidakara ko de gaye naye pahachan, *Debanjali*, 5: 57.
6. Das S, and Sharma R.D, 2019. Yuao ke leye tv ke bad Krishi chetra me haya carrier, *Debanjali*, 5: 58-59.
7. Das S, and Sharma R.D, 2019. Jute se keyse banaye kamaye ke jaria, en mahilayo se sekheye, *Resa Kiran*, 1: 55.

8. Debnath S, Roy A.N, and Kundu T., 2019. Scope of agribusiness entrepreneurship in natural fibre sector (in hindi) , *Devanjali*, 5: 25-32
9. Nayak L.K., Shambhu V.B., Baite H., and Kundu T.K., 2019. Aalsi Resa Ke Niskarshan Ke liye Machinery, *Devanjali*, 5: 38-40.
10. Nayak L.K., Shambhu V.B., Baite H., and Kundu T.K., 2019. Hari Sisal Ki Patto se Resa Niskarshan, *Devanjali*, 5: 22-24.
11. Shambhu V.B, and Thakur A.K, 2019. Jute evam annay chhote aakar ke beej bone ki hath – chalit unnat mashin se karein aaye mein vridhi. *Devanjali*, 5: 14-16.
12. Shambhu V.B, and Thakur A.K, 2019. Jute kisano ki aaya main esthirtha aur vridhi ke liye upayukkat evam kam lagat vali beej bone ki machine. *Laksha*, 1: 58-60.
13. Thakur A K, Shambhu V B and Sharma R.D, 2019. Jute bag banane ki smagra prakriyabidhi. *Resha Kiran*, 2: 36-43.
14. Thakur A.K, Pan R.S, Shambhu V.B, and Sharma R.D, 2019. Sabjee soyabeen- ek paustic evam kriyasheel aahar tatha iske prashashkran ki shambhavnayein. *Devanjali*, 5: 11-13.

## PRESENTATIONS IN SEMINAR/ CONFERENCE/ MEETING

1. Banerjee P, Ray D.P, Maitra S, and Gogada R, *Recent Trends in industrial Application of Ramie Fibre*, 4<sup>th</sup> International Conference on “Management, Sciences, Engineering & Applications”. CUTM, Paralakhemundi , Odisha , 19-21 December 2019.
2. Debnath S, *Jute-Based Bag – Substitute of Plastic Carry Bag*, National Conference on Value Addition to Crop Residues of Natural Fibres, ICAR-CIRCOT, Mumbai, December 04, 2019.
3. Debnath S, Basu G, Mustafe I, Mishra L, and Das R, 2019. *Indian Flax: A Potential Biomass for Doubling of Farmers Income*, International Conference on ‘Advances in Textile Materials and Processes’, Uttar Pradesh Textile Technology Institute, Kanpur, December 2-3, 2019.
4. Mridha N, Saha B, Basu G, Sarkar S, and Manna K, 2019. *Jute crop acreage estimation using multi-temporal Sentinel-1 SAR data*, National symposium on “Innovations in Geospatial Technology for Sustainable Development with special emphasis on NER” , November 20-22, 2019, NESAC, Shillong, Meghalaya.
5. Roy A.N, *Prospect of entrepreneurship development in yak fibre with special reference to North East*, Workshop on “Innovation and Entrepreneurship, ICAR-NRC on Yak, Dirang, Arunachal Pradesh, 19<sup>th</sup> June 2019.
6. Samanta K.K, *Sustainable Value Addition of Textile Substrates using Atmospheric Pressure Cold Plasma*, International Conference on Plasma Science and Applications, University of Lucknow, Lucknow, 11-14 November, 2019.
7. Saha B, *Jute retting and grading*, NFSM sponsored officers’ training program, Kolaghat Irrigation Bunglow, Howrah, August 6, 2019.
8. Saha B, *Grading System Of Jute*, NFSM Sponsored farmers’ training program, Office of the Asst. Director of Agriculture, Amta, Howrah, West Bengal, August 22, 2019.
9. Bhowmick M, Debnath S, Singha A, Baite H, Mridha N and Karmakar S, 2019. *Jute Non-woven as Mulching Material at Farmers Field: A Case Study*, International Conference on Advances in Textile Materials and Processes (ATMP-2019) , Uttar Pradesh Textile Technology Institute, Kanpur, December 2-3, 2019.

10. Ray D.P, Invited lecture on *Improved Retting Technology of Jute, Handicraft and other product of jute*, DAESI programme at KVK, Howrah Jagatballavpur, June 27, 2019
11. Debnath S, Invited lecture on *Diversified use of Jute Fibre*, NFSM Sponsored farmers' training program, Office of the Asst. Director of Agriculture, Amta, Howrah, West Bengal, August 22, 2019.
12. Debnath S, Invited lecture on *Sustainable Strategies towards Value Addition of Jute*, National Workshop on Jute-Strategies for Development, Directorate of Jute Development, Kolkata, July 25, 2019.
13. Debnath S, Invited lecture on *Diversification of Jute Fibre*, Jute Training Camp, Office of Assistant Director of Agriculture Marketing (Administrative), Bhakuri Krishak Bazar, Beharampur, November 27-28, 2019.
14. Nayak, L.K., Roy, A.N. Lead lecture on *Innovations in some fibre extraction technologies & their agri-business perspectives*, International Conference on "Role of Agricultural Engineering towards global food security", Agricultural Engineering Division Board, The Institution of Engineers (India), Karnataka State Centre, Bengaluru, April 11-13, 2019.

## SEMINAR / PROCEEDING PAPERS

1. Debnath S, Basu G, Mustafe I, Mishra L, and Das R, 2019. Indian Flax: A Potential Biomass for Doubling of Farmers Income, Proceedings of International Conference on 'Advances in Textile Materials and Processes', Uttar Pradesh Textile Technology Institute, Kanpur, pp.33-35.
2. Debnath S, 2019. Jute-Based Bag – Substitute of Plastic Carry Bag, Proceedings of National Conference on Value Addition to Crop Residues of Natural Fibres, ICAR-CIRCOT, Mumbai, pp. 55-60.
3. Nayak L.K, and Roy A.N., 2019. Innovations in some fibre extraction technologies and their agribusiness perspectives. Proceeding of the international conference "Role of Agricultural Engineering towards global food security", Bengaluru.

## BOOKS

1. Roy A.N., Chattopadhyay S.N., Ammayappan, L., Nayak L.K, Samanta K.K, Moulik S.R, Baite H, Mitra K, and Mitra P, 2019. *Natural Fibre resource management for Sustainable Development*, Creative Incorporate, Kolkata, ISBN 9788194100904; p.219.
2. Nayak L.K., Ammayappan L., and Shambhu V.B., 2019. *Advances in Product Diversification and Waste Utilization of Natural Fibres*, Creative Incorporate, Kolkata, ISBN 9788194100928; p.237.
3. Nayak L.K., Ammayappan L., and Shambhu V.B., 2019. *Advances in Product Diversification and Waste Utilization of Natural Fibres (E-Book)*, in <http://cbp.icar.gov.in/edook>, Division of Computer Applications, IASRI, New Delhi, p.237.
4. Saha S.C, Sarkar A, Ray D.P, and Roy G, 2019. *Jute & Mesta Fibre Grading*, New Delhi Publishers, New Delhi, ISBN: 978-93-8879-04-0, p.

## BOOK CHAPTERS

1. Samanta K.K, and Roy A.N, 2019. *Suitable Chemical Modification of Indian Coarser Yak Fibre for Development of Jute/Yak Fibres Blended Warm Textile*, In: Functional Textile & Clothing, Eds. A. Majumdar, D. Gupta and S. Gupta, Springer, pp.151-165.
2. Satya P, Mitra S, and Ray D.P, 2019. *Ramie (Boehmera nivea L. Gaud) Genetic Improvement, Advances in Plant Breeding Strategies: Industrial and Food Crops : Vol 6*, Eds. Al-Khayri JM, Johnson MJD, ISBN: 9783030232641, Springer,pp.
3. Roy A.N., Chattopadhyay S.N., Ammayappan, L., Nayak L.K, Samanta K.K, Moulik S.R, Baite H, Mitra K, and Mitra P, 2019. *Natural Fibre Resource Management for Sustainable Development*, Creative Incorporate, Kolkata, ISBN 9788194100904.
  1. Ammayappan L., Chakraborty, S., and Pan, N.C., Effect of resin property on performance of biocomposites, pp126-137.
  2. Baite, H, Samanta, A.K., Bhaumik, N.S., Mallick, P., and Samanta, K.K, Study of dyeing process variables on soyabean extract treated cotton and jute fabrics, pp.188-197
  3. Bhowmick M, Debnath S, Singha A, Baite H, Mridha N, and Karmakar S, *Field trial of Jute mulch material at farmer's field: A Case study*, pp. 41-47.
  4. Chattopadhyay S.N, Pan N.C, Roy A.N and Samanta K.K, Technical Textiles from Jute and banana Union Fabric, pp-55-68.
  5. Das S, Bhowmick M, and Kundu T.K, *Jute edge recognition system for diameter measurement using computer vision and artificial neural network*, pp.111-118.
  6. Debnath S, Basu G, Mustafa I, Mishra L, Das R, Karmakar S, *Flax fibre extraction to spinning – A holistic approach*, pp.69-76.
  7. Debnath S, Bhowmick M, Roy A.N, Mustafa I, Kundu T.K, and Ghosh S, *Natural fibre based disposable carry bag*, pp.107-110.
  8. Ghosh, R.K, Chattopadhyay, S.N, and Ray, D.P. *Chemi-bio conversion of jute stick to microcrystalline cellulose: A green pathway for high value product*, pp-119-125
  9. Nayak L.K, Debnath S., and Shambhu V.B, *Opportunity in waste utilization: Extractor for converting green pineapple leaf to high value natural fibre*, pp. 16-23.
  10. Ray D.P, Ghosh R.K, Das I, Singha A, and Saha B, *Venturing wealth from waste: Nanocellulose from Jute residues*, pp. 179-187.
  11. Roy A.N, Nayak L.K, Kundu T, and Mitra K. *Entrepreneurship in jute sector: Role of agri-business incubation (ABI) centre of ICAR-NINFET*, pp: 215-219.
  12. Roy A.N, Samanta K.K, Debnath S, Baite H, and Mitra K, *Utilization of Indian coarser and fine yak fibre for developing jute/yak fibre blended textile*, pp.83-92.
  13. Samanta K.K, Chattopadhyay S.N, and Bhowmick S, *Eco-friendly fire retardant finishing of jute using banana pseudostem sap*, pp-93-100.
  14. Shambhu V.B, Thakur A.K, and Nayak L.K, Improved power ribboner for separation of green bark from jute and Mesta plants, pp.8-15.

15. Thakur A.K, Shambhu V.B, and Singha A, Retting of Jute in artificial tank for improved quality of fibre. pp. 156-164.
4. Nayak L.K., Ammayappan L., and Shambhu V.B., 2019. *Advances in Product Diversification and Waste Utilization of Natural Fibres*, Creative Incorporate, Kolkata, ISBN 9788194100928.
  1. Ammayappan, L., *An overview on natural fibre reinforced composites*, pp. 134-143
  2. Ammayappan, L., Pan N.C, Khan A, and Bhowmick S., *Functional finishing of jute based textiles*, pp. 156-164
  3. Bhowmick M., *Agro-textiles*, pp. 165-172
  4. Chattopadhyay S.N., *Preparation of handmade paper from jute*, pp. 116-125
  5. Das A., *Role of microbes in value addition in natural fibres*, pp. 29-34
  6. Das S, *Role of artificial intelligence in natural fibre processing*, pp.191-202.
  7. Debnath S, *Jute-based Warm Clothing*, pp. 80-87.
  8. Ghosh R.K., *High-end value added products from natural fibre biomass*, pp. 144-155.
  9. Nayak L.K, Shambhu V.B, Debnath S, and Baite H, *Recent Development in machineries for extraction of some stem& leaf fibres*, pp. 24-28
  10. Pan N.C, Ammayappan L, Bhowmick S., and Tewari A, *Particle board: A value added product from natural fibre biomass*, pp. 126-133
  11. Pan N.C., *Bleaching and dyeing of jute fabric*, pp.93-104
  12. Ray D.P, *Recent advances of retting of jute and Mesta*, pp. 35-44
  13. Roy A.N, and Samanta K.K, *Diversified product from yak wool and its blends*, pp. 88-92
  14. Roy, A.N., Nayak, L.K, and Kundu T.K, *Development of decorative fabrics from natural fibre blends*, pp.60-68.
  15. Roy, S.B., *Techno-economic analysis of jute diversified products manufacturing and entrepreneurship development*, pp. 184-190
  16. Saha, B., *Quality evaluation of natural fibre by digital instruments*, pp. 45-49
  17. Samanta K.K, and Chattopadhyay S.N, *Sustainable value-added finishing of natural fibre*, pp. 173-179.
  18. Sarkar P.C., *Role of natural biopolymers in product diversification*, pp.50-54
  19. Sengupta, S., Ghosh P., and Mustafa I., *Diversified products from natural fibres using nonwoven technology*, pp.55-59
  20. Shambhu V.B, Thakur A.K, and Nayak L.K, *Extraction of fibre from jute and Mesta plants through ribboning*, pp. 8-14.
  21. Thakur A.K, and Shambhu V.B, *Extraction of quality jute fibre by using ribbon retting in an improved retting tank*. pp. 15-23.

## TECHNICAL BULLETINS

1. Bose G, Saha B, Bhowmick M, and Sardar G, 2019. Digital hairiness meter for Jute yarn – Technical Instruction Manual, ICAR-NINFET, Kolkata, p.
2. Saha B, Saha S.C, Sarkar A, Sardar G, and Mandal J, 2019. Handy jute bundle strength tester for farmers- Technical instruction manual, ICAR-NINFET, Kolkata, p.

## TRAINING MANUALS

1. Roy A.N, and Nayak L.K, 2019. Training Manual on “*Production and retting technology of Jute/Mesta/Ramie/Sun-hemp including other related aspects*”, Volume 1, ICAR-NINFET, Kolkata, p.159.
2. Roy A.N, and Nayak L.K, 2019. Training Manual on “*Production and retting technology of Jute/Mesta/Ramie/Sun-hemp including other related aspects*”, Volume 2, ICAR-NINFET, Kolkata, p.141
3. Roy A.N, and Nayak L.K, 2019. Training Manual on “*Production and retting technology of Jute/Mesta/Ramie/Sun-hemp including other related aspects*”, Volume 3, ICAR-NINFET, Kolkata, p.129.
4. Roy A.N, and Nayak L.K, 2019. Training Manual on “*Production and retting technology of Jute/Mesta/Ramie/Sun-hemp including other related aspects*”, Volume 4, ICAR-NINFET, Kolkata, p.142

## OTHER COMPILATIONS

1. Ammayappan L, 2019. Recommendations of the National Seminar on “*Natural Fibre resource management for Sustainable Development*”, The Indian Natural Fibre Society, Kolkata on 08-09<sup>th</sup> February 2019, p. 10.
2. Bose G, Datta M, and Mukherjee S, 2019. Final Report on “*Investigation of effect of structure of jute and allied fibre products on sound insulation property*” under National Agricultural Science Fund, ICAR-National Institute of Natural Fibre Engineering and Technology, Kolkata, p. 77.
3. Naiya R, Chattopadhyay S.N, Ghosh T.S, and Chaudhury S.K, Natural Fibres Abstract, 6 (1&2), ICAR-NINFET, Kolkata, p.
4. Nayak L.K, Shambhu V.B., Baite H, and Kundu T.K., 2019. Post Harvest Processing and Value Addition in Jute & Allied Fibres , One Month practical Training Report, B.Tech (Agricultural Engineering), Dr. Annasaheb Shinde College of Agricultural Engineering & Technology, MPKV, Rahuri, p.61.
5. Nayak L.K, Shambhu V.B., Baite H, and Kundu T.K., 2019. Post Harvest Processing and Value Addition in Jute & Allied Fibres, One Month Summer Training Project, B. Tech (Agricultural Engineering), College of Agricultural Engineering & Technology, BCKV, West Bengal, p.61.
6. Roy A.N, and Samanta K.K, 2019. Yak hair based high value textiles, in Post-harvest management and value-addition, DARE/ICAR Annual Report 2018-19, pp. 100-101.



## PARTICIPATION IN MEETING / WORKSHOP/ CONFERENCE / SEMINAR/ TRAINING

Program	Organized by	Date	Participants
International Conference on “Role of Agricultural Engineering towards global food security”	Agricultural Engineering Division Board, IEI, Bengaluru	April 11-13, 2019	L.K.Nayak
Meeting on organization of retting and other programmes under SCSP	KVK, Malda and KVK, Sargachhi	May 14-16, 2019	D.P.Ray
Meeting with Director and scientists of ICAR-VPKAS, Almorah on agro textile trials	VPKAS, Almorah and ICAR-NINFET	May 13-14, 2019	S. Debnath
Meeting of TXD 09 Cordage Sectional Committee, Bureau of Indian Standards	BIS, New Delhi	May 15, 2019	S. Debnath
State level officers training -meeting under NFSM at Barasat	Office of Deputy Director of Agriculture	May 28, 2019	D.P.Ray
Mid-term Review Meeting of ICAR Regional Committee-II	ICAR-CIFRI, Barrackpore	June 12, 2019	N.C.Pan
State level officers training -meeting under NFSM-jute at Chinsurah	Office of Deputy Director of Agriculture	June 12, 2019	D.P.Ray
Meeting with Secretary, NJB regarding finalization of project	National Jute Board, Kolkata	June 17, 2019	B.Saha D.P.Ray
Institute Management Committee (IMC) meeting	ICAR-IINRG, Ranchi, Jharkhand	June 18, 2019	A.K. Thakur
Workshop on “Innovation and Entrepreneurship”	ICAR-NRC on Yak and TO-CIC, IIT Delhi	June 19, 2019	A.N.Roy
National Roving Seminar on ‘Patent Cooperation Treaty’	Intellectual Property India (IPO) and ASSOCHAM, Kolkata	June 26, 2019	S. Debnath
Institute Management Committee (IMC) meeting	ICAR-NINFET, Kolkata	July 02, 2019	IMC Members
Workshop on “Sustainable management of water resources in agriculture”	Agricultural Engineering Division of West Bengal, Institution of Engineers (India), Kolkata	July 05, 2019	A.K.Thakur H.Baite V.B.Shambhu S.Debnath KK.Samanta
Interface Meeting on “Enhancing the preparedness of agricultural contingencies for West Bengal : Kharif 2019”	ICAR-CRIDA, West Bengal	July 06, 2019	N.C.Pan
Production and retting technology of jute/ mesta/ ramie/ sunnhemp including other related aspects”	ICAR-NINFET	July 9-11, 2019	B.S.Manjunatha
91 <sup>st</sup> Foundation Day of ICAR and Award Ceremony	NASC, ICAR, New Delhi	July 15-17, 2019	N.C.Pan
National Workshop on “Jute- Strategies for development”	Directorate of Jute Development, Kolkata	July 25, 2019	N.C.Pan S.Debnath
Meeting on ‘Promotion of Jute Carry Bags as an Alternative to Plastic Bags’	National Jute Board, Ministry of Textiles, Govt. of India	July 29, 2019	S. Debnath
Seminar on “Security symposium and Awards 2019”	Enterprise IT world and InfoSec foundation	August 02, 2019	S.Das

Program	Organized by	Date	Participants
Seminar on “Production and marketing strategies of major food crops, spices, potato and fish “	S N Bose Society for Sustainable Development, Kolkata	August 09, 2019	A.K. Thakur B.Saha V.B.Shambhu D.P.Ray
Awareness meeting on Accelerated Retting for NFSM sponsored FLD programme	Tona and Hamjanpur village, Balrargarh Block, Hooghly	August 13, 2019	D.P.Ray
Awareness meeting on Accelerated Retting for NFSM sponsored FLD programme	Niroil and Narsinghabati, Habibpur Block, Malda	August 18, 2019	N.C.Pan A.N.Roy D.P.Ray
Workshop on ‘Jute Diversification and Development’	Office of the Asst. Director of Agriculture, Howrah	August 22, 2019	S. Debnath
Meeting on ‘Consultation on Bamboo Fibres/Bamboo Fabric and Paper/Pulp’	ICAR, DARE, Ministry of Agriculture	September 06, 2019	S. Debnath
Town Official Language Implementation Committee, Kolkata	CSIR-Central Glass and Ceramic Research Institute	September 11, 2019	N.K. Jha R.D. Sharma
NITI-V Meeting	ICAR-NINFET, Kolkata	September 21-23, 2019	Scientific Staff
Training program on “Intellectual Property Valuation and Technology management”	ICAR-NAARM Hyderabad	October 15-19, 2019	A.N.Roy
21 <sup>st</sup> Board Meeting of National Jute Board at New Delhi	National Jute Board	October 18, 2019	L.K.Nayak
Training on “Agricultural Extension from TOT to Agripreneurship & Start-ups”	MANAGE, Hyderabad	October 21-25, 2019	L.K.Nayak
Review Meeting of AICRP and AINP at NASC, New Delhi	ICAR, New Delhi	October 30-31, 2019	N.C.Pan
International Conference on “Synthesis, characterization and application of nano-materials”	The Institution of Engineers (India), WBSC, Kolkata	November 01-02, 2019	S.N.Chattopadhyay
India International Science Festival 2019 Agricultural Scientists’ Meet,	Biswa Bangla Convention Centre, Hall No.7. Kolkata	November 6, 2019	N.C. Pan, A.N. Roy S.N. Chattopadhyay B. Saha, P.C. Sarkar L. Ammayappan, D.P.Ray L.K. Nayak, V.B. Shambhu S. Debnath, M. Bhowmick S. Das, A. Singha H. Baite, N. Mridha K.K. Samanta
International Conference on Plasma Science and Applications	University of Lucknow	November 12-13, 2019	K. K. Samanta
Workshop on “Application of Jute Agro-textile Mulch and its Field Demonstration’	Sasya Shyamala KVK, Sonarpur and ICAR-NINFET	November 19, 2019	S. Debnath
National symposium on “Innovations in Geospatial Technology for Sustainable Development with special emphasis on NER”	NESAC, Shillong, Meghalaya, India	November 20-22, 2019	N. Mridha
Workshop on “Application of Jute Agro-textile Mulch and its Field Demonstration’	Nadia KVK, Gayeshpur, Nadia and ICAR-NINFET	November 21, 2019	S. Debnath

Program	Organized by	Date	Participants
Tournament for eastern zone 2019	ICAR-NRRI, Cuttack	November 18-22, 2019	21 contingents
EFC Memo meeting	NASC, ICAR, new Delhi	November 21, 2019	N.C.Pan L.Ammayappan U.Sen
Regional Science Exhibition of CBSE	Apeejay School, Salt Lake, Kolkata	November 22-23, 2019	L.K.Nayak
Regional Committee Meeting, Zone-III	ICAR-RC for NEH Region, Umiam	November 23-24, 2019	S.N.Chattopadhyay
Jute Training Camp at Murshidabad	Office of Asst Director of Agriculture Marketing (Admin)	November 27, 2019	S. Debnath
Exposure visit cum training programs on Jute grading with digital instruments and preparation of NINFET Sathi	SCSP, ICAR- NINFET, Kolkata	November 29, 2019	Scientific staffs
6 <sup>th</sup> P.B.Sarkar Memorial Lecture on "Greener Approach in Textile Industry"	ICAR-NINFET, Kolkata	December 02, 2019	All staff member
International Conference on 'Advances in Textile Materials and Processes'	Uttar Pradesh Textile Technology Institute, Kanpur	December 2-3, 2019	S. Debnath
National Conference on 'Value Addition to Crop Residues of Natural Fibres'	ICAR-CIRCOT, Mumbai and IFS, Mumbai	December 04, 2019	S. Debnath
Training meeting programme on jute at Dewanchak, Paschim Medinipur	Department of Agricultural Marketing, Govt. of West Bengal	December 04, 2019	D.P.Ray
Geo-smart India	International Convention Centre, Hyderabad	December 3-5, 2019	B.Saha
International Conference on "Emerging Frontiers in Carbohydrate Chemistry and Glycobiology"	University of Lucknow & Association of Carbohydrate Chemists & Technologists (India) and NIPER-Raibarely	December 5-7, 2019	S.N.Chattopadhyay
Hindi Workshop	ICAR-NINFET, Kolkata	December 7, 2019	D.P.Ray
Winter School on "Advances in Product Diversification and Waste Utilization of Natural Fibres"	ICAR-NINFET, Kolkata	December 3-23, 2019	A.Singha H.Baite Manjunatha B.S
Farmers' Day, Constitution Day, and Swachh Bharat Program	Babpur village, North 24 Parganas	December 23, 2019	B.Saha S.Debnath R.Naiya



## IN-HOUSE SEMINAR

Date	Presenter	Topic
April 11, 2019	Dr. D.P.Ray Principal Scientist, QEI division	Development of accelerated retting technology for jute and mesta plants
April 18, 2019	Shri. Sujai Das Scientist, ToT Division	Recent advances in artificial intelligence (AI) and sensory technology
June 28, 2019	Shri. Tuhin Ghosh Technical Assistant, Library	Availability of library resources in the digital platform
August 21, 2019	Dr. B.Saha, Head , QEI division & Dr. D.Das, ACTO, PME Cell	Harmful and beneficial effects of Parthenium weed
September 11, 2019	Dr. G.Bose Head, MP Division	Plastic waste management in present environmental context
September 16, 2019	Dr. Nibaran Das, Associate Professor, Jadavpur University	Artificial Intelligence and possible applications in Textiles
October 24, 2019	Dr. Sambhu Nath Chattopadhyay Principal Scientist, CBP Division	Bleaching of jute textiles using per-acetic acid
December 16, 2019	Sh. Manik Bhowmick Scientist, MP Division	Digital flexible material hanging appearance measuring instrument

## DISTINGUISHED VISITORS

Date	Visitor
May 20, 2019	Sh. Nawal Kejriwal, Chairman, Cheviot Company, Kolkata
July 02, 2019	Dr. Ratan Tiwari, Principal Scientist, IIWBR, Karnal
July 09, 2019	Sh. Jintu Das, Deputy Director, Directorate of Jute Development
September 21, 2019	Dr. S. K. Biswas, Former Director, Directorate of Jute Development Sh. A. K. Mukherjee, Managing Director, Velona Enterprises, Kolkata
September 23, 2019	Prof. S.K. Sett, Former Professor, DJFT, Calcutta University, Kolkata
October 02, 2019	Sh.Chandra Gopal Sharma ,Ex Deputy General Manager, Eastern Railway
November 02, 2019	Mr. Bishwa Bandhu Chakravarty, DSP, CBI, Kolkata
December 02, 2019	Dr.A. K. Roy Chowdhury, Principal , KPS Institute of Polytechnic, Belmuri
December 03, 2019	Prof. (Dr.) Purnendu Biswas, Vice-Chancellor, WBUAFS, Kolkata
December 13, 2019	Prof. (Dr) S. R. Kalbande, Head, Department of Unconventional Energy Sources & Electrical Engineering, Dr. P.D. Krishi Vidyapeeth, Akola
December 21, 2019	Dr. Susil Kumar Mitra, Retd. Assistant Controller of Patents, Kolkata
December 21, 2019	Prof. (Dr) Alka Goel , Professor & Head, Department of Clothing and Textiles , College of Home Science, G.B.P.U.A & T, Pantnagar
December 31, 2019	Sh. Ujjal Pal , Worldwide campaigner on Tree plantation Dr. Anjana Guha Thakurta, Associate Professor, Netaji Nagar Day College, Kolkata

# AWARDS / RECOGNITIONS RECEIVED

## Dr. Nimai Chandra Pan

- Peer reviewer of the journal Indian Journal of Fibre & Textile Research
- Chairman of a National Workshop on “Jute- Strategies for development” organized by Directorate of jute Development, Ministry of Agriculture and Farmers Welfare in July 25, 2019
- Member of the National Jute Board (Ministry of Textiles), Kolkata.

## Dr. Gautam Basu

- Member of Board of Studies for the under graduate and postgraduate studies in Fibre Technology/Technical Textiles of the University of Calcutta, Kolkata.
- Give consultancy on “Evaluation of soil erosion of embankment of river Hooghly at Haldia near a Multimodal IWT Terminal” under construction and evaluation of integrity of Embankment to M/s Pollution & Project Consultants, Kolkata.

## Dr. Biplab Saha

- External examiner to conduct Ph. D thesis viva at Palli Siksha Sadan, Visvabharati on July 26, 2019

## Dr. Sambhu Nath Chattopadhyay

- Peer reviewer of Indian Journal of Fibre & Textile Research
- Member / Chairman of different assessment committee for merit promotions or MACP etc of staffs of the institute
- External Examiner for M.Tech Practical for Chemical Processing and Functional Finishing, Paper-V, M.Tech in Textile Technology (Technical Textiles), University of Calcutta for third semester.

## Dr. Abhay Kumar Thakur

- Peer Reviewer of the Journal Food Science and Technology and Journal of Agricultural Engineering
- Member of the Agricultural Engineering Divisional Sub-committee of West Bengal State Centre of Institution of Engineers (India) for the session 2019-20

## Dr. Surajit Sengupta

- Question setter, Moderator and Examiner of University of Calcutta at Department of Jute & Fibre Technology
- Peer reviewer of Indian Journal of Fibre and Textile Research, Textile Research Journal, Journal of Industrial Textiles, Journal of Natural Fibres, Industrial crops and products, and Journal of Institute of Engineers (India), Series E.

## Dr. Sanjoy Debnath

- External examiner for assessment & certification of trainees undergoing skill development training programme on jute Product Maker (HCS/Q7405) at Purba Burdwaman, West Bengal.

- External Examiner for Major Project work of B.Tech (Jute and Fibre Technology) and Project Work' for Post Graduate Diploma in Jute Technology & Management Course under Department of Jute and Fibre Technology, University of Calcutta, Kolkata.
- Examiner to evaluate of Ph.D. Thesis and expert for conducting the PhD viva voce under Anna University, Chennai.
- Examiner to evaluate of Ph.D. Thesis under Jadavpur University, Kolkata during 2019.
- Member of the Textile Engineering Divisional Sub-Committee of West Bengal State Centre for the Session 2019-2020.
- External Examiner to evaluate the PhD Viva-Voce Examination under Production Engineering Department, Jadavpur University, Kolkata.
- Peer reviewer of Journal of Industrial Textiles, Indian Journal of Fibre & Textiles Research, Textile Research Journal, Polymer Composites and Journal of natural Fibres.
- A Radio talk has been given on 'Prospects of cultivation of horticultural crops using Jute mulch' by Dr. S. Debnath, broadcasted on All India Radio on November 25, 2019 from 6:40 pm to 7:02 pm at Kolkata-A Gitanjali channel.

#### **Dr. L.Ammayappan**

- Indian examiner to evaluate the PhD thesis & as an external examiner under Anna University, Chennai, Tamilnadu.
- Peer reviewer for the following journals: Cellulose, Fibres and Polymers, Indian Journal of Fibre & Textile Research, Journal of Industrial Textiles, Journal of Natural Fibres, Textile Research Journal, The Journal of the Textile Institute and Indian Journal of Natural Fibres.

#### **Dr. Deb Prasad Ray**

- Councillor of the Society of Plant Protection Sciences, Division of Nematology, IARI, LBS Centre, New Delhi-110 012
- Winter Internship supervisor of B.Tech. Student from Amity Institute of Biotechnology, Amity University Kolkata
- Vice-President of Society of Pesticide Science India
- Chief Editor of International Journal of Agriculture, Environment and Biotechnology and International Journal of Bioresource Science
- Expert for evaluating the research project proposals and project reports in Mulberry Sericulture by CSRTI-Berhampore, Central Silk Board.

#### **Dr. Laxmikanta Nayak**

- Chairman, Technical session of an International Conference on "Role of Agricultural Engineering towards global food security" at Bengaluru during April 11-13, 2019.
- Convenor, One day workshop on "Sustainable management of water resources in agriculture" at Gokhale Road, Kolkata on July 05, 2019.
- Coordinator, Agricultural Scientists Meet during 5<sup>th</sup> India International Science Festival at Kolkata during November 5-8, 2019.
- Judge under "Sustainable Agricultural Practices" category for CBSE Regional Science Exhibition/Fair 2019-20 with the theme "Science & Technology for sustainable development

with a thrust on water conservation” organized at Apeejay School, Salt Lake, Kolkata during November 22-23, 2019.

- Peer Reviewer of the journal “Oryza”.
- Nominated by Upacharya, VISVA-BHARATI, Santiniketan as a Subject expert for assessment of publications of a Faculty Member from Agricultural Engineering Discipline for promotion from Assistant Professor (Stage 3) to Associate Professor (Stage 4) under CAS of UGC.

### Dr. Vidya Bhushan Shambhu

- Member of the Agricultural Engineering Divisional Sub-committee of West Bengal State Centre of Institution of Engineers (India) in 2019-20.
- Alternate Member for Agricultural Tractor & Power Tiller Sectional committee (FAD 11) Bureau of Indian Standards, New Delhi.
- Peer reviewer of The Indian Journal of Agricultural Science and Environmental Monitoring and Assessment (Springer)

### Sh. Sujai Das

- Got “Cyber Sentinels Awardee 2019” by Enterprise IT world and InfoSec foundation in Kolkata for his contribution in security system developed for ICAR-NINFET.



### Dr. Kartick Kumar Samanta

- Alternative member of Textiles Speciality Chemicals and Dyestuffs Sectional Committee (TXD07) for BIS Standardization.
- Peer reviewer of Journal of Industrial Textile, Journal of Engineered Fibres and Fabrics, and Fibres and Polymers.
- External Examiner of Major Project Work of B. Tech. 8<sup>th</sup> Semester in Department of Jute and Fibre Technology, University of Calcutta, Kolkata

### Mr. Haokhothang Baite

- Presiding Officer & Counting Supervisor for the General Election to The Lok Sabha 2019
- Life Member of Indian Society of Agricultural Engineers (ISAE) since June 26, 2019.



# RESEARCH SUPPORTING SERVICES

## DESIGN, DEVELOPMENT AND MAINTENANCE (DDM) SECTION

The Design, Development & Maintenance (DDM) section is entrusted with the estate management and infrastructure development which are the basic necessities for the R&D activities undertaken at the Institute. Coordination with CPWD for planning & execution of infrastructure development works of the institute is the major work carried out by the section. Listed below are the works which are completed/in progress during the period.

- Repair and renovation of main boundary wall from gate no. 2 to cafeteria building
- Replacement of 02 nos. overhead water tank at CT building annex & residential quarter
- Provision for 02 nos. of toilet in shed behind M.P Division
- Renovation of one toilet in ground floor of QE & I Division
- Replacement of damaged metal windows of QE & I Division
- Repair of old MS shutter in substation and Administrative building (In Progress)
- Repairing and renovation of Residential Quarters (In Progress)
- Renovation of Journal section of the Library (In Progress)



*Renovated boundary wall*



*Renovation of Lilypool at Gate No.2*



*Renovation of fountain in front of CT building*



*Repairment of fountain in front of Administartive building*

DDM section monitors & looks after the various Annual Maintenance Contracts (AMC)/Annual Rate Contracts (ARC) running at the Institute. The following AMC/ARC was executed during the period under report.



- ARC for Fire Extinguisher
- ARC for Overhead Tank & Underground Reservoir
- AMC for water purifier (*Eureka Forbes*)
- AMC for water purifier (*Hindustan Unilever Pureit*)
- AMC for AC units
- AMC for 200 KVA DG set
- AMC for EPABX System

The section monitors all repair/maintenance services related to Institute gardens & civil, electrical, mechanical, sanitary and plumbing works essential for the day to day smooth functioning of the Institute.

This section provides valuable technical support in connection to development, design & modifications of various machines and equipments and also provides the required assistance in connection with the Front Line Demonstrations. The change of the Institute's name (*in KMC records*) from erstwhile Jute Technological Research Laboratory (JTRL) to present ICAR-NINFET was successful through the active coordination of this section with KMC. The section is also involved in providing other support services viz. vehicle, security, annual monitoring of water quality etc.

## LIBRARY

ICAR-NINFET library hold about 18,8100 books in different subjects and had purchased text books in different subjects, manuals, Hindi books and Swamy's rule books. Library has completed partial digitization of valuable old, rare and damaged books partially and converted them into e-book. After digitization, all eBooks shall be uploaded in ICAR-NINFET website as well as KRISHIKOSH which facilitate to access all users. During this period, different visitors and trainees from different universities/ Institutes/ organizations utilized the facilities of the library by reading, consulting CeRA (consortium e-resource in agriculture), different text books, reports, bulletins and photocopy services. Library has the facility to access the e-resources of different ICAR research Institutes and universities through Krishikosh.



*Demonstration of CeRA to trainees*



*Utilisation of library sources by trainees*

All staff members have access to the On-line library system to request and return, browse entire library through the institute website. Each staff can also access e-resources of NINFET Library from outside of Institute through On-Line remote access to fulfill their need. Library has rendered a series for the available books “Current awareness services, Vol. 6 No. 1&2, Jan to Dec., 2019” and abstracting services entitled “Natural Fibre Abstract Vol.6, No. 1&2, Jan to Dec., 2018”. Both publications services were distributed to staff members in soft copy and hard copy to each division as well as uploaded in Krishikosh as institutional repository.

## INSTITUTE TECHNOLOGY MANAGEMENT UNIT (ITMU)

Institute Technology Management Unit of the institute has conducted two ITMC meetings on April 29, 2019 and September 18, 2019 respectively. ITMU is also facilitated the documentation process of patentable / non-patentable technologies, commercialization of the technology and overview the liaison between Patent Office as well as in the process of new patent filing and follow up old cases.

### □ Patent Filed

- Ray, D.P., Ammayappan L., Debnath, S., Ghosh, R.K., Mondal D., and Chakraborty, S., 2019. Jute biocomposite comprising compatibilizer treated jute fibrous material with induced hydrophobicity and a method of manufacture, E-filed on June 24, 2019 (E-1/26479/ 2019-KOL)
- Ray, D.P., Ghosh, R.K., Saha B, and Sarkar A, 2019. Retting accelerator composition for retting of whole jute and mesta plants and the process of retting involving the same, E-filed on May 25, 2019 (201931020813)

### □ Trademark

- A trademark for “Retting accelerator composition for retting of whole jute and mesta plants” under 4259315 for Class 1 & 4259316 for Class 42 were registered The Trade Mark Registry at Kolkata



ITMC Meetings

### □ MoA signed Commercialization

- M/s. Deep Micro System, Bhandardaha, P. O. Antisara, Singur, Hooghly- 712 223, West Bengal has signed a MoA with the institute for the commercialization of technology (Patent No-246007 and Patent application No. 283/ KOL/2006 dt 29.03.2006) for the development of Electronic Fibre Bundle Strength Tester for Jute (Semi-Auto) on July 28, 2019 .

## HINDI CELL ACTIVITIES

### □ Meeting on Official Language Implementation Committee

Hindi Cell regularly organize Official Language Implementation Committee in each quarter and discussed new agenda items for the improvement for the implementation and utilization of the Hindi among the staff members and institutes' publications. All meeting has been chaired by the Director and Assistant Director (OL) coordinated the meeting successfully. There were three meeting have been organized on June 22, 2019 (1<sup>st</sup> quarter); September 16, 2019 (2<sup>nd</sup> quarter) and December 11, 2019 (3<sup>rd</sup> quarter) at the Director's room respectively.



*Workshop on "Computer per Hindi"*



*Workshop on "UNICODE"*



*Workshop on Hindi Noting and Drafting*



*Hindi fortnight celebration*

### □ Hindi Workshop

Hindi cell is frequently organizing workshops for making awareness on importance of Hindi and motivating to use Hindi in all official works. Hindi Workshop on "Hindi Noting and Drafting", "UNICODE" on June 15, 2019; "Hindi Bhasha ka Saralakaran" and "Computer per Hindi" on September 07, 2019; "Hindi Noting and Drafting" and "Computer per Hindi" on December 07, 2019 was organized in the Institute respectively.

### □ Training on Hindi

Training on "Basic Training Programme for working in Hindi on Computer" for five days was organized at Gahan Hindi Tankan evam Ashulipi Prakashikshan Kendra, Kendriya Hindi Prakhshikshan Up-Sansthan, Rajbhasha Bibhag, Griha Mantralaya, Bharat Sarkar, 1, Council House Street, Kolkata-700001 and six staff members from the Institute were trained.

## Poetic Competition

Hindi Cell has organized “Hindi Poetic frequency Competition” for the officers and employees of the member offices of the Town Official Language Implementation Committee, Kolkata (Karyalaya-2) of Central Government in the Institute on November 14, 2019. Twenty three participants from 12 offices have participated in the competition.



*Recitation competition*



*Closing ceremony of hindi fortnight*

### □ Hindi Fortnight

Hindi Fortnight was celebrated from September 12-28, 2019 in the Institute and competitions like extempore competition (12.09.2019), Recitation competition (17.09.2019), Debate competition (20.09.2019), Maximum work in Hindi (25.09.2019), Quiz competition (25.09.2019) and Noting Writing competition (26.09.2019) were organized. Institute Employees/Scientists/Officers have enthusiastically participated in the competitions. Closing ceremony was celebrated September 28, 2019 and Sh Yogerndra Shukla Suman was graced as the chief guest. Dr A.K. Thakur, Principal Scientist read the message of Honorable Minister of Agriculture and Farmers Welfare. Winners of all competition have been awarded. Chief Guest requested everyone to do maximum work in Hindi and said that Hindi is an earthly language and is present in every heart of India. Director informed that every employee of the Institute to do their official work in Hindi as maximum as possible during his address. Sh R.D. Sharma, AD (OL) has coordinated the program.

## PRIORITY SETTING, MONITORING & EVALUATION (PME) CELL

Activities of Institute Technology Management Units in now converged into the Prioritization, Monitoring and Evaluation (PME) Cells institutionalized in ICAR institutes to manage the innovations, showcase the intellectual assets and pursue matters related to IP Management and transfer/ commercialization of technologies and services from the ICAR (institutes) – NINFET.

PME Cell acts as a nodal centre for administrations, coordination, monitoring and evaluation of R&D activities of the institute. Under the close supervision of Director, PME Cell participates in various research planning and resource allocation mechanism, inviting peer reviews from experts and keeping documents of institute’s project, human resource developments in frontier areas of research and decentralization of management functions and powers. Direction of research in obtained from SFC documents, QRT recommendations and RAC meetings which are in unison with institute mandate.



PME Cell organizes all these meetings and finally progress of the projects are critically evaluated by holding IRC meetings under the chairmanship of Director, NINFET. Institutional seminars are regularly organized by PME Cell where scientists and technologists present their research papers for obtaining approvals from competent authorities for subsequent presentation in national or international events after critical evaluation.



*Institute Research Advisory Committee meeting on September 21, 2019*



*Research progress presentation during IRC*

Eminent scientists are also invited to talk in the current and prospective frontier areas of research. All the information received by the institute regarding career advancements, capacity development and R&D activities from ICAR and other national or international organization are percolated to the scientists, technical officers or other staff of the institute through PME Cell. All the necessary steps are taken to nominate scientists and other staff of the institute for different events around the globe.

PME Cell delivers the R&D reports as well as replies to numerous queries sought by the ICAR HQ and Parliament as and when required. Institute Research Council (IRC) Meetings under NITI-V was conducted to review and discuss the progress of research projects on September 21 & 23, 2019. Four new ad-hoc projects proposal, four on-going ad-hoc projects and progress of sixteen on-going research projects were discussed. One Project Monitoring and Evaluation Committee (PMC) were held on September 19, 2019 and. Director of the institute, Heads of Division and In-Charge, PME Cell were discussed eleven ad-hoc project proposals and six proposals were considered for discussion in the IRC meeting.

The main activities of PME cell during the reported period are summarized below.

Sl.No	Quality objective	Date
1.	To conduct Institute Research Committee Meeting twice in a year	IRC NITI-5, September 21 & 23, 2019
3.	Submission of Half Yearly Progress Report	April 07, 2019; October 07, 2019
4.	Submission of HYPM report online	April 10, 2019; October 10, 2019
5.	To conduct Project Monitoring & Evaluation (PMC) meeting - annually	September 16, 2019
6.	Preparation of institute R&D programme year-wise	April, 2019; October, 2019
7.	Maintaining Research project files	Throughout the year
8.	Evaluation of completed institute project through internal and external experts	November, 2019

## PERSONNEL (AS ON 01.01.2020)

Dr. Nimai Chandra Pan Director (Acting)

### QUALITY EVALUATION & IMPROVEMENT DIVISION

Dr. Biplab Saha	Principal Scientist & I/c Head
Dr. Avijit Das	Principal Scientist
Dr. Deb Prasad Ray	Principal Scientist
Dr. Atul Singha	Scientist
Dr. B.S. Manjunatha	Scientist
Dr. Koushik Manna	Technical Officer
Smt. Ruby Das	Senior Technical Assistant
Sh. Gunasindhu Sardar	Senior Technical Assistant
Sh. Jayanta Mandal	Technical Assistant
Dr. Ipsita Das	Technical Assistant
Sh. Amit Das	Technical Assistant
Sh. Saikat Maiti	Technician
Sh. Basanta Nayak	Skilled Supporting Staff
Sh. Nandan Chakraborty	Bearer-cum-Tea Maker

### MECHANICAL PROCESSING DIVISION

Dr. Gautam Basu	Principal Scientist & I/c Head (Up to November 30, 2019)
Dr. Surajit Sengupta	Principal Scientist & I/c Head (w.e.f December 01, 2019)
Dr. Sanjoy Debnath	Principal Scientist
Dr. Kartick Kumar Samanta	Scientist
Dr. Manik Bhowmick	Scientist
Dr. Nilimesh Mridha	Scientist
Sh. Izhar Mustafa	Senior Technical Assistant
Sh. Robin Das	Senior Technical Assistant
Sh. Sujoy Karmakar	Senior Technical Assistant
Smt. Papai Ghosh	Technical assistant
Dr. Leena Mishra	Technical Assistant
Sh. Saurav Pal	Senior Technician
Sh. Pravat Kumar Munda	Senior Technician
Sh. Sudarshan Murmu	Senior Technician
Sh. Somnath Biswas	Technician
Sh. Rajat Sen	Skilled Supporting Staff

## CHEMICAL & BIO-CHEMICAL PROCESSING DIVISION

Dr. Nimai Chandra Pan	Principal Scientist & Head
Dr. Sambhu Nath Chattopadhyay	Principal Scientist
Dr. Purna Chandra Sarkar	Principal Scientist
Dr. Ammayappan Lakshmanan	Principal Scientist
Dr. Rakesh Kumar Ghosh	Scientist
Sh. Amalesh Khan	Senior Technical Officer
Sh. Vikas Chandra	Technical Officer
Sh. Sudipta Bhowmick	Technical Officer
Sh. Avisek Tewari	Senior Technician
Sh. Subir Kumar Bardhan	Skilled Supporting Staff
Sh. Biswajit Haldar	Skilled Supporting Staff

## TRANSFER OF TECHNOLOGY DIVISION

Dr. Alok Nath Roy	Principal Scientist & I/c Head
Dr. Abhay Kumar Thakur	Principal Scientist
Dr. Samir Baran Roy	Principal Scientist
Dr. Laxmikanta Nayak	Principal Scientist
Dr. Vidya Bhushan Shambhu	Senior Scientist
Sh. Sujai Das	Scientist
Sh. Haokhothang Baite	Scientist
Sh. Koushik Mitra	Technical Officer
Smt. Chandra Karmakar	Technical Officer
Sh. Amitava Sarkar	Technical Officer
Sh. Rama Kant Mishra	Senior Technical Assistant
Sh. Tarun Kumar Kundu	Technical Assistant
Sh. Pintu Nandi	Senior Technician
Sh. Kanchan Roy	Technician
Sh. Agnive Mallick	Technician
Sh. Kamal Kumar Ghosh	Bearer-cum-Tea Maker

## LIBRARY

Dr. Rina Naiya	Assistant Chief Technical Officer & I/c
Sh. Tuhin Subhra Ghosh	Senior Technical Assistant
Ms. Jayeeta Choudhury	Technician
Sh. Bhikari Nayak	Skilled Supporting Staff

## PROJECT MONITORING & EVALUATION CELL

Dr. Samir Baran Roy	Principal Scientist & I/c
Dr. Utpal Sen	Chief Technical Officer
Dr. Debabrata Das	Assistant Chief Technical Officer
Sh. Kishun Lal Ahirwar	Senior Technical Officer
Sh. Krishna Gopal Nath	Senior Technical Officer

## DESIGN, DEVELOPMENT & MAINTENANCE SECTION

Dr. Gautam Basu	Principal Scientist & I/c (Up to April 30, 2019)
Dr. Laxmikanta Nayak	Principal Scientist & I/c (From May 01, 2019)
Sh. Prosenjit Sanyal	Chief Technical Officer
Sh. Karunamoy Patra	Senior Technical Officer
Sh. Chanchal Kundu	Technical Officer
Sh. Subir Kundu	Senior Technical Assistant
Sh. Biman Das	Technical Assistant
Sh. Amalesh Ghosh	Technical assistant
Sh. Ashok Kumar Das	Senior Technician
Sh. Surajit Saha	Senior Technician
Sh. Nandu Sharma	Technician
Sh. Chanchal Mondal	Technician
Sh. Gopal Chandra Das	Skilled Supporting Staff
Sh. Ramen Naskar	Skilled Supporting Staff
Sh. Swapan Kumar Ghosh	Skilled Supporting Staff
Sh. Prabir Naskar	Skilled Supporting Staff

## ADMINISTRATION

Sh. Navin Kumar Jha	Senior Administrative Officer
Sh. Amitabh Singh	Finance & Account Officer
Mrs. Anasua Majumder	Assistant Finance & Account Officer
Sh. Ratan Roy	Assistant Administrative Officer – Adm I
Sh. Sujit Kar	Assistant Administrative Officer – Adm II
Smt. Swarnali Mukherjee	Assistant Administrative Officer – Adm III
Sh. Shahzad Javed	Assistant Administrative Officer
Sh. Balaram Chatterjee	Personal Secretary to Director
Smt. Dipa Roy	Personal Assistant
Sh. Satish Kumar	Assistant



Sh. Raj Kumar Shaw	Assistant
Sh. Ajay Ghosh	Assistant
Smt. Rita Sarkar	Assistant
Sh. Manav	Assistant
Sh. Om Prakash Singh	Assistant
Smt. Poonam Keshri	Assistant
Smt. Basanti Murmu	Upper Divisional Clerk
Sh. Shyco Manna	Upper Divisional Clerk
Sh. Prasun Kumar Nath	Lower Divisional Clerk
Sh. Rajiv Ranjan	Lower Divisional Clerk
Sh. Sabir Chowdhury	Lower Divisional Clerk
Sh. Bimal Das	Skilled Supporting Staff
Sh. Prasanta Mondal	Skilled Supporting Staff
Sh. Lalmohar Prasad	Skilled Supporting Staff
Sh. Rajendra Pandey	Skilled Supporting Staff

## HINDI CELL

Sh. Ram Dayal Sharma	Assistant Director (Office Language) & I/c
Sh. Pintoo Kumar	Skilled Supporting Staff

## SCIENTIST HOME

Dr. Deb Prasad Ray	Principal Scientist & I/c
Sh. Kush Kumar Rajak	Skilled Supporting Staff
Sh. Morshed Biswas	Skilled Supporting Staff

## Newly Joined/ Retirement on Superannuation/ Promotions

PROMOTION			
<i>Staff name</i>	<i>From</i>	<i>To</i>	<i>w.e.f</i>
Dr. Debabrata Das	Senior Technical Officer	Assistant Chief Technical Officer	29.04.2018
Sh. Krishna Gopal Nath	Technical Officer	Senior Technical Officer	19.12.2018
Sh. Subir Kundu	Technical Assistant	Senior Technical Assistant	06.10.2018
Sh. Tuhin Subhra Ghosh	Technical Assistant	Senior Technical Assistant	25.04.2019
Smt. Ruby Das	Technical Assistant	Senior Technical Assistant	04.07.2019
Sh. Gunasindhu Sardar	Technical Assistant	Senior Technical Assistant	14.07.2019
Sh. Robin Das	Technical Assistant	Senior Technical Assistant	11.08.2019
Sh. Sujoy Karmakar	Technical Assistant	Senior Technical Assistant	15.09.2019
Sh. Amalesh Ghosh	Senior Technician	Technical assistant	06.03.2018
Sh. Surajit Saha	Technician	Senior Technician	24.04.2019
Sh. Sudarshan Murmu	Technician	Senior Technician	28.01.2019
Sh. Avisek Tewari	Technician	Senior Technician	17.07.2019
Sh. Om Prakash Singh	Upper Divisional Clerk	Assistant	23.03.2018
Sh. Kush Kumar Rajak	Skilled Supporting Staff	MACP Scheme	25.09.2019
Sh. Prasanta Mondal	Skilled Supporting Staff	MACP Scheme	24.10.2019
NEWLY JOINED			
<i>Staff name</i>	<i>Designation</i>	<i>Division/ Section posted</i>	<i>w.e.f</i>
Sh. Chanchal Mondal	Technician	DDM Section	03.05.2019
Sh. Somnath Biswas	Technician	MP Division	25.05.2019
Sh. Saikat Maiti	Technician	QEI Division	29.06.2019
Ms. Jayeeta Choudhury	Technician	Library	22.07.2019
Sh. Agnive Mallick	Technician	ToT Division	27.09.2019
SUPERANNUATION			
<i>Staff name</i>	<i>Designation</i>	<i>Division/ Section</i>	<i>w.e.f</i>
Sh. Roben Soren	Senior Technical Assistant	QEI Division	30.09.2019
Dr. Gautam Bose	Principal Scientist	MP Division	30.11.2019

# INSTRUMENT/ MACHINERY DEVELOPED .....

Sl No	Name of Instrument/ Machinery	Model No
1	Air Flow Fineness Tester	-
2	Automatic Electronic Fibre Bundle Strength Tester for Multiple Fibres (with PC interface)	NIRJAFT-AEFBST-MF01
3	Auto speed controller of spinning frame (without motor)	-
4	Bulk Density Meter	-
5	Colour & Luster Meter	-
6	Fibre Bundle Strength Tester	-
7	Digital Colour Luster Meter (Laboratory Type)	NIRJAFT-DCLM-LT01
8	Digital Colour Luster Meter for multiple fibres	NIRJAFT-DCLM-MF01
9	Digital Colour Range Indicator (Handy type)	NIRJAFT-DCRI-HT01
10	Digital Fineness Meter for Jute	NIRJAFT-DFM-J01
11	Digital Fineness Meter for multiple fibres (Ramie, Sunnhemp, Sisal, Flax)	NIRJAFT-DFM-MF01
12	Digital Moisture Meter for Jute (Handy Type)	NIRJAFT-DMM-HT01
13	Digital Moisture Meter (Laboratory Type with probes)	NIRJAFT-DMM-LT01
14	Electronic Fibre Bundle Strength Tester for Jute (Semi-Auto)	NIRJAFT-EFBST-SA01
15	Fibre clamp (attachment with bundle strength tester)	-
16	Grading Aid Album for Jute	-
17	Graded Sample Box	-
18	Manual Ribboner	-
19	Portable Hard Fibre Tensile Tester (without computer)	-
20	Portable Hard Fibre Tensile Tester (with computer)	-
21	Power Jute Ribboner	-
22	Ramie Degumming Plant (10 Kg. capacity)	-
23	Thermal Insulation Value Tester (with PC interface)	NIRJAFT-TIV-01

For detail, please visit our website <http://nirjaft.res.in/>

## SERVICES OFFERED

Institute has highly qualified scientists and highly skilled and trained technical officers in the area of the natural fibres and provided the services in the following areas.

1. Spinning trial of various lingo-cellulosic fibres
2. Grading of jute fibre
3. Property evaluation of fibre, yarn and fabric.
4. Trial on chemical processing of fibre, yarn and fabric.
5. Non-woven trial of various natural fibres
6. Analysis of chemical composition of various natural fibres
7. Blend analysis of textile materials
8. Field trial of Geo-textiles and Agro-textiles
9. Evaluation of properties of pulp and paper
10. Evaluation of properties of composites
11. Training on different modules related to Jute and Allied fibres
12. Business Incubation Centre
13. Sales counter at our campus
14. Entrepreneurship Development Programme

In addition, institute has Sophisticated Analytical Instruments Facility (SAIF) and offers the students and researchers working in the area of material science can utilize these facilities on charge basis.

### SOPHISTICATED ANALYTICAL INSTRUMENTS FACILITY

Sophisticated Analytical Instruments have been procured and they have maintained in different divisions of the institute. Students and researchers working in different institutions can utilize these facilities on charge basis. All the communications regarding the utilisation of the facility should be address to the Director, ICAR- NINFET. Competent authority will instruct the concerned Head of Division to quote the testing charges and availability of the instrument. After finalizing the total charges, it will be intimated to the user. The payment for the testing may be done either by Demand Draft in the name of ICAR-NINFET payable at Kolkata or through online banking. All the requisitions received will be arranged serially and testing of samples will be done accordingly. The results will be communicated as per available standards.

For detail, please visit our website <http://nirjaft.res.in/TestFees>

# INSTRUMENTS PROCURED

- Induction Heater
- Minidisk Infiltrimeter
- Electronic Weighing Balance-20 KG Capacity
- Soil Tensiometer (AIC make)
- High Speed Cooling Centrifuge without rotor heads & accessories
- Mobile Mapper
- AEBAS System
- 4MP MINI Bullet network Camera-CCTV
- Platform Balance
- Brothers Embroidery Machine
- Hot Plate
- Carpet Shearing Machine
- Digital Twin Sublimation Heat Transfer & Fusing Machine
- Cream Making Machine
- Heat Flux Sensor (Hukseflux)

# FINANCE

## Balance Sheet as on April 01, 2020

Corpus/Capital Fund & Liabilities	Schedule	2018-2019 (₹)	2019-2020 (₹)
Capital Fund	1	16,57,42,437	15,42,38,036
Reserves	2	-	-
Earmarked/Endowment Fund	3	-	-
Current Liabilities & Provisions	4	2,26,66,936	2,18,10,647
Total		18,84,09,373	17,60,48,683
Assets			
Fixed Assets	5	15,74,55,664	15,23,31,561
Investments-Earmarked/Endowment Funds	6	-	-
Current Assets, Loans & Advances	7	3,09,53,709	2,37,17,122
Total		18,84,09,373	17,60,48,683

\*- As per annual account 2019-2020 submitted to ICAR

## A. Budget provision & actual utilization under grants & plan schemes as on January 01, 2020

S.No	Name of Heads	Fund Received (₹)	Actual Utilization (₹)	Balance (₹)
1	Grants	18,90,84,000	15,05,53,306	3,85,30,694
2	Plan Schemes	83,39,441	49,86,342	33,53,099

## B. Sub-head wise budget provision and actual utilization under grants till December 2019

S.No	Sub-Head	Grants (₹)	
		Budget Provision	Actual Utilization
A) REVENUE EXPENDITURE			
1	Establishment Expenses	13,30,00,000	11,05,47,399
2	Pension & Other Retirement Benefits	1,94,00,000	1,25,69,844
3	Travelling Allowances	14,90,000	9,94,426
4	Research & Operational Expenses	79,70,000	43,23,990
5	Administrative Expenses	3,11,41,000	1,90,67,564
6	Miscellaneous Expenses	19,72,000	10,72,798
<b>Total of A</b>		23,01,16,000	19,49,73,000

S.No	Sub-Head	Grants (₹)	
		Budget Provision	Actual Utilization
<b>B) CAPITAL EXPENDITURE</b>			
1	Equipment	27,00,000	11,99,646
2	Library Books & Journals	1,03,000	35,520
3	Furniture & Fixture	2,86,000	2,08,753
4	Information Technology	7,90,000	5,33,366
5	Vehicle	7,20,000	0
<b>Total of B</b>		<b>55,25,000</b>	<b>45,99,000</b>
<b>Total (A+B)</b>		<b>23,56,41,000</b>	<b>19,95,72,000</b>

### Income & Expenditure account for the year ended 31<sup>st</sup> December 2019

A. Income	Schedule	2018-19 (₹)
Income from Sales/Service	8	15,40,951
Grants in aid/subsidies	9	20,04,75,002
Fees/Subscriptions	10	0
Income from Investments	11	0
Income from Royalty, Publications	12	0
Interest earned	13	91,551
Other Income	14	7,62,738
Prior Period Income	15	0
<b>Total (A)</b>		<b>20,28,70,242</b>
B. Expenditure	Schedule	2018-19 (₹)
Establishment expenses	16	15,30,25,963
Research & Operational Expenses	17	1,33,13,201
Administrative expenses	18	3,91,45,052
Grants and subsidies	19	0
Miscellaneous expenses	20	19,51,589
Depreciation	5	98,08,570
Prior period expenditure	21	0
<b>Total (B)</b>		<b>21,72,44,375</b>
<b>Balance being surplus/(Deficit) carried to corpus/Capital Fund</b>		<b>-1,43,74,133</b>

**Abstract of 'Other receipts' from April to December 2019**

S.No	Head of account	Amount (₹)
1	Sale of farm produce	2,59,595
2	Sale of vehicle, other machine tools	--
3	License fee	41,333
4	Interest earned on loans & advances	1,67,057
5	Analytical and testing fee	5,90,160
6	Income from service	--
7	Application fee from candidates	11,000
8	Receipts from services rendered	3,68,900
9	Interest earned on short term deposits	--
10	Income generated from Internal Resource Generation Schemes	--
	a) Training	--
	b) Consultancy	15,000
	b) Sale of technology	13,000
11	Recoveries of Loans & Advances(including the refund of S-Advance)	2,76,250
12	Miscellaneous Receipts	5,90,136
	<b>TOTAL</b>	<b>23,32,431</b>



**GOOGLE SCHOLAR CITATION** (AS ON 01.01.2020) .....

S.No	Researcher	Cumulative citation	H-index	i-10 Index	Citation in 2019
1	Sanjoy Debnath	563	12	15	98
2	Deb Prasad Ray	554	11	21	96
3	Sambhu Nath Chattopadhyay	481	12	18	65
4	Ammayappan Lakshmanan	476	10	13	85
5	Gautam Bose	472	11	16	91
6	Nimai Chandra Pan	415	10	12	41
7	Rakesh Kumar Ghosh	322	10	11	62
8	Surajit Sengupta	287	9	9	34
9	Abhay Kumar Thakur	267	7	7	45
10	Purna Chandra Sarkar	198	8	8	44
11	Manik Bhowmick	151	7	5	32
12	Atul Singha	79	6	2	23
13	Nilimesh Mridha	62	5	2	32
14	Vidya Bushan Shambhu	51	4	2	10
15	B.S. Manjunatha	9	2	0	7
16	Haokhothang Baite	1	1	0	1

# Notes

A series of horizontal dotted lines for writing notes.



# ICAR-NINFET

Staffs with winter school  
trainee participants



## ICAR-National Institute of Natural Fibre Engineering and Technology

भाकृअनुप-राष्ट्रीय प्राकृतिक रेशा अभियांत्रिकी एवं प्रौद्योगिकी संस्थान

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